Jordan Downs Redevelopment, South Central Los Angeles: Vapor Intrusion Should Not Be Ignored

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The billion-dollar Jordan Downs Redevelopment Project, located in the heart of Watts in South Central Los Angeles, could end up as a model for neighborhood revitalization in low-to-medium density urban areas. The Housing Authority of the City of Los Angeles (HACLA) plans to replace a 700-unit housing project originally built for World War II veterans with a sustainable urban village containing as many as 1800 mixed-income housing units, major retail stores, and recreational facilities. The planned hardscape is being complemented by a Human Capital effort, underway since 2012, designed to prepare residents for employment and provide social services.

The View from Alameda Street

In the first phase of the project, HACLA and its private partners, Michaels Development Co. and Bridge Housing, plan to build several hundred new rental units on an adjacent 21-acre former steel factory site. To make it safe for housing, they plan to remove at least 33,600 cubic yards of soil contaminated with lead, arsenic, and PCBs A draft Remedial Action Plan (RAP), prepared for California's Department of Toxic Substances Control (DTSC) under a Voluntary Cleanup Agreement, is out for public comment. The proposed off-site disposal of contaminated soil is a welcome step in cleaning up this heavily contaminated community, but the draft RAP considers vapor-intrusion a non-issue, despite the presence of unacceptable concentrations of trichloroethylene (TCE) in groundwater and soil gas in the northeastern section of the property.

Privatized Housing

Developers have submitted a $30-million grant proposal to the U.S. Department of Housing and Urban Development's Choice Neighborhoods Initiative, but the key to the project's financing appears to be the transfer of public property to private parties. While it's unlikely that residential rents in this area could provide enough revenue to repay the massive investment, commercial development—sorely needed in this part of town—should make up the difference.

In general, area residents and their elected officials welcome the project, but housing activists are concerned that despite HACLA's promises many current residents—nearly all African-American or Latino—will be displaced. Seven hundred structurally sound publicly-owned apartments will be replaced with nicer private units. Instead of paying discounted rents to HACLA, residents of the new project will require Section 8 subsidies, uncertain and declining in today's federal fiscal climate. While the first phase of construction might produce enough units to match the 700 planned for demolition, many will be offered to medium-income tenants. Activists fear that HACLA will rely upon evictions to meet its promise to find homes for existing (at the time of demolition) tenants.

Environmental Legacy

The privatization of public housing is a national issue, and the development partnership at Jordan Downs is already in place. But plans for environmental remediation are still underway. Before abandonment, the property was used for steel production, trucking operations, and waste storage. Fortunately, most documents created for the cleanup project are publicly available, and DTSC has a robust program of public involvement in the oversight of voluntary cleanup projects. It plans a public meeting to discuss the RAP in mid-November.

Existing Jordan Downs housing: The wall on the left separates the old housing from the TCE-contaminated steel factory site

After extensive soil sampling, a 2011 Human Health Risk Assessment found that lead and polychlorinated biphenyls posed unacceptable risk to future residents. Other contaminants of concern include arsenic and both diesel-range and oil-range petroleum hydrocarbons. Consequently, Anderson Environmental, on behalf of HACLA, studied six remedial alternatives before proposing excavation of at least 33,600 cubic yards of soil for off-site disposal. Sampling after initial excavation will determine if removal has been successful, and clean soil will be imported to backfill excavated areas.

This proposal seems appropriate as far as it goes. Some area residents are wary because of the recent closure and demolition of a nearby housing project, Ujima Village, due to residual contamination from a former Exxon-Mobil fuel-tank farm, and the recent emergency declaration in nearby Carson, where the 285-home Carousel housing tract was built on a former Shell Oil facility. They have expressed concerns over the spread of toxic dust during removal, and some are wondering how far contamination extends beyond the 21-acre property.

Site Plan from RAP: SV-1, SV-19, and MW-34 are on upper right "Herringbone" structures are existing Jordan Downs buildings

Vapor Intrusion

However, in reviewing available documents, I found that the vapor intrusion pathway had been prematurely dismissed. The Remedial Action Plan (RAP) includes the excavation of one naphthalene hotspot because of unacceptable levels in soil vapor. But both the RAP and the Risk Assessment do not even consider TCE a contaminant of concern, even though it was found in five-foot-down soil vapor in the middle of the property (SV-1) at 4,090 micrograms per cubic meter ($\mu g/m^3$), above the residential California Human Health Screening Levels (CHHSLs) for soil gas with and without engineered fill. *That should have been enough to trigger a vapor intrusion investigation on the site.* On the northeastern boundary (SV-19), it was found at 13,200 $\mu g/m^3$ at fifteen feet below ground surface, though at five feet the level was much lower.

