Carlsbad Environmental Monitoring & Research Center

Radioactive and Hazardous Materials Committee

10/31/2016

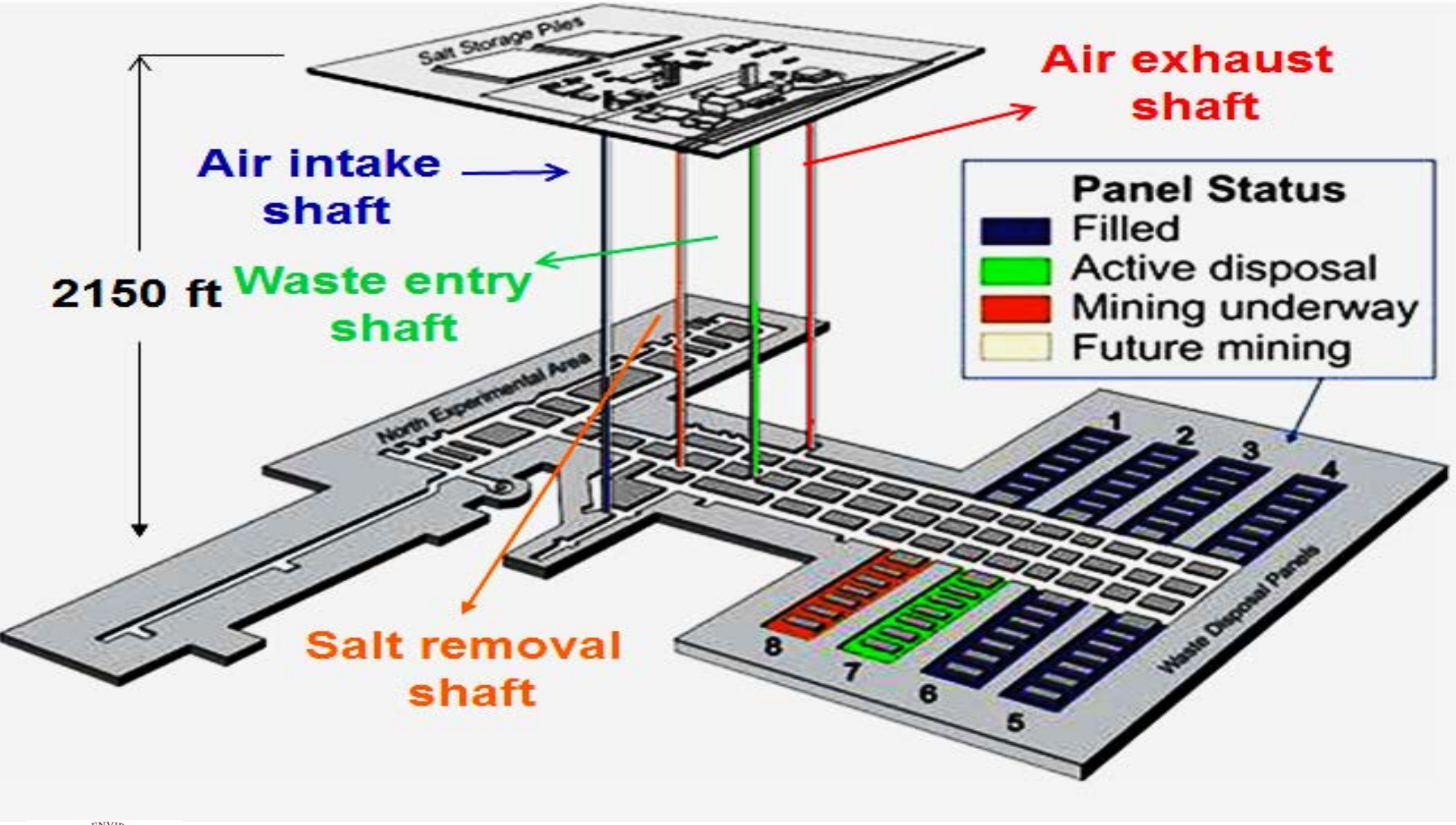
Dr. Russell Hardy, Director

Data, Charts, and Graphs Prepared by Dr. Punam Thakur

CEMRC Overview

- Created in 1991 to conduct an independent environmental monitoring program of the WIPP.
  - Funded Primarily by the Department of Energy
    - Current funding level $3m per year (~80% of total funding for CEMRC)
      - WIPP Underground Exhaust Air
      - Ambient Air
      - Drinking Water
      - Soil
      - Surface Water & Sediment
      - Whole Body Counting for Area Residents age 13+
  - The CEMRC also provides office & lab space for DOE-related entities
    - Los Alamos National Labs (LANL) Actinide Chemistry & Repository Science Program (ACRSP)
    - URS Professional Solutions (WIPP-Labs)
  - Lastly, the CEMRC performs several subcontracts for DOE-related and Nuclear-related Entities
    - Volatile Organic Compound, Hydrogen, and Methane Analyses for WIPP - Nuclear Waste Partnership (NWP)
    - In-vivo Radiobioassays (Whole Body Counting) for WIPP - Nuclear Waste Partnership (NWP)
    - In-vivo Radiobioassays (Whole Body Counting) for Waste Control Specialists (WCS)

