



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

WIPP Underground Fire Accident Investigation Summary February 5, 2014

Ted Wyka
Chairman, Accident Investigation Board
March 2014

The Accident



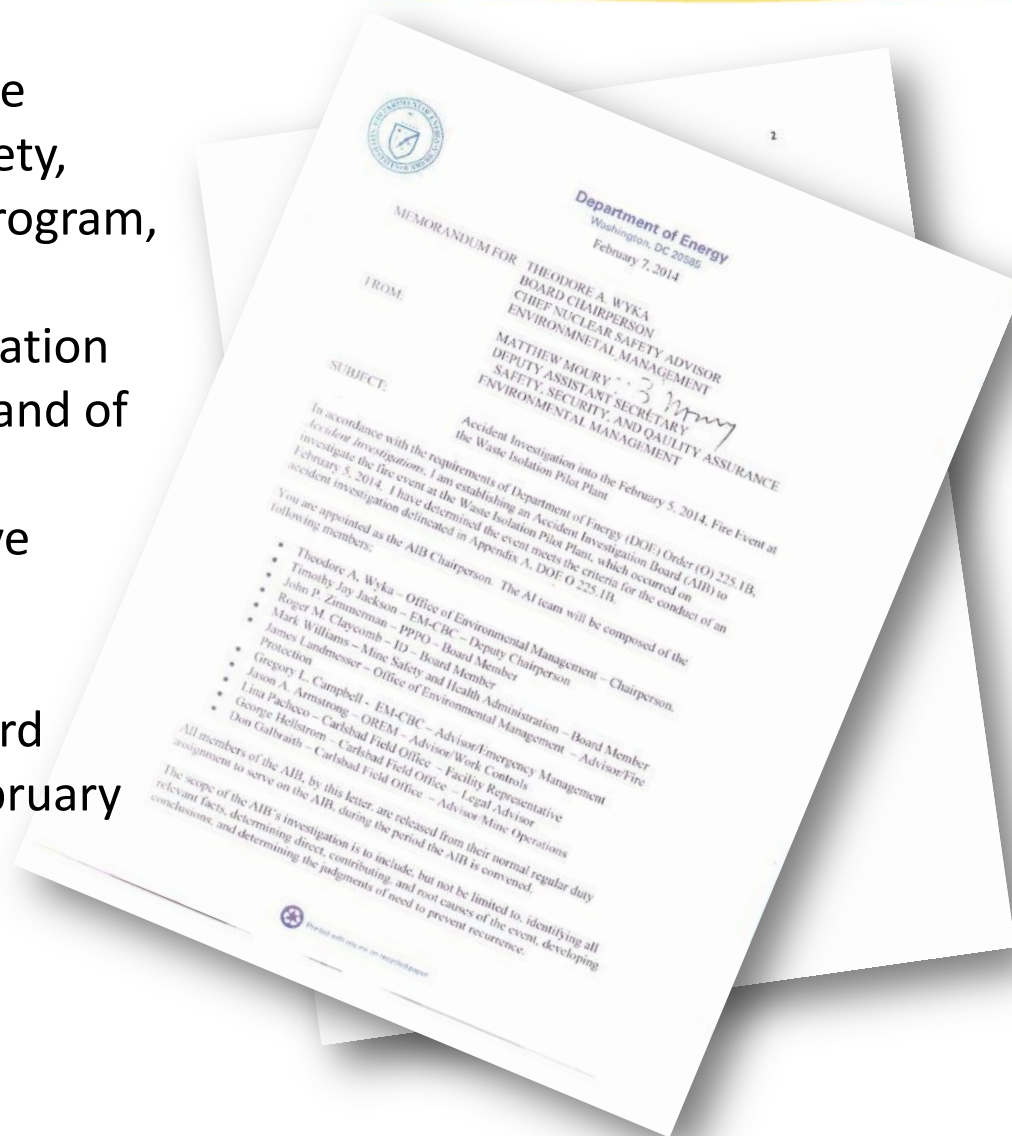
On February 5, 2014, at approximately 11:00 AM, the Waste Isolation Pilot Plant in Carlsbad, New Mexico suffered an underground fire in a salt hauler vehicle. There were 86 people in the mine at the onset of the fire, all exited the mine safely. Six personnel were transported to the Carlsbad Medical Center for smoke inhalation and an additional seven personnel were treated on-site.



