



**Northern New Mexico Citizens' Advisory Board**  
*A U.S. Department of Energy Site-Specific Advisory Board*  
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February 4, 2008

Donald L. Winchell Jr.  
Manager  
Los Alamos Site Office  
528 35th St.  
Los Alamos, NM 87544

**RE: Comments by the NNM CAB to DOE and NMED on the Closure of MDA-H**

Dear Mr. Winchell,

The Northern New Mexico Citizen's Advisory Board (NNMCAB) is pleased to have the opportunity to provide the following comments to the DOE and the NMED relative to the proposed closure of MDA-H as described in the Fact Sheet/Statement of Basis document by NMED dated November 5, 2007.

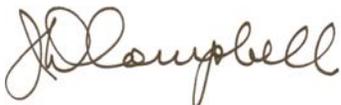
1. RCRA detection monitoring program for groundwater beneath MDA-H is not in place according to NMED. The NNM CAB recommends that DOE implement a full RCRA groundwater detection-monitoring program to characterize the groundwater beneath MDA-H to understand the groundwater flow conditions beneath MDA-H and to evaluate any potential contamination or impacts to the groundwater from the waste disposal at MDA-H. The data and understanding obtained from such a RCRA compliant groundwater monitoring system at MDA-H may impact decisions to be made regarding the appropriate closure and post-closure procedures to be implemented in at MDA-H.
2. Pilot studies for proposed soil-cement slurry walls to encapsulate all the shafts of MDA-H proposed by NMED need to be completed to evaluate their effectiveness. Vertical panel slurry walls or diaphragm walls as developed some 50 years ago by ICOS in Italy may be considered by LANL to provide effective encapsulation of the shafts at MDA-H. Such panel walls can be installed in limited space under controlled conditions as will be required at MDA-H. Panel walls may also be installed as a partial or full depth lateral barrier to future biological intrusion and contamination migration at MDA-H.
3. Pilot studies for the proposed Soil Vapor Extraction (SVE) system to remove volatile organic constituents (VOCs) in the vadose zone at MDA-H need to be completed to evaluate its effectiveness. Such a pilot study may confirm the amount of VOCs that are available in the vadose zone beneath MDA-H and determine requirements for further SVE.
4. The NNM CAB has reviewed recent observations and data regarding the concentrations of VOCs in the vadose zone beneath MDA-H. The DOE, LANL and NMED need to consider these recent data in developing the remedy and

closure for MDA-H. If the actual concentrations and mass of VOCs in the vadose zone beneath MDA-H are not as large as originally understood by DOE and NMED, the risk to the groundwater from VOC contamination may not warrant the full remedy as it has been proposed. The mechanism and analyses of the potential for migration from VOCs in the vadose zone soil vapor down into the groundwater should be carefully reviewed by DOE, LANL and NMED. The SVE pilot study may be valuable in guiding this analysis.

5. The NNM CAB recommends that Long-Term Stewardship requirements to be implemented by DOE for MDA-H be explicitly integrated during the remedy selection process. If radioactive waste materials are to be left in place following the closure of MDA-H, the NNM CAB wishes to understand the specific requirements and actions, which DOE will implement to monitor and maintain barrier effectiveness to protect the public from the closed MDA-H facility over the next tens, hundreds and thousands of years while the waste materials remain radioactive.
6. The MDA-H Focus Group (2001-2004) Report of 2004 contains comments on the engineered evapotranspiration cap that was the closure option of majority choice at that time, with dissenting comments from Concerned Citizens for Nuclear Safety (CCNS) and hydrologist Zane Spiegel. Many of the comments are still appropriate today. Of particular note is the discussion on fracture flow and the parameters that were used to simulate it. The NNM CAB encourages the DOE and the NMED to review the comments from the Focus Group and incorporate those that are relevant. (The Focus Group was made up of representatives of a variety of business, government, tribal and citizens groups, including a hydrologist.)

The NNM CAB will be pleased to discuss any of our comments with the DOE, LANL and/or NMED at your convenience. Thank you for this opportunity to provide these comments.

Very truly yours,



J. D. Campbell, Ph.D., P. E., Chair, NNM CAB

CC: Christina Houston, DOE  
Sue Stiger, LANS  
George Rael, DOE  
Mat Johansen, DOE  
Paul Huber, LANS  
James Bearzi, NMED  
John E. Kieling, NMED (via email to [john.kieling@state.nm.us](mailto:john.kieling@state.nm.us))  
Menice Santistevan, Executive Director, NNM CAB  
NNM CAB Members  
NNM CAB File

Attachments: Focus Group Report and Comments on Focus Group Recommendations by CCNS.

***FINAL REPORT***

***ON***

***MDA H FOCUS GROUP PROCESS***

**Submitted by:**

***Southwest Planning & Marketing***  
***903 W. Alameda, #206***  
***Santa Fe, NM 87501***  
***(505) 989-8500***

***2004***

## EXECUTIVE SUMMARY

- As part of the development of a Corrective Measure Study (CMS) Report for the MDA H site in Los Alamos, Los Alamos National Laboratory (LANL) established a focus group of concerned stakeholders.
- MDA H was viewed by LANL staff as a test case for how to involve the public in environmental restoration efforts at other sites in the future.
- Given the complex nature of the material to be discussed, it was determined that it would best to educate one group of stakeholders over a period of time as to the alternatives and to solicit their more informed input.
- Focus group members were selected to represent a number of interested stakeholders, including: adjacent pueblos, local governments, state government, Congressional representatives, environmental groups, the Citizens Advisory Board (CAB), the business community, and technical experts.
- The focus group was requested to recommend one or more preferred alternatives based on information given at the focus group meetings, a review of the report provided by the independent peer reviewer, and the group's review of the CMS report.
- The focus group nominated and evaluated possible candidates for providing independent peer review, with George Rice ultimately being selected.
- In his review, Mr. Rice raised five primary question areas: fracture flow, the use of partition coefficients (as they apply to complexed contaminants), the estimate of RDX cancer risk, materials not fully identified in the shafts, and the possibility that water is standing at the bottom of the shafts.
- Mr. Rice also suggested an alternative corrective measure that is predicated on the possibility of fracture flow; this measure involves the creation of a capillary barrier to reduce groundwater flow.
- LANL staff identified the following benefits from the focus group process: the decision to evaluate all hazards over a 1,000-year time frame; requesting an independent review of the report, which led to the fracture flow modeling study; and hearing the public's concerns early and throughout the process.
- The focus group (with one dissent at the meeting and one subsequent dissent by a non-attendee) supported the selection of the corrective measure alternative recommended by LANL for MDA H, Alternative 2, the engineered evapotranspiration cover, along with the following additional recommendations. (Dissenting opinions that were submitted in writing are included in the appendix to this report.)
- It is essential that DOE provide a secure source of funding for ongoing cleanup and monitoring efforts at MDA H.
- DOE should fund the independent monitoring of the MDA H site (in such a way as to minimize duplication of efforts with any monitoring by DOE), including the development of an independent plan for monitoring the site.
- There should be a full performance review every five years, to include an evaluation as to whether the availability of any new technology should lead to any additional corrective measures.

- There should be adequate public notice of all performance review activities and findings, including to all parties of record (at a level comparable to that pursuant to CERCLA requirements).
- No action should be taken that would preclude or significantly complicate possible excavation of the site.
- The group generally felt that the focus group process was valuable, although it should have been compacted into a shorter timeframe and should have provided input to NMED at an earlier date.

## INTRODUCTION

As part of the development of a Corrective Measure Study (CMS) Report for the MDA H site in Los Alamos, Los Alamos National Laboratory (LANL) established a focus group of concerned stakeholders. This effort was designed to complement the more traditional public involvement process mandated by the New Mexico Environment Department (NMED) and the Resource Conservation and Recovery Act (RCRA). MDA H was viewed by LANL staff as a test case for how to involve the public in environmental restoration efforts at other sites in the future.

This report documents the focus group process, key issues discussed, and the conclusions that were reached through that process. It also provides an evaluation of the process, along with an appendix containing further documentation and background material, along with comments submitted by individuals.

Prior to the initiation of the focus group, a workshop was held in Los Alamos on June 25, 2001. The purpose of the workshop was to inform the public of the CMS process, to educate them on the alternatives being evaluated, and to seek volunteers for the focus group process.

Initially, it was intended to hold three separate focus groups at three different locations with three different publics. But, given the complex nature of the material to be discussed, it was determined that it would be best to educate one group of stakeholders over a period of time as to the alternatives and to solicit their more informed input.

Bruce Poster of Southwest Planning & Marketing in Santa Fe was placed under contract by LANL to facilitate the focus group process, including

- The identification of potential participants
- Inviting participants to attend meetings and providing them with background materials
- Planning the meetings
- Moderating discussions at the meetings
- Documenting the results of the meetings
- Preparing this final report on the process

Focus group members were selected to represent a number of interested stakeholders, including:

- Adjacent pueblos
- Local governments
- State government
- Congressional representatives
- Environmental groups
- The Northern New Mexico Citizens Advisory Board (CAB)
- The business community
- Technical experts

The focus group was requested to recommend one or more preferred alternatives based on information given at the focus group meetings, a review of the report provided by the independent peer reviewer, and the group's review of the CMS report. The facilitator was charged with writing up the position of the group, which will go to DOE/LANL and NMED. Minority opinions were to be included in the report. The group was expected to provide a final recommendation(s) to LANL on the preferred alternative, as well as recommendations for long-term monitoring or stewardship requirements.

Initially, it was intended that there would be three meetings of the focus group over a period of several months, beginning in August 2001; however, for reasons discussed below, the process was ultimately extended to seven meetings over a period of more than two years.

## **FOCUS GROUP PROCESS AND KEY ISSUES**

All focus group meetings were held at the Cities of Gold Hotel in Pojoaque, which provided a central meeting place. Meetings were convened in the late afternoon for two to three hours, with dinner served near the end of the meeting. LANL staff were available to make presentations and answer questions. However, there were times when the LANL staff were asked by the facilitator to leave the room in order to encourage a free flow of discussion. At the first meeting, common courtesies (ground rules) were established to facilitate productive and congenial meetings (see appendix for list of the common courtesies.)

### **Key Issues and Concerns**

What follows are some of the key issues that came up in the course of discussion during the first three focus group meetings.

#### **1. What are your general concerns regarding the presence of waste material at LANL?**

- Do LANL waste and environmental restoration personnel know what they are doing?
- Are they doing the right thing?
- Preventing migration of materials if left in place.
- Is there a backup plan (and a backup plan for that) if measures fail?
- Proximity to San Ildefonso lands, especially the sacred area near TA 54; the existence of the waste disposal sites is an insult to the San Ildefonso people, and there is a threat of migration onto their lands.
- Concern with radioactive waste in general; it's here essentially forever in some cases and could be a threat as a result of long-term erosion.
- Natural disaster: fire and earthquake.
- Moving the problem to other areas by relocating the waste.
- The amount of time it takes to address the problems and the lack of financial commitment to proper resolution. Cleanup dollars should

accompany weapons dollars, and LANL should be asking DOE Headquarters for more funding for environmental restoration.

- What kind of mess are we leaving for future generations?
- Waste will eventually end up in the Rio Grande.

**2. How far in the future do you believe that LANL is responsible for protecting human health and the environment?**

- The consensus was that the responsibility is for all time.
- The University of California should be held accountable.
- Substances with shorter half-lives will not be a problem in time.
- The waste should be viewed as a resource for future generations.
- Regulations (DOE Order 435.1) now require reasonable assurance of protection for 1,000; older regulations (DOE Order 5820.2A) had required protection for 10,000 years.

**3. Do you believe that DOE can and will control the LANL property for the next 100 year? 500 year? 1,000 years?**

- Responsibilities are likely to shift from DOE in time.
- The people are the government and must take responsibility.
- Yes, the government will be around for at least 100 years; it should focus on alternative energy and recycling of the waste.
- There should be an increase in the role of local governments in stewardship.
- The problem is politics, which must be addressed first.
- Maybe, but DOE has walked away from underground test sites; don't count on it.
- There is a large political risk over a long time frame.
- It's safer to assume that DOE will not be in control; it's better to be conservative.
- The less valuable waste (like that at MDA H) might be forgotten in time.
- DOE itself says not to assume control of a site for over 100 years. (DOE Order 5820.2A)

**4. Do you trust that LANL has accurately characterized the nature and extent of contamination at MDA H?**

- No, due to poor record keeping.
- No, due to lack of trust.
- In part, but the extent of contamination could change over time.
- No, due to poor records of inventory.
- No, the public does not trust LANL.
- No, though not out of suspected malice.
- Don't know about the accuracy of the characterization.
- No, due to lack of trust and uncertainty about what is in MDA H.
- The written records have been supported by sampling, which was done well.

