U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

Waste Management Update

Frank Marcinowski
Deputy Assistant Secretary for Waste Management

EM Site-Specific Advisory Board Chairs Meeting
April 23, 2015

Presentation Topics

- **WIPP Recovery Status**
- **Waste Disposition Status**
- **Map Disposition Model**

Recap of the Incidents at WIPP

February 5, 2014 Truck Fire:

- All operations at the repository ceased following salt haul truck fire in the WIPP underground.
- An investigation team was deployed to determine the cause of the fire.

February 14, 2014 Radiological Incident:

- A continuous air monitor detected airborne radiation in the underground.
- WIPP's ventilation system automatically switched to high-efficiency particulate air (HEPA) filtration mode when airborne radiation was detected
- Underground and the WIPP mine remains in filtration mode at this time.
- Extensive sampling and monitoring conducted by DOE, New Mexico, and Carlsbad Environmental Monitoring Research Center Monitoring.
  - EPA and the NMED also performed sampling.
- Efforts by the DOE and Nuclear Waste Partnership are ensuring workers are fully protected during recovery and restart.

Incidents at WIPP

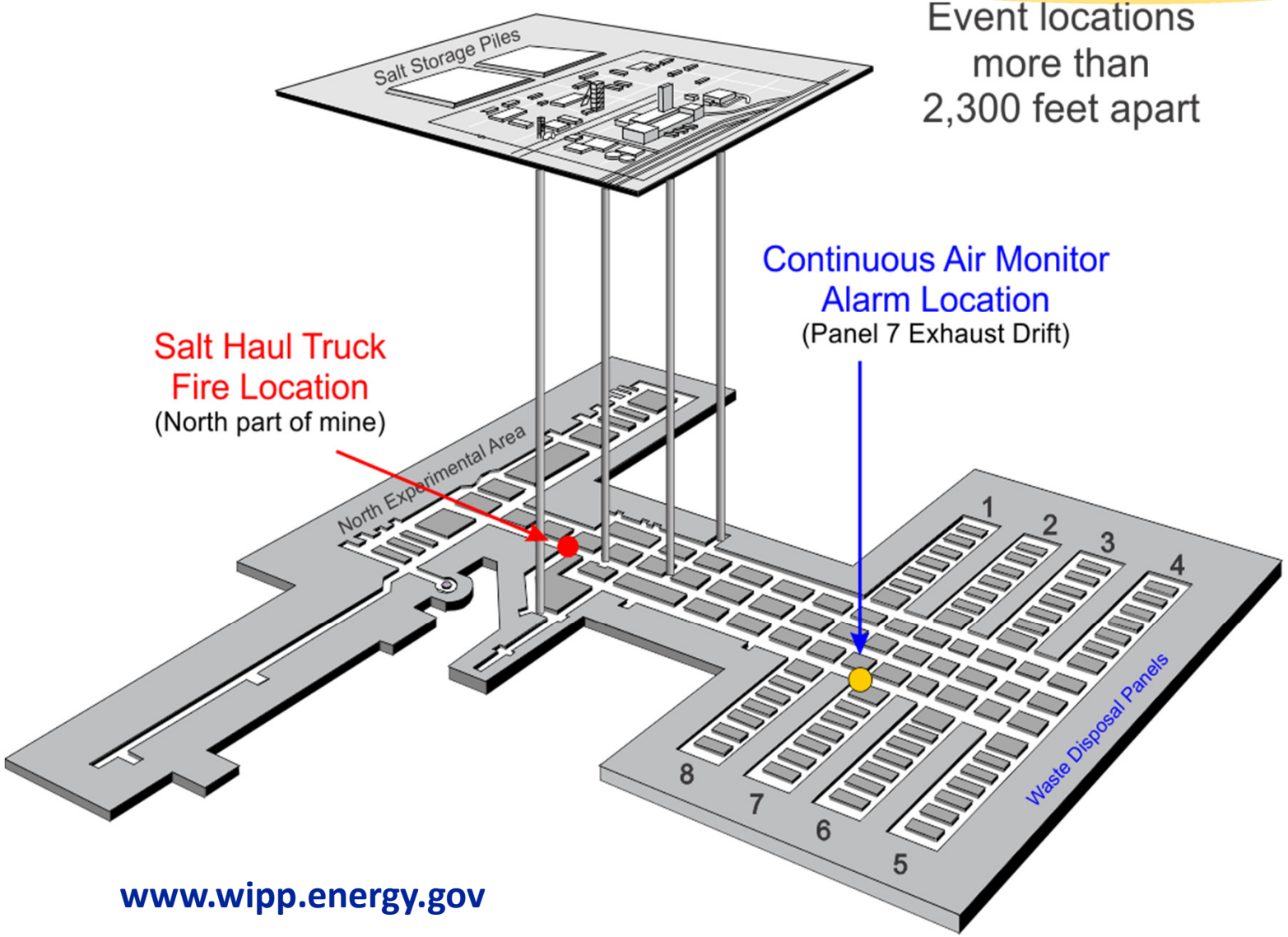
February 5 Underground Fire

- Accident Investigation Board (AIB) Report issued March 13, 2014

February 14 Radiological Release

- AIB Report, Phase I issued April 24, 2014
- AIB Report, Phase II issued April 16, 2015

