

Groundwater Cleanup Report Analysis

What This Presentation Covers

↘ Cleanup progress highlights & gaps

↘ Pilot tests & technical results

↘ Tritium and vapor risks

↘ Budget

↘ Oversight concerns

↘ Community recommendations

Decades of Cleanup: Where We Are Now

- 3,574 kg VOCs removed since 1989
- Only 31.3 kg removed in 2024
- Slowing removal = diminishing returns
- Containment is working — but far from finished

● We're in the hard-to-reach phase — slow, uneven, and still risky.





Treatment Systems in 2024

25 groundwater & 7 soil vapor units in use

Pump-and-treat effectiveness now limited

VOC declines are small & site-dependent

Some reductions may not even be due to cleanup

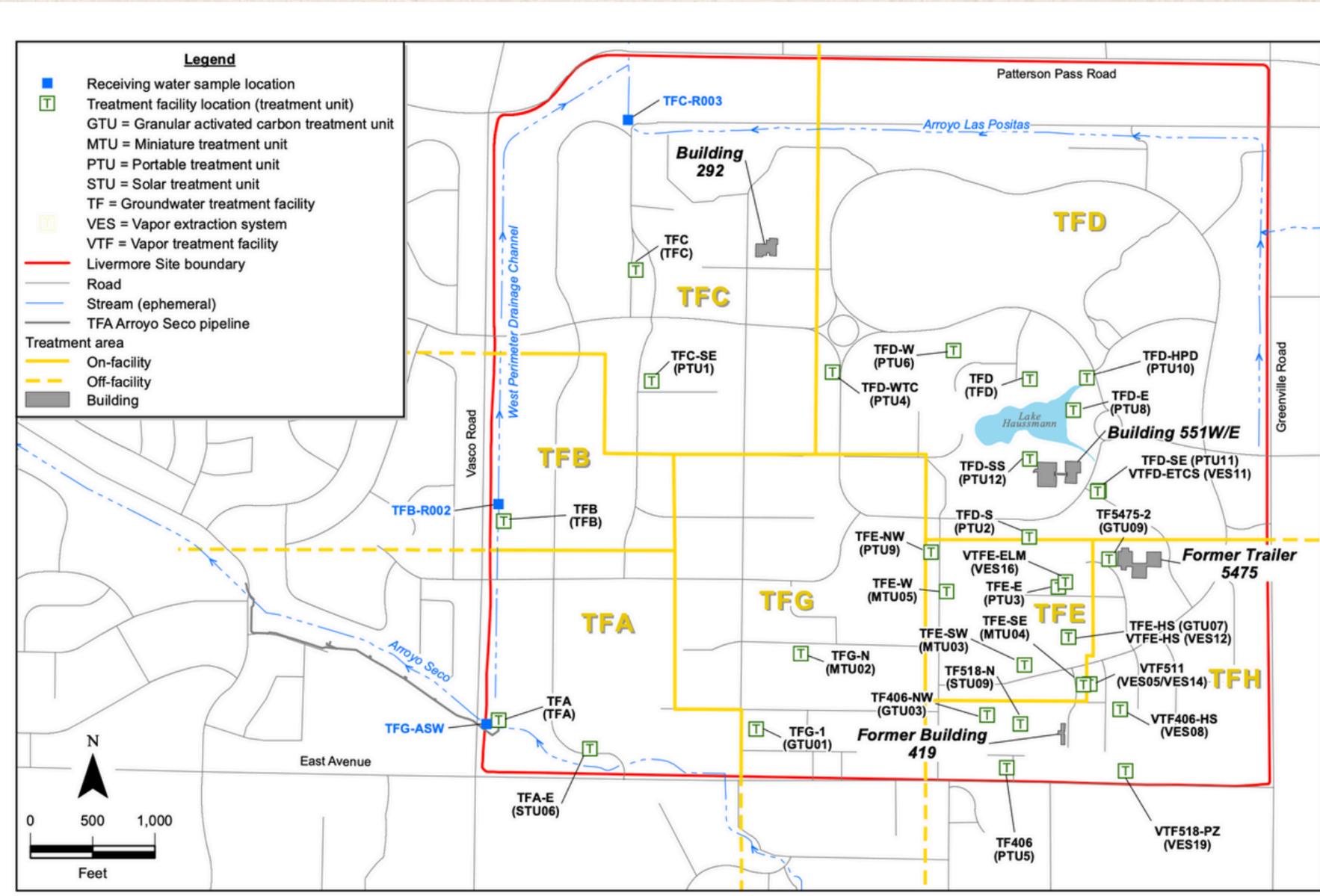
! LESS THAN 1% OF TOTAL MASS REMOVED IN 2024.

