

**STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION**

**IN THE MATTER OF THE APPLICATION OF THE NEW MEXICO OIL  
CONSERVATION DIVISION FOR REPEAL OF EXISTING RULE 50 CONCERNING  
PITS AND BELOW GRADE TANKS AND ADOPTION OF A NEW RULE  
GOVERNING PITS, BELOW GRADE TANKS, CLOSED LOOP SYSTEMS AND  
OTHER ALTERNATIVE METHODS TO THE FOREGOING, AND AMENDING  
OTHER RULES TO MAKE CONFORMING CHANGES, STATEWIDE.**

CASE NO. 14015

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**PRE-HEARING STATEMENT  
of  
The New Mexico Citizens for Clean Air & Water**

NMCCA&W'S REPRESENTATION:

This prehearing statement is submitted by the New Mexico Citizens for Clean Air & Water, Inc. (NMCCA&W), pursuant to Oil Conservation Division Rule 19.15.14.1204(B) NMAC.

NMCCA&W intends to offer technical testimony by Dr. Neeper, and to cross-examine witnesses at the hearing in this matter.

NMCCA&W is represented by Alletta Belin, of Belin & Sugarman, 618 Paseo de Peralta, Santa Fe, New Mexico 87501. In addition, NMCCA&W will also be represented by Dr. Donald Neeper, who has been duly authorized by NMCCA&W to act as the organization's representative in this proceeding. See Exhibit 1 attached hereto. Due to the length of the hearing, it will not be possible for NMCCA&W always to be represented at this hearing by their counsel, Ms. Belin; Dr. Neeper also will probably have to be absent from portions of the hearing. Cross-examination for NMCCA&W may be conducted by either Ms. Belin or Dr. Neeper, depending on the circumstances.

NMCCA&W'S TESTIMONY:

WITNESS

ESTIMATED TIME OF DIRECT TESTIMONY

Donald A. Neeper

3 hours

Dr. Neeper's qualifications are attached hereto as Exhibit 2.

## SYNOPSIS OF TESTIMONY:

### DISPOSAL OF DRILLING WASTES

Donald A. Neeper

This testimony will review portions of the data obtained both by OCD and by the industry when sampling pits prior to closure. Particular attention will be paid to chloride concentrations. The average concentrations of chloride exceed the concentration that can be damaging to biota, and sometimes damaging to the soil structure itself. Data will be presented regarding the salt tolerance of plants, and the effects of salt-induced osmotic pressure.

Testimony will include a description of unsaturated hydrology as it applies to the movement of water and soluble contaminants through the soil. The osmotic pressure of dissolved salt strongly affects plants and subsurface biota, but affects the movement of liquid water very little in soils other than compressed clay. It is therefore expected that salts in buried drilling wastes would not cause preferential retention of water or chemicals. Chemical diffusion is a significant transport mechanism over short distances, tending to distribute dissolved contaminants evenly in the presence of preferential pathways for unsaturated flow. However, transport over distances of several meters is dominated by the flux of liquid water. In general, the effects of dissolved salts on the motion and distribution of liquid water and water vapor are expected to be dominant near ground surface, where evaporation and large temperature gradients occur. However, the physical effects of dissolved salts are expected to have little influence on the transport at depths beneath the expected bottom locations of buried wastes.

Modeling of moisture flow above and beneath a buried waste unit reveals that salts are expected to move downward only a few meters in a century in soils of low-permeability, but will move downward more than 30 meters in more sandy soils. Movement to ground surface is accentuated in less-permeable soils. Because soils in New Mexico are usually dry, moisture in the buried material itself contributes to the transport after burial. General conclusions of the modeling will be compared with surface and subsurface sampling of the chlorides released from closed pits near Caprock, NM and near Loco Hills, NM.

The possibilities of subsurface collapse and liner failure suggest that burial in lined trenches does not guarantee long-term security for wastes. It is the density of buried waste units, more than the possible release from a single unit, that creates a prejudice on future uses of the land.

Testimony will support most sections of the proposed rule. NMCCA&W encourages that the rule provide motivation for treatment of portions of the waste to remove harmful constituents. NMCCA&W prefers that no on-site closure of harmful wastes be allowed. However, if on-site closure is permitted, NMCCA&W suggests the depth to ground water should exceed 100 feet where such closure is allowed, whether by rule or by exception. NMCCA&W will suggest that applications for exceptions to disposal requirements should have full and convenient public notice, with hearing required when objections have technical merit or when public interest is significant.

