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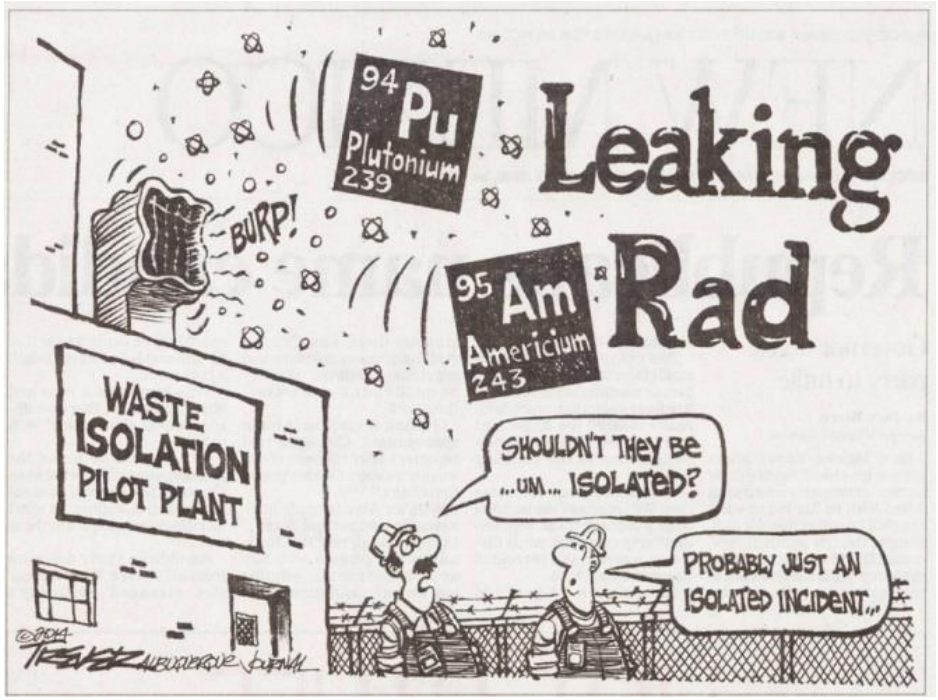
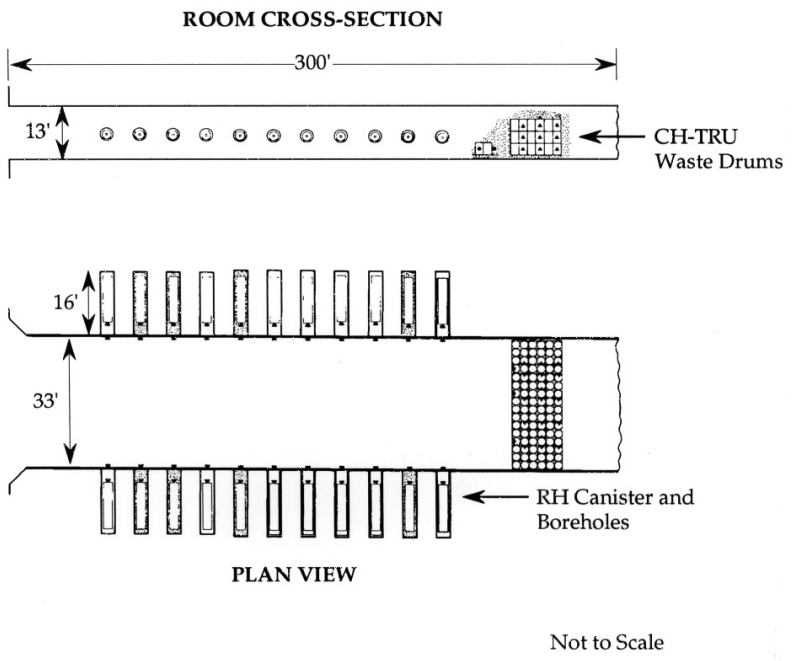
WIPP Radioactive Material Release Event and Internal Dosimetry Challenges



