Is Our Drinking Water Safe?
Contamination of Groundwater from LANL Operations

Los Alamos National Laboratory (LANL) is located on the Pajarito Plateau, which is comprised of volcanic tuff and has a very complex geology. Over 18 million cubic feet of radioactive and hazardous waste is buried in the mesa tops and in the shallow sediments along the canyon bottoms. Much of this waste is buried in unlined pits, shafts and trenches. Few precautions have been taken to protect the regional aquifer located below LANL. This aquifer is the **sole source of drinking water for the communities of White Rock and Los Alamos**. Likewise, LANL's own modeling indicates that the **groundwater flows east toward the Buckman Wellfield where Santa Fe pumps 40% of its drinking water**.

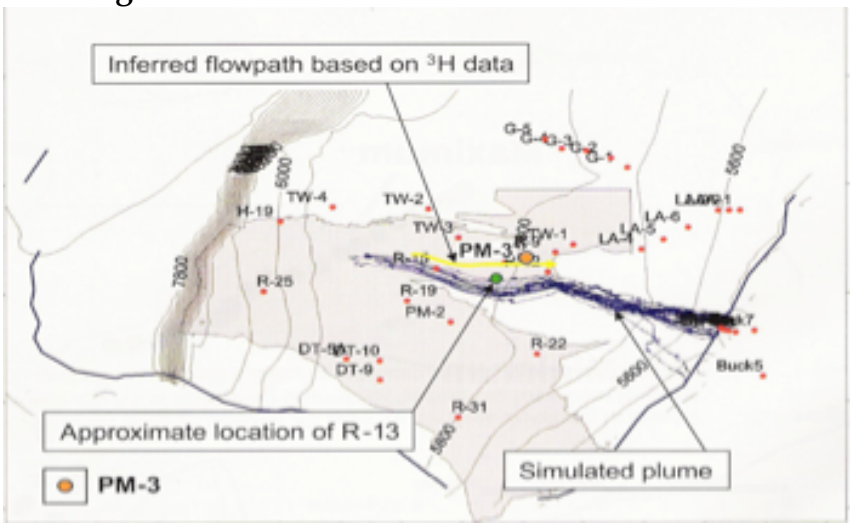

Figure 1: LANL's own computer modeling of the toxic hexavalent chromium plume shows its pathway to the Buckman Wellfield.

Contaminants detected in groundwater include hexavalent chromium, nickel, high explosives, perchlorate, pentachlorophenol, and radioactive tritium, plutonium, americium, cesium, strontium-90, and possibly neptunium. Already one Los Alamos County drinking water well, Otowi 1, was closed due to the presence of perchlorate contamination.

In order to protect drinking water LANL is required by the State of New Mexico and federal regulations to install ground water monitoring wells. Unfortunately, many of LANL's wells are not capable of detection.

Recently, the New Mexico Environment Department (NMED) identified many deficiencies in LANL's groundwater well network, including misplacement of wells and well screens, poor sampling methods and use of organic fluids and bentonite clay drilling muds which mask the presence of radionuclides.[1]

The issues with the groundwater wells mean that we cannot know what contaminants are traveling in our groundwater or drinking water. However early detections of fast moving contaminates indicate that our water is at risk. In order to protect drinking water we must:

- Require monthly sampling of our drinking water wells using the most protective and sensitive methods possible
- Install new groundwater wells according to environmental laws and regulations
- Conduct an independent review of all data in the LANL water quality database to remove all unrepresentative data.

Data from flawed wells has been used to justify expanded nuclear weapons operations at LANL in reports to Congress and the Department of Energy's (DOE) draft 2006 Site-Wide Environmental Impact Statement documents, as wells as reports to NMED regarding clean up of legacy waste. These reports must be withdrawn until new reliable and representative data can be provided.