Recap of Incidents: Layout of the Underground

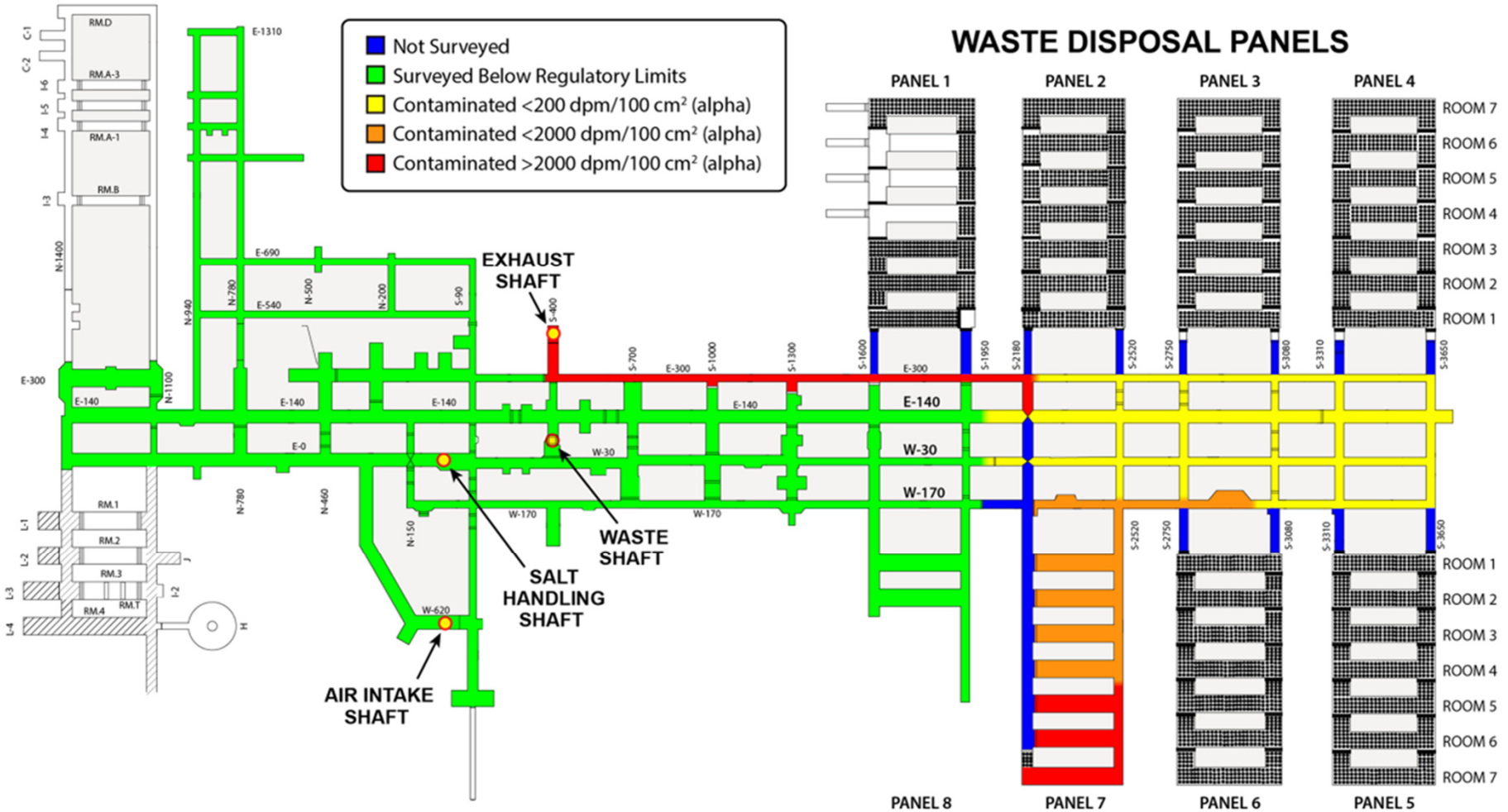


www.wipp.energy.gov

Key Recovery Steps toward Resumption of Operations

- **Nuclear Safety Document Revisions**
- **Safety Management Program Revitalization**
- **Underground Restoration**
  - Re-Establish Degraded Equipment
  - Fire Protection
  - Maintenance and Ground Control
  - Radiological Roll-back
  - Soot cleaning of electrical panels
