

# Predecisional Enforcement Conference

NRC Region II  
Atlanta, GA  
September 29, 2011



**Global Nuclear Fuel**

---

A Joint Venture of GE, Toshiba, & Hitachi

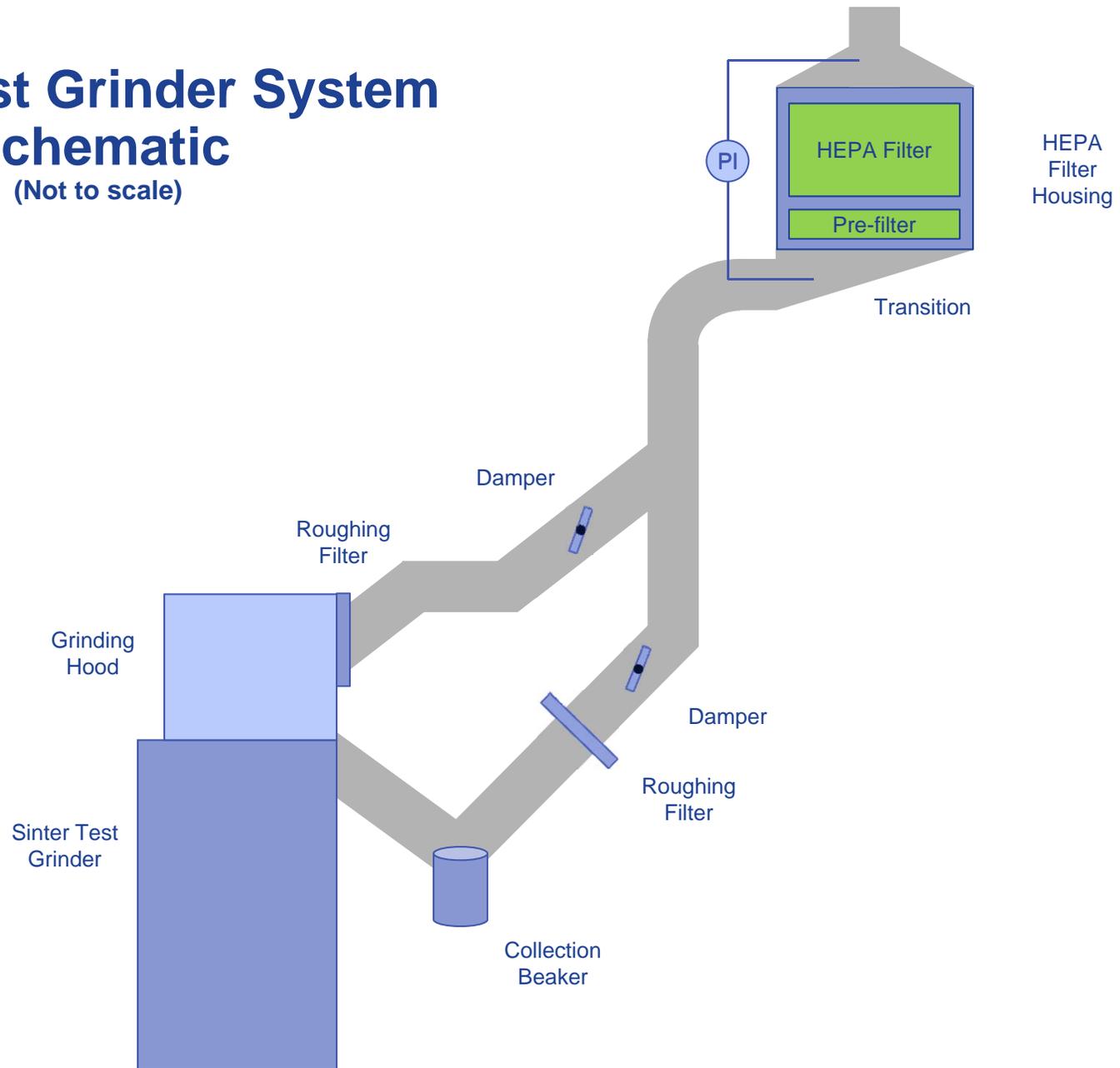
# Agenda

- Background and Facts (Holmes)
- Apparent Violations and GNF-A Response (Hilton)
- Event Investigation & Actions (Reynolds)
- Excellence Plan (Holmes)
- Conclusion (Walsh)