WIPP Overview

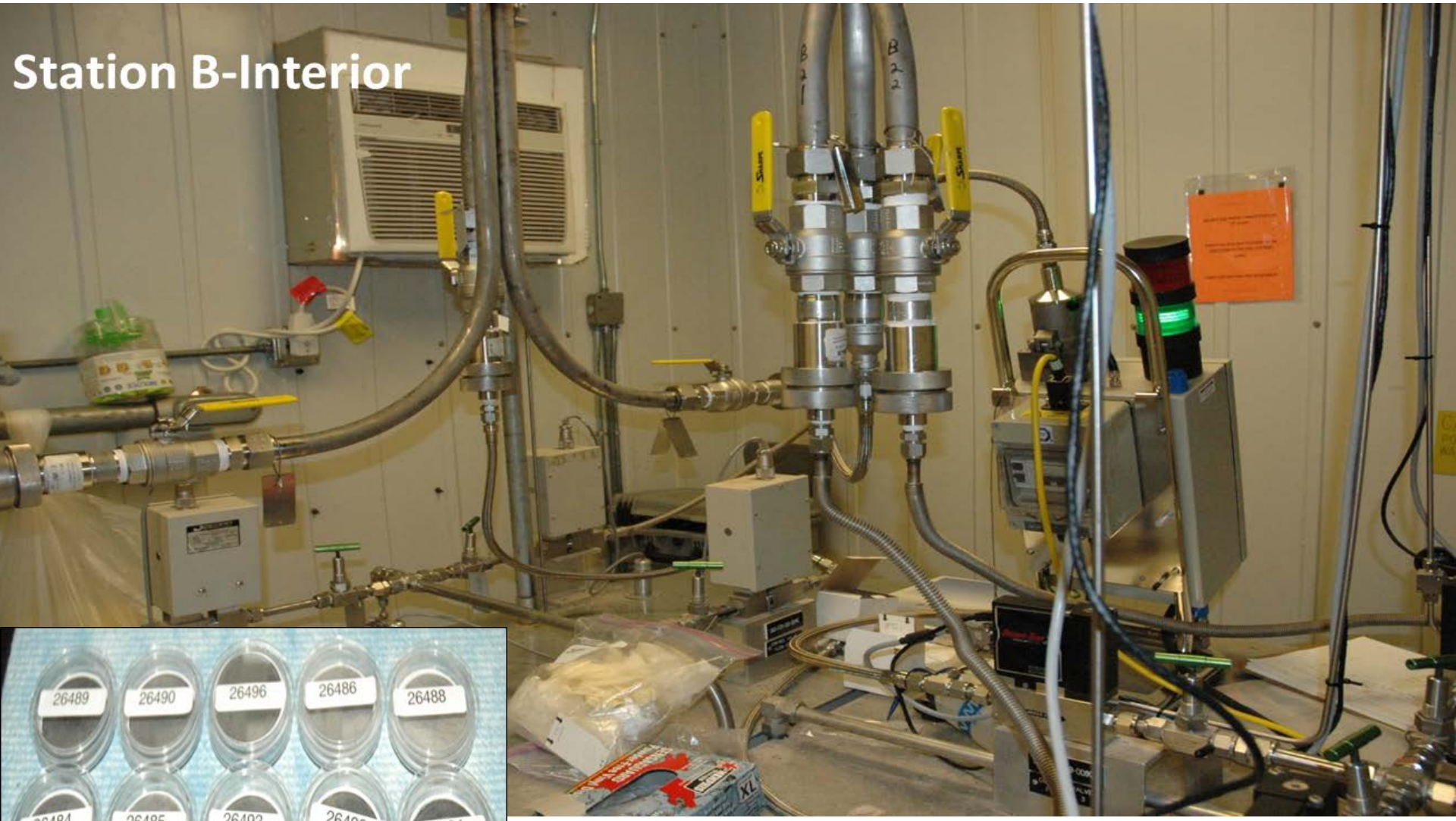


WIPP Underground Exhaust Air Monitoring

Station A (Pre HEPA)

WIPP Underground Exhaust Air Monitoring
Station B (Post HEPA)

WIPP Sampling Skid – Station B



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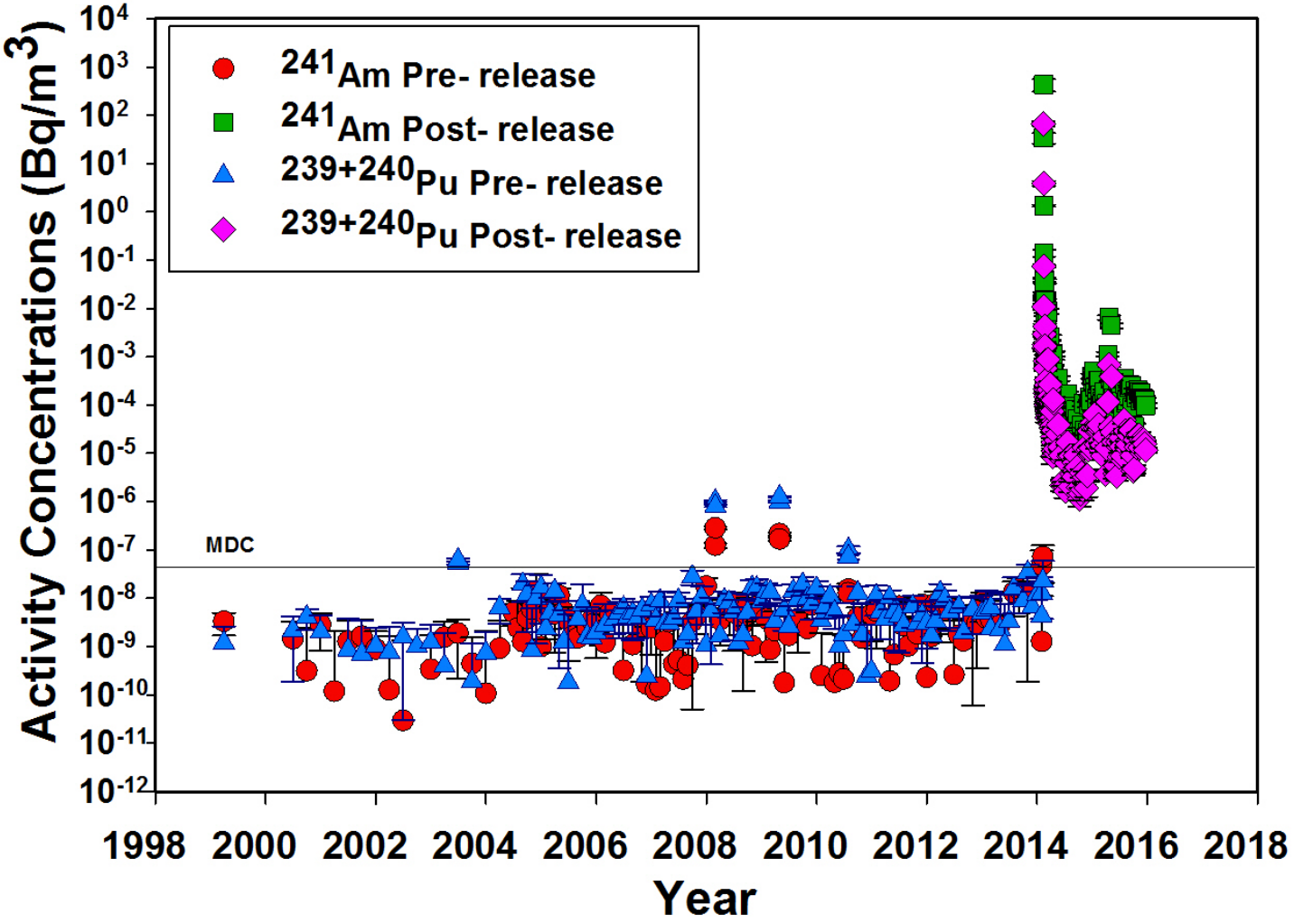
Actinide Activity Station A (Pre-HEPA)



