nuclear watch new mexico

Northern New Mexico Citizen's Advisory Board

February 12, 2014

www.nukewatch.org

Mission Statement

Through comprehensive research, public education and effective citizen action, Nuclear Watch New Mexico seeks to promote safety and environmental protection at regional nuclear facilities; mission diversification away from nuclear weapons programs; greater accountability and cleanup in the nation-wide nuclear weapons complex; and consistent U.S. leadership toward a world free of nuclear weapons.

The total cost of our Cold War nuclear weapons program has yet to be paid.

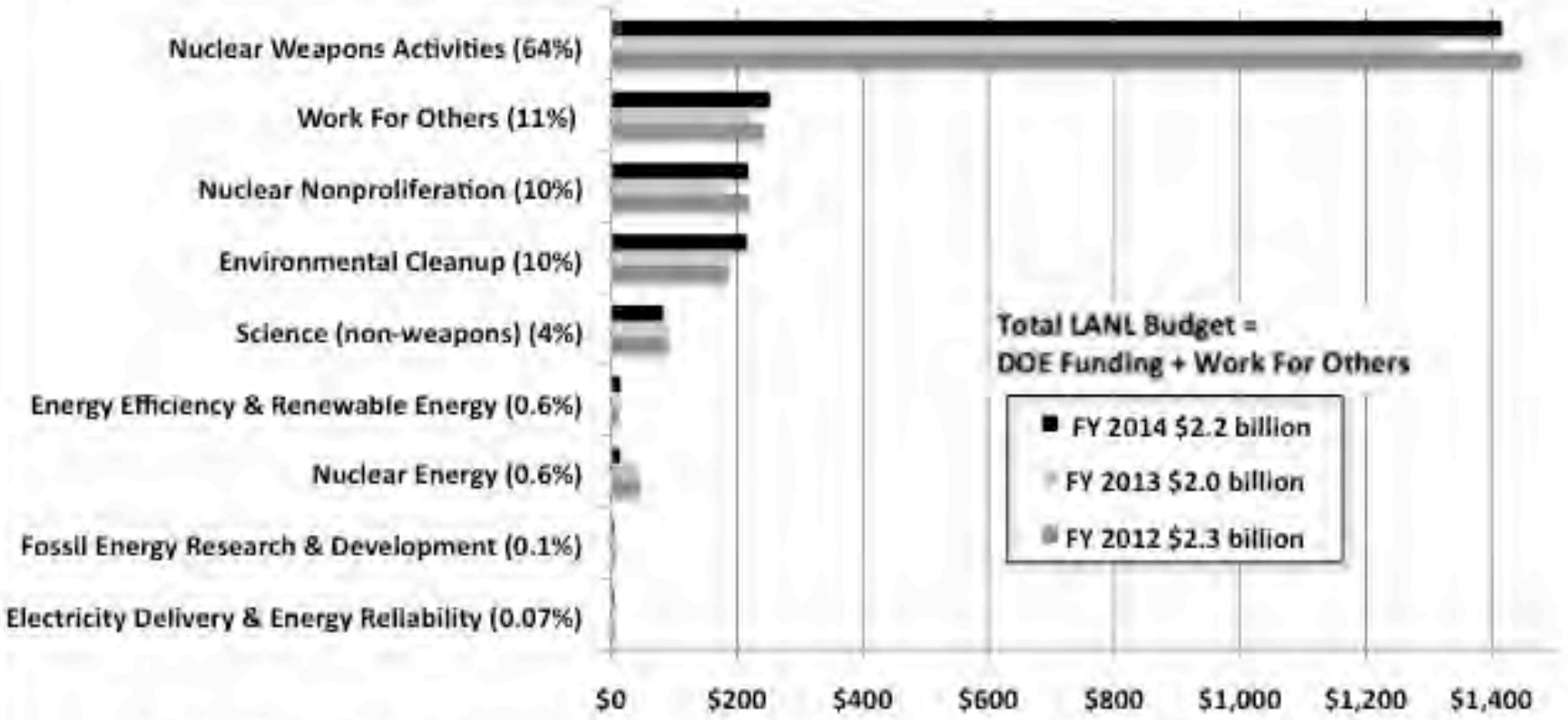
Will Budget constraints make de-facto decisions concerning public health?

Current National Estimate For Cold War Cleanup = $260 billion

- The nation-wide clean up of the environmental legacy of nuclear weapons production and nuclear energy research. Seventy years of these activities produced large, technically complex problems. These problems will require billions of dollars a year over the several decades it will take to do the work.
- Los Alamos should take lead in cleanup technologies that can be shared across country

Los Alamos National Laboratory
FY 2014 Congressional Budget Request
(In millions of $$)

nuclear watch new mexico



Notes: The above are officially named budget categories. The percentages are of total Lab budget for FY 2014. "Work For Others" is for other than the Department of Energy (e.g., Depts. of Defense and Homeland Security, the FBI, CIA, etc.) and based on pas

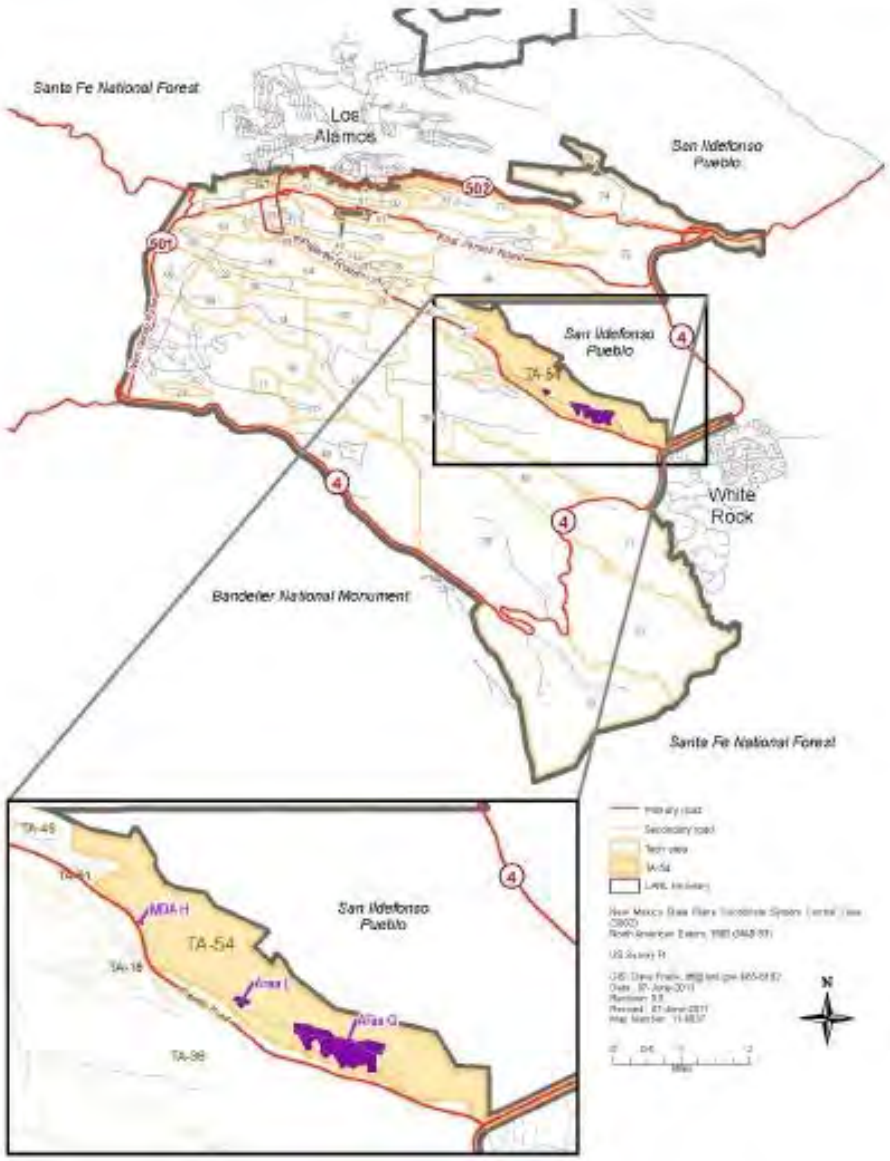


Figure 1.0-1 Location of Area G in TA-54 with respect to Laboratory TAs and surrounding landholdings

Material Disposal Area G
57 Years - 65 Acres

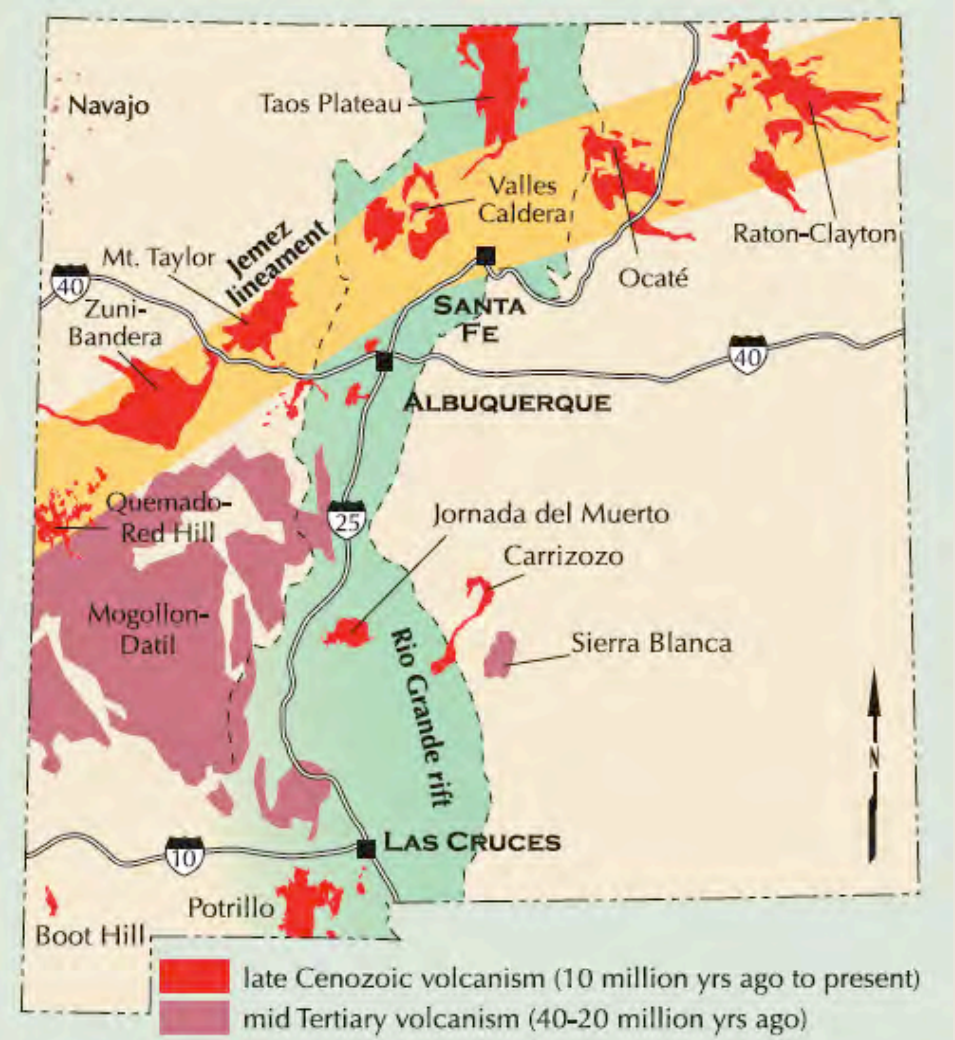
Material Disposal Area G
32 pits, 194 shafts

