



Portsmouth EM Site Specific
Advisory Board

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RECYCLING AND WASTE DISPOSITION SUBCOMMITTEE

TUESDAY, MAY 13, 2014 @ 4:00 P.M.

THE PURPOSE OF THIS MEETING IS FOR THE SSAB SUBCOMMITTEE TO RECEIVE AN UPDATE ON D&D BY THE NUMBERS AND FY14 LOOK AHEAD

AGENDA

- D&D BY THE NUMBERS AND FY14 LOOK AHEAD - DENNIS CARR AND JEFF WAGNER, FBP
- WASTE ISOLATION PILOT PLANT (WIPP) ISOLATION OVERVIEW AND LESSONS LEARNED AT PORTSMOUTH-DENNIS CARR, FBP
- DISCUSSION

ADJOURN



RECYCLING & WASTE DISPOSITION SUBCOMMITTEE

MEETING SUMMARY

MAY 13, 2014 • 4:00 P.M.

THE OHIO STATE UNIVERSITY ENDEAVOR CENTER
1862 SHYVILLE ROAD, PIKETON, OH 45661

SSAB Subcommittee Members Present: Martha Cosby, subcommittee vice chair; Al Don Cisco, Frank Halstead, Dan Minter

SSAB Subcommittee Members Absent: Richard Snyder, subcommittee chair; Adrian Harrison, Brian Huber

Other SSAB Members Present: Will Henderson, board chair; Stan Craft, Sharon Manson

U.S. Department of Energy (DOE) and contractors: Greg Simonton, Johnny Reising, DOE; Rick Greene, Restoration Services, Inc. (RSI); Jeff Wagner, Karen Price, Dennis Carr, Fluor-B&W Portsmouth (FBP)

Liaisons: Mike Rubadue, Ohio Department of Health (ODH); Maria Galanti, Ohio Environmental Protection Agency (EPA)

Support Staff: Eric Roberts, Julie Galloway, Cindy Lewis, EHI Consultants (EHI)

Public: None

Cosby opened the meeting at 4:00 p.m.

1. Waste Isolation Pilot Plant Overview and Lessons Learned at Portsmouth-Dennis Carr, FBP

- **WIPP Underground Fire Accident Investigation Summary-February 5, 2014**
 - 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.
 - Maintenance program was ineffective. Fire protection program was less than adequate
 - CMR response (evaluation and protective actions) were less than adequate

- Emergency management/preparedness and response program were ineffective (several repeat issues from external reviews)
- Nuclear facility versus mine culture
- Operability and recognition of impaired critical safety equipment
- Ineffective training and drilling
- Unreasonable expectations and uncertain capabilities of the Facility Shift Manager (FSM) to manager all aspects of an emergency or abnormal event.
- Emergency Operating Center (EOC) Ineffective as an Incident Command System (ICS)
- Inadequate combustible loading program in the underground
- Inadequate Fire Hazard Analysis
- Maintenance, Emergency Management/Preparedness programs and NWP contractor assurance system (CAS) and CBFO oversight were evaluated as ineffective.
- **WIPP Underground Radiological Event Investigation Summary-February 14, 2014**
 - February 14, 2014, a high radiation alarm was received in the Central Monitoring Room (CMR) at the DOE Waste Isolation Pilot Plant (WIPP).
 - The alarm was from a continuous Air Monitor (CAM) in the underground that was monitoring an active transuranic (TRU) waste panel.
 - No employees were working in the underground. There were 11 personnel working on the surface.
 - Test results of filters from effluent monitoring Station B downstream from the HEPAs, and at the discharge to the atmosphere, were reported at 9:15 a.m. and indicated ~28 thousand dpm alpha and ~5.9 thousand beta contamination.
 - On February 19, Carlsbad Environmental Monitoring and Research Center (CEMRC) reported radiological results from the CEMEC air sampling station located approximately 0.6 miles northwest of the site on the WIPP access road.
 - The levels were higher than normal background levels of radioactivity from transuranic elements commonly found at WIPP and indicated a small release of radioactive particles from the WIPP site.
 - The Board identified the root cause of Phase 1 to be NWP's and CBFO's management failure to fully understand, characterize, and control the radiological hazard. The cumulative effect of inadequacies in ventilation system design and operability compounded by degradation of key safety management programs and safety culture resulted in the release of radioactive material from the underground to the environment; and the delayed/ineffective recognition and response to the release.
 - Conclusions
 - NWAP does not have an effective nuclear safety program in accordance with federal nuclear safety basis requirements.
 - Not effective in ensuring the operability and reliability of key components and equipment, e.g., Continuous Air Monitors, the

filtration system, effluent monitoring equipment (on and offsite).
 Etc.

