



# **San Onofre Special Inspection Webinar**

November 8, 2018

NRC Region IV, Arlington, TX

# Logistics

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- Webinar Format
- Back-up Bridge Line  
(888) 469-1677, Passcode 2471451
- Questions and Answers

# NRC Staff

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- Eric Simpson, Special Inspection Team Leader  
Region IV Fuel Cycle and Decommissioning Branch
- Patricia Silva, Branch Chief  
Division of Spent Fuel Management
- Troy Pruett, Director  
Region IV Division of Nuclear Materials Safety

# Webinar Agenda

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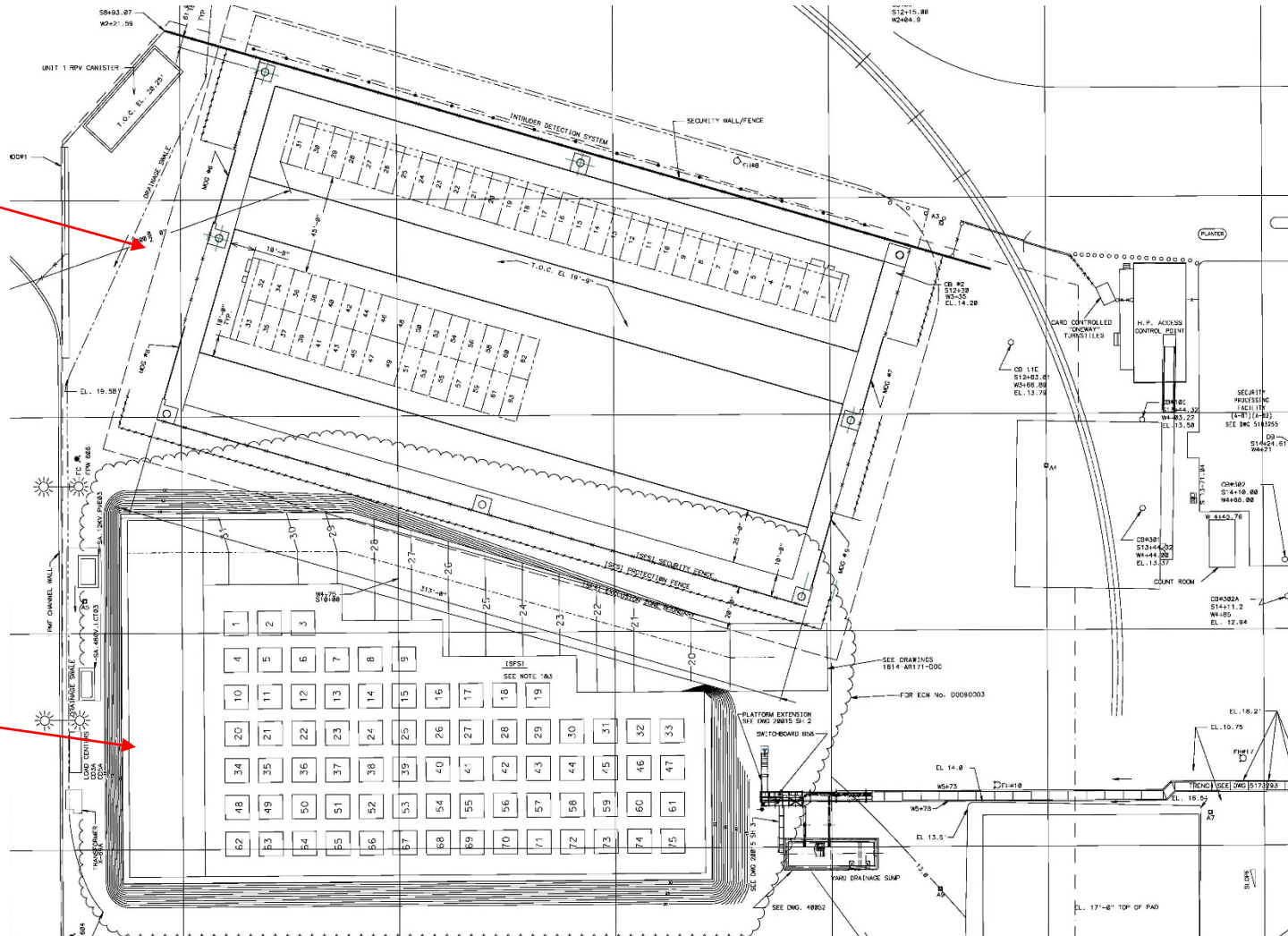
- Background
- Canister Downloading Operations
- Inspection Team Findings
- Current Status
- Summary
- Questions & Answers