NMCCA&W'S EXHIBITS:

1. NMCCA&W authorization for Dr. Donald A. Neeper to act as its representative in this proceeding
2. Resume of Dr. Donald A. Neeper
3. Dr. Neeper's Powerpoint presentation (including approximately 85 slides)

Respectfully submitted,



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Attorney for NMCCA&W

**QUALIFICATIONS**

**Donald A. Neeper**  
**(retired, Los Alamos National Laboratory)**  
**(retired, Science and Engineering Associates, Inc.)**  
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**Education**

B.A. (physics) Pomona College, 1958, magna cum laude.  
M.S. (physics) Univ. Wisconsin, 1960.  
Ph.D. (low temperature physics) Univ. of Wisconsin, 1964.  
Academic honors: Phi Beta Kappa; Pi Mu Epsilon; Sigma Xi.

**Relevant experience**

- 25 years experience in thermal engineering at Los Alamos National Laboratory, including supervision of RCRA Facility Investigation of large waste disposal sites containing hazardous and radioactive wastes.
- Six years part-time experience consulting on vapor extraction and soil remediation.
- Continuing research on vapor transport in soils and passive vapor extraction; authored four publications since 2001.
- Three years' service on the governing board of STRONGER, Inc..

**Continuing research**

Transport of volatile organic compounds and other contaminants in the vadose zone.

**Professional experience**

- 2004-07**     Guest scientist, Los Alamos National Laboratory.
- 2003**         Scientist-in-residence, Meadville Theological School, winter quarter.
- 1996-2002**   Senior Scientist, Science & Engineering Associates, Inc.
- 1994-96**     Scientist, ERM, Inc.
- 1968-94**     Staff Member, Group Leader, and Project Leader, Los Alamos National Laboratory.

**AWARDS**    Department of Energy Certificate of Appreciation, 1984.

**PATENTS**   "Ventilation of Porous Media," U.S. Pat. 5,288,169 (Feb. 22, 1994).

**LICENSES**   Commercial pilot; certified flight instructor (expired).

**Professional association**

American Geophysical Union

**Technical publications**

"Unidirectional gas flow in soil porosity resulting from barometric pressure cycles," D. A. Neeper and P. Stauffer, *Journal of Contaminant Hydrology* 78, 281-289, 2005.

"Harmonic Analysis of Flow in Open Boreholes due to Barometric Pressure Cycles," D. A. Neeper, *Journal of Contaminant Hydrology* 60, 135-162 (2003).

"Investigation of the Vadose Zone with Barometric Pressure Cycles," D. A. Neeper, *Journal of Contaminant Hydrology* 54, 59-80 (2002).

"A Model of Oscillatory Transport in Granular Soils, with Application to Barometric Pumping and Earth Tides," D. A. Neeper, *Journal of Contaminant Hydrology* 48, 237-252 (2001).

"Thermal Dynamics of Wallboard with Latent Heat Storage," D. A. Neeper, *Solar Energy* 68, 393-403 (2000).

"The Influence of Topography, Stratigraphy, and Barometric Venting on the Hydrology of Unsaturated Bandelier Tuff," D. A. Neeper and R. H. Gilkeson, in The Jemez Mountains Region: New Mexico Geological Society, Forty-Seventh Annual Field Conference, Sept. 25-28, 1996, F. Goff, ed., pp. 427-432.

"Barometric Pumping with a Twist: VOC Containment and Remediation without Boreholes," W. Lowry, D. Neeper, and S. Dunn, Proc. Industry Partnerships to Deploy Environmental Technology, Morgantown WV, Oct. 22-24, 1996. DOE/CONF-9610231-31.

"Frequency Domain Analysis of Subsurface Barometric Flows," D. A. Neeper and S. P. Limback, EOS, Transact. Amer. Geophys. Union 75 (44, Suppl.) p. 264, 1994. Amer. Geophys. Union 1994 Fall meeting, San Francisco CA, Dec. 5-9, 1994.

"Soil Vapor Extraction Enhanced by Oscillatory Flow," D. A. Neeper, Proc. Fifth National Outdoor Action Conf. on Aquifer Restoration, Ground Water Monitoring, and Geophysical Methods, Las Vegas NV, May 13-16, 1991, pp. 75-88.

"Potential Benefits of Distributed PCM Thermal Storage," D. A. Neeper, Proc. 14th National Solar Conf., Denver CO, June 19-22, 1989, pp.283-288.

"Analytic Model of a Passive Vapor Transport Heating System," D. A. Neeper, *Solar Energy* 41, 91 (1988).