Maximum conc. measured

4,337 Bq/m^3 for ^{241}Am

672 Bq/m^3 for $^{239+240}$Pu

30.3 Bq/m^3 for ^{238}Pu

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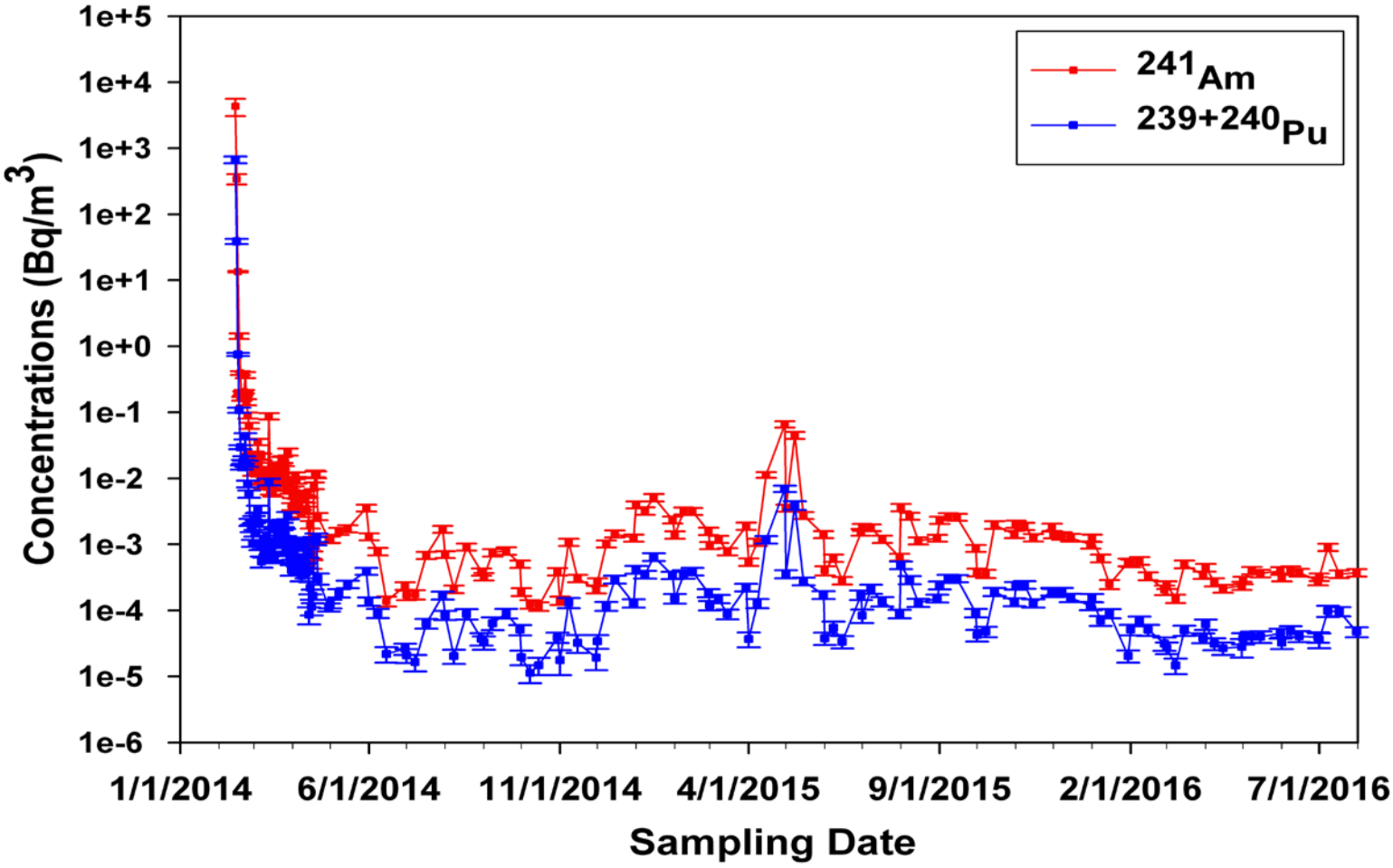
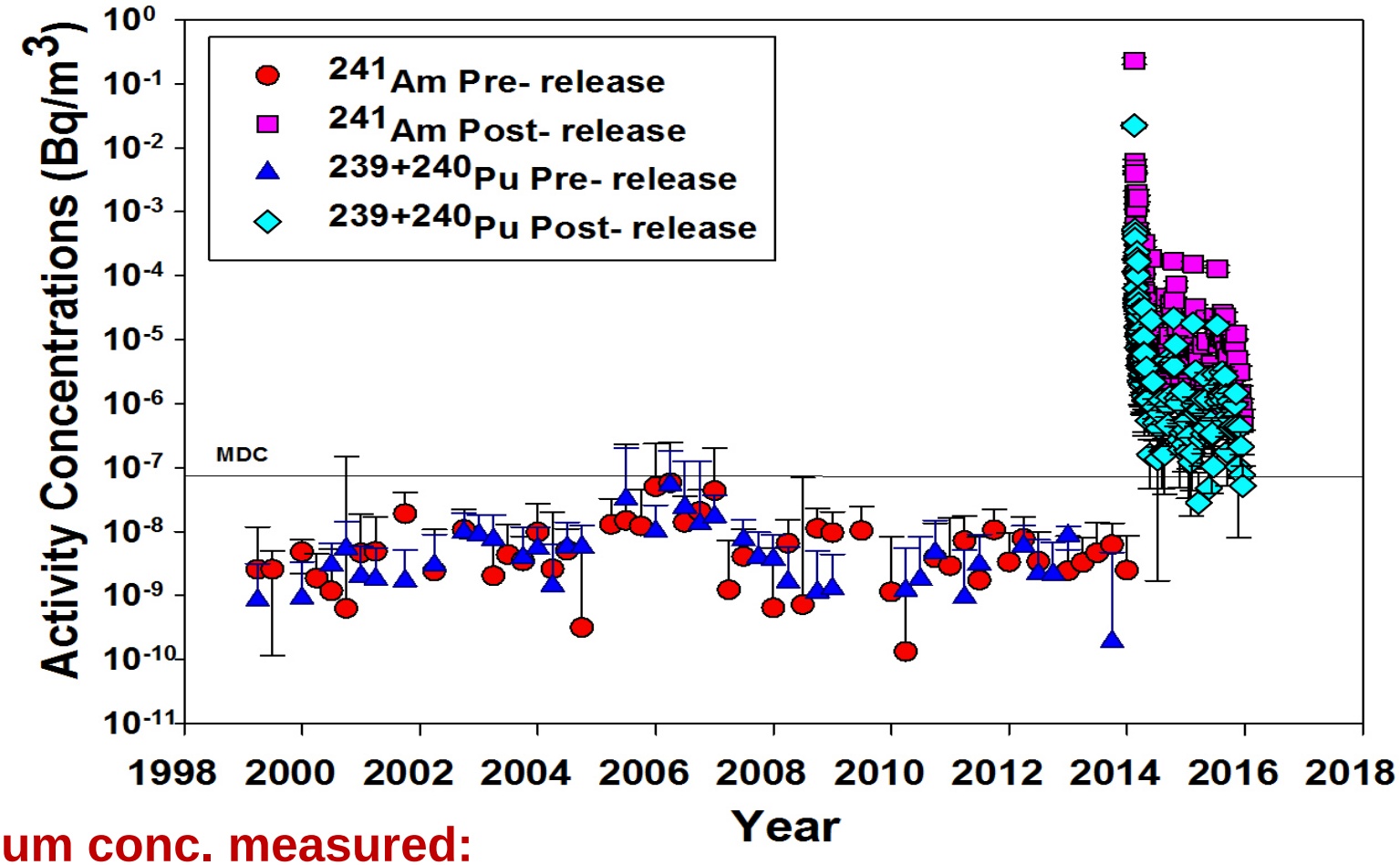
Station A Activities since 2/14/14



