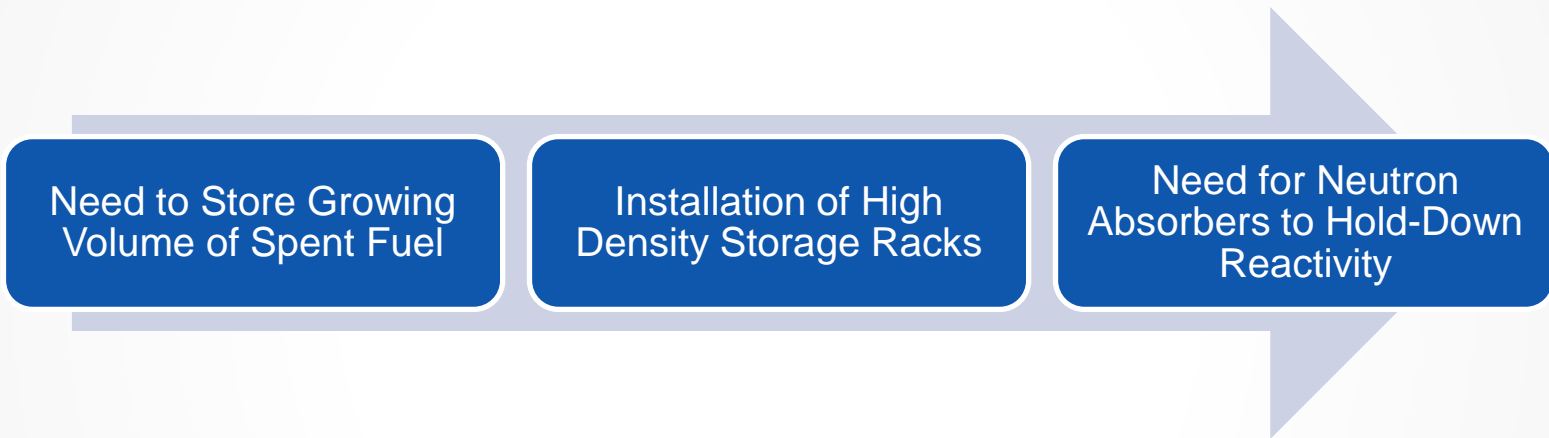

Neutron Absorber Material Supplementation

ICENES 2011
San Francisco

K. Scot Leuenroth
5/16/2011

Background

- Spent Fuel Storage Continues to be an Ever Growing Problem for Utilities

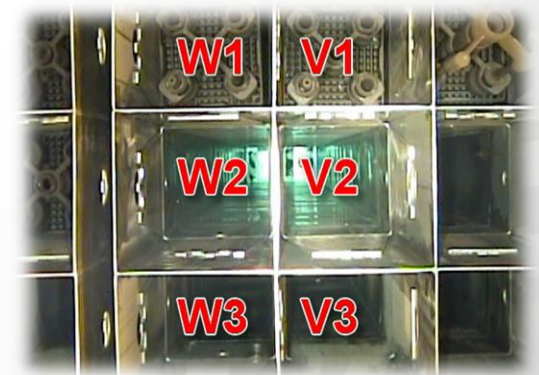


- Once Manufactured, High Density Racks have a Fixed Amount of Reactivity Hold Down
- Or, In the Case of Boraflex, a Degrading Amount of Reactivity Hold-Down

Design Challenge

Develop a Neutron Absorber System to Supplement or Replace Existing Absorber Material

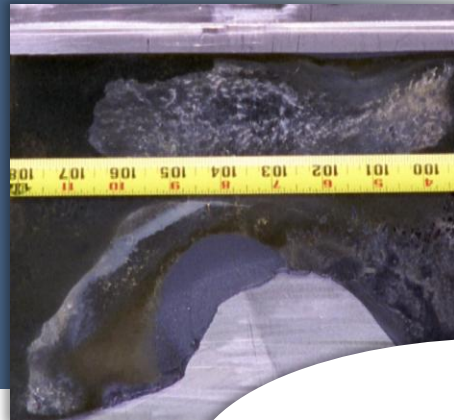
- Replace Lost Reactivity Hold-Down from Degraded Absorbers or Supplement Existing Absorbers
- Provide Integrated Absorber at a Fraction of the Cost of Re-Rack
- Allow for Modular Installation
- Joint Venture Between NETCO and Exelon Corp.
- NETCO Issued U.S. Patent 6,741,669 B2 in 2004 for Absorber Insert Design



What are NETCO-SNAP-IN® Inserts?

