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April 7, 2008

Virginia Finlay
Richmond Planning Commission Chair
c/o Richard Mitchell, Planning Director
Richmond City Hall
1401 Marina Way South
Richmond, CA 94804

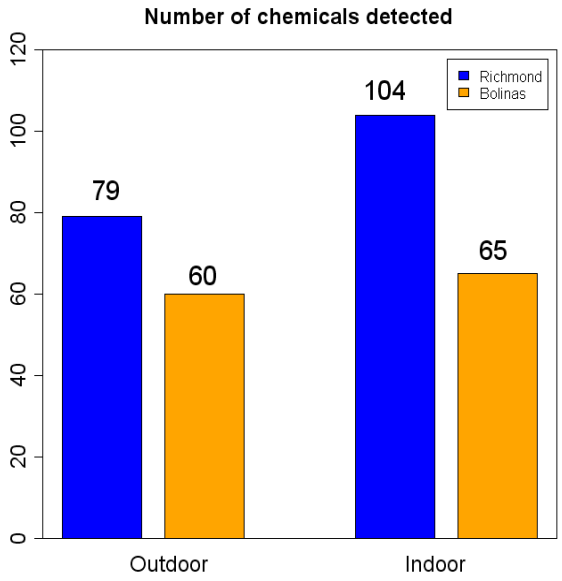
Dear Ms. Finlay:

I am writing regarding the Richmond Planning Commission's pending decision on a conditional use permit for the Chevron Refinery. I am an environmental health scientist at UC Berkeley specializing on research on air pollution and environmental health inequalities and am involved in the Northern California Household Exposure Study, a collaborative research project that includes: Silent Spring Institute (Newton, MA) a non-profit research organization specializing in women's health and the environment; Brown University (Providence, RI); and Communities for a Better Environment.

The Household Exposure Study entails household exposure assessment of air and dust for pollutants from industrial emissions, transportation sources, and consumer products. We recruited non-smoking residents from the Liberty and Atchison Village neighborhoods and from Bolinas to participate in the study. A total of 50 homes are in the study: 40 in Richmond and 10 in Bolinas, our comparison community. Researchers collected air and dust samples from each home and from outdoor areas nearby and tested these samples for over 150 analytes, including, endocrine disrupting compounds, as well as particulates, metals, polycyclic aromatic hydrocarbons (PAHs), ammonia, sulfates, and other pollutants originating from nearby industries, and which are commonly emitted from refinery activities. The preliminary study results discussed below focus on the compounds we found in the indoor and outdoor air samples and that are coming primarily from outdoor emission sources and where refinery activities are likely to be the primary source.

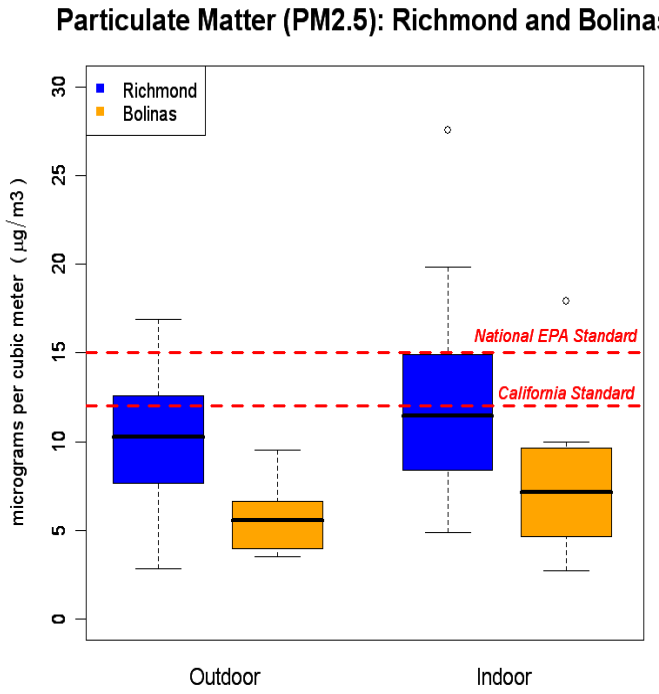
Of the 155 chemicals we sampled for in indoor and outdoor air, we detected 79 chemicals in outdoor air and 104 chemicals in indoor air (Figure 1).