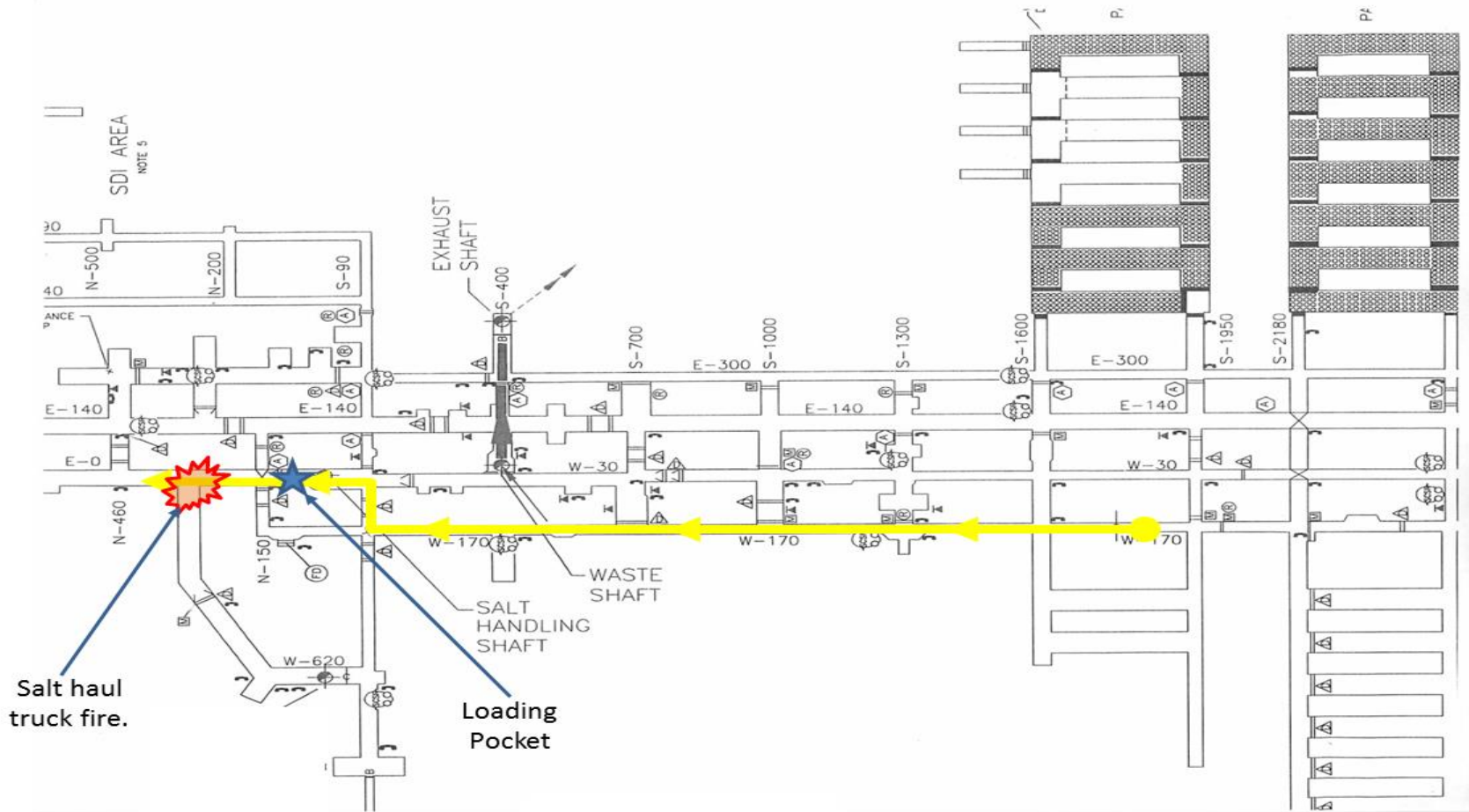
The EIMCO Model 985, 15 ton haul truck is a diesel powered vehicle used to haul salt from the mine. This is an aged piece of equipment, approximately 29 years old.

