

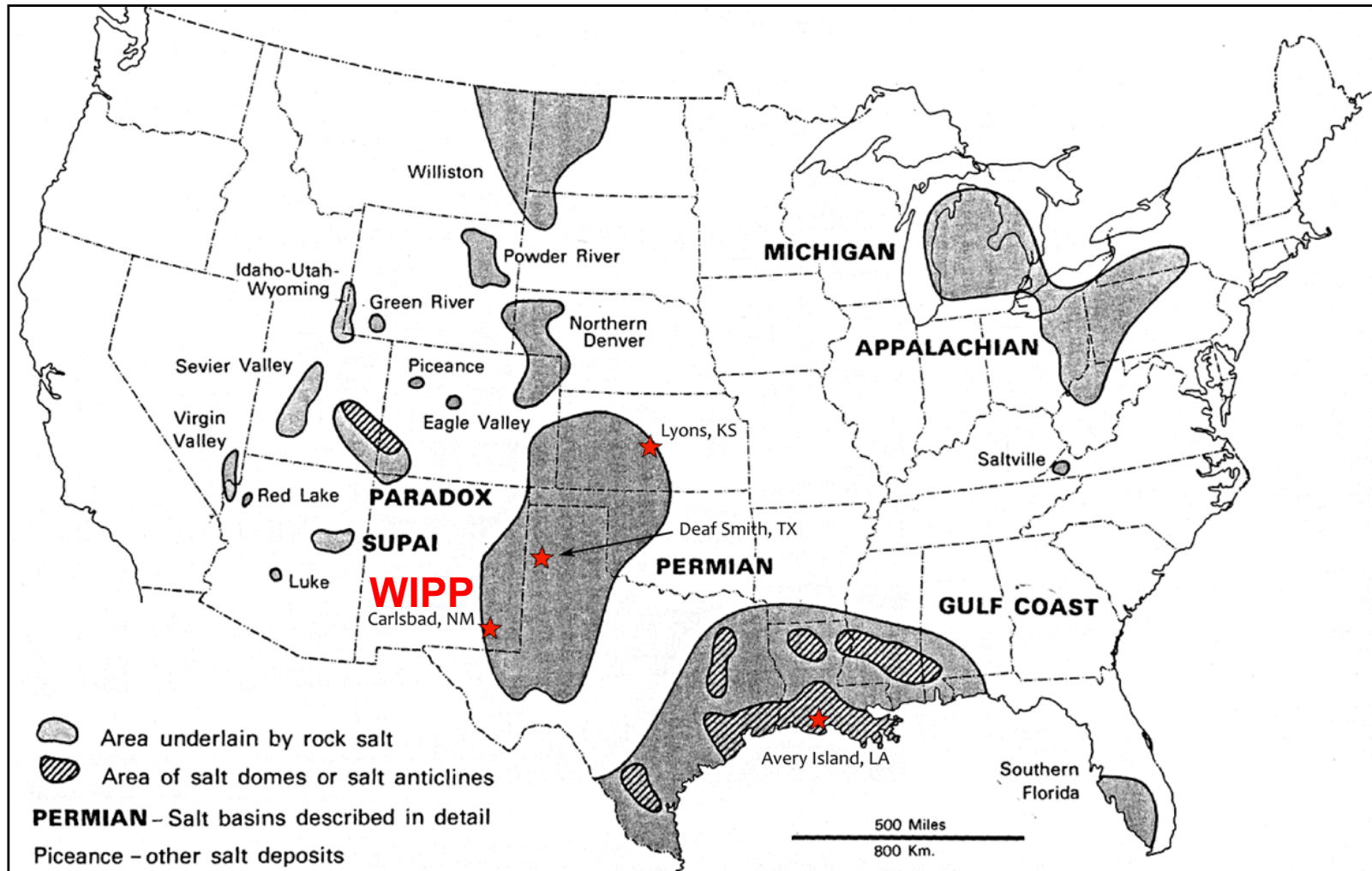


WIPP: From URL to Disposal Facility

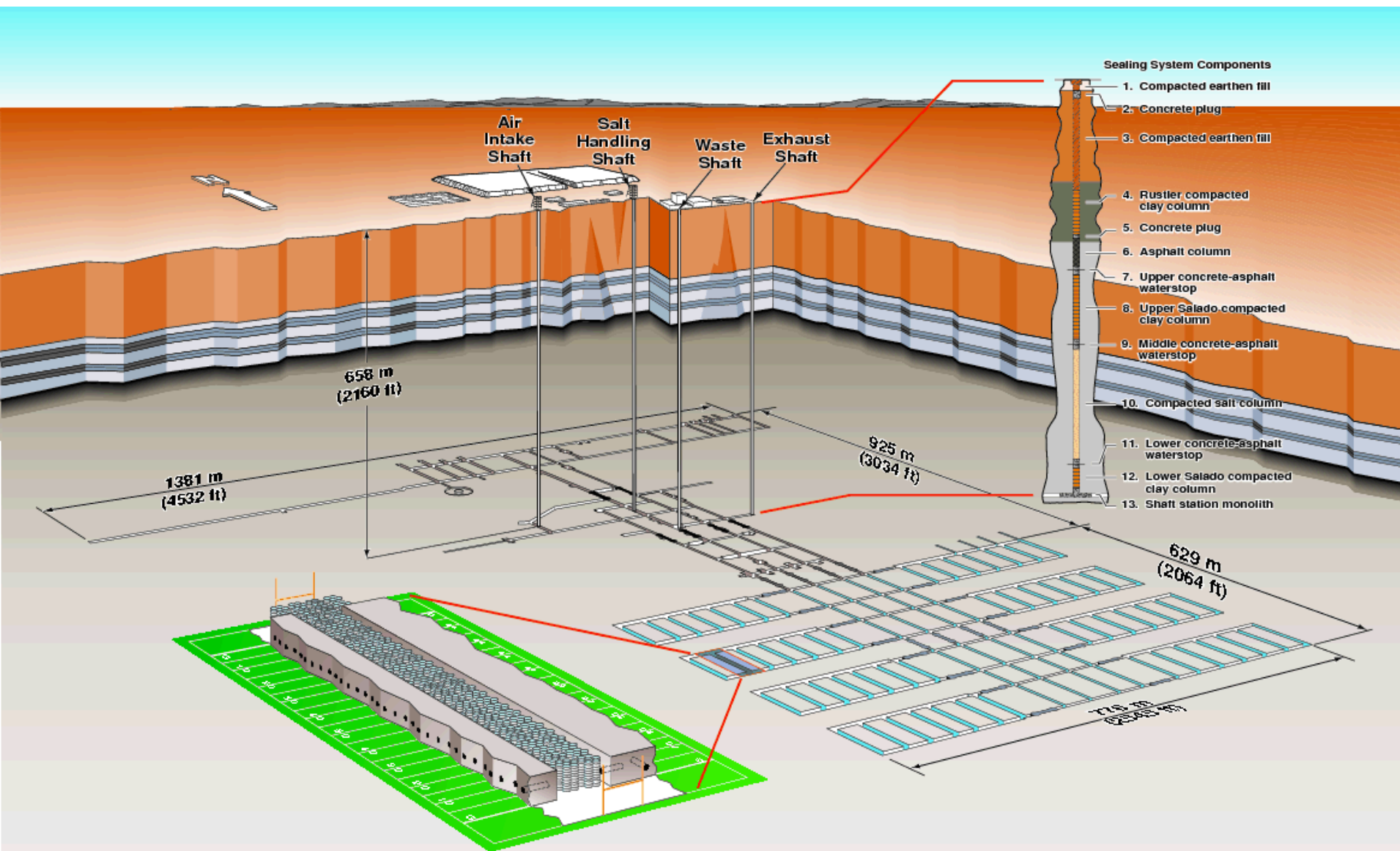
Kristopher L. Kuhlman

Sandia National Laboratories

Salt in US and WIPP



WIPP Layout



Events in WIPP History

- 1973: SE New Mexico salt site chosen for investigation
- 1975: Sandia chosen to lead characterization & design
- 1980: Environmental Impact Statement (EIS)
- 1981: First shaft completed
- 1983: Full construction begins
- 1984-1992: Large-scale underground experiments
- 1985: EPA writes 40 CFR 191 (definitions, foundation)
- 1990: First full WIPP Performance Assessment
- 1992: WIPP Land Withdrawal Act (waste type/amount limits)
- 1996: EPA writes 40 CFR 194 (implementation details)
- 1999: WIPP receives first waste
- 2014-2017: WIPP temporary shutdown