- **Expedite mine stability**
- **Initial Panel 6 and Panel 7, Room 7 Closure**
- **Interim Ventilation**
- **Supplemental Ventilation Modifications**

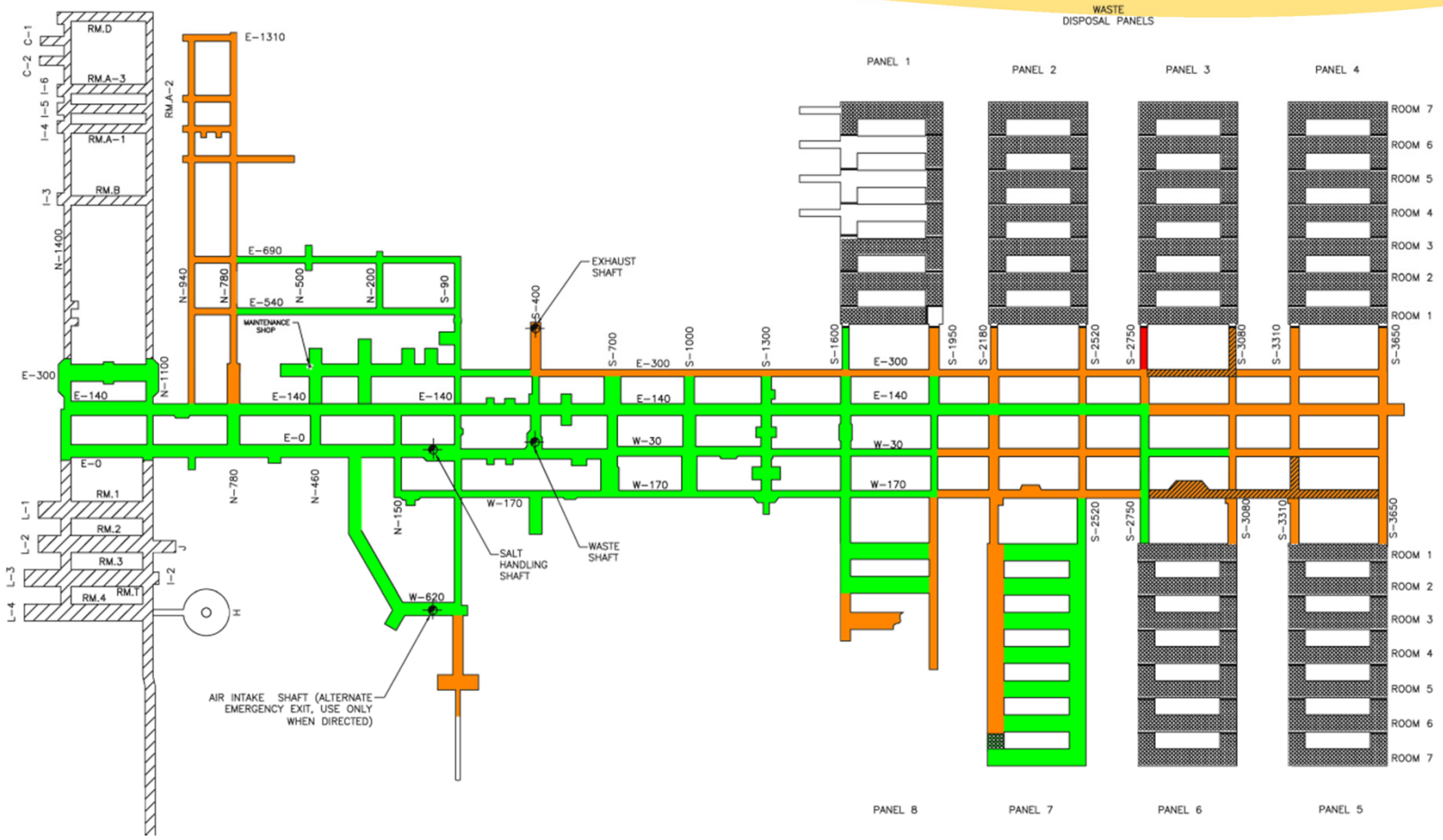
Radiological Rollback



Ground Control

- Bolting activities are being completed in a number of operationally significant areas
- As expected, the salt has moved since the incidents, and some rock-bolts have failed.