# ISFSI Layout

**TN  
NUHOMS  
Design**

**Holtec  
UMAX  
Design**



# Transnuclear NUHOMS

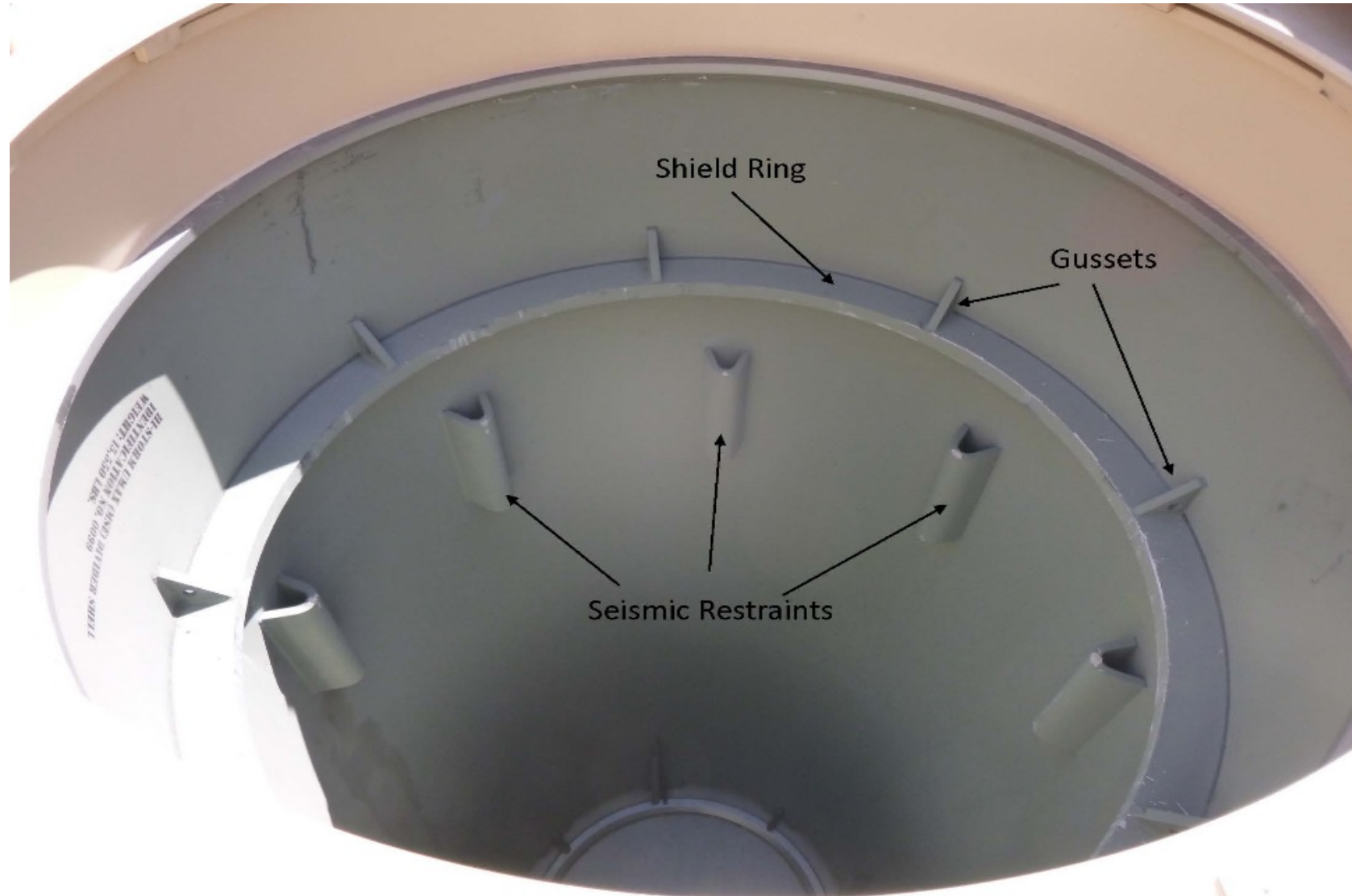


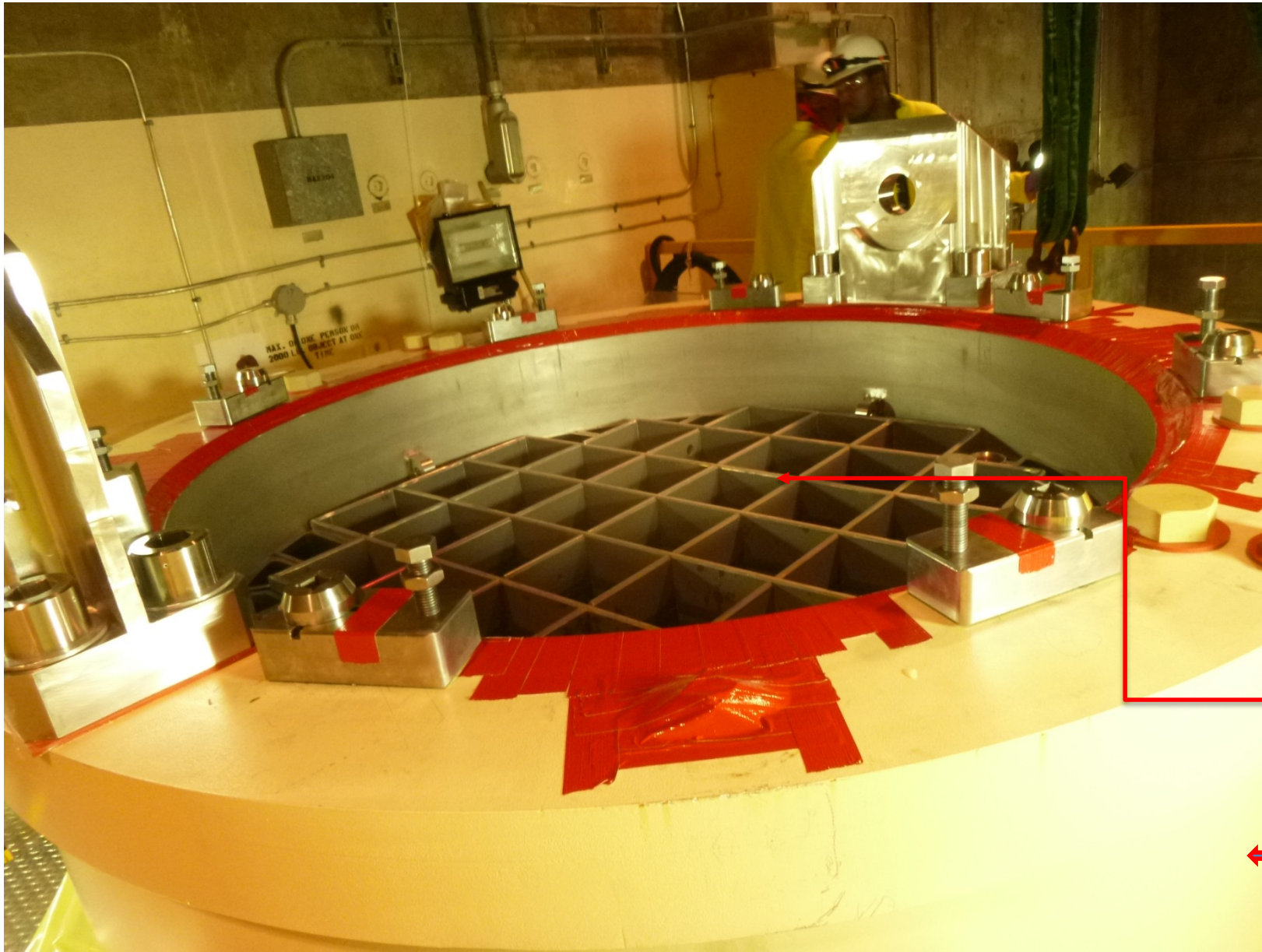
# Holtec UMAX





# Vertically Ventilated Module (Vault)





# Spent Fuel Canister

Holtec MPC

