



FACT SHEET
ANNUAL LONG-TERM GROUNDWATER MONITORING RESULTS
SERVICING OF RESIDENTIAL CARBON FILTER SYSTEMS
SIX MILE RICHARDSON HIGHWAY
FAIRBANKS, ALASKA

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What's New

The year 2001 groundwater monitoring event of the regional trichloroethylene (TCE) plume was performed during August and September 2001 with the monitoring results published in February 2001. New monitoring wells were installed during the winter 2000/2001 to provide a better definition of the regional plume's extent and concentration levels. Long-term monitoring has been conducted annually since 1996 at a series of permanent monitoring wells and at selected residential wells.

In addition, the Alaska Department of Environmental Conservation (ADEC) performed annual servicing and testing of most residential carbon filter systems that were installed in 1995/1996 due to the discovery of the regional TCE plume. These residences had well water containing TCE at or above 75% of the TCE drinking water standard of 5 micrograms per liter ($\mu\text{g}/\text{l}$). The servicing consisted of changing the activated carbon filters and testing the well water prior to treatment.

This fact sheet provides a synopsis of the test results from both the annual long-term monitoring and residential testing.

Executive Summary

The monitoring data indicate that the size of the regional TCE plume has not changed significantly from past years. However, the installation of new monitoring wells has increased the confidence in estimating the plume's lateral boundaries. As a result, the regional plume is somewhat narrower than originally estimated in 1995. Figure 1 depicts the estimated boundaries of the regional plume showing the 1 $\mu\text{g}/\text{l}$ and 5 $\mu\text{g}/\text{l}$ concentration levels at a thirty-foot depth.

In some parts of the plume, the concentration levels are decreasing at predictable rates. In other parts of the plume, the concentration levels exhibit no trend. At one monitoring well the TCE concentration levels have continued to increase slightly.

Only three residences are known to have TCE in their well water above the drinking water standard in 2001 as compared to twelve residences in 1995. However, it should be noted that two of the twelve residences sampled in 1995 did not allow re-sampling in 2000 and it is unknown if these two homes are above the safe drinking water standard. Figure 2 shows the concentration levels detected in 2001. All of the homes have carbon filter systems that can effectively remove the low levels of contamination.

The three residences with water that remains above the TCE standard presently exhibit decreasing concentration trends. Activated carbon filters were changed at twelve residences in 2001. The residential carbon filter treatment systems (if properly serviced and maintained) are capable of removing organic contaminants to essentially non-detect limits: generally 0.5 µg/l or one tenth of the safe drinking water standard of 5 µg/l. A 1999 assessment of the filter systems by ADEC found that the majority of installed systems were not properly maintained. In 2000, ADEC assumed responsibility for the filter system maintenance. If the filters are serviced properly, all systems effectively removed organic contamination to acceptable limits.

Groundwater Monitoring Results

The 2001 groundwater monitoring data provide the following conclusions.

- 1) The size of the regional plume remained generally stable, suggesting that natural attenuation is likely occurring at the regional scale. Natural attenuation refers to the breakdown of hazardous substances through naturally occurring conditions. This includes dilution, dispersion, sorption, volatilization, and biotic and abiotic transformations.
- 2) Geochemical data from the local aquifer and the presence of TCE breakdown products (i.e., products produced by the biodegradation of TCE) provide evidence that biological degradation of TCE has occurred. However, dilution and dispersion likely contribute much more than biodegradation to current concentration decreases.
- 3) The TCE concentration levels vary within the plume. Where concentration levels are decreasing at a statistically significant rate, the decreases are predictable by a mathematical model.
- 4) Some monitoring well data exhibit no statistical trend.
- 5) One monitoring well continues to show a statistically significant and slight increase in concentration from 5.3 µg/l in 2000 to 5.6 µg/l in 2001. The reason for the increase is not clearly understood.
- 6) Only three residences in the Six-Mile Village Subdivision currently have TCE levels above the safe drinking water standard of 5 µg/l as compared to twelve residences in 1995 and four residences in 2000. All of the homes have carbon filter systems that can effectively remove the low levels of contamination.

Assessment of Residential Filter Systems

Since 1995, only a selected number of residences were tested annually as part of the long-term groundwater-monitoring program. In September 1999, ADEC offered to re-test all residential wells within the regional TCE plume as a “five year check-up” after discovery of the plume. In addition, ADEC offered to install a treatment system if any well tested at or above 3.5 µg/l (70% of safe drinking water standard for TCE). This was the same criterion used in 1995.

In 1995, seventeen residences qualified for grant monies to install treatment systems and fourteen residences accepted. Three residences chose not to participate at that time, however one residence did install a filter system in 2000. The grant recipients used the monies to upgrade and install treatment systems of their choice. All homeowners installed some form of carbon filtration system for which they were responsible for the service and maintenance.

