nuclear watch new mexico

Comments on
The Proposed Risk-Based End States Vision
For Completion of the EM Cleanup Mission
At Los Alamos National Laboratory

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Nuclear Watch of New Mexico submits these comments in two parts on the so-called LANL Risk-Based End States Vision. The first part is responses to quotes (in italics) from that document. The second part is comments from our technical consultant.

The Proposed Risk-Based End States Vision is no vision for cleanup. Instead it is the latest permutation in the long pattern of DOE and the University of California avoiding comprehensive cleanup at the lab, with the accompanying waste of taxpayers' money supporting an environmental restoration program that has been largely ineffective. However, this is not the fault of the environmental restoration program *per se*. DOE and UC management at the highest levels simply lacks the will to truly cleanup; instead working successfully year after year to engineer increases to the nuclear weapons programs budgets. "Cleanup" is to be given added funds only on the condition that New Mexico accepts LANL's "vision" of not cleaning up.

There is no fixing the LANL RBES Vision. Our distrust of it is so deep that we think the only remedy is the New Mexico Environment Department (NMED) prevailing in the legal fight that DOE and UC have initiated in the courts against the State's Corrective Action Order. We applaud Gov. Richardson for saying that New Mexico will not be extorted and look forward to that fight.

- *The proposed goal is described as a "vision" of how the LANL campus will look when the Department of Energy (DOE) Environmental Management (EM) program mission is complete and the National Nuclear Security Administration (NNSA) assumes full responsibility for environmental management at LANL.* §1, p. 1. It always amuses us to see the lab projected as another friendly UC campus that happens to design and help produce weapons of mass destruction. The "vision's" explicit purpose is to "cap and cover" the still-as-yet undetermined quantities and compositions of radioactive and hazardous wastes buried forever at the lab and then turn "cleanup" over to the nuclear weaponeers who produced the mess to begin with. The reader may understand our natural cynicism toward this general direction.

- *The April 2003 DOE Policy 455, Use of Risk-Based End States, requires DOE EM sites to define and document a risk-based end states vision that is acceptable to regulators and stakeholders, and then to revise cleanup program plans as necessary to achieve that end-state in the*

most efficient manner. §1, p. 1. DOE Policy 455 states that the RBES Vision document must provide an executive summary that "will highlight the major hazards that will remain [and] the potential risks associated with those hazards, and the primary receptors." The omission of that vital information in this document is incredible. The Policy also states that "Site managers will establish communication approaches for working with stakeholders for all phases of this effort in conjunction with preparation of their site vision.'" This too was not done at the beginning stages. Thus, it appears that, in addition to all of the other deficiencies noted in these comments, the draft LANL RBES Vision document does not even comport with DOE policy.

• *Uncertainties in source(s), nature, extent, transport, and fate of contaminants are very large and can never be absolutely eliminated. Risk-based corrective action provides an objective means of managing uncertainties to the degree necessary and sufficient to make defensible decisions about cleanup actions.* §1, p. 1. It is true that in cleanup uncertainties can never be absolutely eliminated (like the rest of life). However, Nuclear Watch of New Mexico contends that DOE and LANL have intentionally avoided serious steps to reduce those uncertainties. As evidence, if DOE/UC were truly interested in reducing uncertainties, they would embrace the intent of NMED's Corrective Action Order instead of vigorously resisting it at great taxpayers' expense. As more evidence, discussion of environmental restoration programs in the 1999 LANL Side-Wide Environmental Impact Statement was deemed to be "not compatible with the preparation of this SWEIS," thereby avoiding an excellent (if not required) platform for comprehensive discussion of cleanup at LANL.

From for being an "objective means", we think that the LANL RBES Vision is designed to set the framework for the lab meeting only what it deems to be minimally required for cleanup. A critical operative assumption under the RBES Vision is that the risks can be largely explained away through lab-controlled analyses using industrial standards to begin with. We believe the RBES Vision to be more a political tool than anything. It is certainly not a cleanup document, with it preordained turnover of too-contaminated sites to the NNSA (see below) and the obvious lack of will to cleanup material disposal areas (i.e., historic dumps).

