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Fire Protection Upgrades at New Brunswick Laboratory Lessons Learned on an ASME NQA-1 Design Build Project

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Introduction

- Alex Smith
- Worked for Nexus for 7 years
- PE in Fire Protection
- Based out of our Chicago Office (Oakbrook Terrace, IL)

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Background

- New Brunswick Laboratory (NBL) Fire Protection Upgrades
- Scope of work (Design Build)
  - Sprinkler System
  - Penetration Seals & Fire Wrap
  - Gypsum Fire Barrier
  - Fire Dampers
  - Emergency Lighting
  - Minor Electrical and Mechanical Work

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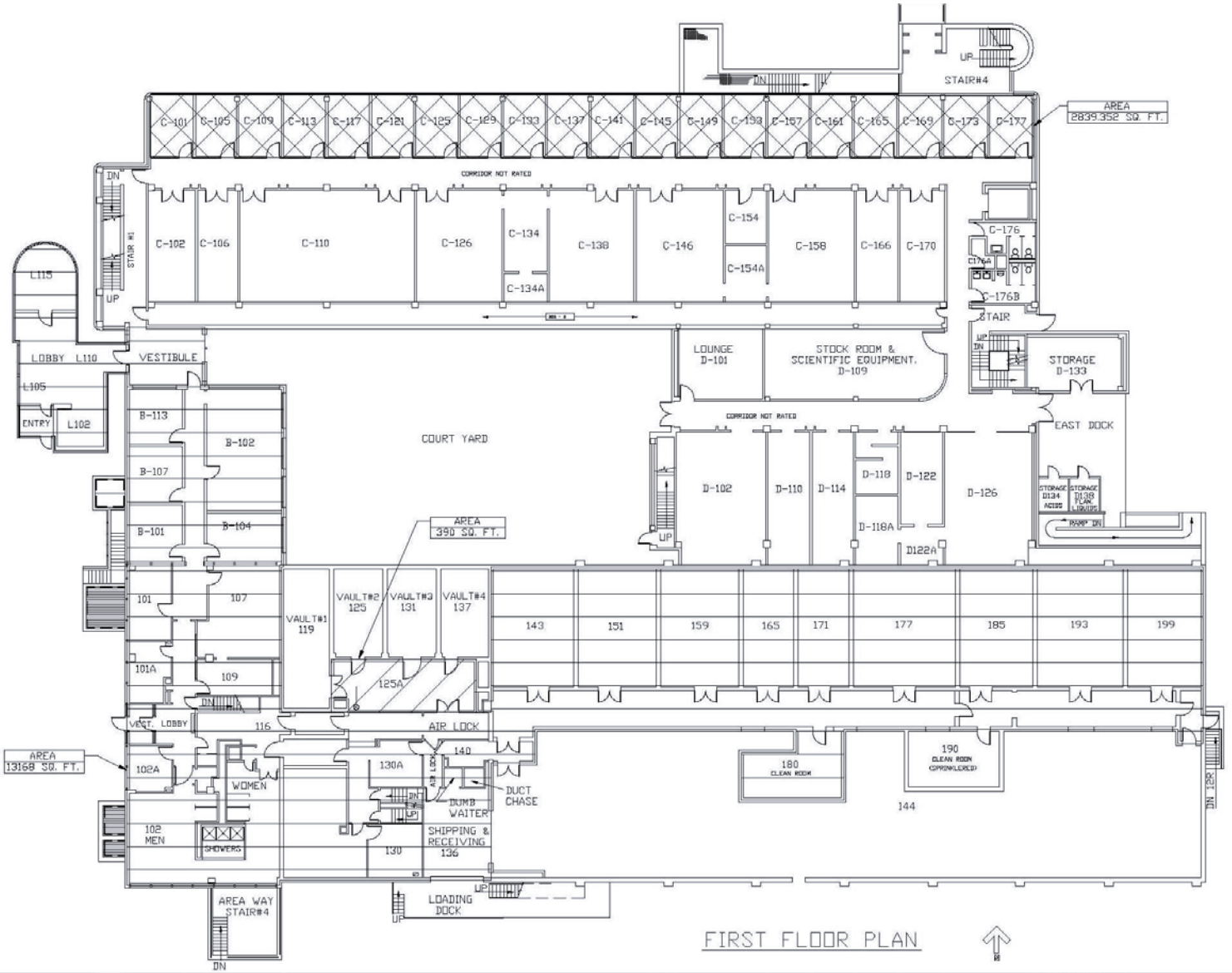
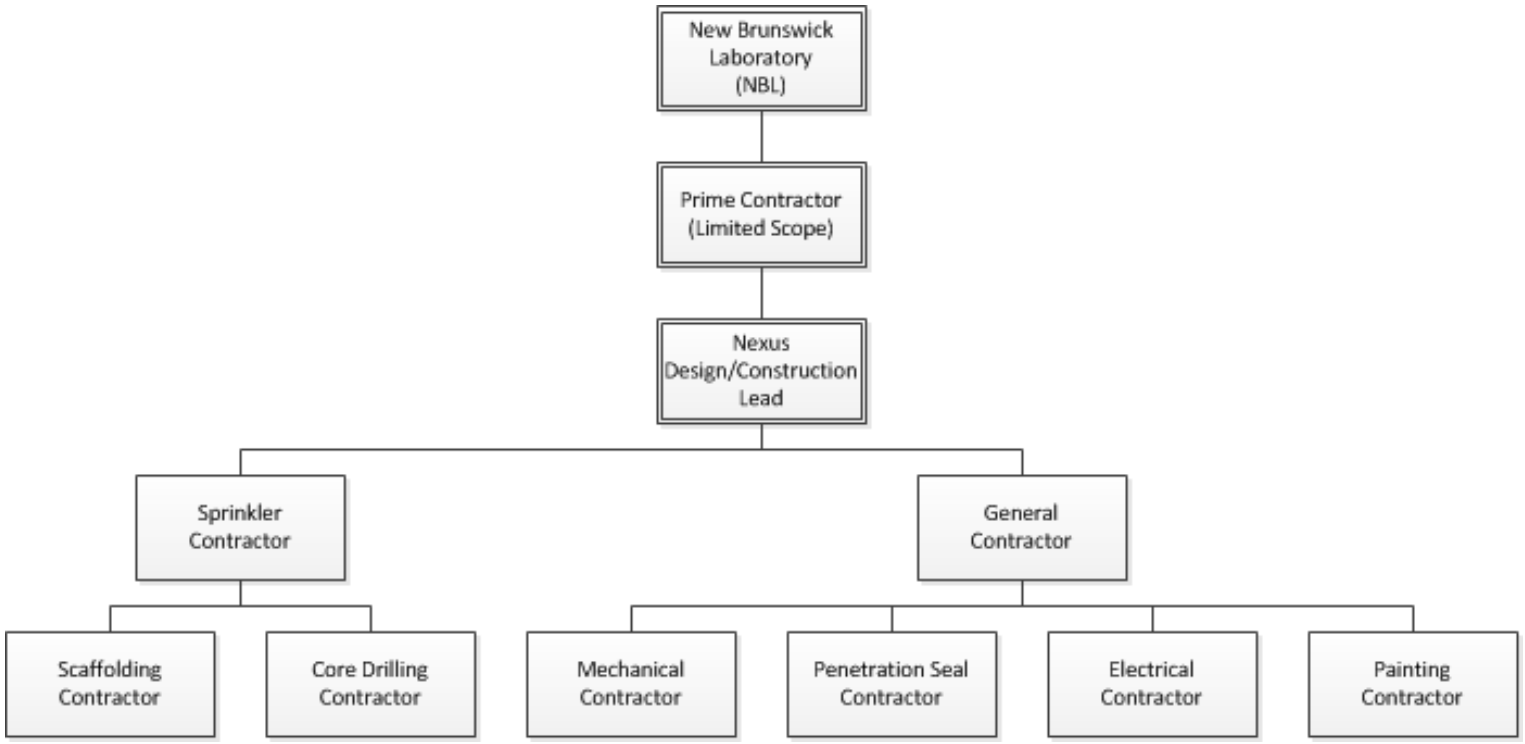
Background