Figure 1: Number of Chemicals Detected in Richmond versus Bolinas



One of the pollutants we tested for in both indoor and outdoor air was fine PM, also known as $PM_{2.5}$. Epidemiological studies have consistently shown that this pollutant is known to cause respiratory and cardiovascular problems. Our air sampling results indicate that $PM_{2.5}$ levels in Richmond in both indoor and outdoor air are much higher than in Bolinas (Figure 2). More important, over 50% of the homes we tested in Richmond had indoor air levels of $PM_{2.5}$ that exceeded the California ambient air quality standard. This is an important finding since studies suggest that people tend to spend between 70-80% of their time indoors. Moreover, our air sampling was conducted during the summer months when $PM_{2.5}$ levels tend to be lower. During the winter months, $PM_{2.5}$ tends to build up due to specific weather patterns. This suggests that the levels we found in our study are likely to be underestimating the actual PM levels to which residents are exposed. Finally, indoor and outdoor levels of $PM_{2.5}$ were highly correlated, which indicates that outdoor sources of PM are penetrating the homes of residents in Richmond.

Figure 2: Indoor and Outdoor Levels of PM $_{2.5}$



Figures 3-4 display the air sampling results for sulfates. This pollutant is most commonly emitted from major industrial sources such as oil refining. Again, indoor and outdoor levels of this pollutant were significantly higher in Richmond than in Bolinas. There is no air quality standard for sulfates, but health studies indicate that higher sulfate content in particulate matter is more likely to cause adverse respiratory health effects. Moreover, as shown in Figure 4, the extremely high correlation between indoor and outdoor levels of sulfates indicates that the primary source of this pollutant is industrial emissions. In general, oil refining activities are a major source of this pollutant in ambient air.

Figure 3: Indoor and Outdoor levels of Sulfates

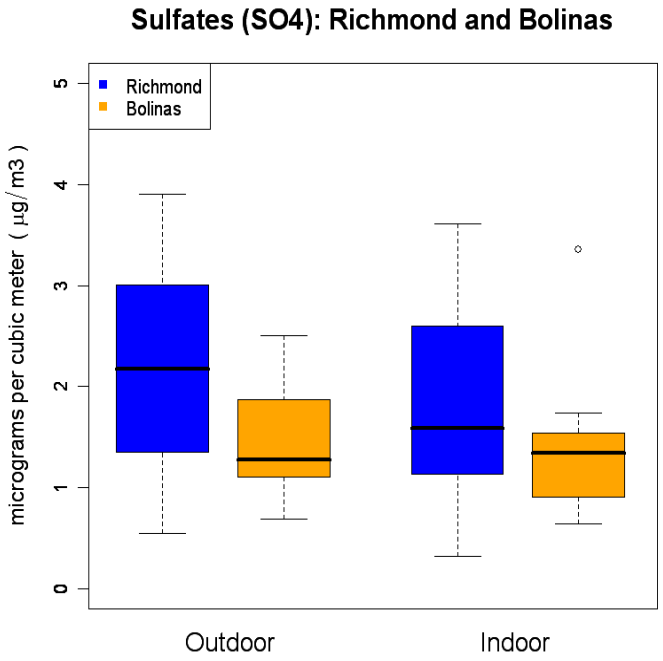
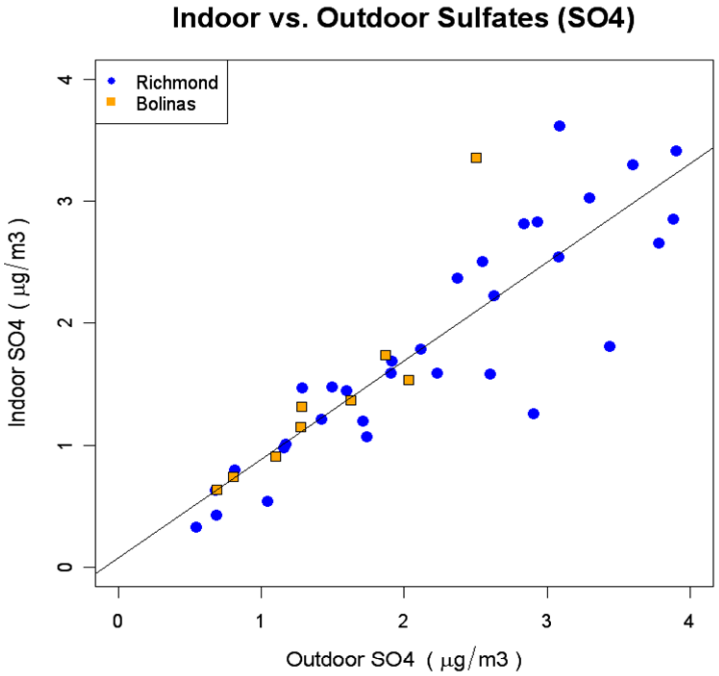