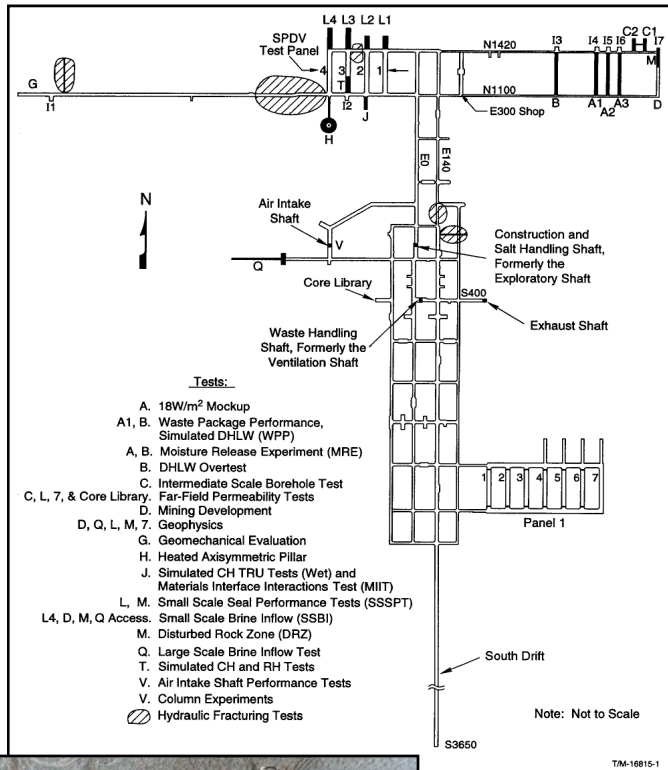
WIPP Regulations and Mission

- Regulations were developed concurrently with:
 - Underground testing
 - Performance assessment modeling
- WIPP mission changed through time:
 - 1977: design included two levels (included commercial waste)
 - 1980: limited to defense-generated waste
 - 1982-1987: Nuclear Waste Policy Act included other salt sites
 - Large-scale heater tests performed at WIPP for Deaf Smith, TX site
 - 1992: agreement with state of NM limited volume/type of waste
- Original compliance certification application submitted 1996
- Recertification every 5 years since waste received
 - 2004, 2009, 2014, 2019 ...

WIPP as Underground Research Lab

- Three periods of underground research
 - Large-scale heated defense high-level waste studies (1984-1990)
 - Basic THM science of heat-generating waste in salt
 - Once tests executed, waste was already planned to go elsewhere
 - WIPP-mission (transuranic waste) (1987-1992)
 - Plugging and sealing (shaft tests)
 - Brine inflow and DRZ studies (Room Q)
 - Focused on WIPP waste forms (Remote + Contact-handled TRU waste)
 - Recent testing
 - New experimental area (mined 2012-2013)
 - EXO project (neutrinoless double β -decay physics experiment) (2007-)
- DOE (Dials) used PA models to focus/limit research (1993)
 - Aborted all underground tests not directly supporting license

WIPP URL stage 1 (1984-1990)



