

General



Department of Energy
Albuquerque Operations Office
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JUL 16 2002

Mr. Greg Lewis
Director, Water and Waste Management
Division
New Mexico Environment Department
1190 St. Francis Drive
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Dear Mr. Lewis:

The Department of Energy (DOE) and the Los Alamos National Laboratory (LANL) are changing the way analytical results for perchlorate are reported for future environmental samples. There has recently been a great deal of interest in the potential adverse health effects and accurate detection of perchlorate, particularly in groundwater. This has been heightened by the Environmental Protection Agency's (EPA's) general interest in perchlorate and a recent peer review meeting on perchlorate risk.

Perchlorate has been reported as being detected by the currently accepted EPA method 314 for determining perchlorate in water in Los Alamos wells at various times in relatively low concentrations over the past year and a half. However, because detection limits among laboratories vary and several results were reported at extremely low levels and at concentrations between the laboratory's method detection limit (MDL) and practical quantitation limit (PQL), confidence in the data relative to the extremely low levels reported to date is low. MDLs represent the lowest concentration at which a particular analyte can be detected. PQLs, which are typically about 3 to 5 times the calculated MDL, represent the lowest concentration at which a laboratory can quantify the concentration of a particular analyte with an acceptable degree of certainty.

Interpretation of analytical results is based fundamentally on the MDL calculated by the laboratories performing the analyses. Laboratories are required to calculate MDLs pursuant to the procedures established in 40CFR136, Appendix B. While Appendix B allows for determining MDLs using specific matrices, in practice most laboratories calculate MDLs using deionized (DI) water.

MDLs calculated using DI water are adequate and appropriate for many analytes. However, with regard to perchlorate (as well as some other analytes) some natural matrices have been shown to interfere significantly with the detection of analytes. Specifically, with regard to the measurement of perchlorate by Ion Chromatography (IC)--the technique used in method 314--the baseline noise increases with some



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groundwater matrices. This, taken together with the fact that there is no secondary means of confirming analyte identity using IC alone, leads to the potential for false positive results and a general low level of confidence in the perchlorate results obtained to date.

In the investigation of perchlorate detections at DOE's Pantex site in Texas, for example, the reporting laboratory could not measure perchlorate in Ogallala aquifer water spiked at the laboratory's reported MDL of 1 ppb (calculated using DI water). The true MDL in the natural matrix was determined to be 4 ppb. That is, although the laboratory calculated the MDL appropriately and according to conventional practice, in reality due to natural matrix interferences, perchlorate could not be detected at that conventionally calculated MDL.

While there are currently no applicable regulatory standards for perchlorate in New Mexico, DOE, LANL, New Mexico Environment Department, the Northern New Mexico Citizens Advisory Board, and other stakeholders all share the desire to have the highest possible confidence in all analytical measurements, including perchlorate. The EPA draft document, "Perchlorate Environmental Contamination: Toxicological Review and Risk Assessment," and current health advisory standards adopted by other states, indicate acceptable levels of perchlorate in a range near the current analytical MDL of 1-4 ppb. Continuing to monitor for perchlorate by IC with MDLs calculated using DI water will likely lead to more uncertainty and low confidence with regard to low-level results.

Accordingly, and effective immediately for future analytical samples, the DOE and LANL will report perchlorate results by EPA method 314 only on the basis of MDLs for which the reasonableness has been verified, as allowed under 40CFR136, Appendix B, Part 7. Based on our recent experience, we anticipate that the MDL for perchlorate will be at or about 4 ppb. Concentrations below that level will be qualified as "U" (undetected) and reported in the standard manner. However, the actual concentrations calculated by the instruments will be available on the quantitation reports that are included in all data packages.

Given the convention of setting PQLs at 3-5 times the MDL level, and considering what we know of the performance of method 314 in difficult matrices, we anticipate that the PQL will be approximately 12 ppb. We are planning an empirical test of several matrices from two DOE facilities to verify the reasonableness of that concentration as a PQL. Until those data have been acquired, we plan to use 12 ppb as the interim PQL.

We are currently exploring, in concert with your staff and other stakeholders, Liquid Chromatography/Mass Spectrometry/Mass Spectrometry, an alternative technique for perchlorate analysis that will improve the reporting accuracy and resolve the above issues.

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We look forward to continuing to work with you and your staff to acquire and report defensible analytical data. If you have any questions, please contact Dave Bourne of my staff at (505) 845-4032.

Sincerely,



Jack B. Tillman
Director
Office of Environmental Programs

cc:

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