- Don't trust LANL doing their own sampling tests.
- 5. If you perceive there to be a risk associated with the site, what populations do you believe to be most at risk?**
- San Ildefonso members using the sacred area 100 yards away.
  - High tritium levels could travel everywhere, especially into groundwater and into the Rio Grande; also into the biosphere, e.g. to the elk.
  - Rio Grande water users, including pueblos downstream (who should participate in this focus group).
  - Populations downwind from LANL.
  - Workers at the site, San Ildefonso members, Los Alamos residents.
  - Santa Fe residents.
- 6. What future natural and man-induced changes could affect the release and migration of waste from MDA H? Should LANL plan for each of these contingencies?**
- It was felt that LANL should plan for all of the possible contingencies.
  - Earthquake.
  - Fire.
  - Erosion and cliff retreat (which was a major concern of the group).
  - Terrorism.
  - Flooding (say after a fire), which would lead to erosion and undercutting.
  - Biotic intrusion.
  - Political changes.
- 7. Are there any other factors that should be considered in the analysis of alternatives?**
- Long-term environmental stewardship
  - Cultural impacts
  - Ethics
  - Historical perspective
  - Animal health
  - Plant health
  - Worker health and safety
  - Transportation
  - Environmental justice (regarding impacts on disadvantaged populations)
  - Damage from the cleanup efforts (this was part of a discussion of how clean is clean and whether to delay cleanup until new more cost-effective technologies have been developed)
- 8. Should cost be a factor in the evaluation of alternatives?**
- No
  - Yes, if two options are comparable in terms of safety and effectiveness
  - Yes, in relationship to the severity of the problems at each site (i.e. spend the inherently limited resources on the worst sites first)

- A simple cost benefit analysis does not consider enough factors
- Yes, but that doesn't mean that you necessarily choose the cheapest alternative; funds should be spent to reduce the future generation of waste
- Yes, since funds are not infinite; prioritize the ER projects
- Higher management at the Lab should become aware of the issues raised by this group
- No, find the dollars to do it right; after all, LANL has no trouble finding much larger sums of money for other projects
- You could stabilize the site for the time being and clean it up later, when there is better technology
- The MDA H effort could be a PR ploy to avoid addressing more serious problems at other sites (this response was made at the meeting: but it's a prototype site, for which more data was available)
- LANL ER has a history of going after low-hanging fruit and avoiding the big problems
- How clean is clean? Clean enough for residential use, with nothing new added to nature. Concern expressed regarding the cure (cleanup) possibly being worse than the problem

**9. Can you suggest any additional alternatives?**

- Vary the engineered cover, e.g. by increasing the overlap over the site
- Excavate the waste and rebury it more safely at greater depth at the same site, though this does not address the pueblo's concerns about having material there at all

**As Is Alternative: Pros**

- Inexpensive
- Less worker risk
- It's worked so far

**As Is Alternative: Cons**

- Highest risk of migration
- Risk to sacred areas
- Questions about long term stewardship (LTS) beyond DOE
- Site may not be identifiable in the future
- Sends the wrong message to society, i.e. that there are no consequences associated with generating and storing waste
- Despite the sampling, we don't know everything about the site
- There may be unknown risks, e.g. from internal reactivity of the materials
- It lets DOE off the hook
- It leaves things hanging, buying time, but not solving the problem
- It does not set a good precedent for other cleanups
- A cheap solution sends the wrong message to DOE
- Does little to prevent human intrusion
- Perpetual operating costs

**As Is Alternative: Other Comments**

- Disposal costs should be included in the cost of nuclear energy
- The savings from the most expensive case should be used for other cleanups and contingencies
- The group still needs an answer about the legality of bonding for LTS
- What are the consequences for DOE violation of health standards? Who cares if wells are later destroyed?
- Discretionary funds should be allocated to communities and pueblos for education, monitoring, safety, and contingencies

**Engineered Cover Alternative: Pros**

- Pros and cons are similar to the As Is Alternative, but the additional benefits are limited relative to the risks that LTS will not be successful

**Engineered Cover Alternative: Cons**

- Eventual erosion of the cap
- Recharge could allow contaminants to escape
- Ineffective
- Buys time, but forestalls the inevitable results of the mesa eroding away
- Native vegetation could camouflage it, increasing the risk of human intrusion

**Stabilization Alternative: Pros**

- Pros and cons are similar to the As Is Alternative, but the additional benefits are limited relative to the risks that LTS will not be successful
- Better at preventing human intrusion
- May forestall migration

**Stabilization Alternative: Cons**

- Does not address possible contamination beneath the shaft
- Some day, when the waste ultimately must be removed, it will be more difficult.

**Stabilization Alternative: Other Comments**

- It is necessary to test beneath the shaft to determine how deep to take the encapsulation

**Excavation Alternative: Pros**

- Solves migration risk at the site by removal from unstable mesa
- Eliminates need for LTS (at that site)
- Some materials can be recycled
- Allows eventual return of lands to San Ildefonso in healthy condition
- We'll find out what is really there (which will help calibrate the accuracy of the records for other sites)

- Avoids LTS for future generations, which is an ethical responsibility
- It will get costlier to remove it in the future

**Excavation Alternative: Cons**

- Material could be dispersed during excavation and recovery
- Expensive
- Worker health hazards
- The adverse impacts of disposing the waste elsewhere
- Transportation risks

**Independent Peer Reviewer**

LANL had intended to hire an independent peer reviewer to evaluate the CMS report. The focus group asked to have the opportunity to nominate potential peer reviewers, with the focus group ultimately selecting the person. LANL agree to this process, with a fourth focus group being held to discuss the selection of a reviewer.

There was discussion of the need for two independent peer reviewers, rather than one. Most of the group felt that one reviewer was sufficient for the MDA H site and that the additional costs of a second reviewer and responding to that reviewer’s comments were not warranted; however, it was agreed that any individuals may petition DOE or the CAB to fund a second reviewer.

The group discussed the qualities important in an independent reviewer and came up with this list:

1. A nitpicker
2. A person who looks for what is not addressed in the report
3. Practical related experience
4. Good personal experience as more important than associations
5. Expertise in geotechnical engineering, hydrogeology, geochemistry, risk assessment, cultural impacts, modeling, and materials transport
6. Impartiality

The group recommended that John Hopkins contract with either George Rice or Bernd Franke. Ultimately, George Rice was placed under contract.

**Delays**

It was originally expected that a fifth and final focus group would be held after the peer reviewer completed his evaluation, and that this meeting would be held a few months after the fourth focus group meeting (which was held in February of 2002). However, unforeseen events were to delay this process.

Laboratory staff had first to complete the preliminary draft of the MDA H CMS Report for review by MDA High Performing Team (HPT) members, which include New Mexico Environment Department (NMED), Los Alamos National Laboratory, and Department of

Energy staff. Unforeseen issues delayed the completion of the draft report. First, the NMED issued a Draft Section 13 Order to the Laboratory on May 2, 2002, with a public comment period that required the Laboratory to provide comments within 60 days of issuance. Second, a key member of the team developing the draft CMS report was no longer with the NMED or on the MDA HPT. Third, the efforts of Laboratory staff on the HPT were redirected to support the Laboratory's RCRA Hazardous Waste Facility Permit renewal process, that had been ongoing simultaneously with the MDA H CMS process.

After work on the draft report resumed, it was shared with all HPT members in November 2002 for review, comment, and revision to make it acceptable for formal submittal to the NMED in early 2003. NMED and the Laboratory agreed that when the final report was formally submitted, it would be shared with the focus group and George Rice, the independent reviewer. The fifth focus group session would be scheduled at that time and was ultimately held in June 2003.

At that meeting, concerns were expressed regarding the timing of the separate environmental assessment (EA) being prepared by DOE (prior to the focus group recommendations), the fact that the review period for the EA would be 21 (rather than 45) days, and that the EA would not be focused on the alternative preferred by NMED. (Under NEPA, the EA must address the full range of alternatives.)

### **Peer Review of CMS Report**

During the fifth and sixth focus group meetings, George Rice provided an initial overview of the CMS report and recommendations.

Mr. Rice raised five primary question areas: fracture flow, the use of partition coefficients (as they apply to complexed contaminants), the estimate of RDX cancer risk, materials not fully identified in the shafts, and the possibility that water is standing at the bottom of the shafts.

Mr. Rice also suggested another possible corrective measure that is predicated on the possibility of fracture flow. This measure involves the creation of a capillary barrier to reduce groundwater flow. (It has been noted that construction of such a barrier may enhance biointrusion.)

Mr. Rice's presentations and reports generated considerable discussion, including responses by LANL to the issues that he raised.

### **Impact of the Focus Groups on the CMS Analysis and Report**

According to LANL staff, the focus group influenced the CMS by:

- 1) Recommending that all hazards be evaluated over a 1,000-year time frame. This recommendation is part of the CMS.

- 2) Requesting an independent review of the report. This recommendation led to the fracture flow modeling study, which may affect cover design, if NMED chooses a final cover as the alternative.
- 3) LANL and NMED heard the public's concerns early in the process and throughout the process.

## **OUTCOME/RECOMMENDATIONS**

### **Issues**

At the seventh and final meeting, some important issues were addressed including:

- The time frame for evaluation (1,000 years or longer)
- Whether to recommend a final solution or an interim solution (subject to improved technology in the future)
- Whether to address the larger LANL context in making a recommendation (since MDA H is not the most contaminated site and there will be other remediation efforts)
- Concerns about DOE's commitment to long-term stewardship
- The need for independent monitoring
- Whether it is better to concentrate the materials in a smaller footprint
- The risks associated with removal
- Whether it is better to make it easier to remove the materials in the future rather than further encapsulate them

### **Recommendations**

In the end, the following consensus was reached by all but one participant concerning the preferred alternative and by all participants concerning long-term stewardship:

1. The focus group (with one dissent at the meeting and one subsequent dissent) supports the selection of the corrective measure alternative recommended by LANL, Alternative 2, the engineered evapotranspiration cover. (See appendix for dissenting opinions, which support complete excavation and off-site disposal.)
2. It is essential that DOE provide a secure source of funding for ongoing cleanup and monitoring efforts at MDA H.
3. DOE should fund the independent monitoring of the MDA H site (in such a way as to minimize duplication of efforts with any monitoring by DOE), including the development of an independent plan for monitoring the site.
4. There should be a full performance review every five years, to include an evaluation as to whether the availability of any new technology should lead to any additional corrective measures.

5. There should be adequate public notice of all performance review activities and findings, including to all parties of record (at a level comparable to that pursuant to CERCLA requirements).
6. No action should be taken that would preclude or significantly complicate possible excavation of the site

## IMPROVING THE PROCESS

During the sixth and seventh meetings, time was devoted to evaluating the focus group process. Participants also had an opportunity to complete an anonymous evaluation form.

### Issues Raised at Sixth Focus Group

- Attrition in the membership of the group (at least four members had conflicts that prevented them from attending).
- The wrong people were participating in the technical discussion of fracture flow. The focus group should focus on policy rather than on technical details.
- The value of the focus group in the decision process, although it is a valuable educational experience, even for one without a technical background.
- The focus group recommendations should have come out before the CMS report was submitted.
- DOE's EA is being developed without input from the focus group
- The focus group could be reconvened during the design phase to receive input on mitigation measures.
- A broader context than just MDA H is needed, as other sites will be more problematic and costly to remedy.
- The public participation process should be streamlined so it does not drag out over two years.
- Some of the sites could be studied together, perhaps with a focus group for each mesa.

### Issues Raised at Seventh Focus Group

- The general public has not been adequately represented in the process.
- Interest has waned due to the length of the process.
- The issue of an independent reviewer will likely come up again in other focus groups; the group needs to choose its own reviewer, as it did in this process.
- There should be a team of independent reviewers, not just one.
- There were questions about the cost of the focus group process.
- The introduction of tangential issues into the discussion delayed the process.
- The participants gained considerable information, which they have a responsibility to share with others.
- The process is demanding of time; participants need to know up front exactly what they are getting into.

## **Summary of Evaluation Forms and Scores**

Eight focus group participants who remained active throughout the process responded to a request to evaluate the focus group process. An arithmetic average of their ratings is found in the appendix.

In general, participants were well satisfied with the independent peer reviewer, the facilitator, LANL staff support, the technical information that was made available, the fairness of the meetings, and the composition of the focus group. There was moderate satisfaction with the overall focus group process and the sincerity of LANL's desire for input. Satisfaction was lowest as to the productiveness of the meetings, the consideration of input by LANL, and the impact of the focus group on the decision-making process.

