The Role of the Northern New Mexico Citizens' Advisory Board (NNMCAB) in Assuring the Protection of the Environment from Legacy Spills from Los Alamos National Laboratory (LANL) - 11368

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ABSTRACT

Northern New Mexico Citizens' Advisory Board (NNMCAB) is a volunteer organization chartered by the Department of Energy (DOE) to help assure that citizens of northern NM have a vehicle with which to have their concerns about environmental issues from legacy waste produced from Los Alamos National Laboratory (LANL) addressed. Using broad citizen input and their own expertise the NNMCAB presents to the DOE recommendations affecting clean up, storage and issues associated with waste. An example of such a recommendation is presented here together with the background of the NNMCAB.

INTRODUCTION [1, 2]

The Northern New Mexico Citizens' Advisory Board (NNMCAB) is a community advisory group that was chartered in 1997 to provide citizen input to the U.S. Department of Energy (DOE) on issues of environmental monitoring, remediation, waste management, and long-term environmental stewardship at Los Alamos National Laboratory (LANL). It is chartered under the Federal Advisory Committee Act (FACA).

The formation of the NNMCAB is recognition that legacy waste from Los Alamos National Laboratory operations may have impacted the environment detrimentally over the past 60 years. The NNMCAB provides an official mechanism for the citizenry to both monitor current activities affecting the region and also to have input into future activities.

The Board’s responsibilities include providing advice and recommendations to the DOE’s environmental restoration program in the areas of waste management, monitoring and surveillance, future land use and long term environmental stewardship. This includes risk management and, inevitably, budget management and prioritization.

Not only does it have a formal role in advising the DOE about environmental matters at LANL, it also communicates using public outreach with Northern New Mexico communities, including Native American pueblos, which may have been or are being affected by LANL operations.

The goals of the Board are increasing public involvement, education and awareness related to LANL activities and ensuring that citizens of Northern NM have a way of influencing environmental issues caused by LANL in the past.

The organizational chart is presented in Figure 1.