- Not effective in ensuring timely and effective response, including collection and analysis of radiological data, contamination control, personnel and site surveys, equipment, training, etc.
- Not effective in ensuring prompt categorization and classification, timely implementation of protective actions, and required notifications and reporting.
- Key elements of the NWP Conduct of Operations program were ineffective in driving safe and compliant operation of a Hazard Category 2 facility.
- Nuclear Facility versus Mine Culture: Difference in expectations between operation of a Hazard Category 2 nuclear facility and a mine.

○ Questions?

Question/Comment:	Answer:
Simonton: Will headquarters be more involved in decisions made here?	Carr: I would think they would be more involved in the decisions here.
Roberts: At the Chairs meeting, they were talking about the cost to make the repairs. It is going to be very costly.	

Cosby: Meeting adjourned at 4:50 p.m.

2. Action Items: None



U.S. DEPARTMENT OF
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Pre-decisional Draft

WIPP Underground Fire Accident Investigation Summary February 5, 2014

Ted Wyka
Chairman, Accident Investigation Board
March 2014

The Accident



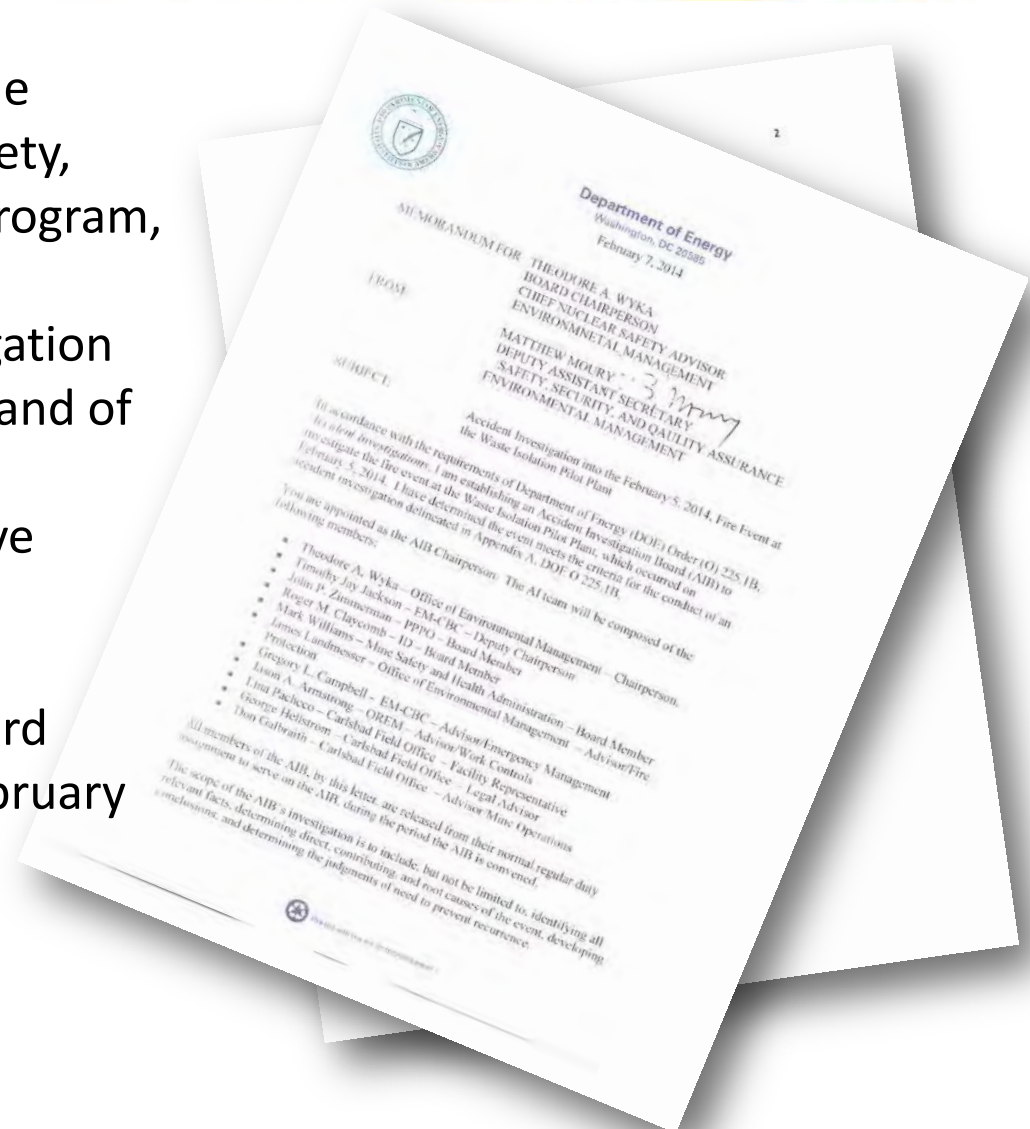
On February 5, 2014, at approximately 11:00 AM, the Waste Isolation Pilot Plant in Carlsbad, New Mexico suffered an underground fire in a salt hauler vehicle. There were 86 people in the mine at the onset of the fire, all exited the mine safely. Six personnel were transported to the Carlsbad Medical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



