nuclear watch new mexico

November 6, 2023

New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive, Building 1
Santa Fe, New Mexico, 87505-6303
By email to neelam.dhawan@env.nm.gov

SUBJECT: Support for Comprehensive Cleanup at the Los Alamos National Laboratory and a Request for a Hearing

Dear New Mexico Environment Department:

We strongly support the Environment Department's mandate for comprehensive cleanup at the Los Alamos National Laboratory's Material Disposal Area C, an 11.8-acre dump consisting of seven unlined pits and 108 shafts of radioactive and toxic wastes. This mandate will help maximize protection of human health and the environment and ensure that our critical drinking water resources are permanently protected.

We completely agree that the cleanup remedy for Area C must, in NMED's own words, "consist of waste excavation, characterization, and appropriate disposal of the buried waste," plus a soil-vapor extraction system to remove the underground plume of volatile organic compounds (which are typically carcinogenic solvents).

Background

In 2021 LANL submitted its preferred "cleanup" remedy to the New Mexico Environment Department to "cap and cover" Area C. We strongly oppose LANL's proposal for "cleanup" on the cheap because it would leave the wastes permanently buried as a perpetual threat to irreplaceable groundwater. We also agree with NMED's assessment that "cap and cover" can only partially prevent the intrusion of deep-rooting plants and burrowing animals over time.

In its September 7, 2023 "Public Notice of Statement of Basis," the Environment Department ruled:

> "For maximum protection of human health and the environment and to ensure that the drinking water resource can be conservatively protected, NMED has determined that the selected [cleanup] remedy for MDA C must consist of waste excavation, characterization, and appropriate disposal of the buried waste... Excavation will ensure that the source of contamination at MDA C is removed..."

We note that the total volumes and composition of radioactive and toxic wastes in LANL's unlined, underground waste dumps remain unknown. Similarly, the degree and depth of contaminant migration is still not fully known. For these reasons, NMED must compel LANL and the Department of Energy (DOE) to excavate and characterize the wastes for proper treatment.

The regional groundwater aquifer under Area C, and LANL's other unlined waste dumps, is a sole-source drinking water resource for some 250,000 people in communities throughout north-central New Mexico. Protecting clean water resources for the future is the strongest argument for total cleanup of LANL's radioactive and toxic waste dumps, for which Area C can be a leading model. The need for clean water is beyond debate. Clean water itself becomes priceless when not available. In addition, comprehensive cleanup at LANL can be an economic driver for the region, producing hundreds of high paying jobs while protecting the environment.

Costs

LANL and DOE will likely argue that comprehensive cleanup of Area C will cost too much. That argument is hollow when the budget for nuclear weapons programs that caused the mess to begin with has more than doubled over the last decade to $4 billion annually. At the same time, as a percentage, cleanup has stayed flat at less than 6% of the Lab's total budget.

The Government Accountability Office has reported that the estimated cost of cleanup at LANL has increased to $7 billion from the 2016 estimate of $4 billion, with "final" completion delayed 7 years to 2043.[1] But DOE premises that cost and schedule on cap and cover and not on the comprehensive cleanup that NMED is now mandating for Area C.

In 2019, the head of DOE Environmental Management Los Alamos falsely claimed that legacy cleanup at LANL was more than half complete.[2] All the while, DOE's Environmental Management programs have been the GAO's High Risk List for project mismanagement and waste of taxpayers' dollars ever since that list was started in 1991. Moreover, we note that cleanup at LANL is actually being cut 12% from $331.8 million in FY 2023 to $292.5 million in FY 2024 (which began this October 1). This is clearly the wrong direction.

There is also the issue of growing mistrust between NMED and DOE, which the July 2023 GAO report repeatedly points to. We assert that the history of contamination and failed cleanup at the Lab merits that distrust. For example, in the 1990's the Lab was publicly claiming that plutonium from Lab operations had never been detected in the Rio Grande, despite previously existing studies tracking Lab plutonium all the way downstream to Cochiti Lake. Moreover, as late as the late 1990's LANL was falsely claiming that groundwater contamination was impossible. Now,

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1 *NUCLEAR WASTE CLEANUP: DOE Needs to Address Weaknesses in Program and Contractor Management at Los Alamos*, GAO-23-105665, Government Accountability Office, July 2023, Government Accountability Office, https://www.gao.gov/assets/d23105665.pdf

2 Los Alamos National Laboratory Legacy Cleanup By the Numbers, N3B, April 2019, https://www.energy.gov/em-la/articles/los-alamos-national-laboratory-site-cleanup-numbers-0

20 years after its initial discovery, DOE still doesn't know the full extent and depth of the large chromium contamination groundwater plume that is regarded as the number one environmental threat at LANL.