Transfer Cask



# Downloading: Shield Cone



# Downloading: Transporter





# Downloading: Vault Door







## Downloading: Alignment





## Downloading: Attaching Slings



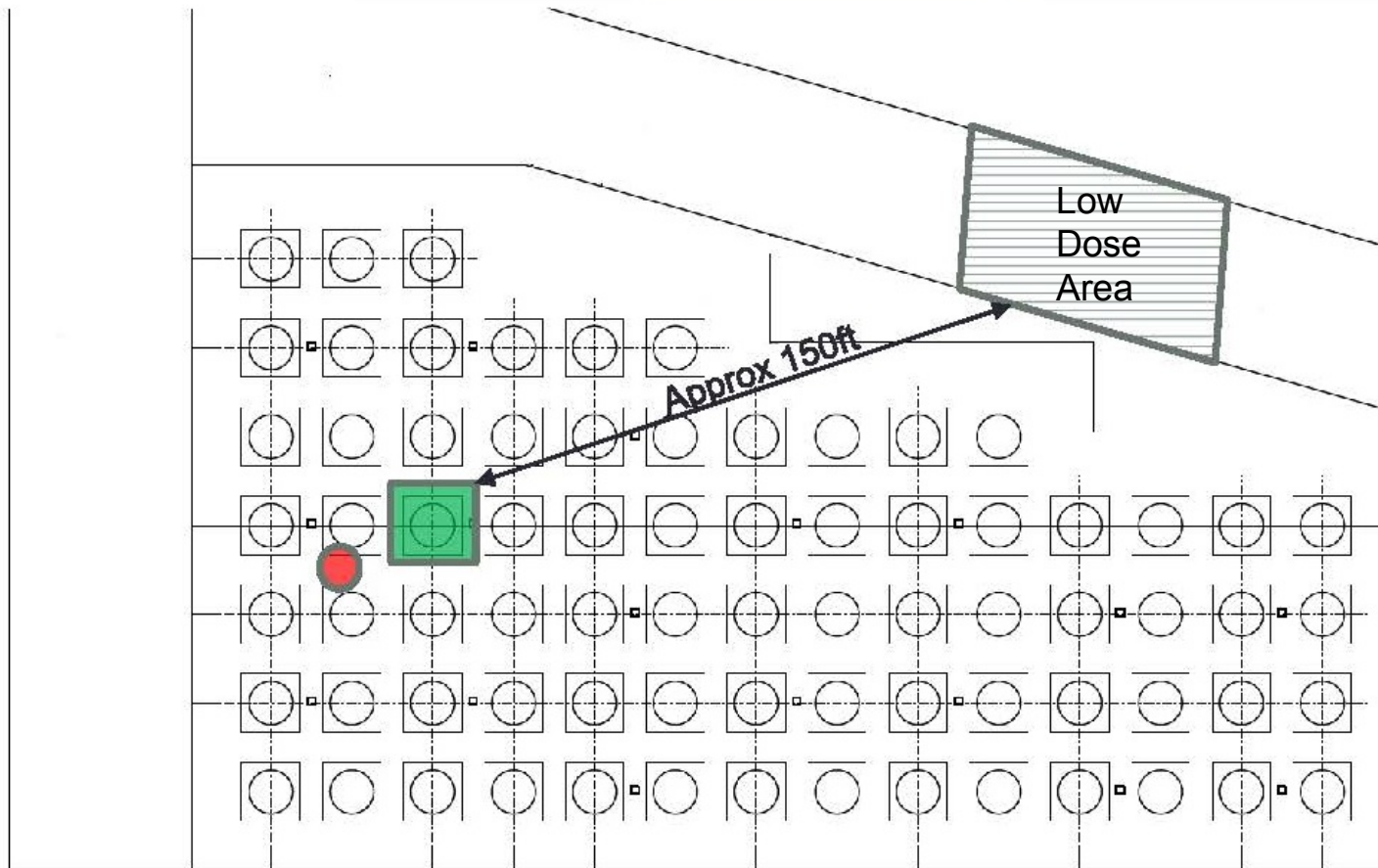
## Downloading: Attaching Slings





# Downloading Preparations

# What Happened on August 3rd?





# What Happened on August 3<sup>rd</sup>?





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What  
Happened on  
August 3<sup>rd</sup>?