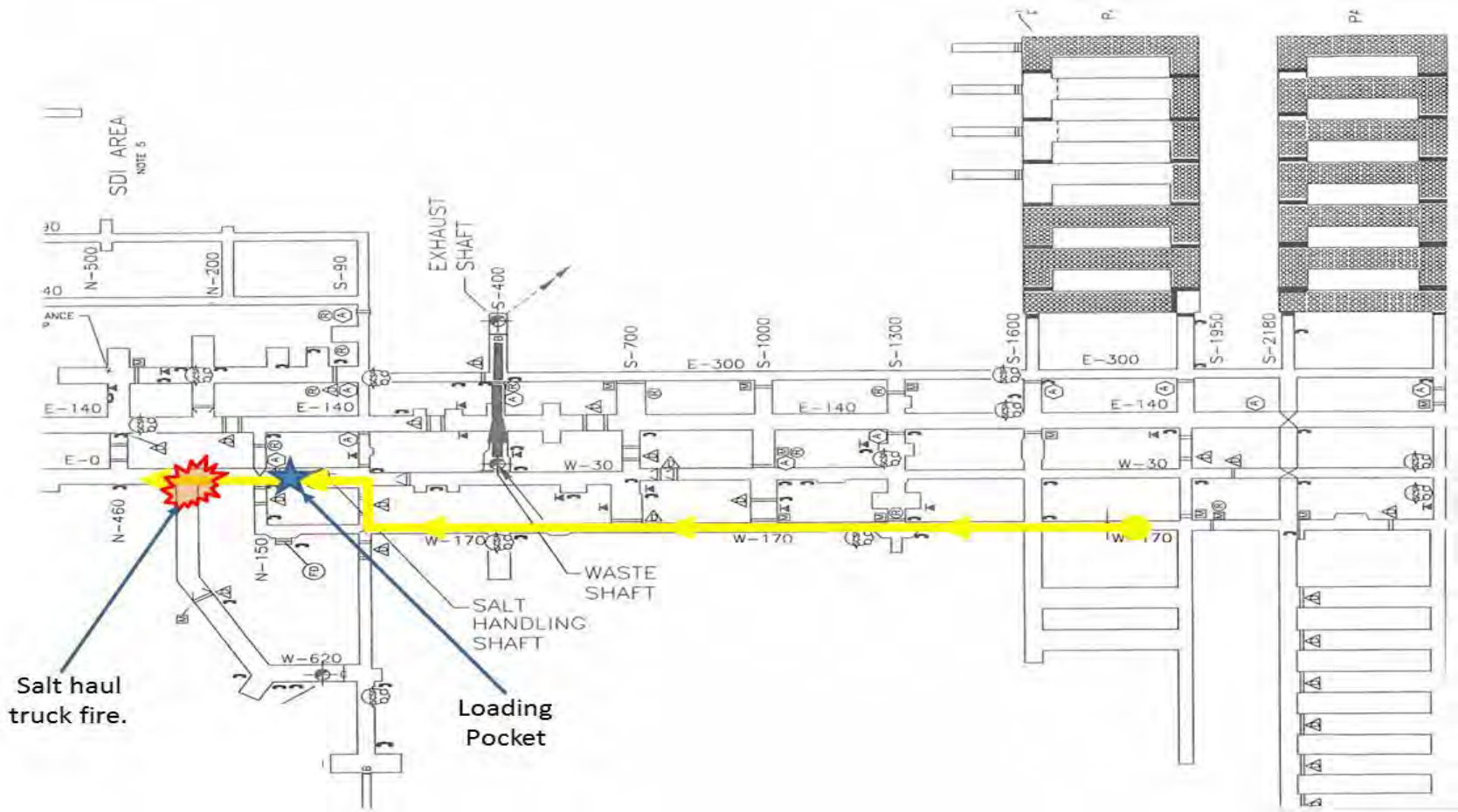
The EIMCO Model 985, 15 ton haul truck is a diesel powered vehicle used to haul salt from the mine. This is an aged piece of equipment, approximately 29 years old.