In the "Statement of Basis" itself, NMED reported:

> "DOE's 2021 cost estimates for each alternative are as follows. $0 for Alternative 1; $16,000,000 for Alternative 2; $39,336,000 for Alternative 3A; $12,105,000 for Alternative 3B; and $805,260,000 for Alternative 4. Alternative 4 is the most thorough and expensive cleanup measure... [3]
>
> NMED did not select Alternatives 1, 2, 3A, or 3B because the implementation of Alternative 4 is the most conservative option for remediation of MDA C. It removes the source of contamination and eliminates the need for long-term monitoring and maintenance of the cover. Alternative 4 provides the most protection of human health and the environment. It does not pose a significant risk to workers and the community... Releases from MDA C poses a greater threat to environmental contamination than the risk to workers and the affected community during a **controlled** excavation of the wastes." [4]

The Lab's total cost estimate for its preferred Alternative 3B, "cap and cover" of Area C, is $12.1 million, versus an estimated $805 million to fully exhume the wastes for offsite disposal.[5] We believe it is no coincidence that DOE chose the cheapest option.

More than a decade ago Nuclear Watch New Mexico compared the costs of removing wastes at three LANL dump sites.[6] Our central thesis here is that when DOE wants to do something it lowballs the costs it gives to Congress. Multi-billion-dollar examples abound.[7] When it doesn't want to do something it highballs the costs. One possible example is the estimated cost of full cleanup of Area G, which DOE calculated at $29 billion. But our 2012 calculation extrapolating known costs of successful cleanup at LANL arrived at an estimate of not greater than $7 billion.

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[3] Note: Alt 1 is No Action, hence $0. Alt 3B is DOE's preferred alternative of cap and cover.

[4] Bolded emphasis on "controlled" not in the original. We emphasize "controlled" here because we concur with NMED's opinion that past cleanup at MDAs P and B have demonstrated that ambient contamination can be avoided and workers protected through temporary enclosures and remotely directed excavators. Further, we recommend that NMED examine DOE's successful cleanup program at the Idaho National Laboratory for beneficial lessons learned that could be applied to LANL.

[5] By way of budget comparison, LANL is slated to receive $1.74 billion in taxpayer dollars for expanded plutonium pit production in FY 2024 alone. DOE FY 2024 *Laboratory Tables*, p. 44.

[6] *What Should Comprehensive Cleanup of Area G Cost? Budget Comparisons between Material Disposal Areas B, C, and G*, Nuclear Watch New Mexico, 2012 https://nukewatch.org/oldsite/facts/nwd/Area_G_Comparison_Costs-11-14-12.pdf

[7] The Waste Treatment Facility at Hanford, the Uranium Processing Facility at Y-12, the Chemical and Metallurgical Research Replacement Project at LANL, the Savannah River Plutonium Processing Facility, the National Ignition Facility at the Livermore Lab, etc.

As another example, while working at Concerned Citizens for Nuclear Safety (CCNS) in the 1990's, the NukeWatch Executive Director was deeply involved in Clean Air Act litigation against LANL. At the time, the Lab was declaring in annual congressional budget requests that full compliance would cost a few hundred million dollars and on the order of three years to achieve full compliance. But three months after a federal judge ruled in favor of CCNS that the Lab was in major noncompliance at 30 radioactive air emissions stacks, LANL issued a press release claiming that it had achieved full compliance after spending only a few million dollars (which was subsequently debunked by a whistleblower). The narrow point here is do not trust Lab and DOE cost estimates.

Going back to our 2012 cost estimate of Area G cleanup, we are not necessarily claiming that we are correct. First, obviously those figures need to be adjusted for inflation. But what we are saying is that Congress should require DOE to give realistic, credible costs for all of its projects, whether it wants to do them or not. In any event, NMED should regard any DOE cleanup estimates with deep skepticism and question DOE motivations, methodology, competence, premises and assumptions.

Conclusion on costs: DOE and LANL pay lip service to cleanup but genuine cleanup has never been their objective. To the contrary, they seek to avoid comprehensive cleanup while prioritizing the expansion of the nuclear weapons research and production programs that caused the mess to begin with. DOE and LANL have also been misleading about cleanup, for example claiming in 2019 that cleanup was more than half complete. They seek billions in funding for expanding nuclear weapons programs but go on to cut cleanup for FY 2024.

