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Julie Roth, Executive Director
DSCSOC

Information on Health Effects of Landfills

Julie,

One of the issues of concern to those living or working near landfills and other hazardous chemical sites (not necessarily defined as hazardous waste sites, including Superfund sites) is the potential for airborne releases from the site to cause adverse health effects to people within the sphere of influence of the site. You may recall that, when I first became involved as the Technical Assistance Grant advisor to DSCSOC, you and several of the other members of DSCSOC were concerned that past operations of LEHR, as well as existing waste buried at the site were threats to the health of those in the area. At the time, I indicated to you that, based on my public health background, I did not feel (at least in 1995, when DSCSOC became active) that radiation from the LEHR site had been or continued to be a health threat to you and your neighbors. I did point out at that time that there were significant public health threats associated with the pollution of groundwater at the site through UCD's mismanagement of its campus wastes. However, there was inadequate information to make an assessment of the potential for airborne releases from the LEHR site landfills to have been adverse to the health of those near the landfills.

Over the years I have followed closely what is known about health effects of airborne releases from landfills and other hazardous chemical sites on the health of those within the sphere of influence of the site. This sphere can extend several miles from a landfill. As discussed in my "Flawed Technology" review,

> Lee, G. F. and Jones-Lee, A., "Flawed Technology of Subtitle D Landfilling of Municipal Solid Waste," Report of G. Fred Lee & Associates, El Macero, CA, December (2004). Updated March (2006).
> http://www.members.aol.com/apple27298/SubtitleDFlawedTechnPap.pdf

it has been known for many years that those living or working near landfills (including municipal landfills) and hazardous chemical sites have a higher incidence of various types of illnesses. However, the various investigators, including the Center for Disease Control (CDC) in Atlanta, have not been able to develop a definitive relationship between illness and proximity to hazardous chemical sites, including municipal landfills. The

basic problem is that epidemiological techniques needed to investigate the situation require a large database in order to develop such a relationship. Typically the database available for potentially impacted individuals near a landfill/hazardous chemical site is sufficiently small that adequately developed statistical relationships are not possible.

Recently, however, a new study of this issue has been published,

> Kouznetsova, M.; Huang, X.; Ma, J.; Lessner, L. and Carpenter, D., "Increased Rate of Hospitalization for Diabetes and Residential Proximity of Hazardous Waste Sites," *Environmental Health Perspectives* 115(1):75-79, January (2007).
> http://www.ehponline.org/members/2006/9223/9223.pdf
> Also available at:
> http://www.members.aol.com/annejlee/EnvironHealthDiabetes.pdf

which establishes a relationship between living near hazardous waste sites and hospitalization for diabetes. Based on this and an earlier publication from England (which established a relationship between municipal landfills and birth defects), both of which used large databases, I have developed the following write-up,

> Lee, G. F. and Jones-Lee, A., "Association between Hazardous Chemical Sites and Illness," Report of G. Fred Lee & Associates, El Macero, CA, January (2007). http://www.members.aol.com/annejlee/HazChemSites-Illness.pdf

which discusses these issues. This write-up is available on our website at the URL listed.

As discussed in this write-up, municipal solid waste landfills and other hazardous chemical sites, including the UCD campus landfills, have had (and, for that matter, the currently active landfill on the west campus still has) significant airborne releases of hazardous and deleterious chemicals. Some of these chemicals are odorous. As I have suggested, if an individual living or working near a municipal landfill or hazardous chemical site can smell the site, then there is the potential for adverse health effects to that individual. ATSDR has summarized this issue as follows:

> *"Many of the typical landfill gases, notably the alkyl benzenes and the sulfur compounds (both organosulfides and acid gases), may present an odor problem that can cause adverse health effects such as mucous membrane irritation, respiratory irritation, nausea, and stress. If an individual has a pre-existing health condition (e.g., allergies, respiratory illness), these additional health impacts can be significant."*
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> ATSDR, "Landfill Gas Primer: An Overview for Environmental Health Professionals, Appendix B: ATSDR Guidelines, ATSDR Guidelines for Public Health Actions in Response to Landfill Fires," Agency for Toxic Substances and Disease Registry (2006).
> http://www.atsdr.cdc.gov/HAC/landfill/html/appb.html

This past week I attended a lecture organized by the Groundwater Resources Association, presented by Richgels (formerly of the Sacramento Department of Public Works, now with Golder Associates), in which he discussed estimates of releases from municipal landfills. This lecture was based on a paper that Richgels presented at a SWANA symposium in 2000:

> Richgels, C. M., "Reasonably Foreseeable Water Quality Risks from Lined Landfills - Leachate and Landfill Gas Releases," Proceedings of SWANA 5th Annual Landfill Symposium, Solid Waste Association of North America, pp 213-224 (2000). Proceedings available for purchase from:
> http://swanastore.stores.yahoo.net/gensym-21.html

Richgels' paper is based on his experience in measuring landfill gas production and emissions from the Sacramento County Kiefer municipal landfill. Richgels points out that the greatest threat to the environment from municipal landfills is associated with gaseous releases of VOCs, which have a much greater potential to cause groundwater pollution than the initial leakage of leachate through the plastic sheeting liner used in today's Subtitle D landfills. It is his conclusion that the typical landfill gas control at today's modern landfills is inadequate to effectively control both airborne and groundwater pollution by hazardous chemicals such as the VOCs. The important message from Richgels' assessment is that currently active and recently closed landfills have the potential to release substantial amounts of hazardous chemicals to the environment. I was able to obtain a copy of the Richgels paper and can send it to anyone who is interested.

It is my assessment that, because of the low rates of gaseous emissions from the LEHR Superfund site landfills, this is not an issue at this time; however, it could readily have been an important issue while the site was active and for a few years after closure of the landfills. It is certainly an issue associated with UCD's current campus landfill located on Pedrick Road. As you may recall, individuals in that area were concerned about UCD's continuing to manage (mismanage) its campus waste in its own landfills. This approach has led to four UCD campus landfills' polluting groundwaters, and the fifth will, as the composite liner fails, pollute groundwaters as well.

You may also recall that the fourth UCD campus landfill (i.e., the first Pedrick Road landfill) should be part of the LEHR Superfund site, since former UCD employees who worked at LEHR took LEHR site waste to that landfill. However, the politics of the situation were such that the US EPA did not want to expand the magnitude of the LEHR Superfund site investigation and remediation, with the result that it is the CVRWQCB's responsibility to properly monitor and remediate the groundwater pollution that exists at this site, where there is a chloroform plume extending over a mile from the landfill. As a result of the comments made by DSCSOC on this issue, we were able to get the CVRWQCB to expand their monitoring to include testing for radioactivity in the polluted groundwaters near the site.

While current airborne releases from the LEHR Superfund site landfills are small, this situation could change significantly if UCD is allowed to proceed with moving/excavating one or more of the LEHR site landfills. Of particular concern would be the potential for UCD employees and other employees who work at the LEHR site to be exposed to airborne releases of hazardous chemicals. Any manipulation of landfilled wastes at LEHR will have to be very carefully monitored for a wide variety of gases as well as particulates released from the landfill during remediation.

If you have questions about these comments, please contact me. I suggest that you may want to pass these comments on to the LEHR site RPMs and PRPs.

Fred

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