On Friday, February 7, 2014, the Deputy Assistant Secretary Safety, Health, Security, and Quality Program, Environmental Management, appointed an Accident Investigation Board to determine the cause and of the accident and to develop recommendations for corrective actions to prevent recurrence.

The Accident Investigation Board arrived on-site on Monday, February 10, 2014.



Accident Scene



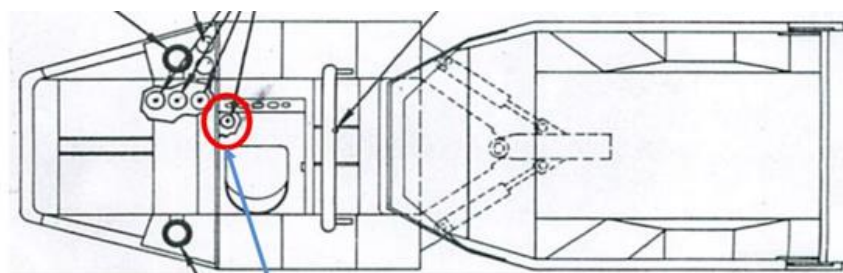
Salt Haul Truck



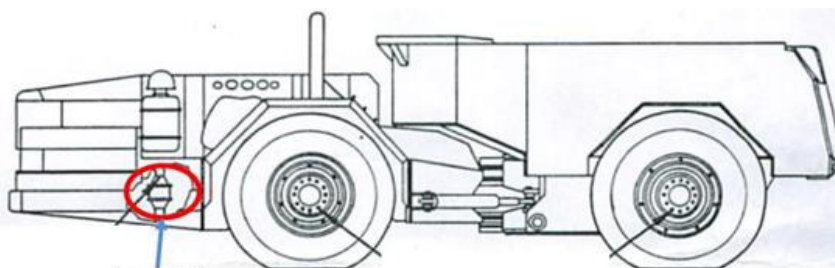
Location operator saw
orange glow.

What Caused the Fire

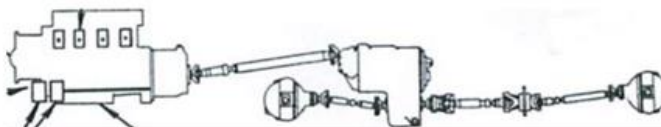
- The Board has been unable to perform detailed physical forensics on the vehicle underground due to the February 14th radiological event.
- The Board reviewed photographs taken with forensic experts including a New Mexico Fire Investigator from the State Fire Investigation Bureau and the Eddy County New Mexico Fire Marshall.



(a) Plan View



(b) Elevation



(c) Power System Elevation

- The Board made two entries into the underground prior to the event on February 14th:
 - Inspect the salt haul truck involved in the fire;
 - Examine the condition of equipment, including discarded self-rescuers and carts;
 - Examine the amount and location of soot on the back (roof) and ribs (walls);
 - Determine the operability of essential communication equipment (mine phones at the assembly areas, the mine paging system);
- The Board has conducted interviews with NWP underground workers, first responders, NWP management and support staff, subcontractors, DOE management, and DOE oversight staff.

Score Card of Conclusions and Judgment of Needs

SUBJECT	Conclusions	Judgment of Needs			
		NWP	CBFO	HQ	Total
Maintenance and CONOPS	5	7	4	0	11
Fire Protection Program	3	3	2	0	5
CMR Response	3	3	0	0	3
Training and Qualification	2	2	0	1	3
Emergency Management/ Preparedness	3	8	7	0	15
Nuclear Facility versus Mine Culture	2	2	2	0	4
NWP Quality Assurance	1	1	0	0	1
CBFO Oversight	3	0	3	0	3
Headquarters Oversight	2	0	0	6	6
Totals	22	26	18	7	49

Positive Observations

- Supervisors and employees in the underground proactively alerted other workers of the fire and need to evacuate before the evacuation alarm was sounded.
- Workers assisted each other during the evacuation, including helping them to don self-rescuers and SCSRs.
- Personnel in the underground exhibited detailed knowledge of the underground and ventilation splits.
- NWP on-site medical response was effective in treating personnel.

