

Memorandum

Wisconsin Department of Health and Family Services

Division of Public Health
Bureau of Environmental Health

DATE: October 3, 2003
TO: Binyoti Amungwafor, DNR
FROM: Robert Thiboldeaux, DHFS
RE: Decorah Annex vapor intrusion investigation, West Bend Wisconsin

Received
10/04/2003

Binyoti, this memo follows our conversations regarding the results of the vapor intrusion investigation conducted in West Bend by Key Engineering. At the time of your April 8, 2003 letter approving the investigation, you state (point c.) that additional data may be needed. We were aware at that time that the scope of the investigation was purposely limited and might not yield enough information for us to confidently exclude the vapor intrusion pathway to the residences in question. Currently, "do we have enough information?" is still the looming question. The points I wish to discuss are whether we agree with the consultant's interpretation of the results and whether more investigation is needed to move on from the vapor intrusion issue.

The concentration of TCE and PCE in soil gas collected at the source area, GP-23, and the down-gradient groundwater plume locations GP-24 and GP-25 were much lower than modeled partitioning from groundwater predicted. Kris King from Key provided several possible explanations, the most plausible being that VOC gases from the groundwater source are quickly diverted down the utility corridor that lies midway between South Main Street and Lincoln Drive West. If this is the case, this further supports Key's conclusion that the down-plume houses along Lincoln Drive West and beyond are not receptors for vapor intrusion. However, this raises the possibility of vapor migration down this utility corridor. For this reason, additional investigation along and adjacent to this utility corridor should be considered. It may not be necessary to "chase" VOCs along the corridor if an examination of city engineering records provides arguments that this is not a valid pathway to nearby buildings.

The other problem I see with this utility corridor scenario is that, based upon Key's PCE isoconcentration contour map (10/18/02, proj. 0702007 and MW-13, 11/05/01), GP-24 and GP-25 are placed near the 1000 ppb PCE groundwater contour. The groundwater concentration of PCE near the source area (GP-18) was reported as 1800 ppb on 9/27/02. My interpretation of this limited information is that it does not exclude the utility corridor scenario, but does suggest that vapor partitioning near MW-13 must be considered. In other words, the groundwater concentrations of PCE at MW-13 and GP-18 are similar enough that GP-18 should not be considered the sole vapor source in any conceptual site model. This leaves us with several possibilities of the environmental fate of the PCE and TCE: 1) The groundwater contaminants remain in groundwater and are not partitioning as vapor into soil spaces, contrary to our current view of the behavior of these chemicals. 2) PCE and TCE rapidly gas off vertically through sandy soil, and do not appreciably accumulate

in the vadose zone. 3) Vapors are vented through utility corridors that lie both in the alley behind the Lincoln Drive residences and within Lincoln Drive. 4) Some combination of the above.

It is frustrating but not surprising that the limited soil gas sampling has raised more questions than it has answered. My confidence in this investigation would be improved by either repeating the present sampling regimen, particularly under frozen soil conditions, by chasing the vapors to learn if PCE and TCE are traveling along preferential pathways, or by going into homes to rule out individual buildings as vapor intrusion receptors. I do not see a reason at this time to expand the area of investigation beyond the GP 23-25 plume area and the utility corridor traveling north from GP 23.

My main question is what does the RP plan to do next? If remediation of the source area is the next course of action, then that would directly address uncertainties about unknown future effects from the source. That, combined with the low risk indicated by current soil gas sampling, would provide the confidence needed to inform the public that there is no current risk, and that the environmental situation is only going to improve following removal or treatment of the source of contamination.

Conclusions.

- Based solely on very limited evidence, a complete vapor migration and intrusion pathway was not observed downgradient from the source area.
- There are remaining uncertainties in the conceptual site model regarding the environmental fate of PCE and TCE. Vapors downgradient from the source area were far less than expected, and may be migrating north from the source area along the utility corridor.

Recommendations.

- Repeat the soil vapor monitoring at GP 23-25, preferably under winter conditions.
- Investigate vapor migration along the utility corridor behind the Lincoln Drive residences.
- Consider sub-slab monitoring within 1-3 residences over the 1000 ppb groundwater plume beneath Lincoln Drive, this being the most direct and unequivocal evidence for excluding the vapor intrusion pathway.