# What Happened on August 3rd?





# What Happened on August 3<sup>rd</sup>?



# Post Event Actions

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- Spent Fuel Handling Activities Suspended
- NRC Inspection Activities
- San Onofre Notification to NRC
- Causal Evaluations
- Corrective Actions

# Spent Fuel Handling Activities Suspended

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- MPC 29 lowered into vault
- San Onofre suspends fuel loading
- MPC 30
  - Inside Transfer Cask
  - Seismically Restrained in Fuel Building

# NRC Inspection Activities

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- August 6<sup>th</sup>: NRC Region IV informally notified of Misalignment Event and initiates daily oversight communications
- August 7<sup>th</sup>: San Onofre commits to NRC review before resuming operations
- August 17<sup>th</sup>: NRC decides to conduct Special Inspection
- September 10-14: NRC Special Inspection Team onsite
- NRC to perform inspection prior to resumption of fuel loading

# NRC Inspection Activities

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- 2 Preliminary Escalated Findings
  - Failure to provide redundant drop protection
  - Failure to report
- 3 Preliminary Severity Level IV Violations
  - Procedures
  - Corrective actions
  - Training
- Management Oversight Weaknesses

# Causal Evaluations

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- San Onofre Apparent Cause Evaluation
- Holtec Root Cause Analysis
- Common Cause Evaluation

# Root Causes

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- San Onofre Management failed to provide
  - Adequate procedures
  - Adequate training to support procedure
  - Adequate oversight

# Corrective Actions

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- Training Requirements
- Procedure Enhancements
- Equipment Enhancements
- Oversight Improvements



# Event Significance

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- No Actual Drop of Canister
- No Radiological Release
- Load Drop Analysis (if canister fell)

# Next Steps

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- Issue NRC Inspection Report
- NRC Inspection of Causal Analyses
- NRC Inspection of Corrective Actions

# Summary

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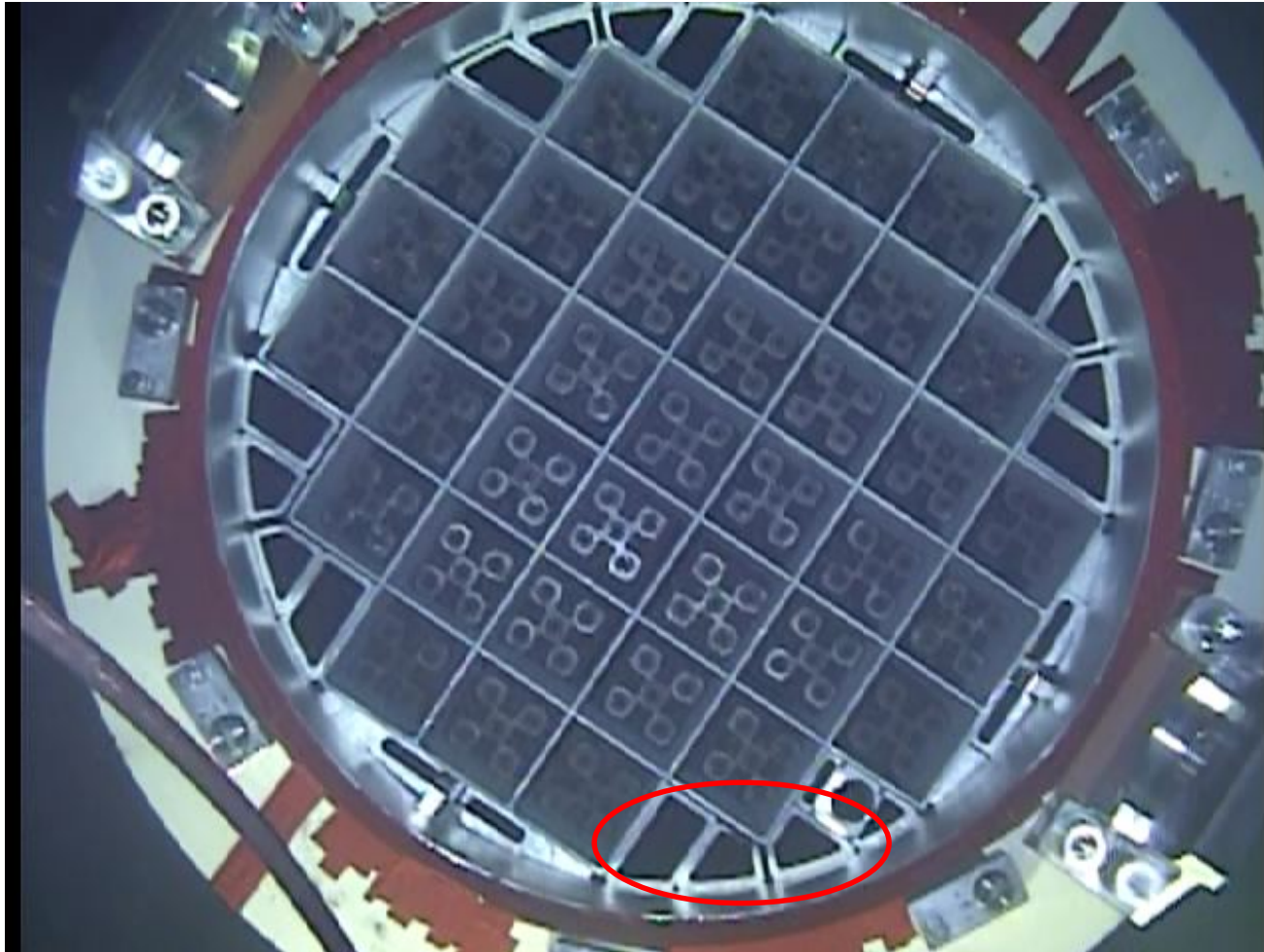
- Could have been prevented
- Weaknesses in management oversight
- Multiple failed barriers
- Increased NRC oversight

