Understanding the "what?" and the "why?" of February 14, 2014

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Los Alamos NATIONAL LABORATORY EST.1943

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Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA

NNSA National Nuclear Security Administration

Chemistry and Reactions in Drum 68660

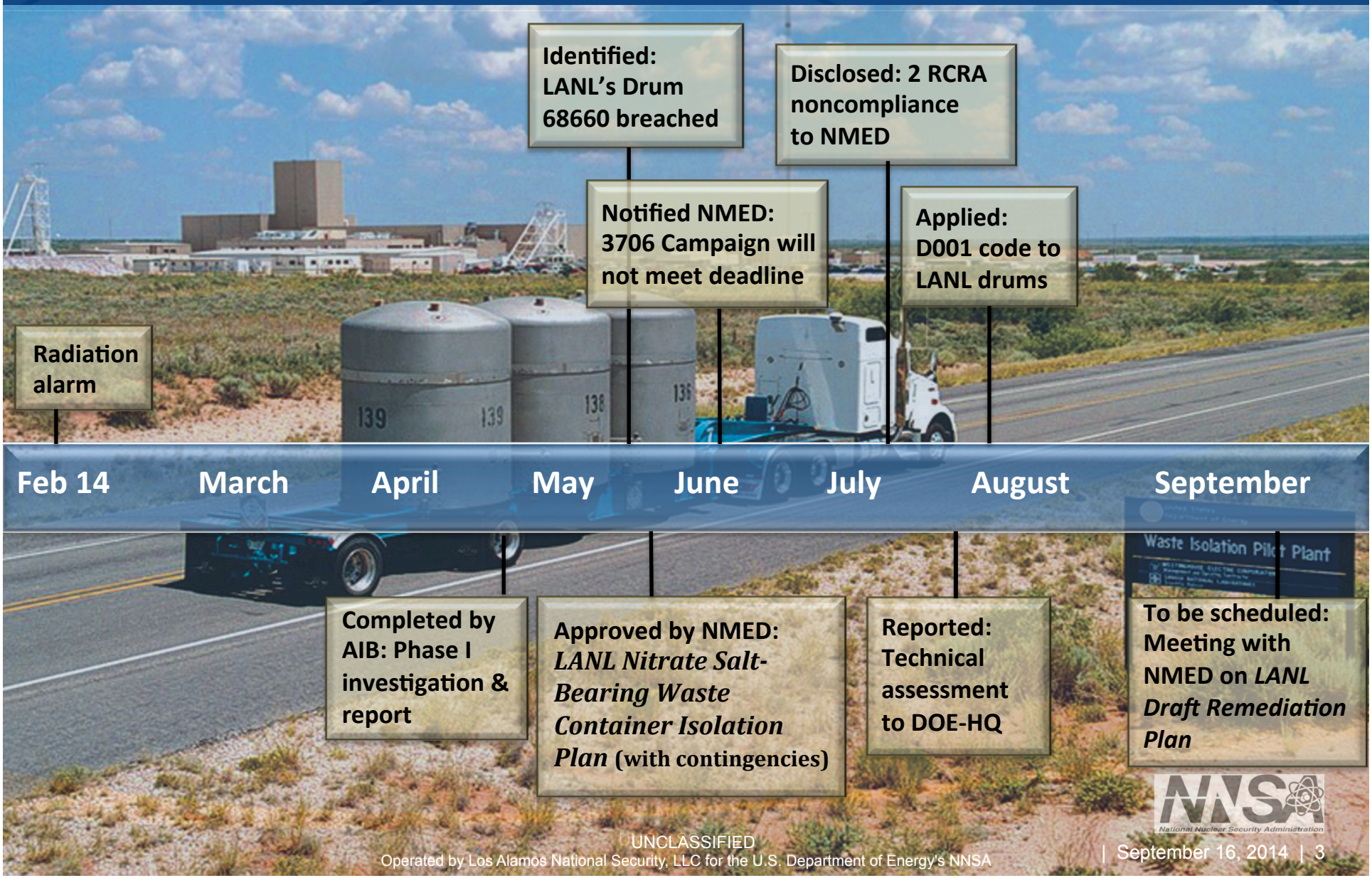
What happened and why

Ensuring that all LANL TRU waste is safe

Creating a remediation strategy

Making all LANL TRU waste inert

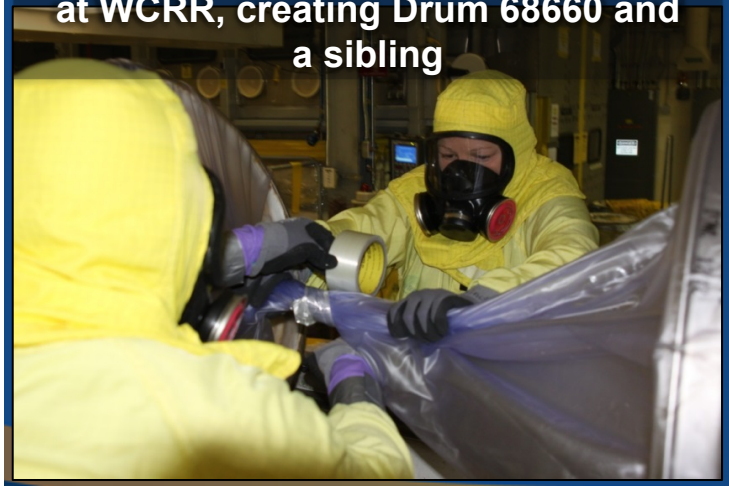
Update on LANL's Response



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.

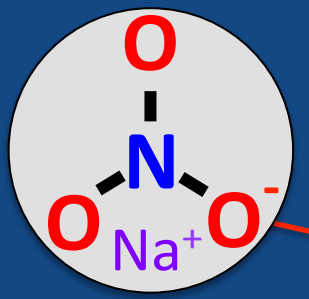
12/04/2013
Parent Drum remediated & packaged at WCRR, creating Drum 68660 and a sibling



1/31/2014
Drum 68660 placed in WIPP's Panel 7, Room 7