Each participant also provided open-ended comments. Some of the major issues addressed in those comments include:

- Declining attendance over time, largely due to the extended time frame
- The need to keep participants on track and focused
- Increasing the diversity of participation in the future
- Whether the value was worth the expense

## APPENDIX

### FOCUS GROUP PARTICIPANTS

- Adele Hopkins, Los Alamos League of Women Voters
- Dorothy Hoard, Northern New Mexico Citizens Advisory Board (CAB)
- Joni Arends, Concerned Citizens for Nuclear Safety
- Neil Weber, San Ildefonso Pueblo
- [John Tauxe, Neptune & Company](#)
- Fran Berting, Los Alamos County Council and CAB
- ~~Zane Spiegel, Hydrologist~~[Helen Dorado-Gray, Senator Bingaman's Office](#)
- Ernesto Rodriguez, State Emergency Management Bureau
- Jay Pecos, Cochiti Pueblo
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Council
- Kevin Holsapple, Los Alamos Community Development Corporation
- ~~Helen Dorado-Gray, Office of Senator Bingaman~~[Zane Spiegel, Hydrologist](#)
- ~~John Tauxe, Neptune & Company~~[Coila Ash, Creative Commotion](#)

### COMMON COURTESIES

(These were adopted by the focus group as ground rules at the first meeting.)

- One person speaks at a time.
- No interruptions.
- Keep remarks short.
- Stick to the point.
- Focus on issues, not personalities.
- Seek consensus whenever possible.

### FOCUS GROUP COSTS

Recruiting, moderation, communication, report	\$31,000
Independent peer reviewer	16,000
Initial workshop	5,000
Meeting room and food	<u>2,000</u>
<b>Total</b>	<b>\$54,000</b>

Note: Some of these costs (peer reviewer and workshop) would have been incurred whether or not there was a focus group.

## EVALUATION OF MDA H FOCUS GROUP PROCESS

Eight focus group members with the highest frequency of participation responded to this survey, that was emailed out on two occasions; additional efforts were made to obtain responses by telephone.

On a scale of 1 to 5, where *5 is highly satisfied* and *1 is highly dissatisfied*, how satisfied have you been with each of the following:

	<b>Arithmetic <u>Average</u></b>
The sincerity of LANL's desire for input	3.0
Consideration of your input by LANL	2.7
Your impact on the decision-making process	2.4
The composition of the focus group	3.7
The productiveness of the meetings	2.3
The fairness of the meetings	3.6
The role of the facilitator	3.9
The role of the independent peer reviewer	4.1
The support from LANL staff	4.0
The technical information that was made available	3.9
The overall focus group process	3.0

## NOTES FROM MDA H FOCUS GROUP #1

Twelve people attended the initial focus group meeting for MDA H at the Cities of Gold Hotel in Pojoaque on August 14, 2001, from 4:30 to 6:30. The attendees are listed below:

- Adele Hopkins, Los Alamos League of Women Voters
- Coila Ash, N.M. Toxics Coalition
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Commission
- Dorothy Hoard, CAB
- Ernesto Rodriguez, State Emergency Management Bureau
- Fran Berting, Los Alamos County Commission and CAB
- John Tauxe, Neptune & Company
- Joni Arends, CCNS
- Kevin Holsapple, Los Alamos CDC
- Neil Weber, San Ildefonso Pueblo
- Zane Spiegel, Hydrologist

The following people RSVPed that they would be unable to attend:

- Greg Mello, LASG
- Dolores Garcia, Office of Senator Bingaman

Bruce Poster, facilitator, described the purpose of the group and that this would be the first of three meetings. He then offered ground rules, which were accepted by the group. Next, participants introduced themselves. John Hopkins made a presentation of background information on the environmental restoration efforts at LANL in general and MDA H in particular. Participants asked a number of questions, including:

- Please describe the regional test wells and their locations. Answer was provided by locating a figure in the RCRA Feasibility Investigation (RFI) document.
- Why was MDA H chosen as the first mesa-top site with a remediation plan to be presented to the public? Answer: This was the easiest of the MDAs currently under investigation.
- Do you intend to perform an ecological risk assessment? Answer: Yes.
- What is the current practice for disposal of materials at LANL? Answer: Low-level waste (LLW) goes to MDA G, transuranic (TRU) waste goes into storage and some of this goes to WIPP, and the disposition of classified wastes was not known.
- How is migration of groundwater affected by wells? Answer: Wells do change gradients and the directions of groundwater flow.

Bruce Poster then moderated the following discussion.

**10. What are your general concerns regarding the presence of waste material at LANL?**

- Do they know what they are doing?
- Are they doing the right thing?
- Preventing migration of materials if left in place.
- Is there a backup plan (and a backup plan for that) if measures fail?
- Proximity to San Ildefonso lands, especially the sacred area near TA 54; the existence of the waste disposal sites is an insult to the San Ildefonso people, and there is a threat of migration onto their lands.
- Concern with radioactive waste in general; it's here forever in some cases and could be a threat as a result of long-term erosion.
- Natural disaster: fire and earthquake.
- Moving the problem to other areas by relocating the waste.
- The amount of time it takes to address the problems and the lack of financial commitment to proper resolution. Cleanup dollars should accompany weapons dollars, and LANL should be asking D.C for more funding for environmental restoration.
- What kind of mess are we leaving for future generations?
- Waste will end up in the Rio Grande.

**11. How far in the future do you believe that LANL is responsible for protecting human health and the environment?**

- The consensus was that the responsibility is for all time.
- The University of California should be held accountable.
- Substances with shorter half-lives will not be a problem in time.
- The waste should be viewed as a resource for future generations.
- Regulations (DOE Order 435.1) now require reasonable assurance of protection for 1,000 years; older regulations (DOE Order 5820.2A) had required this protection for 10,000 years.

**12. Do you believe that DOE can and will control the LANL property for the next 100 year? 500 year? 1,000 years?**

- Responsibilities are likely to shift from DOE in time.
- The people are the government and must take responsibility.
- Yes, the government will be around for at least 100 years; it should focus on alternative energy and recycling of the waste.
- There should be an increase in the role of local governments in stewardship.
- The problem is politics, which must be addressed first.
- Maybe, but DOE has walked away from underground test sites; don't count on it.

- There is a large political risk over a long time frame.
- It's safer to assume that DOE will not be in control; it's better to be conservative.
- The less valuable waste (like that at MDA H) might be forgotten in time.
- DOE itself says not to assume control of a site for over 100 years.

**13. Do you trust that LANL has accurately characterized the nature and extent of contamination at MDA H?**

- No, due to poor record keeping.
- No, due to lack of trust.
- In part, but the extent of contamination could change over time.
- No, due to poor records of inventory.
- No, the public does not trust LANL.
- No, though not out of suspected malice.
- Don't know about the accuracy of the characterization.
- No, due to lack of trust and uncertainty about what is in MDA H.
- The written records have been supported by sampling, which was done well.
- Don't trust LANL doing their own sampling tests.

**14. If you perceive there to be a risk associated with the site, what populations do you believe to be most at risk?**

- San Ildefonso members using the sacred area 100 yards away.
- High tritium levels could travel everywhere, especially into groundwater and into the Rio Grande; also into the biosphere, e.g. to the elk.
- Rio Grande water users, including pueblos downstream (who should participate in this focus group).
- Populations downwind from LANL.
- Workers at the site, San Ildefonso members, White Rock, and Los Alamos residents.
- Santa Fe residents.

**15. What future natural and man-induced changes could affect the release and migration of waste from MDA H? Should LANL plan for each of these contingencies?**

- It was felt that LANL should plan for all of the possible contingencies.
- Earthquake.
- Fire.
- Erosion and cliff retreat (which was a major concern of the group).
- Terrorism.
- Flooding (say after a fire), which would lead to erosion and undercutting.

- Biotic intrusion.
- Political changes.

At the end of the discussion, the group agreed to meet again in Pojoaque on Tuesday, September 25 from 4:30 to 6:30. These notes will be sent to participants prior to the next meeting.

## NOTES FROM MDA H FOCUS GROUP #2

Ten people attended the second focus group meeting for MDA H at the Cities of Gold Hotel in Pojoaque on September 25, 2001, from 4:30 to 6:30. The attendees are listed below:

- Adele Hopkins, Los Alamos League of Women Voters
- Coila Ash, N.M. Toxics Coalition
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Council
- Dorothy Hoard, CAB
- Fran Berting, Los Alamos County Council and CAB
- John Tauxe, Neptune & Company
- Joni Arends, CCNS
- Kevin Holsapple, Los Alamos CDC
- Neil Weber, San Ildefonso Pueblo

The following people were unable to attend:

- Greg Mello, LASG
- Dolores Garcia, Office of Senator Bingaman
- Ernesto Rodriguez, State Emergency Management Bureau
- Zane Spiegel, Hydrologist
- Jay Pecos, Cochiti Pueblo

Bruce Poster, facilitator, began the meeting with a review of the purpose, ground rules, and introductions. John Hopkins of LANL provided background information on the alternatives under study at MDA H. He was assisted in this effort by Neelam Dhawan of the New Mexico Environment Department. Participants asked a number of questions during the presentation, including the following:

- Q: Can a citizen scientist or a UNM Faculty participate in the peer review? A: It's OK with John Hopkins. Technical persons working outside LANL/DOE will have a chance to review and provide input.
- Q: Can LANL legally post a bond to ensure maintenance and monitoring of the site? A: Oak Ridge has done it; John Hopkins will check into how it was done there.
- Q: With a barrier, would the waste be retrievable in the future? A: Yes, you could drill through the cover.
- Q: Will more technical information be available prior to the participants' forming an opinion? A: Yes, technical work is continuing and will be provided to participants as it becomes available.
- Q: Who will eventually approve the LANL plan for MDA H? A: The New Mexico Environment Department.

- Q: It is important to know what each of the pueblos think about the plan. A: LANL will be going to each pueblo to present the alternatives.
- Q: It is equally important that the pueblos are solicited for their own ideas about possible solutions to the problem, not just have LANL's solutions presented to them. The dialogue should go both ways. A: No response.
- Q: Tribes need a lot of background information to fully participate in the process. A: John Hopkins will contact the tribes to meet with them and determine what type of information would be of interest.
- Q: Communication from LANL should be comprehensible to lay people.
- Q: LANL should take the plan to high schools, assisted living homes, and neighborhood meetings.
- Q: Funding for waste disposal should be tied to the generation of additional waste.

After John and Neelam left the room at 5:45, Bruce Poster then moderated the following discussion.

**1. Is it necessary to make any revisions to the notes from the first focus group?**

- Several people did not recall receiving the notes; the notes will be resent to those people.
- John Tauxe will contact Bruce to provide comments.

**2. Are there any other factors that should be considered in the analysis of alternatives?**

- Long-term environmental stewardship
- Cultural impacts
- Ethics
- Historical perspective
- Animal health
- Plant health
- Worker health and safety
- Transportation
- Environmental justice (regarding impacts on minorities)
- Damage from the cleanup efforts (this was part of a discussion of how clean is clean and whether to delay cleanup until new more cost-effective technologies have been developed)

**3. Should cost be a factor in the evaluation of alternatives?**

- No
- Yes, if two options are comparable in terms of safety and effectiveness
- Yes, in relationship to the severity of the problems at each site (i.e. spend the inherently limited resources on the worst sites first)

- A simple cost benefit analysis does not consider enough factors
- Yes, but that doesn't mean that you necessarily choose the cheapest alternative; funds should be spent to reduce the future generation of waste
- Yes, since funds are not infinite; prioritize the ER projects
- Higher management at the Lab should become aware of the issues raised by this group
- No, find the dollars to do it right. After all, LANL has no trouble finding much larger sums of money for other projects.
- You could stabilize the site for the time being and clean it up later, when there is better technology
- The MDA H effort could be a PR ploy to avoid addressing more serious problems at other sites (response: but it's a prototype site, for which more data was available)
- How clean is clean? Clean enough to use with nothing new added to nature. Concern expressed regarding the cure (cleanup) possibly being worse than the problem

**4. Can you suggest any additional alternatives?**

- Vary the engineered cover, e.g. by increasing the overlap over the site.
- Excavate the waste and rebury it more safely (at greater depth) at the same site, though this does not address the pueblos' concerns about having the material there at all.

**5. Is November 13<sup>th</sup> an acceptable date for the third focus group, which will address your preferred alternative and mitigation measures related thereto?**

All will be able to attend except for Adele Hopkins.

**6. Would you be willing to participate in a fourth focus group in January after the technical analysis has been completed?**

All are willing to participate in a fourth group.

