

***Pre-Decisional  
Enforcement  
Conference***

***NRC Region II  
Atlanta, Georgia***

***May 19, 2008***

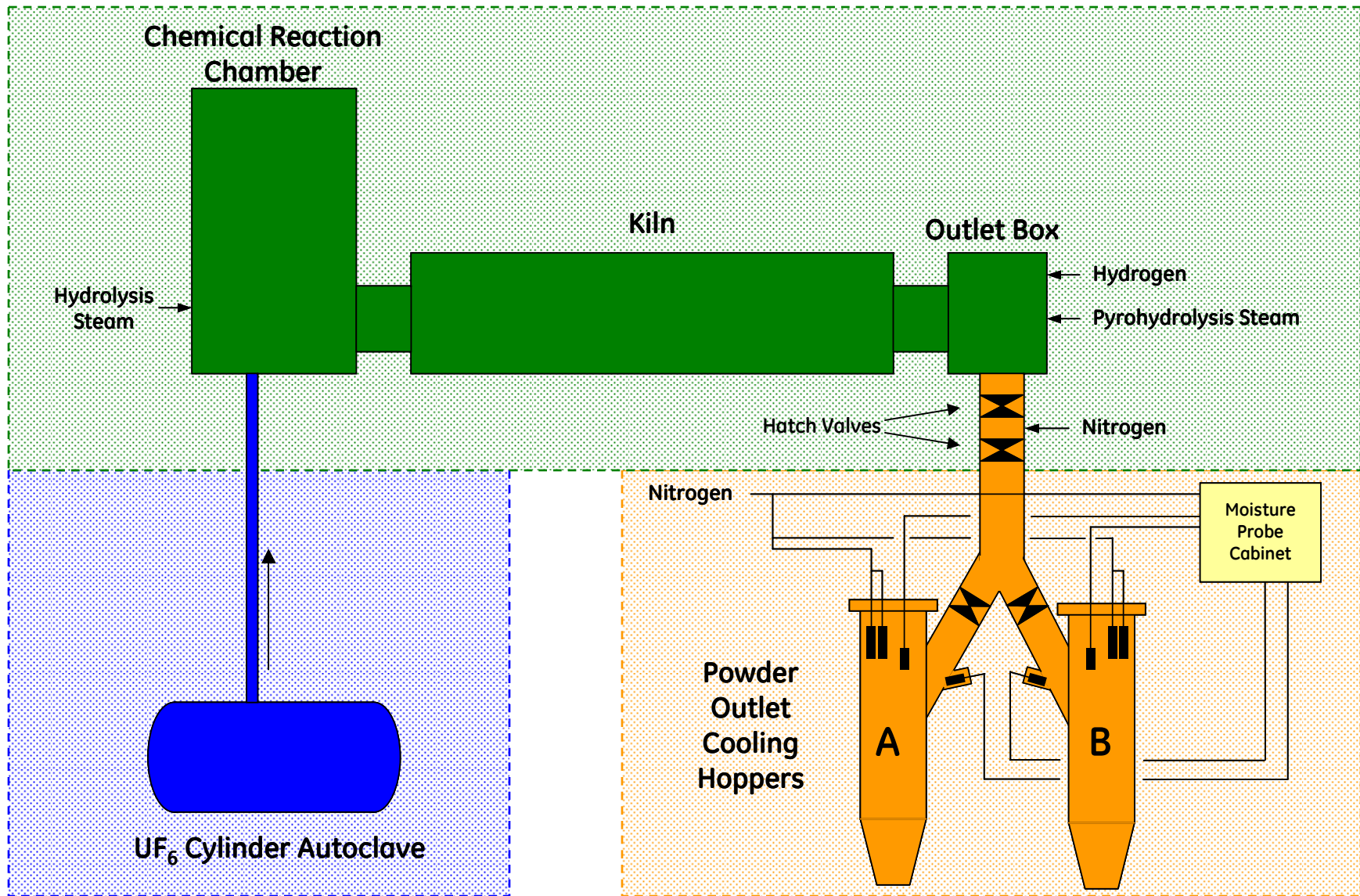
***Global Nuclear Fuel - Americas***



# Agenda

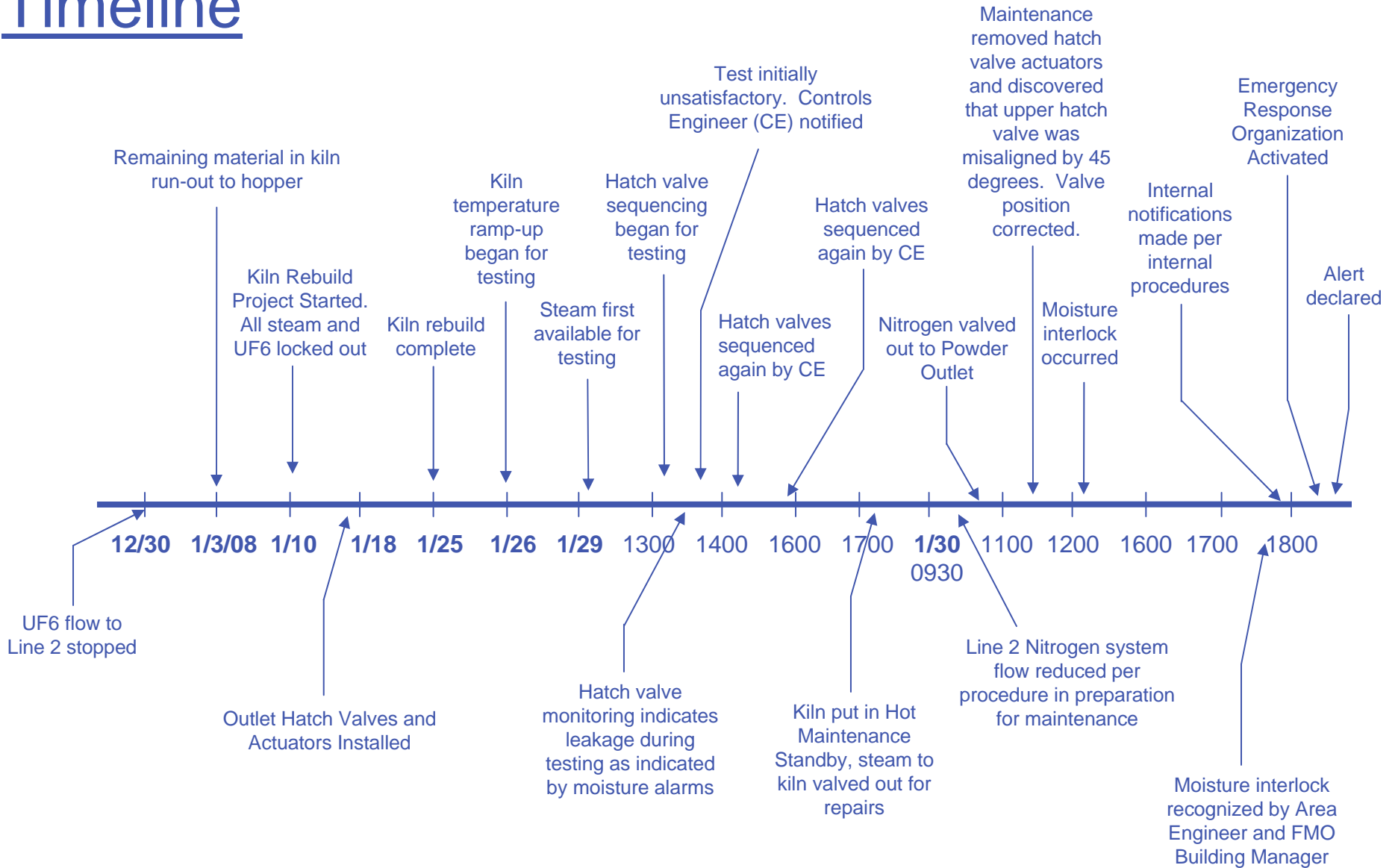
- I. Description of the Issue and Immediate Actions
- II. Cause Assessment and Corrective Actions
- III. NRC Identified Apparent Violations
- IV. Assessment of Significance
- V. GNF's Evaluation of the Issue
- VI. Conclusion