Time for Better Tools: Why ESAR Matters

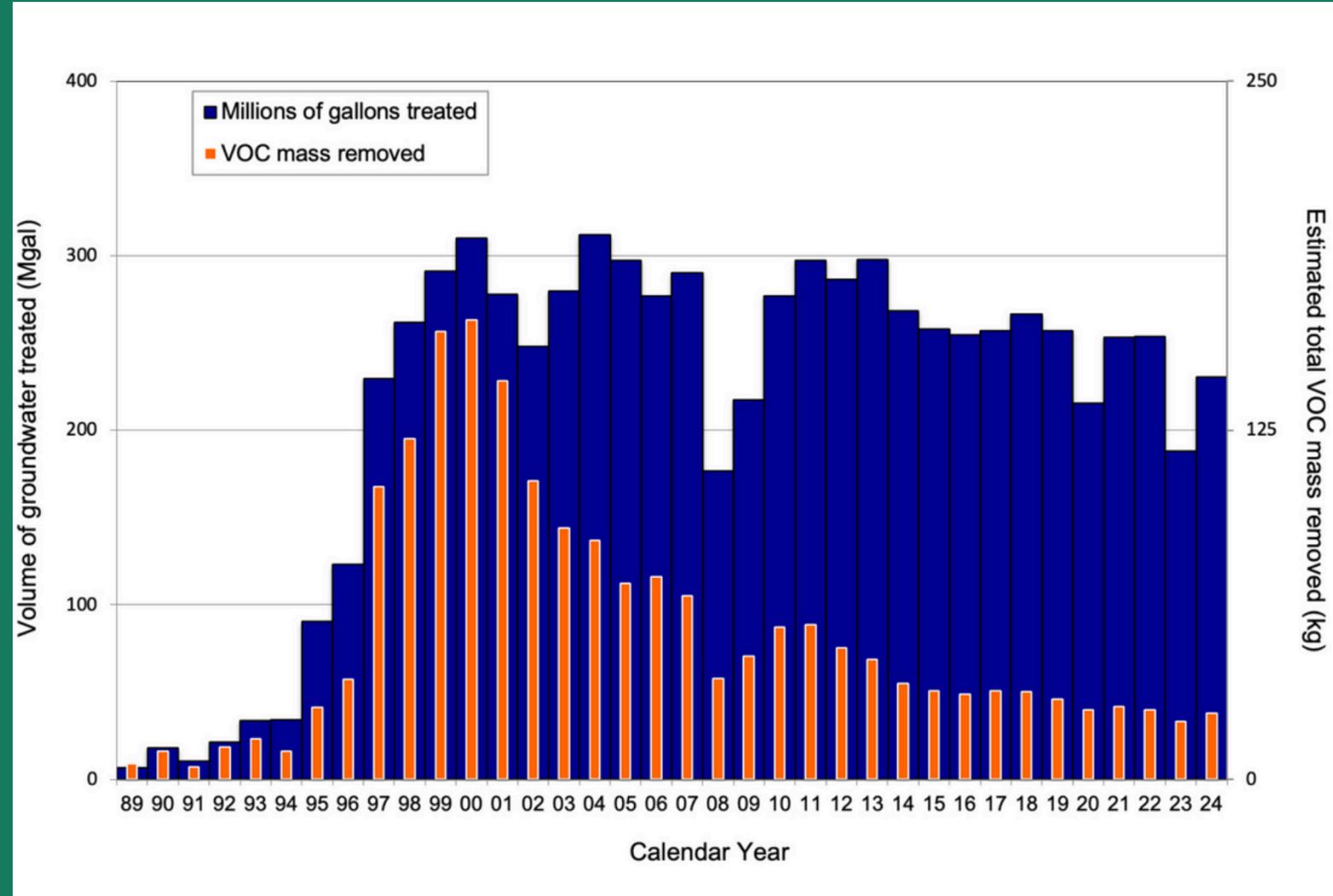
➤ Pump-and-treat alone isn't enough

➤ LLNL piloted 3 Enhanced Source
Area Remediation (ESAR) projects in
2024

➤ Let's assess their progress & transparency



Locations of treatment areas and treatment facilities at the Livermore Site



Estimated total VOC mass removed from groundwater at the Livermore Site since 1989

ESAR Pilot 1: Bioremediation at TFD-HPD

↘ Injected lactate & KB-1® bacteria

↘ Promising early drops:

- W-3702: 3,000 → 1,600 µg/L
- W-3703: 1,300 → 1,000 µg/L

↘ But: one well worsened, others inconsistent

↘ Results buried in Appendix C

● WORKS UNEVENLY, MORE CLARITY
NEEDED ON SUCCESS CRITERIA

ESAR Pilot 2: ZVI at TFC Hotspot

- ZERO-VALENT IRON WORKING IN SOME SPOTS
- 74%, 51% DROPS: BUT REBOUNDS IN 2024
- DEEPER ZONES LESS IMPROVED
- STILL OPERATING — BUT IS IT ENOUGH?

! *PATCHY SUCCESS; LIMITED REACH; STABILITY UNCLEAR*

ESAR Pilot 3 : Thermal Cleanup at TFE-ELM

- Full failure in 2024
- System shut down due to clogging from heat-induced scaling
- No cleanup occurred this year

● **UNACCEPTABLE TO LEAVE A TOXIC SOURCE AREA UNTREATED FOR A FULL YEAR**

- STILL EXCEEDING LIMITS NEAR BLDG 419
- W-1414: >37,000 PCI/L (6 YEARS IN A ROW)
- EXCUSE: RAIN MOBILIZED TRITIUM
- RESPONSE: MONITOR & WAIT