Figure 1.0-3 Area G waste disposal units

The Los Alamos site was not selected as nuclear waste dump

- To build the atomic bomb, J Robert Oppenheimer and General Leslie R. Groves decided that, for security, they needed a secret research laboratory in a remote location.
- Over the decades, immense amounts of radioactive and hazardous wastes have been buried under self regulation.
- A modern landfill would never have been allowed to use Area G's unlined disposal methods.

Where the Jemez Lineament Crosses the Rio Grande Rift



The major volcanic fields in New Mexico tend to follow two major zones of weakness in the crust and underlying mantle, the Jemez lineament and the Rio Grande rift.

Not the Place for a Permanent Nuclear Waste Dump!

Los Alamos's geology was poorly understood when it was chosen as a secret nuclear weapons site.

The Jemez Lineament is a geologic weakness formed where two very old blocks of the earth's crust were pressed together, like a seam.

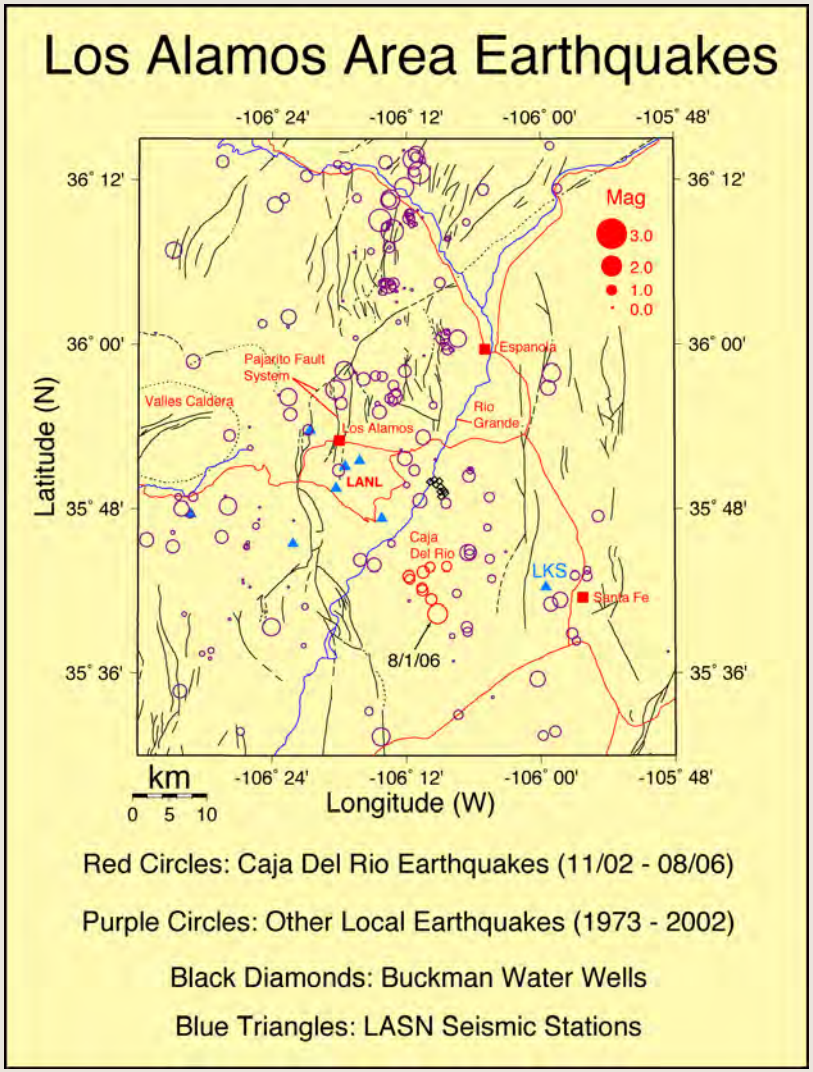
In addition to crustal weakness, volcanism in New Mexico is also likely related to upwelling of abnormally hot mantle material.

All existing volcanoes in New Mexico are probably extinct, except the Jemez Mountains.

http://geoinfo.nmt.edu/publications/periodicals/earthmatters/6/EMV6N1.pdf

Several dozen earthquakes occur in northern New Mexico each year.

An active tectonic feature known as the Pajarito Fault System passes just west of town and has major sub-faults dissecting LANL property.



Fault cross section

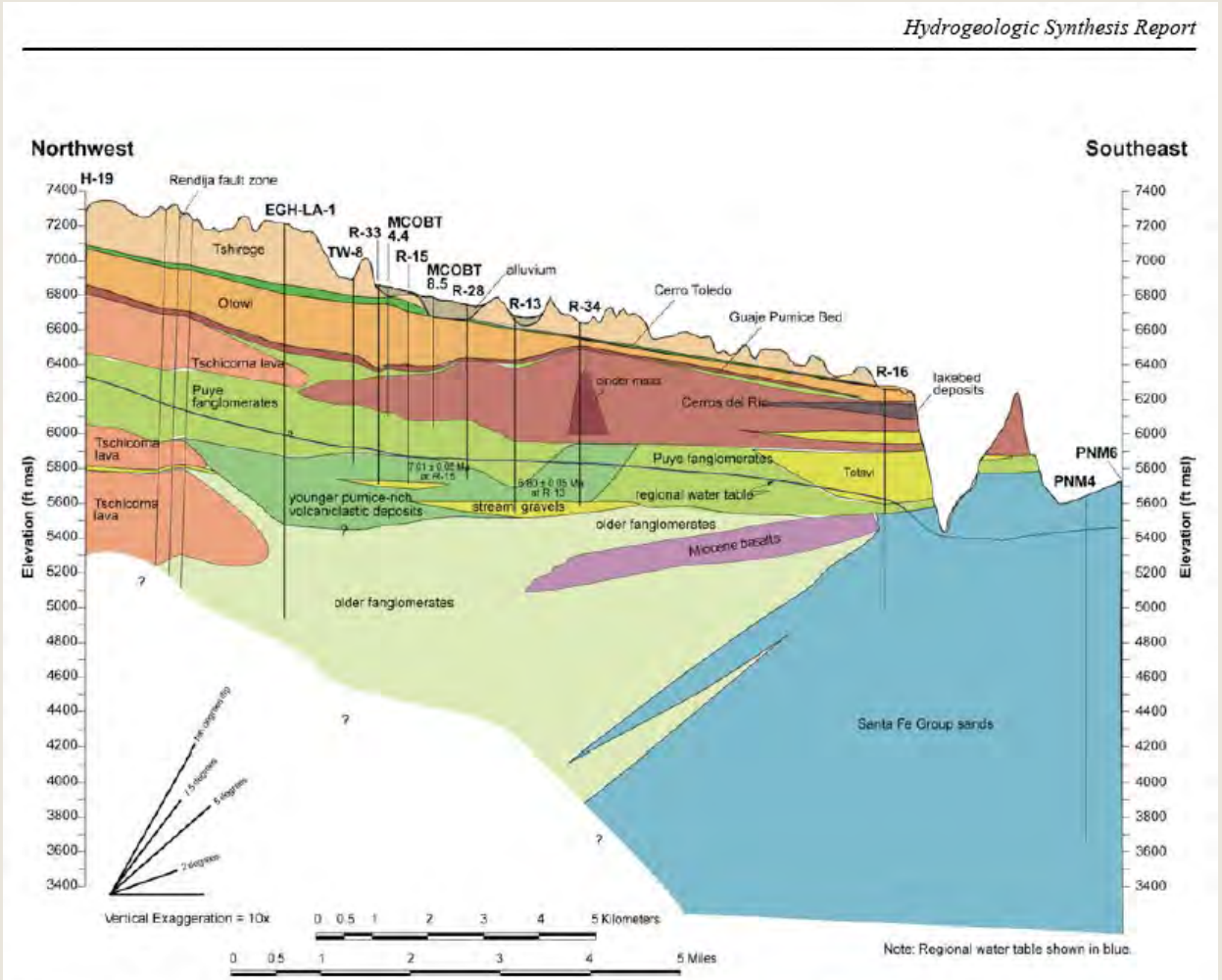


Figure 2-13. Conceptual cross-section for Mortandad Canyon. Regional water table is shown in blue.