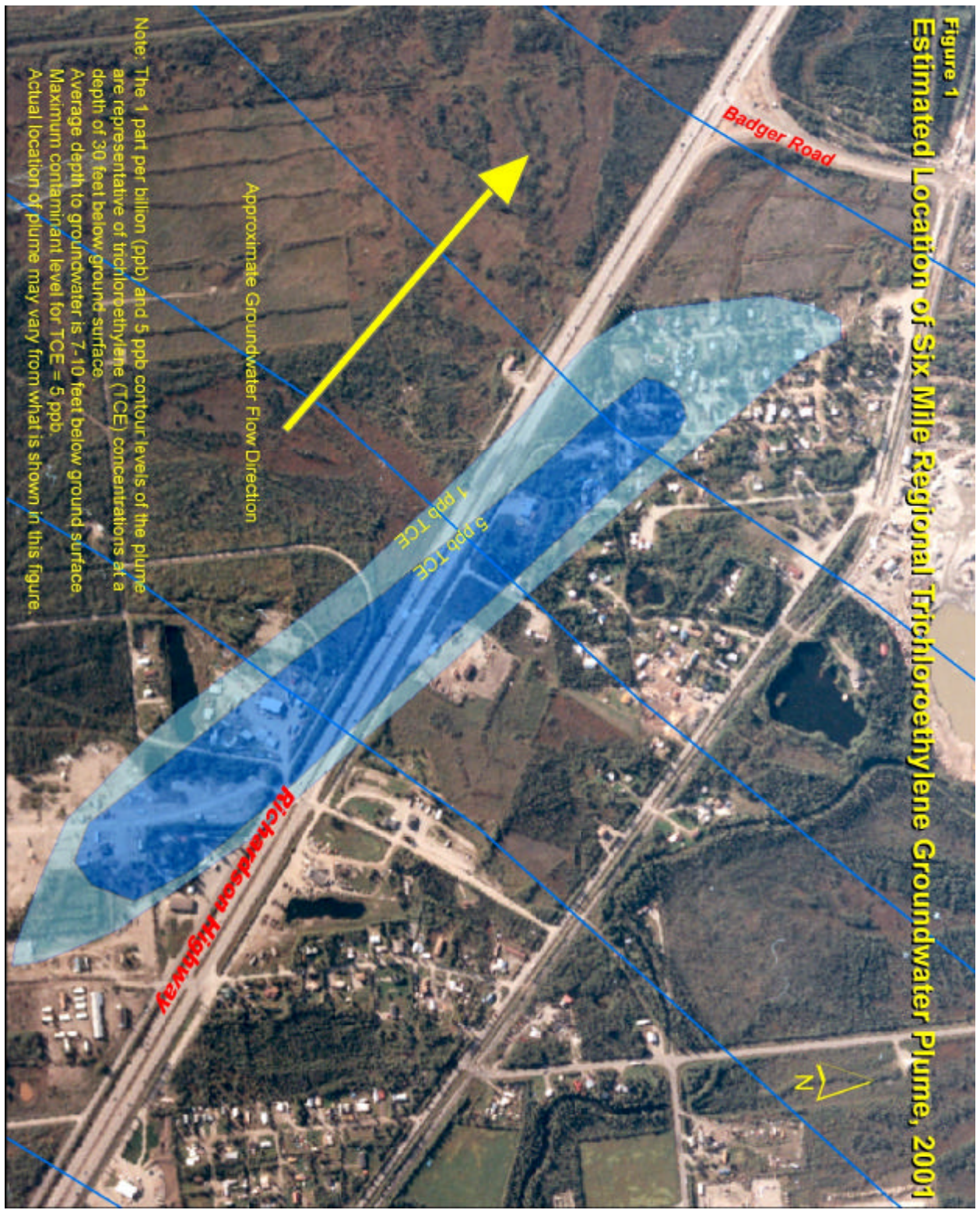
From September 1999 to July 2000, ADEC tested the well water and inspected the treatment systems (if present) at approximately thirty residences. Twelve of the original fifteen grant recipients allowed re-testing and it was concluded that the majority of carbon treatment systems needed service and filter changes. ADEC changed filters and serviced the systems and then re-tested the water. All systems were determined adequate to remove the organic contaminants to nearly non-detect limits. The normal laboratory detection limit is 0.5 µg/l, or one tenth of the safe drinking water standard of 5 µg/l for TCE.

In 2001, ADEC either changed or paid for the filter system change at twelve residences. The water was tested at these residences prior to treatment and the results were evaluated as part of the 2001 long-term groundwater-monitoring program.