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

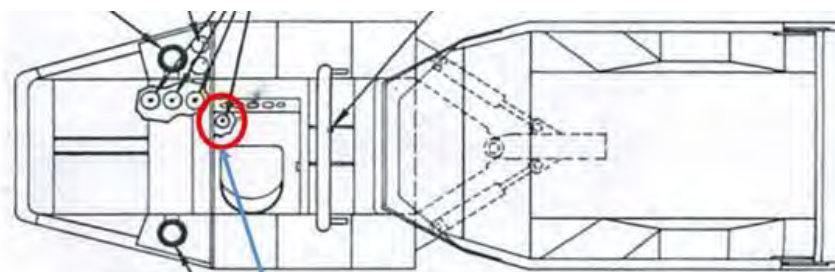


Salt Haul Truck



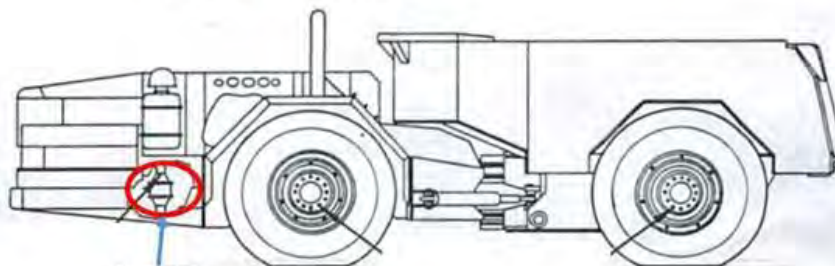
What Caused the Fire

- 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.



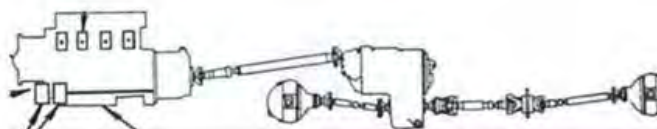
(a) Plan View

Initial location of access panel



(b) Elevation

Suspected
ignition point



(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.

- 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

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.



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Pre-decisional Draft

WIPP Underground Radiological Event Investigation Summary February 14, 2014

Ted Wyka
Chairman, Accident Investigation Board
March 2014

Pre- Decisional Draft

On Friday, February 14, 2014, at approximately 11:14 PM (MST), a high radiation alarm was received in the Central Monitoring Room (CMR) at the DOE Waste Isolation Pilot Plant (WIPP) east of Carlsbad, New Mexico.



Continuous Air Monitor (CAM)

The alarm was from a Continuous Air Monitor (CAM) in the underground that was monitoring an active transuranic (TRU) waste panel.