A 7.0 quake “will occur at some point”

“Rio Grande Rift F.A.Q” by the Cooperative Institute for Research in Environmental Sciences

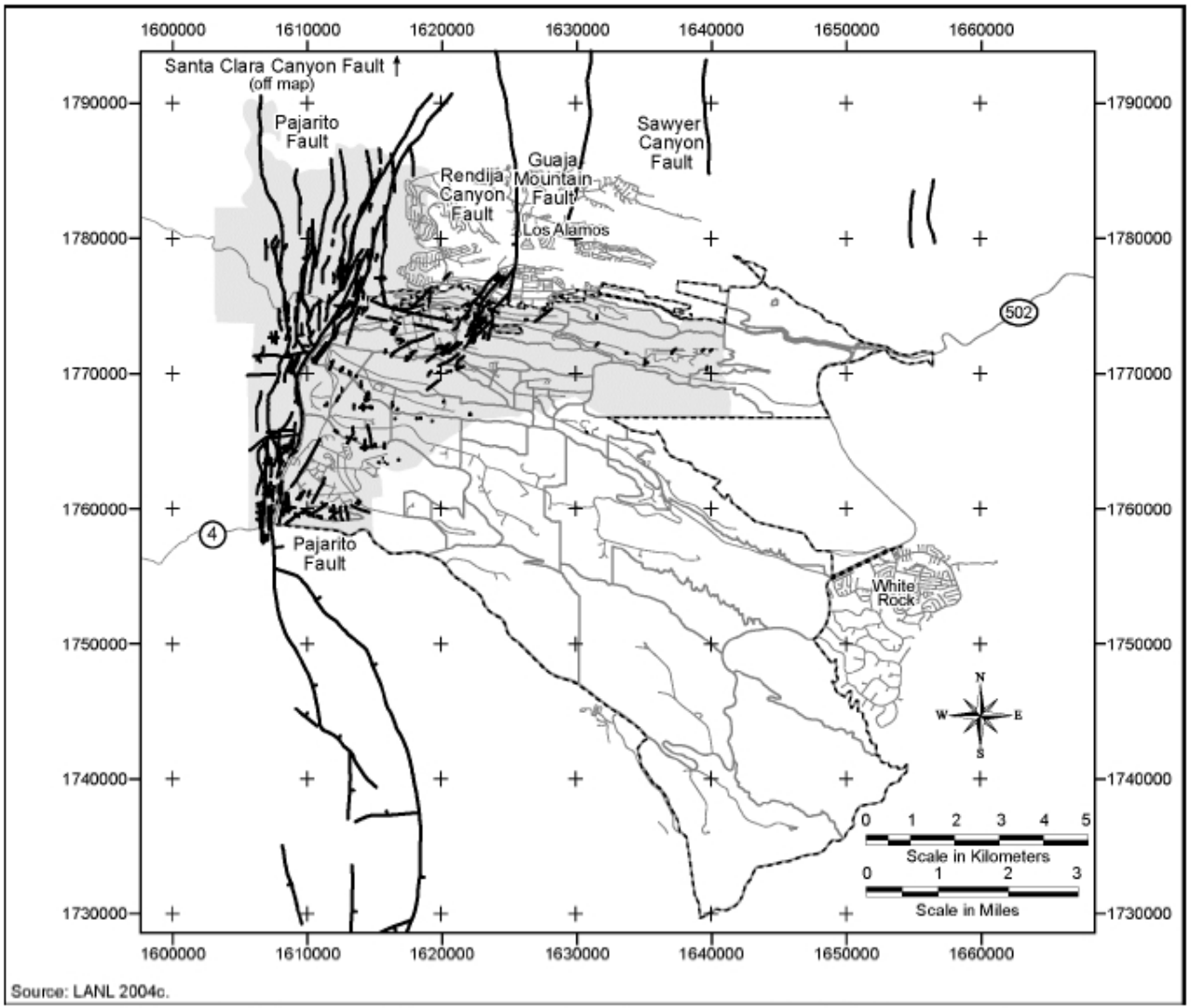
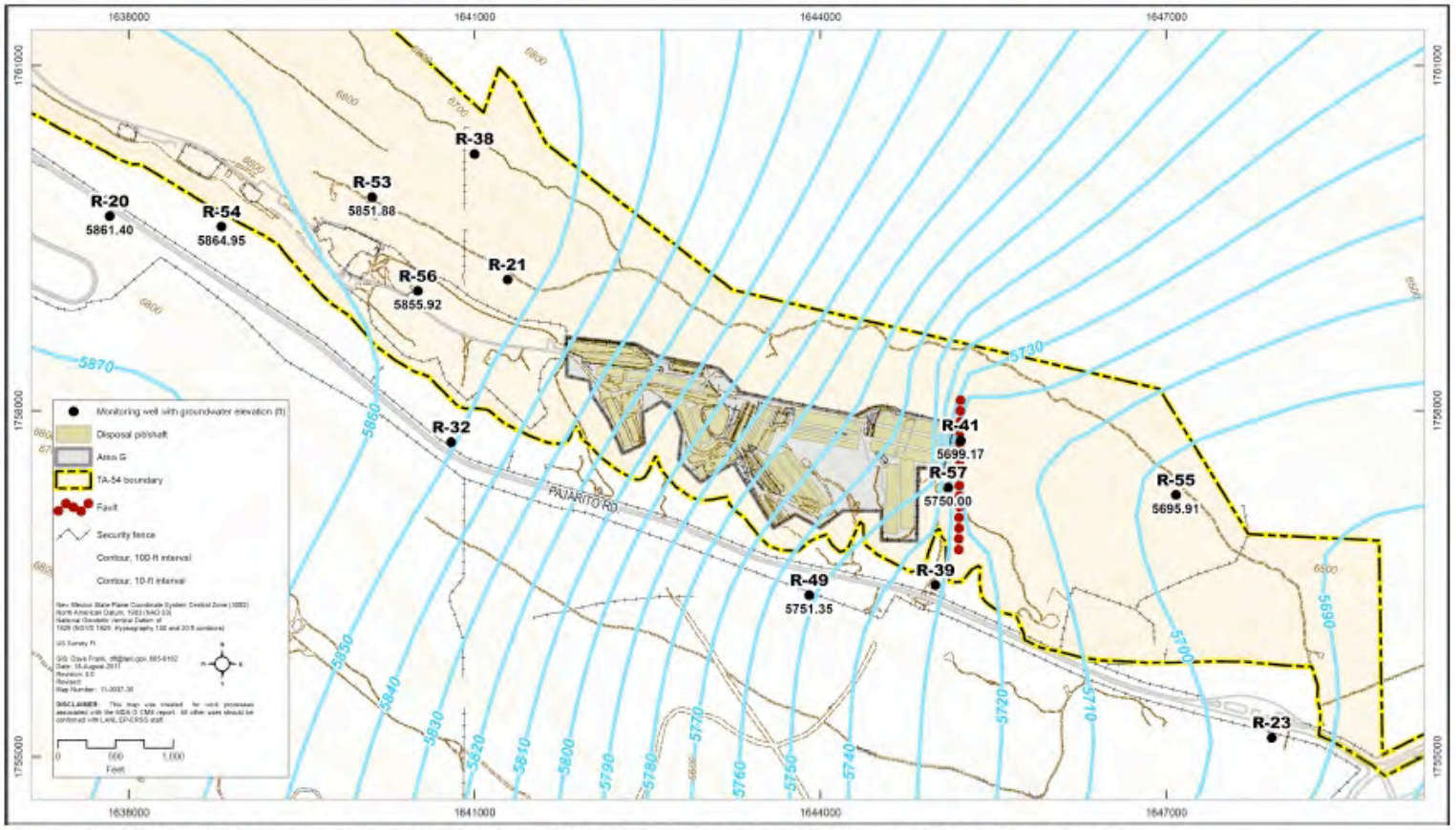


Figure 4–9 Mapped Faults in the Los Alamos National Laboratory Area

Possible Seismic Fault at Area G



Note: Applied water-level data are presented for each monitoring well. This version takes into account the deep water level at R-41 and assumes that there is a vertical barrier impacting the deep aquifer flow between R-57 and R-41.

Figure E-3.3-6 Version 2 of the water-level contour map representative of the regional piezometric surfaces near MDA G; the map is based on February 2011 water levels measured in the deepest screens in the monitoring wells

E-46

Area G Fails
DOE's Current Siting Criteria

DOE Order 420.1

FACILITY SAFETY lists elements of defense-in-depth related to safety design and construction that **must be objectives during the design process.**

Siting - Consider site locations that reduce the need to provide design measures to alleviate potentially hazardous conditions or to protect surrounding populations.

Solvent Plume Spreading from Area G
(Abutting San Ildefonso Pueblo Lands)