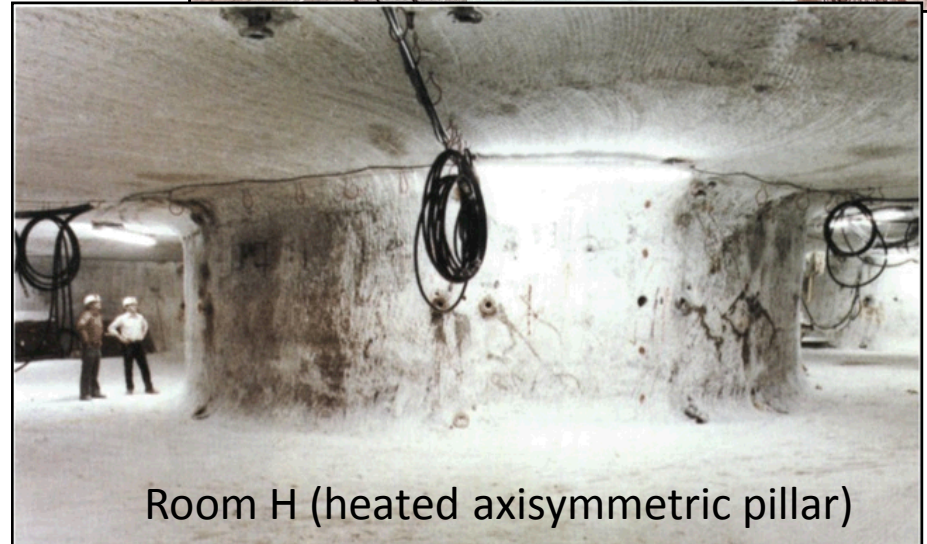
Room A (DHLW mockup disposal)



Materials Interface Interactions Test



Room H (heated axisymmetric pillar)



WIPP URL stage 2 (1987-1992)

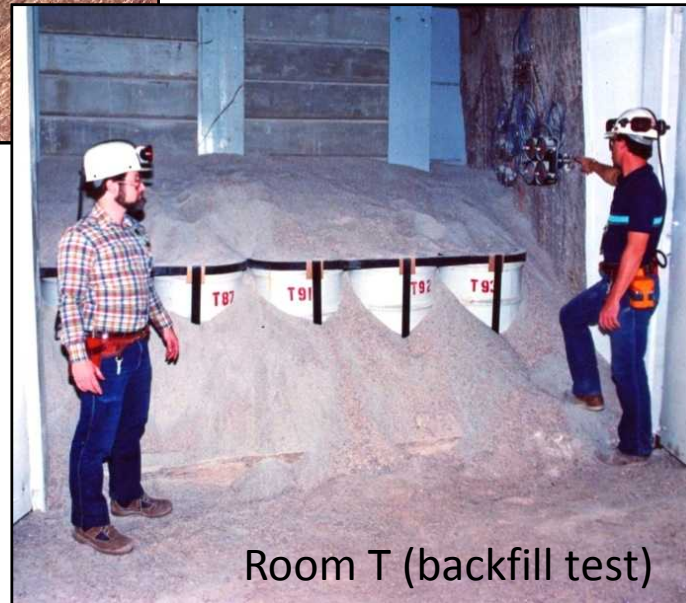
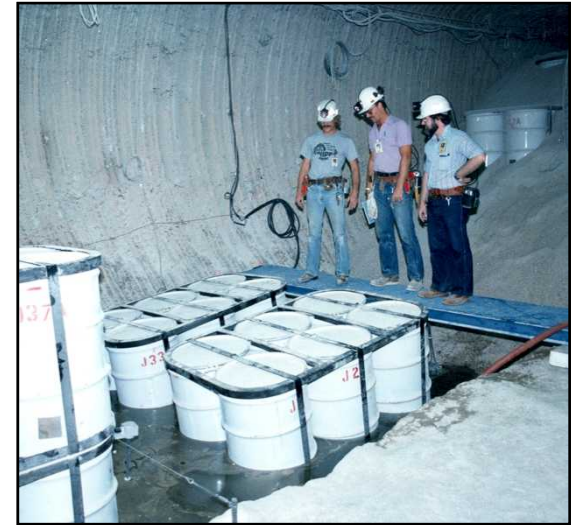


Room Q (brine inflow)