• *The risk-based end state vision describes cleanup goals that would be protective under the planned future uses described in two planning documents. The first is LANL's Ten-Year Comprehensive Site Plan which describes NNSA's facility and operations over a 10-year planning window; the second is the Land Transfer Report to Congress under Public Law 105-119…* §1, p. 1. As the latter concerns limited land parcels that could be transferred from DOE ownership Nuclear Watch of New Mexico contends that for the sake of discussion here it can be largely dismissed. With respect to the Ten-Year Comprehensive Site Plan it should be noted the NNSA has deemed that to not be releasable to the public, and is in fact the subject of a Freedom of Information Act request by us (which we have also asked for year after year). Thus, what we believe to be the most important foundation document underpinning the LANL RBES Vision is being withheld from the public.

The fundamental issue here is over what future designated land uses will be. If LANL succeeds in having its territory designated as being for future "industrial use" it will thereby avoid cleanup being performed at far more stringent residential or agricultural standards. If it succeeds in doing so for a ten-year planning window it will likely succeed in doing so forever, in light of the planned turnover of "cleanup" functions to the NNSA and the return of federal

budget deficits. The end result is that what cleanup there might be will leave quantities of contaminants orders of magnitude above what would be left under agricultural and residential standards (for more, see Mr. Franke's comments below).

•` *Once the final end-state goal is resolved with public and regulatory stakeholders, LANL will use risk-based decision analysis to objectively, defensibly, and cost-effectively align its remediation project plans to achieve that goal.* §1, p. 1. The RBES Vision is not objective to begin with (nor do we think it defensible). Again, the document is more a political tool than anything else. It is certainly devoid of cleanup can-do's. We don't believe that the lab's desired final end-state goal of what is effectively non-cleanup can ever be resolved with the public and regulatory stakeholders (specifically NMED). Instead, we believe this will ultimately be resolved, for better or for worse, in court over the pending contest over the Corrective Action Order.

• *Management of Operational Risks.* §1, p. 3. Potential radioactive and toxic risks are briefly discussed. We find it curious that there is no discussion of biological risks given the lab's expanding biological research program and the newly constructed Biosafety Level-3 facility.

• *The EM mission at LANL was initiated in 1989 and is scheduled to be completed in 2015 on the basis of its 2003 Performance Management Plan*. §1, p. 4. We find the year 2015 to be an arbitrary date set by LANL and DOE. Further, the PMP is, in fact, an insubstantial basis (see our July 2002 PMP comments at http://www.nukewatch.org/facts/nwd/LANLPMP.pdf, incorporated herein). Again, the course of the legal fight will decide the matter, not simply the declarations of the "accelerated cleanup plan" *du jour*.

• *…which would remedy one of the primary objections to the order, namely the lack of completion criteria.* Footnote, §1, p. 4. As LANL knows, the NMED's Corrective Action Order is essentially a gloried information request (albeit one with legal and regulatory weight). NMED claims that it may use the information obtained to order cleanup in an amended order or subsequent orders. As we believe real cleanup to be synonymous to "completion" we concede the point that the Order does not contain completion criteria. However, our hope and belief is that the Order will lead directly to cleanup in due time. As already stated, in our view the RBES Vision (and its progenitor the July 2002 Performance Management Plan) seek to avoid cleanup. Therefore, it is DOE and LANL that is far more culpable of lacking "completion criteria."

• *According to EPA Region VI, the source-control performance standard applies to "materials that contain hazardous wastes or hazardous constituents, that act as a reservoir for migration of contaminants to soil, sediment, ground water, surface water, or air, or as a source for direct exposure." This implies that the source-control performance standard applies to contained or confined hazards (including storage tanks and associated plumbing, landfills, surface impoundments, and evaporation lagoons), but does not apply to media contaminated indirectly as a result of these sources (including air, surface soil, sediment, surface water, ground water, and biota). Therefore, investigations and assessments designed to support source-control decisions are limited to sites that meet EPA Region VI's applicability criteria.* §1, p. 6. This is certainly a convenient and sweeping interpretation for LANL. Cleanup of the landfills is already largely written off (see immediately below). Now indirect contamination is given similar treatment. Further, indirect contamination won't even be investigated and assessed. That clearly preempts a lot of the need for cleanup.

