



# Understanding the “what?” and the “why?” of February 14, 2014

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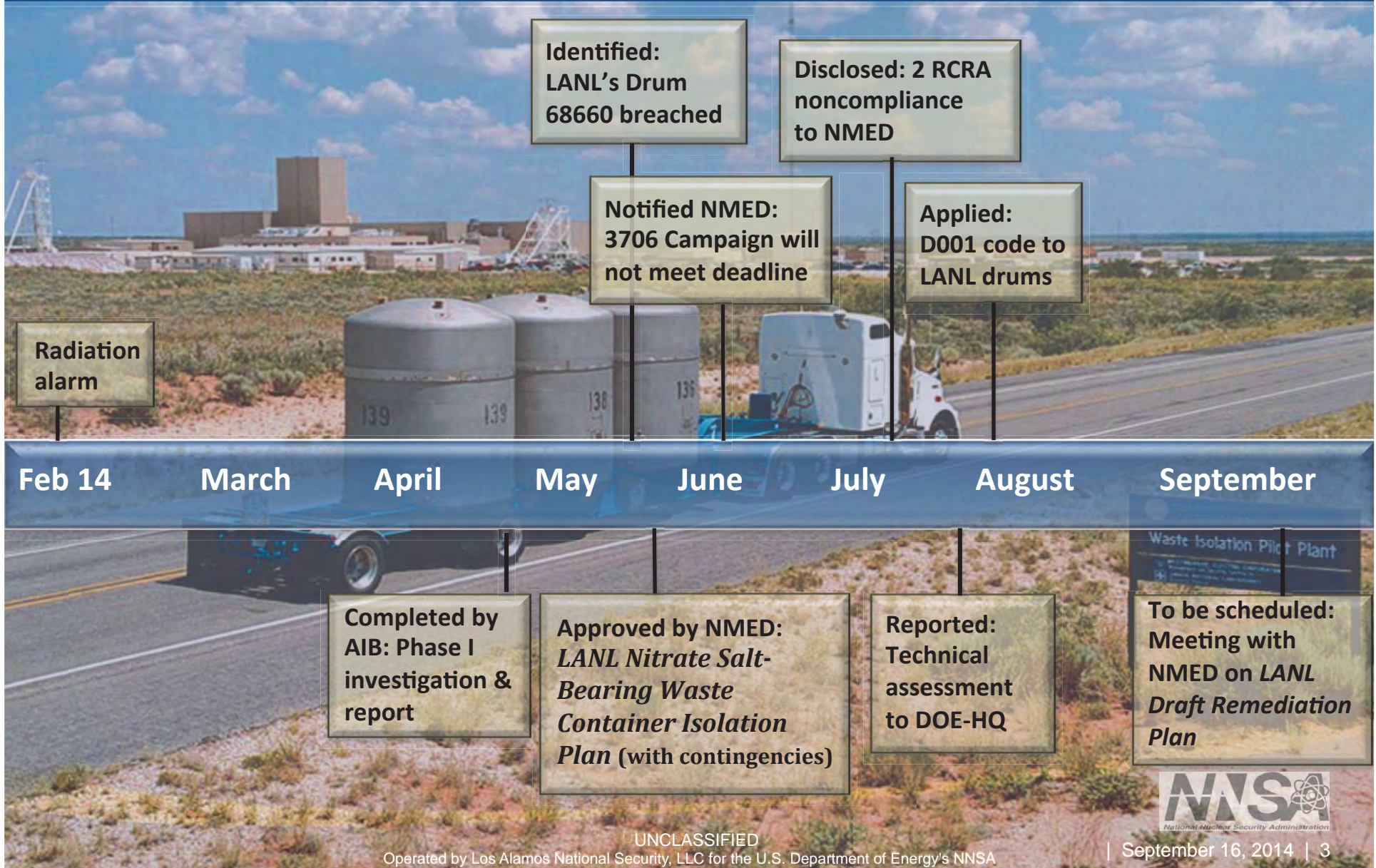
# Chemistry and Reactions in Drum 68660



What happened and why  
Ensuring that all LANL TRU waste is safe  
Creating a remediation strategy  
Making all LANL TRU waste inert



# Update on LANL's Response





# The History of Drum 68660

LANL generated waste to purify weapons-grade plutonium for Rocky Flats mission. Parent Drum initially packed at TA-55 circa 1985.