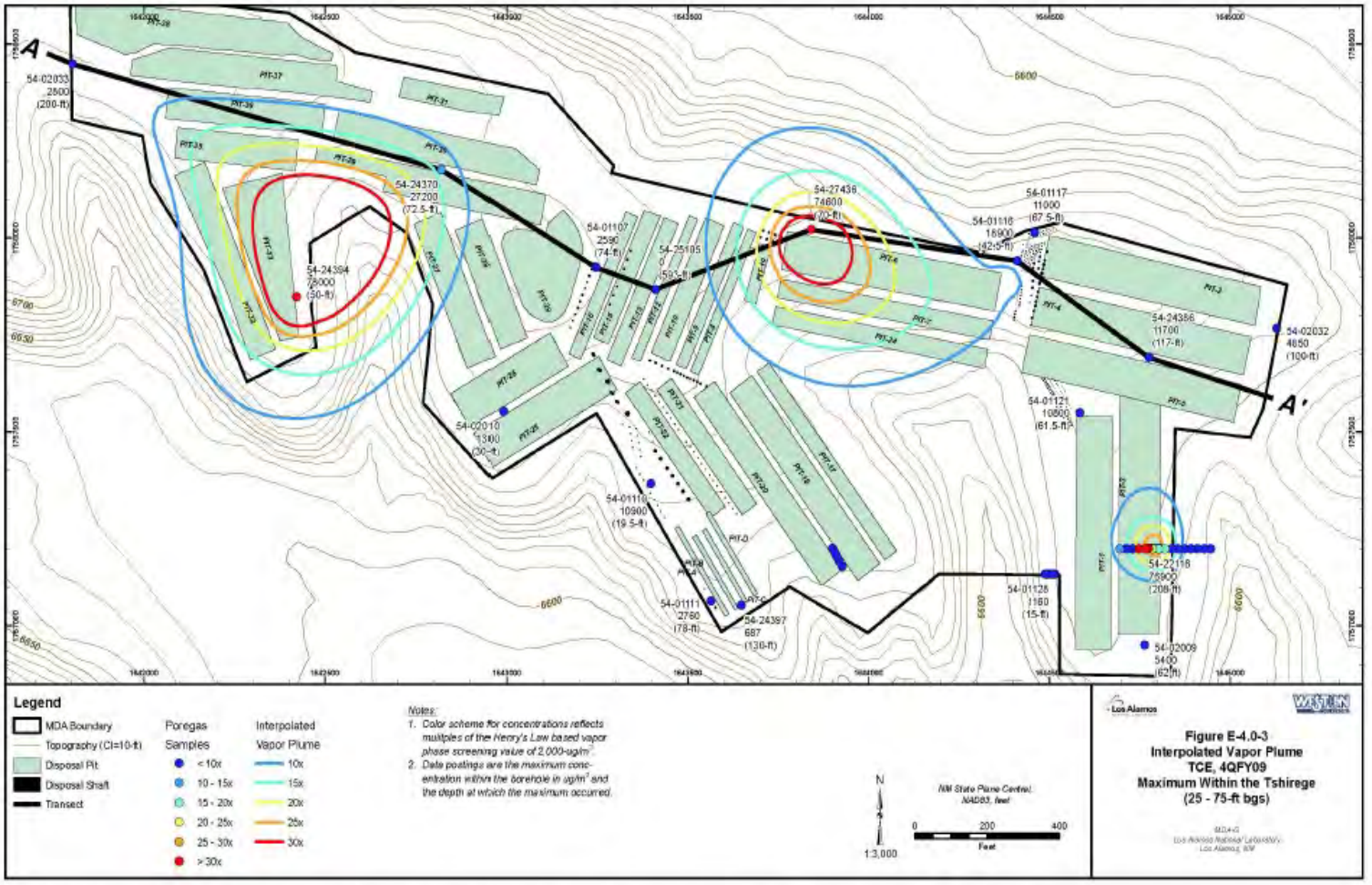


Figure C-3.1-2 Interpolated vapor plume for TCE at MDA G based on fourth quarter FY2009 data, maximum concentration within the Tshirege (25 to 75 ft bgs)

Solvent Plume Has Migrated Nearly 200 Feet Toward Aquifer

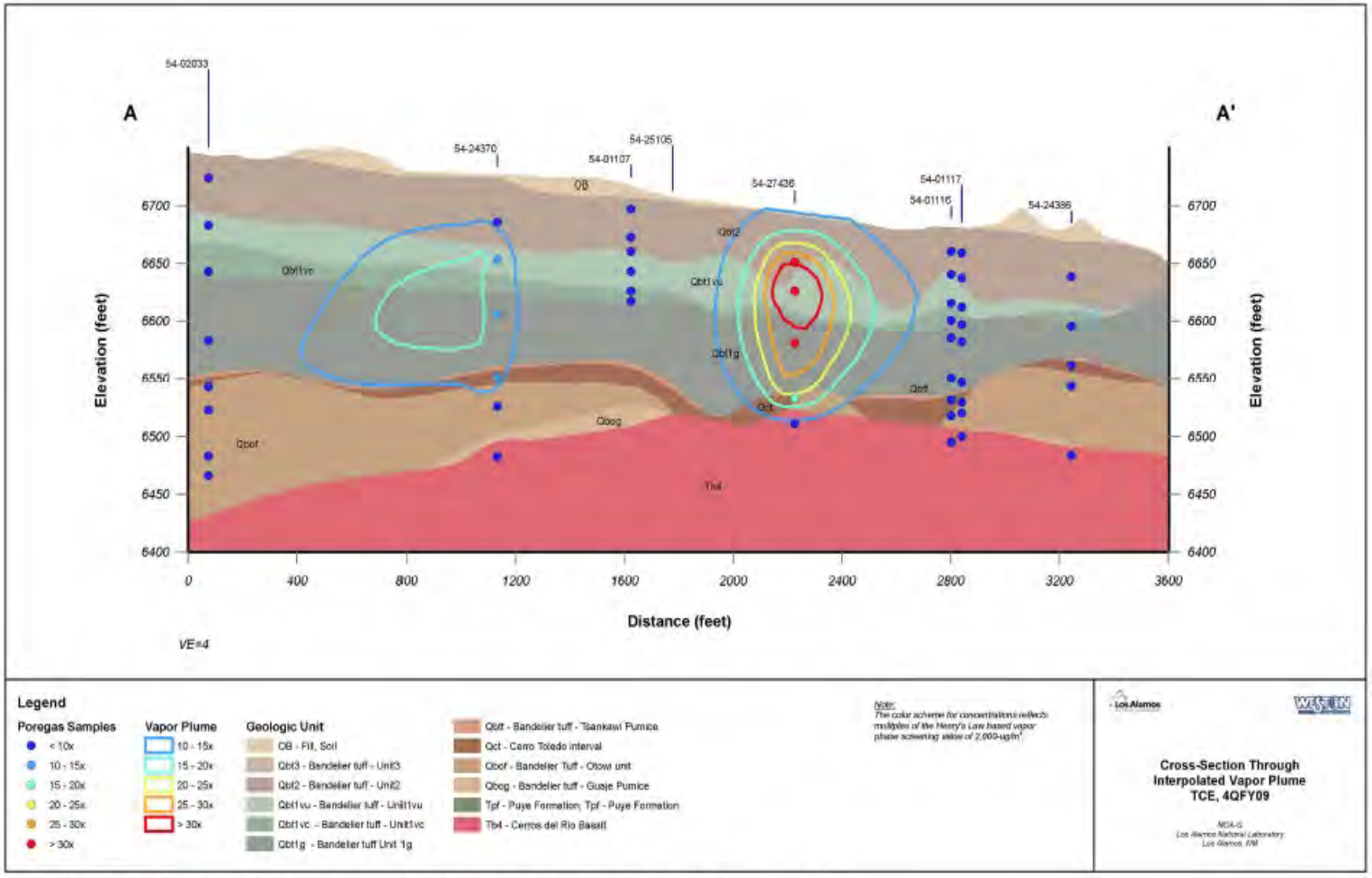


Figure C-3.1-4 East-west cross-section through interpolated vapor plume for TCE at MDA G based on fourth quarter FY2009 data

Pu, Am, H^3, Co-60 Surrounding Area G

(Abutting San Ildefonso Pueblo Lands)

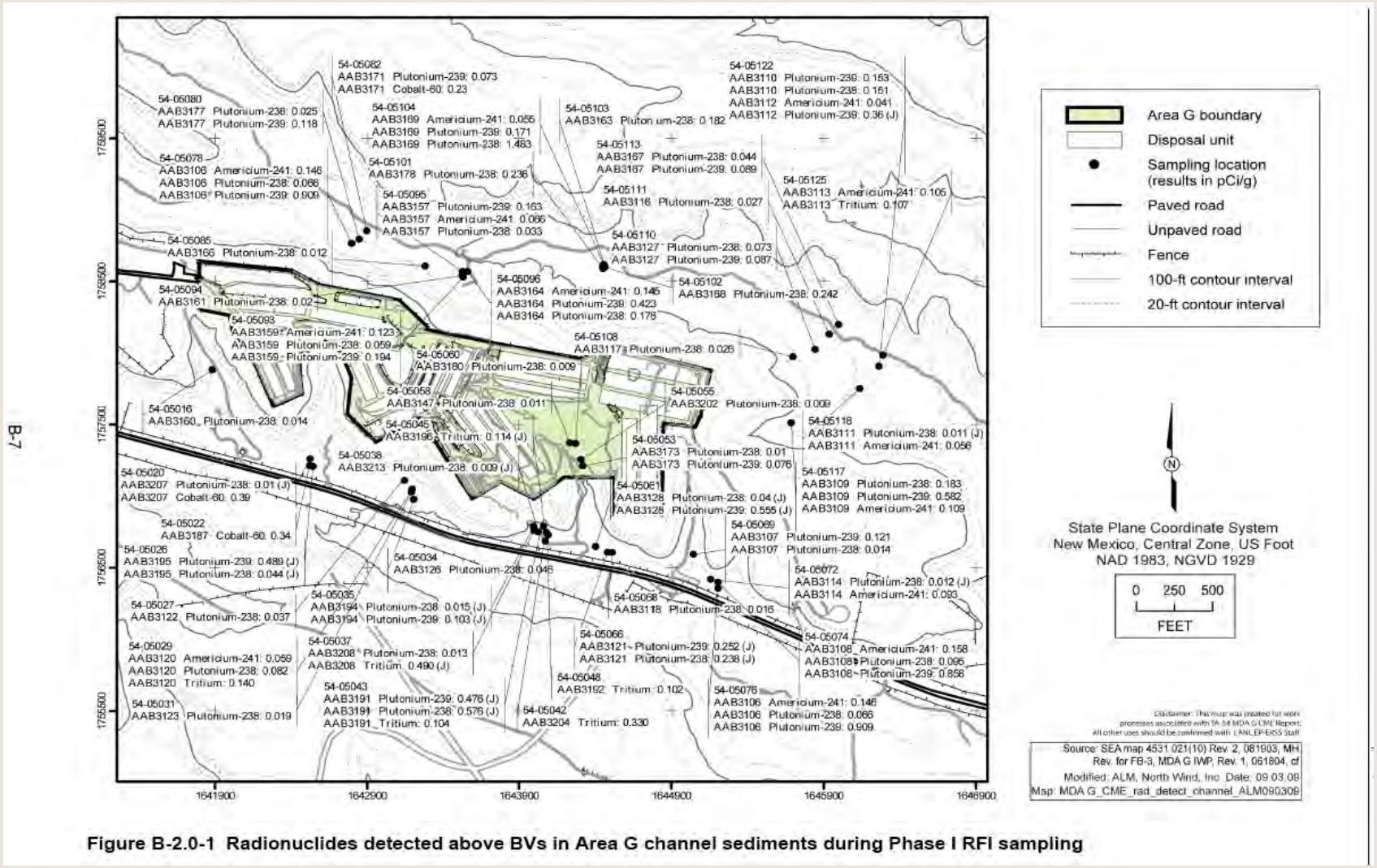
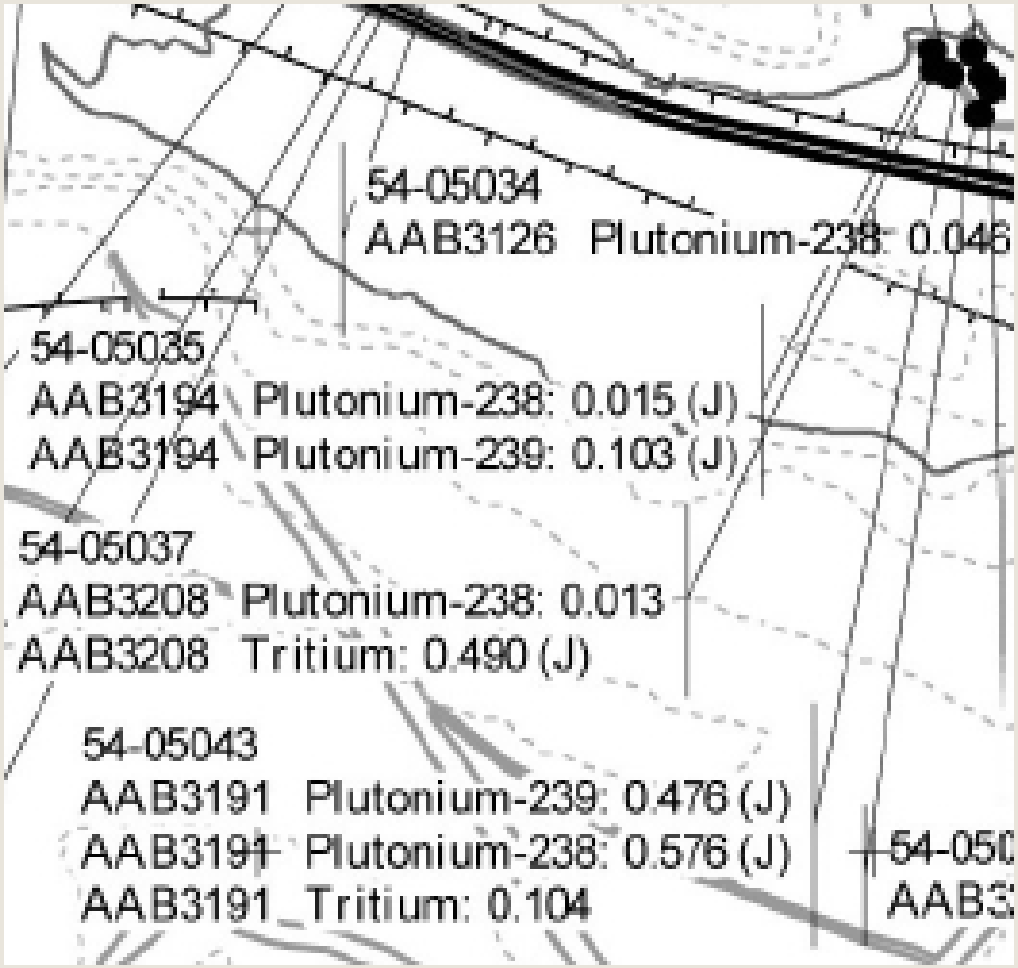