# Dry Conversion Process (DCP)



***Integrated Dry Process in a Moderation Restricted Area***

# Timeline



# Facts Leading to Alert Declaration

- Following a Dry Conversion Process (DCP) Line 2 kiln rebuild, a hatch valve was misaligned during system rebuild (1/18/2007)
- During the pre-startup test the valve issue was identified (1/29/2007)
- During an area walk down, the Area Engineer and Acting Building Manager (5:30 p.m. 1/30/2007) identified a concern with a Hi-Hi moisture condition on Line 2 cooling hopper and residual (~36 kg indicated/ 28.6 kg actual) powder in cooling hopper
- Maintenance and alarm history were not readily available as dayshift had left. Fuel Manufacturing Operations Nuclear Safety Manager and the GNF Environment, Health and Safety Manager were called via telephone at approximately 5:45 p.m. in accordance with our internal notification procedures

# Facts Leading to Alert Declaration

- Emergency Response Organization was activated at 6:19 p.m. to assess the concern and collect information
- At that time, there were no ongoing maintenance activities, steam was previously isolated and the process was static.
- Response Personnel were assembled, initial characterization of conditions was conducted as personnel arrived in ECC including the primary ED who had arrived between 6:19 and 6:25 p.m.
  - Key points of discussion included:
    - Enrichment of uranium in hopper
    - Accuracy of cooling hopper scale
    - Time and duration of moisture interlock
    - Imprecise language in emergency plan (“unsafe mass”)

# Facts Leading to Alert Declaration

- Based on the information available at the time, the ED conservatively declared an Alert at 6:30 p.m. and agency notifications were made.
- Subsequently, it was determined that the hopper contained a safe mass and that moisture level of the  $\text{UO}_2$  powder in the hopper was within normal range
- The alert was terminated at 9:21 p.m.

# Immediate Actions

- All fissile material movement immediately secured, not only in the affected area, but throughout the building.
- Required agency notifications made and regular updates provided.
- Material in 2A cooling hopper transferred to favorable geometry container using an approved Temporary Operating Procedure (2B hopper was already empty).
- Material sampled for moisture content. Moisture content found to be normal.
- DCP conversion operations suspended pending completion of Root Cause Analysis and completion of short term corrective actions.



## Causes (Identified by GNF RCA):

- Maintenance instructions created for the specific task did not address cooling hopper cleanout when maintenance was being performed on hatch valves
- General maintenance cleanout procedures required cleanout of the affected equipment but did not include consideration of adjoining equipment
- There was no visible external indication that the hatch valve actuator was misaligned or installed incorrectly until pre-startup testing
- No job specific training provided on proper hatch valve actuator installation
- When moisture alarm escalated to interlock condition, no audible signal alarm in control room

# Short Term Actions to Prevent Recurrence

- Hatch valve maintenance cleanout requirements added (i.e., confirm hoppers empty)
- Added local leak check using nitrogen (before steam is introduced) to test hatch valves after installation or maintenance
- DCP operating procedures revised to ensure proper cleanout of adjoining equipment prior to maintenance
- Additional guidance and training provided for maintenance or repairs on Items Relied On For Safety (IROFS)
- Added audible interlock alarm signals to DCP control room

# Long Term Actions to Prevent Recurrence

- Analyze need for cleanout requirements on other equipment in Moderation Restricted Areas (MRAs) (complete)
- Issue generic criticality safety requirements to ensure proper cleanout of adjoining equipment prior to maintenance activities (complete)
- Issue guidance/training regarding performing maintenance on active engineered controls (AEC) or Items Relied On for Safety (IROFS) (complete)
- Add IROFS designation to appropriate equipment records (complete)
- Redesign the valve stem indicator to visually show valve position (estimated completion August 2008)

## Apparent Violation:

*Failure to have a properly issued and approved management control procedure for conducting maintenance activities on an Item Relied on For Safety (specifically the powder outlet hatch valve system) while licensed material was present in the system.*

## GNF Assessment:

*Concur. The hatch valve and N2 purge system were identified as an Item Relied On For Safety and were treated and retested consistent with the requirements for Active Engineered Controls, but there was no specific procedure requiring a safety conditions review prior to performing maintenance on IROFS. While general maintenance instructions required equipment under maintenance be cleaned out, the instructions did not require the removal of uranium from adjoining equipment (the hoppers).*