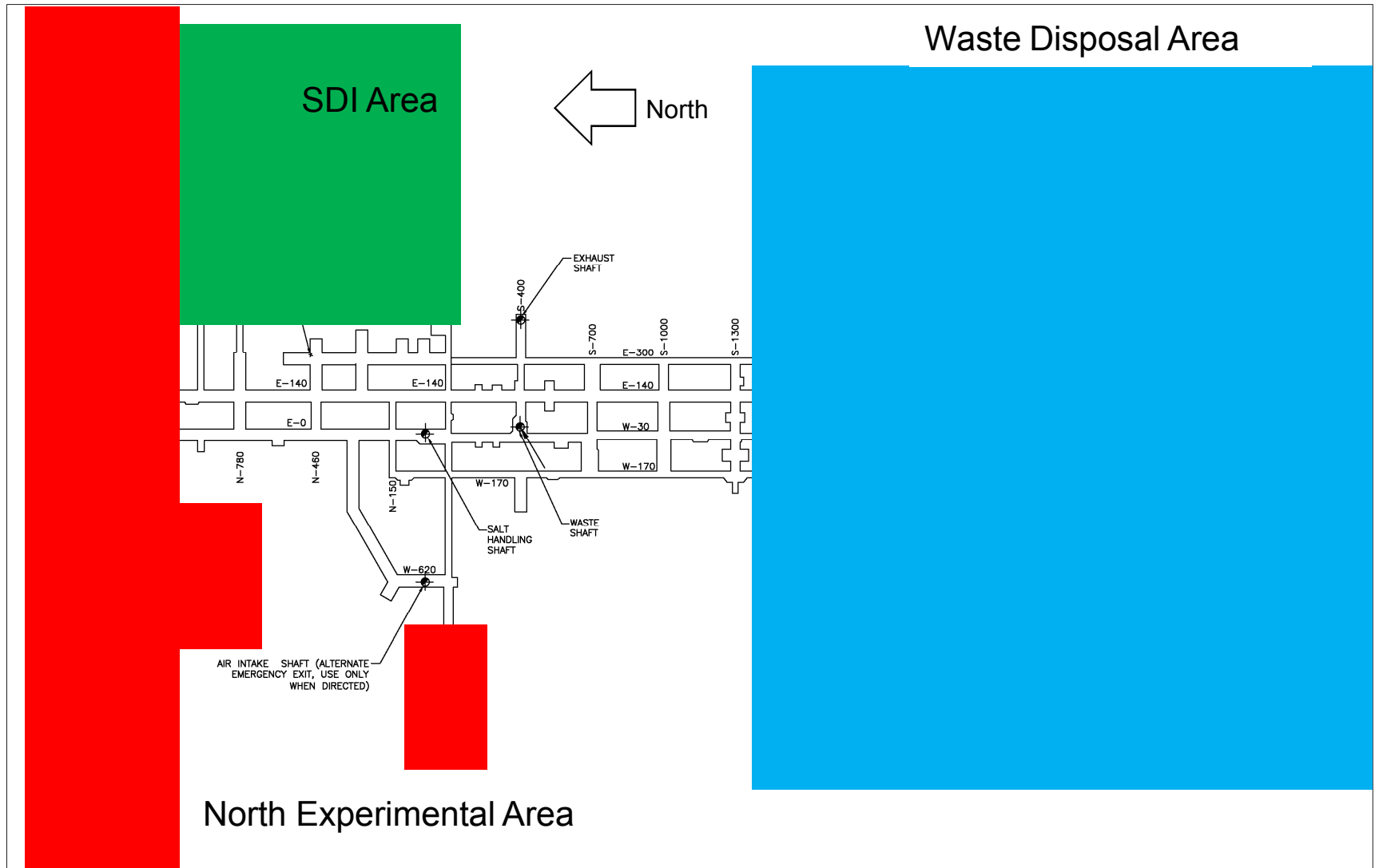
Proposed Bin Test (waste evolution)

Room J
(TRU overtest)