The Event

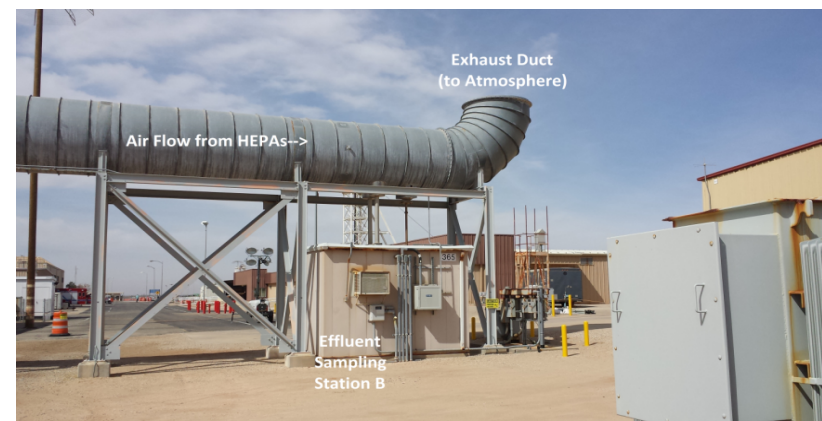
- In response to the alarm, the Underground Ventilation System (UVS) automatically initiated a switch to High Efficiency Particulate Air (HEPA) filtration mode.
- Contaminated air was then directed through two HEPA filter banks and then to the atmosphere.
- There were no employees working in the underground. There were 11 personnel working on the surface.
- Upon receiving the alarm, the CMR operator attempted to call the on-call radcon technicians. Two hours later, the CMR operator contacted the Operations and Radiological Controls Managers who were offsite.



Active Waste Face at Panel 7, Room 7

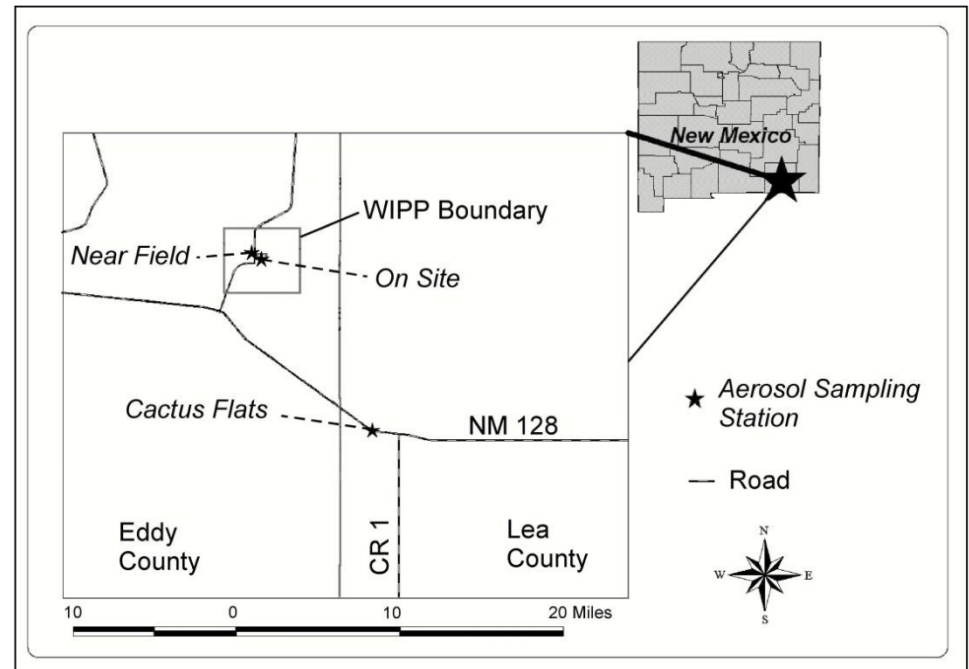
The Day After the Event

- On Saturday at 7:15 AM, February 15, the Radiological Controls Manager reported 4.4 million disintegrations per minute (dpm) alpha contamination on filters from effluent monitoring Station A upstream from the HEPAs and indicative of transuranics (TRU).
- Test results of filters from effluent monitoring Station B downstream from the HEPAs, and at the discharge to the atmosphere, were reported at 9:15 AM and indicated ~28 thousand dpm alpha and ~5.9 thousand beta contamination.
- Site Personnel were sheltered-in-place from 9:34 AM to 4:35 PM, then site access was restricted to essential personnel.