W.M. Findley
MJW Corporation
HPS-SR Chapter Technical Seminar
16.May.2014

CH and RH TRU Waste



WIPP Schematic

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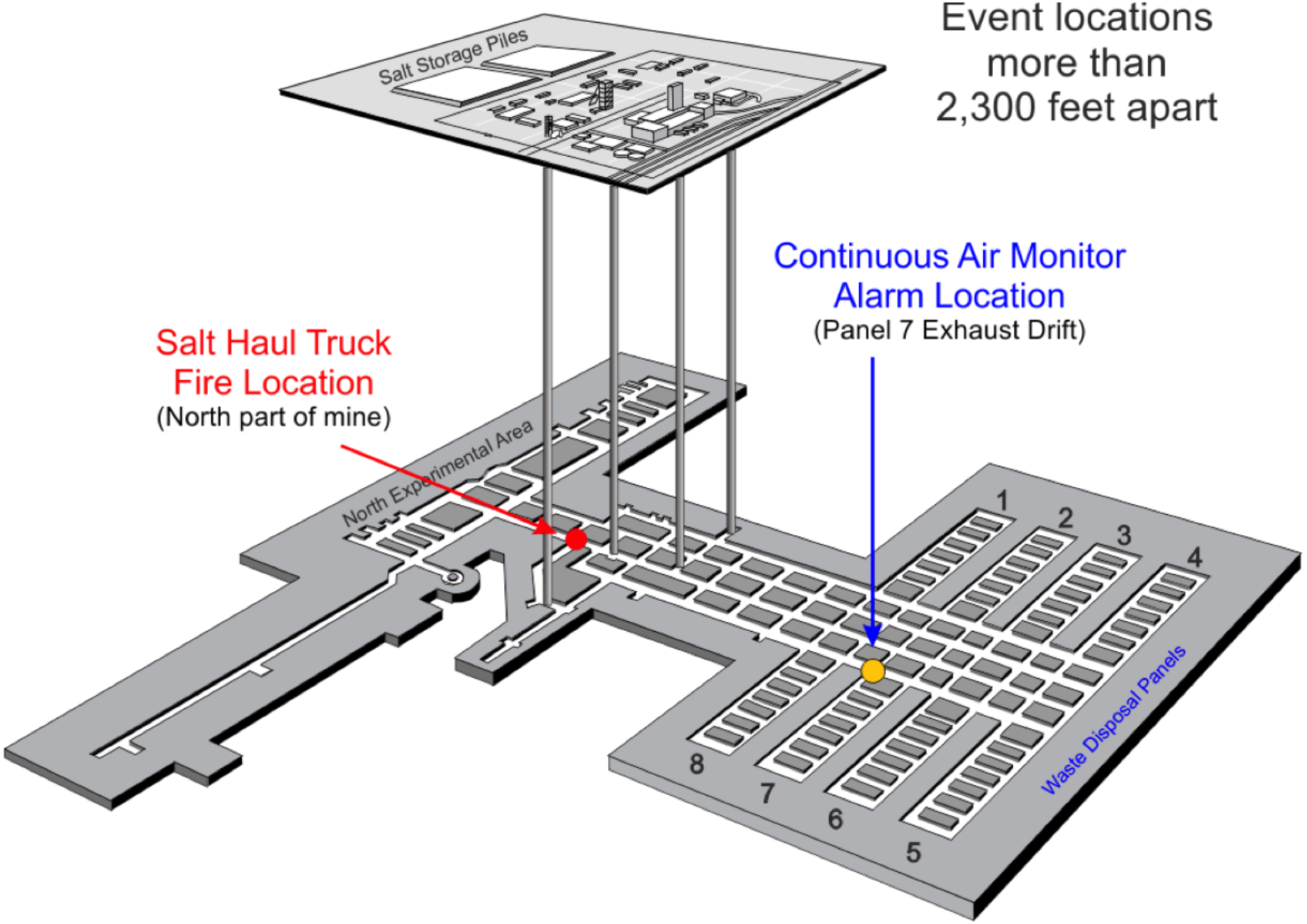

Rad Release Event

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- At 23:14 on 14.February.2014, an alarm was received from a continuous air monitor (CAM) at the waste face of Panel 7 in the underground storage area at the Waste Isolation Pilot Plant (WIPP).