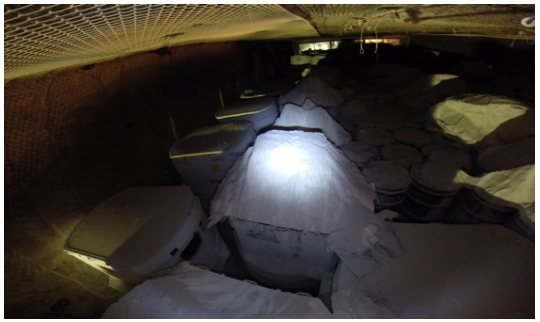
Recovery Status - Bolting



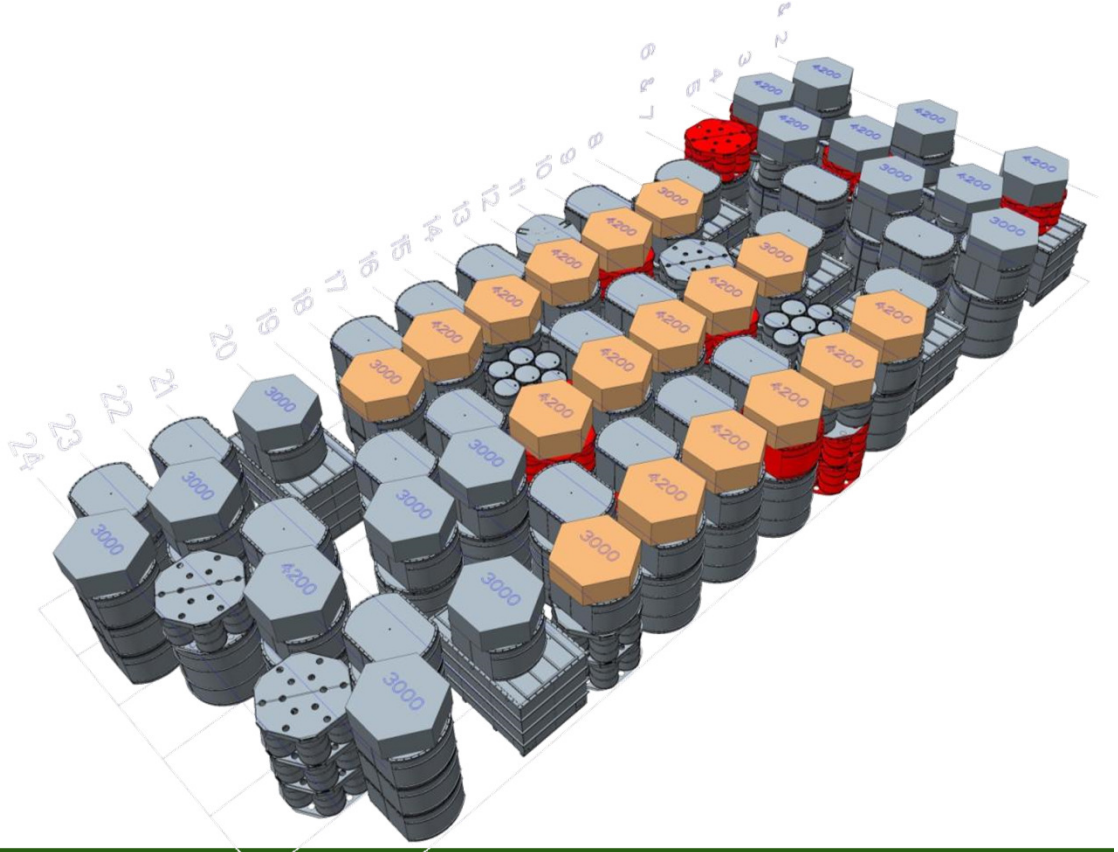
Bolting activities are continuing in both uncontaminated and contaminated areas

- Underground “catch-up” bolting continues with over 1,750 bolts installed
- Bolting activities to the entrance side of Panel 6 completed earlier this month

Room 7 Panel 7 Project REACH-- Completed



- Videos were completed on January 28, 2015; Accident Investigation Board confirmed no additional videos required.
- REACH project is complete.
- Photographic and video examination found no anomalies or other breached drums.
- Accident Investigation Board released the Phase II report on April 16, 2015.

