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17 August 1995

Mr. Larry Kirkman
Acting Area Manager
Department of Energy
Los Alamos Area Office
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

RE: Comments Concerning Ground-water Contamination and Protection at Los Alamos National Laboratory(LANL), Los Alamos, New Mexico

Dear Mr. Kirkman:

The New Mexico Environment Department (NMED), Department of Energy Oversight Bureau (DOE OB) and Hazardous and Radioactive Material Bureau (HRMB) staff have assessed LANL's ground-water protection program, and have concluded that several problems concerning ground-water contamination and protection exist. The following summarizes major concerns of the NMED in relation to ground-water protection at LANL:

- o From 1989 to 1993, water at approximately 271 ground-water monitoring stations(wells) exceeded Department of Energy, Environmental Protection Agency, New Mexico State drinking water standards or maximum contaminant levels, and NMED Water Quality Control Commission (WQCC) standards.
- o Results of historical tritium concentration trend analyses, performed for seven LANL regional aquifer monitoring wells indicate that past laboratory releases of tritium-contaminated water may have commingled with the regional aquifer.
- o LANL's Environmental Surveillance group recently released preliminary data which indicate that the regional aquifer near production well O-4 contains strontium-90 at levels

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four(4) times the New Mexico State drinking water standard and NMED WQCC standard.

- o Both LANL and NMED DOE OB analytical data obtained from on-site and off-site springs are showing elevated concentrations of chlorinated solvents, high explosives, nitrates/nitrites as nitrogen and radionuclides.

- o Preliminary modeling of the water balance in Mortandad Canyon by NMED suggests radionuclide-bearing effluent from LANL's liquid radioactive waste treatment facility(Tech Area 50) can leak out of the shallow(alluvium) aquifer and thus percolate towards the regional aquifer.

The above conditions warrant NMED's previous recommendations to develop a site-wide ground-water monitoring system to ascertain the impacts of laboratory operations to the groundwater regime. Currently, the impact to human health and the environment is unknown. A plan is required to determine adequately the effect past, current, and future laboratory operations have on the ground-water regime. The inadequacy of LANL's current ground-water monitoring system, the lack of basic hydrologic information, and the lack of compliance with both HSWA and RCRA ground-water monitoring requirements have previously been conveyed by NMED through memoranda, presentations, and letters. (c.f. NMED internal letter, August 26, 1992; NMED letter to Jerry Bellows, November 25, 1992; NMED Initial Ground-Water Assessment Report, December 1992; NMED internal memo, February 5, 1993; NMED presentation at San Ildefonso, February 16, 1993; NMED/LANL meeting February 19, 1993; NMED letter to Diana Webb, March 10, 1993; NMED letter to Diana Webb, July 1, 1993; NMED letter to distribution, August 6, 1993; NMED memo to EPA, August 5, 1993; NMED internal memo, November 23, 1993; NMED letter to Diana Webb, February 28, 1994; NMED internal memo, February 22, 1994; NMED internal presentations, May 13, 1994; NMED letter to Joseph Vozella, July 7, 1994; NMED letter to EPA, January 23, 1995; NMED letter to EPA, January 24, 1995; NMED/DOE meeting, April 13, 1995; NMED letter to Larry Kirkman, May 30, 1995; NMED internal memo, July 5, 1995).

Basic geology, hydrogeology, and pathways for contaminant transport have not been adequately addressed to date. At present, the following fundamental hydrogeologic issues/questions remain unresolved at LANL.

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- o Individual zones of saturation beneath LANL have not been adequately delineated, and the "hydraulic interconnection" between these is not understood. A facility-wide description of the hydrogeologic characteristics affecting ground-water flow beneath the facility cannot be made without adequate delineation of the perched-intermediate aquifer(s) beneath LANL.
- o The recharge area(s) for the main and perched-intermediate aquifers have not been identified. It is unknown at this time if any significant quantity of water is recharging the main aquifer through fracture-fault zones which occur on the Pajarito Plateau. Characterization of these site-wide fault zones as potential pathways for aqueous migration is not complete. It is unknown what effect, if any, these zones may have on the direction of ground-water flow and hydraulic gradient of the main and perched-intermediate aquifers.
- o The ground-water flow direction(s) of the main aquifer and perched-intermediate aquifer(s), as influenced by pumping of production wells are unknown.
- o Aquifer characteristics cannot be determined without additional monitoring wells installed within specific intervals of the various aquifers beneath the facility. Locations of wells designed for aquifer testing cannot be addressed adequately without the delineation of individual zones of saturation beneath LANL.

At present, it appears that several different organizations (i.e., Environmental Restoration, Environmental Surveillance and Earth and Environmental Science divisions) at LANL are performing activities related to ground-water protection, monitoring and characterization. NMED does not consider that LANL's individual programs are adequately addressing the necessary requirements for a comprehensive ground-water protection program.

The hydrogeologic projects underway lack the integration necessary to meet the specific requirements of the HSWA permit and to address the fundamental hydrogeologic issues mentioned above. The lack of knowledge surrounding these fundamental hydrogeologic issues does not allow for compliance with the regulatory requirements of a site-wide characterization.

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NMED is currently evaluating what work needs to be conducted and to what level of detail to assure compliance with both the HSWA hydrogeologic permit requirements and the requirements for ground-water monitoring of RCRA regulated units. This evaluation should be completed in October, 1995, and provided to EPA and then available to LANL.

During the course of NMED's investigation for the RCRA hydrogeologic evaluation, it has become evident to NMED that a RCRA site-wide hydrogeologic workplan should be developed and submitted to NMED and EPA for review and approval. A site-wide hydrogeologic workplan developed under the driver of RCRA will provide a mechanism to assure a compliance schedule with specific tasks to meet the permit objectives. The workplan should address both the HSWA hydrogeologic permit requirements and RCRA regulatory ground-water monitoring requirements.

Thank you for your attention in this matter. Should you have any questions concerning either technical or regulatory issues please contact Ms. Teri Davis of HRMB at (505) 827-1560. If you have any questions concerning technical matters please contact Mr. Michael Dale of DOE OB at (505) 672-0449.

Sincerely,



Ed Kelley PhD, Director, Water and Waste Management Division
New Mexico Environment Department

cc: Theodore Taylor, DOE LAAO, AAMEP, MS A316
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