Figure B-2.0-1 Radionuclides detected above BVs in Area G channel sediments during Phase I RFI sampling

Plutonium in channel sediments off-site of Area G



Limited Borehole Sampling For Rads Under Area G

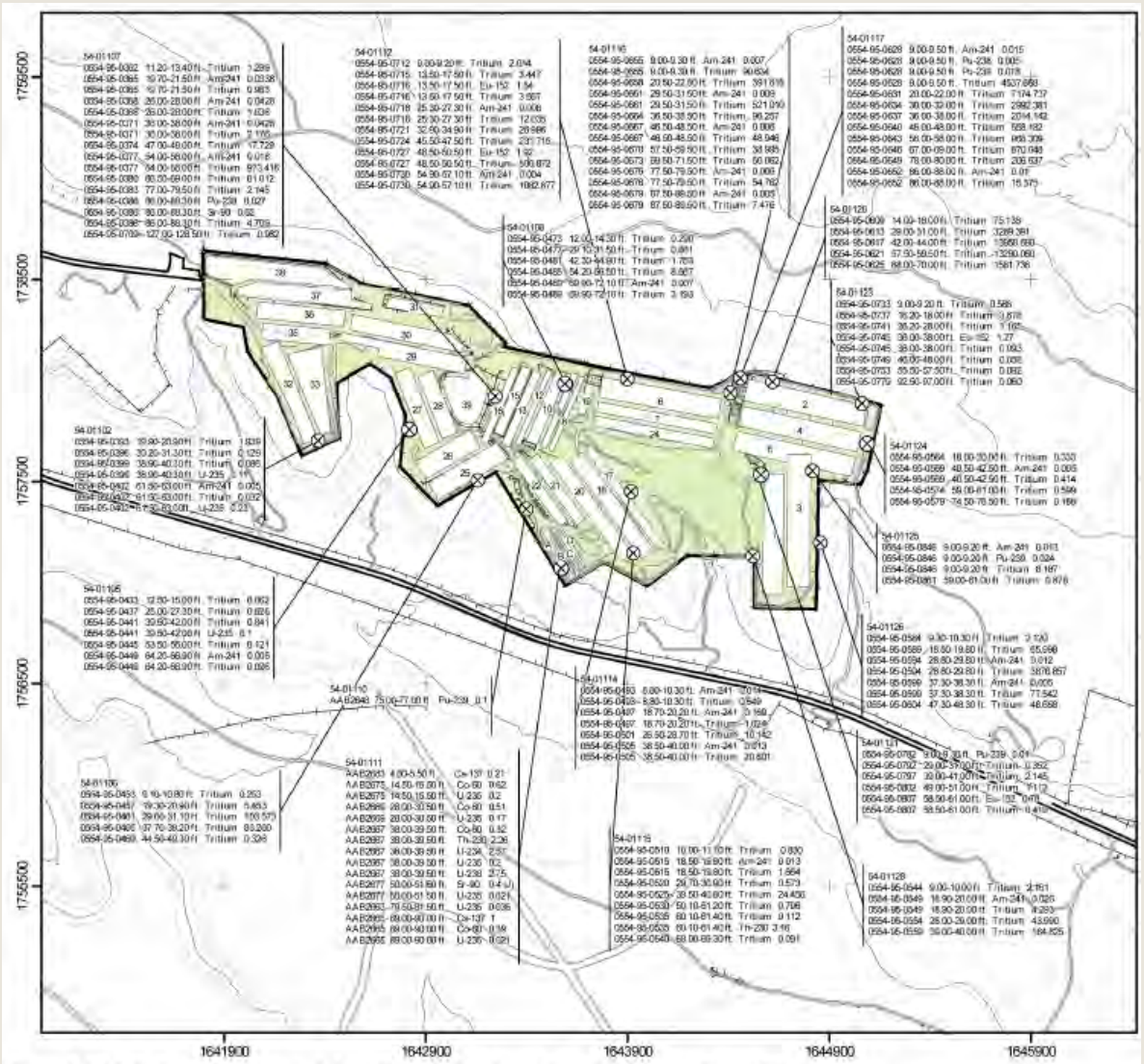


Figure B-2.0-8 Radionuclides detected above BVs in subsurface tuff at MDA G during Phase I RFI sampling

