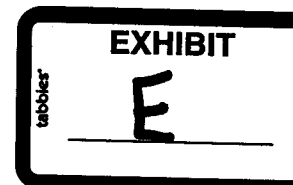




## Low-level perchlorate detection method shows promise

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LOS ALAMOS, N.M., July 17, 2003 -- A Los Alamos National Laboratory evaluation of a relatively new method to detect miniscule amounts of perchlorate in water indicates that the detection method holds promise in detecting perchlorate at concentrations of less than one part per billion, which could further strengthen and improve the Laboratory's environmental surveillance capabilities. The study — done in conjunction with personnel from the New Mexico Environment Department and U.S. Department of Energy — also indicates that Northern New Mexico waters may have trace concentrations of perchlorate that are well below any proposed safe-drinking-water standard.



Perchlorate is a non-radioactive chemical used in gunpowder, rocket fuel, high explosives, fireworks, radiochemistry experiments and automobile airbags. Perchlorate is very soluble in water and has been linked to thyroid dysfunction, making it a potential health hazard and contaminant of concern for drinking water.

Perchlorate contamination of drinking water became an issue in 1998, when the U.S. Environmental Protection Agency added the chemical to its Safe Drinking Water Act Contaminant Candidate List. This year EPA reiterated its previous guidance that perchlorate concentrations in drinking water should remain below four to 18 parts per billion. The agency eventually intends to set a drinking water standard for the chemical, and a standard of one part per billion has been discussed.

"This study may make a major advancement in the detection of perchlorate to help safeguard the environment," said Jim Holt, associate Laboratory director for Operations. "The Laboratory invested considerable time and effort in this study as part of its ongoing commitment to quality of life and the quality of life of our regional neighbors. The Laboratory will continue to do whatever it takes to ensure that our community and the region remain a safe place in which to live and work."

EPA currently has one approved method for perchlorate detection, but the method is reliable only for concentrations of four parts per billion or greater.

Since the detection limit of the EPA-approved method (known as Method 314) falls at the lower end of EPA's drinking-water guidance level, Laboratory scientists and others are interested in finding or developing methods that can reliably detect perchlorate concentrations that are well below any guidance level or proposed standard.

In February, Los Alamos researchers began a rigorous scientific evaluation of a method to detect ultra-low concentrations of perchlorate known as Liquid Chromatography/Mass Spectrometry/Mass Spectrometry, or LC/MS/MS for short. Proponents of the LC/MS/MS method claim a detection limit of 0.05 parts per billion for perchlorate in water. The Los Alamos research team sought to test the reliability and validity of the LC/MS/MS detection method.

For the study, researchers used the LC/MS/MS method to test pure water, pure water spiked with known concentrations of perchlorate, drinking water samples from communities upstream and downstream of the Laboratory, and Los Alamos-area groundwater samples. Two separate outside, independent laboratories used the LC/MS/MS method to test water samples provided as part of the study.

The LC/MS/MS method seemed to be able to reliably detect perchlorate in the pure water samples that had been spiked with a known concentration of the chemical. But when used to test drinking water samples and groundwater samples, the LC/MS/MS method seemed less reliable — perhaps due to the presence of salts and minerals commonly found in groundwater.

The study suggested the presence of miniscule traces of perchlorate in all drinking water samples tested with the LC/MS/MS method; the concentrations potentially ranged from 0.1 to 0.3 parts per billion, all well below EPA's four-part-per-billion safe-drinking-water guidance. The results of this study suggest that trace levels of perchlorate may be widespread in the environment, but this hypothesis must be further tested.

Los Alamos researchers agree that greater quality control and calibration procedures are necessary at laboratories that use the LC/MS/MS method to test water before the LC/MS/MS detection method can be deemed reliable and accurate.

The Laboratory has been monitoring local drinking water supplies and groundwater for perchlorate ever since EPA's 1998 announcement that perchlorate was of concern. The Laboratory continues to refine and improve its groundwater monitoring activities throughout the Pajarito Plateau and has virtually eliminated all perchlorate from liquid discharges.

Recently, the Laboratory installed an ion-exchange filtration system that has removed perchlorate from wastewater from the Radioactive Wastewater

Treatment Facility — the single largest contributor of liquid discharges from the Laboratory.

In addition, the Laboratory is installing an ion-exchange filtration system at the Laboratory's High Explosives Wastewater Treatment Facility to ensure that perchlorate is not discharged to the environment from that facility.

Earlier this year, the Laboratory installed a Passive Reactive Barrier in Mortandad Canyon. The PRB is designed to scrub the canyon's shallow groundwater of perchlorate from historic discharges before that water can continue downstream or toward deeper groundwater bodies.

Los Alamos enhances global security by ensuring the safety and reliability of the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction, and solving problems related to energy, environment, infrastructure, health and national security concerns.

### **Laboratory actions to reduce or eliminate perchlorate**

LOS ALAMOS, NM, July 17, 2003 — As part of its continuing effort to be a good steward of the environment, Los Alamos National Laboratory has undertaken the following actions to identify, reduce and eliminate environmental perchlorate, a water contaminant that has been linked to thyroid dysfunction:

- The Laboratory has been monitoring local drinking water supplies and groundwater for perchlorate ever since the U.S. Environmental Protection Agency announced in 1998 that perchlorate was a potential health concern.
- The Laboratory was the first agency to detect and announce the detection of perchlorate in Los Alamos-area groundwater in summer 2000.
- The Laboratory has virtually eliminated all perchlorate from liquid discharges since its detection in local groundwater. The Laboratory installed an ion-exchange filtration system that has removed perchlorate from wastewater from the Radioactive Wastewater Treatment Facility — the single largest contributor of liquid discharges from the Laboratory.
- The Laboratory is installing an ion-exchange filtration system at the Laboratory's High Explosives Wastewater Treatment Facility to ensure that perchlorate is not discharged to the environment from that facility.
- Earlier this year, the Laboratory installed a Passive Reactive Barrier in Mortandad Canyon. The barrier is designed to scrub the canyon's shallow groundwater of perchlorate from historic discharges before that water can continue downstream or toward deeper groundwater bodies.
- The Laboratory continues to refine and improve its groundwater monitoring and modeling capabilities throughout the Pajarito Plateau.

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