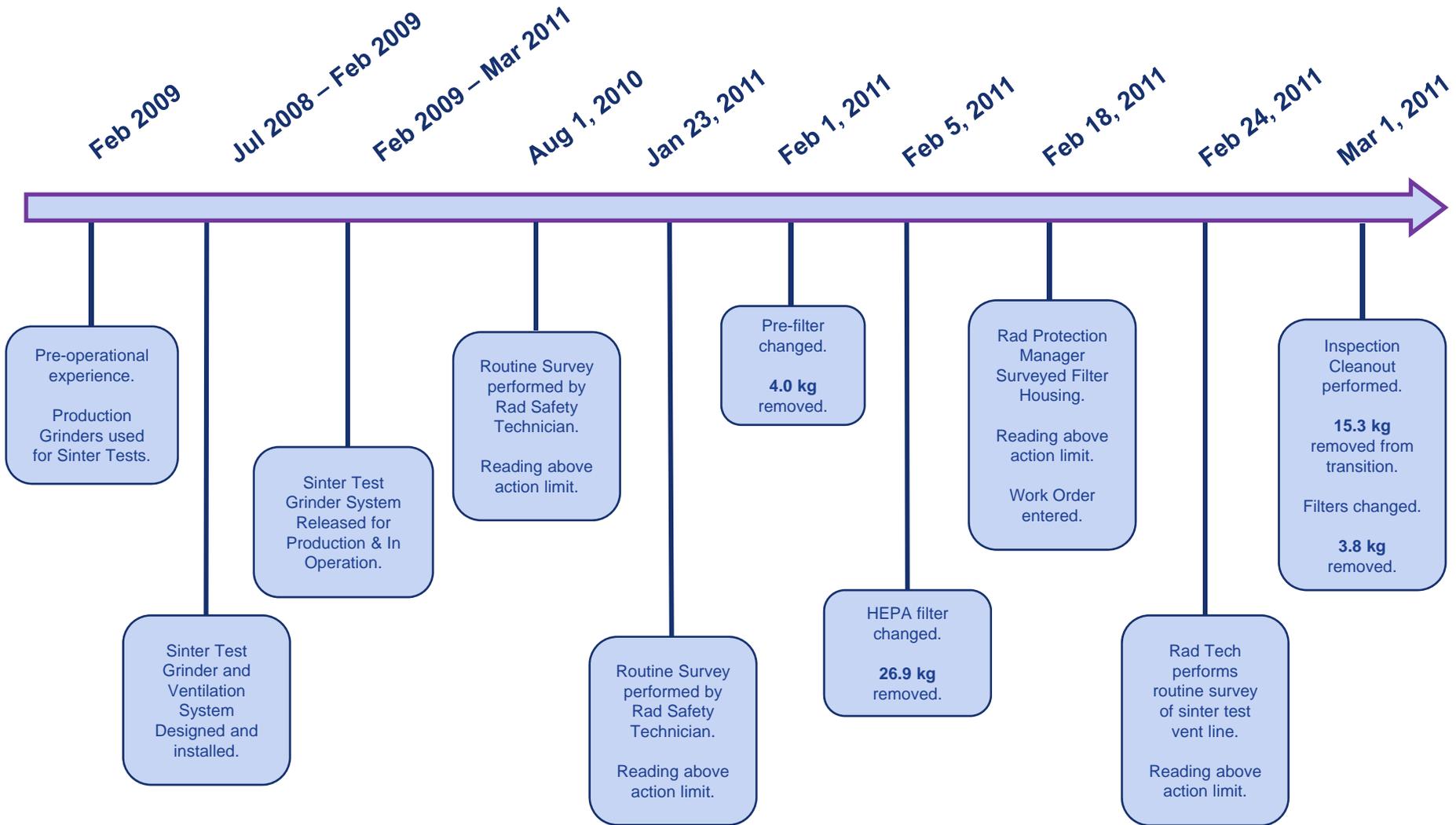
# Background and Facts

# Sinter Test Grinder System Schematic

(Not to scale)



# Simplified Timeline



# Apparent Violations & GNF-A Response

# NRC Apparent Violations 1 & 2

- Failure to meet double contingency
- Failure to meet performance requirements of 10CFR70.61(b) that the risk of credible high-consequence events be limited

## GNF-A Response:

### GNF-A Concur

Failure to maintain mass control resulted in a loss of double contingency for the primary HEPA filter housing. The double contingency controls required include (1) mass control and (2) moderation control. Moderation control remained in place, was effective and was not challenged.

# NRC Apparent Violation 3

Failure to validate assumptions related to mass control.

