Alameda Point Vegetable Uptake Sampling Study

"edible plant tissues collected...did not show any detectable PAHs."

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Fig.1. The view of the San Francisco skyline from Alameda Point. Wouldn't you want to live here?

Excerpts:
Out here in the San Francisco Bay Area, the traditionally cooler months are usually a bit more agreeable and this allowed ORD to assist Region 9 with a vegetable upake experiment over the fall and winter. Duane Newell from the Las Vegas Lab provided helpful support for this project at the former Alameda Naval Air Station, now called Alameda Point.

As an EPA RPM in Superfund or a RCRA project manager, you too can take advantage of Remedial Investigation support (like at Alameda Point) that is available through ORD. This is just one of a number of types of technical support that I can assist you with; please don't hesitate to ask. **In most cases, the funding is already there and waiting for requests.**

Mike Gill - EPA Region 9
ORD Hazardous Substances Technical Liaison

ORD [Office of Research and Development] recently assisted Region 9 with a vegetable uptake test at the Alameda Point Site. The site is the former Alameda Naval Air Station and is located on San Francisco Bay. Historically, the property was used as a borax processing facility, an oil refinery, and for military fleet aviation activities. Part of the property was contaminated with polycyclic aromatic hydrocarbons (PAHs). The site will be transferred to the local community and will be redeveloped into residential, commercial, industrial and recreational areas.

The objective of this project was to determine the potential exposure threat to current and future residents from the consumption of fruits and vegetables grown within the area of concern at the site. The Las Vegas Lab's ERT section was requested to provide support to this effort. To accomplish this, an investigation was conducted that included a vegetation reconnaissance throughout the site. Fifteen targeted sampling locations and two reference areas were selected for the collection of soil and edible plant tissue samples to determine whether PAHs are transferred from soil to plant roots and then translocated from roots to edible plant parts. At each sampling location, fruits, vegetables or edible weed flowers were collected for PAH analysis. At the same time, a soil sample was collected from the root zone of the target plants to link the PAHs in the soil to the PAH accumulation in the plant tissues. The plant tissues sampled were fruits (apple, fig, and tomato), fava bean seeds, and flowers of Cat's-Ear.

The concentrations of benzo(a)pyrene-equivalent PAHs in the soil from these locations ranged from 16 to 462 ug/kg. The benzo(a)pyrene-equivalent concentrations for the reference areas were 21 ug/kg and 58 ug/kg. There were five locations on site where the soil collected from

plant root zones contained comparatively higher benzo(a)pyrene- equivalent PAHs than the reference areas. The total benzo(a)pyrene-equivalent concentrations in the soil from these five locations ranged from 94 to 462 ug/kg, which were 3 to 14 times higher than the average concentration of the benzo(a)pyrene- equivalent PAHs from the reference areas.

Fig 2. Region 9 toxicologist Dr. Sophia Serda is in her element as she assists with vegetable sample collection.

Fig. 3. Some of the sampled vegetation analyzed for PAHs.

None of the 16 PAH congeners on the EPA Priority Pollutant List was detected in any of the plant samples collected from the site. Method detection limits ranged from 17 to 62 ug/kg. Even in the locations with the higher benzo(a)pyrene-equivalent PAHs in soil, edible plant tissues collected from these same locations did not show any detectable PAHs.

The results will be used in the human health risk assessment for the site. With assistance like this from ORD, an RPM can collect and utilize empirical data from the field for risk assessments during the RI, instead of depending on data derived from scientific literature that may not be applicable to the conditions at your site. These results will surely be "site specific", as we always say!

Fig. 4. Collected samples (tasty apple slices) are tagged for lab analysis by Lockeed Martin's Jianwei Huang.