12/04/2013

Parent Drum remediated & packaged at WCRR, creating Drum 68660 and a sibling



1/31/2014

Drum 68660 placed in WIPP's Panel 7, Room 7



2/14/2014

Drum 68660 breached



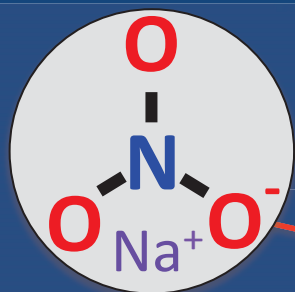
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# LANL's analysis of potential chemical reactions with nitrate salt wastes

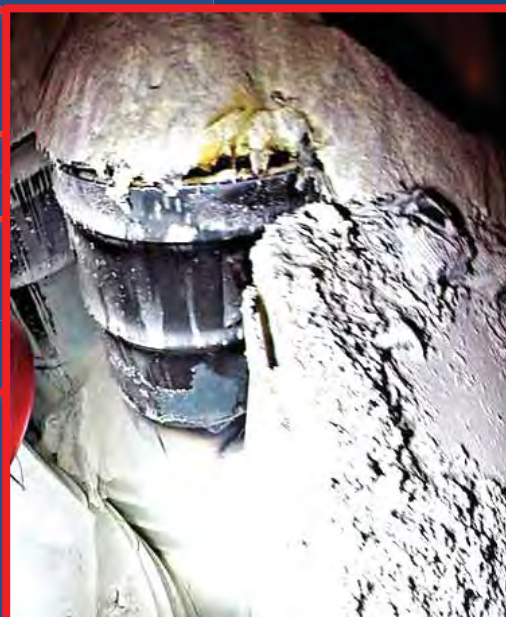
We can explain energetic reactions, but not initiation



Nitric  
Acid (pH)



Bi  
Pb  
W  
La



a matrix of organic kitty litter (fuel) with sodium nitrate (oxidizer)  
[reaction temperature: 300 °C]

unique combination of acids, salts, metals, and organics  
[reaction temperature: 100 °C]

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# LANL Technical, Causal, and Systems Analyses: Looked at processes, procedures, management systems



LANL did not consider the chemical reactions that unique combinations of radionuclides, acids, salts, metals, liquids, and organics might create

LANL did not comply with our RCRA permit for TRU waste characterization and treatment

- Neutralization & Treatment
- Acceptable Knowledge



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# A Limited Number of Higher-Risk, Remediated Drums:

None are at LANL; none can return without additional processing



678\*

remediated drums have  
nitrate salts,  
organic  
absorbent,  
metal impurities  
(e.g., lead),  
nitric acid

\*does not include  
29 unremediated  
drums at LANL

16

of those drums  
have absorbed  
free liquid with  
a recorded low  
initial pH (<2.0)

68660 in Panel 7  
11 in Panel 6  
4 at WCS

8

of those drums  
have absorbed  
free liquid with  
organic liquid  
neutralizer

68660 in Panel 7  
3 in Panel 6  
4 at WCS

2

of those drums  
have a WCRR  
glovebox glove

68660 in Panel 7  
1 in Panel 6

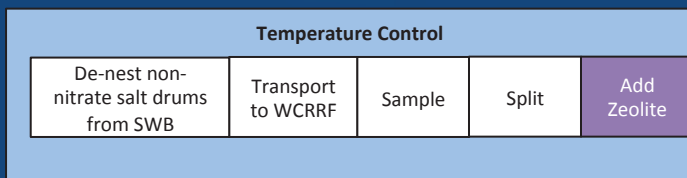
**WIPP:** 55 drums in Panel 7/Room 7 and 453 drums in Room 6. NMED issued an Administrative Order to close Panel 7/Room 7 and Panel 6 with the drums in place.

**WCS:** 113 drums at Andrews, TX, facility. Pursuing alternatives for processing and disposition.

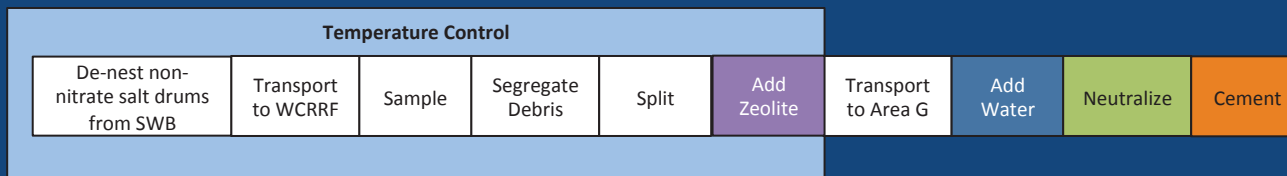
**LANL:** 57 drums will require additional processing at WCRR facility.