Issues with LANL Characterization Wells

The purpose of Los Alamos National Laboratory (LANL) characterization wells is to detect the migration of contaminants before they rise to high levels or reach drinking water wells. Early detection would allow measures to be implemented to protect drinking water supplies.

Misplacement of wells and well screens

LANL drilled the characterization wells too far from waste disposal sites. The wells do not meet regulatory requirements and cannot characterize the nature and extent of any contamination plumes that are seeping from the buried waste or from the waste liquids discharged into canyons.

The well screens, which allow water to pass into the well and be sampled, are frequently located at the wrong depth for early detection. For example,

- LANL placed many screens hundreds of feet below the water table, which is where we need to detect contaminants if we are to know that they have entered the water.
- LANL failed to place other screens where they could take samples of fast moving water. Comonly, drinking water is collected in these known as the "fast pathways."
- Some of the screens are located at depths where little or no water flows.

Altered Water Chemistry

LANL has changed the water chemistry in the areas surrounding the well screens so that accurate detection of present contamination is impossible. Organic fluids and additives, such as bentonite clay, used during drilling mask the presence of radionuclides. Rusty and corroded well screens further change the water chemistry.

Poor sampling methods

LANL used materials that clog the well screens making it almost impossible to take fresh samples and detect present contamination. The majority of samples are taken with what is called a "no purge" method. This means that they continue to sample the same stagnant water, which has been trapped in screens clogged by the drilling fluids mentioned above.

In addition, LANL installed well screens that are too long and therefore take diluted samples. The recommended length for well screens is 10 feet. However, many of LANL's screens are from 40 to 60 feet long. Some of these screens are up to 649 feet. The result is that contaminants may go undetected, the true levels are not known and we do not know the extent of the contamination.

Inappropriate Methods of Analysis

Frequently LANL reports "non-detects" or "below detects" for contaminants. However, LANL frequently uses analytical methods with low resolution for detecting contaminants of concern. This means that the contaminant is "not detected" by the analytical method, but it may actually be present at a level that is lower than the analytical method can measure. For example:

- LANL is using a method for analysis of 1-4 Dioxane that reports the contaminant is "not detected." However, the LANL reports only assure that the contaminant is not present in the water at levels greater than 50 parts per billion (ppb). The Environmental Protection Agency has not assigned a Drinking Water Standard to 1,4-Dioxane. Nevertheless, California has a Health Advisory Action Level set at 3 ppb. There are analytical methods that will measure 1,4-Dioxane in water to levels as low as ½ part per billion.

Detections of Contaminants

Despite all of the issues with the wells, sampling and analytical methods, contaminants have been found in groundwater and drinking water supplies. These detections are primarily of fast moving contaminants and indicate that other contaminants are on their way, long before LANL's estimated travel times. **These findings demonstrate that we must act now if we are to protect regional drinking water.**

Warning Signs

In 2006, LANL scientists made presentations to the National Academy of Science (NAS) that the travel time for wastes buried in the mesa tops to reach ground water would take over 1,000 years. However, the radionuclide contaminant technetium-99 and the chemicals pentachlorophenol, chloroform, phenol, 4-methylphenol, 2-butanone, diethylphthalate and other contaminants have already been detected at regional well R-22, located 500 feet from the boundary of LANL's legacy waste dump at Technical Area 54 (TA-54). This dump is also LANL's active facility for ongoing disposal of radioactive waste. These six chemical contaminants are highly mobile in water and are commonly found in groundwater beneath toxic waste landfills. One, pentachlorophenol, was present at concentrations six times the Maximum Contaminant Level for EPA Drinking Water Standards.

These contaminants were detected in the early years of sampling well R-22. The new chemical environment formed by the organic drilling additives and the no-purge water sampling method are now preventing the detection of contamination in the water samples produced from the well.