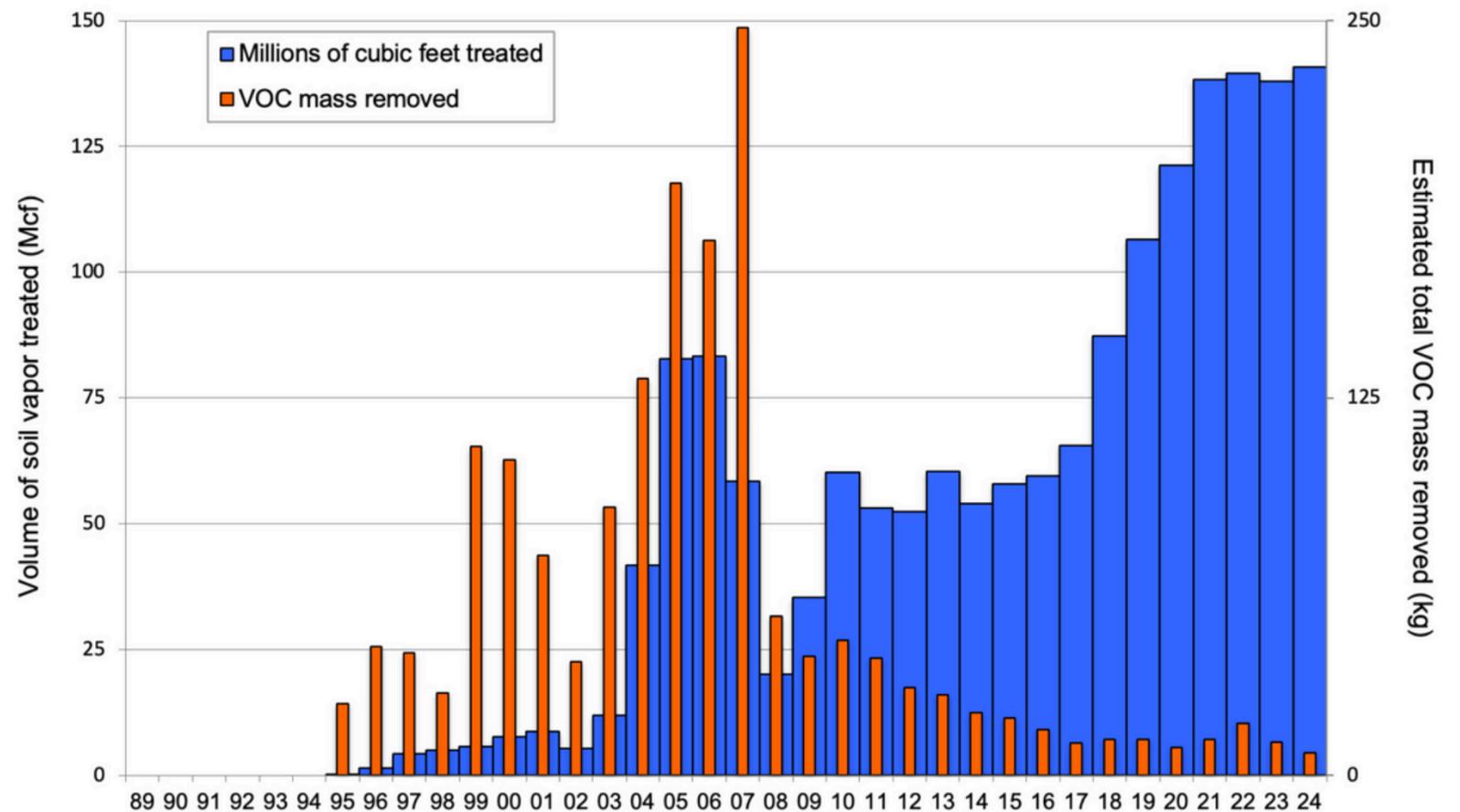
Tritium Trouble

 **“NATURAL ATTENUATION” =
DECADES OF PASSIVE EXPOSURE**

Vapor Intrusion—Indoor Air Risks

- 6 of 12 tested buildings still show VOCs
- None exceeded limits this year
- 7 vapor systems running
- No off-site testing discussed