• *For the majority of the deeper subsurface material disposal areas (MDAs) [i.e., radioactive and mixed waste dumps], excavation is dangerous and/or impractical, and off-site disposal is unlikely or virtually impossible due to large volumes of deeply buried heterogeneous materials contaminated with a variety of constituents. Source control at MDAs is limited primarily to stabilization of existing caps.* §1, p. 6. There you have it, "cleanup" consists mostly of "cap and cover" and walk away without well-defined long-term stewardship protocols.

• *To streamline MDA investigations to support stabilization decisions, LANL developed a risk-based characterization process (ref MDA Core Document submitted to NMED).* §1, p. 6. We requested that document. The Remediation Services Project Communications Specialist replied that it had been "withdrawn at NMED's request and the documents should not have been referenced in the RBES Vision document." This clearly calls into question the validity of both the risk-based characterization processes and the MDA [material disposal areas, i.e., waste dumps] investigations. These are major components of the RBES Vision, yet without related and valid reference they seem to be built on thin air.

• *To further* [sic, no "the'] *streamline characterization process, models developed for the performance assessment and composite analysis for LANL's operating on-site radioactive waste disposal facility* [Area G] *have been modified to account for release and transport of both hazardous and radioactive constituents.* §1, pp. 11-12. *An important part of MDA's G authorization basis is the performance assessment and composite analysis (PA/CA).* §3, p. 5. We requested the Area G Performance Assessment and Composite Analysis. The response was that it "became a controlled document and is unavailable to the public following the 9/11 tragedy." Thus the public cannot be assured of the validity of the characterization and modeling. This also begs the question of what is the extent of release and transport of radioactive and hazardous constituents. Finally, what are the potential risks at Area G? Surely, by definition, they are high. Otherwise the dump's Performance Assessment and Composite Analysis would not be controlled. It also calls into question the internal authorization basis for Area G, exacerbated by the fact that the dump does not have a closure plan as required by the Resource Conservation and Recovery Act.

• *For cleanup sites located on DOE property, EM completion will coincide with the attainment of performance standards through remedies approved by the administrative authority. LANL intends for the final risk goal performance standard to meet the intent of the Risk-Based End States, which represents EM completion.* §1, p. 9. We find this statement to be circular logic and self-justifying. It really does seem that the arbitrary termination of the EM program in 2015 is driving this logic, not real cleanup. It's as if the final risk goal performance standard will be tailored to meet that termination. And who is to tailor that standard? It will be the "administrative authority," either DOE or LANL. It is fortunate that DOE and LANL will likely not have the final say in this matter. For better or worse, this will be decided in the courts.

• *Long-term performance monitoring and response actions to maintain the risk-based end state will be integrated into the NNSA environmental management system consistent with the requirements of DOE Order 450.1. The location, frequency, and duration of monitoring will be established using systems-engineering design principles, and a logical exit strategy will be defined to ensure that resources are not wasted on unnecessary date collection and reporting.*

§1, p. 9. This smacks of the nuclear weaponeers being ever so impatient to not only get out of serious cleanup, but also avoiding any long-term monitoring responsibilities.

• *At LANL, EM sites that cannot be remediated to contaminant levels allowing unrestricted use (either now or in the future) will transition to the National Nuclear Security Administration (NNSA).* §1, p. 10. No criteria are given for what and what cannot be remediated. Nor has LANL made a comprehensive effort to fully characterize and quantity the extent and composition of contamination. Further, LANL is vigorously resisting the State Order to do so. These and other factors (e.g., the coercive nature of "accelerated cleanup funding) demonstrate to us that the RBES Vision is mostly a procedural document that LANL will use to explain away the need for cleanup. It is certainly convenient for the lab, first of all, to position itself to be the arbiter of what can and cannot be cleaned up. Secondly, by virtue of what the lab deems that it can't clean up, have that site simply revert to the NNSA. This virtually guarantees that it will never be cleaned up.