## Apparent Violation:

*The licensee performed maintenance activities on DCP Line 2 involving handling of enriched uranium which were not assessed for the known/expected conditions by the criticality safety function.*

## GNF Assessment:

*Concur. Work performed on DCP Line 2 was conducted in accordance with a Change Request which was approved by the criticality safety function, however, during the approval process the presence of material in the 2A hopper was not considered.*

## Apparent Violation:

*Failure to maintain double contingency for the DCP line 2A cooling hopper*

## GNF Assessment:

*Concur. The outlet hatch valve system was degraded. This was discovered during verification following maintenance on the hatch valves prior to releasing the system for operation in accordance with GNF Practices and Procedures.*

# Identification of Problem:

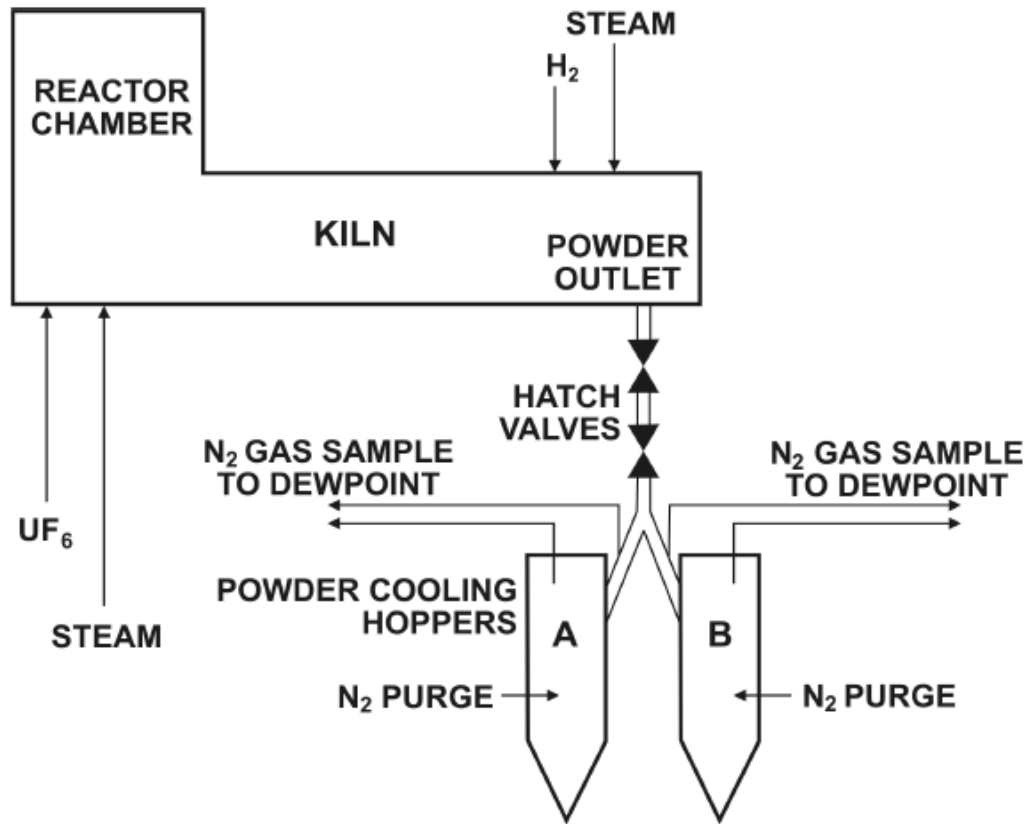


Figure 1

Conversion Reactor/Kiln and Cooling-Hopper Equipment Arrangement

During post-maintenance verification on the hatch valves, the operator identified that cycling the hatch valves resulted in elevated moisture levels. This discrepancy was reported to the Controls Engineer who confirmed the problem by observing two additional cycles. The Area Engineer directed that the system be secured in preparation for troubleshooting. Misalignment was discovered upon removing actuator.

Steam was only applied to the system during cycling of the hatch valves.