The Days Following

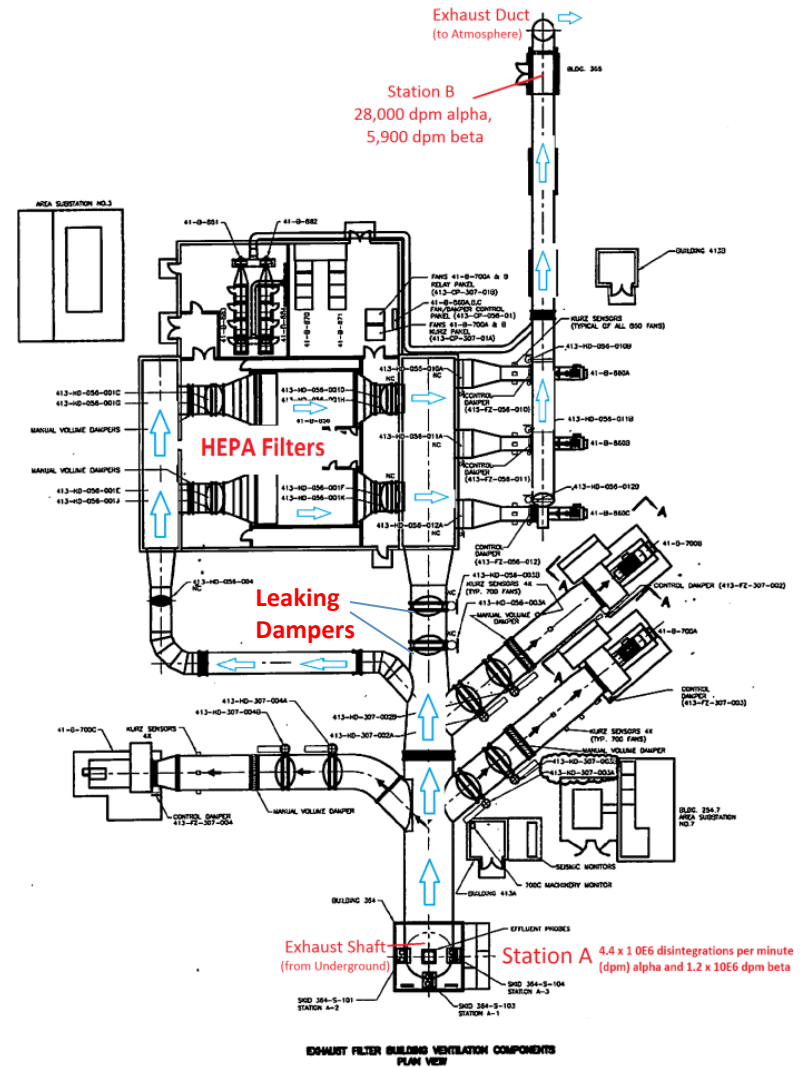
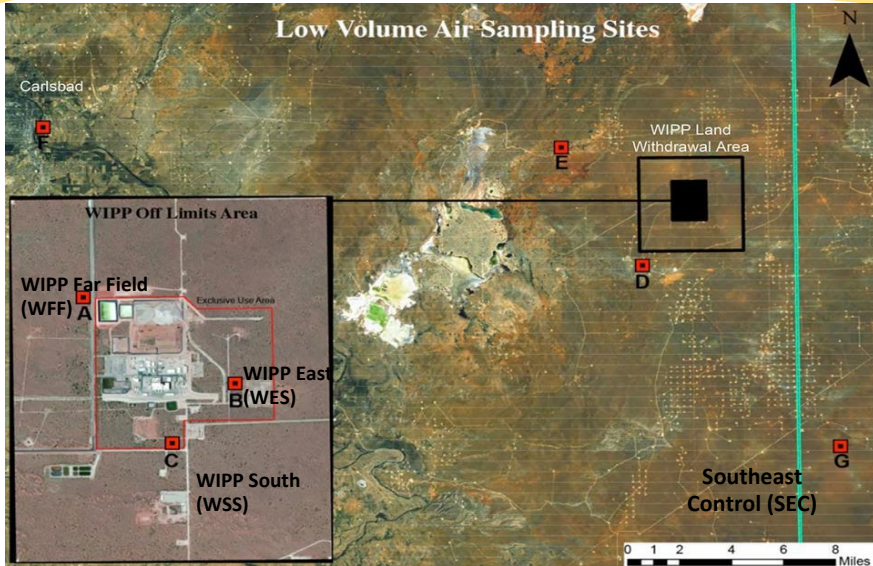
- On February 19, Carlsbad Environmental Monitoring and Research Center (CEMRC) reported radiological results from the CEMRC air sampling station located approximately 0.6 miles northwest of the site on the WIPP access road.
- The filter counted was installed at the station prior to the event (on Tuesday, February 11) and was removed on Sunday, February 16.
- The levels were higher than the normal background levels of radioactivity from transuranic elements commonly found at WIPP and indicated a small release of radioactive particles from the WIPP site.