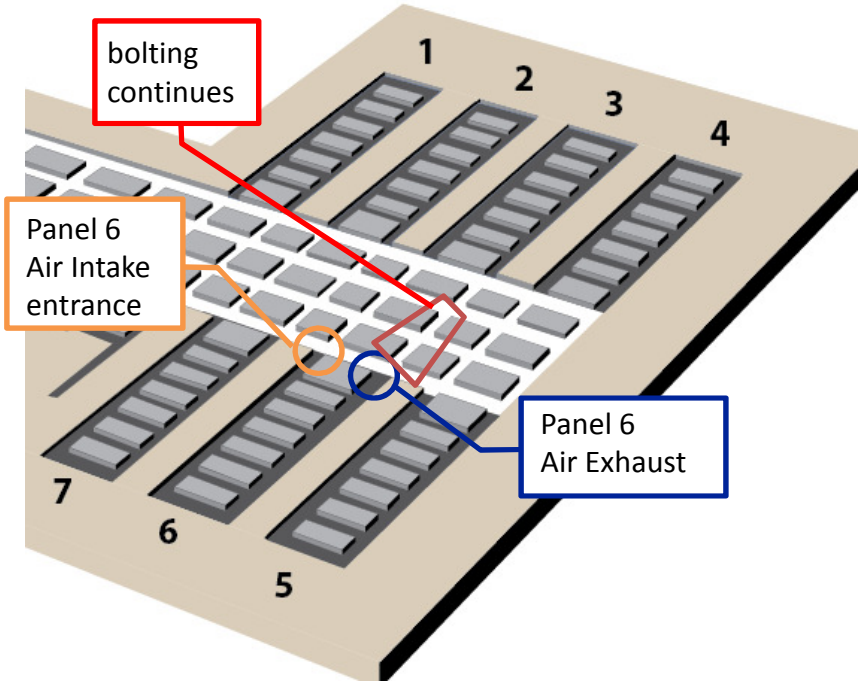


Contamination Mitigation

- WIPP has procured new equipment to mitigate contamination
  - Spray cart
    - Applies a water mist to stabilize and encapsulate the radioactive particles into the salt
  - HEPA vacuum system
    - Used to capture loose contamination that has not been encapsulated into the salt

Panel Closure Plans

- **Completed:**
  - Installation of two portable 10 horsepower fans in the entrance access area for air movement
  - Bolting at the entrance side of Panel 6
  - Installation of a bulkhead at the entrance side of Panel 6 (brattice cloth, chain-link and 10ft of salt already installed)
- **On-going:**
  - Bolting activities continue into the exhaust side of Panel 6
- **Upcoming:**
  - Panel 7, Room 7 to follow Panel 6



Ventilation

- **Increasing ventilation (airflow) is a principal requirement for safe underground operations, as it supports worker safety, mining and waste emplacement.**
- **Current Status**
  - Ventilation in Filtration Mode
    - 60,000 cubic feet per minute (cfm) of filtered air
  - Note: WIPP's standard (unfiltered) operational airflow is 425,000 cfm
    - WIPP Permit requires annual average 260,000 cfm through underground
    - Minimum of 35,000 cfm of air through the active rooms when waste disposal is taking place
- **Recovery Actions-- Ventilation will be increased in three phases.**
  - **Phase I** – HEPA skid and fan unit (114,000 cfm).
  - **Phase II –** Reconfiguring airlock and bulkheads and additional fans (180,000 cfm). ECD
  - **Phase III (not needed for initial limited operations)** – Design and construct new permanent ventilation system (420,000 cfm).

Technical Assessment Team (TAT)

Technical Assessment Team:

- Established to conduct analyses and assessments to determine the mechanism(s) and chemical reactions that resulted in the drum failure and release of material
- Utilized the technical and scientific expertise of the national laboratories to form its core leadership team (Savannah River, Pacific Northwest, Sandia, Oak Ridge, and Lawrence Livermore National Laboratories)
- Coordinated efforts with the Accident Investigation Board

Goals and Objectives:

- Determine the reaction history and mechanisms that caused the breach of WIPP drum 68660 and how it compared to other MIN02 waste
- Increase understanding of the MIN02 waste stream and provide meaningful scientific data and assessments to the Accident Investigation Board (AIB)

Technical Assessment Team (TAT) cont.

TAT Overarching Conclusion:

"Chemically incompatible contents of Drum 68660 from Los Alamos National Laboratory in combination with physical conditions (e.g., the configuration of the materials in the drum) supported exothermic chemical reactions leading to a thermal runaway; the consequent build-up of gases within the drum displaced the drum lid, venting radioactive materials and hot matter that further reacted with air or other materials outside the drum to cause the secondary damage observed in WIPP P7R7."