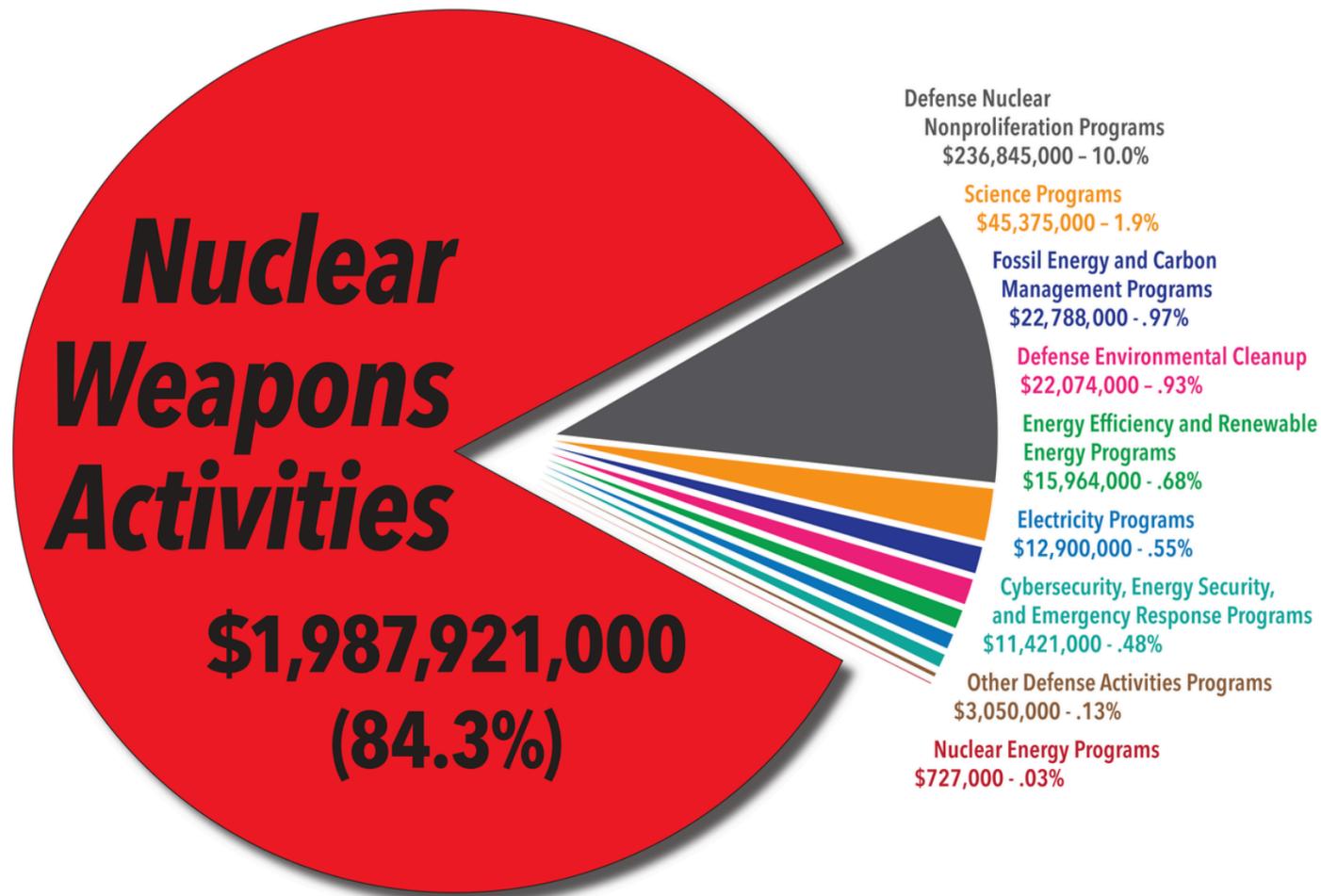
● What happens if and when systems turn off? No plan yet.



FY2024

Budget Request for LLNL

Total \$2,359,047,000



Budget Cuts = Delayed Cleanup

No drilling in 2024

Postponed upgrades

Merged systems to save cost

Long-term data gaps & equipment risks

● FUNDING SHORTFALL = REGULATORY AND COMMUNITY RISK

Oversight—Is it Enough?

- ↘ LLNL followed reporting timelines, but vague language masks setbacks

- ↘ Next Five-Year Review due 2025-26

- ↘ No public-facing summary or easily digestible data





Key Concerns

- ↘ Stalled ESAR pilot
- ↘ Tritium rebound
- ↘ No clear cleanup timeline
- ↘ Minimal action on thermal failure
- ↘ Budget shortfall shows vulnerability

Recommendations

- SECURE CONSISTENT FUNDING
- CLARIFY GOALS & DATA
- SUSTAINED INDOOR AIR TESTING
- ACT ON PERSISTENT VOC & TRITIUM HOTSPOTS
- PUSH FOR HONEST, ACCESSIBLE LANGUAGE
- DEMAND STRONGER STATE/FEDERAL OVERSIGHT



Thank You

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