## Apparent Violation:

*Failure to declare an Alert based on potential unsafe mass of UO<sub>2</sub> in the L2A cooling hopper.*

## GNF Assessment:

- At the time the Emergency Response Organization was activated, there had been no determination that an “unsafe mass” existed*
- The declaration of an Alert was a conservative decision made by the Emergency Director assuming worst case moisture and mass conditions*
- Later it was determined safe mass limit was not exceeded and normal moisture conditions existed*



# Our Assessment Is Based On the Following:

- At the time the ERO was assembled, the mass and moisture conditions were uncertain. The ERO was assembled to bring together the best technical expertise to assess the concern.
- The interval (11 minutes) between the sounding of the “four ones” (calling ERO personnel to assemble at the ECC) and the declaration of the Alert included the following:
  - Relocation of ERO personnel from their work locations to the ECC
  - Assembly and sign in activities in the ECC
  - Initial recording of known facts and evaluation of the situation
  - Reviewing the emergency plan based on known information
  - Consideration of “unsafe mass” terminology (undefined)
  - Discussion of data gaps and implication of the gaps
- Declaration of an Alert was prompt and conservative

# Assessing Significance

NRC Enforcement Policy lists criteria for assessing the significance of each violation:

- Actual Safety Consequences
- Potential Safety Consequences
- Impacting the Regulatory Process
- Willfulness

# Actual Safety Consequences

- There were no actual safety consequences as a criticality event was not possible
  - The cooling hopper contained a safe mass of uranium
  - Moisture in the powder was within normal limits
  - There was no health or safety impact to workers or the public

# Potential Safety Consequences

- A criticality event was not possible
  - The cooling hopper contained a safe mass of uranium. Additional quantities of uranium were not present or reasonably available
  - Moisture content of powder in the hopper remained normal
  - Despite degradation of one of the hatch valves, the moisture probe interlocks remained fully operational preventing excess moderator from entering the hoppers
  - The system was not in operation but was undergoing post-maintenance verification and was being actively monitored
  - Steam was only applied to the system during cycling of the hatch valves

# Impacting the Regulatory Process

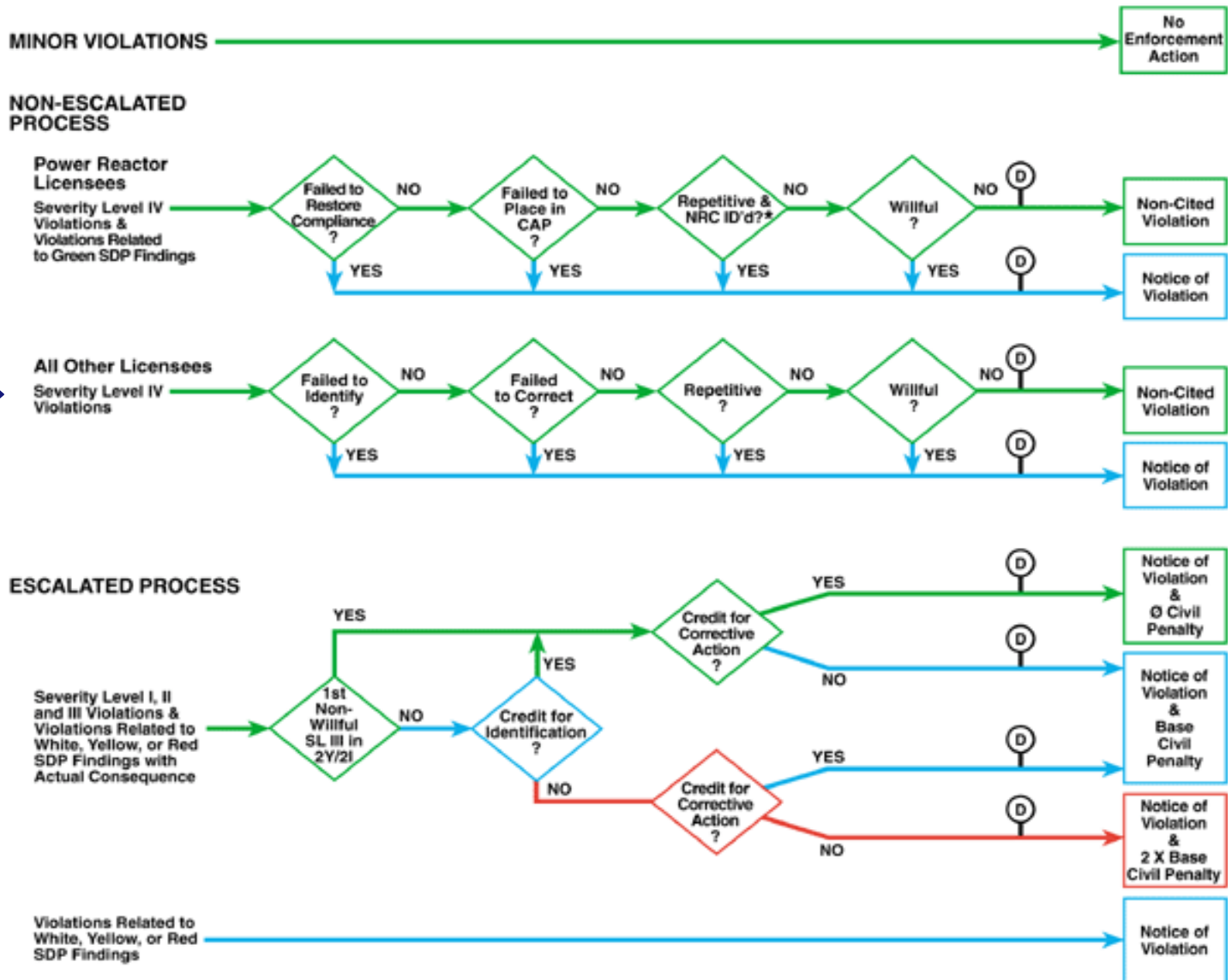
- The issue was self identified
- The issue was promptly reported
- The NRC was kept informed at all stages of the event
- Complete and accurate information has been provided