Plutonium Has Migrated 200 Feet Under Area G

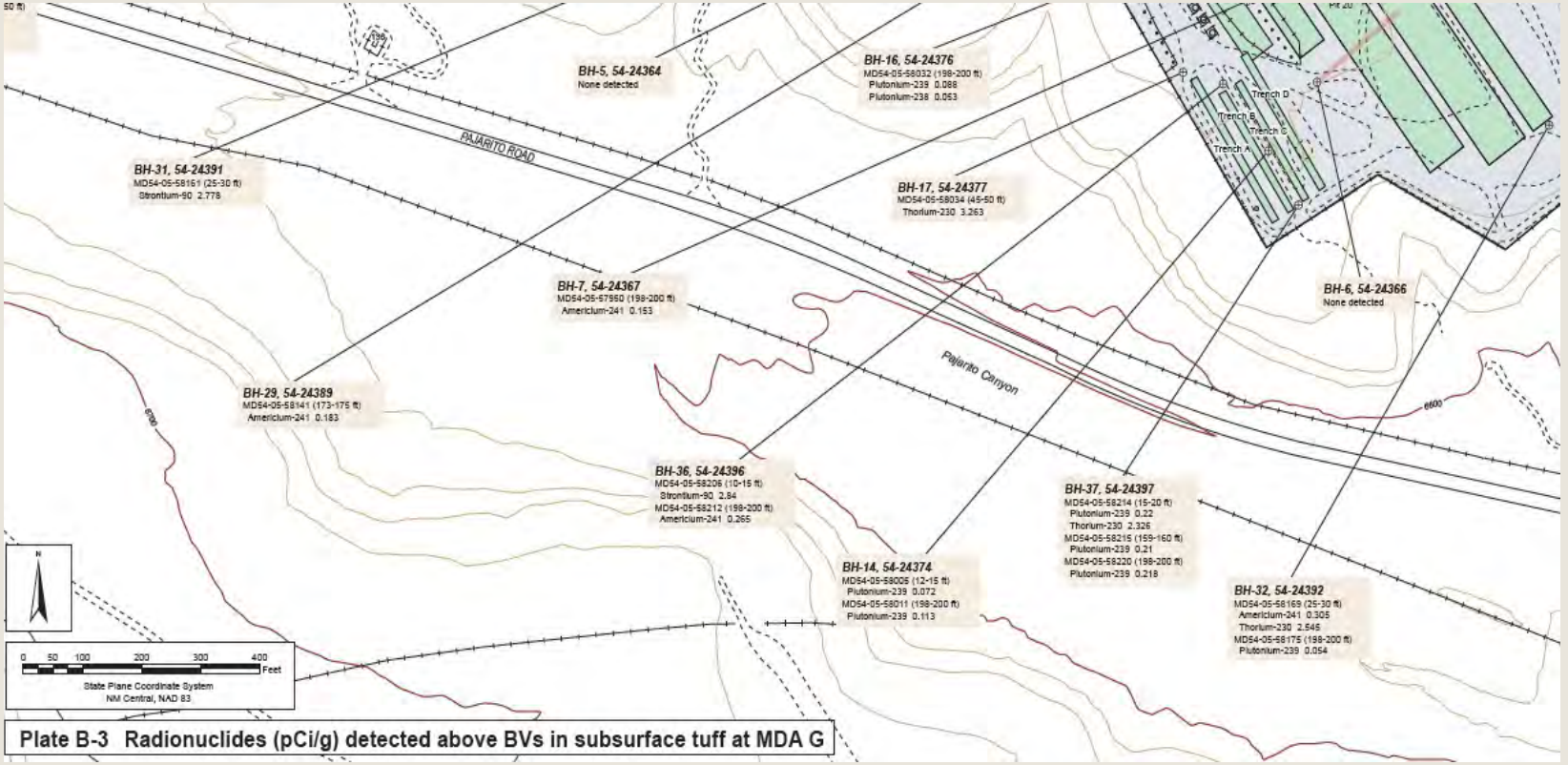


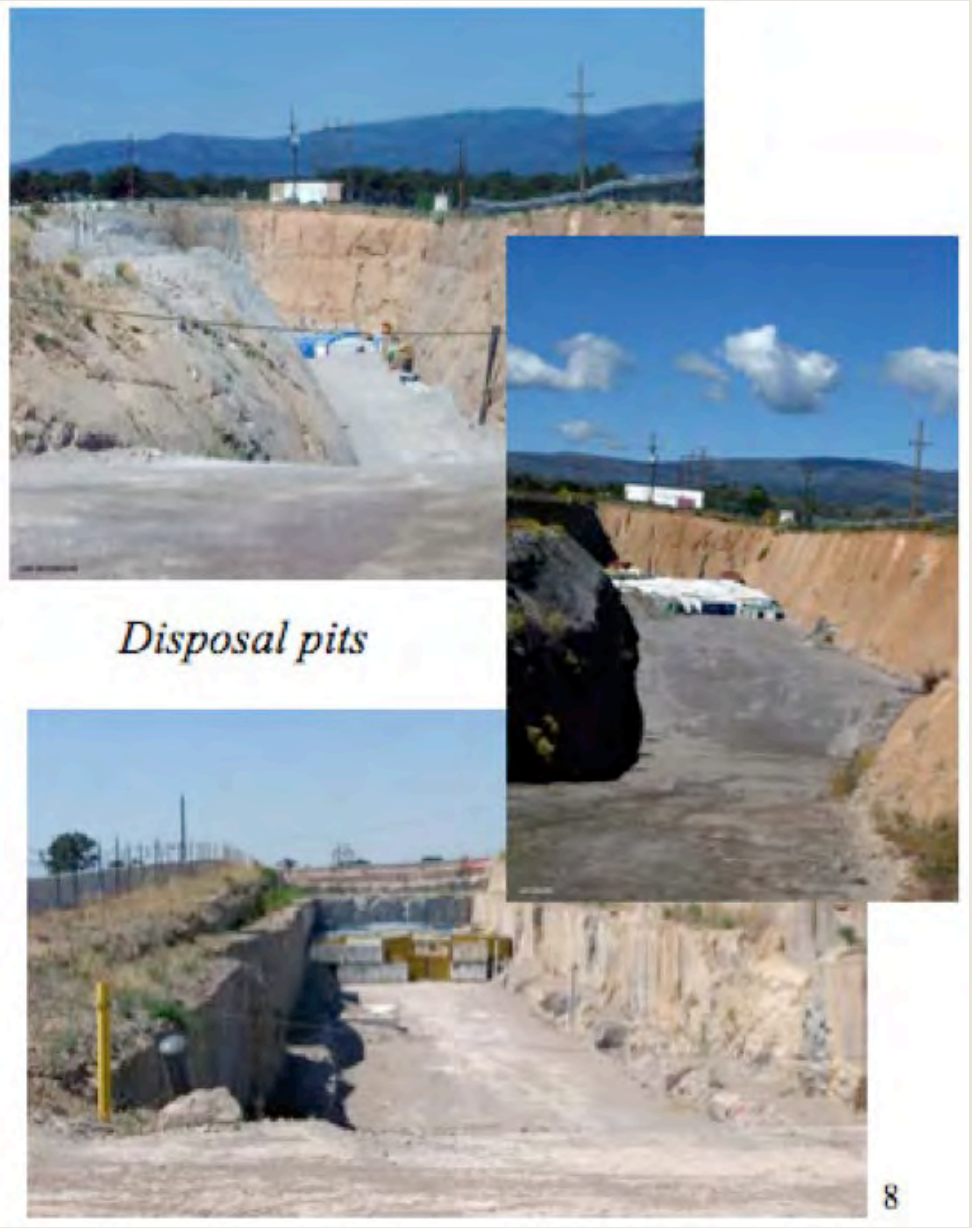
Plate B-3 Radionuclides (pCi/g) detected above BVs in subsurface tuff at MDA G

Plutonium and Other Rads at 200’

- ***BH-37, 54-24397***
  - MD54-05-58214 (15-20 ft)
    - Plutonium-239 0.22
    - Thorium-230 2.326
  - MD54-05-58215 (159-160 ft)
    - Plutonium-239 0.21
  - MD54-05-58220 (198-200 ft)
    - Plutonium-239 0.218
  - pCi/g

MDA G

- Before the mid-1990s, the waste was typically placed into the pits in lifts; each layer of waste was covered with crushed tuff and compacted using heavy equipment.



Waste + Backfill = 1 Million Cubic Yards
(Approx. Volume of Empire State Building)

Table G-3.4-1 (continued)

Pit No.	Dimensions (length × width × depth)	Rectangular Volume of Pit (yd^3)	Field-Measured Pit Volume (yd^3)	Estimated Disposed Waste Volume in Pit (yd^3)	Estimated TRU Waste Volume (yd^3)[a]	Estimated MLLW Volume (yd^3)[b]	Estimated Total Waste Volume (yd^3)[c]	Estimated Materials Suitable for Backfill (yd^3)
30	568 ft × 39 ft × 35 ft	42,843	28,716	13,464		28,716	28,716	14,127
31	280 ft × 52 ft × 25 ft	13,481	13,481	2702		13,481	13,481	0
32	518 ft × 74 ft × 51 ft	72,405	36,364	5367		36,364	36,364	36,041
33	425 ft × 115 ft × 40 ft	72,407	59,930	7776		59,930	59,930	12,477
35	363 ft × 83 ft × 40 ft	44,636	20,957	3361		20,957	20,957	23,679
36	435 ft × 83 ft × 43 ft	57,501	28,057	4491		28,057	28,057	29,444
37	731 ft × 83 ft × 61 ft	137,076	57,213	24,299		57,213	57,213	79,863
Totals		**1,491,253**	**898,924**	**200,986**	**54,536**	**844,388**	**898,924**	**592,329**

Note: Blank cell indicates this waste type/material is not known to be found in the pit.

[a] Newly generated TRU equals volume of waste in pit containing TRU in Table 2.1-1.

[b] Difference between the field-measured pit volume and estimated TRU waste volume.

[c] Sum of estimated TRU waste volume and estimated MLLW volume.

[d] Difference between the rectangular volume of pit and field-measured pit volume.

Incomplete Area G Records Reveal Huge List of Contaminants

13	Nov 1976–Sep 1977	400 ft × 42 ft × 28 ft	17,422	12,107	1931	Uranium, mixed fission products, mixed activation products. Uranium fission products and induced activity wastes
16	Sep 1971–Aug 1975	400 ft × 25 ft × 25 ft	9259	8081	2235	Crates and drums containing uranium-contaminated wastes
17	Aug 1972–Mar 1974	600 ft × 46 ft × 24 ft	24,533	17,399	4962	Low-level Pu TRU <10 nCi/g. Misc. scrap wastes, crates, filter plenums
18	Feb 1978–Aug 1979	600 ft × 75 ft × 40 ft	66,667	46,685	12,358	Contaminated dirt, lab wastes, noncompactible waste, D&D, drums
19	Nov 1975–Aug 1979	153 ft × 30 ft × 18 ft	3060	1371	na	Asbestos and carcinogens, plastic layer placed in bottom
20	Nov 1975–Oct 1977	600 ft × 71 ft × 36 ft	56,800	37,454	14,899	Lab waste, oil, sludge drums, trash, contaminated dirt
21	Aug 1972–Dec 1974	402 ft × 56 ft × 26 ft	21,678	13,328	3607	Uranium, classified material, boxes, drums, scrap metal
22	Sep 1976–Mar 1978	413 ft × 56 ft × 33 ft	28,268	17,690	3744	Filter plenum, sludge drums (possibly aqueous from TA-50), lab waste, graphite fuel rods, contaminated dirt
24	Jul 1975–Nov 1976	600 ft × 58 ft × 30 ft	38,667	23,388	7327	Graphite, lab wastes, 22 truck loads of soil. Uranium, tritium, mixed fission products, and mixed activation products

This list goes on for 10 pages.

Unlined Pits at Area G

Pit 22, Area G looking southeast, January 14, 1976

Pit 24, Area G looking west, November 8, 1973

Photo courtesy: Los Alamos National Laboratory and author Margaret Anne Rogers. Area G pits and trenches photos are from her report titled "History and Environmental Setting of LASL Near-Surface Land Disposal Facilities for Radioactive Wastes (Areas A, B, C, D, E, F, G, and T)", a Source Document, Informal Report, LA-6848-MS, Vol. I, June 1977.

Water monitoring network not up to speed.