Since 1943, LANL has directly discharged many liquid contaminants into the Pajarito Plateau's extensive canyon system. There is a very large inventory of chemical and radionuclide waste spread over many miles along the wet canyon bottoms. Already one of these chemicals, toxic hexavalent chromium, has been detected in the regional aquifer at concentrations four times the EPA drinking water standard and eight times the New Mexico standard. We do not know the extent of this or other possible contaminant plumes because LANL has failed to install the required network of monitoring wells to protect the regional aquifer from contamination beneath the wet canyons.

Travel to Drinking Water

All Los Alamos County and White Rock drinking water is pumped from the regional Aquifer beneath LANL. Already, one Los Alamos country drinking water well has been closed down due to perceived perchlorate contamination. In addition, the chromium contamination mentioned above was detected in a characterization well in close proximity to drinking water well PM-3, which is the primary source of drinking water for the community of White Rock.

Santa Fe drinking water is also at risk. In a new report (Keating et al.)[2], LANL admits that the travel time between the legacy waste dump at TA-54 and the Buckman Wellfield may be a few decades and that field studies are needed. **In other words, nobody knows when the contaminants will begin showing up in full force in Santa Fe's drinking water wells. All we do know is that the contamination has reached the regional aquifer and it is not being adequately monitored.** LANL has stated that they need to conduct these field tests, but have not taken the steps to do so.

The question remains: Is our drinking water safe?
The disturbing and unacceptable answer – We Don't Know!

Detections of the radionuclide contaminants in Los Alamos County and Buckman drinking water wells have been reported in numerous technical documents and reports.[3] However, when confronted about the data by Concerned Citizens for Nuclear Safety, LANL dismissed these detections. They defend this claim with data from their network of monitoring wells despite the well-documented flaws.

The well drilling program, already cost over $100 million of taxpayer money. Despite this time and money, the monitoring wells, which LANL drilled during the past decade, have serious flaws that render the data useless. The frontline of defense on groundwater contamination is a reliable network of monitoring wells; LANL, DOE, and NMED have not met this requirement.

What You Can Do

- Call the Santa Fe City Manager at 505.955.6509 and ask for monthly sampling of the Buckman Wellfield.
- Call Congressional Representatives and ask them for funding for cleanup at LANL and to put pressure on DOE to withdraw the 2006 draft LANL SWEIS because it is based on flawed groundwater data. Senator Bingaman: 505.988.6647; Senator Domenici: 505.988.6511; Congressman Udall: 505.984.8950.
- Keep an eye out this summer for opportunities to oppose the Complex 2030 proposal to expand nuclear weapons activities throughout the nation. Please visit our website at www.nuclearactive.org for latest opportunities to participate.
- Call your local legislator and express your concerns about these water issues.

About CCNS Water Work

Responding to citizen concerns about impacts of the May 2000 Cerro Grande fire on the Rio Grande watershed surrounding LANL, CCNS began its Rio Grande Watershed Initiative to address the myriad of issues, including impacts of LANL contaminants reaching the drinking water wells. For the past four years, CCNS has worked/partnered (choose one of these words) with whistleblower and former lead consultant to LANL's well drilling program, Robert H. Gilkeson, about the problems with wells.

We are also working to protect the Rio Grande from LANL contamination. Please visit our website to learn about the 60 day Notice of Intent to Sue, which CCNS, eight other community-based organizations and two individuals, recently sent to LANL and DOE for surface water violations under the Clean Water Act.

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[1] NMED April 5, 2007 letter to LANL available at www.nuclearactive.org

[2] Keating, Elizabeth, B.A. Robinson, and V.V. Vesselinov, 2005, "Development and Application of Numerical Models to Estimate Fluxes through the Regional Aquifer beneath the Pajarito Plateau," Vadose Zone Journal, Volume 4, August, 2005.

[3] These documents include the 1999 Site-wide Environmental Impact Statement for LANL (LANL SWEIS) and the 2006 draft LANL SWEIS that are used to determine future operations at LANL.

For more information contact Concerned Citizens for Nuclear Safety
at 505.986.1973 or visit our website, www.nuclearactive.org

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