Figure 4: Correlation between Indoor and Outdoor Sulfate Levels



Figures 5-6 show the air sampling results we found for vanadium, a metal that is a key pollutant marker for petroleum refining activities. Our sampling results showed significantly higher levels of vanadium in Richmond, and very low detection rates for this chemical in Bolinas. Moreover, there was a high correlation between indoor versus outdoor levels of this metal, indicating that this outdoor pollutant is penetrating the indoor environments of Richmond homes.

Figure 5: Vanadium Levels in Richmond

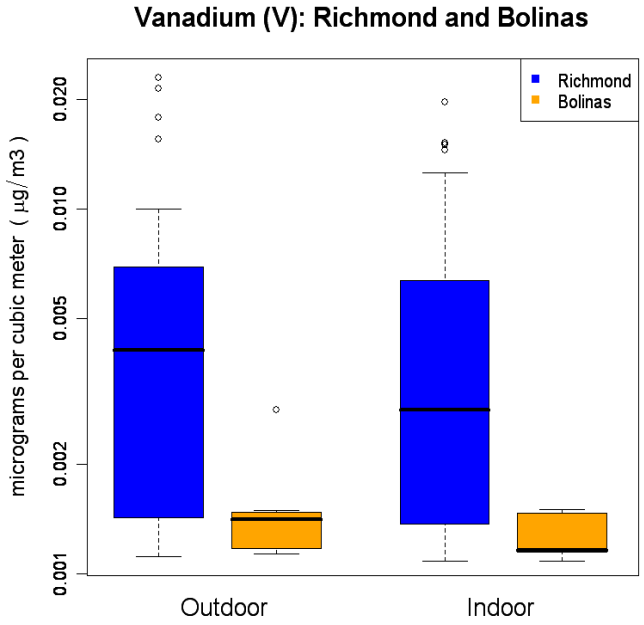
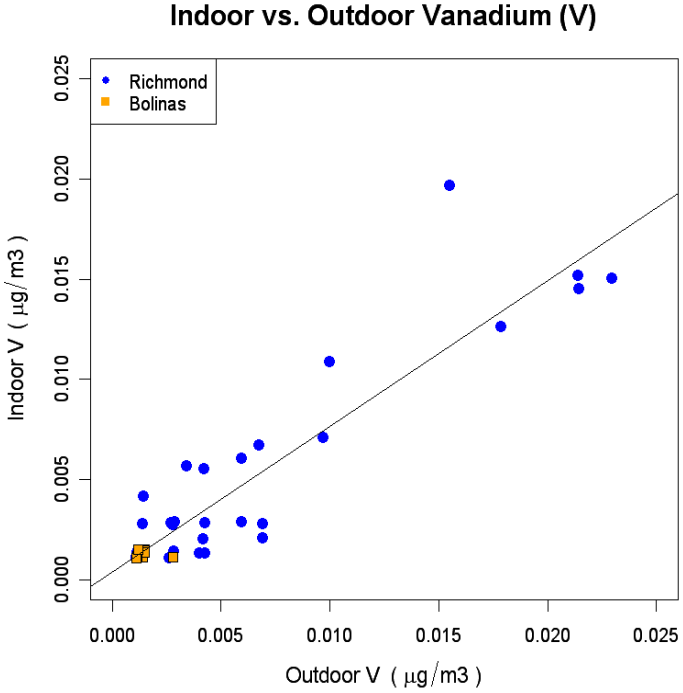