• *The risk-based remedy-selection process developed for these MDAs is nearly identical to the performance assessment/composite analysis process that established the authorization basis for radioactive waste disposal at LANL's MDA G. Indeed, seven of the legacy-waste MDAs (MDAs A, B, C, T, U, V, and AB) are included in the composite analysis for MDA G. For this reason, LANL expects that the long-term institutional management of the legacy-waste MDAs can be integrated directly into the MDA G performance assessment/composite analysis maintenance program already implemented by NNSA, which is likely to be integrated within the LANL environmental management program.* § 3, p. 8. First, this is pretty much gibberish. From there, we already know that the MDA G Core Document was "withdrawn at NMED's request" and the MDA G PA/CA is a controlled document not available to the public. The lack of the required MDA G closure plan is already alluded to above. To then sweep up all of the other mentioned MDAs into the Area G net certainly does not engender confidence. In addition, we already know what the prescriptive remedy is anyway, i.e., cap and cover and not true cleanup (see Table 3.1-3 that immediately follows the above quote). Thus, the RBES Vision appears to us as just the paper platform (like the Performance Management Plan) for excusing cleanup away.

• *The regional aquifer is the only source of drinking water for the local communities; alluvial and perched groundwater is not accessible.* § 3, p. 9. Alluvial and perched groundwater may not accessible now, but they could be in the future. In any event, they are State-protected resources for whatever may occur in the future. In the context of the currently deepening drought all water sources will become increasingly valuable. The cavalier approach in the LANL RBES Vision for potentially important future resources is yet another deficiency in the document.

Comments on "The Proposed Risk-Based End-State Vision for Completion of The EM Cleanup Mission at Los Alamos National Laboratory, Pre-decisional Draft, November 3, 2003, LA-UR-03-8254"

1. LANL's Risk-Based End-State Vision mandates restrictions of future use for generations to come.

LANL's proposal is based on the DOE Policy 455.1, Use of Risk-Based End States, that was approved on July 15, 2003. According to this policy, the following key requirements have to be met:

- "Risk-based end states are representations of site conditions and associated information that reflect the planned future use of the property and are appropriately protective of human health and the environment consistent with that use."
- "A risk-based end state vision will be formulated in cooperation with regulators, and in consultation with affected governments, Tribal nations, and stakeholders ..."

LANL's interpretation of future land uses and management options results in the following scenario for LANL property:

- Keep environmental management (EM) sites that cannot be remediated under institutional control (e.g. area G)
- Remediate to allow industrial-use for mesa-tops and firing sites
- Remediate to allow recreational use for canyons
- Remediate to allow recreational use for parcels of land to be released to National Park Service and/or National Forest Service
- Remediate to allow residential use for 10 parcels of DOE property that were designated for transfer to either Los Alamos County or the Pueblo of San Idelfonso

A review of the maps that are provided by LANL suggests that access to most of the LANL site will either remain under institutional control or will be restricted in use for an undetermined time period. With the exception of some parcels, residential use is excluded; and agricultural use of all of the LANL property is not envisioned at all. The report does not contain any information as to how these restrictions will be guaranteed for decades or centuries to come. Without it, the proposal hardly deserves the term "end-state vision."

2. The final risk goal is not clearly defined.

According to Table 1.3-1, the final risk goal is defined as follows: "Providing 95% confidence that the probability of exceeding applicable thresholds is not greater than 10^{-5} for a period of 20 years under exposures consistent with future land use."

From reading the documentation, the risk level is ambiguously defined. Does the 20-year period referred to in Table 1.3-1 imply that 20 years of exposure will not lead to a cancer risk of greater than 10^{-5}? If yes, this would be in contradiction to Table 3.1-4 that refers to a 10^{-5} risk level from groundwater consumption implying lifetime exposure.

Or does "probability of exceeding applicable thresholds is not greater than 10^{-5} for a period of 20 years" mean that an exposure, if existing over lifetime, should not exceed a risk of 10^{-5} and that the probability of exceedance is not greater than 10^{-5}? If that is the case, why then is the scenario period limited to 20 years?

A final risk goal of 10^{-5} lifetime cancer risk is compatible with US federal laws. However, the determination of the final risk goal and the conditions to demonstrate compliance with it should be determined in a consensus process together with the residents and other stakeholders. Whatever goal may be chosen, it should be amended by a goal for the error associated with the risk estimate.