Actinide Activity Station B (Post- HEPA)



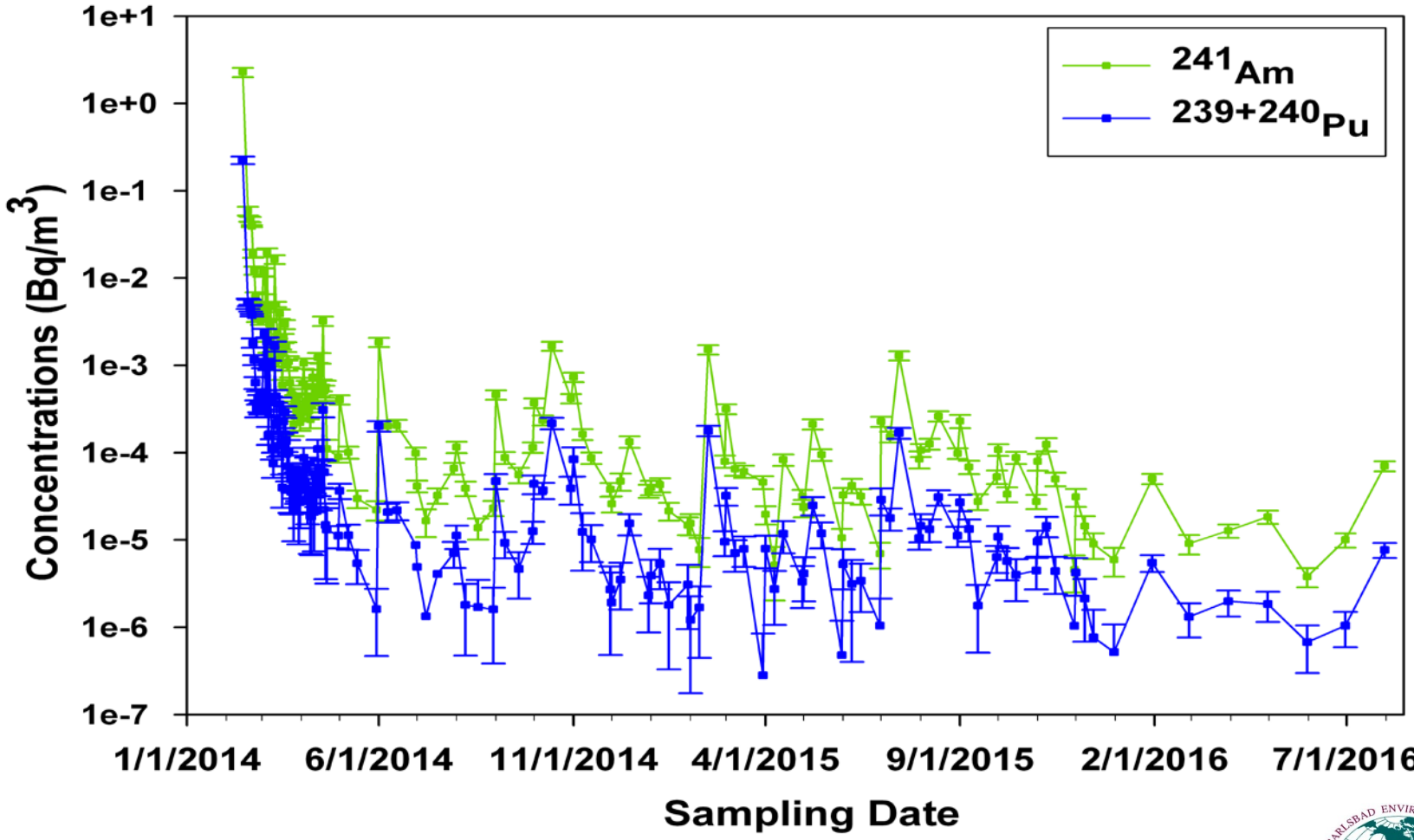
Maximum conc. measured:

2.28 Bq/m^3 for ^{241}Am

0.22 Bq/m^3 for $^{239+240}$Pu

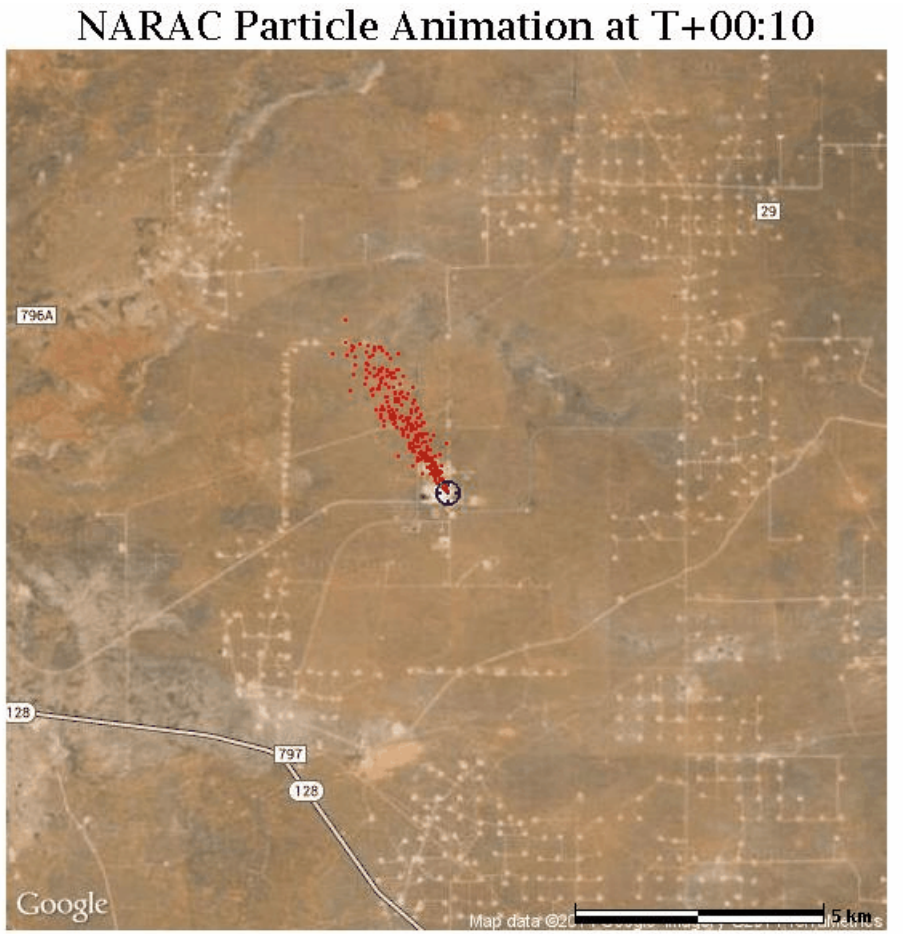
0.032 Bq/m^3 for ^{238}Pu

Station B Activities since 2/14/14



CEMRC Ambient Air Monitoring

NARAC Particle Dispersion Simulation for First 12 hours of Release from WIPP



- **Release Start Time: February 14, 2014 23:39 Mountain time.**
- **On-site meteorological data used to update NARAC wind fields.**
- **Significant wind shift occurred around 07:00 Mountain on February 15, during the majority of the release.**

National Atmospheric Release Advisory Center NARAC

Red dots show horizontal location of all NARAC-simulated airborne particles at all heights for every 10 minutes from beginning of the release

