

Filling in the Blanks? Contaminants in the Ogallala Aquifer

Contaminants from the Pantex Plant have been documented by Pantex and the Texas Commission on Environmental Quality (TCEQ) to have entered the Ogallala Aquifer (also known as the High Plains Aquifer). These contaminants include metals, and organic and explosives compounds. This report examines some of the analyses of groundwater that were reported by the Department of Energy (DOE) and the TCEQ for the time period 1998-2003.

Pantex Methodology

During the calendar year 2002 Pantex collected and analyzed groundwater samples for metals and radionuclides from 16 wells drilled into the Ogallala Aquifer and 18 wells in the shallower perched aquifer. Of the wells in the Ogallala Aquifer, 1123 different analytical results were reported for metals in 51 paired-samples. These paired samples consisted of two samples taken from the same well at the same time. Then, one of the samples was filtered to remove any solid particles that may be in the water sample. Then, analytical results from both the unfiltered and filtered samples were compared to determine if they were similar or not.

Summary of Results

Of the 51 paired-samples, approximately

- 40% (446 of 1123) of the analytical results were not useable because of some problem with the “blanks” – an especially high number considering the costs of these analyses. (see box below)
- 33% (374 of 1123) showed results below detection limits, so no concentrations were reported.
- 27% (303 of 1123) of the results provided the basis for comparing metals concentrations in filtered samples to the traditionally unfiltered groundwater samples.

“Blanks”

A “blank” is considered to be a pure water sample that is analyzed along with the groundwater samples to show that the instruments are working properly. For example, for a series of groundwater samples being analyzed for the metal Arsenic, results from analyzing the “blank” should show no Arsenic. If this is not the case, then the laboratory may assume that the result for the “blank” is in question and, also, that the results for the groundwater samples with Arsenic may also have been in error. Pantex seems to exclude any results for which the “blanks” show some level of contamination. There are several reasons to explain this problem. One is that the pure water “blank” is not pure. Another might be that the “blank” happens to follow a groundwater sample with a large amount of Arsenic (in this example), the laboratory detector may be contaminated by the groundwater sample.

Of the 303 results that provided information, approximately half suggested essentially identical results in both the filtered and unfiltered water. Most of the remaining analyses indicated reduced concentrations for the filtered samples.

Comparing TCEQ results to those of Pantex

During 2002 and 2003, the TCEQ co-sampled 23 Pantex wells, 13 of which are completed in the Ogallala Aquifer. A comparison of results obtained by TCEQ to those by Pantex indicated that metals concentrations were similar. The co-sampling program by TCEQ provides an important validation of the Pantex monitoring program as well as providing information on additional wells that need to be sampled and monitored.

Questions

1. How often were contaminants detected?

A total of 770 detections of organic or explosives contaminants were reported for Pantex Ogallala groundwater samples collected between July 1998 and December 2003. This number does not include metals.

It is important to note that any concentrations of organic or explosives compounds in the groundwater are considered to be contaminants. However, small concentrations of contaminants may be in the groundwater samples, but the presence of contaminants not be reported. Usually this is due to (1) the laboratory equipment is unable to measure concentrations that low, (2) the analytical method used is not the one that can detect small concentrations, or (3) the results were discarded due to problems with the “blanks” or another quality check on the laboratory results.

Organic contaminants were detected in 43 Ogallala wells at or near the Pantex Plant. Two of the most commonly detected contaminants are acetone and toluene. Some of the highest concentrations of acetone and toluene have been found at, and down-gradient of, the Burning Grounds. This is not unexpected because at least 150,000 gallons and as much as 300,000 gallons of contaminated waste oils and solvents were disposed of in unlined, earthen pits at the Burning Grounds between 1954 and 1980. Detections of organics and explosives peaked in 2001 and have decreased significantly since then.

2. Why are there such a high number of problems with blanks?

Of the detections of these contaminants, 51% (393 of 770) were discarded because of problems with the blanks or sampling systems. In a few of these discarded results, the contaminant concentrations exceeded human health standards – an important concern.

Any problem with “blanks” should be addressed and the samples re-analyzed. However, in general, this was not the case. Also, because of the “blanks” problems, funding for monitoring is producing less than half the analytical results. Why hasn't this problem been corrected?

3. Why does Pantex filter some samples prior to analyses?

Is it reasonable to expect that water used for domestic or agricultural purposes would be filtered prior to use? If the answer is no, then the unfiltered sample analyses should be just as valid as the filtered ones.

The inconsistent use of filtered and unfiltered analyses by Pantex should be scrutinized by TCEQ, EPA, and the community – especially since Pantex based its determination of “background” on results from the potentially higher values from unfiltered samples.

Pantex uses the amounts of contaminants in unfiltered groundwater samples for its claim of “background” contaminants in the Ogallala Aquifer. This is inconsistent if it should be allowed to compare “filtered” groundwater samples to the “unfiltered” “background” samples in determining what needs to be cleaned up at the site.

4. Why did Pantex discontinue monitoring some wells?

Although Pantex and TCEQ continue to monitor wells in the vicinity of Pantex, the results reported show that Pantex has discontinued monitoring some of the wells in which contaminants were detected in the past. This fact is especially troubling given that these wells are located in areas in which industrial contamination would be expected and in areas where there are few other, if any, Ogallala wells to monitor. The reasons for which Pantex has discontinued monitoring these wells have not been provided to the community.

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