# LANL's Remediation Options for 57 Drums Onsite

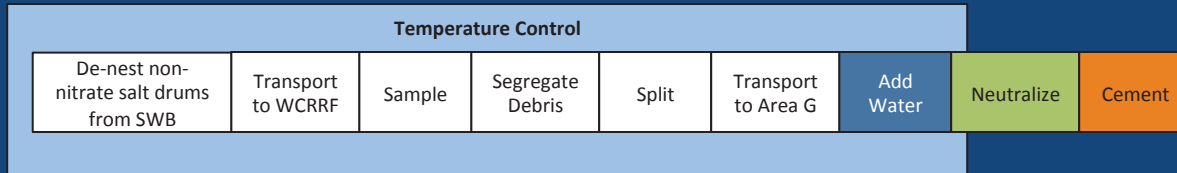
## OPTION 1 – Zeolite Addition without Cementation



## OPTION 2: Zeolite Addition with Cementation



## OPTION 3: Dry Process and Cementation without Zeolite Addition



## OPTION 4: Wet Process and Cementation without Zeolite Addition



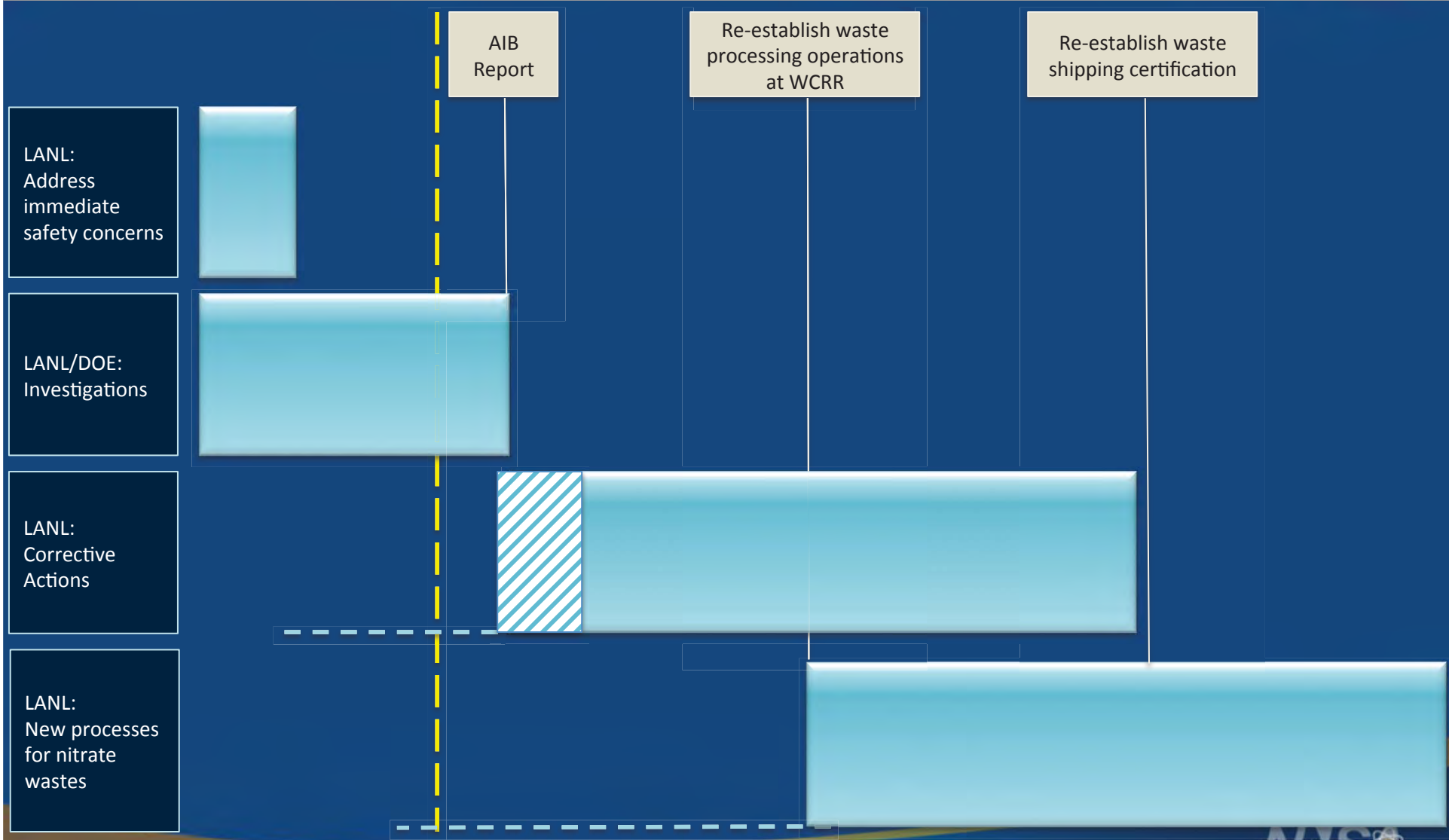
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# LANL support of WIPP recovery activities



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