

**Comments of Dr. Bart Ostro. Former Chief of the Air Pollution Epidemiology Section, California Environmental Protection Agency. Dr. Ostro was responsible for helping to develop the air pollution standards for fine particles (PM2.5) for California, the U.S. EPA and the World Health Organization and is the author of over 100 peer reviewed publications on the health effects of air pollution and heat waves.**

RE: Comments regarding Exposure and Public Health Impacts of Coal Exports at the Former Oakland Army Base for the Council hearing on Sept 21, 2015

Dear Oakland City Council Members:

## **EXPOSURES**

- Recent studies of 367 trains in Washington State (Jaffe et al., 2014; 2015) reported the average peak in near-by concentrations of fine particles (particles less than 2.5 microns or PM2.5) of coal trains were twice that of freight, specifically 21 versus 11 micrograms per cubic meter (the standard measure of particle concentrations, abbreviated as  $\mu\text{g}/\text{m}^3$ ). For reference, the current U.S. standard for 24-hour average of PM2.5 is  $35 \mu\text{g}/\text{m}^3$ . In addition, they reported several events with concentrations greater than  $75 \mu\text{g}/\text{m}^3$  with concentrations up to  $230 \mu\text{g}/\text{m}^3$ . Thus, we could expect very high peaks of PM2.5, at concentrations that could cause health effects.
- PM2.5 has been determined by The World Health Organization (WHO) to have the greatest worldwide impacts of any environmental exposure with an estimated 3 million deaths per year. Estimates for California range from 10 to 30 thousand per year.
- In addition to PM2.5, the coal dust will include toxic heavy metals such as arsenic, cadmium, chromium, lead, mercury and nickel.
- It is likely that coal trains, especially mile-long trains coming through a community on a daily basis will significantly impact the noise levels in the community.
- Since the location of the facility is in close proximity to the Bay, it is likely to lead to deposition of toxic metals in to the water which could ultimately enter the food chain.

## **HEALTH IMPACTS**

- Studies from around the world and from California demonstrate important associations between daily exposure to PM2.5 and a wide range of health impacts including respiratory symptoms, school and work loss, asthma exacerbation, emergency room visits, non-fatal heart attacks, adverse birth outcomes, hospital admissions, and death from cardiovascular disease. The populations at greatest particular risk (though other groups are susceptible) include children, asthmatics and older individuals with pre-existing cardiovascular or respiratory disease.
- Studies in California demonstrate that daily exposure to PM2.5 and larger particles can lead to early death, increases in hospitalization and emergency room visits, and adverse birth outcomes (Ostro et al. 2006, 2009; Malig and Ostro (2009), Green et al. (2009), Malig et al. (2013)). In addition, since exposure to coal dust can be considered similar to

that of black carbon, on a per microgram basis the risks of early death and hospitalization might even be larger than that of PM<sub>2.5</sub> (Ostro et al., 2014).

- While specific ambient standards have been established for PM<sub>2.5</sub>, institutions including California EPA and WHO, have specified there is no clear cut safe level for these effects. This indicates that every exposure adds to the likelihood of an adverse health outcome.
- Chronic exposure to the toxic metals in coal have been linked to cancer, adverse birth effects, and other severe health outcomes.
- A recent review of the health effects of noise pollution indicates effects on sleep quality and quantity, reduced learning and school performance, impaired social–emotional development, stress and hypertension (Hammer et al., 2014).
- In addition, we need to consider the added health impacts of burning up to 10 million tons of coal on climate change. Over time, climate models predict increases in both the intensity and duration of heat waves in California and an increase in ozone pollution. Again, the health effects of higher temperatures and of ozone in California have been well documented and will result in increases in both mortality, hospitalization and emergency room visits in Oakland.

## CONCLUSIONS

- 1. While there is uncertainty about the specific increase in coal dust from trains coming to Oakland, the available literature indicates important increases in fine and larger particles and several toxic metals.**
- 2. The increase in local exposure to PM<sub>2.5</sub> from coal trains is almost double that of freight trains.**
- 3. Exposure to these pollutants have been linked in dozens of studies, including several conducted in California, with death, hospitalization for cardiovascular and respiratory disease, emergency room visits, cancer, asthma exacerbation and adverse birth outcomes.**
- 4. There is likelihood that the pollutants will also end up in the Bay and in our food chain.**
- 5. There is a possibility of other health effects on those on individuals working on or near the loading and unloading of the coal, from the exposure to noise and from potential derailments and fires.**

## References

- Green et al. (2009) *Environmental Health Perspectives* 117: 1939-44.  
Hammer et al. (2014) *Environmental Health Perspectives* 122:115–119.  
Jaffe et al. (2014) *Atmospheric Pollution Research* 5:344-351.  
Malig and Ostro (2009) *Occupational and Environmental Medicine* 66:832-839.  
Malig et al. (2013) *American Journal of Epidemiology* 178:58-69.  
Ostro et al. (2006) *Environmental Health Perspectives* 114: 29–33.  
Ostro et al. (2009) *Environmental Health Perspectives* 117:475-480.  
Ostro et al. (2014) *Occupational and Environmental Medicine* 72:123-9.

The opinions expressed here do not necessarily represent those of the California EPA.