# Questions

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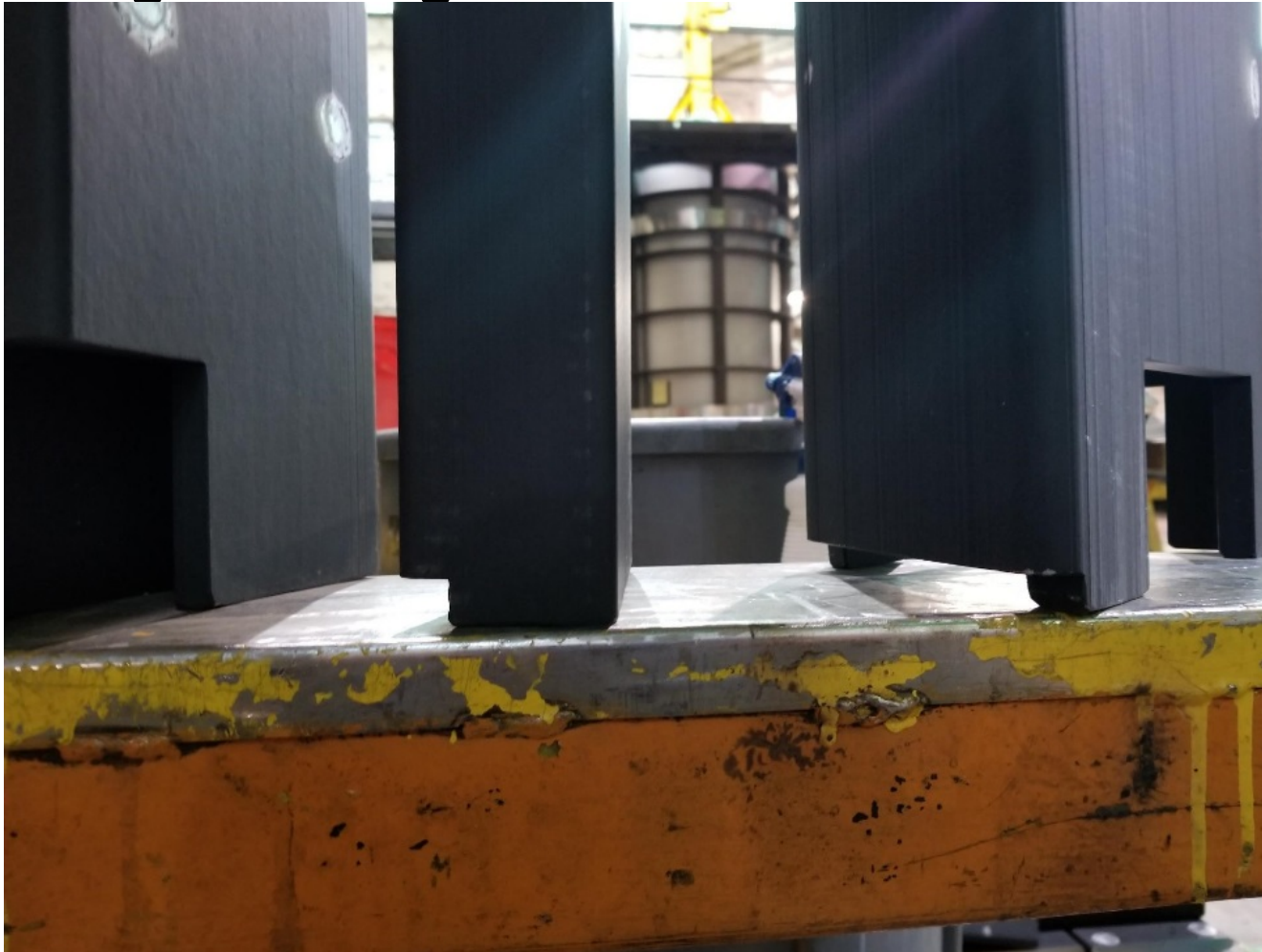
# Shims