### NOTES FROM MDA H FOCUS GROUP #3

Ten people attended the third focus group meeting for MDA H at the Cities of Gold Hotel in Pojoaque on November 13, 2001, from 4:30 to 6:30. The attendees are listed below:

- Coila Ash, N.M. Toxics Coalition
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Council
- Dorothy Hoard, CAB
- Fran Berting, Los Alamos County Council and CAB
- John Tauxe, Neptune & Company
- Joni Arends, CCNS
- Kevin Holsapple, Los Alamos CDC
- Neil Weber, San Ildefonso Pueblo
- Zane Spiegel, Hydrologist

The following invitees did not attend:

- Adele Hopkins, Los Alamos League of Women Voters
- Greg Mello, LASG
- Dolores Garcia, Office of Senator Bingaman
- Ernesto Rodriguez, State Emergency Management Bureau
- Jay Pecos, Cochiti Pueblo

Bruce Poster, facilitator, began the meeting with introductions and an overview of the agenda. He distributed revised notes from the first two focus groups, based on comments received from John Tauxe. Bruce and John Hopkins of LANL provided an update on outreach efforts, indicating that LANL is requesting meetings at San Ildefonso and Pojoaque and with the Eight Northern Indian Pueblo Council.

The meeting between Paul Davis, a consultant to LANL, and Zane Spiegel to discuss hydrologic issues was mentioned. Participants indicated that, in the future, they would like an opportunity to sit in on such meetings. Notes from the meeting, as well as an indication of how LANL intends to respond to Zane's comments, will be obtained from Paul Davis. Zane stated that his concern is that, in some years, future recharge rates could be much higher than historic average recharge rates (as was the case in 1941-42) and that the incidence and magnitude of such extreme weather is being exacerbated by global warming. There was also a request to have the physics of vapor transport explained in writing in layman's terms to the participants.

John Hopkins provided an update on the peer review process, indicating that the DOE peer review would begin in late November. John also indicated that he intended to hire Bruce Thomson, an engineer at UNM, to conduct an independent peer review, beginning in December. Participants indicated that they would like to review the curriculum vita of Dr. Thomson prior to his being put under contract.

John Hopkins distributed environmental monitoring results from MDA H to the participants. He explained that the readings for tritium and organics are well below allowable health standards. He will resend the data with reference to EPA/NMED standards and information on vapor density. There was concern about tritium coming out of the side of the mesa; John will check other nearby stations to see if there is evidence of such release.

John Hopkins provided preliminary estimates (not for quotation) of the range of capital costs for the various alternatives. The group would also like to see cost estimates for monitoring the site for different periods of time. John said that a long-term stewardship (LTS) plan will be developed for the preferred alternative. Participants felt that the LTS plan should be a part of each alternative, prior to selection. John stated that the LTS plans would be similar for each of the on-site alternatives.

Bruce Poster then facilitated a discussion of the pros and cons of each of the four alternatives, as summarized below:

**As Is Alternative: Pros**

- Inexpensive
- Less worker risk
- It's worked so far

**As Is Alternative: Cons**

- Highest risk of migration
- Threat to sacred areas
- Questions about LTS beyond DOE
- Site may not be identifiable in the future
- Sends the wrong message to society, i.e. that there are no consequences associated with generating and storing waste
- Despite the sampling, we don't know everything about the site
- There may be unknown risks, e.g. from internal reactivity of the materials
- It lets DOE off the hook
- It leaves things hanging, buying time, but not solving the problem
- It does not set a good precedent for other cleanups
- A cheap solution sends the wrong message to DOE
- Does little to prevent human intrusion
- Perpetual operating costs

**As Is Alternative: Other Comments**

- Disposal costs should be included in the cost of nuclear energy

- The savings from the most expensive case should be used for other cleanups and contingencies
- The group still needs an answer about the legality of bonding for LTS
- What are the consequences for DOE violation of health standards? Who cares if wells are later destroyed?
- Discretionary funds should be allocated to communities and pueblos for education, monitoring, safety, and contingencies

#### **Engineered Cover Alternative: Pros**

- Pros and cons are similar to the As Is Alternative, but the additional benefits are limited relative to the risks that LTS will not be successful

#### **Engineered Cover Alternative: Cons**

- Eventual erosion of the cap
- Recharge could allow contaminants to escape
- Ineffective
- Buys time, but forestalls the inevitable results of the mesa eroding away
- Native vegetation could camouflage it, increasing the risk of human intrusion

#### **Stabilization Alternative: Pros**

- Pros and cons are similar to the As Is Alternative, but the additional benefits are limited relative to the risks that LTS will not be successful
- Better at preventing human intrusion
- May forestall migration

#### **Stabilization Alternative: Cons**

- Does not address possible contamination beneath the shaft
- Some day, when the waste ultimately must be removed, it will be more difficult.

#### **Stabilization Alternative: Other Comments**

- It is necessary to test beneath the shaft to determine how deep to take the encapsulation

#### **Excavation Alternative: Pros**

- Solves migration risk at the site by removal from unstable mesa
- Eliminates need for LTS (at that site)
- Some materials can be recycled

- Allows eventual return of lands to San Ildefonso in healthy condition
- We'll find out what is really there (which will help calibrate the accuracy of the records for other sites)
- Avoids LTS for future generations, which is an ethical responsibility
- It will get costlier to remove it in the future

#### **Excavation Alternative: Cons**

- Material could be dispersed during excavation and recovery
- Expensive
- Worker health hazards
- The adverse impacts of disposing the waste elsewhere
- Transportation risks

#### **Next Meeting**

- The group agreed to meet on February 26, 2002 at the same location from 3:30 to 6:30 p.m.
- The group is also interested in meeting again at a later date to review the LTS plans.

## NOTES FROM MDA H FOCUS GROUP #4

Nine people attended the fourth focus group meeting for MDA H at the Cities of Gold Hotel in Pojoaque on February 26, 2002, from 3:30 to 6:20. The attendees are listed below:

- Coila Ash, N.M. Toxics Coalition
  - Adele Hopkins, Los Alamos League of Women Voters
- Dolores Garcia, Office of Senator Bingaman
- Dorothy Hoard, CAB
- Fran Berting, Los Alamos County Council and CAB
- John Tauxe, Neptune & Company
- Joni Arends, CCNS
- Neil Weber, San Ildefonso Pueblo
- Zane Spiegel, Hydrologist

The following invitees were unable to attend:

- Ernesto Rodriguez, State Emergency Management Bureau
- Jay Pecos, Cochiti Pueblo
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Council
- Kevin Holsapple, Los Alamos CDC

### Introduction and Handouts

Bruce Poster, facilitator, began the meeting with introductions and an overview of the agenda. He described the makeup meeting that had been held. He went over materials that had been sent to participants prior to the meeting to make sure everyone had a complete package. Some additional materials were also distributed and described: a preliminary evaluation matrix (which was returned to LANL at the end of the meeting), an EPA guide to calculating cost estimates, and a conceptual model of tritium transport. The following discussion ensued.

- Q: Who is Paul Davis (who met with Zane)? A: His role as a consultant on the LANL ER project was explained.
- Q: What happens if there are new evaluation criteria for the CMS report in the new LANL permit? A: If new criteria are required by NMED, LANL will address them.
- Q: What is the role of the focus group and the audience of its report? A: The focus group is requested to recommend one or more preferred alternatives based on information given at the focus group meetings, a review of the report provided

by the independent peer review, and the group's review of the CMS report. Bruce Poster will write up the position of the group, which will go to DOE/LANL and NMED. Minority opinions will be included in the report.

- Joni Arends handed out two newspaper articles on a new LANL study on groundwater movement under the Rio Grande and suggested the need for additional modeling of groundwater travel times from MDA H.
- It was stated that LANL lacks information on water quality impacts on wells in Espanola and the Pueblos.
- John Hopkins will update the tritium and VOC monitoring data and provide EPA/NMED standards for VOCs in groundwater and tritium in air.
- Q: What is the status of the CAB recommendation on the investigation of high explosives at MDA H? A: LANL has acted on the recommendation and submitted a core-protected sample from the 60-ft depth level in an MDA H borehole to an offsite analytical laboratory for high explosive analysis.
- Q: What is the status of meeting with the Pueblos? A: LANL is trying to get on the agenda for the annual meeting of the Eight Northern Indian Pueblo Council.
- Zane asked that we distribute his paper on the “Fundamental Concepts of Ground-Water Recharge,” which also includes a reference to an article in the December 2001 *GSA Today* regarding groundwater transport.

### **Peer Reviewer**

- The group was asked to recommend a first and second choice for an independent peer reviewer to review the MDA H CMS report.
- John Hopkins described the persons already involved in the DOE peer review, so that the group could get a sense of the expertise already brought to bear.
- There was discussion of the need for two independent peer reviewers, rather than one. Most of the group felt that one reviewer was sufficient for the MDA H site and that the additional costs of a second reviewer and responding to that reviewer's comments were not warranted; however, any individuals may petition DOE or the CAB to fund a second reviewer.
- The group discussed the qualities important in an independent reviewer and came up with this list:
  1. A nitpicker
  2. A person who looks for what is not addressed in the report
  3. Practical related experience
  4. Good personal experience as more important than associations

5. Expertise in geotechnical engineering, hydrogeology, geochemistry, risk assessment, cultural impacts, modeling, and materials transport
  6. Impartiality
- Neil indicated that San Ildefonso Pueblo would assess cultural impacts on its own.
  - The top three candidates were Peterson, Rice, and Franke, each of whom was discussed.
  - Each member of the group voted for his/her two favorites, with Rice and Franke tying for the most votes.
  - The group recommended that John Hopkins contract with either Rice or Franke.

### **Next Meeting**

- The group agreed to meet on June 4, 2002 (tentatively) at the same location from 3:30 to 6:30 p.m.
- The group will receive several mailings, including the results of the independent peer review, prior to that meeting.
- The group is expected to provide a final recommendation(s) to LANL on the preferred alternative and recommendations for long-term monitoring or stewardship requirements at that time.

## **NOTES FROM MDA H FOCUS GROUP #5**

Six people attended the fifth focus group meeting for MDA H at the Cities of Gold Hotel in Pojoaque on June 24, 2003, from 3:00 to 6:00. The attendees are listed below:

- Adele Hopkins, Los Alamos League of Women Voters
- Helen Dorado Gray, Office of Senator Bingaman
- Dorothy Hoard, CAB
- John Tauxe, Neptune & Company
- Joni Arends, CCNS
- Neil Weber, San Ildefonso Pueblo

The following invitees were unable to attend:

- Coila Ash, N.M. Toxics Coalition
- Fran Berting, Los Alamos County Council and CAB
- Zane Spiegel, Hydrologist
- Ernesto Rodriguez, State Emergency Management Bureau
- Jay Pecos, Cochiti Pueblo
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Council
- Kevin Holsapple, Los Alamos CDC

Other people in attendance included George Rice (the independent reviewer working for the group), Neelam Dhawan of NMED, and the following LANL staff: John Hopkins, Paul Schumann, Kim Birdsall, Carmen Rodriguez, and Sandra Martinez.

### **Introduction and Handouts**

- Bruce Poster, facilitator, began the meeting with introductions and an overview of the agenda.

### **Review of Focus Group Process and Issues to Date**

- Bruce Poster provided a handout with highlights from the first four focus groups. He reviewed the role of the focus group (to recommend one or more preferred alternatives to NMED and DOE/LANL) and summarized the highlights of the first four meetings.
- Bruce is planning to prepare a report after the next meeting summarizing the recommendations of the group. At the next meeting, there will be discussion as to whether the report is, instead, to be prepared by a subcommittee of the focus group.

## **Update on CMS Report and Next Steps**

- John Hopkins provided a presentation on the status of the MDA H project and covered some of the highlights of the CMS Report. He explained the processes for the review of the report by NMED and an Environmental Assessment (EA, pursuant to NEPA) to be conducted in parallel by DOE.
- Concerns were expressed regarding the timing of the EA (prior to the focus group recommendations), the fact that the review period for the EA would be 21 (rather than 45) days, and that the EA would not be focused on the alternative preferred by NMED. (Under NEPA, the EA must address the full range of alternatives.)
- John was asked to include the annual cost of maintenance and monitoring activities in the report (a range would be OK).
- John was asked to clarify why the amount of plutonium was shown as 25 pounds greater than shown previously in the RFI.
- It was commented that long-term stewardship (LTS) is very important to the focus group. There is concern that DOE's budget has been reduced and that the ball has been dropped elsewhere (e.g. at Weldon Spring, Missouri).
- In response to a question, John stated that the upward biotic intrusion pathway is addressed in the fate and transport model for MDA H.
- Inadvertent human intrusion is not addressed, as it is not required to be addressed.