A Notice of Violation for failure to declare an Alert immediately upon activation of the ERO is not consistent with allowing a reasonable time for team to determine facts, identify information gaps and acquire information necessary to make informed decisions

# Willfulness

No indication of Willfulness associated with the event

# NRC ENFORCEMENT PROCESS



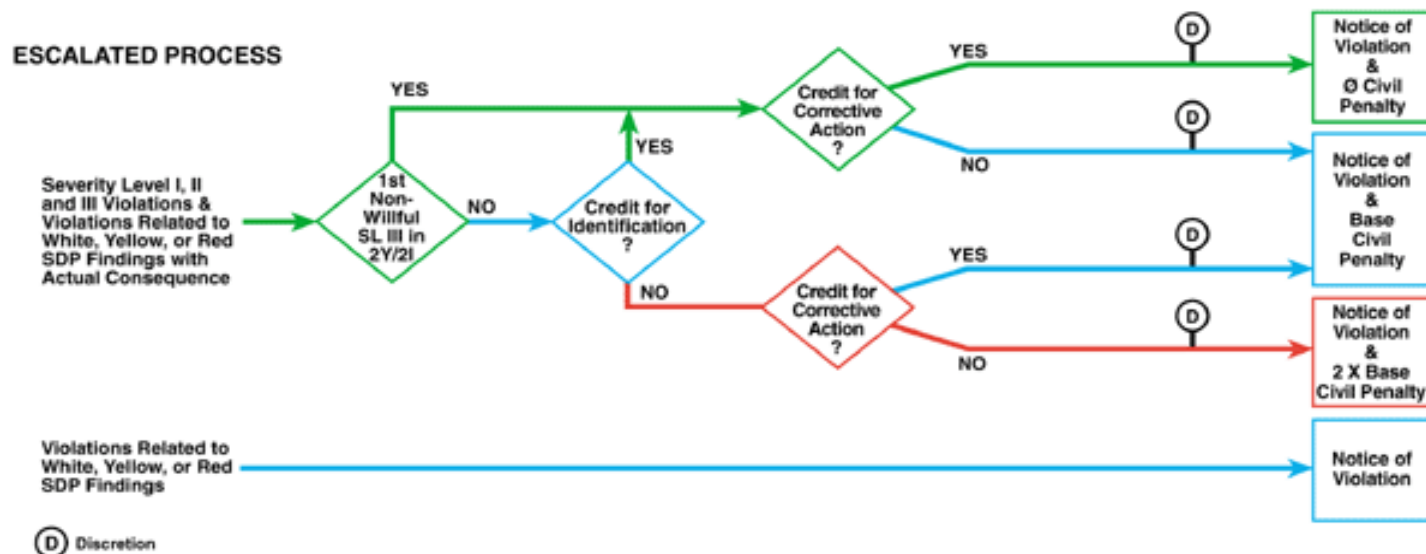
(D) Discretion