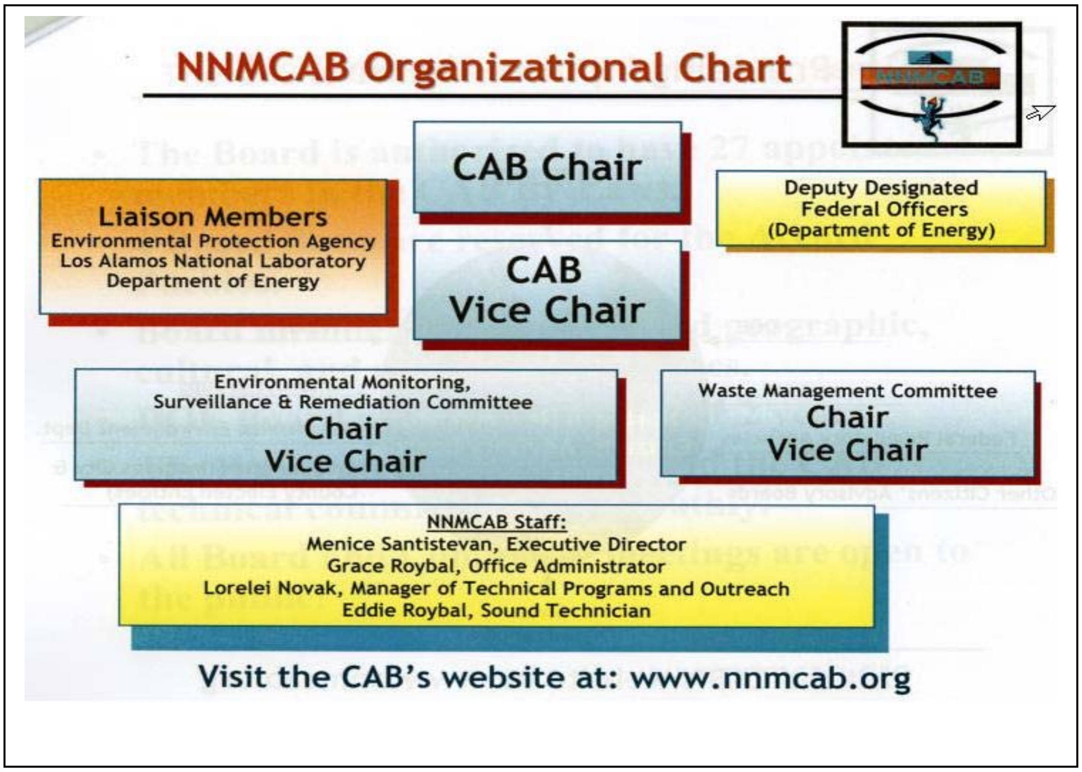

Fig. 1. Organization of NNMCAB.

The membership of the board comes from many communities in Northern New Mexico and represents a variety of backgrounds and interest but the members are united in their goal of assuring that past practices used in disposing of waste by LANL will be effectively addressed to the satisfaction of the residents of northern NM (New Mexico). Thus it acts as a liaison between the public and DOE/LANL and provides a sanctioned pathway for citizens to bring concerns to the DOE/LANL.

The Board meets regularly in the communities in northern NM including Taos, Espanola, Santa Fe and Los Alamos. It is updated by LANL experts on environmental issues currently under investigation including scheduled reports (Corrective Measures Evaluation or CME). These CMEs are sent to the New Mexico Environment Department (NMED) for approval, discussion and modification before their implementation.

Because Pueblo lands border on the National Lab's boundaries, the NNMCAB is particularly sensitive to the needs of the Pueblos. Thus we currently have a member on the board from Santa Clara Pueblo as well as close liaison both with the LANL's representative to the Pueblos and also the Environmental Departments of all neighboring Pueblos. Of particular concern is the San Ildefonso Pueblo. San Ildefonso has its own monitoring station close to the boundary of Technical Area-54 (TA-54) which is the current location of radioactive waste.

The Board's deliberations result in formal recommendations being sent to the DOE. The DOE is obligated to reply to these recommendations but not necessarily to implement them. In the calendar year 2010 up to November, CAB has submitted 7 recommendations.

These are listed in Table I.

Table I. Recommendations Submitted in 2010.

Recommendation Number	Topic
2009-08 (submitted in 2010)	Establish an Effective Policy and Funding for Recycling of Valuable Materials from Environmental Restoration Work at DOE Sites
2010-01	Recommendation for Disposition of Remote-handled Waste Buried in 33 Shafts at Technical TA-54
2010-02	Reducing all Outfalls Generated at LANL, including Sandia Canyon, Relating to Studies and Cleanup of Chromium, the 260 Outfall, and all others
2010-03	Recommendation for Sufficient funding for LANL Environment Management Projects and the Consent Order
2010-04	Recommendation Regarding Unfunded Liabilities
2010-05	Recommendation for Interim Measure for Volatile Organic Constituent Contaminant Source Removal in Material Disposal Area–L (MDA-L) and MDA-G
2010-06	Recommendation of Budget Priorities for FY 2012 and Baseline Change Proposal with Future Budgets at LANL

In order to understand the impact of these recommendations a following brief overview of the LANL Environmental program for remediating legacy wastes follows.

LANL ENVIRONMENTAL PROGRAM [3, 4]

There were 2,100 sites including small spills and legacy disposal areas of which about 850 now remain. Cleanup of the remaining sites varies between soil remediation of hazardous and radioactive waste, closure of the low level waste landfill and removal of 10,000 above ground legacy transuranic (TRU) waste containers. Regulatory control of the remediation program is administered by the NMED under an agreement with DOE and LANL signed in

2005, known as the “Consent Order”. The Consent Order with the NMED requires this to be complete by October 2015. Many contaminants, such as PCBs (polychlorinated biphenyls) and high explosives, have already been removed. Monitoring of air, surface and ground water, soil and wildlife is continuous and costs of the order of 25 million dollars per year while the total environmental program has an annual budget of about 300 million dollars per year.

Figure 2 shows the terrain of LANL’s 37 square mile site with steep canyons and flat mesa tops, a topography that makes cleanup efforts challenging. One of the main contaminant transport pathways is by water either subsurface into the groundwater or from surface run off. In order to track these movements many wells have been drilled.