2/14/2014
Drum 68660 breached

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



Nitric Acid (pH)

We can explain energetic reactions, but not initiation

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]

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

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

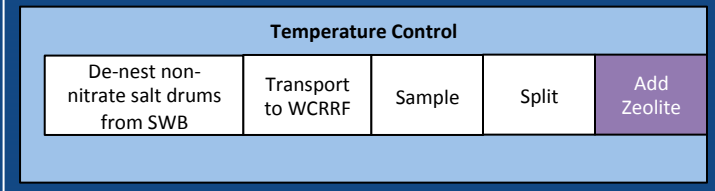
WIPP: 55 drums in Panel 7/Room 7 and 453 drums in Room 6. NMED issued an Administrative Order to close Panel 7/Room 7 and Panel 6 with the drums in place.

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

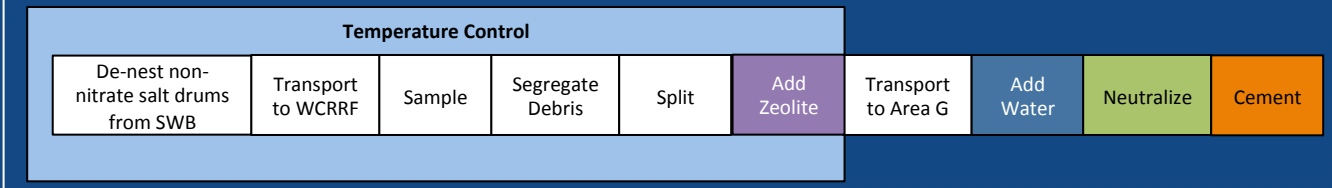
LANL: 57 drums will require additional processing at WCRR facility.

LANL's Remediation Options for 57 Drums Onsite

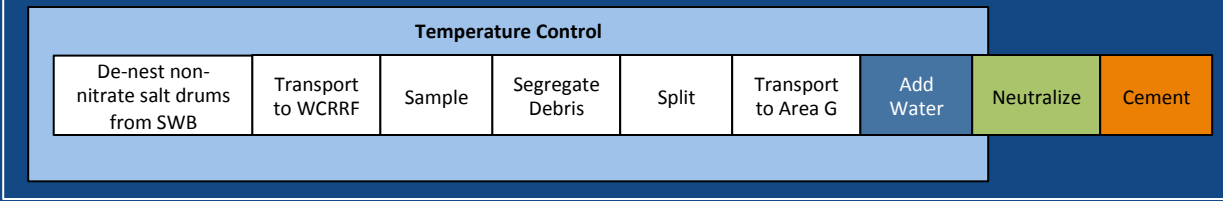
OPTION 1 – Zeolite Addition without Cementation