## **Overview of CMS Report**

- George Rice provided a handout and a slide presentation with an initial overview of the CMS report.
- Included in the presentation are five question areas: fracture flow, the use of partition coefficients (as they apply to complexed contaminants), the estimate of RDX cancer risk, materials not fully identified in the shafts, and the possibility that water is standing at the bottom of the shafts.
- George also suggested another possible corrective measure that is predicated on the possibility of fracture flow. This measure involves the creation of a capillary barrier to reduce groundwater flow.
- George answered a number of questions posed by focus group members.

## **Next Meeting**

- The group agreed to meet on August 20, 2003 at the same location from 3:00 to 6:00 p.m.
- The group will receive several mailings, including the results of the independent peer review, prior to that meeting (no later than August 8<sup>th</sup>).
- The group is expected to provide a final recommendation(s) to LANL on the preferred alternative and recommendations for long-term monitoring or stewardship requirements at that time.

## NOTES FROM MDA H FOCUS GROUP #65

Six people attended the ~~fourth-sixth~~ focus group meeting for MDA H at the Cities of Gold Hotel in Pojoaque on ~~June 24~~August 20, 2003, from 3:00 to 6:00. The attendees are listed below:

- Adele Hopkins, Los Alamos League of Women Voters
- ~~Helen Dorado-Gray, Office of Senator Bingaman~~Zane Spiegel, Hydrologist
- Dorothy Hoard, CAB
- ~~John Tauxe, Neptune & Company~~Coila Ash, Creative Commotion
- Joni Arends, CCNS
- Neil Weber, San Ildefonso Pueblo

The following invitees were unable to attend:

- ~~Coila Ash, N.M. Toxics Coalition~~John Tauxe, Neptune & Company
- Fran Berting, Los Alamos County Council and CAB
- ~~Zane Spiegel, Hydrologist~~Helen Dorado-Gray, Senator Bingaman's Office
- Ernesto Rodriguez, State Emergency Management Bureau
- Jay Pecos, Cochiti Pueblo
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Council
- Kevin Holsapple, Los Alamos CDC

Other people in attendance included George Rice (the independent reviewer working for the group), Neelam Dhawan, Dave Cobrain, and John Young of NMED, and the following LANL staff and consultants: John Hopkins, Paul Davis, Paul Schumann, Kim Birdsall, Carmen Rodriguez, and Sandra Martinez.

### Introduction and Handouts

- Bruce Poster, facilitator, began the meeting with introductions and an overview of the agenda. He provided copies of comments submitted by Joni Arends and Zane Spiegel. He also reminded the group of its role in the public involvement process.

### ~~Review of Focus Group Process and Issues to Date~~

- ~~Bruce Poster provided a handout with highlights from the first four focus groups. He reviewed the role of the focus group (to recommend one or more preferred alternatives to NMED and DOE/LANL) and summarized the highlights of the first four meetings.~~
- ~~Bruce is planning to prepare a report after the next meeting summarizing the recommendations of the group. At the next meeting, there will be~~

~~discussion as to whether the report is, instead, to be prepared by a subcommittee of the focus group.~~

### ~~Update on CMS Report and Next Steps~~

- ~~•John Hopkins provided a presentation on the status of the MDA H project and covered some of the highlights of the CMS Report. He explained the processes for the review of the report by NMED and an Environmental Assessment (EA, pursuant to NEPA) to be conducted in parallel by DOE.~~
- ~~•Concerns were expressed regarding the timing of the EA (prior to the focus group recommendations), the fact that the review period for the EA would be 21 (rather than 45) days, and that the EA would not be focused on the alternative preferred by NMED. (Under NEPA, the EA must address the full range of alternatives.)~~
- ~~•John was asked to include the annual cost of maintenance and monitoring activities in the report (a range would be OK).~~
- ~~•John was asked to clarify why the amount of plutonium was shown as 25 pounds greater than shown previously in the RFI.~~
- ~~•It was commented that long-term stewardship (LTS) is very important to the focus group. There is concern that DOE's budget has been reduced and that the ball has been dropped elsewhere (e.g. at Weldon Spring, Missouri).~~
- ~~•In response to a question, John stated that the upward biotic intrusion pathway is addressed in the fate and transport model for MDA H.~~
- ~~•Inadvertent human intrusion is not addressed, as it is not required to be addressed.~~

### ~~Overview of CMS Report~~

- ~~•George Rice provided a handout and a slide presentation with an initial overview of the CMS report.~~
- ~~•Included in the presentation are five question areas: fracture flow, the use of partition coefficients (as they apply to complexed contaminants), the estimate of RDX cancer risk, materials not fully identified in the shafts, and the possibility that water is standing at the bottom of the shafts.~~
- ~~•George also suggested another possible corrective measure that is predicated on the possibility of fracture flow. This measure involves the creation of a capillary barrier to reduce groundwater flow.~~

- George answered a number of questions posed by focus group members.

### Presentation and Comments

- George Rice made a presentation regarding his findings as to the adequacy of the CMS report and the acceptability of the alternatives. (The report on his evaluation, dated August 7, 2003, was previously distributed to the focus group.) George continues to have questions about the potential impact of fracture flow and the need for mitigation by a lateral barrier under the LANL-recommended alternative.
- John Hopkins offered a short presentation, demonstrating the value of the focus group and independent reviewer in the development of the CMS report and the research that had been done to address fracture flow and other issues raised by Mr. Rice. He handed out a draft of his comments.
- Joni Arends went over her questions, which John Hopkins will attempt to respond to within two weeks.
- Zane Spiegel questioned LANL's view of fracture flow, especially as it relates to historic climatic data, not only for MDA H, but for other sites as well. Paul Davis acknowledged that fracture flow exists and stated that the issue is the magnitude, continuity, and location of fracture flow. His offer to meet with Zane to resolve differences (as a continuation of earlier discussions) was rebuffed.

### Discussion

- Paul Davis will provide Joni with a copy of the LANL 1998 performance assessment.
- Paul Davis will write up the comments that he provided.
- Adele was concerned about attrition in the membership of the group (at least four members had conflicts that prevented them from attending).
- Dorothy was concerned that the wrong people were participating in the technical discussion of fracture flow. She thought that the focus group should focus on policy rather than on technical details.
- Coila questioned the value of the focus group in the decision process, although found it a valuable educational experience, even without a technical background.
- Neelam said that the focus group recommendations should have come out before the CMS report was submitted.
- John said that it was unfortunate that that did not occur, due to timing issues.

- Joni expressed concern that DOE's EA is being developed without input from the focus group and would like Elizabeth Withers to attend a focus group meeting.
- Neil would like to focus on long-term stewardship.
- Adele felt that it is often better to make a decision with imperfect data than to delay indefinitely. With monitoring, the action can be improved over time, as needed.
- John said that the focus group could be reconvened during the design phase to receive input on mitigation measures.
- Dorothy stated that a broader context than just MDA H is needed, as other sites will be more problematic and costly to remedy. There was then discussion regarding DOE's responsibility to mitigate properly and the costs to society of mitigation.
- Zane indicated that, as he had put his concerns in writing, his contribution was coming to an end.
- Joni would like to see the public participation process streamlined so it does not drag out over two years.
- John suggested that some of the sites could be studied together, perhaps with a focus group for each mesa.
- Coila would like to address the focus group process and long-term stewardship in the next focus group.
- Neil said it has been a good education process.
- Adele stated that it is going to be hard to reach consensus.
- Dorothy indicated a concern that a monitoring well could become a pathway. George assured her that, with proper design, that would not occur.
- At Dorothy's request, all participants expressed their views on the preferred alternative. There were a range of positions, with several members saying they still needed more information.
- The group would like an opportunity to share their ideas on long-term stewardship and the focus group process prior to the next meeting.
- The group agreed that the facilitator would draft a report on their recommendations, which they would all review and comment on.

- Joni and George would like more information on fracture flow.

### **Next Meeting**

- The group agreed to meet one final time on ~~August 20~~October 8, 2003 at the same location from 3:00 to 6:00 p.m.
- The group will receive several mailings, ~~including the results of the independent peer review,~~ prior to that meeting and have an opportunity to distribute their views on long-term stewardship and the focus group process.  
~~(no later than August 8<sup>th</sup>).~~
- The group ~~is expected to provide~~will attempt to reach a consensus on 1) the final recommendation of a preferred alternative(s) to LANL on the preferred alternative and NMED, 2) -and- recommendations for long-term monitoring or stewardship requirements at that time, and 3) how the focus group process could be improved.

## NOTES FROM MDA H FOCUS GROUP #75

Five people attended the ~~fourth~~<sup>seventh</sup> and final focus group meeting for MDA H at the Cities of Gold Hotel in Pojoaque on ~~June 24~~ October 8, 2003, from 3:00 to 6:00. The attendees are listed below:

- Adele Hopkins, Los Alamos League of Women Voters
- Dorothy Hoard, CAB
- Joni Arends, CCNS
- Neil Weber, San Ildefonso Pueblo
- [John Tauxe, Neptune & Company](#)

The following invitees were unable to attend:

~~Coila Ash, N.M. Toxics Coalition~~

- Fran Berting, Los Alamos County Council and CAB
- ~~Zane Spiegel, Hydrologist~~[Helen Dorado-Gray, Senator Bingaman's Office](#)
- Ernesto Rodriguez, State Emergency Management Bureau
- Jay Pecos, Cochiti Pueblo
- Daniel Moya, Pojoaque Pueblo
- Diane Albert, Los Alamos County Council
- Kevin Holsapple, Los Alamos CDC
- ~~Helen Dorado-Gray, Office of Senator Bingaman~~[Zane Spiegel, Hydrologist](#)
- ~~John Tauxe, Neptune & Company~~[Coila Ash, Creative Commotion](#)

Other people in attendance included the following LANL staff: John Hopkins, [Paula Bertino](#), Paul Schumann, Kim Birdsall, and Sandra Martinez.

### Introduction and Handouts

Bruce Poster, facilitator, began the meeting with introductions and an overview of the agenda. [He provided copies of comments submitted by](#) John Tauxe, an evaluation form for the focus group, and a LANL document addressing concerns about potential fracture flow. [He also reminded the group of its role in the public involvement process](#) and discussed what it is to reach a consensus (all parties have been heard and can live with the outcome). He clarified remarks that were attributed to Dorothy Hoard in the notes for the sixth focus group and revised those notes accordingly.

### ~~Review of Focus Group Process and Issues to Date~~

~~—Bruce Poster provided a handout with highlights from the first four focus groups. He reviewed the role of the focus group (to recommend one or more preferred alternatives to NMED and DOE/LANL) and summarized the highlights of the first four meetings.~~

~~—Bruce is planning to prepare a report after the next meeting summarizing the recommendations of the group. At the next meeting, there will be discussion as to whether the report is, instead, to be prepared by a subcommittee of the focus group.~~

#### ~~Update on CMS Report and Next Steps~~

~~—John Hopkins provided a presentation on the status of the MDA H project and covered some of the highlights of the CMS Report. He explained the processes for the review of the report by NMED and an Environmental Assessment (EA, pursuant to NEPA) to be conducted in parallel by DOE.~~

~~—Concerns were expressed regarding the timing of the EA (prior to the focus group recommendations), the fact that the review period for the EA would be 21 (rather than 45) days, and that the EA would not be focused on the alternative preferred by NMED. (Under NEPA, the EA must address the full range of alternatives.)~~

~~—John was asked to include the annual cost of maintenance and monitoring activities in the report (a range would be OK).~~

~~—John was asked to clarify why the amount of plutonium was shown as 25 pounds greater than shown previously in the RFI.~~

~~—It was commented that long-term stewardship (LTS) is very important to the focus group. There is concern that DOE's budget has been reduced and that the ball has been dropped elsewhere (e.g. at Weldon Spring, Missouri).~~

~~—In response to a question, John stated that the upward biotic intrusion pathway is addressed in the fate and transport model for MDA H.~~

~~—Inadvertent human intrusion is not addressed, as it is not required to be addressed.~~

#### ~~Overview of CMS Report~~

~~—George Rice provided a handout and a slide presentation with an initial overview of the CMS report.~~

~~—Included in the presentation are five question areas: fracture flow, the use of partition coefficients (as they apply to complexed contaminants), the estimate of RDX cancer risk, materials not fully identified in the shafts, and the possibility that water is standing at the bottom of the shafts.~~

~~—George also suggested another possible corrective measure that is predicated on the possibility of fracture flow. This measure involves the creation of a capillary barrier to reduce groundwater flow.~~

~~—George answered a number of questions posed by focus group members.~~

## **Schedule Fracture Flow Meeting**

A special meeting will be held to discuss technical issues surrounding fracture flow on November 10<sup>th</sup> at LANL, a time that is convenient to George Rice, the independent reviewer. Anyone wishing to attend is encouraged to read the paper “Addressing Concerns about Potential Fracture Flow at MDA-H,” submitted by John Hopkins, prior to the meeting.