Fig. 2. LANL from the Air.

METHODOLOGY OF DRAFTING RECOMMENDATIONS [5]

After data has been collected on any specific site to be remediated a CME Process is performed. The various stages are shown in Figure 3.

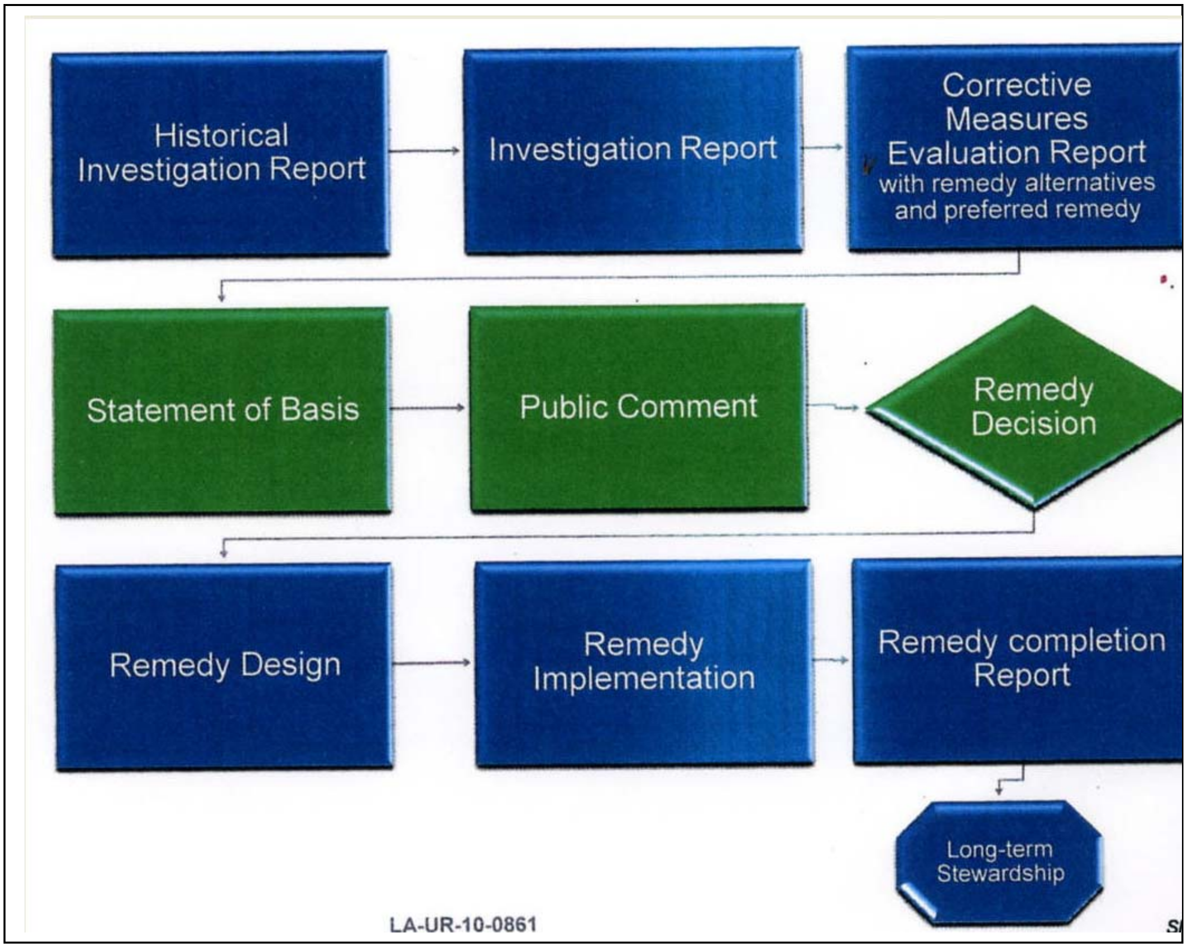

Fig 3. Methodology for Obtaining a Remedial Path Acceptable to All.

The various different remedial options include:

No action
If the level of contamination has been shown to be an insignificant threat to human health and the environment, no action is required.