The New Mexico Environment Department is making the right call mandating comprehensive cleanup of Area C. Nuclear Watch New Mexico strongly supports that decision. What best protects New Mexicans should be the sole driver of NMED cleanup decisions. Costs are not NMED's problem and should not be a factor whatsoever in its decision-making process. Instead, the onus should be on DOE to streamline its operations, radically improve project management, make better, more realistic cost estimates and quit wasting taxpayers dollars. More fundamentally, DOE should quit making more radioactive and toxic wastes from unnecessarily expanding nuclear weapons programs.

DOE Has Successful Examples of Cleanup That Should Be Followed

At just under 12 acres, comprehensive cleanup at MDA C can be successful. The wastes are shallow, with the deepest wastes at 25 feet deep. There are at least two examples of comprehensive cleanup that LANL have already been successfully completed. MDA B was a 6-acre dump built in the 1940's for disposal of radiological and hazardous waste. The site was excavated, starting in 2012, inside rolling enclosures. Even though the excavation yielded almost twice the expected volume of waste (43,500 cubic yards actual vs. 22,500 planned), the depths of waste were as much as 30 feet instead of 12-18 feet and the radiation discovered was 10 tens the originally estimated amount, the cost to complete only increased from $110 million to $136 million.[8]

[8] 2012 ARRA Projects reports under the American Recovery and Reinvestment Act of 2009.

LANL received $110 million from the American Recovery and Reinvestment Act of 2009 to excavate the Manhattan Project era Area B dump. LANL used large moveable tents under negative pressure and HEPA filtration so that earthmovers and other large equipment removed the waste from the deep trenches. The wastes were then characterized and disposed of in appropriate facilities.

One MDA B cleanup report described the planning, challenges and surprises encountered. It concluded that, "The one area where planning did not fail to meet reality was safety. There were no serious worker injuries and the minor injuries recorded were those common to construction type activities." LANL does know how to safely clean up its messes.[9]

NMED also cites the success of the soil remediation at Material Disposal Area P, which included the excavation of detonable residues of high explosives. DOE prepared a site-specific health and safety plan that indicated the need for remote excavation to avoid placing personnel in direct contact with potential explosive hazards. A computer-controlled, remotely operated, 25 metric ton, hydraulic excavator was deployed to the site to perform all initial excavation operations. Remediation of MDA P demonstrated the ability to adequately minimize the hazards faced by workers due to exposure to hazardous materials and potential fires and explosions during excavation and removal.

Cleanup at MDA C Is Long Overdue, But the Total Waste Is Unknown

As previously stated, MDA C is an inactive 11.8-acre landfill consisting of 7 disposal pits and 108 shafts. Radioactive wastes and chemical wastes were disposed in the landfill between 1948 and 1974. The depths of the pits and shafts at Area C range from 10 feet to 25 feet below the original ground surface. The total waste and fill in the pits and shafts are estimated at 198,104 cubic meters. The regional aquifer is estimated to be approximately 1,332 feet below ground surface based on the water level in regional well R-46,[10] which is one of the wells designed to monitor contamination migrating from Area C. The CME gives an inventory, but it is an inventory of the types of wastes without listing the estimated amounts of those wastes. DOE estimates that the total activity for MDA C shafts and pits is 8,390 curies, of which more than half of the estimated curies are transuranics. The RCRA hazardous wastes and the rad wastes leaking from the site are comingled.[11]

The total amounts of wastes disposed of in MDA C remain unknown. The extent of the migration of wastes from MDA C is unknown. A subsurface volatile organic compound (VOC) vapor plume is present beneath MDA C, but the volume of remaining VOCs that could add to the plume are unknown.

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[9] *Oppenheimer's Box of Chocolates: Remediation of the Manhattan Project Landfill at Los Alamos National Laboratory*, https://inis.iaea.org/search/search.aspx?orig_q=RN:45115088

[10] 2020 Annual PMR for the Area C Monitoring Group, P. 2.

[11] June 2021 MDA C Cover Design Report, Area C Corrective Measures Evaluation, P. 8.

Volatile Organic Compound Must Be Removed

DOE has condoned nearly 80 years of "monitored natural attenuation," which is a fancy way of saying do nothing and watch the contaminants migrate through soil and water. Using chromium as an example, LANL's now notorious groundwater plume was not discovered until 30 years after the use of chromium to prevent corrosion in cooling towers was ended. [12]

A subsurface volatile organic compound (VOC) vapor plume is present beneath Area C.[13] LANL's preferred alternative included operating a passive soil-vapor extraction system to remove the VOCs from the subsurface. But this is more "cleanup" on the cheap since some VOCs are heavier than air. It is therefore doubtful how well a passive system would work.