## **Consensus Recommendations Regarding the Preferred Alternative and Long-Term Stewardship**

John Tauxe discussed issues covered in his paper “Thoughts on the Selection by the MDA H Focus Group of the Preferred Alternative for Remediation of MDA H.” This generated considerable discussion. Some of the issues addressed included:

- The time frame for evaluation (1,000 years or longer)
- Whether to recommend a final solution or an interim solution (subject to improved technology in the future)
- Whether to address the larger LANL context in making a recommendation (since MDA H is not the most contaminated site and there will be other remediation efforts)
- Concerns about DOE’s commitment to long-term stewardship
- The need for independent monitoring
- Whether it is better to concentrate the materials in a smaller footprint
- The risks associated with removal
- Whether it is better to make it easier to remove the materials in the future rather than further encapsulate them

In the end, the following consensus was reached by all but one participant concerning the preferred alternative and by all participants concerning long-term stewardship:

1. The focus group (with one dissent) supports the selection of the corrective measure alternative recommended by LANL, Alternative 2, the engineered evapotranspiration cover. (See appendix for dissenting opinions, which support complete removal and off-site storage.)
2. It is essential that DOE provide a secure source of funding for ongoing cleanup and monitoring efforts at MDA H.
3. DOE should fund the independent monitoring of the MDA H site (in such a way as to minimize duplication of efforts with any monitoring by DOE), including the development of an independent plan for monitoring the site.
4. There should be a full performance review every five years, to include an evaluation as to whether the availability of any new technology should lead to any additional corrective measures.

5. There should be adequate public notice of all performance review activities and findings, including to all parties of record (at a level comparable to that pursuant to CERCLA requirements).
6. No action should be taken that would preclude or significantly complicate possible excavation of the site.

### **Evaluation of Focus Group Process**

Participants were asked to comment on the focus group process, in addition to filling out the evaluation forms. The following comments were made:

- The general public has not been represented in the process.
- Interest has waned due to the length of the process.
- The issue of an independent reviewer will likely come up again in other focus groups; the group needs to choose its own reviewer, as it did in this process.
- There should be a team of independent reviewers, not just one.
- There were questions about the cost of the focus group process.
- The introduction of tangential issues into the discussion delayed the process.
- The participants gained considerable information, which they have a responsibility to share with others.
- The process is demanding of time; participants need to know up front exactly what they are getting into.

### **Next Steps**

- Bruce will write up notes from the focus group and prepare a final report on the process and outcome.
- Participants will have an opportunity to review and comment on that report, before it is submitted to NMED and LANL/DOE.
- Joni will write up a dissenting opinion and get it to Bruce within two weeks.
- All focus group participants will be asked to submit evaluation forms on the process.

- The fracture flow meeting will be held on November 10<sup>th</sup>, for anyone who is interested.

## NOTES FROM FRACTURE FLOW MEETING OF 11/10/03

Participants included John Hopkins, Paul Davis, Kay Birdsell, Phillip Stauffer, Brent Newman, Becky Coel-Roback, and Paul Schumann of LANL; Neelam Dhawan, John Young, and Dave Cobrain of NMED; John Tauxe, Dorothy Hoard, and Joni Arends of the MDA H focus group; George Rice, independent peer reviewer; and Bruce Poster, focus group moderator.

John Hopkins discussed the reasons for the meeting and that it would be videotaped to provide a record for DOE. Joni raised a concern about the videotaping. There were introductions. Handouts were provided from Kay and Zane Spiegel. It was agreed that additional written comments will be accepted after the meeting.

Paul Davis made a presentation using PowerPoint. The purpose of the meeting is to review and justify assumptions and parameters re fracture flow and to question these. LANL has committed to reassessing MDA H performance in the light of new assumptions and/or parameters defined by stakeholders.

Initial questions were raised about the safety of the waste (if left in the ground) under any circumstances and the 1,000-year timeframe. Paul D said that the DOE order would allow a longer timeframe. There may also be a need for new data collection if it could change the analysis.

Kay then discussed the assumptions/parameters that were used. These include evidence of fracture flow in the upper zone, e.g. under ponding conditions in the fractured basalt, with ponding in welded tuffs, and in long-term uncontainerized liquid disposal sites. Some regimes are instead dominated by matrix flow. The modeling strategy was discussed.

George summarized his comments. He is not convinced that fracture flow is not significant. The spatial distribution of chlorine-36 in the tuff could be used to constrain infiltration history; and alternate conceptual models could be used. Fracture flow could occur episodically after heavy runoff. LANL is willing to model these episodes.

LANL agreed to consider uncertainty as much as possible through sensitivity testing and to show the degree of uncertainty in the final analysis. The depth of the cover is also a variable to include in the analysis. Assumptions about institutional control (and failures therein) should also be varied.

Assumptions 3 and 4 (from Kay's handout) were accepted as conservative and appropriate for future modeling. In future modeling with uncertainty, however, realistic assumptions and distributions for parameter values should be used in place of conservative ones, where practicable.

Some amount of fracture flow should be incorporated into the model: 1) See MDA G and 2) determine how many fractures would be required to impact the results. Try another model in the vadose zone, if that would matter.

Stakeholders were encouraged to agree on some assumptions for LANL to use. LANL will develop a straw man. This will be shared with stakeholders for comment; the videotape will also be made available.

If the results change a lot after the additional analysis, it could then be necessary to re-involve the focus group and amend the CMS.

## COMMENTS RECEIVED

### **Thoughts on the Selection by the MDA H Focus Group of the Preferred Alternative for Remediation of MDA H John Tauxe, October 7, 2003, revised January 10, 2004**

In its Corrective Measures Study (CMS) for Material Disposal Area (MDA) H, Los Alamos National Laboratory (LANL) has developed a variety of alternative measures intended to remediate the site to varying degrees. The alternatives cover the range from nearly no action (a regrading of the cover) to extreme action (complete removal of buried materials to some location off site). The Focus Group is tasked with selecting from one of the proposed alternatives.

I believe that LANL has done an adequate job of discussing the relative technical benefits of the various alternatives, so I will not rehash that here. Rather, I would like to bring up points that are not addressed in the CMS that may aid in the decision. I do not intend to present conclusions, but simply introduce points for discussion, in no particular order.

#### **1. Is the selection of the alternative to be made on solely technical grounds?**

Typical of most such reports, the LANL MDA H CMS focused on technical aspects of the problem. In selecting a preferred alternative, the technical is moderated by the economical. But social issues, such as the ancestral claim to the land by San Ildefonso Pueblo, are not addressed. Other facets of the problem involve politics, religion, ethics, environmental justice, and intergenerational justice.

#### **2. Why are we concerned with a 1000-year time horizon?**

The CMS also restricts its scope to the regulatory compliance obligations of, for example, an analysis for 1000 years into the future. We, on the other hand, are at liberty to question whether the 1000-y time frame is relevant outside a regulatory context. Perhaps we should be thinking in terms of “forevermore”. If we do, then we must face the inevitable conclusion that this waste, indeed all of Pajarito Plateau, is on its way to the Gulf of Mexico via the Rio Grande. It’s only a matter of time. Does it matter if it happens in a million years as opposed to a thousand?

#### **3. How do we make things OK with San Ildefonso?**

Given their claim to the land, and their stated desire that the land be returned to its former state, what can be done? Clearly, the land cannot be returned to its former state, since the tuff has been excavated and there is no undoing that and many other actions. It could conceivably be returned to a state that looks very much like its former state, however, and indeed all the sources of contamination could be removed, albeit at enormous expense. Contamination that has escaped into the mesa tuff, however, simply cannot be retrieved.

Nevertheless, even if the entire site (and all the other MDAs and even all LANL facilities and the town site) were removed, where shall it go? The contaminated material would have to go to some other disposal facility, and I strongly expect that all such facilities are located on land which is claimed by other Indian Nations. Without tacitly validating the contamination of other Native lands, where is it fair to dispose of this material?

#### **4. Perhaps the largest question to be answered is, “Does the material in MDA H go or stay?”**

This issue has been labeled by DOE as “long-term stewardship”, but I’d like to stay away from that catch phrase and all its baggage. Let’s consider the alternatives: If the waste stays in place, we have a reasonable range of alternatives outlined in the CMS report. These have been subjected to a cost/benefit analysis, though it is necessarily incomplete because the long-term performance of the proposed engineered barriers and their newly-developed materials cannot be known.

If the site is to be excavated, we have two possibilities for final disposition of the materials: on site and off site. On site would probably mean MDA G, which is certainly no better than MDA H, or some new facility, which also would be no better without some engineered barriers. Any waste left on Pajarito Plateau is ultimately destined for exposure and transport to the Gulf. If the waste is to be shipped off site, where would it go? Is it fair to put it in someone else’s “backyard”? What if potential exposures to future people are minimized? Either way (on site or off site) the site of ultimate disposition should be determined before the alternative can be said to have been fully addressed.

#### **5. Fracture flow in the Bandelier Tuff (BT) is a continuing issue.**

The CMS claims that fracture flow is negligible, and in fact gives no credit to attenuation of vadose zone flow by the basalts and conglomerates underlying the BT. What is still in question is the BT itself. Perhaps LANL hydrogeologists should pay more attention to the lessons learned by surprises in the field. At Yucca Mountain, researchers were surprised by the rapid travel time of water from the mountain top to the repository level. They had predicted much longer times than a mere 50 years. At LANL’s MDA P and the 260 Outfall, local hydrologists had predicted long breakthrough times for explosives to migrate to drinking water wells, and were surprised by detection already occurring. Other examples abound, and hydrogeologists (and I am one myself) are repeatedly forced to admit that the science is inadequate to predict contaminant transport. Rather than sticking to a story that has little technical merit, LANL should acknowledge the fact that their models may be in gross error, and that we may all be surprised one day.

Both George Rice and Zane Spiegel, accomplished practitioners in their fields, agree that the fracture flow problem is inadequately understood. Other practitioners, including LANL scientists, will readily admit this as well. Throughout the field of hydrogeology, fracture flow is still recognized as essentially not modelable.

But what of this changes our selection of an alternative? Any hydrogeologist knows that contamination will reach the groundwater eventually – it's only a matter of when. Again we come back to the 1000 years: Does some unknown chance that contaminants will reach the groundwater in less than 1000 years make a difference? If we recognize that contamination of the groundwater is inevitable, even if we do not know when, does this mean that the source must be removed from Pajarito Plateau? Wherever it is moved to, a new site will be contaminated. Are there sites that could accept this waste that are better suited for disposal than this one?

**6. Consider that MDA H is less of a potential problem than other LANL waste disposal areas**, such as neighboring MDA G, or MDA B on DP road, or MDA C. We are not tasked with considering the context of the entire LANL land grant, but we should also not be ignorant of it. The future risk posed by MDA H is small when compared to that of these other sites, which have more poorly known inventories and generally present wastes much closer to the ground surface than at MDA H.

**7. A final thought is that we, the citizens of New Mexico, the United States, and local Pueblos, are the long-term owners of this land.** LANL is a tenant on the land, and ought to be held responsible for its actions and the condition of the land. The decision is ours, not LANL's. LANL, supported by our taxes, should be responsive to our wishes, and exists only at the pleasure of the government. LANL is working for us. We are in the position to guide LANL in its activities. Let's make the best of it.

**Additional thoughts from John Tauxe (after final focus group meeting), October 9, 2003, revised January 10, 2004**

I also wish to clarify my thoughts regarding the desired remediation alternative:

I settled on LANL's alternative 2, the engineered and instrumented cap, augmented by periodic review, independent monitoring, and a financial guarantee that monitoring will continue. The possibility of excavating it in the future must also be maintained.

But I am ambivalent. The problem is that I really don't believe that the site will be monitored appropriately, based on experience with other DOE sites. I was willing to let it remain where it is only because there are larger problems (other MDAs that pose greater risks) competing for the same money.

If we are truly to consider MDA H in isolation, knowing nothing about other MDAs, then I would select the excavation alternative with off-site disposal. If MDA H were LANL's only contamination problem, then I would argue for excavation, sorting and declassifying of all materials in it, recycling and neutralizing appropriately, and disposing of the rest either as RCRA hazardous waste or low-level waste (and perhaps mixed waste), all sent off-site. There are disposal facilities elsewhere that can accept

these wastes and are better suited for disposal than anywhere on Pajarito Plateau.