Institutional Controls
When a site is found to pose some threat to human health and the environment but the logistics of remediation are such that any cost benefit for remedial action is small and an inappropriate use of environmental dollars, institutional controls are incorporated. Such a

site might be remote from human habitation or inaccessible. Since long term monitoring is carried out any change in the environmental risk would result in immediate reevaluation.

In-situ treatment
Examples of such treatments are vitrification and use of biological agents.
For vitrification, the area is heat treated (effectively turning the site into glass) thus preventing leaching of contaminants.
Biological agents, such as bacteria, will transform the contaminant either removing it or by conversion into a non hazardous form, such as reduction of chromium, from the hazardous +6 state to the non-hazardous +3 state.

Ex-situ treatment
Because of the expense involved, treatment and returning to the site is used infrequently.

Excavation
Removal of contaminated soil (buildings/equipment) is the most common method of remediation because it is, in general, far cheaper than using developed treatment technologies.

Some of the considerations that must be considered during evaluation include:

Long term reliability and effectiveness,
Reduction of toxicity, mobility or volume,
Short term effectiveness,
Implementation, and
Cost.

All of these processes need to result in the required cleanup standards being reached. In addition, there are, what can be considered as “soft” considerations which are nonetheless important to any remediation method. These include local cultural traditions, visual impacts, historical importance of the area, religious and ceremonial uses and access for future uses, such as hunting, fishing or recreation. A further consideration is potential economic development, where a particular area may be of interest to the local communities for industrial or commercial use, energy park status or, in some exceptional cases, residential use. These soft considerations will often involve decisions on long term monitoring and overall stewardship and control of remediated areas, which in turn may influence the financial and political decisions of waste remediation options. The example provided herein for MDA-G exemplifies some of these soft considerations.

We now consider the case study of a current site, 33 SHAFTS**,** one of the NNMCAB priorities, in order to illustrate the CME process:

33 SHAFTS [6]

An example of one of our current concerns (Recommendation 2010-01) is the disposition of remote handled waste buried in 33 shafts at TA-54, shown in Figure 4. This is the site of radioactive waste disposal that has been in operation since the 1960s. Some, but not all, TRU waste from TA-54 is in the process of being sent to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

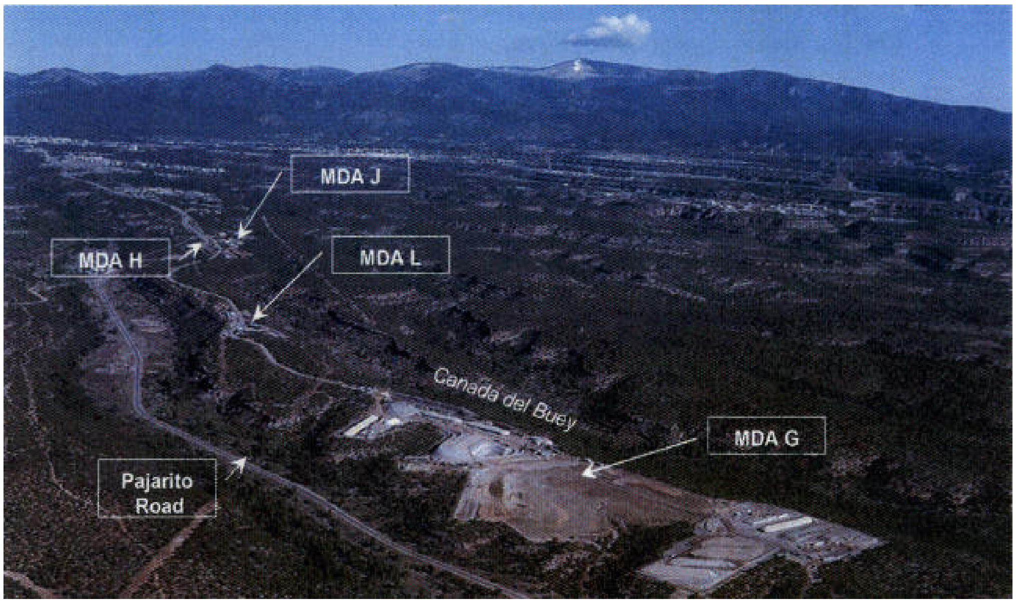

Fig. 4. The Waste Disposal Area, TA-54 showing Material Disposal Areas (MDAs).

