

Redfield Site

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

September 2006

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, approximately 154 were identified as initially testing below CDPHE's new action levels for 1,1-DCE and trichloroethene (TCE) that originated from groundwater.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 was approved by CDPHE in March 2005 and describes future testing, ventilation and monitoring requirements and procedures based on Colorado's new

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"

1,1-DCE action level. The protocol also factors in new screening levels for another of the 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 outlines a phased approach for re-testing homes to determine if they meet the new action levels. Phase I began in April 2005 and evaluated 88 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. Of the 88 homes re-evaluated in Phase I, 86 met the state's new action levels and therefore, do not require continued operation of the ventilation systems.

Homeowners who meet the state's new action levels are sent a letter notifying them that they no longer need to operate their indoor air remediation system for compounds associated with the Redfield site. Homeowners may opt to continue operating and maintaining their ventilation systems at their own expense. Operating the system is economical, averaging slightly more than \$100 annually in electricity costs. Indoor-air testing of these homes is no longer necessary and will be discontinued.

Because the systems also eliminate radon, both CDPHE and the City and County of Denver Department of Environmental Health recommend that homeowners conduct radon tests in their homes to determine if they should continue operating the system to safeguard against radon.

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.

Evaluation of the Phase II houses began in December 2005 and is scheduled to conclude in early 2007. Phase II evaluates homes that initially tested between 2.5 and 5.0 µg/m³ for 1,1-DCE and below 0.8 µg/m³ for TCE. To date, 44 homes have been re-tested. A second round of testing will be conducted this winter. Once testing is complete, homes with two consecutive tests below the new action levels will also

be notified that they no longer need to operate their system for Redfield related compounds.

Brown Retail's environmental contractor, EnviroGroup Ltd., is contacting the owners of Phase II homes to schedule an indoor air test 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.

For houses where homeowners deny permission for the re-testing or do not respond to the request after repeated attempts, EnviroGroup Ltd. uses a comprehensive "lines-of-evidence" evaluation to determine the status of these homes. The evaluation takes into account solvent concentrations, approved by the state, in groundwater and nearby indoor-air data to determine if indoor-air levels in these homes would meet state criteria if the ventilation systems were turned off. CDPHE considers the lines-of-evidence evaluation when determining which homes meet the state's new indoor-air standards for 1,1-DCE and TCE.

Evaluation of homes in Phase III will begin in 2007. Indoor air concentrations of 1,1-DCE and TCE will decrease over time as the underlying groundwater continues to be treated and cleaned up. Until their homes are evaluated, Phase III homeowners should continue to operate their ventilation systems and monitoring will continue.

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