Thirty-eight types of VOCs have been detected in subsurface vapor samples collected at MDA C from October 2012 to February 2020. Trichloroethylene (TCE) is the most frequent VOC and was detected in all but 6 of the 1,020 vapor samples collected at MDA C since October 2012 (i.e., in 99.4% of all samples). TCE is also the VOC most frequently detected above the Tier 1 screening level, with 796 sampling results (2040 µg/m3 to 85,900 µg/m3) exceeding the Tier 1 screening level (2020 µg/m3). In addition, TCE is the VOC detected at the highest concentrations in vapor samples at MDA C.[14] In its final remedy for MDA C, NMED should require DOE to give credible estimates of VOC contamination.

Excavation of waste in the shafts pursuant to Alternative 4 will guarantee that waste disposed of at MDA C will present no further risk at the site and there will be no operation and maintenance requirements at MDA C, except for any necessary remediation of contaminated media. Cleanup under Alternative 4 will be more reliable than Alternatives 1, 2, 3A, and 3B because long-term maintenance under the other alternatives cannot be assured after the 100-year institutional control period ends (or even during the entirety of the institutional control period). Similarly, implementation of Alternatives 1, 2, 3A and 3B are likely to require additional corrective measures following the 100-year institutional control period. In contrast, DOE estimated that Alternative 4 would not need long-term maintenance or future corrective measures after completion in 3 years.

NMED acknowledges that Alternative 3B (ET cover, passive and/or active SVE, institution controls), recommended by the DOE, would be effective in reducing or limiting the amount of water that percolates into the pits and shafts under design conditions. However, NMED's assessment indicates that the ET cover can only partially prevent bio-intrusion of deep-rooting

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12 The timing of the Lab's "discovery" of the chromium groundwater contamination is perhaps suspect, shortly after the strict 2005 Consent Order governing cleanup at LANL went into effect. Therefore, the 2005 Consent Order did not address what is now regarded as LANL's #1 environmental threat. In 2016 the 2005 Consent order was "superseded" by a revised weak and ineffectual Consent Order that NMED is suing to terminate.

13 VOCs are compounds that have a high vapor pressure and low water solubility. VOCs typically are industrial solvents.

14 As a sign of the public health risks involved, just two weeks ago the Environmental Protection Agency proposed a rule to completely ban TCE.

plants and burrowing animals. In addition, Alternative 3B does not address the current and future releases of VOCs and tritium to the subsurface at MDA C given the uncertainty associated with inventory of waste disposed at MDA C over the years.

Moreover, NMED questions the long-term reliability of an ET cover in preventing the intrusion of deep-rooting plants and burrowing animals over the lifetime of the ET cover.

NMED did not select Alternatives 1, 2, 3A, or 3B because the implementation of Alternative 4 is the most conservative option for remediation of MDA C. It removes the source of contamination and eliminates the need for long-term monitoring and maintenance of the cover. Alternative 4 provides the most protection of human health and the environment. It does not pose a significant risk to workers and the community. Waste inventories do not include high explosives or pyrophoric materials that elevate the risk of combustion. The risk of continued or renewed releases from MDA C poses a greater threat to environmental contamination than the risk to workers and the affected community during a controlled excavation of the wastes.

Additionally, NMED cites the success of the soil remediation, which included the excavation of soil containing detonable pieces of high explosives, at Material Disposal Area P.
NMED also cites the successful excavation and off-site shipment of waste at MDA B.

A Long-Term Detection Question – Plutonium Migrating Toward the Regional Aquifer

Environmental reports and samples in the Lab's environmental database, Intellus, show plutonium below the surface at numerous locations. LANL states that the total amount of plutonium dumped in the soil under the Lab is unknown, so NukeWatch believes that future migration remains impossible to predict. A recent report shows plutonium hits in the aquifer at 1200' and 1300' in the regional wells around MDA C. Intellus and Lab report data showed very specific amounts (for example, 0.005 pCi/L) but labeled these as non-detects because those samples were below the so-called Minimum Detectable Activity (MDA).

The report states, "In Intellus, radionuclide results are uncensored (although some results are flagged as non-detect). The uncensored results may be used directly in calculations without treatment or estimation."[15] So, when we read that even though a Pu sample may be 100ths or 1000ths of a pCi/L, we believe that we can still use that number to demonstrate plutonium and other contaminant migration toward irreplaceable groundwater. And we believe that the only permanent solution is the comprehensive cleanup that NMED has mandated for Area C. False solutions such as cap and cove will not suffice.