The Days Following

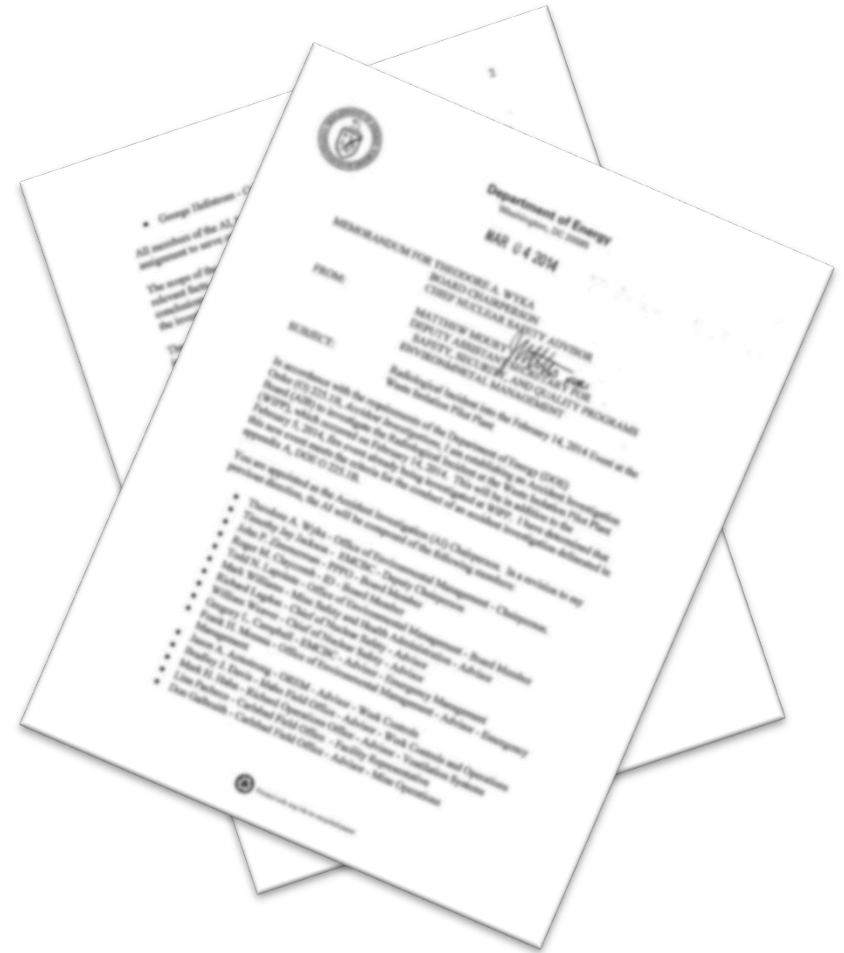
- On February 24, results of off-site environmental monitoring samples (Far Field) were received and indicated slightly elevated levels of Pu^{239/240} and Am²⁴¹. These levels were also well below a public or environmental hazard.
- On March 6, high-density foam was applied to seal the two ventilation system dampers which leaked and allowed contaminated air to bypass the HEPA filters.
- Manned entry into the underground to collect samples, assess conditions, and gather information, necessary to determine the physical cause for the release, is underway with great progress to date, but challenges ahead.
- Personnel bioassay was subsequently performed on 150 personnel to determine if there was any uptake of contamination.