3. The risk goals for LANL are not internally consistent.

The performance objective of 30 to 100 mrem/yr for all pathways for the MDA G site is too high in comparison. Taking the cancer morbidity rate for low dose rates of 7.6×10^{-7} per mrem of whole body exposure (= committed effective dose equivalent, CEDE),[1] a 50 year exposure to ~0.2 mrem/yr CEDE results in a lifetime risk of 10^{-5}. Consequently, 50 years of 100 mrem/yr CEDE is equivalent to an incremental lifetime cancer risk of $\sim 6 \times 10^{-4}$ or ~1:1,800. Hence, the risk that is equivalent to the upper limit of the performance objective is 60 times the final risk goal of 10^{-5}. The proposed criteria for MDA G clearly do not comply with this goal.

4. The choice of usage scenarios selected by LANL is not protective of human health and the environment.

The usage scenarios are crucial in defining the level of protection for persons exposed in the future. To illustrate this, Table 1 indicates results for soil cleanup goals selected from the 2002 EPA publication on Radionuclide Preliminary Remediation Goals (PRG)[2] relative to the level for the strictest usage scenario. In all cases, the assumption of agricultural use results in the strictest cleanup goal. The assumption of industrial use (outdoor or indoor worker) would allow soil contamination levels that are up to five orders of magnitude larger than for agricultural use. Given these differences, selecting industrial use is inherent with the selection of the most lenient cleanup standard. This procedure is unacceptable because it does not follow the principle of keeping the exposures as low as reasonably achievable (ALARA).

Radionuclide	Residential use	Agricultural use	Outdoor worker	Indoor worker
Am-241	140	1	430	900
Cs-137	3,100	1	52,000	96,000
Co-60	41	1	68	150
Pu-239	430	1	2,400	4,300
Ra-226	290	1	5,500	11,000
Ru-106	37	1	1,500	2,800
Sr-90	170	1	22,000	40,000
Tc-99	43	1	150,000	300,000
U-234	1,600	1	13,000	24,000
U-238	1,600	1	14,000	25,000

Table 1 Soil concentration values relative to the most conservative usage scenario (agricultural use) as derived from EPA's Radionuclide Preliminary Remediation Goal (soil concentration for agricultural use = 1)

The implications for LANL can be further discussed using plutonium-239 in surface soil as an example. The LANL onsite mean value based on 12 routine measurements reported in the 1998 Environmental Surveillance Report of 0.23 pCi/g is 3.8 times larger than the EPA PRG value of 0.00608 pCi/g for agricultural soil. The PRG values for residential (2.59 pCi/g) or industrial usage (14.3 to 25.9 pCi/g) are much more lenient. EPA's PRG values are based on a 10^{-6} risk goal; they would be ten times larger for the 10^{-5} risk goal proposed by LANL. The evidence of plutonium-239 hot spots is documented in the maximum reported concentration of 2,500 pCi/g for Hillside 138 (Source: 1995 LANL RFI report). The contamination was removed in a "voluntary corrective action." Future site characterization and remediation activities will likely reveal further hot spots of plutonium-239. It is evident that the selection of usage scenarios and parameters for exposure modelling predetermines the extent of site characterization and remediation options.