The cleanup of MDA-G has been previously considered as one of the three top priority remediation sites by the NNMCAB in Recommendation 2009-05. This recommendation has been reiterated in Recommendation 2010-01.

Typical waste materials and waste material parameters in the 33 shafts are summarized below.

1. 193 packages of waste (~27 m^3) in 1/3-2/3 m diam. metal pipes buried in 33 shafts (shafts 200-232) that are 1 to 7 m length. The wastes in the metal pipes were generated and emplaced at different times (1970 to 1995) and in different configurations.
2. Nineteen of 33 shafts have waste that is >2.58 x 10^{-1} C/kg/h contact but only 10 shafts have radiation levels > 2.58 x 10^{-2} C/kg/h @ 1 meter.
3. The principal beta-gamma activities are from Mixed Fission Products (MFP) are:
   Cs-137 with a 30.1 yr half-life for 662 kev gamma-ray, Sr-90 28.2 yr half-life Pure beta-emitter, and Eu fission product activity is low level, resulting in a combined MFP radioactivity is ~7.4 x 10^{13} Bq.

4. Also present are ~1.54 kg of Pu with ~ 4.7 x 10^{12} Bq of alpha-activity with Am-241.
5. Shaft #212 contains the core of the Los Alamos Molten Pu Reactor Experiment that reportedly contains 200 g of Pu and weighs over 7200 kg. There may be residual Na coolant in the concreted core.
6. Typical general waste items in the 33 shafts are highly radioactive materials contaminated with irradiated fuel claddings, grindings, metallurgical fuel sample mounts, stainless steel and fuel cut remains, but there are no gross fuel pin samples in the waste.

According to the current governing document CCP-TP-500 (Central Characterization Project –Training Program) Revision 8 (7-24-08), the waste must be examined item-by-item for prohibited items and for characterization of waste material parameters. (There may be negotiation or exception to this requirement but it may take an unacceptable length of time). There is a final radiation limit of 2.58 x 10^{-1} C/kg/h per packaged drum prepared for shipment to the WIPP.

The TRU waste belongs to WIPP but the low level waste, with which it is intertwined, does not and cannot go to WIPP. The level of funding needed to separate the two runs into the hundreds of millions of dollars. Although the current decision is to remove the waste it may be that fiscal responsibility becomes a bigger issue when planning starts, especially as the waste, in its current location, presents a low level of risk to the environment and to any neighboring communities.

The material in these 33 shafts presents challenges because it is remote handled (RH) waste (defined as waste surface doses > 5.2 x 10^{5} c/kg/h @ contact) which will require special equipment for handling. Thus it requires analyses and special packing in order to meet safety requirements. There is some urgency about its removal because The Consent Order requires that MDA-G corrective actions be completed by October, 2015.

The NNMCAB's current recommendation is to remove the material in the 33 shafts. However an alternate approach would be to leave the material in situ and subject it to long term monitoring. This would be considerably cheaper and safer as removing the contents of the shaft involves risk to the workers and expense as special containers will be needed. In addition transport of the materials over the roads is hazardous.

Another consideration is the fact that MDA-G abuts onto San Ildefonso Pueblo Lands. The inhabitants of this territory consider the lands sacred to their people and prefer that the contaminants be removed. The 33 shafts are deemed to present very low risk if left in place. Does the presence of TRU waste affect the sacred nature of the subsurface?

An ongoing concern for MDA-G is fully understanding and correctly monitoring groundwater, to ensure that leaving this waste in place does not result in long term transport of radioactivity from movement of water [7]. To date, no contaminant transport has been found.

The NNMCAB invites the participation of all our local pueblos, both as personal representative members of the NNMCAB and as advice and input from their relationships with DOE as sovereign governments. The ultimate decision on MDA-G remediation will be decided with pueblo input.

The above description shows the complex issues required to resolve long term disposition of radioactive waste.

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