Report Findings

- Maintenance program was ineffective
- Fire protection program was less than adequate
- CMR response (evaluation and protective actions) were less than adequate



Hydraulic Leak under Sister Vehicle



Air Lock Doors Wired Open



Combustible Loading in the Mine

- **Emergency management/preparedness and response program were ineffective (several repeat issues from external reviews)**



Self-Contained Self-Rescuers – Deployed and Abandoned



Inset Shows Obstructed Reflectors

- **Nuclear facility versus mine culture**
 - Different treatment of waste versus non-waste handling equipment, e.g., combustible buildup, manual versus automatic fire suppression system, fire resistant hydraulic oil, etc.
 - DSA/TSR LCO 3.3.7 allows a non-waste handling truck in this condition to be at the waste face for retrieval.
 - There is a difference in the level of oversight and attention on waste versus non-waste handling equipment.

Oversight

- Contractor Assurance System
- Carlsbad Site Office Oversight
- Lost opportunities to utilize Mine Safety and Health Administration (MSHA) inspections and assist visits required by public law and the MOU with respect to mine geology, underground construction techniques, and mine safety.
- Headquarters Oversight

Continuous Improvement for Operations

For more information go to www.wipp.energy.gov



WIPP Fire Accident Investigation

- **Nuclear Facility vs., Mine Culture:** Difference in expectations between waste handling and non-waste handling vehicles; e.g., combustible buildup, manual versus automatic fire detection and suppression system, fire resistant hydraulic oil. Potential USQ with use of these vehicles at the waste face (LCO).
- **Operability and recognition of impaired critical safety equipment,** e.g., salt haul truck combustible build up; discontinued use of the vehicle wash station; chaining open of ventilation doors impairing remote operation; inoperable ventilation fans; out-of-service regulator/damper; inoperable mine phones ; emergency lights in the Waste Handling Facility; obscured evacuation reflectors; decision and analysis to disable the automatic fire detection and suppression system, etc. No method to readily understand status and impact of impaired mine safety related equipment.
- **Ineffective training and drilling**
 - No unannounced drills.
 - No donning of self-rescuers or SCSRs during training or drills, or hands on training with portable fire extinguishers.
 - Inconsistencies between Baseline Needs Analysis (BNA), underground fire response procedures, and drills/training.
- **Unreasonable expectations and uncertain capabilities of the Facility Shift Manager (FSM) to manage all aspects of an emergency or abnormal event.**
 - Significant problems with communications and alarms during the fire/evacuation delaying egress.
 - Shifting ventilation configuration during an ongoing evacuation.; inconsistent with procedures and mining best practices
 - During the radiological event, 8 hours elapsed before ordering sheltering in place
- **Emergency Operating Center (EOC) Ineffective as an Incident Command System (ICS).**
 - No tactical and strategic role/inconsistent with DOE Order 151.1C.
 - Failure to classify and categorize, and make required notifications and declarations during both the fire and radiological events.
- **Inadequate combustible loading program in the underground.**
- **Inadequate Fire hazard Analysis** (i.e. analysis of a fire near a shaft)
- **Maintenance, Emergency Management/Preparedness programs and NWP contractor assurance system (CAS) and CBFO oversight** were evaluated as **ineffective.**
- **Inadequate Headquarters oversight:** ineffective emergency management Incident Command System (ICS) and exercises; inadequate corrective action and closure on repeat externally identified issues; need for technical expertise available at HQ to support CBFO in overseeing the operation of a Hazard Category 2 facility in a mine or leveraging technical expertise at MSHA.