AREA
2839.352 SQ. FT.
STAIR#4
C-101
C-105
C-109
C-113
C-117
C-121
C-125
C-129
C-133
C-137
C-141
C-145
C-149
C-153
C-157
C-161
C-165
C-169
C-173
C-177
CORRIDOR NOT RATED
C-102
C-106
C-110
C-126
C-134
C-134A
C-138
C-146
C-154
C-154A
C-158
C-166
C-170
C-176
C-176A
C-176B
STAIR
L115
LOBBY L110
VESTIBULE
L105
ENTRY
L102
LOUNGE
D-101
STOCK ROOM &
SCIENTIFIC EQUIPMENT.
D-109
STORAGE
D-133
EAST DOCK
B-113
B-102
B-107
B-101
B-104
COURT YARD
CORRIDOR NOT RATED
D-102
D-110
D-114
D-118
D-122
D-126
D-118A
D122A
AREA
350 SQ. FT.
101
107
VAULT#1
119
VAULT#2
125
VAULT#3
131
VAULT#4
137
143
151
159
165
171
177
185
193
199
101A
109
125A
VEST. LOBBY
116
AIR LOCK
140
AREA
13168 SQ. FT.
102A
WOMEN
130A
DUCT
CHASE
DUMB
WAITER
102
MEN
SHOWERS
SHIPPING &
RECEIVING
136
130
180
CLEAN ROOM
190
CLEAN ROOM
(SPRINKLERED)
144
AREA WAY
STAIR#4
LOADING
DOCK
FIRST FLOOR PLAN