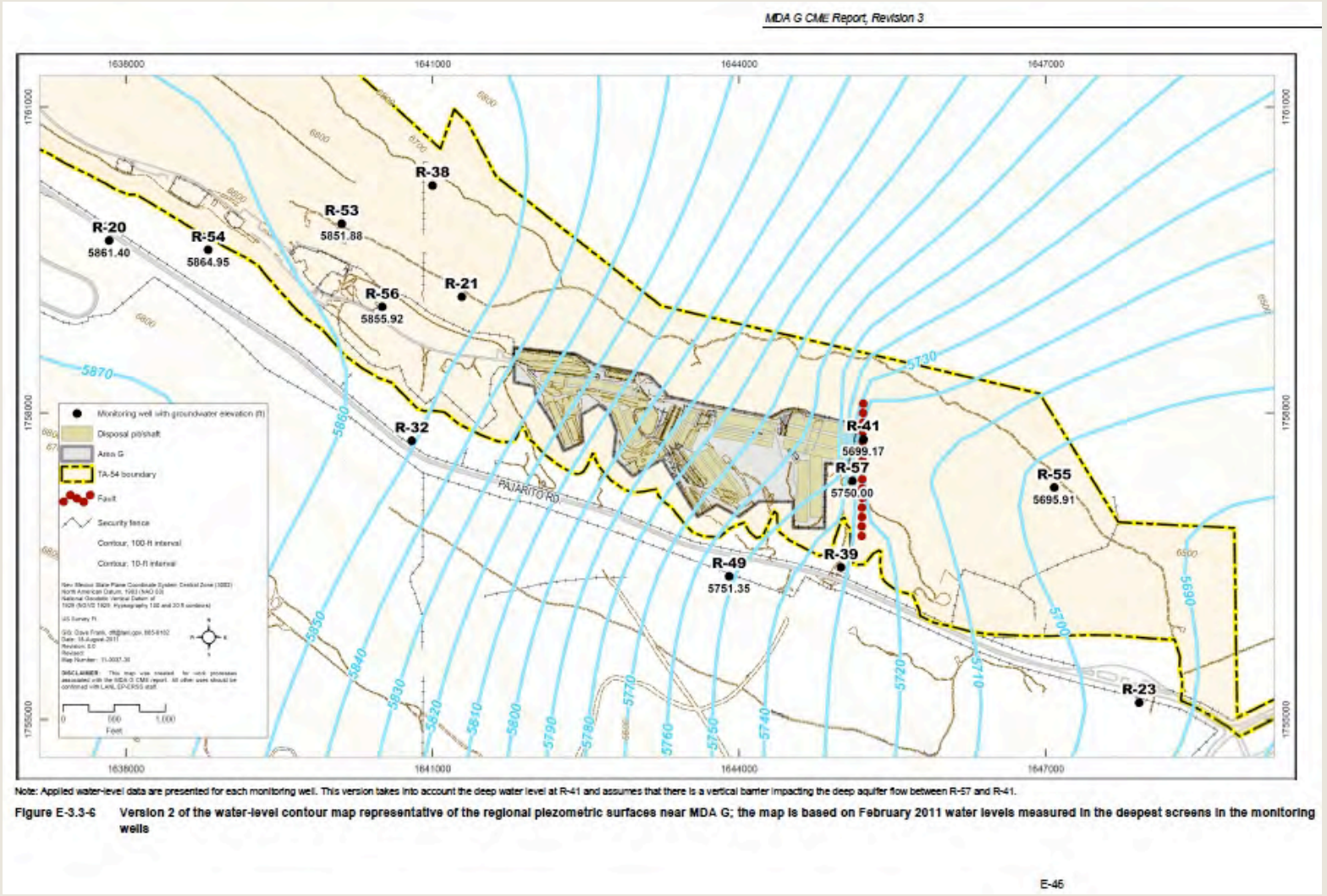


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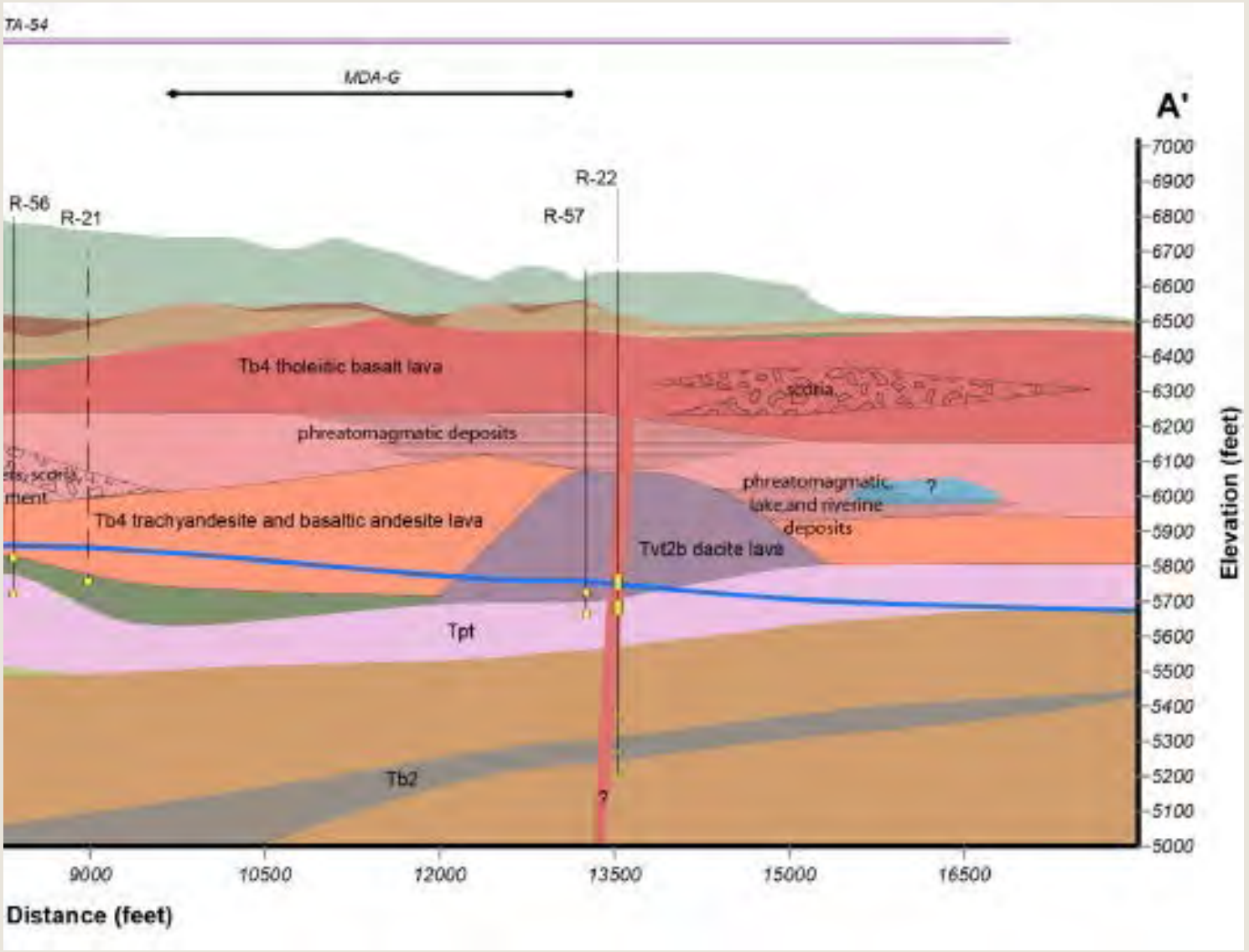
Figure E-3.3-6 Version 2 of the water-level contour map representative of the regional piezometric surfaces near MDA G; the map is based on February 2011 water levels measured in the deepest screens in the monitoring wells

E-46

Complex Geology Not Fully Known

Multiple Contaminant Pathways to Aquifer



Solution?

- The Lab narrowly limited its analyses of remediating Area G to two methods, with estimated costs, timelines and worker-hours.
- The first method LANL proposed is evapotranspiration cover (or "cap and cover"), costing $386 million.
- This would take three years to build, followed by 30 years of monitoring and vapor extraction and a century of "institutional controls" (i.e. fences).

Cap and Cover: A Permanent Decision?

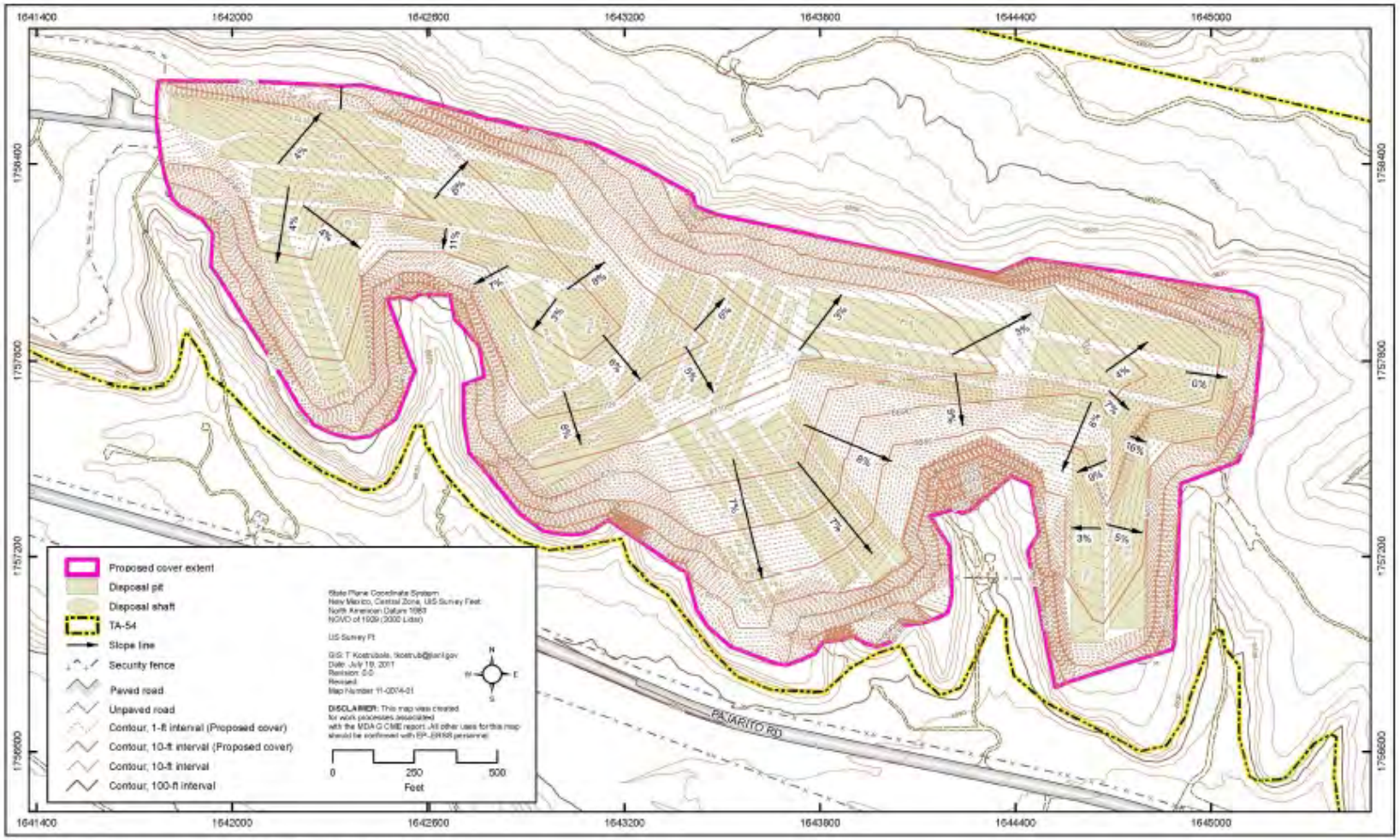


Figure 7.3-1 Conceptual cover layout for Alternatives 2A and 2B

Excavation and Removal: LANL Claims $29 billion

- The second method the Lab analyzed is full excavation of more than 100 pits and shafts, with off-site waste disposal and excavated areas backfilled with clean material, costing $29 billion. This would take 30 years to complete, requiring an estimated 108 million worker-hours.
- $.992 billion design
- $7 billion overhead
- $9.7 billion contingency

240,000 years

- There is no mystery as to what the LANL wants, as it has made explicitly clear that it wants cleanup on the cheap with cap and cover so that it can declare Area G "cleaned up."
- Cover Inspections and Maintenance for 100 years.
- In contrast, plutonium-239, LANL's material of choice for nuclear weapons research and production, remains an environmental threat for its ten half-lives (240,000 years).