Replace Lost
Reactivity Hold-
Down

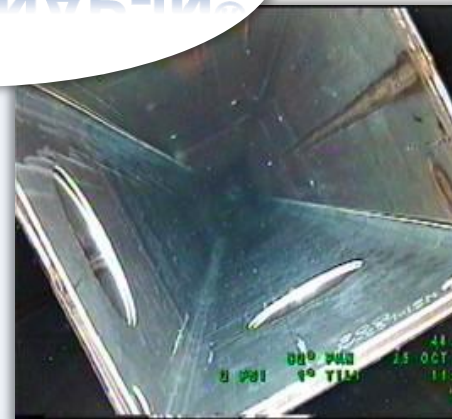
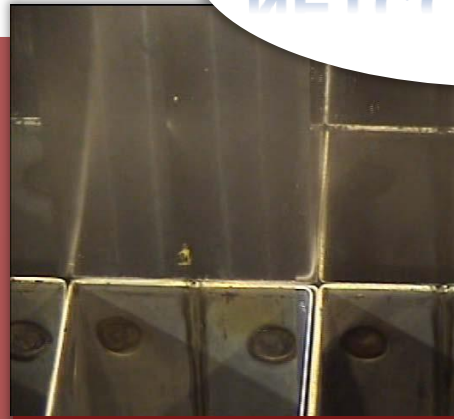
Supplement
Existing Reactivity
Hold-Down



Made of Al/B₄C
Composite
Material

NETCO-SNAP-IN®

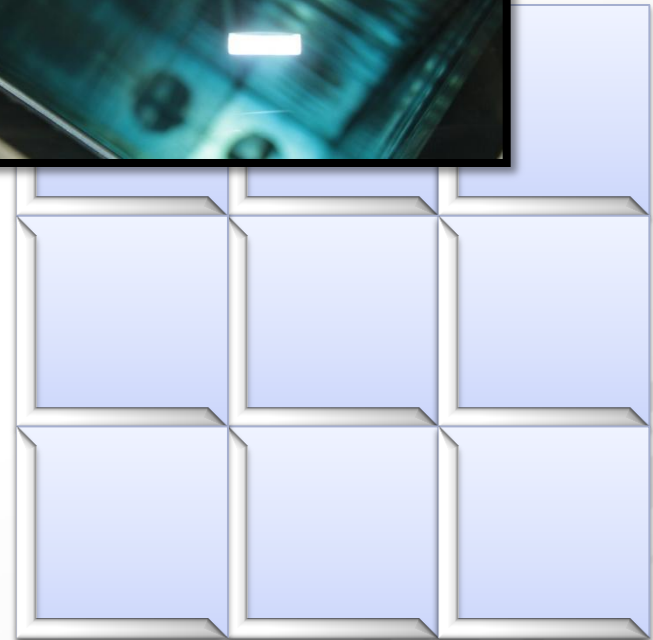
Extends Useful
Storage Rack Life



Minimal Impact
on Fuel Move
Operations

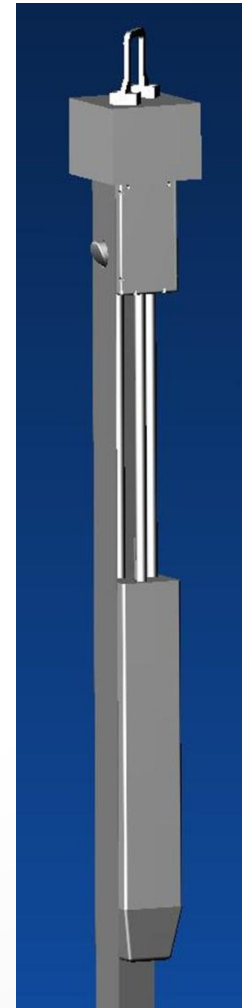
Description

- Al-1100/B₄C Composite, Provided by Alcan
- Installed via Custom Tool from the Refueling Bridge
- Chevron is Compressed During Installation; Friction and Compression Forces Hold it in Place.
- When Placed in Each Storage Location, the NETCO-SNAP-IN[®] Inserts Replace the Neutron Poison in the Existing Racks