## GNF-A Response:

GNF-A Concur

The double contingency controls required for the sinter test grinder HEPA enclosure include (1) mass control and (2) moderation control. The mass control relied on historically derived filter differential pressure data that corresponded to  $\text{UO}_2$  mass of a characteristic particle size.

Assumptions were made that this relationship applied to the sinter test grinder system even though there were significant differences in the ventilation design. There was no validation of this assumption prior to or after the start-up of the system.

# NRC Apparent Violation 4

Failure to conduct a criticality safety analysis as required by the license application.

## GNF-A Response:

GNF-A Concur

The analysis for the sinter test grinder was documented in a Criticality Safety Summary (CSS). We believed the CSS met the needs and characteristics of the system being analyzed as required by our license. However, the CSS failed to completely document that all requirements specified in the license were considered.

# NRC Apparent Violation 5

Failure to follow procedure for exceeding radiation protection action limits.

## GNF-A Response:

GNF-A Concurs

In four separate instances, the proper response actions required by internal procedures were not requested by radiation protection personnel following a radiation survey result above the action level of 0.5 mR/hr.

# Safety Significance

# Safety Significance

## Actual

There was no actual safety significance to the workers, public, or the environment since no criticality event occurred. Controls on moderation remained intact at all times and were not challenged.

## Potential

The potential safety significance is considered to be low because a series of unlikely events would be required for the controls on moderation to fail. Although double contingency was not maintained, the risk of a criticality was highly unlikely due to the layers of protection available. Controls on moderation include:

- The primary HEPA housing is located in a Moderation Controlled Area.
- The primary HEPA housing enclosure provides a physical barrier to external water intrusion.
- The sinter test grinding operation processes only dry sintered  $\text{UO}_2$  pellets, which is controlled through material control transactions.