We quote one of LANL's own hydrogeologic report:

> "To date, several observations have been made of contaminants reaching the regional aquifer. Conditions facilitating possible rapid downward migration to the regional aquifer are described in the previous subsections. High percolation rates, typically enhanced by

[15] 2017 Treatment of Non-Detects in the Los Alamos National Laboratory, p. ES-4

anthropogenic water sources, and/or relatively thin or non-existent Bandelier Tuff at the surface are the conditions most likely to result in present-day regional aquifer contamination of nonsorbing constituents. **Future contamination at additional locations is expected over a period of decades to centuries as more of the contaminant inventory reaches the water table."** [16]

To repeat, only full and complete cleanup of LANL's radioactive and toxic waste dumps will end the threat to the public's common groundwater. That groundwater resource will grow only more valuable over time with inevitable climate change and increasing aridity.

Comparison of 2012 CME to 2021 CME

The 2021 CME relies heavily on the 2012 CME. NMED should require DOE to provide a red line strike out. We find it striking how little DOE's position on cleanup has changed since 2012, in contrast to its radical ramping up of nuclear weapons production programs since then.

LANL Must Re-examine What It Calls Detects and Non-detects

A recent report shows plutonium hits in the aquifer at 1,200 and 1,300 feet in the regional wells around MDA C. Intellus and Lab report data showed very specific amounts (for example, 0.005 pCi/L) but labeled these as non-detects because those samples were below the so-called Minimum Detectable Activity (MDA).

Plutonium is showing up now at all depths across the Lab, including in the regional aquifer at depths over 1,400 feet. LANL officials claim that these are not-detects because the samples are below so-called Minimum Detectable Activity (MDA). Non-detects and estimated values arise in environmental datasets because methods used to measure contaminants are limited in their sensitivity. In fact, the laboratories that analyze the samples get a different MDA for every radiologic sample. So just because they are unable to determine the exact amount of a particular contamination does not mean that there is no contamination but it does means that we don't know exactly how much. Many authors have considered the question of how to treat non-detects in environmental and other datasets. The literature is not unanimous with respect to preferred approaches.[17]

All this said, the uncertainty over plutonium and other contaminant migration depth is of the utmost concern. It again buttresses the argument for rejecting incomplete cleanup (i.e., "cap and cover") of LANL's radioactive and toxic waste dumps in favor of complete and genuine cleanup in order to protect New Mexicans' precious asset, uncontaminated groundwater.

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16 LANL's Hydrogeological Studies of the Parajito Plateau (1998-2004), 2005, p. 5-15, http://www.worldcat.org/title/los-alamos-national-laboratorys-hydrogeologic-studies-of-the-pajarito-plateau-a-synthesis-of-hydrogeologic-workplan-activities-1998-2004/oclc/316318363, bolded emphasis added.

17 Treatment of Non-Detects in the Los Alamos National Laboratory in the Natural Resource Damage Assessment, LANL Natural Resource Damage Assessment Trustee Council, Final - June 2017, http://www.lanlnrda.org/wp-content/uploads/2017/08/Final_NonDetect_Report-6-20-2017.pdf

Request for a Hearing

Nuclear Watch New Mexico requests a public hearing on NMED's draft decision for cleanup of LANL's MDA C.

According to NMED:

> "Requests for a public hearing shall provide: (1) a clear and concise factual statement the nature and scope of the interest of the person requesting the hearing; (2) the name and address of all persons whom the requestor represents; (3) a statement of any objections to this action, including specific references to any conditions being addressed; and (4) a statement of the issues which the commenter proposes to raise for consideration at the hearing".[18]

Our responses:

1) Nuclear Watch New Mexico mission statement demonstrates our interests:
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.

2) Jay Coghlan, Executive Director
Scott Kovac, Operations and Research Director
Sophia Stroud, Digital Content Manager
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3) We strongly support NMED's Statement of Basis and object to any cap and cover proposals by DOE and LANL.

4) We strongly support NMED's Statement of Basis and object to any cap and cover proposals. We seriously question LANL/DOE cost estimates and object to any potential use of costs in their arguments (if any) to avoid full cleanup. We object to LANL's use of the term "non-detect." We believe that contaminant migration is much more widespread and deeper at LANL than DOE admits, which in turn bolsters the argument for full cleanup.

These comments respectfully submitted,

Jay Coghlan
Executive Director

Scott Kovac
Research Director

[18] Statement of Basis for Area C, NMED, September 7, 2023, P. 19.

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