Report available on the WIPP recovery web site at:
http://www.wipp.energy.gov

Accident Investigation Board Phase II Report

- **Accident Investigation Board Phase II Report issued April 16, 2105**

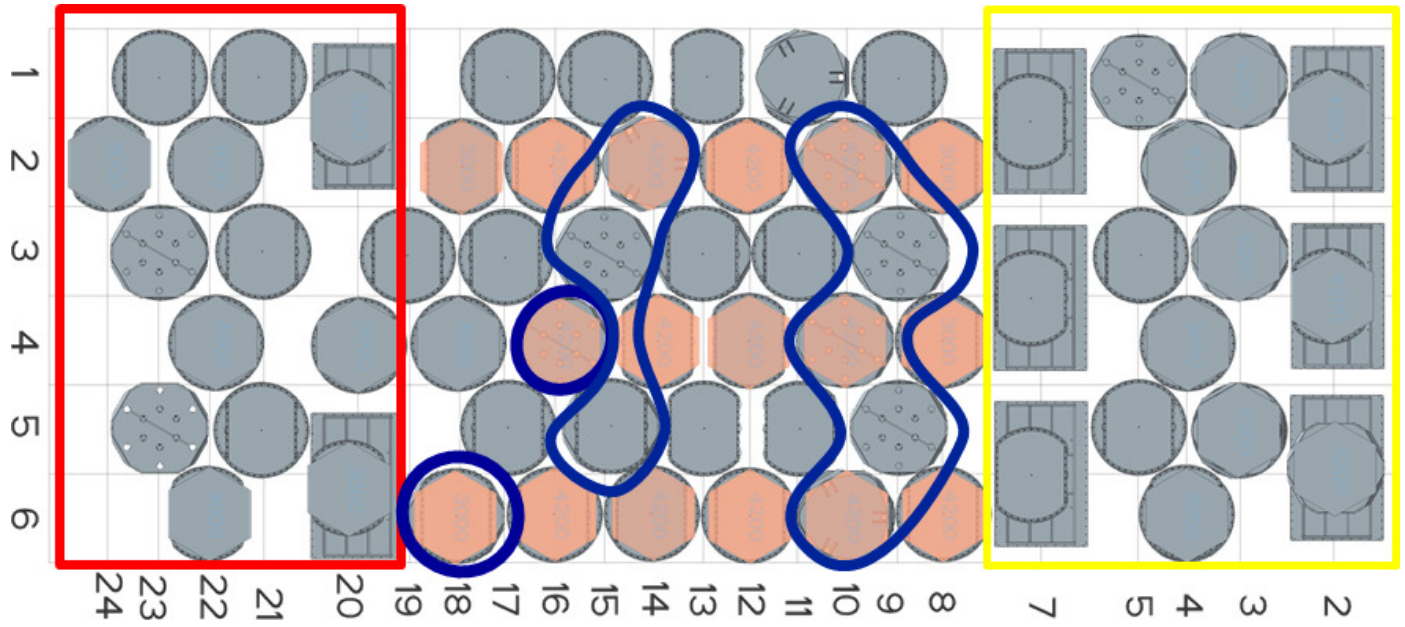
- **The AIB determined the accident was preventable.**

  - **Direct Cause**: Exothermic reaction of incompatible materials in a LANL waste drum
  - **Local Root Cause**: Failure of LANS to understand and effectively implement the LANL Hazardous Waste Facility Permit and Carlsbad Field Office directed controls
  - **Systemic Root Cause**: Los Alamos Field Office and the Carlsbad Field Office National Transuranic Program failure to ensure that LANL had adequately developed and implemented repackaging and treatment procedures.

- Shortcomings found within both contractor and federal processes at the Los Alamos National Laboratory, WIPP, EM, and the National Nuclear Security Administration

AIB Report Forensics Summary

- Event initiated at R16:C4 – Drum 68660
- Ruled out initiation in R15:C5
- Ruled out other start locations
- Greatest damage at areas with most exposed combustibles
- Demonstrated importance of ember transfer propagation
- Radiological and chemical analyses were similar to the TAT results



Corrective Actions

- **Four Corrective Action Plans Finalized**
  - DOE HQ Corrective Action Plan (CAP) in response to Accident Investigation Board (AIB) Report on the fire DOE HQ CAP in response to AIB Report on the Radiological Release, Phase 1 Report
  - CBFO combined CAP on Fire/Phase 1
  - NWP combined CAP on Fire/Phase 1