Background



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Background

- For the ASME NQA-1 work a CGD was performed for material and services.
- Subcontractors with ASME NQA-1 experience were not readily available.
- Subcontractors were chosen based on their DOE or commercial experience.

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Lessons Learned

- Issue: Contractors did not understand the requirements of ASME NQA-1.
  - Design Interface Requirements
  - Configuration Management
  - Receipt Inspections
  - Quality Control Checks
  - Inspection and Testing Procedures

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Lessons Learned

- Example: Installers identified a need for making field changes. They received approval from their designer and proceeded with the change. The project procedures required the completion of an FCR (Field Change Request) with Nexus approval.

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Lessons Learned

- Corrective Actions: Retraining on the procedures was provided. Increased oversight was implemented.
- Example: Items were not submitted for approval before they were brought to the site. These items are where the supplier substituted an “equal” part to the subcontractor.

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Lessons Learned

- Corrective Actions: Items are evaluated before they are accepted. This delayed the schedule but was required to meet the quality requirements. Retraining was provided but because the problem was with the supplier this was a reoccurring problem throughout the project.

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Lessons Learned

- Corrective Actions:
- After the project: Revised Procurement Procedures to include examples of previous work

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Lessons Learned

- Issue: All parties involved were unfamiliar with large scale modifications at NBL
  - NBL personnel (mostly residents) were unfamiliar with procedures and postings
  - Prime contractor was unfamiliar with NBL and Nexus procedures
  - Nexus was unfamiliar with NBL and subcontractor's procedures
  - Subcontractor's were unfamiliar with NBL and Nexus Procedures

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Lessons Learned

- Example: NBL Residents ignored construction barriers to get into their office or their laboratories. Forcing installers to stop work to prevent an accident.
- Corrective Action: NBL Management sent out reminder emails about procedures and conducted refresher training for affected people.

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Lessons Learned

- Example: Subcontractors missed steps in QC checklists and installation procedures
- Corrective Action: Nexus was prepared for this and had implemented increased surveillance in the beginning of the project and was able to catch issues as they were happening and could prevent non-conformances.

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Lessons Learned

- Corrective Actions:
- After the project:
  - Revised Procurement Procedures to include examples of previous work
  - Revise Proposal Writing Procedures to obtain client procedures (when available)
  - Provide Lessons Learned in LLD to review subcontractors procedures and integrate them into the project specific procedures.

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Lessons Learned

- Issue: Contractors did not understand the DOE safety and radiological requirements.
- Example: Subcontractors scheduled installation, use, and removal of scaffolding in one day. This did not account for NBL inspections.
- Corrective Action: After the first two day process the schedule was revised to account for inspections.

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Lessons Learned

- Example: Subcontractors intended to use a HEPA filtered shop vac that was not DOP tested in the radiological laboratories.
- Corrective Action: The HEPA filtered shop vac was evaluated and determined to be suitable for other areas where control of dust was a concern. A facility HEPA vac was used instead.

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Moving Forward

- Nexus has revised its procurement procedures for Design Build jobs to provide the expected level of detail and subcontractor expectations in bid documents.
- Bid documents will be reviewed in a pre-bid meeting with an emphasis on lessons learned, non-standard commercial activities, and not just what we are doing but how.

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Moving Forward

- Subcontractors will be included in the creation of installation procedures and their existing procedures will be used as much as possible.
- Training on procedures will include not only the installers and site personnel but also support personnel (shop designers, procurement, and management).

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Moving Forward

- At the start of project on-the-job-training and increased surveillance will be used to ensure proper use and adherence to project procedures and QC checklists.
- Facility personnel should receive refresher training when they are not used to construction taking place.
- Re-training will be implemented as needed.

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Questions

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