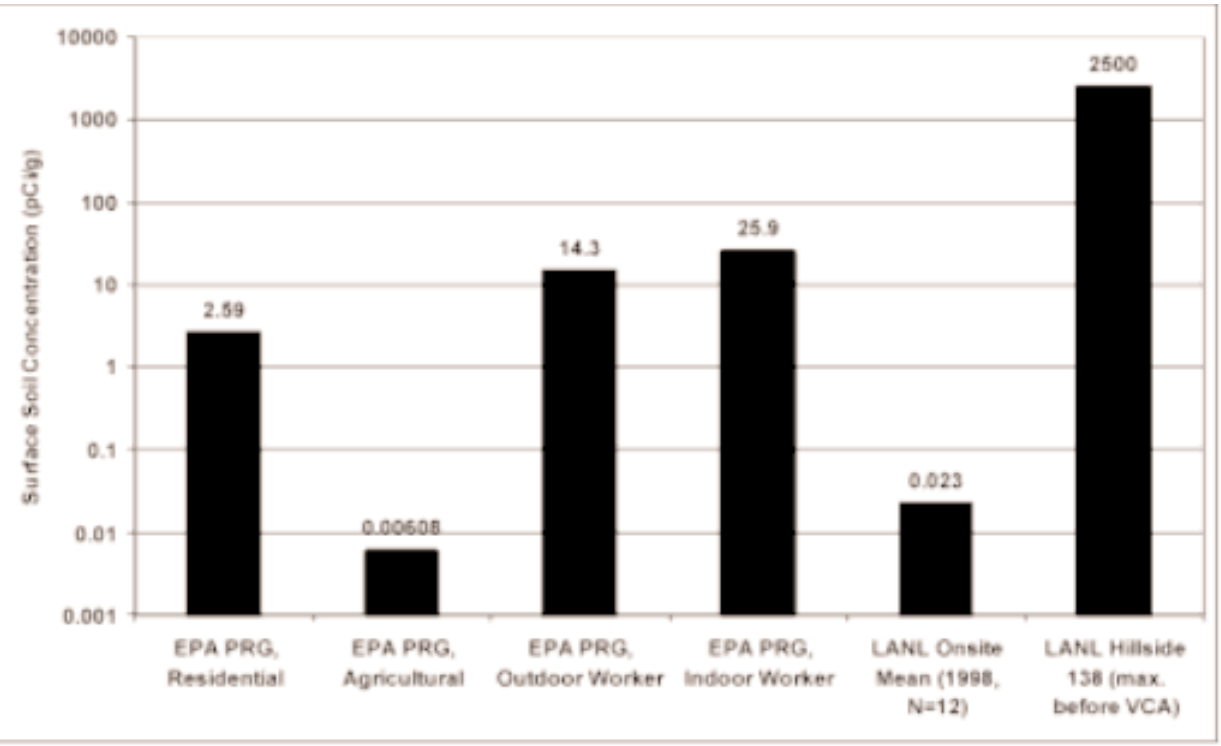

Figure 1 Comparison of EPA preliminary remediation goals (PRG) for plutonium-239 in surface soil with soil levels reported by LANL

5. LANL fails to demonstrate that the inhalation of Pu-238 and Am-241 particles can be limited to the 10^{-5} risk goal.

Plutonium-238 and Am-241 are among the radionuclides that are present at the LANL site as demonstrated by measurements of air and soil samples. The likely mode of transport is resuspension from contaminated areas. The specific activity for a particle with 1 µm aerodynamic diameter that consists of pure Pu-238 oxide particles is 2.8 pCi. In order to remain below the 10^{-5} risk goal, the annual effective dose should remain below 0.2 mrem/yr. Because the effective dose factor (type F) is 0.45 mrem/pCi, the inhalation of a single 1 µm particle of Pu-238 would deliver the risk goal dose for about six years. The specific activity for a particle with 1 µm aerodynamic diameter that consists of pure Am-241 oxide particles is 0.6 pCi; the effective dose factor is 0.36 mrem/pCi (type F). The inhalation of a single 1 µm particle of Am-241 will

deliver the risk goal dose for one year.

If such particles are present at the LANL site, they would be difficult to detect. A review of this matter conducted by the author during the LANL Clean Air Audits did not resolve the issue; the existence of such particles could not be ruled out. In order to meet the risk goal, LANL should demonstrate how this issue would be addressed.

6. LANL should evaluate what it takes to remediate the property for residential and agricultural use.

Rather than selecting a usage scenario first and planning the necessary steps of remediation on that basis, a prudent approach is to characterize the property and evaluate the impact if the property would be cleaned up to allow residential and agricultural use. The precise information on the nature and the costs of remedial action that would be necessary to achieve this should be provided for an informed discussion. After all, future generations of residents may have a different end-state vision of the property than LANL has at this time. If the legacy contamination can be removed so that residential and agricultural uses are possible in the future, it should be done. Anything less does not qualify for the term “end-state vision.”

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- End of Comments -

Respectfully submitted,

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1 USEPA, 1994. U.S. Environmental Protection Agency. Estimating Radiogenic Cancer Risks. EPA 402-R-93-076 June 1994

2 USEPA, 2002. U.S. Environmental Protection Agency. Radionuclide Preliminary Remediation Goals (PRGs) for Superfund (available online at http://epaprgs.ornl.gov/radionuclides/download/rad_master_prg_table.xls).