"Efficiency of a Solar Collector with Internal Boiling," D. A. Neeper, *ASHRAE Trans.* 93 part 1, 295 (1987).

"Solar Buildings Research: What Are the Best Directions?" D. A. Neeper, *Passive Solar Journal* 3, 213 (1986).

"Passive Space Heating with a Self-Pumping Vapor System," J. C. Hedstrom and D. A. Neeper, Proc. 11th National Passive Solar Conf., Boulder CO, June 8-11, 1986.

"Passive Vapor Transport Solar Heating Systems," J. C. Hedstrom and D. A. Neeper, Proc. 10th Annual Passive Solar Conference, Raleigh, October 15-20, 1985, p. 231.

"Vapor Phase Heat Transport Systems," J. C. Hedstrom and D. A. Neeper, Los Alamos National Laboratory report LA-10487-MS (September 1985).

"A Self-Pumping Vapor System for Hybrid Space Heating," D. A. Neeper and J. C. Hedstrom, Proc. Congress International Solar Energy Society, Montreal, June 23-29, 1985, p.440.

"Vapor Phase Heat Transport Concepts," D. A. Neeper and J. C. Hedstrom, Proc. Solar Buildings Conference, Washington DC, March 18-20, 1985. DOE/CONF-850388, p. 176 (July 1985).

"Impacts of Research Efforts on New and Existing Buildings," D. A. Neeper, Proc. Solar Buildings Conference, Washington DC, March 18-20, 1985. DOE/CONF-850388, p. 131 (July 1985).

"Potential Performance Benefits of Advanced Concepts and Materials Research," D. A. Neeper, et. al., Proc. Passive and Hybrid Solar Energy Update, Washington DC, Sept. 5-7, 1984. DOE/CONF-8409118, p. 20 (October 1984).

"Diurnal Heat Storage in Direct-gain Passive Solar Buildings," J. D. Balcomb and D. A. Neeper, ASME/AICHE National Heat Transfer Conference, Seattle WA July 21-24, 1983. CONF-830702-15 (1983).

"Some Potential Benefits of Fundamental Research for the Passive Solar Heating and Cooling of Buildings," D. A. Neeper and R. D. McFarland, Los Alamos National Laboratory report LA-9425-MS (August 1982).

"Research and Development of Solar Ponds," D. A. Neeper, Testimony for the U.S. House of Representatives, Committee on Science and Engineering, Subcommittee on Energy Development and Application, Washington DC, March 19, 1980. Published in the transcript of the hearing and as Los Alamos National Laboratory internal document LA-UR-80-1018.

"Analysis of Matrix Air-Heaters," D. A. Neeper, Proc. Congress International Solar Energy Society, Atlanta, May 28, 1979, p. 298.

Various classified reports, D. A. Neeper, Los Alamos National Laboratory, 1970-77.

"Ion Motion and Vortex-Ring Formation in Pure Liquid He<sup>4</sup> and He<sup>3</sup>-He<sup>4</sup> Solutions between 0.05 and 0.5 K," D. A. Neeper and L. Meyer, *Phys. Rev.* 182, 223 (1969).

"Vortex-Ring Formation by Negative Ions in HeII under Pressure," D. A. Neeper, *Phys. Rev. Lett.* 21, 274 (1968).

"Rapid Startup of a He<sup>3</sup>-He<sup>4</sup> Dilution Refrigerator," D. A. Neeper, *Cryogenics* 7, 307 (1967).

"The Kapitza Resistance of Mercury," D. A. Neeper, D. C. Pearce, and R. M. Wasilik, *Phys. Rev.* 156, 764 (1967).

"Negative Magnetoresistance in Tellurium," D. C. Pearce, R. M. Wasilik, and D. A. Neeper, *Proc. IXth Int. Conf. Low Temperature Physics*, Plenum Press, 1965, p. 736.

"Thermal Resistance at Indium-Sapphire Boundaries between 1.1 and 2.1 K," D. A. Neeper and J. R. Dillinger, *Phys. Rev.* 135, A1028 (1964).

"Volume Flow Rate of the HeII Film on Glass," R. W. Selden, D. A. Neeper, and J. R. Dillinger, *Proc. VIIth Int. Conf. Low Temperature Physics*, University of Toronto Press, 1961, p. 525.

**CERTIFICATE OF SERVICE**

I hereby certify that on this 29<sup>th</sup> day of October, 2007, I have caused a copy of this pre-hearing statement in Case 14015 to be delivered to the following persons, by U.S. Mail, by hand delivery, or by electronic means.

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Donald A. Neeper (by #B)

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