The Days Following



On February 27, 2014, the Deputy Assistant Secretary Safety, Security, and Quality Program, Environmental Management, appointed an Accident Investigation Board (the Board) to determine the cause and of the accident and to develop recommendations for corrective actions to prevent recurrence.

The Board started the investigation on Monday, March 3, 2014.



The Board's Actions

As the underground was inaccessible, the Board was unable to determine the physical mechanism of container(s) failure, e.g., back (roof) or rib (wall) fall, puncture by a failed roof bolt, over pressurization, etc. is unknown at this time and must be determined once access to the U/G is restored.

- Phase 1 focused on the release of radioactive material from underground to the environment, and the follow-on response to the release.
 - Board reviewed the adequacies of the safety management programs and systems.
 - Important to report on Phase 1 to maintain transparency and move quickly on the corrective actions.
- Phase 2 will be focused on determining the direct cause of the release of the material.
 - A Judgment of Need (JON) has been developed to investigate and determine the mechanism of release and determine the related conditions and causal factors, reach conclusions, and identify Judgments of Need.
 - Phase 2 will also evaluate the impact on worker protection in the underground.
 - A supplemental report will be issued following Phase 2.

Phase 1 Root Cause

Root Cause of the release of radioactive material from underground to the environment (Phase 1)

The Board identified the root cause of Phase 1 to be NWP's and CBFO's management failure to fully understand, characterize, and control the radiological hazard. The cumulative effect of inadequacies in ventilation system design and operability compounded by degradation of key safety management programs and safety culture resulted in the release of radioactive material from the underground to the environment; and the delayed/ineffective recognition and response to the release.

Scorecard of Conclusions and Judgments of Need

SUBJECT	Conclusions	Judgments of Need			
		NWP	CBFO	HQ	Total
Nuclear Safety Program	8	7	3	2	12
Emergency Management	3	7	2	1	10
NWP Conduct of Operations	1	1	1	0	2
Maintenance Program	2	2	2	2	6
Radiation Protection Program	2	4	1	0	5
Safety Culture and Oversight	2	1	1	2	4
NWP Contractor Assurance System	5	2	0	0	2
CBFO Oversight	4	0	4	0	4
Headquarters Oversight	3	0	0	4	4
Totals	30	24	14	11	49

Nuclear Safety Program

- NWP does not have an effective nuclear safety program in accordance with Federal nuclear safety basis requirements.
- The CBFO review and approval process of the nuclear safety basis and safety evaluation reports also had weaknesses.
- Hazard analysis did not drive the appropriate classification of the underground ventilation system and Continuous Air Monitors.
- General reduction in the level of conservatism in the Documented Safety Analysis, hazard/accident analysis and Technical Safety Requirement safety controls.
- Documentation rigor inconsistent with a Hazard Category 2 nuclear facility.

Maintenance program

- Not effective in ensuring the operability and reliability of key components and equipment, e.g., Continuous Air Monitors, the filtration system, effluent monitoring equipment (on and offsite), etc.

Radiation protection program

- Not effective in ensuring timely and effective response, including collection and analysis of radiological data, contamination control, personnel and site surveys, equipment, training, etc.

Emergency management program

- Not effective in ensuring prompt categorization and classification, timely implementation of protective actions, and required notifications and reporting.

Conduct of Operations

- Key elements of the NWP Conduct of Operations program were ineffective in driving safe and compliant operation of a Hazard Category 2 facility.

Safety Culture and Oversight

- Nuclear Facility versus Mine Culture: Difference in expectations between operation of a Hazard Category 2 nuclear facility and a mine.
- The safety culture does not fully embrace and implement the principles of the Department's Integrated Safety Management Policy and Guides.
- Execution of the NWP Contractor Assurance System (CAS) and CBFO Oversight were ineffective.
- Headquarters line management ownership and oversight was inadequate.

Questions?