Based both upon U.S. EPA's data base of soil vapor attenuation as well as my personal experience, these levels should have led to a thorough vapor intrusion investigation, if not a direct requirement for mitigation in all new construction. Over the past several years, U.S. EPA has compiled real-world data on the relationship of soil gas concentrations to indoor air concentrations, and on that basis it has established a generic soil gas attenuation factor of .03. Applying that to the SV-1 five-foot reading, one comes up with a possible indoor air concentration of 123 $\mu g/m^3$.

That's more than 100 times higher than California's 1.2 $\mu g/m^3$ threshold associated with one-in-a-million (10^{-6}) excess lifetime cancer risk and nearly 300 times higher than the risk screening level (.43 $\mu g/m^3$) derived from U.S. EPA's IRIS Assessment. It's also more than 61 times higher than the 2 $\mu g/m^3$ level (the Reference Concentration) that the IRIS Assessment associates with cardiac birth defects in a residential scenario. This is significant because DTSC toxicologists have explained that such exposures are of concern for periods as short as one to twenty-one days in the first trimester of the exposed individual's pregnancy.

But the Human Health Risk Assessment, referring to DTSC Guidance, relies on a version of the Johnson-Ettinger model to calculate a risk level of about half the allowable one-in-a-million excess lifetime cancer risk. Though I consider EPA's proposed attenuation factor superior, even the model would have found a problem if the risk assessor had plugged in the 4,090 $\mu g/m^3$ number. Instead, the soil vapor concentration input was 663 $\mu g/m^3$. That value does not appear in the sampling data, so it appears to be some type of average, perhaps incorporating soil vapor readings from areas where no TCE was detected.

Furthermore, the RAP reports an off-site TCE groundwater sample (MW-34), just north of the property at 97th Street, of 720 parts per billion, well above the drinking water standard of 5 ppb. Despite the fact that it conducted no on-site sampling, Anderson Environmental concluded, "Given that the PCE and TCE concentrations in SV-19-15' are higher than the concentrations detected on the Property, the concentrations are significantly less in SV-19-5', and the location of SV-19, it appears that the elevated VOC concentrations detected are from vapors emanating from an offsite source."

However, SV-1—about 300 feet south of SV-19 and the property boundary—shows a TCE vapor concentration of 4,090 $\mu g/m^3$ at five feet below ground surface, higher than the 764 $\mu g/m^3$ found at that depth at SV-19 and more important, more than five times higher than the 786 $\mu g/m^3$ found at 15 feet below ground surface at the same location (SV-1). A significantly higher shallow concentration suggests that SV-1 may be located in or near a potential source area. The RAP does not identify an off-site source of TCE, but even if it did that would not preclude the presence of an on-site source.

Furthermore, if indeed some or all of the TCE found in soil gas on the site is migrating with groundwater from the north, it is possible that concentrations will rise and/or spread on site, increasing the risk from vapor intrusion. But again, no effort was

made to measure groundwater flow, let alone TCE concentrations.

TCE levels in soil gas, at least on a portion of the property, are high enough to merit either extensive, repetitive sampling before construction, or—more cost-effectively—incorporating mitigation into the construction of buildings. Under DTSC Guidance, this should include both vapor barriers and a sub-structure depressurization system. This system may be installed in the passive mode, with the addition of fans should TCE be detected inside. Since TCE poses a short-term risk of cardiac birth defects, such post-construction sampling should take place frequently enough to ensure that peak concentrations do not exceed the Reference Concentration. At sites with TCE in the subsurface, it has proven both more protective and less expensive to design mitigation into construction than to respond to indoor air pollution after the fact.

The requirement for mitigation in buildings on or near TCE in the subsurface should be written into the Remedial Action Plan, and there should be a long-term management plan that calls for maintenance of the mitigation remedy, monitoring to ensure that the system is functioning as designed, contingency plans should indoor air concentrations exceed standards, and notification of building occupants.

A Toxic Neighborhood

Finally, neighborhood residents deserve to see a human health risk assessment that reviews all the sources of toxic substances in the area. The TCE found along 97th Street may indeed spread under nearby residences. In 2004 DTSC conducted an emergency removal of lead-contaminated soil from the Jordan High School baseball field, just south of the 21-acre housing site. While that contamination apparently came from S&W Atlas Iron and Metal Company, also south of the development site, there is concern that lead dust spreads further. Similar businesses operate north of 97th Street. DTSC has done a good job of managing individual sites, but it is time to look at the neighborhood as a whole.