

Kelly Air Force Base: Indoor Air Testing Is Needed

by Lenny Siegel

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On April 10-11, 2007 I visited the former Kelly Air Force Base in San Antonio, Texas. I attended a meeting of the Restoration Advisory Board (RAB), met with community activists, and reviewed documents in the Air Force-sponsored repository in the San Antonio library.

Kelly was an Air Logistics Center, a major 4,000-acre industrial operation employing 30 thousand civilians at its peak. It was designated for closure in 1995, and it halted operations in 2001. In general, it has been a partial reuse success, serving as a home to private aerospace companies. The flight line was realigned to adjacent Lackland Air Force Base.

Contamination includes massive shallow groundwater plumes, containing tetrachloroethylene (PCE) and trichloroethylene (TCE), which flow under low-income, predominantly Hispanic neighborhoods east of the base. There are also releases of TCE, PCE, and other pollutants into Leon Creek. The Air Force has spent at least \$331 million thus far on environmental projects, and it expects to spend a great deal more. Under the oversight of the Texas Commission on Environmental Quality (TCQ) and U.S. EPA, it has installed numerous innovative remedies, including in situ bioremediation at source areas and permeable reactive barriers.

I first visited Kelly Air Force Base in August 2003 as part of the National Environmental Justice Advisory Council's Federal Facilities Working Group. From that visit, meeting with community members at workshops and conference, and correspondence—strongly reinforced by



Successful Commercial Reuse at Kelly

statements by RAB members this April—I learned that members of adjacent neighborhoods blamed their health problems on exposure to pollution from Kelly. They also charged that the Air Force had spent most of its cleanup money enabling industrial reuse, ignoring the health of people in the neighborhoods. The groundwater remedies are designed to prevent additional off-post migration, but no action is being taken to clean up volatile compounds that have already pooled under the community.

The Air Force and other government agencies say that the claims of health injury are baseless because people don't drink water from the shallow aquifers. If there is no pathway, then the decision to let the PCE and TCE already under the neighborhoods degrade naturally, with monitoring, makes sense.

But since my first visit, I've wondered whether vapors from shallow groundwater contamination, well above 100 parts per billion in places for both PCE and TCE, was volatilizing and migrating into people's homes. If the inhalation pathway has been complete, that might explain some of the health problems that the neighbors associate with the contamination. It may also, as some community members want, lead to active treatment approaches that would more rapidly reduce groundwater contamination under the neighborhoods.



Edge of contaminated neighborhood along East Kelly Air Force Base

Recently, I found some data that reinforces my concerns. In a February 2007 Public Health Assessment for the East Kelly area, the U.S. Agency for Toxic Substances and Disease Registry (ATSDR)¹ reported maximum PCE and TCE concentrations in soil gas of 14,230 and 618 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), respectively. Though ATSDR uses the Johnson-

¹“Public Health Assessment for East Kelly Air Force Base,” Agency for Toxic Substances and Disease Registry, February 27, 2007, p. E-2.

Ettinger model to predict currently acceptable (according to virtually every regulatory agency's action level) indoor air concentrations of .345 and .016 ($\mu\text{g}/\text{m}^3$), that seems to be based on an extraordinarily low attenuation factor of about .000025.²

Typically, however, (according to U.S. EPA's national data base), the attenuation factor is .02 (1/50) to .001 (1/1000), and some studies, by EPA's Office of Research and Development and the state of New York, suggest that in some cases the measured attenuation is even less significant. If the soil gas concentration near homes are close the reported maximums, that could indicate indoor levels of from 14 to 285 $\mu\text{g}/\text{m}^3$ for PCE and from 12 to .6 $\mu\text{g}/\text{m}^3$ for TCE, generally above action – that is, requiring mitigation—levels, which are around 1 $\mu\text{g}/\text{m}^3$ for both compounds in leading jurisdictions with active vapor intrusion programs.

The data doesn't prove that residents are being/have been exposed to unacceptable levels of these compounds, generally believed to cause cancer, but it suggests a need for indoor air sampling. If indoor testing above the highest plume concentrations indicates a problem, then widespread sampling is called for.

As I pointed out at the RAB meeting, the Air Force, at still-operating Hill Air Force Base in Utah (also an Air Logistics Center), routinely tests homes for vapor intrusion, and it is operating mitigation systems at many of them. According to Hill Air Force Base officials, they have tested 1400 homes, finding TCE in about 16%.

Furthermore, in researching the Administrative Record, I found a December 2000 letter from Laura Stankosky, an EPA Region 6 Scientist, in which she suggested indoor air testing:

The model may indicate that the concentrations are below risk-based levels in the intermediate step of measured vapor monitoring wells but other numerous variables may be working to potentially create unsatisfactory conditions in the indoor air. The model does not take into account the various other factors that influence vapor migration, such as preferential flow paths caused by cracks in the soil, root holes, burrowing animal tunnels, subsurface conduits leading into buildings such as sewer and drinking water lines, etc. Actual sampling of indoor air could be justified as it would provide direct results; however, in measuring indoor air there is the problem of interference from household-originating vapors that would need to be addressed. Even with this hurdle, direct measurement would provide more definitive data.³

The more recent soil gas data makes an even stronger case for indoor air testing. The Kelly neighbors have long sensed that something is wrong, but they haven't had the technical basis to reinforce their demands. The available soil gas data is strong enough to trigger indoor air sampling along with subslab soil gas and outdoor air sampling. Agencies such as the Air Force, TCEQ, and ATSDR should stop denying that there is a problem unless they have real, point-of-exposure data to prove it.

² The attenuation factor is the ratio of the concentration of a substance in indoor air to the concentration of the same substance in soil gas.

³ Laura Stankosky, "Re: Informal Technical Information Report Zone 4 OU-2 and Site S-4 Soil Vapor Monitoring, Kelly Air Force Base, letter to Mark Weegar, TCEQ, December 8, 2000, Kelly Air Force Base Administrative Record document #1978.