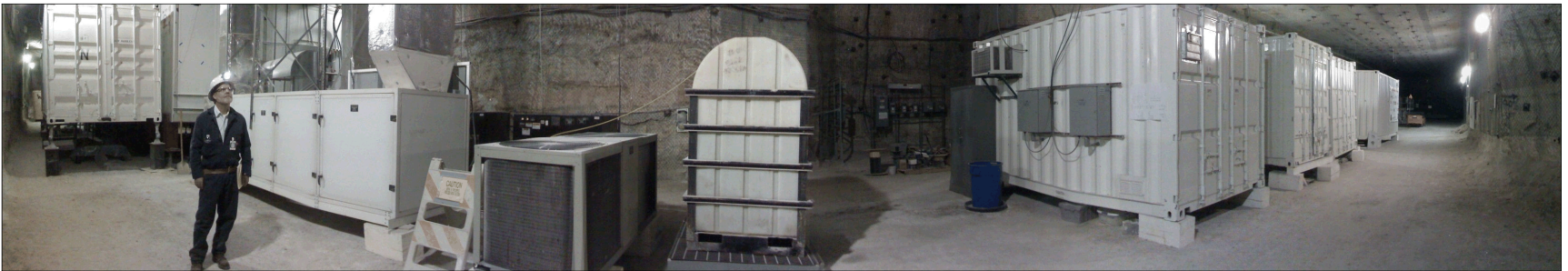
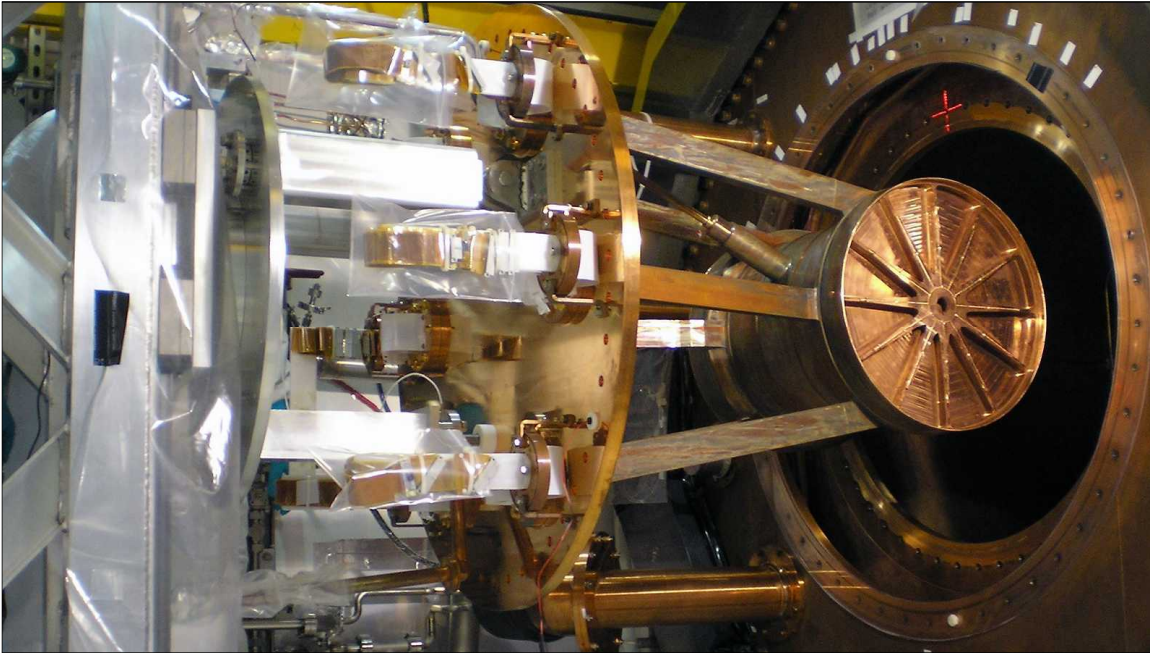
Room T (backfill test)

WIPP URL stage 3 (recent)