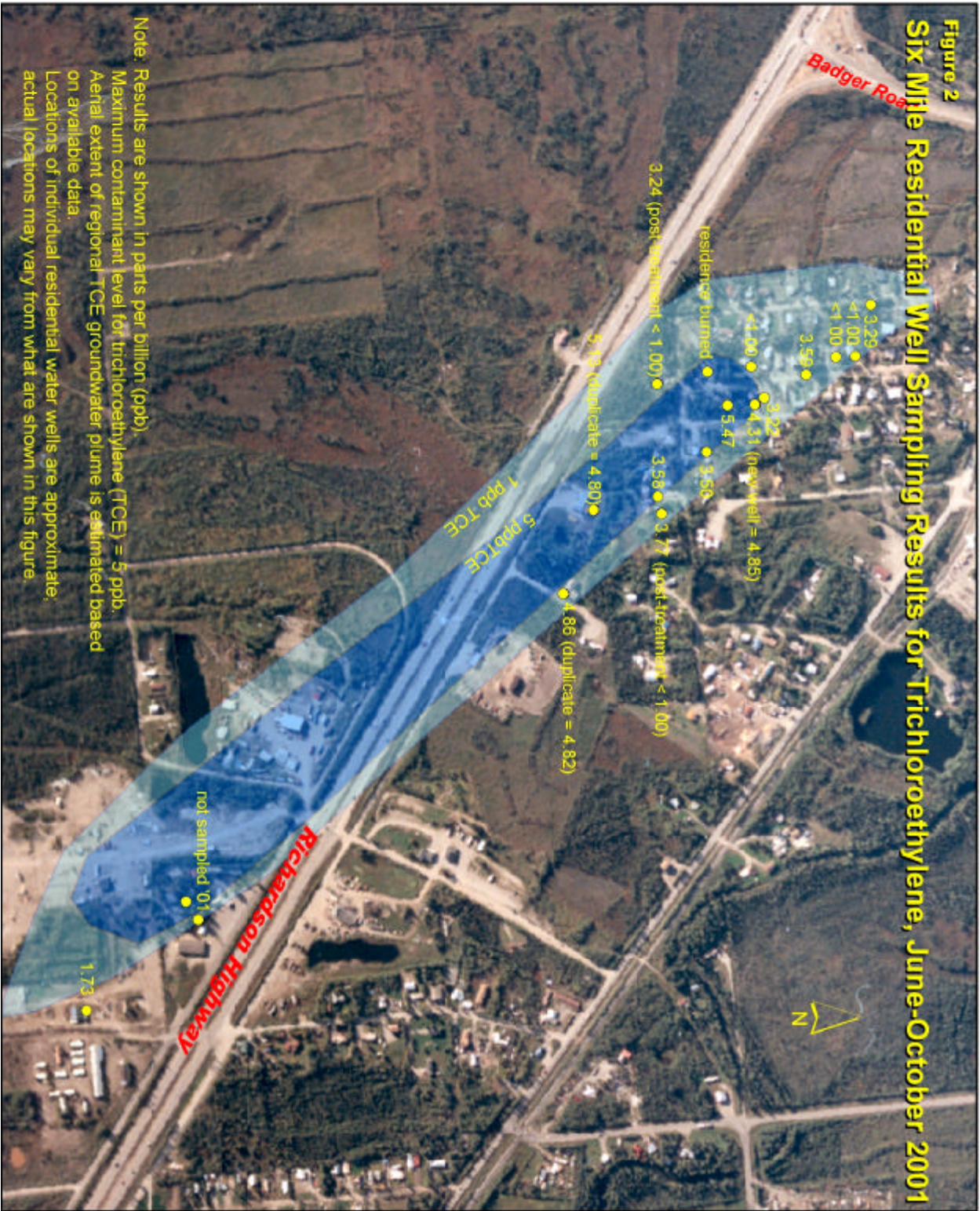
Questions or Need Additional Information

If you have any questions or need additional information, please contact the ADEC project manager, Douglas Bauer at (907) 451-2192 or at doug_bauer@envircon.state.ak.us.

Figure 1
Estimated Location of Six Mile Regional Trichloroethylene Groundwater Plume, 2001



Note: The 1 part per billion (ppb) and 5 ppb contour levels of the plume are representative of trichloroethylene (TCE) concentrations at a depth of 30 feet below ground surface. Average depth to groundwater is 7-10 feet below ground surface. Maximum contaminant level for TCE = 5 ppb. Actual location of plume may vary from what is shown in this figure.



Note: Results are shown in parts per billion (ppb).
 Maximum contaminant level for trichloroethylene (TCE) = 5 ppb.
 Aerial extent of regional TCE groundwater plume is estimated based on available data.
 Locations of individual residential water wells are approximate. Actual locations may vary from what are shown in this figure.