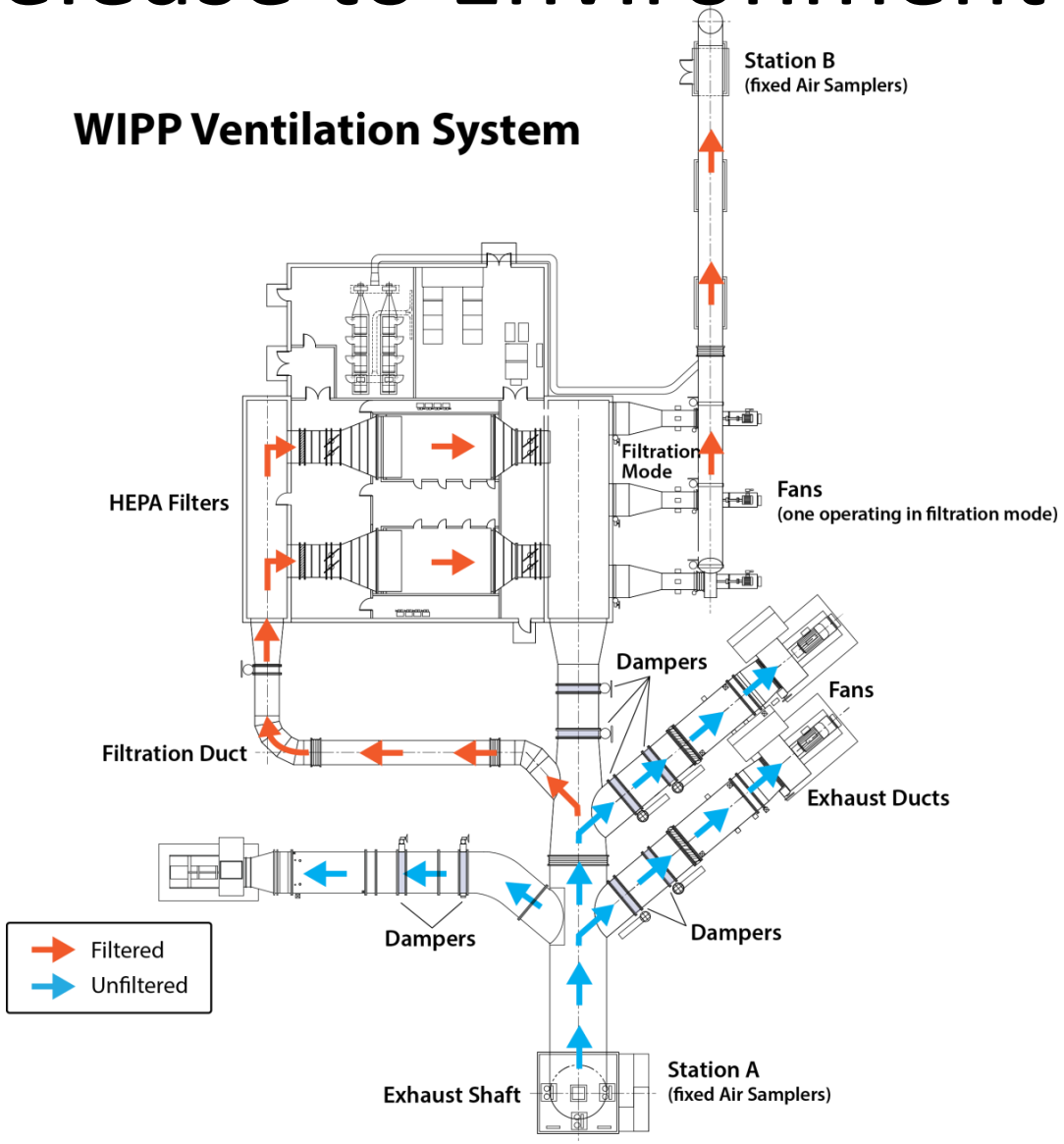
- The underground ventilation exhaust system was switched to HEPA filtration mode when the airborne radioactivity was detected.

- There were no employees working in the underground storage area at the time of the CAM alarm and only 11 employees on the surface. Two additional employees reported a couple of hours after the release began.

- On 15.February.2014 07:15, the underground exhaust system monitoring filters were exchanged. The Station “A” is air filter, which monitors all underground exhaust, was initially determined to have 4E+06 dpm alpha. Additionally, the Station “B” air filter, which monitors post-HEPA filtered air was determined to have 5.7E+04 dpm alpha.

- As a precaution, site personnel were sheltered in place at 09:00. At 15:57, it was reported that site surveys and personnel surveys did not detect radiological contamination. At 16:35, the shelter in place was lifted and non-essential personnel were released from the site.