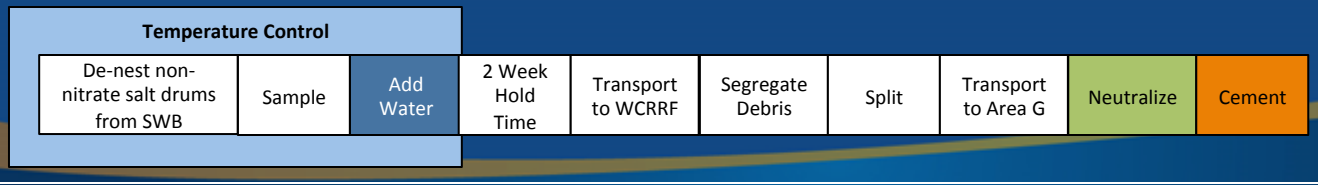
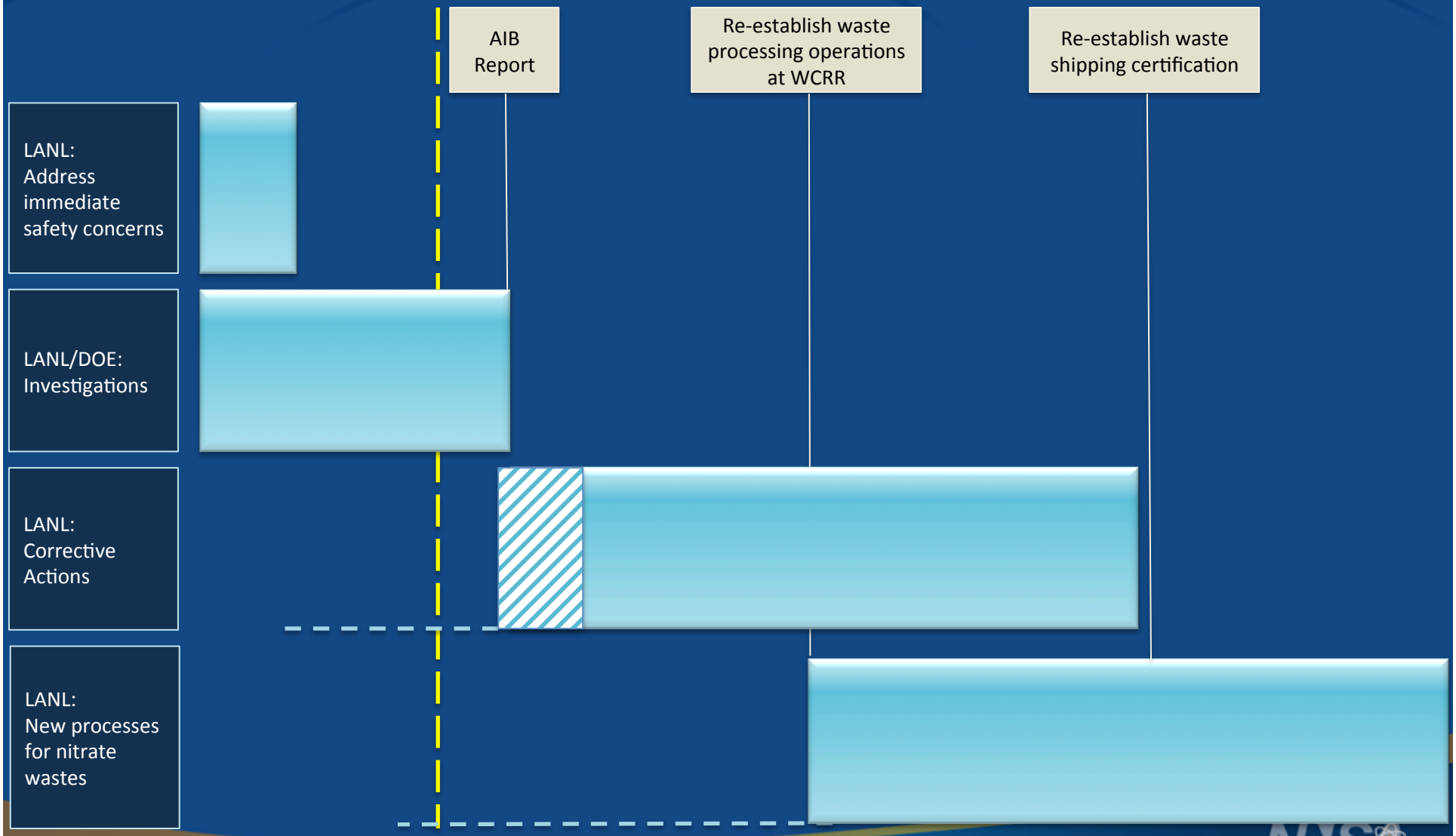
OPTION 2: Zeolite Addition with Cementation



OPTION 3: Dry Process and Cementation without Zeolite Addition



OPTION 4: Wet Process and Cementation without Zeolite Addition



LANL support of WIPP recovery activities