Figure 6: Correlation between Indoor and Outdoor Levels of Vanadium



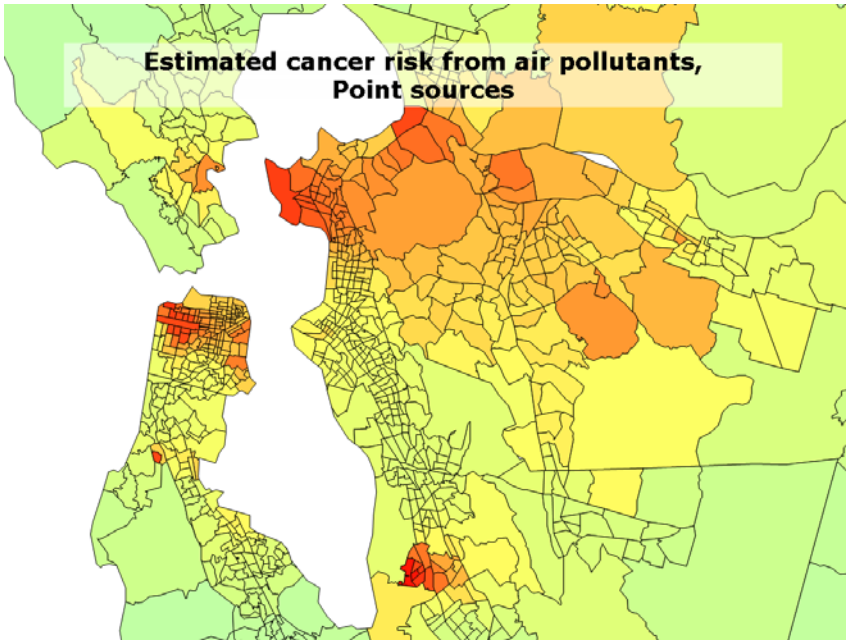
These highlights of the air sampling results in the Household Exposure Study point to the following issues that the Planning Committee should consider it its deliberations:

- **Cumulative Impacts**: our study results indicate that local industry sources, of which the Chevron Refinery is the largest emitter (according to the Toxic Release Inventory data), are adversely impacting

both the outdoor and indoor air quality of nearby Richmond residents. In order to adequately protect public health, any permitting decision must take into account the multiple pollution sources that are already present in this community and that are contributing significantly to current levels of air pollution, which are already problematically high.

- **Decreasing Pollutants from Refinery Activities**: Our study results for metals, such as vanadium, as well as sulfates, ammonia and nitrates, which are typically emitted from refining activities, point to the need for the Planning Commission to explicitly address how the conditional use permit would affect levels of these pollutants, since our study found high levels of these compounds outdoors and inside people's homes.
- **Environmental Justice**: Previous studies of air quality in the San Francisco Bay Area indicate that Richmond is a hotspot for estimated cancer and respiratory health risks associated with ambient air toxics (1) from major point sources (Figure 7). The community within a one-mile radius of the refinery has significant environmental justice concerns as it has a large proportion of residents of color (nearly 80%) most of whom are African American and Latino. Also, over 25% of residents within this radius live at or below the national poverty line. These demographic indices, coupled with the high burden of pollution already in indoor and ambient air, suggest that environmental justice concerns must also be a central consideration in the Commission's deliberations over the conditional use permit. Moreover, Contra Costa's lifetime asthma prevalence rate hovers at around 15%, one of the highest levels in the State of California, with most of the sufferers living in the Richmond area (2). These demographic factors, coupled with significant health issues, raise important concerns about the potentially enhanced vulnerability of residents to the toxic impacts of pollutant exposures and the need for the Commission to ensure that its permitting decision does not increase pollution levels in this already burdened community of color. Given the existing cumulative impact of pollution exposures from diverse sources in this area, it would be prudent for the Planning Commission to proactively seek opportunities for reducing pollutant levels in this area, especially since it appears that indoor levels for certain predominantly outdoor pollutants, such as $PM_{2.5}$, exceed California's ambient air quality standards.

Figure 7: Distribution of estimated lifetime cancer risks from ambient air toxics—Point Sources



In conclusion, air monitoring results, coupled with concerns about environmental equity and the potential for enhanced community vulnerability to air pollution, are all issues that should be central to the Planning Commission's deliberations and guide its decision regarding Chevron's conditional use permit project.

If you have further questions regarding the information presented in this letter, please do not hesitate to contact me.

Sincerely,

Rachel Morello-Frosch, Ph.D., M.P.H.

Cc: Bill Lindsay, City Manager
Janet Schnieder, Administrative Chief

References cited:

1) Pastor M, Morello-Frosch R, Sadd J (2007): *Still Toxic After All These Years: Air Quality and Environmental Justice in the San Francisco Bay Area*. Available at: http://cjtc.ucsc.edu/docs/bay_final.pdf.

2) Milet M, Tran S, Eatherton M, Flattery J, Kreutzer R.(2007) *The Burden of Asthma in California: A Surveillance Report*. Richmond, CA: California Department of Health Services, Environmental Health Investigations Branch.