That said, the reality of LANL's environmental problems is that there are much nastier sites than MDA H to be dealt with. Once MDAs B, C, and G (for example) are cleaned up, then we should revisit sites like MDA H, V, T, U, and AB for further work.

So, I will recommend Alternative 2 as an interim measure (similar to the interim measures taken at MDA AB at TA-49) with the understanding that the site work is not really completed.

### **Further Thoughts of John Tauxe, January 10, 2004**

Confidence in DOE's ability and willingness to maintain institutional control of contaminated sites is undermined by the fact that DOE is self-regulating. Furthermore, DOE's regulations regarding radioactive waste tend to become less restrictive as they are revised. For example, DOE Order 5820.2A (Radioactive Waste Management) required analyses to estimate site performance for 10,000 years into the future, and recommended a default value for the time of DOE's loss of institutional control of 100 years. The Order was replaced by DOE Order 435.1, which requires only 1,000-year estimates, and allows credit to be taken for institutional controls for essentially any length of time. Such "watering down" of DOE's own regulations suggests a lack of commitment to long term management of radioactive waste.

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George summarized his comments. He is not convinced that fracture flow is not significant. Chlorine 36 could be used; and alternate conceptual models could be used. Fracture flow could occur episodically after heavy runoff. LANL is willing to model these episodes.

LANL agreed to consider uncertainty as much as possible through sensitivity testing and to show the degree of uncertainty in the final analysis. The depth of the cover is also a variable to include in the analysis. Assumptions about institutional control (and failures therein) should also be varied.

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Approach for addressing fracture flow concerns at MDA H. The focus group wants LANL to consider a conceptual model that includes fracture flow and transport in the unsaturated zone.

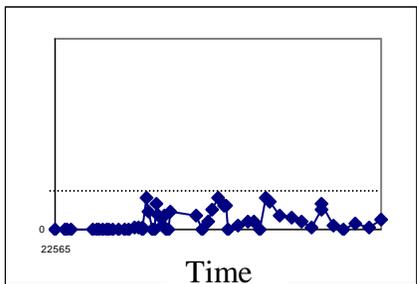
**Approach:**

1. The study will use two one-dimensional columns that represent the stratigraphy at MDA H. One of these columns will be assigned matrix properties; the other will be assigned fracture properties. Both columns will assume fracture properties for the Cerros del Rio Basalt and the Puye Conglomerate at the base of the unsaturated zone.
2. One-dimensional flow and transport calculations will be run with FEHM. Parameter uncertainty will be quantified and propagated using Monte Carlo methods and FEHM. Simulations will assume a 1000-year assessment period.
3. Fracture properties will be based on available property information.
4. An infiltration relationship will be derived between precipitation data and TA-51 moisture data that predicts the initiation of fracture flow based on precipitation event, antecedent moisture, etc.
5. Flow into the fractured column at the upper boundary will occur during those times when the infiltration relationship indicates that it should. When that condition isn't met, the upper boundary will have a flux of zero. Fracture flow will be based on the geometry of the fractures and the relation of that geometry to the geometry of the shafts.
6. Flow into the matrix column at the upper boundary will occur during those times when the infiltration relationship indicates that it should. When that condition isn't met, the upper boundary will have a flux of zero.
7. Hazard index at receptor wells will be calculated.

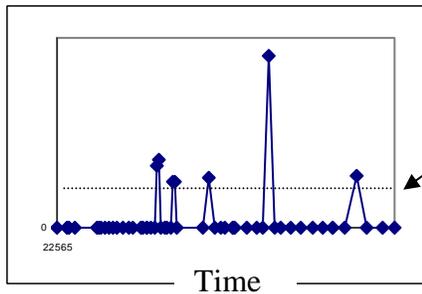
**Input data:**

1. 100-year precipitation record (actual)
2. Other estimates of 100-yr precipitation records (stochastic, previously generated by Everett Springer based on statistics from the actual record) will be used to generate 1000-yr climate records for the simulations.
3. Moisture content data from Mesita del Buey at TA-51; 15 years worth of data along a N-S transect with 11 shallow observation wells; time series shows when tuff wets up (beneath soil layer); some observations of interflow
4. Fracture spacing, aperture, strike/dip
5. Hydrologic properties

Matrix Flow Rate

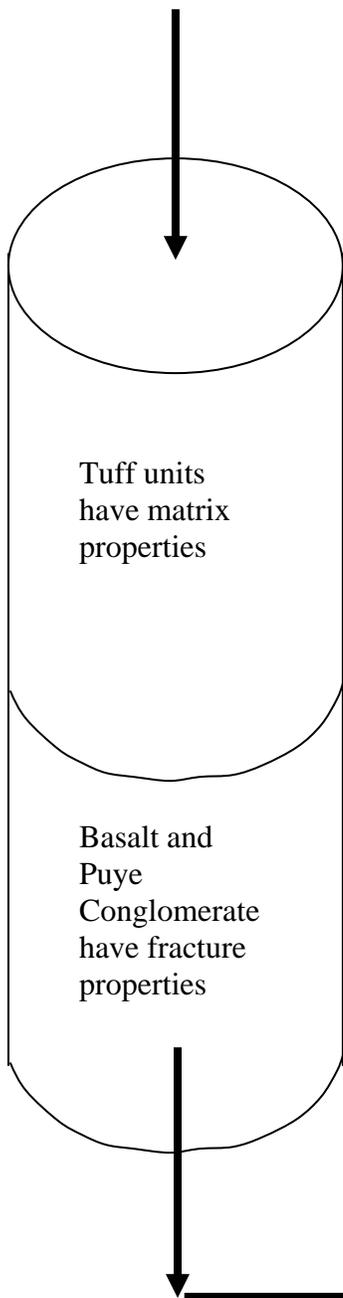


Fracture Flow Rate



Fracture Flow Trigger Value

1-D Matrix Column – Represents all shafts plus underlying geologic column



1-D Fracture Column - Represents fractures that intersect all shafts plus fractures in underlying geologic column



All units have fracture properties based on observations

Compute HI, ICR or dose



To: MDA H Focus Group  
From: Joni Arends, Concerned Citizens for Nuclear Safety  
Date: January 12, 2004  
Re: CCNS Dissenting Opinion to Recommendation Reached at the  
October 8, 2003 MDA H Focus Group Meeting

Please find below the dissenting opinion of Concerned Citizens for Nuclear Safety (CCNS) to the recommendation of corrective measure Alternative 2 (engineered ET cover) made at the October 8, 2003 meeting of the MDA H Focus Group.

CCNS requests that the MDA H Focus Group add the following to its recommendation: A provisions should be included in the contingency plan that if conditions change, a mandatory review of the chosen remedy must be done by LANL within ninety (90) days of the finding of changed conditions.

CCNS requests that the following changes be made to the December 2003 Draft Final Report on MDA H Focus Group Process:

1. The CAB should be listed as the Northern New Mexico Citizens Advisory Board.
2. There are two dissenting opinions, CCNS and Zane Spiegel. The final report should note that and give a reference to the dissenting opinions at the back of the report within the Executive Summary (p. 1) and Recommendations (p. 11).
3. We question why a response was given to the concern found in the sixth bullet on p. 7 concerning the effort of the Focus Group being a PR ploy. No response was given for the other concerns.
4. Please spell out CCNS's name on p. 14.
5. Please correct the third arithmetic average on p. 15 to read 2.4.
6. With respect to the notes from the Fracture Flow Meeting of 11/10/03, how will those attending the meeting receive the results of the fracture flow modeling of Chlorine-36, the modeling straw man and a copy of the videotape of the meeting?
7. CCNS believes that George Rice's primary question areas have been mischaracterized in the seventh bullet of the Executive Summary. CCNS suggests the following language as a substitute:

In his draft and final reports, George Rice raised the following issues:

1. The lack of groundwater quality data at MDA H.
2. The lack of a determination about the full extent of the vapor-phase contaminant (tritium and volatile organic compounds (VOCs) plumes; has the plume reached the regional aquifer?
3. LANL's assumption that fracture flow was insignificant; the data is ambiguous and should be more fully evaluated.

4. At an infiltration rate of 10 mm/year, “the predicted concentration of RDX was above the EPA drinking water guidance.” “Evaluation of Corrective Measures Study Report for MDA H, SWMU 54-004, at TA-54,” August 7, 2003, p. 2.

5. There is provision in the preliminary contingency plan for reconsideration of the corrective measure if the water volume increases above predetermined levels.

6. “The proposed monitoring plan is not likely to detect episodic fracture flow through the vadose zone.” Id.

7. “The recommended corrective measure alternative does not include features to minimize or prevent the transport of contaminants from the waste shafts by water flowing through fractures. Id., p. 3.

Because of the uncertainties associated with MDA H, including

- \* an inadequate inventory of MDA H
- \* a lack of information about groundwater quality at MDA H
- \* predicted concentrations of RDX exceeding Environment Protection Agency (EPA) drinking water guidelines at MDA H
- \* a lack of analysis of fracture flow, lateral flow, convergent flow and matrix flow in the vicinity of MDA H
- \* a lack of analysis of episodic fracture flow through the vadose zone at MDA H,
- \* a lack of information about the extent of the vapor-phase contaminant plumes, and
- \* the failure of institutional controls at other Department of Energy (DOE) sites,

CCNS believes that in order to protect the groundwater, the waste emplaced at MDA H should be removed from the ground and recycle those materials that can be recycled. We believe that the following issues remain outstanding:

**1. DOE Institutional Controls - Long-term Stewardship, Environmental Covenants, Risk-Based End States.** CCNS is concerned about the reliance on DOE/LANL institutional controls for long-term oversight of MDA H. Such reliance has already failed at other DOE sites, e.g., Weldon Springs in Missouri and Oak Ridge in Tennessee. Public health and environment protection are suffering as a result.

CCNS is very concerned about DOE’s new proposal for “risk-based end states” (RBES), which is an inadequate approach to cleanup of contaminated air, soil and water. DOE/LANL is very concerned about spending resources on environmental issues unless there is a “regulatory driver.” As far as we have been able to determine, there is no regulatory driver for RBES, other than DOE’s self-regulatory process, through a DOE Order.

There is too much uncertainty regarding DOE’s long-term oversight of its mess at LANL. The public cannot rely on DOE’s institutional controls; we must demand that

DOE/LANL cleanup their mess on the Pajarito Plateau now. There is no reasonable excuse for them not to.

**2. Fracture Flow and Contaminant Travel Times.** George Rice, groundwater hydrologist, raised the fracture flow issue in his August 7, 2003 report, which report was prepared for the MDA H Focus Group. *Id.*, p. 16. LANL concluded in the MDA H Corrective Measures Study (CMS) that fracture flow is not significant. However, Rice reported, "this conclusion is not strongly supported by available information. Some of the information is ambiguous, and some appears to contradict this conclusion." *Id.*

CCNS remains concerned about the lack of information about contaminant travel times through Mesita del Buey.

CCNS believes that fracture flow at MDA H remains an outstanding issue that must be resolved before a technically based recommendation can be made.

**3. Episodic Fracture Flow through the Vadose Zone.** CCNS believes that episodic fracture flow through the vadose zone remains an outstanding issue that must be resolved before a technically based recommendation can be made.

**4. Lateral Flow, Convergent Flow and Matrix Flow.** CCNS believes that lateral flow, convergent flow and matrix flow remain outstanding issues that must be resolved before a technically based recommendation can be made

**5. Groundwater Quality at MDA H.** There is no information about groundwater quality at MDA H. The nearest down-gradient Mesita del Buey monitoring well is approximately two miles east of MDA H. CCNS believes that information about MDA H groundwater quality must be made available before a technically based recommendation can be made.

**6. Vapor-Phase Contaminant Plumes.** Tritium and volatile organic compounds (VOCs), including benzene, toluene and trichloroethene, have been found in samples taken from the MDA H shafts. The plumes are known to extend 100 feet from the waste shafts and to a depth of 250 feet. CCNS requested information from LANL as to whether the vapor-phase plumes have reached the regional aquifer in our August 2, 2003 memo to the MDA H Focus Group. LANL responded that it "will provide this information when the monitoring results are available for regional wells R-20, R-21 and R-32." "Response to CCNS Questions on the MDA H Corrective Measures Study Report," LA-UR-03-6687, September 2003, ER2003-0589, p. 1. CCNS awaits the data.

**7. RDX Predicted Concentrations.** CCNS remains concerned that the RDX concentrations are predicted to exceed Environmental Protection Agency drinking water guidelines at MDA H. In our August 20, 2003 memo, CCNS requested

information about mitigation measures that LANL will take to prevent RDX migration. CCNS awaits the opportunity to reviewing the modeling straw man.