Release to Environment



Above Ground Ventilation

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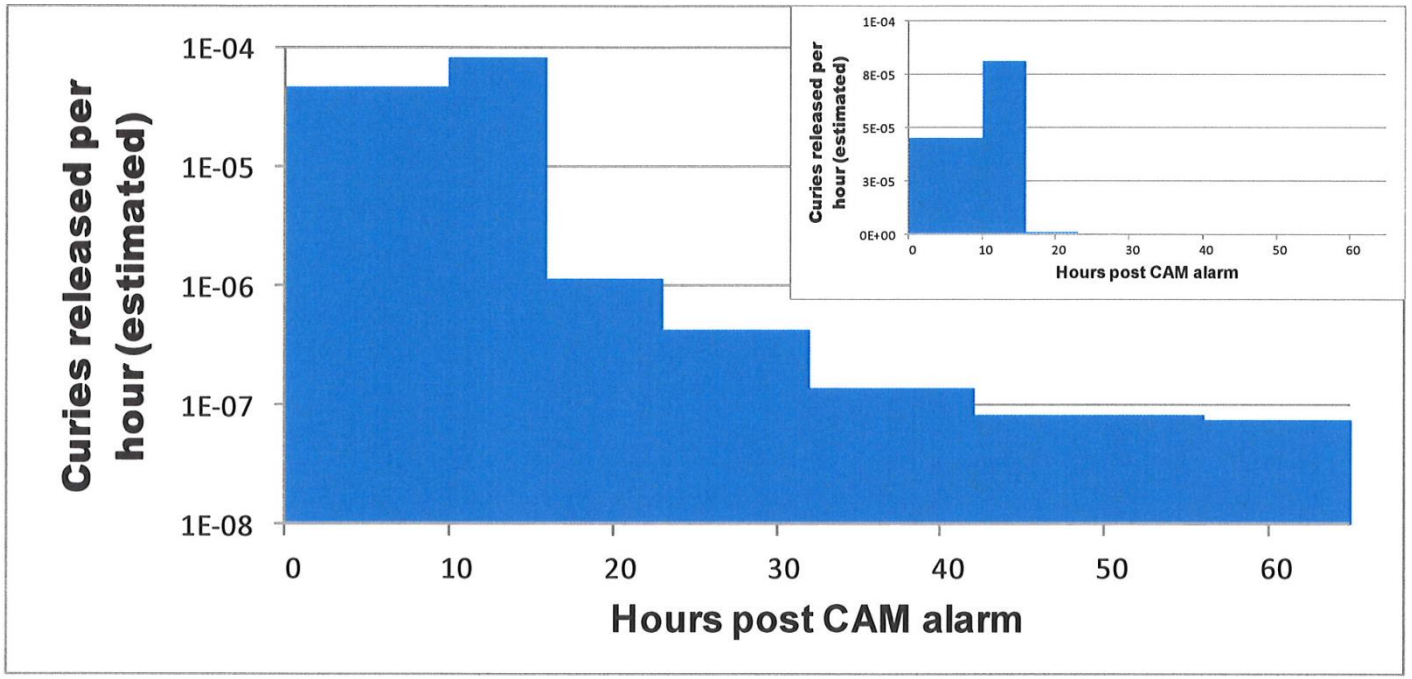
Source Term: Composition and Release Quantities

Radionuclide	Disintegrations Per Minute	TPU 2σ (dpm)	Alpha Activity Fraction	Fraction Relative to ^{241}Am
^{241}Am	2.01E+05	3.06E+04	0.877	1.000
$^{239/240}$Pu	1.16E+04	2.21E+02	0.051	0.057
^{238}Pu	5.14E+02	4.64E+01	0.002	0.003
^{241}Pu	1.59E+04	4.01E+01	N/A	0.079



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So What Happened? 30.April Panel 7 Room 7

Hot Hot Hot: May 10: Panel 7 Room 7

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Current Status at WIPP

- Waste of Concern:
  - potential concerns with waste stream from LANL
  - There are 26 similar containers at LANL, 116 of them at WCS (all overpacked in SWBs) and 349 of them in WIPP (209 in Panel 6, Room 1; 85 in Panel 6, Room 2; 55 in Panel 7, room 7).
  - SRNL was expected to receive filter samples for analysis 9.May.2014
- HEPA filter change out scheduled for next week. Estimated that about 1 Ci on filters.

Radiobioassay Metrics

- Total workers at WIPP site during majority of rad release: 153
  - Most likely population: 14 of 153
  - Elevated potential: 21 of 153
  - Verification (voluntary participation or declined in writing): 118 of 153

- Fecal samples: 31
  - 21 low-level positive
  - 1.45 dpm/sample was highest total activity

- Urine samples: 140
  - 1 low-level positive

- Chest counts: 90
  - No positive measurements for Am-241

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Doses and Other Stuff

- Internal Doses
  - 20 dose evaluations
  - Highest calculated dose: 8 mrem
  - <10 mrem CED not required to be recorded per 10CFR835 § 702
- REAC/TS review
- CDC (14 samples) using ICP-MS

Dosimetry Challenges

- Culture: mining vs rad
- Minimal technical basis
- Delayed monitoring response
- Radiobioassay methods
- Number of workers
- MDC vs DL
- Remote requests
- Chelation concerns
- Union requests

More Information

- http://www.wipp.energy.gov/wipprecovery/recovery.html
  - Lots of information
  - Accident Investigation Reports available

- http://www.cemrc.org/
  - Environmental monitoring data