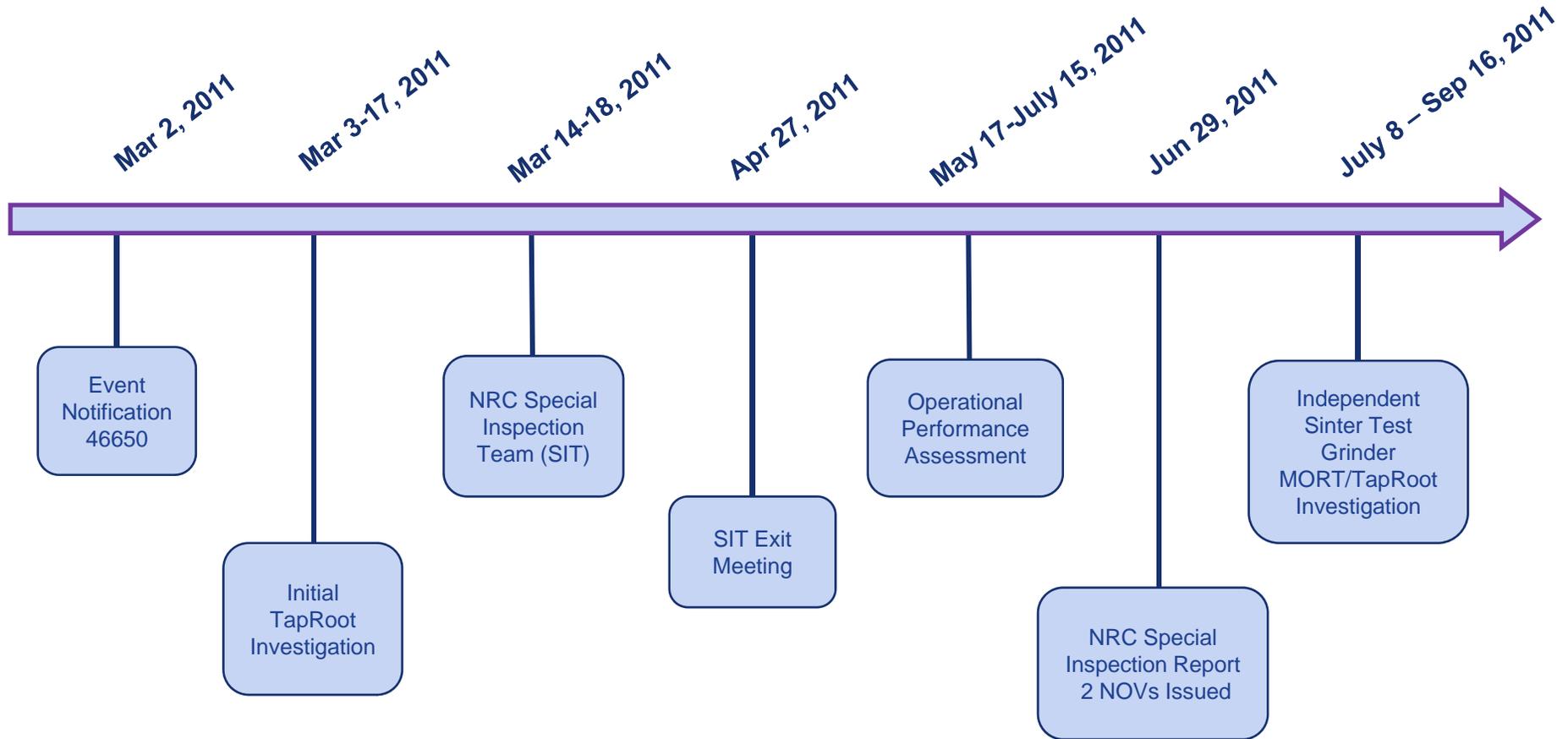


**Global Nuclear Fuel**

A Joint Venture of GE, Toshiba, & Hitachi

# Event Investigation and Root Causes

# Investigation Timeline



# Initial TapRoot Root Cause Analysis

- Design – Problem Not Anticipated
- Design – Needs Improvement
- Management Systems – Procedures/Communications Need Improvement
- Management Systems – Procedures Need Improvement
- Though not specifically referenced as a causal factor, actions were specified to address lack of conservative decision making

TapRoot root cause analysis identified causal factors, but did not adequately address generic and organizational issues



**Global Nuclear Fuel**

A Joint Venture of GE, Toshiba, & Hitachi

# Operational Performance Assessment

- Broad common cause analysis using cross-functional independent team
- Tools included MORT and input from INPO SOER 10-2
- Multiple events across entire business evaluated
- Sinter test grinder event included in assessment – technical causes consistent with initial TapRoot investigation

## Areas for Improvement

- Policies and procedures
- Change management
- Oversight
- Organizational learning

# MORT Root Cause Analysis

- Focused assessment of sinter test grinder event using cross-functional independent team.
- Contributing causes and extent of conditions consistent with initial TapRoot investigation. Assessment also addressed extent of cause.

## Root Cause Areas

- Nuclear safety
- Processes, programs, and controls
- Hazard control barriers
- Risk assessment and design processes



**Global Nuclear Fuel**

A Joint Venture of GE, Toshiba, & Hitachi

# Corrective and Preventive Actions

# Immediate Corrective Actions

- Sinter test grinder equipment and activities shut down.
- Grinder HEPA filter replaced and powder in housing removed.
- Initiated TapRoot root cause analysis.
- Completed numerous extent of condition actions.
- Replaced 12” sinter test grinder HEPA filter with 6” favorable geometry filter.
- Confirmed assumptions regarding relationship between differential pressure and powder collected in HEPA filters during typical applications.

# Initial Actions to Prevent Recurrence

## Key Technical Actions Completed

- Modified procedures in the areas of configuration management, radiation protection, HVAC
- Updated criticality safety analysis for primary HEPA filters
- Improved preventive maintenance for applicable HEPA filters and pre-filters
- Conducted independent assessment of radiation protection program
- Evaluated work order prioritization process

## Actions to Address Lack of Conservative Decision Making

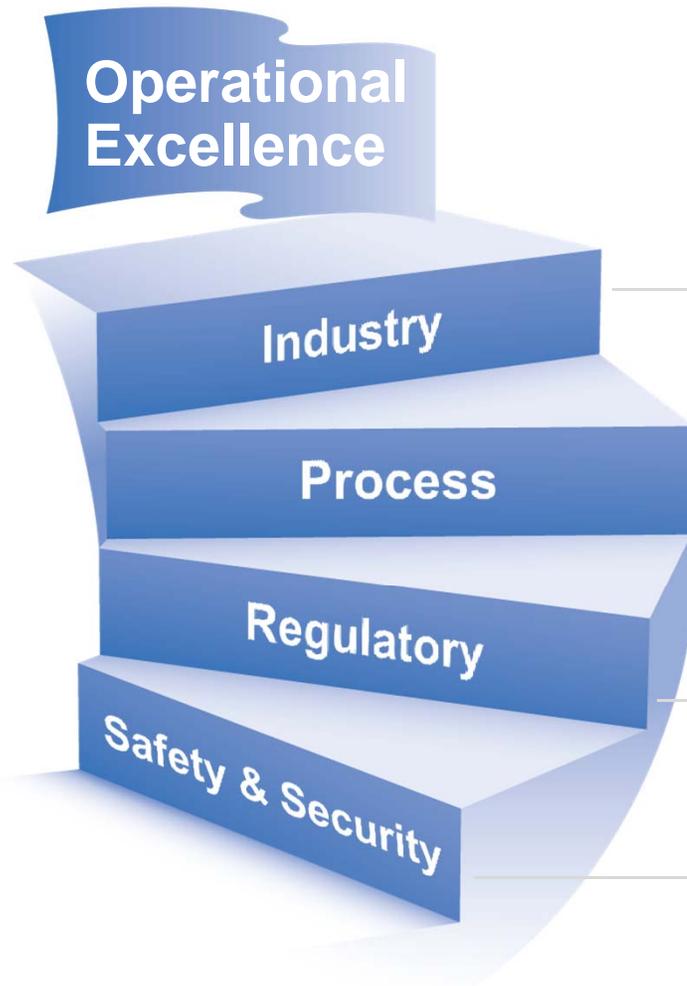
- Modified Safety Event Communication and Notification procedure
- Trained on procedural compliance, conservative decision making, and questioning attitude