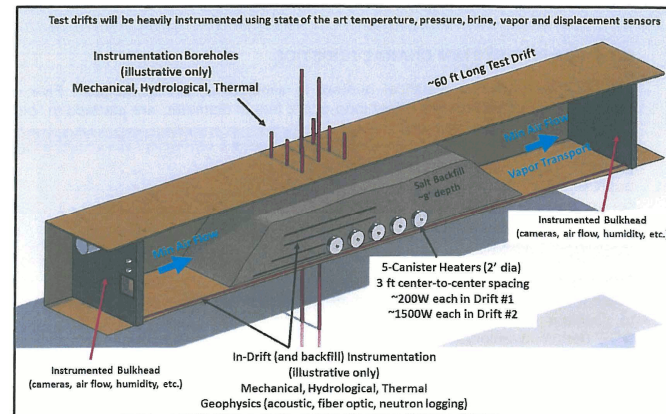
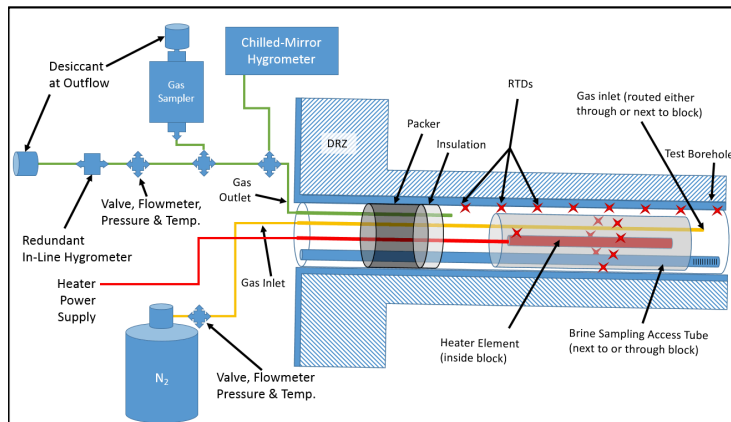
WIPP URL stage 3 (recent)

- Enriched Xenon Observatory (2007-2014, 2017-)



WIPP URL stage 3 (recent)

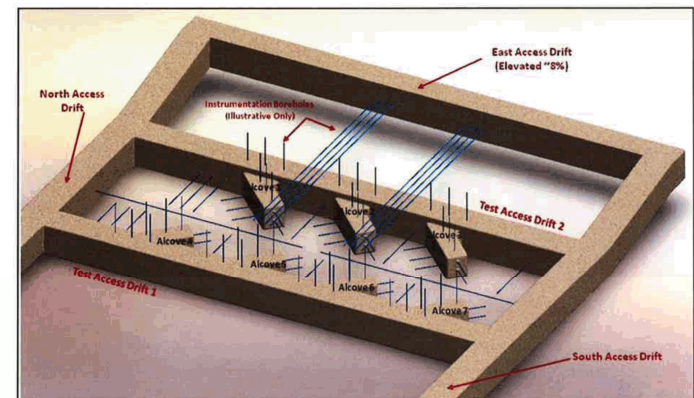
- Salt Disposal Investigations (proposed 2011)
- Salt Defense Disposal Investigations (proposed 2013)
- Small-diameter borehole heater test (proposed 2017)