Waste Control Specialists (WCS)

It can be done!

An excavator inside a rolling enclosure at MDA B

MDA B Comparison

- Excavation yielded almost twice the expected volume of waste (43,500 cubic yards actual vs. 22,500 planned).
- Depths of waste were as much as 30 feet instead of the estimated 12-18 feet. The plutonium equivalent curies (PE-Ci) count was 115 actual vs. 12 assumed.
- Yet the total project cost only increased from $110M to $136M to accommodate these unanticipated project changes.
- It cost $136,000,000 to fully cleanup 6 acres, or $22.7 million per acre, or the cost $136,000,000 to clean up 43,500 cubic meters of waste, or $4,136 per cubic meter.

MDAs Comparison

MDA cleanup costs (& dates) using LANL data

Material Disposal Area	*Acres*	*Total cleanup costs*	*Cost per acre*	*Excavated waste & fill (m^3)*	*Cost per m^3 excavated*	*Meter^3 of waste per acre*
MDA B Feb. 2012[b]	6.0	Actual $136,000,000	$22,700,000	32,875	$4,136	5,480
MDA C Sept. 2012[c]	11.8	Est. $787,116,295	$66,704,770	259,110	$3,973	16,788
MDA G Sept. 2011[d]	51.0	Est. $29,000,000,000	$568,627,451	1,400,000	$20,714	27,451

This chart calculates what the estimated cost for Area G cleanup would be if the per unit prices of MDAs B and C are used.

Area G cleanup cost estimates using MDA B and MDA C costs per acre and per cubic meter

	Area G acres	*Per acre cost (from above)*	*Total Area G using per acre costs*	*Area G excavated waste & fill (m^3)*	*Cost per m^3 (from above)*	*Total Area G per meter^3 costs*
Using MDA B costs	51	$22,700,000	$1,157,700,000	1,400,000	$4,136	$5,790,400,000
Using MDA C costs	51	$66,704,770	$3,401,943,270	1,400,000	$3,973	$5,562,547,011

The Perfect Place to Start

- Technically, we first want to argue for a pilot demonstration project at Area G, but one that would be heavily based upon the recent successful completion of Material Disposal Area B at LANL's TA-21. We propose to start with Pit 9, which holds retrievable TRU that is planned to be removed in 2017. After the TRU is removed from Pit 9, Pits 8 and 10 will be accessible on either side.
- Cleanup would be a win-win that permanently protects the environment and creates hundreds of high paying jobs. The method and degree of completeness of required Area G cleanup is yet to be officially stated by NMED.

Put RCRA Landfill back on the table

- "At this time, the Laboratory is not considering the construction of a RCRA landfill. A new RCRA landfill would require a siting study and permit approvals, including public comment. This option would delay final action through the permitting approval process and construction of the new landfill. This delay impacts the Consent Order corrective action requirements."
- "An on-site RCRA landfill is not a preferred option for waste management and disposal."
- *MDA G CME Report, Revision 3, Pg.38*

Put Corrective Action Management Units (CAMU) Back on the Table

- "A CAMU would require prior approval by the New Mexico Secretary of the Environment, a process that includes public comment or incorporation into the existing RCRA permit. This option would delay final action through the approval process and construction of the CAMU. This delay impacts the Consent Order corrective action requirements."
- "An on-site CAMU is not a preferred option for waste management and disposal."
- *MDA G CME Report, Revision 3, Pg.38*

Meanwhile, Disposal Continues at Area G

Jobs, Jobs, Jobs!

- The ~$6 billion CMRR Nuclear Facility would have produced NO new permanent jobs.

CMRR Final EIS, NNSA, August 2011, Volume 1, page 2-55, explaining it would have merely relocated existing Lab jobs.

- While addressing only a small fraction of Area G cleanup, the 3706 Campaign currently employs 400 workers.

Dan Cox, LANL 3706 Campaign manager, Dec. 13, 2013 RCLC meeting.

- Comprehensive cleanup of Area G would be a true win-win for New Mexicans, permanently protecting our precious water while creating hundreds of well-paying jobs for 20 – 30 years.

Requests of this CAB for Recommendations to DOE

- Recommend against cap and cover of Area G
- Re-examine other cleanup alternatives for Area G such as RCRA Landfill, CAMU, and complete excavation
- Re-estimate the proposed costs of cleanup because the original estimate to excavate was inflated
- Advocate for steadily increasing cleanup funding to $400M – up from the current $250 million per year

The Case for Cleanup: NNSA/LANS Must Re-Examine Costs

- LANL's Sept. 2011 Corrective Measures Evaluation estimated $29.5 billion
  - "Full Excavation Design" $992 million
  - "Project Mgt" $7 billion
  - Contingency $9.7 billion

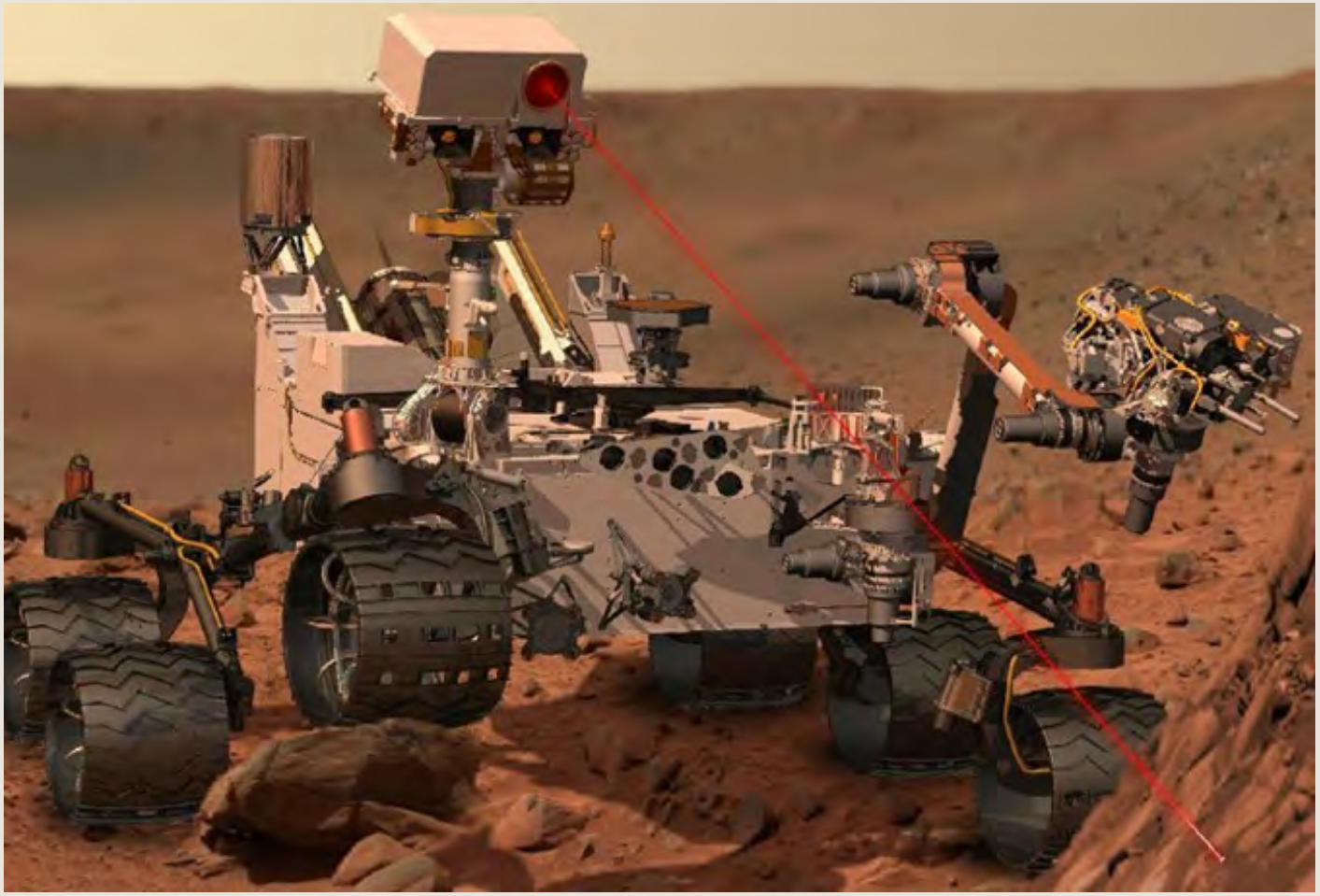
- Nuclear Watch's comparison using Area B actual cleanup costs = $6 - $7 billion.

http://www.nukewatch.org/facts/nwd/Area_G_Comparison_Costs-11-14-12.pdf

Within Ten Years, the Lab Should Be Receiving $400M/yr for Cleanup

- The Lab has deferred much cleanup for the sake of the 3706 Campaign to send the surface TRU to WIPP
- LANL must meet current cleanup priorities, such as the chromium groundwater plume, as well as start on the re-characterization of all legacy wastes buried at the Lab.
- http://www.nmenv.state.nm.us/HWB/documents/LANL_Extensions_as_of_7-16-2013.pdf

LANL Sampling on Mars



P.S. Area G is a lot closer.

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