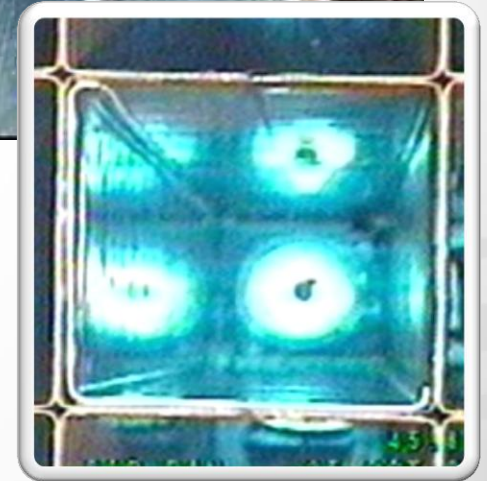
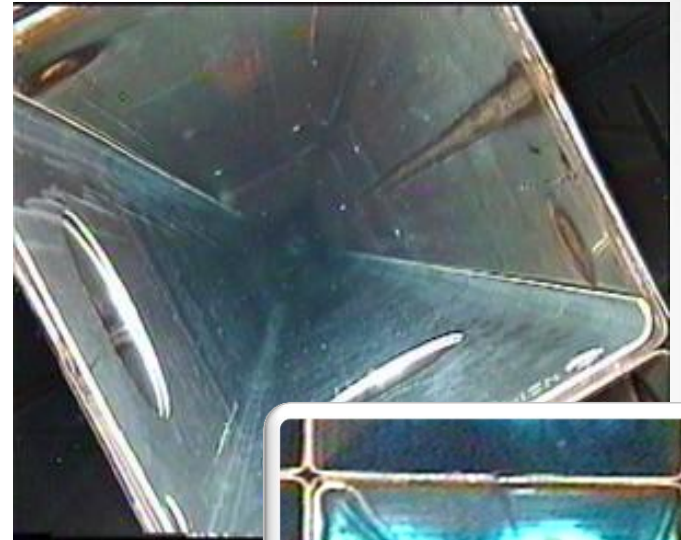
Key Features

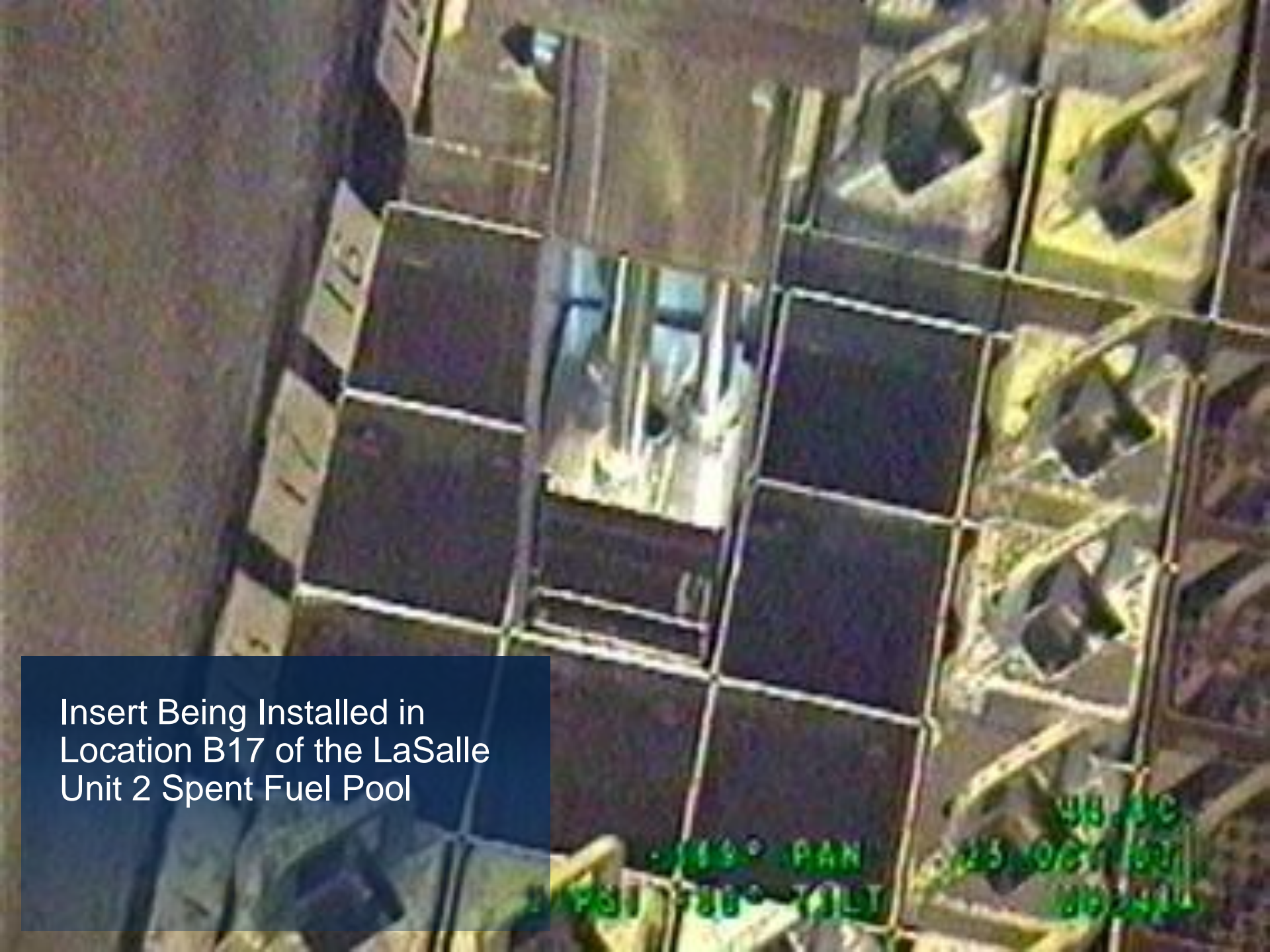
- Simplicity of NETCO-SNAP-IN®
 - Standard Fabrication Methods Used to Form Al/B₄C Composite Material
- Simplicity of Installation Tool
 - No Electrical or Hydraulic Systems
- Installed NETCO-SNAP-IN® Inserts Become an Integral Part of the Rack Modules
- Once Installed, Fuel Can Be Moved In and Out of the Storage Locations as Usual