## NRC ENFORCEMENT PROCESS

The facts do not support a Severity Level III violation

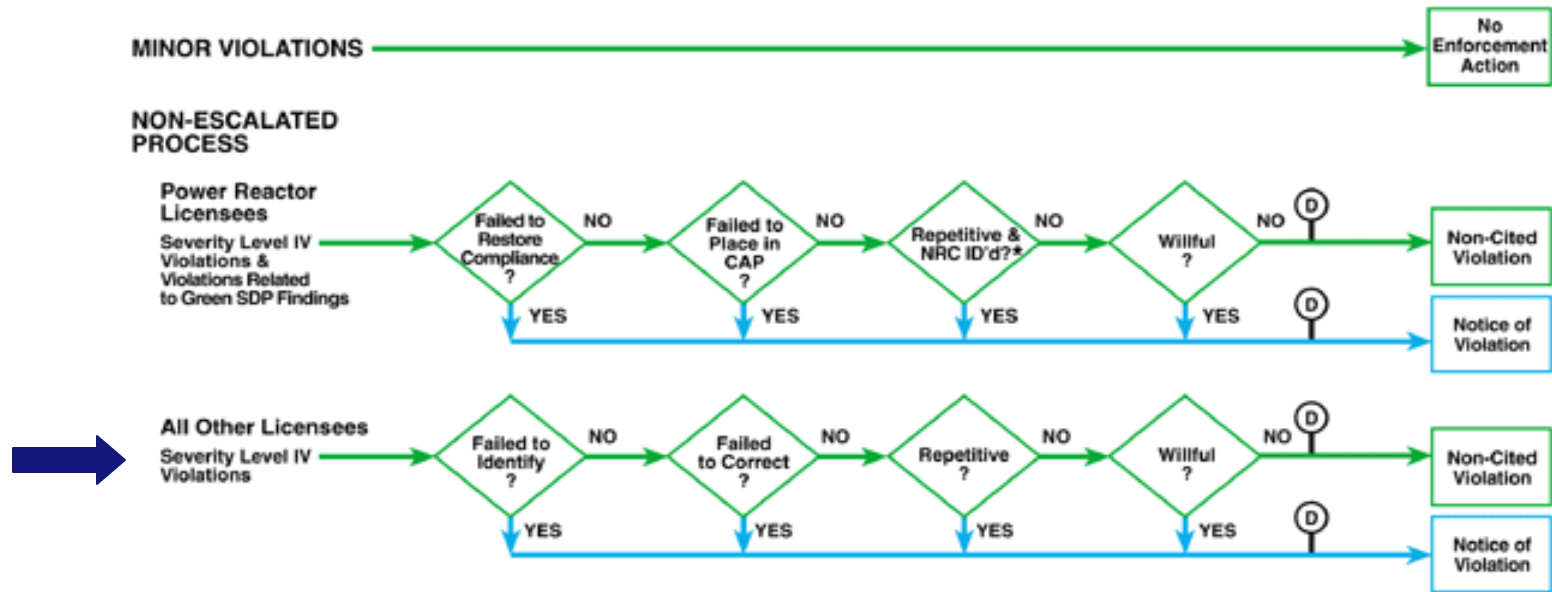
### Severity Level III Example

A failure to establish, implement, or maintain all but one criticality control (or control systems) for a single nuclear criticality scenario when a critical mass of fissile material was present or reasonably available such that a nuclear criticality accident was possible.