# Additional Actions – MORT/Operational Performance Assessment

Focus Areas	Key Actions
Safety Culture	<ul style="list-style-type: none"> <li>• Create business-wide safety policy implementing procedures</li> <li>• Establish nuclear safety as a goal in employee annual objectives</li> <li>• Establish metrics and processes for measuring safety policy effectiveness</li> </ul>
Training	<ul style="list-style-type: none"> <li>• Provide training related to safety culture and conservative decision-making</li> <li>• Align with industry guidance for training program (INPO 04-003)</li> <li>• Implement Systematic Approach to Training (SAT) more broadly</li> </ul>
Radiation Protection	<ul style="list-style-type: none"> <li>• Develop SAT-based radiation protection training program</li> <li>• Develop track and trend process for survey results</li> <li>• Provide expertise to establish radiation protection standards</li> </ul>
Staffing	<ul style="list-style-type: none"> <li>• Establish organizational role(s) responsible for organizational culture</li> <li>• Develop and maintain organizational directory including team responsibilities</li> </ul>
Procedures	<ul style="list-style-type: none"> <li>• Establish standards for procedures based on MORT criteria</li> <li>• Unify procedural systems into single, business-wide architecture</li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>• Improve process to schedule, plan and prioritize work orders</li> <li>• Strengthen preventive maintenance program</li> </ul>

# Excellence Plan ... “Raise the Bar”

# Steps to Excellence



## Industry excellence

- Organizational assessment (INPO SOER 10-2, Common cause assessment)
- Quality program optimization
- Industry Alignment

## Process excellence

- Training program
- Corrective action program
- Change management program
- Human performance
- Procedure simplification
- Strengthen ASME program

## Regulatory excellence

- Requirements Management
- Compliance/Commitment Tracking

## Safety & Security excellence

- Improve nuclear safety culture
- Industrial safety performance improvement



**Global Nuclear Fuel**

A Joint Venture of GE, Toshiba, & Hitachi

# Process Excellence ... “Raise the Bar”

## Objectives

- 1 Implement compensatory measures
- 2 Complete commitments from event root cause analyses
- 3 Enhance problem identification and resolution
- 4 Simplify procedures and improve requirements flow-down
- 5 Strengthen process surveillance + human performance observations
- 6 Improve training program
- 7 Engage employees to assure organizational learning
- 8 Communicate internally and externally



**Global Nuclear Fuel**

A Joint Venture of GE, Toshiba, & Hitachi

# What's Changed?

## Comprehensive Approach

- Common cause assessment across events ... across entire business
- New root cause analysis tool ... MORT applied to recent issues plus TapRoot
- Immediate actions taken on safety culture ... including training, roundtables, and leadership two-way dialogue sessions

## Organizational Changes

- Project Manager position dedicated to “Raise the Bar” program
- Focused core team ... many others supporting from across enterprise
- Additional jobs posted including technical and program resources

## Visible Improvements

- Leadership moved offices to manufacturing facility
- Daily leadership meeting moved to manufacturing facility
- Manufacturing building improvement campaign underway

# Conclusion

# Conclusion

- Completed corrective actions
- Driving long-term comprehensive improvements
- Committed to regulatory and operational excellence

Nuclear Safety is Our Highest Priority



**Global Nuclear Fuel**

A Joint Venture of GE, Toshiba, & Hitachi