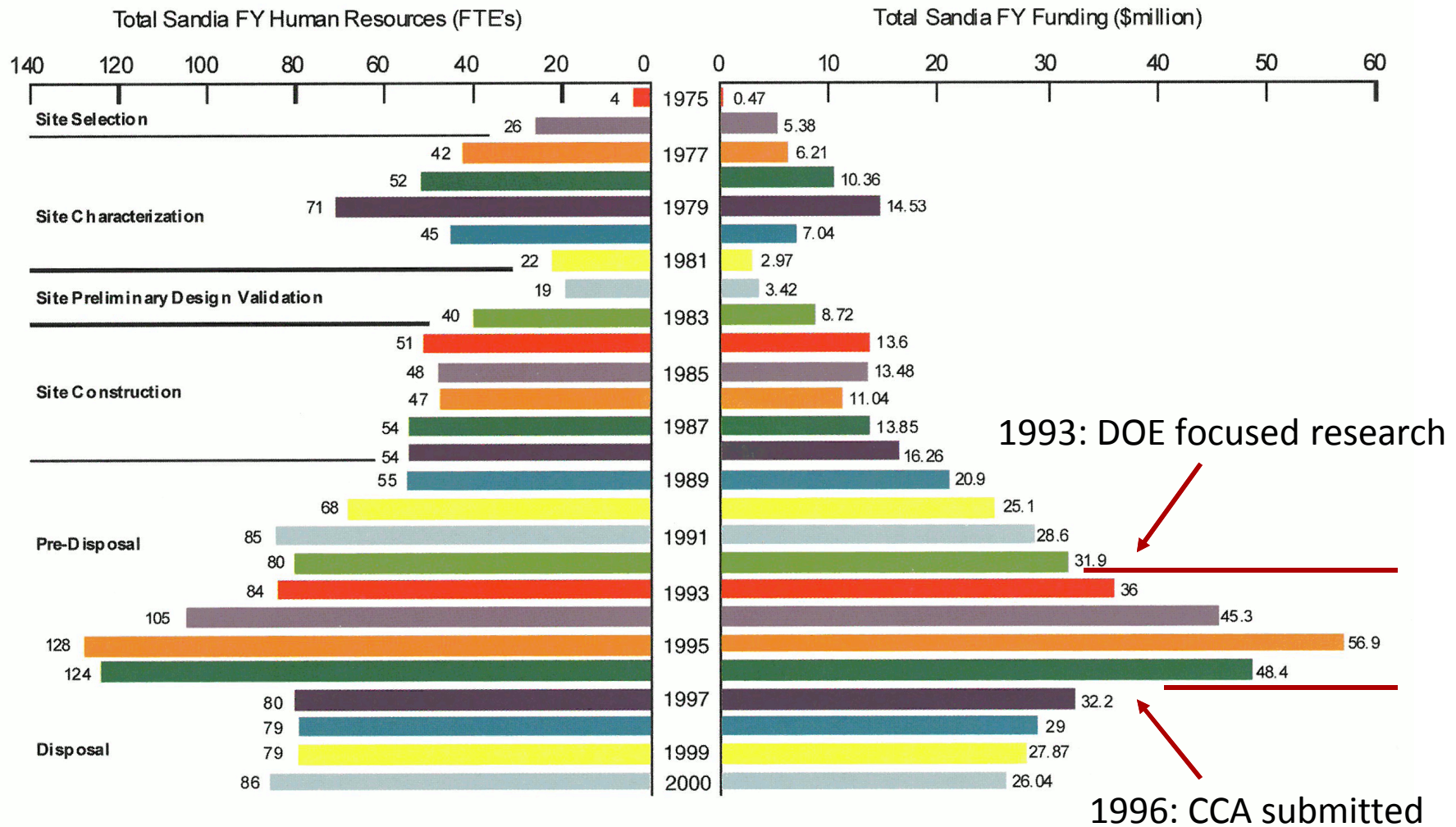
DOE Carlsbad Field Office, (2011). *A Management Proposal for Salt Disposal Investigations with a Field Scale Heater Test at WIPP*. DOE/CBFO-11-3470. Carlsbad, NM: US DOE-EM.

DOE Carlsbad Field Office, (2013). *Test Specification for the Salt Defense Disposal Investigations Thermal Test in WIPP*. DOE/CBFO-13-3510. Carlsbad, NM: US DOE-EM.

Kuhlman, K.L., M.M. Mills & E.N. Matteo, (2017). Consensus on Intermediate Scale Salt Field Test Design. SFWD-SFWST-2017-000099, SAND2017-3179R. Albuquerque, NM: Sandia National Laboratories



WIPP SNL Budget



2000 to 2017: SNL budget roughly \$10 M/year

WIPP “Transition”

- Path from design to implementation not linear
- Regulations/repository developed somewhat in parallel
- URL for DHLW site mission (1984-1990)
- URL for WIPP mission (1987-1992)
- DOE (George Dials) focused research to get WIPP licensed
- Disposal facility: 1999-2014, 2017-
- Limited Underground Research still going on at WIPP
 - EXO (2007-2014, now restarted)
 - Disposal operations come first
 - Must be no impact to operations
 - Limited by availability of underground mining/operations workforce
 - Since restart WIPP operating on filtered mine ventilation
- DOE has considered (but not funded) new salt URL work

WIPP: Operating Disposal Facility