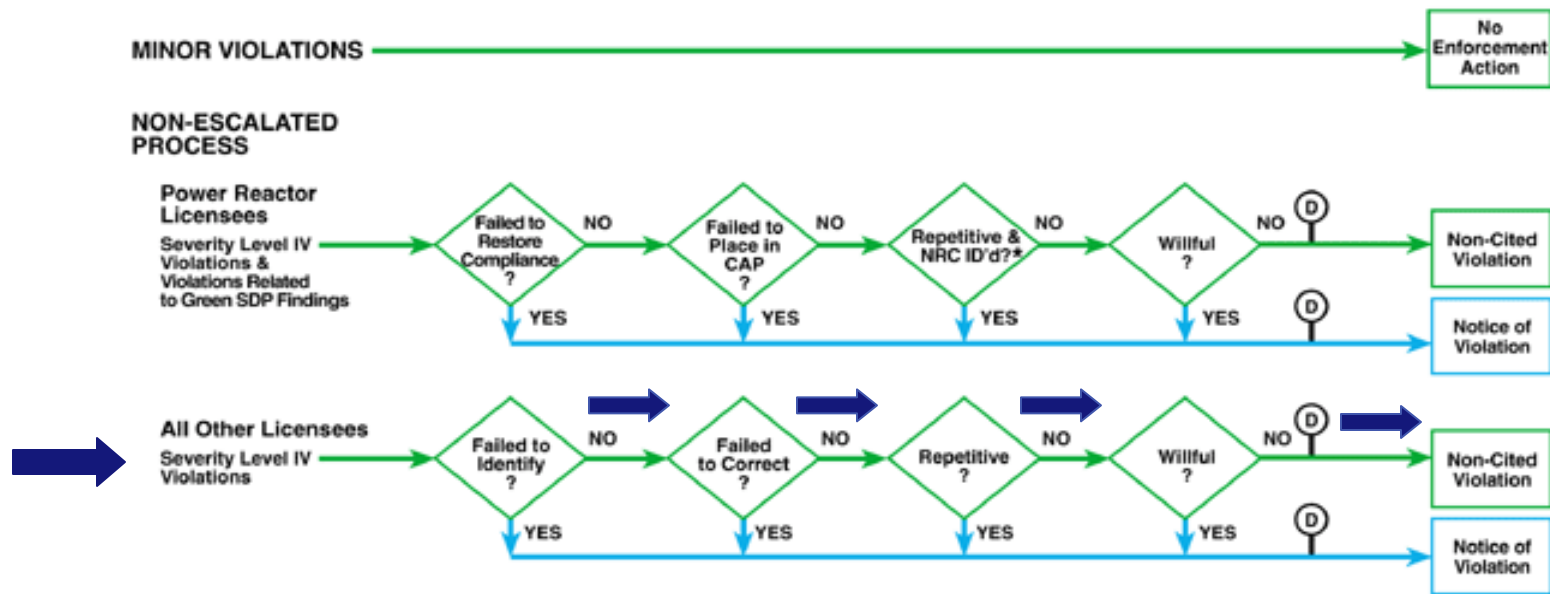
## NRC ENFORCEMENT PROCESS



### Severity Level IV Example

A failure to establish, implement, or maintain a criticality control (or control system) for a single nuclear criticality scenario when the amount of fissile material available was not, but could have been sufficient to result in a nuclear criticality.

## NRC ENFORCEMENT PROCESS



The problem was self-identified.

During post-maintenance verification on the hatch valves, the operator identified that cycling the hatch valves resulted in elevated moisture levels. This discrepancy was reported to the Controls Engineer who confirmed the problem by observing two additional cycles. The Area Engineer directed that the system be secured in preparation for troubleshooting. Misalignment was discovered upon removing actuator.

# Summary

- GNF concurs with three apparent violations which we believe qualify as non-cited violations
- With respect to the apparent violation of failure to declare a timely Alert, GNF believes that circumstances do not support the finding of a violation

# Conclusions

- A criticality event was not possible
  - Minimum critical mass was not present or reasonably available
  - Moisture in the powder was normal
- The problem was self-identified and NRC promptly notified
- The root causes have been determined
- Effective corrective actions were promptly implemented or planned
- This issue has a very high level of management attention
- Global Nuclear Fuel Americas has a very positive compliance record