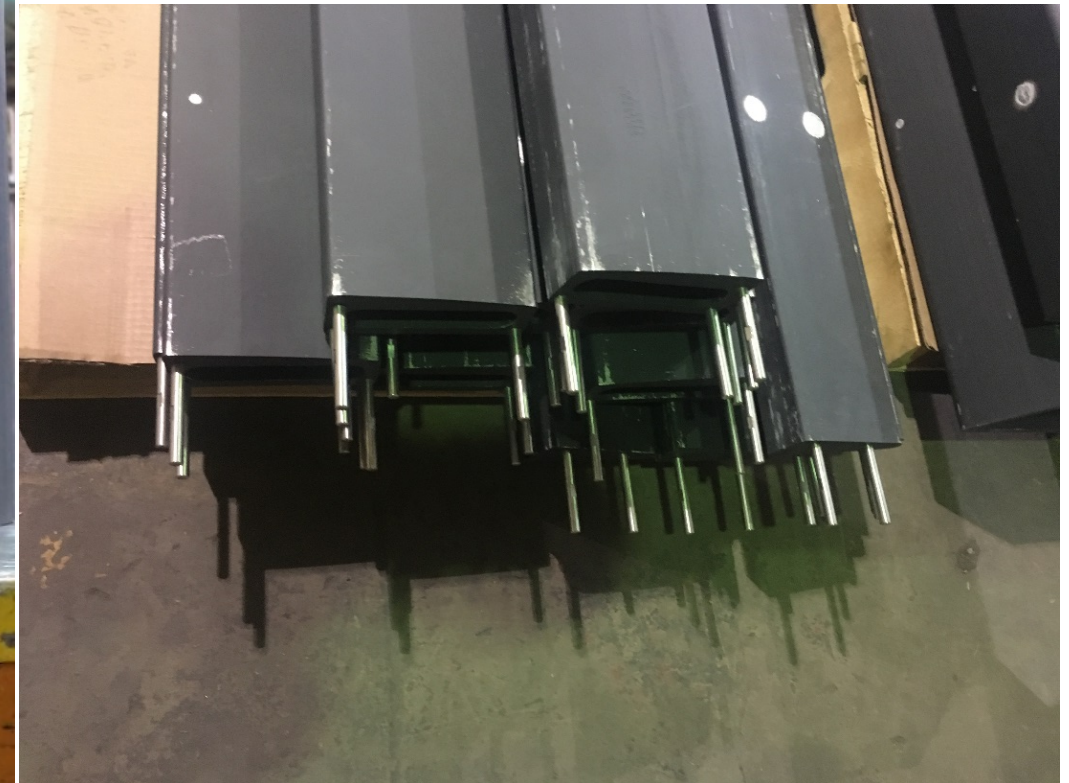


# Shims

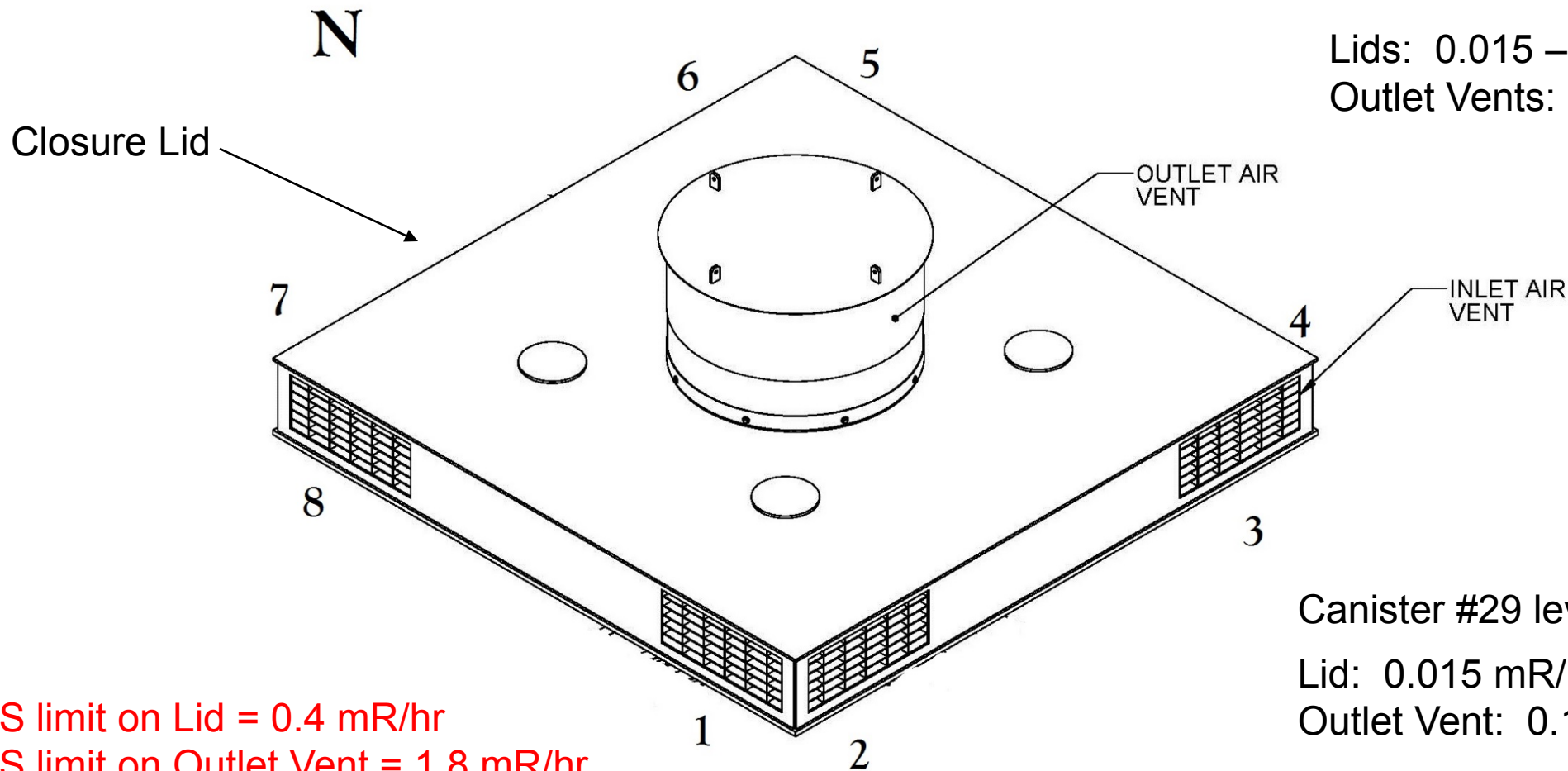
**Original Design: Machined Slots**



**Design Change: Standoffs Pins**



# Radiation Levels on the ISFSI Pad



Survey Results found by the NRC:

Lids: 0.015 – 0.018 mR/hr

Outlet Vents: 0.12 – 0.24 mR/hr

Canister #29 levels in Gamma

Lid: 0.015 mR/hr

Outlet Vent: 0.12 mR/hr

TS limit on Lid = 0.4 mR/hr

TS limit on Outlet Vent = 1.8 mR/hr

# Aging Management Plan

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- Required upon *license renewal*
- Tracks Degradation of Structures, Systems, and Components
  - Concrete
  - Steel
  - Stainless Steel
- Some licensees have performed Aging Management Inspections
  - No breaches of the canisters have been identified
  - No chloride induced stress corrosion cracking has been identified
- California Coastal Commission Commitment



# Canister Drop analysis

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- San Onofre provided preliminary analysis
- Analysis under NRC review
- San Onofre preliminary results: no loss of containment

# Unresolved Item

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- Last NRC Inspection report (2017-001) documented an Unresolved Item
- Licensee has modified loading operations to address NRC concern

# Seismic and Flooding

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- Both ISFSI systems at San Onofre are evaluated for:
  - Design Base Earthquake
  - Maximum flood height and flood velocity (Tsunami)