

Redfield Site

Update on Testing and Indoor Air Ventilation for 1,1-Dichloroethene (1,1-DCE)

March 2005

About 1,1-Dichloroethene (1,1-DCE)

Brown Group Retail, Inc. has been monitoring the indoor air in homes in the vicinity of the Redfield site for the presence of eight chemical constituents identified by the Colorado Department of Public Health and the Environment (CDPHE) since 1998. Of those eight, CDPHE identified 1,1-dichloroethene (1,1-DCE) as the constituent of primary importance. The compound, a breakdown product of certain solvents, is present in varying concentrations in groundwater under the Redfield site and in some surrounding areas. It has also been detected in the indoor air in certain homes in the vicinity of the site. Owners of homes where indoor air concentrations of 1,1-DCE tested above 0.49 micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) were offered a ventilation system like those used to vent radon from homes. As of December 31, 2004, 395 homes tested above 0.49 $\mu\text{g}/\text{m}^3$ for 1,1-DCE before mitigation. Owners of each of these homes were offered a ventilation system, and 381 opted to have a system installed.

New 1,1-DCE Indoor Air Remediation Level is 5.0 $\mu\text{g}/\text{m}^3$

In the fourth quarter of 2004, CDPHE increased the indoor air action level for 1,1-DCE from 0.49 $\mu\text{g}/\text{m}^3$ to 5.0 $\mu\text{g}/\text{m}^3$ for the environmental programs it oversees in Colorado. The change was made after CDPHE evaluated 1,1-DCE toxicity assessments recently conducted by the U.S. Environmental Protection Agency (EPA), the Agency for Toxic Substances and Disease Registry (ATSDR), and other health and regulatory agencies.

In 2002, based upon these same studies, the EPA concluded that the evidence that breathing 1,1-DCE could cause cancer in humans was too weak to warrant any quantitative estimate, and proposed a remediation guideline of 200 $\mu\text{g}/\text{m}^3$. CDPHE, however, concluded that the toxicity assessments were limited or contained uncertainties. It therefore selected 5.0 $\mu\text{g}/\text{m}^3$ as the new indoor air remediation standard for 1,1-DCE for indoor air programs it oversees: a significantly more conservative standard than EPA's guideline of 200 $\mu\text{g}/\text{m}^3$. To date, none of the homes near the Redfield site have tested above EPA's 2002 guideline. The highest level of DCE found in indoor air in a home tested as part of the Redfield site work was 131 $\mu\text{g}/\text{m}^3$.

A total of 395 homes out of the 728 homes tested near the Redfield site had indoor air levels of 1,1-DCE that exceeded the former action level of 0.49 $\mu\text{g}/\text{m}^3$. Of these 395 homes, 148 had concentrations that were below 5.0 $\mu\text{g}/\text{m}^3$ for 1,1-DCE and below the new action level for trichloroethene (TCE).¹ Therefore, some homes with concentrations over the former action level may no longer require remediation for 1,1-DCE. In addition, indoor air monitoring is no longer necessary in some of the unventilated homes.

Future Testing and Ventilation Protocol

After adopting the new 1,1-DCE action level, CDPHE asked Brown Retail to determine which homes may no longer require indoor air remediation or monitoring. On January 21, 2005, Brown Retail submitted its proposed work plan, *Implementation of New 1,1-DCE Indoor Air Action Levels, Former Redfield Facility, Denver, Colorado*, in response to CDPHE's request. The work plan describes future testing, ventilation and monitoring requirements and procedures based on Colorado's new 1,1-DCE action level. The protocol also factors in new screening levels for another of the

¹ CDPHE's adoption of a new action level for TCE is discussed more thoroughly in the companion fact sheet entitled "Redfield Site Update On Testing And Indoor Air Ventilation For TCE, January 2005"

eight constituents—trichloroethene (TCE). While CDPHE has adopted a less stringent action level for 1,1-DCE, it has adopted a more stringent screening level for TCE (of 0.8 to 1.6 µg/m³). As a result of these two changes, there may be some homes that now require monitoring and/or remediation for TCE but not for 1,1-DCE. Overall, however, there will not be an increase in the extent of the test area or in the total number of homes offered ventilation systems.

The work plan, which the state health department approved in March 2005, provides a phased approach to evaluate homes. During the first phase, beginning in early 2005, 98 remediated homes that originally tested between .49 µg/m³ and 2.5 µg/m³ for 1,1-DCE, and below 0.8 µg/m³ for TCE, will be evaluated. Homes located along the narrow bedrock channel in the vicinity of South Jasmine Street and East Mexico Avenue will remain vented and in the monitoring program until the offsite groundwater bioremediation system is evaluated in 2007 to monitor the impact of bioremediation in indoor air, if any.

Brown Retail's environmental contractor, EnviroGroup, will contact the owners of homes to advise them if venting is no longer be required. If the owners of these homes choose to voluntarily shut off their indoor air ventilation systems, Brown Retail will conduct indoor air testing to confirm that venting is not required to meet the new action levels. Homeowners who opt to voluntarily shut off their system temporarily for this confirmation sampling will be asked to turn them off for only 1-2 weeks before testing. Once the canister is removed, the system can be turned back on. A second sample will be collected in the winter or summer using the same procedure.

If these homeowners opt to keep their systems running, however, direct confirmation testing will not be possible. For those homes, we will be required to use indirect methods of testing and evaluation to determine whether venting is actually necessary to meet the new action levels. These indirect methods may include evaluation of indoor air tests in nearby homes, evaluation of groundwater concentrations in the vicinity, and possibly testing of the venting system emissions. In the latter case, an air sample would be collected directly from the pipe of the ventilation system.

If the tests and/or other evaluations confirm that indoor air concentrations of 1,1-DCE and TCE are below the levels dictated by CDPHE for these compounds, CDPHE will not require continued operation of the ventilation system or further performance moni-

toring by Brown Retail. Homeowners may, of course, opt to continue operating the system—which is no different than a radon mitigation system—at their own expense.

Phase 2 of the evaluation will examine homes that initially tested between 2.5 and 5.0 µg/m³ for 1,1-DCE and below 0.8 µg/m³ for TCE. A process similar to that described for the first phase will be used to determine if ongoing operation and monitoring of the venting system is required to meet the new CDPHE action levels.

Phase 3 will address the need for continued venting in homes that originally had 1,1-DCE and/or TCE concentrations in excess of CDPHE's new action levels. Although these homes initially tested in excess of CDPHE's revised standards, indoor air concentrations of 1,1-DCE and TCE should decrease as the underlying groundwater is remediated. As that occurs, it will be necessary to determine at what point indoor air concentrations of 1,1-DCE and TCE in a particular home decrease to the point that ventilation of that home may be discontinued.

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