Applications

- First Installation at Exelon's LaSalle Station in 2007
- 650 Inserts Installed To-Date at LaSalle
- 1875 Installed by the End of the Year
- Currently Storing Fuel in Installed Locations
- PWR Installation at Millstone in June 2011
- Projects Currently in Development or Deployment at 4 Plants





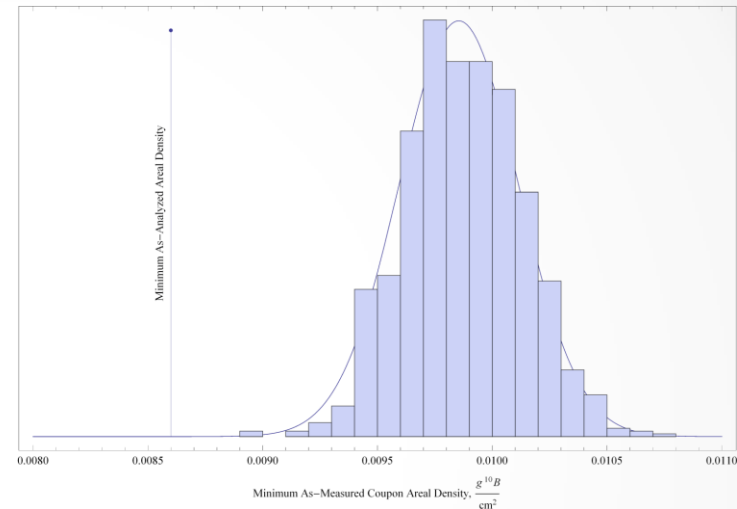
Insert Being Installed in
Location B17 of the LaSalle
Unit 2 Spent Fuel Pool

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Material Performance

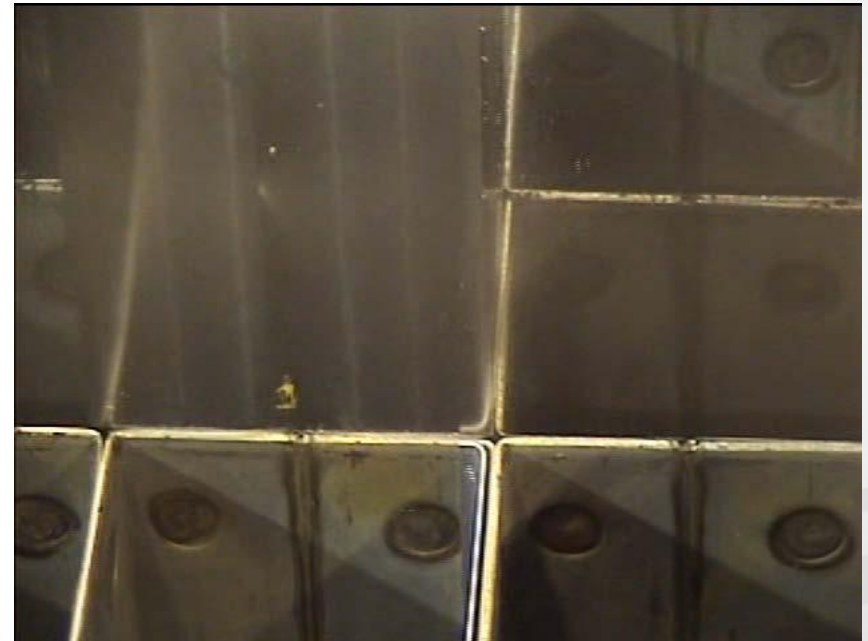
Alcan Material Shows Consistent Performance in Neutron Attenuation Tests

- Material Qualification of Alcan Through Accelerated Corrosion Testing
 - 2000, 4000, 6000 & 8000 hour test results
- Results Show Corrosion Rates Within Measurement Uncertainty of Zero for 8000 hr Tests
- Stability of Areal Density Values Throughout Test



Potential Applications

- NETCO-SNAP-IN[®]
Represent a Shift in the Approach To Reactivity Mitigation
- Applications:
 - Supplement Hold-Down for Higher Enrichments
 - System for New-Build Racks
 - System for Dry Cask Applications





Questions?