Who Is Nelco?

- Privately held
- Over 75 years in business
- Over 150 Full-time Employees
- 10-year Employees over 50%

NELCO Locations

- Headquarters
- Additional Fabrication Plants
- Sales / Project Management Offices

Five Market Segments

- Industrial Radiation Shielding
- Anti-Corrosive Linings & Specialty Products
- Design and Construction
- Medical Radiation Therapy: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)
- Medical Diagnostic Imaging: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)
- Shielded X-Ray Rooms and Enclosures: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)
- Shielded Storage or Process Equipment: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)
- Airport Detection Shielding Systems: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)
- Customized Shielded Hot Cells: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)
- Consulting Services: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)

Nuclear Medicine Linings and Repairs: Medical (Medical Imaging, Medical-Surgic, and Medical-Surgic Radiation Therapy); Radiation Oncology (Linear Accelerator, HDR, Gamma, MRI, and PET Imaging); Radiation Oncology (External Beam Radiation Therapy, PET Imaging, and Radiation Therapy Planning)

Professional Affiliations

- American Association of Physicists in Medicine
- Construction Specifications Institute
- American Institute of Architects
- American Society for Therapeutic Radiology and Oncology
- Associated General Contractors of America
- Black Business Association of New England

Shielding Products Diagnostic

- Leaded Glass
- Leaded Acrylic
- Lead-lined Drywall
- Lead-lined Plywood
- Lead-lined Door Systems

- 20 minute "S" label
... for typical shielding applications, a lead sheet is glued to a sheet of gypsum wallboard and installed lead inward with nails or screws on wooden or metal studs. X-Ray images of wall segments show that insertion of the nails or screws does not result in significant radiation leaks. In fact, the steel nails or screws generally attenuate radiation equally, or more effectively, than the lead displaced by the nails. Therefore, steel nails or screws used to secure lead barriers need not be covered with lead discs or supplementary lead. However, where two lead sheets meet, the continuity of shielding shall be ensured at the joints (SEC. 2.4.2)..."
OFF SET Neutron Swinging Doors

48" clear Opening with door in it's open position

Neutron Sliding Doors

Over 300 Doors Installed Worldwide

Compliance Standards

- OSHA
- NCRP
- Site-Specific Physics
- Shop Drawings
- Infection Control Guidelines
- Quality Assurance Program

Lead Safety

Establish Lead Work Area

Air Sampling
I don't know if this is the correct machine or not - I picked it off the internet. If it matters, then tell me what machine we use, and I'll get an image of it.

OSHA Definitions

- **Normal Level**: < 30 μg/m³ per 8-hour period
- **Action Level**: > 30 μg/m³ per 8-hour period
- **Permissible Exposure Limit**: 50 μg/m³ per 8-hour period

**Establish Lead Work Area**

- Air Sampling
- Blood Tests

**TYPICAL PROJECT TEAM**

- Owners
- Architect
- Equipment Vendor
- Physicist
- Technicians
- General Contractor

**NELCO’S TYPICAL SCOPE**

1. Develop Shop Drawings
2. Have them approved by Architect
3. Start Product Fabrication

**Shop Drawing Process**

We produce the set of drawings that should be approved by the physicist of record.
Shielding Challenges

Cost Effective Shielding

– WHEN SPACE IS NOT AN ISSUE
  – Most cost effective shielding is 147 pound per cubic foot concrete.
    • CIP - Cast in Place
    • Modular Precast Concrete

Cost Effective Shielding

– WHEN SPACE IS AN ISSUE
  – NELCO philosophy for shielding complex projects is based upon available space.
  – We offer shielding solutions to meet the physics needs with a variety of material starting with concrete, HD Concrete MU, Precast Concrete, Steel Plate, Lead, Pure Poly, and Borated poly.

OOPS

• Items most often left out of a physics design
  HVAC – SHIELDING
  – Supply and Return air ducts are often times 24” tall and 60” wide.
  – Physics port! Hard to install after the fact!
  NEUTRON SHIELDING CALCULATIONS
  – Neutron Shielding! Many physicist often overlook this calculation on a 10MV Accelerator

HVAC SHIELDING

HVAC SHIELDING CAN RUN UPWARDS OF 20,000 DOLLARS

Interlocking Lead Brick
LEAD BRICK WALL SHIELDING

LIMITED HEAD ROOM

LEAD SHIELDING INSTALLED BETWEEN STEEL BEAMS DUE TO LIMITED CEILING HEIGHT

MEGASHIELD – MODULAR BLOCK

LOW HEAD ROOM REQUIRED THE VAULT TO BE 2'-0" LOWER THAN THE FINISH FLOOR, THEREBY REQUIRING A RAMP INTO THE ROOM.

LIMITED HEAD ROOM
UPGRADE OF EXISTING VAULT

Precision Shielding?

+/- 1/16”

+1 = 2”

+4 1/2 = 10 1/2”
**Standard Thicknesses**

<table>
<thead>
<tr>
<th>Wall Type</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Wall Primary</td>
<td>3 1/16&quot; = 4&quot;</td>
</tr>
<tr>
<td>North Wall Secondary</td>
<td>2 1/2&quot; = 2 1/2&quot;</td>
</tr>
<tr>
<td>South Wall Primary</td>
<td>3 3/16&quot; = 3 1/2&quot;</td>
</tr>
<tr>
<td>South Wall Secondary</td>
<td>2 3/4&quot; = 3&quot;</td>
</tr>
<tr>
<td>East &amp; West Walls</td>
<td>1/2&quot; = 1&quot;</td>
</tr>
</tbody>
</table>

**Nelco for Physicists**

- Fit and Feasibility
- Shielding Solutions
  - Various material options
- Budgetary Input

**Nelco for Physicists**

- Standard Product Details
- Historical Data
- Design Consulting
- Engineering Support
- Referrals

**Questions?**

**1-800-NELCO13**

For More Information...

WWW.NELCO-USA.COM