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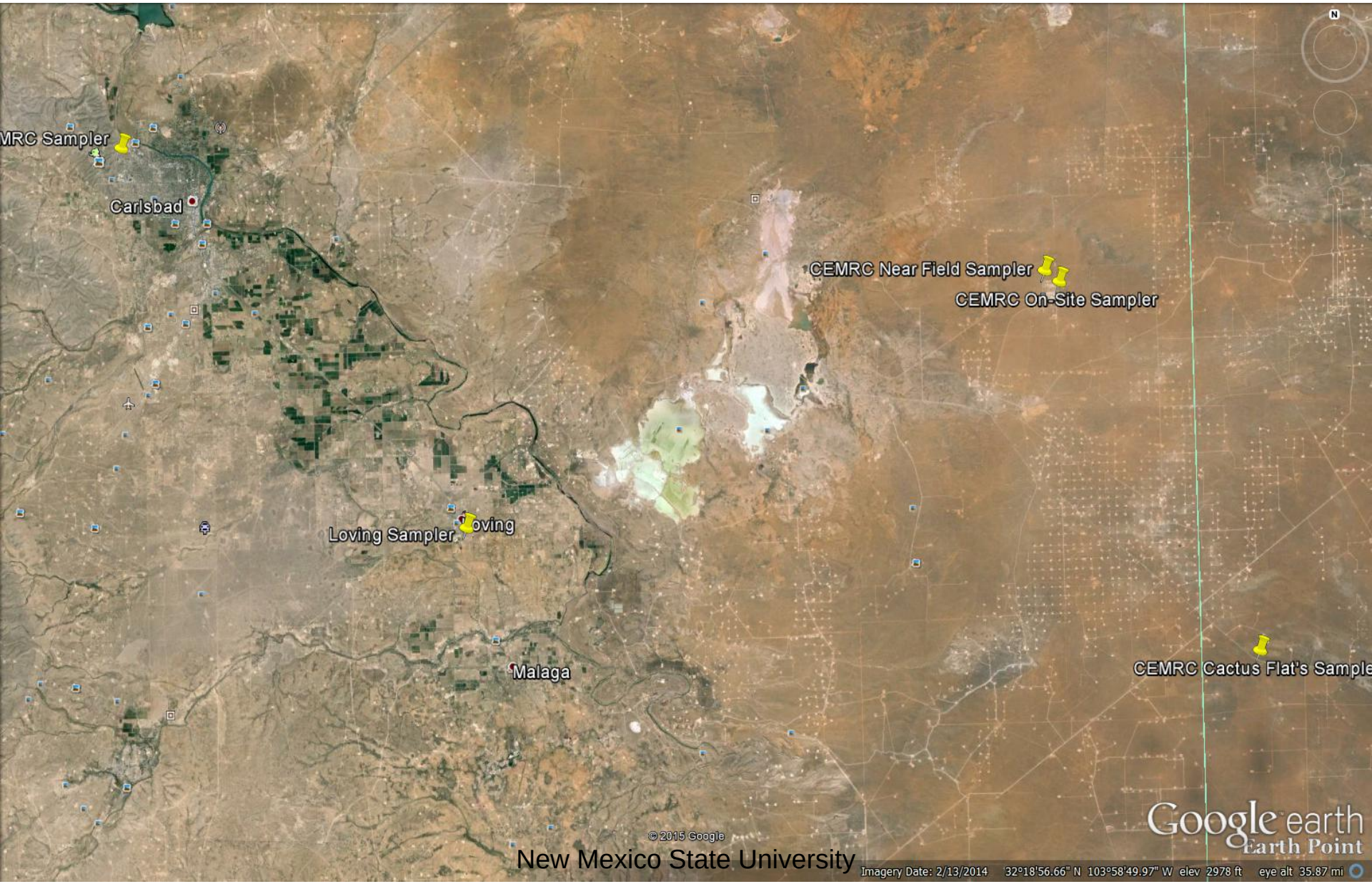
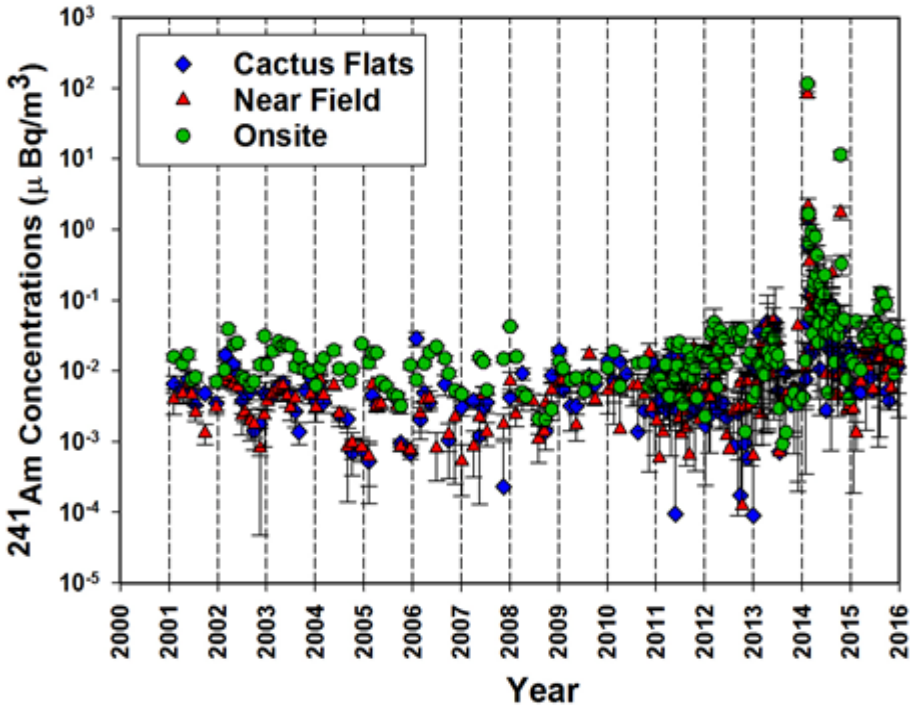
Current CEMRC Ambient Air Monitoring Locations