January 16, 2004

Mr. John Young  
New Mexico Environment Department  
Hazardous Waste Bureau  
2905 Rodeo Park Drive East  
Santa Fe, NM 87505

Dear Mr. Young:

As you know LANL and DOE created a focus group to provide input regarding the MDA H CMS. That group met seven times and developed recommendations that were agreed to by all but one of the participants at the final meeting. In all, there were two dissents. (Those dissents and other comments are documented in the Draft Final Report on the MDA H Focus Group Process, which was previously sent to Neelam Dhawan at your office.) We will shortly send you a copy of the final report.

As the facilitator of the focus group, I have been asked to inform you of the consensus position of the focus group, which is summarized below.

1. The focus group (with one dissent at the final meeting and one subsequent dissent) supports the selection of the corrective measure alternative recommended by LANL, Alternative 2, the engineered evapotranspiration cover.
2. It is essential that DOE provide a secure source of funding for ongoing cleanup and monitoring efforts at MDA H.
3. DOE should fund the independent monitoring of the MDA H site (in such a way as to minimize duplication of efforts with any monitoring by DOE), including the development of an independent plan for monitoring the site.
4. There should be a full performance review every five years, to include an evaluation as to whether the availability of any new technology should lead to any additional corrective measures.
5. There should be adequate public notice of all performance review activities and findings, including to all parties of record (at a level comparable to that pursuant to CERCLA requirements).
6. No action should be taken that would preclude or significantly complicate possible excavation of the site.

Please enter these comments into the public record regarding the MDA H CMS. Thank you.

Yours truly,

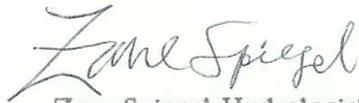
Bruce Poster  
President

RESPONSE BY ZANE SPIEGEL, 031109,  
BASED ON HYDROLOGY RESEARCH PERTINENT TO LANL WASTE PATHWAYS  
FROM 1949 TO PRESENT,  
TO UNDATED LANL FALSE ASSUMPTIONS 3 AND 4, RE MESA RECHARGE

(1) SWPM has not adequately (if at all) distributed to the MDA-H F.G. my clarification of their characterization of my "decline" (to meet with Hopkins and Davis), which was not a refusal. It was a deferral until they had adequately responded in writing to my numerous written documentations of the reasons why some earlier LANL assumptions (summarized in their items 3 and 4 in their recent 2-page "Addressing Concerns..." sent to FG participants) were undeniably false.

To date, I have not received any communication from LANL staff regarding my request for their written evidence and reasoning on these issues, which take into account the written evidence and references which I have supplied to LANL staff during the past three years.

(2) On the basis of the aforementioned assumptions LANL #3 and #4, at this time I can only believe that they must be deliberately adopting these false assumptions to justify pre-determined remediation procedures, as there are vast quantities of data worldwide, and also in NM, which certainly prove that recharge occurs at very low thresholds--or there would not be any perennial springs discharging that recharge--and that wet periods provide most of that recharge, especially in semi-arid and arid zones.



Zane Spiegel, Hydrologist  
POB 8527, Santa Fe NM 87504  
Tel / Fax: 505 994 2520

COMMENTS BY ZANE SPIEGEL, 031128

ON (A) LANL's FAILURE TO RESPOND CONSTRUCTIVELY DURING THE PAST THREE YEARS TO RECENT AND PAST ALLEGATIONS THAT LANL HAS IGNORED ABUNDANT LONG-TERM EVIDENCE OF FALSITY OF THEIR INITIAL AND CONTINUING ASSUMPTION OF LACK OF DEEP INFILTRATION OF PRECIPITATION AT WASTE SITE MDA-H with special reference to LANL's untitled and unpaginated (B) "FRACTURE-FLOW SUMMARY" DENYING MDA-H DEEP INFILTRATION provided to MDA-H Focus Group members and others in November, 2003.

INTRODUCTION TO (A) IN TITLE ABOVE

I was not able to attend the subject Fracture-Flow Model meeting at Los Alamos (November, 2003), due to prior commitments. However, the major issue has remained the same for three years-- LANL's persistent refusal to respond constructively in any way (in both their regional modeling and local studies at MDA-H site) to my written and oral allegations that LANL's work has been grossly deficient because it has neither taken into account nor specifically countered abundant lines of pertinent evidence by several researchers foremost in their respective fields. in readily-available New Mexico, Federal, and Geological Society of America (GSA) reports, most of which were supplied to LANL's Bruce Gallaher or John Hopkins at no cost. These documents are available from the files of the Santa Fe Water Quality Task Force (SFWQTF) and LANL Focus Group on MDA-H Site, and the Santa Fe office of Forest Guardians (copy of all of Spiegel, 1963, "Water Resources of New Mexico", a document prepared for the NM State Engineer Office under a Federal water-planning grant).

SPECIFIC COMMENTS ON (B) IN TITLE ABOVE

To facilitate reference to (B) items, I have made it easier for those "scientists" (who apparently have a limited ability or motivation to facilitate responses by their readers to their first page (of eleven) of the subject document). I will refer to my own numbering of those eleven pages beginning with "1" for the first page, and ending with "11" for the back page, ignoring the blank page following p. "9". This blank page, and other pages as needed, could have been used constructively to show monthly values of precipitation at TA-54 from 1992-2001, or some of the strong evidence presented by Spiegel (1958, 1963). Copies of pertinent hydrographs of the latter were distributed to LANL staff on at least two occasions in the previous three years. They show that most recharge in semi-arid regions of New Mexico occurs in a few wet seasons and years in the historical record of long-term response of deep ground-water levels to monthly precipitation values, beginning in 1929. These hydrographs used data compiled by the late C.V. Theis of the USGS (and principal scientist assigned to AEC oversight in the 1950's and later).

In addition to pagination of document "(B)", the first page has items identified as follows: Rows below the title blocks, numbered in Arabic numerals 1-4; Columns identified by Roman numerals I-IV; Items in Col. II and III identified by Capital Letters beginning anew in each block (e.g., item 1/II/A), item 1/III/A, item 1/IV/A, etc.

Comments on Table on p. 1

ROW/COL/ITEM QUESTIONING (COL III); CONSISTENT ALTERNATIVES (COL IV  
(THE "WHOLE TRUTH")

1/II/A III/A (a) Long-term hydrological data in NM, tree-ring records (from Spiegel, 1963; GSA, 2002, copied by Spiegel, 2002, in records of SFWQTF), showing unequivocal response of well water levels to wet periods and years; (b) LANL data on p. 9 (Fig. 2.1-2 (P vs. PET) "conveniently are "average" values , which (perhaps deliberately?) obscure the "WHOLE TRUTH" shown in the data in the references cited at the beginning of this block comment. IV. Occasional deep recharge to ground water, with local flow by a combination of fracture and matrix flow into, through, and out of uncased underground waste cylinders of MDA-H and similar storage sites. The recharge during such wet periods is obviously, from Theis's historical NM data, most of the long-term recharge, so it is not surprising that it was "convenient" for the authors to limit the scope of their study to local evidence, which, as is well-known, was in a drought period that had only a few, isolated, heavy rains or snowmelt. QUESTIONS for AUTHORS: Would the long-term strong visual evidence, and any statistics which could be prepared from those data, convince any non-blind thinking person that there is something "rotten in Los Alamos" about three years of LANL's consistent failure to reproduce older data in their reports? Does your failure to attempt to refute the evidence with facts (not bald, un-documented "assumptions" disguising deliberate lies) suggest that the LANL assumptions, and failure to respond (in writing or otherwise) to my challenge in the MDA-H Focus Group meeting in September 2003, represent the result of deliberate adoption (or response to an administrative mandate?) of a pre-conceived conclusion of "no problem" ?

1/II/EF 1/III/E, F Most vertical and lateral fractures that do not cross tuff unit boundaries are probably due to cooling stresses within each tuff-unit depositional event, but some vertical fractures are of tectonic origin, and these, connected to cooling joints by lateral fractures, do cross the tuff unit boundaries. The cooling fractures are so numerous, and the vertical ones are connected by so many lateral fractures, that there should be sufficient opportunity for water in one unit to descend into underlying units. In any case, the impeding layers are not impermeable, but leaky. Such transmission and transient storage of water is apparent even within the sequence of the layers of Qbt shown in Figure 2.1-5 (p. 7). Water saturation in unit Qbt1g, at depths of about 150-250 feet, below the leaky impeding layer Qbt1vg, is maintained at values (6-11 percent) significantly higher than in higher strata (about 50-110 feet depth), even during the severe drought period including the year 2001. See comments below re Fig. 2.1-5 (p.7) for amplification of this example of selective data taken out of historical context by LANL "ghosts".

2/II/A 2/III/A "Very dry conditions" is an observation that, to any knowledgeable and/or ethical scientist, would be qualified by the historical context that the short period studied locally was not representative of what the site had experienced in previous decades or is likely to occur in future millenia (see comments below re probable future storm patterns resulting from global warming).

[L-MDA-HfxMtg], continued, p. 3.

2/II/B,C                    2/III/B, C Both model match and chloride data procedures involve many assumptions and subjective judgments of "a good match"--see my review in <[www.environmentalsafeguards.com](http://www.environmentalsafeguards.com)> of some of the ridiculous "good matches" made by Vesselinov and Keating (2002). In any case, the lack of data for very wet periods casts dark shadows on any conclusions that might be made during the mainly dry study period .

2/IV/B, C Asssume that the fracture pattern in the vicinity of MDA-H waste cylinders is sufficiently transmissive laterally to transport the infiltrate that is likely to have occurred in 1941-42 (when the annual precipitation in most of new Mexico was twice the recent average--more than in many dry years in southern "wet" Minnesota)

3/II/C                    3/III/C Wet periods farther east, previously disregarded by LANL, are likely to have ponded conditions, based on long-term personal observations, plus historic data. 3/IV/C Assume ponding or arroyo flow exist in wet periods, subsurface soils under ponded or flow areas are saturated and permit combined matrix and fracture flow.

4/II/A                    4/III/A Exposed and drilled Puye suggest Puye is much more uniform in hydraulic conductivity (nearly isotropic) and has much higher T and K. 4/IV/A Assume very rapid vertical transport through Puye.

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Comments on pages 2-4

All the conclusions on model considerations, assumptions, rock properties, and supporting evidence should be reviewed (and revised as necessary to take into account the foregoing evidence for greater matrix and fracture flow than has been calculated based on a narrow reach of time. This short period and continuing deliberate avoidance by LANL (FOI WHAT REASONS???) fail to represent the long-term climate variations that have already been experienced at MDA-H site, and will be repeated--or even exceeded--in the future, as predicted by the community of scientists who have studied the causes and consequences of global warming ).

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Comments on Figures

Fig. 2.1-5 (p. 7) "Volumetric water content (%) at MDA-H"

See Comment above, re 1/II/E, F; III/E, F. Most of the data were collected on July 31, 2001, the rest on an unspecified date in or prior to 1996, and are not qualified by use of the historical context of the long drought (i.e., showing a graph of daily, or at least monthly, precipitation at one or more nearby stations during the entire period 1996-2001, and preferably extending back to periods that include one or more very wet months, such as 1978-9, 1941-2).

Fig. 2.1-2. (p. 9) "Actual precipitation vs. PET at station TA-54 (1992-2001)".

See Comment above, re 1/II/A; III(b). Add below caption "It is well known in science and politics, that using average values of data, rather than detailed tabulation or graphing, is a useful way of hiding or distorting the truth. We have adopted this "scam" because

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Well-documented hydrologic history should not be ignored to suit preconceived or directed assumptions and conclusions. It is the responsibility of ethical scientists and engineers to report any attempted coercion or mandate from administrators.

The formerly blank page following p. 9 of the reviewed document (B), and/or additional pages could have shown the long-term monthly precipitation and deep groundwater levels since 1929 (from Spiegel, 1963) to simulate what is likely to occur in the future with the present scenario of future precipitation variation caused in large part by rising and warming oceans. All assumptions and conclusions made heretofore are modified to take into account the implications of history and the probable future under conditions of global warming. "

CONCLUSION

The procedures and assumptions in characterizing the hydrologic conditions and probable past, present, and future waste pathways at MDA-H site must represent the truth, so far as it can be determined from all pertinent data, both local and elsewhere, for whatever periods of time are pertinent to the LANL area, not only to guide selection of the best method of waste confinement or alternative management, but also to guide all current and future studies of other waste sites at Los Alamos, and to guide much-needed drastic revision of the LANL geohydrologic model of the Espanola Basin, as described in detail in our review of that model study (see <[www.environmentalsafeguards.com](http://www.environmentalsafeguards.com)>).

*Zane Spiegel*  
6/20/04 05:22