- **Corrective Action Plan for Radiological Release Phase 2 AIB Report in Progress**
  - Many corrective actions have been completed or are in progress

Corrective Action Plans are available on the WIPP recovery web site at: http://www.wipp.energy.gov

TRU Waste Generator Impacts

Prioritization of Shipments:

- It is premature at this stage of the recovery to predict and allocate the rate of TRU waste shipments to WIPP.
- Initial focus will be on emplacement of wastes generated during recovery activities and emplacement of wastes currently stored in the WIPP surface facilities (these wastes were received but not emplaced prior to the events).
- The timing for resumption of shipments from offsite currently is uncertain and will be based on a variety of factors.
- In determining the rate of shipments among sites, DOE will consider numerous technical and programmatic factors
  - WIPP transportation and waste acceptance capabilities
  - Generator site compliance commitments
  - Storage capacities
  - Other site specific technical or safety issues

EM Management Activities at Los Alamos

- September – Secretary Moniz direction
- December – acquisition efforts initiated associated with "bridge" contract – for scope to be conducted in ~2 yr period
- January – DOE approved initial actions related to establishment of an EM Los Alamos Field Office (EMLA) – directly responsible for implementation of legacy environmental cleanup scope
- February – initiated acquisition process for future competitive contract(s) for cleanup
- March – Industry Day — a "kickoff" event to inform and socialize issues regarding long-term contract with potential bidders — is held; and EM LA becomes operational under an Acting Manager until a Field Manager is selected and transition complete

Waste Disposition Status

Current Disposal Issues & Topics

- Ability to systematically plan and implement disposal plans for legacy nuclear materials
- Continuing to assure availability of receiver sites
- Decreased volumes and market impacts?
- Considerations in selection of offsite disposal vs. DOE regional disposal?
- Evaluation and planning for new on-site cells at Portsmouth and Paducah sites
- Pending regulatory actions affecting commercial facilities
    - Monitoring NRC's progress regarding the potential licensing of WCS as a GTCC disposal facility.

Key Waste Management Initiatives

- Implementing efforts to strengthen DOE's oversight of DOE disposal facilities and its waste management programs
- Continuing to seek opportunities to optimize waste generation, treatment, transportation and disposal
- Working with EFCOG Waste Management Group on efforts to integrate waste disposition efforts (such as LLW and TRU Corporate Boards)
- Continuing collaboration with stakeholders and industry is key to continued success

DOE LLW and MLLW Disposal Options

- DOE utilizes both Federal and commercial disposal facilities; under DOE policy commercial facilities may be utilized if disposition is cost effective, compliant, and in the best interest of the government
- Site-generated LLW and MLLW continues to be disposed at Hanford and Nevada Nuclear Security Site (NNSS); Savannah River Site continues to dispose of LLW; and some limited LLW disposal continues at Los Alamos
- DOE has operating CERCLA disposal facilities for LLW and MLLW from site cleanup at Hanford, Idaho Site, and the Oak Ridge Reservation; potential future new facilities are being evaluated at Portsmouth GDP and Paducah GDP sites
- NNSS accepts DOE LLW/MLLW for disposal from other DOE sites that do not have disposal options on site; currently there are 26 approved generators to NNSS
- Hanford currently does not accept DOE LLW/MLLW from other DOE sites
- DOE has indefinite delivery/indefinite quantity national treatment and disposal contractors with commercial vendors open to all DOE sites and contractors
- Waste disposed at the WCS Federal Waste Facility falls under an MOU with the State of Texas and contract provisions with WCS; DOE will accept title to the FWF disposal cell upon closure at no cost to the government

Map Disposition Model

New Disposition Map Model

- Responding to request for site specific disposition maps
- Addressing challenges with WIMS data base used for LLW/MLLW data
- Developing a new graphic, a disposition map model for input
- Idaho
  - Lots of disposition paths
  - Seeking input

OFFICE OF ENVIRONMENTAL MANAGEMENT

IDAHO SITE

MAJOR ONSITE TREATMENT FACILITIES
AMWTP – CH TRU/MLLW
RHDP – RH TRU, M/LLW
IWTU – SBW
Calcine disposition Facility (planned) - Calcine
ISFF (planned) – SNF Treatment and Packaging