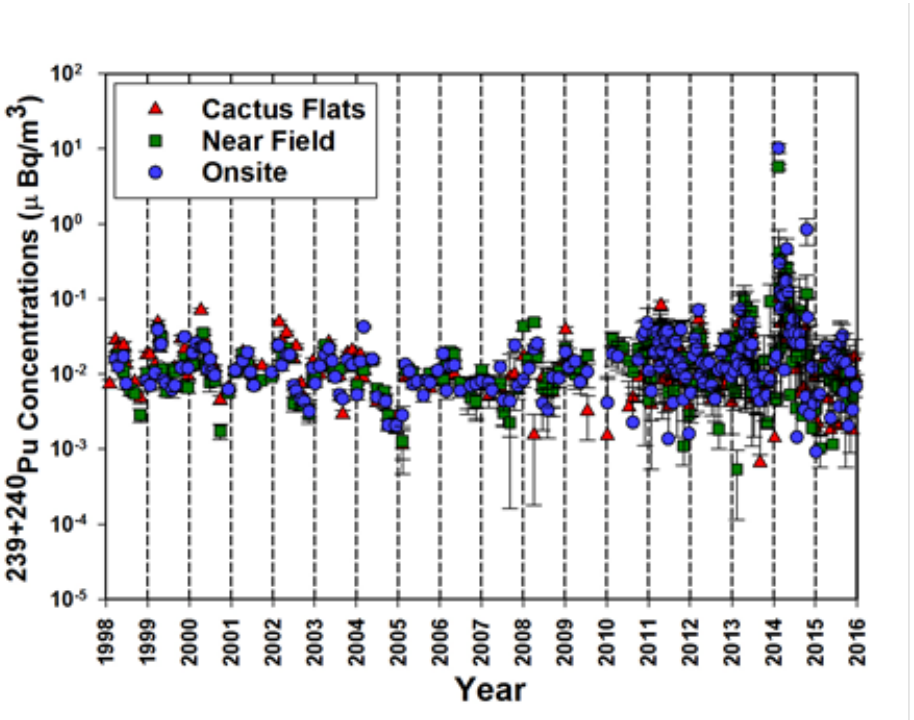
Ambient Air Monitoring



Am-241

115.2 µBq/m³ at Onsite

81.4 µBq/m³ at Near Field

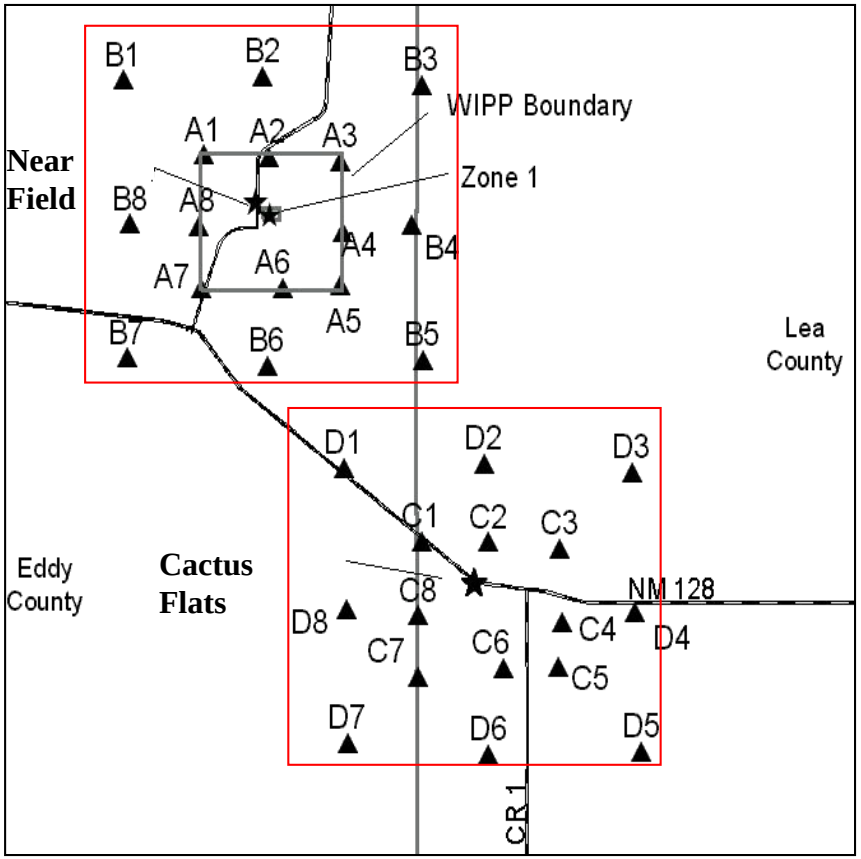


Pu-239+240

10.2 µBq/m³ at Onsite

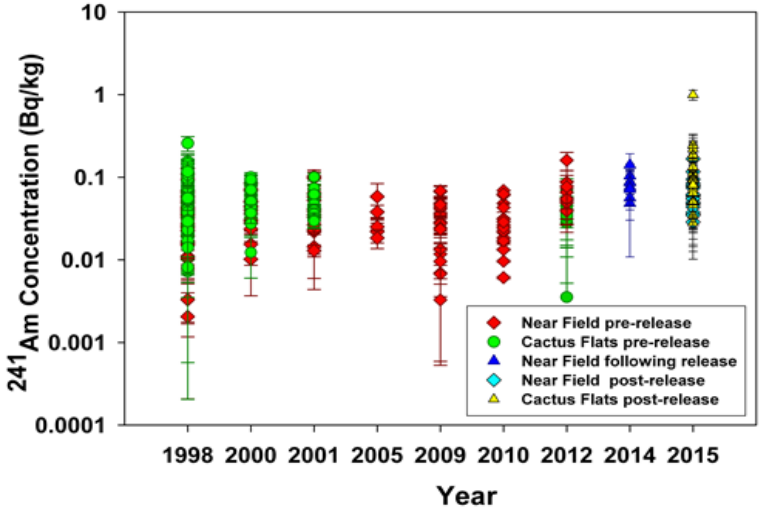
5.8 µBq/m³ at Near Field

Soil Monitoring

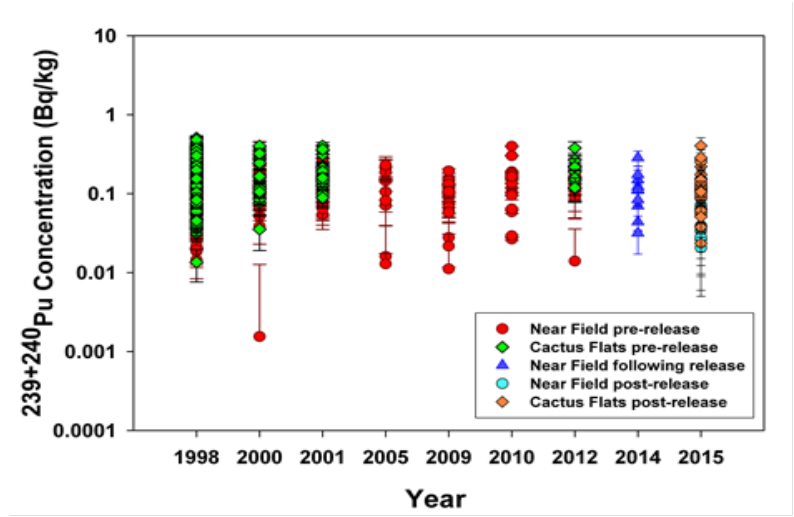


Soil sampling Location

Am-241



Pu-239+240

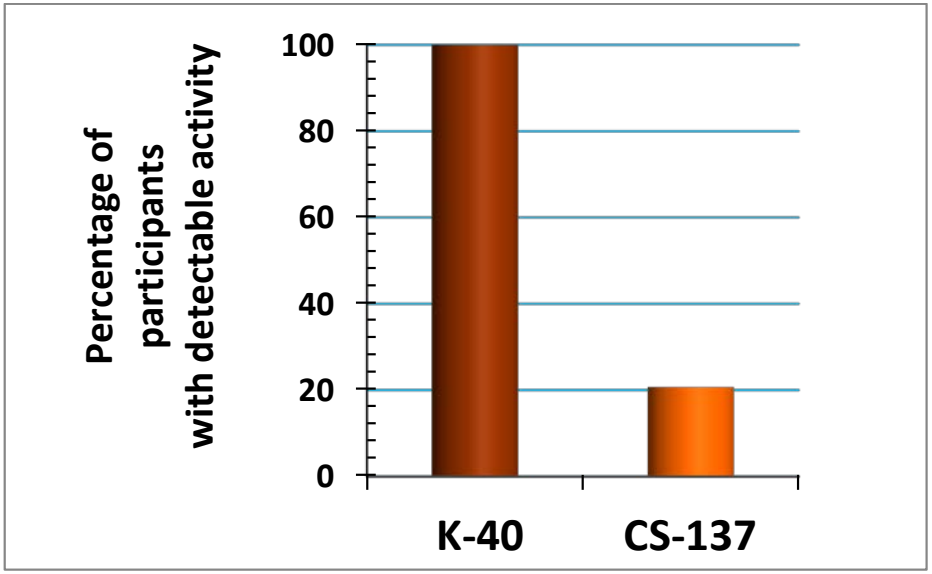


State-of-the-art *in vivo* bioassay (lung & whole body) facility.

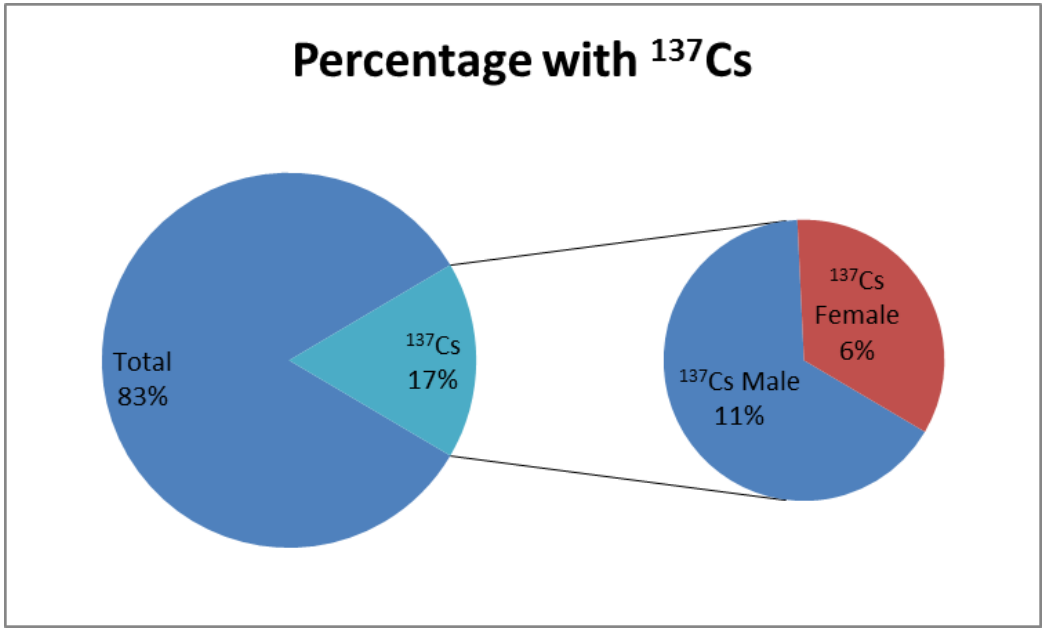
- Provides free *in-vivo* bio-assay services to citizens in the vicinity of the WIPP >13 years of age.
- Screen for over 30 natural and anthropogenic gamma & X-ray emitting radionuclides.

- Between Feb-July 2014, 144 WIPP workers and 42 local citizens were counted.
  - 0.1 nCi MDA for ^{241}Am
  - ^{241}Am not detected in any WBC participants during this period.

Public Volunteer WBC Results



Percentage of participants with detectable ^{40}K and ^{137}Cs through December 2015



Conclusions

- **After almost fifteen years, the first significant airborne radiation was released from WIPP and detected above ground on February 14, 2014.**
- **The concentrations detected in air were very small, localized, and well below any level of public-health or environmental concern.**
- **Independent monitoring and public engagement by the CEMRC helped to alleviate fears both locally and regionally.**
- **The WIPP release incident was newsworthy, but as our data show, it was not dangerous to any member of the public.**
- **Once recovered, WIPP can once again be a safe permanent disposal solution to the country's Cold War legacy of transuranic nuclear waste.**
- **The CEMRC independent monitoring and communications model should be considered as part of any consent-based siting process for new nuclear facilities, especially nuclear waste repositories, elsewhere in the nation and in the world.**

Any Questions?