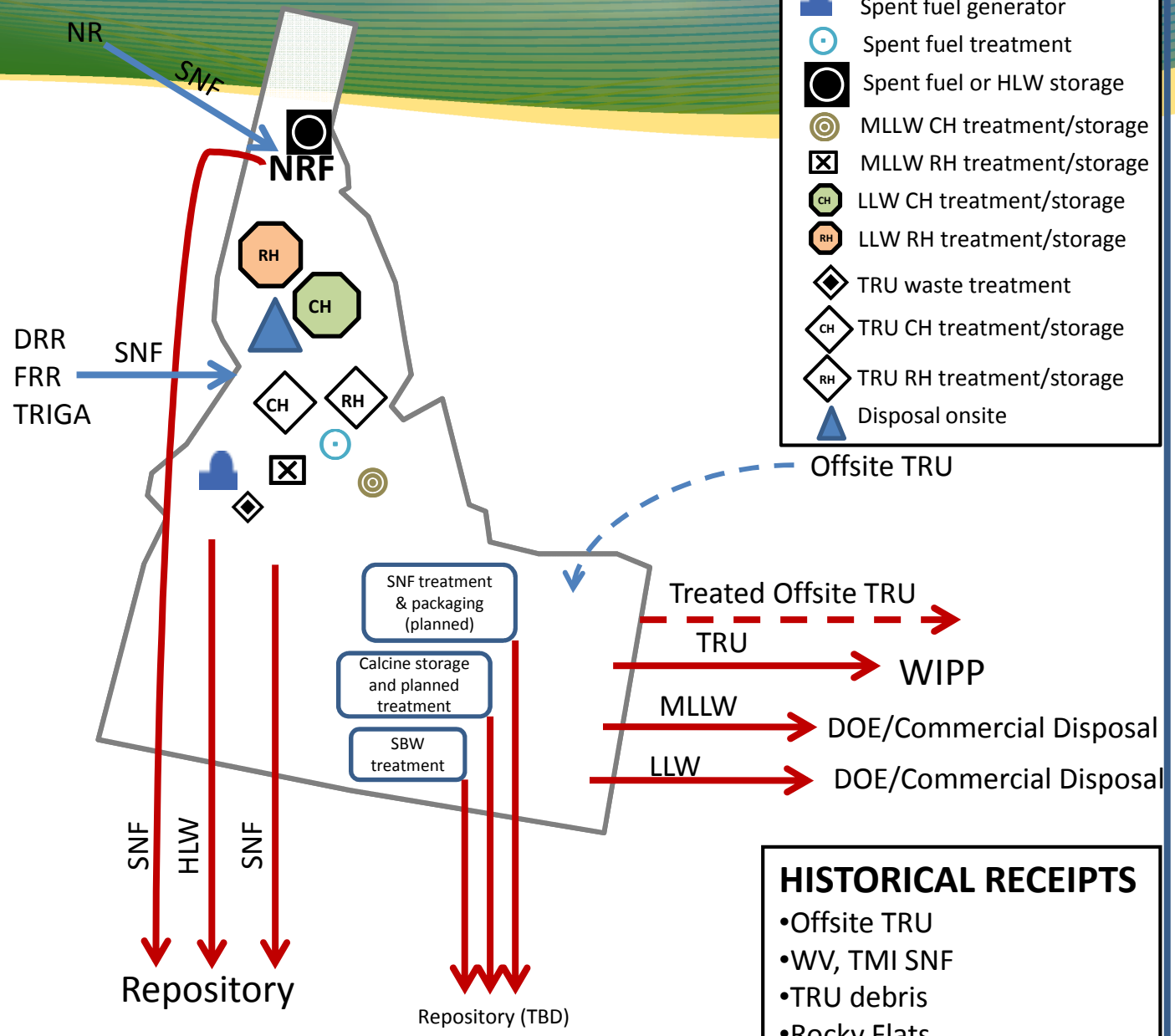
ONSITE ACTIVE DISPOSAL FACILITIES
ICDF – Onsite CERCLA Remediation Waste

Active
RH LLW Disposal Facility } INL and NR activated metals

Replacement
RH LLW Disposal Facility (Planned) } INL and NR activated metals

FUEL
NR – Naval Reactor Fuel
DRR – Domestic Research Reactor Fuel
FRR – Foreign Research Reactor Fuel
TRIGA Reactor Fuel

TYPES OF WASTE
HLW - High-level waste
MLLW - Mixed/low-level waste
LLW - Low-level waste
TRU - Transuranic
CH - Contact Handled
RH - Remote Handled
SNF - Spent Nuclear Fuel



HISTORICAL RECEIPTS

- Offsite TRU
- WV, TMI SNF
- TRU debris
- Rocky Flats
- Commercial fuel for R&D

*Offsite SNF receipts suspended until completion of SBW treatment
** Offsite TRU must be treated and shipped out of Idaho within one year of receipt