



## AMCO 2010 Health Risk Assessment Summary

**A** Human Health Risk Assessment is a method of determining the probability of harm occurring to people from exposure to contaminants at a site. Both the toxic properties of hazardous substances and the ways that people may be exposed to these substances are evaluated. A risk assessment helps determine whether significant risks to people's health may exist at or near a contaminated site and also helps determine risk-based cleanup levels for contaminants at the site. The risk assessment is one factor project managers use to make decisions on how a contaminated site should be cleaned up. Other factors include state and federal regulations, costs, treatment techniques and their feasibility, and community acceptance.

To characterize potential non-cancer effects, estimated intakes of substances and their toxicity values are examined. Potential carcinogenic effects are evaluated by calculating probabilities that an individual will develop cancer over a lifetime of exposure based on projected intakes and chemical-specific dose-response information. Non-carcinogenic health effects are expressed in terms of hazard index (HI) while carcinogenic effects are expressed in terms of an excess lifetime cancer risk (ELCR). Human health risks were compared against EPA's target risk management range of  $10^{-4}$  to  $10^{-6}$  for cancer risks (in other words, a cancer risk of 1 to 100 people in 1 million) and the HI benchmark of 1 for non-cancer hazards (in other words, any value over 1 is avoided). Because the neighborhood surrounding the site is a vulnerable community, EPA has elected to use the most conservative ELCR of  $10^{-6}$ , or 1 in a million people, as the point at which action will be required at this site.

The risks calculated during the risk assessment are based on conservative assumptions so that they are not likely to be exceeded by any member of the exposed population even under reasonable maximum exposure conditions. A risk assessment cannot identify who within an exposed community may or may not become ill due to exposure to toxic agents; nor can a risk assessment be used to associate a particular illness with a particular toxic agent. A risk assessment is best used as a predictive tool to identify those circumstances under which exposure to a toxic agent may potentially lead to unacceptable health outcomes. This information can then be used to select options that will reduce or remove the community's exposure to the toxic agent.

### Potential Health Risks from Exposure to Soil

For the risk assessment at the AMCO site, four areas associated with historical industrial activities were evaluated for two types of workers, industrial and construction, and potential future residential exposures. The areas include the former AMCO facility, parking lot, large vacant lot, and small vacant lot.

Industrial workers may be exposed to soil through incidental ingestion, dermal contact with soil or inhalation of dust. Estimated cancer risks are at the upper end or exceed the EPA's risk



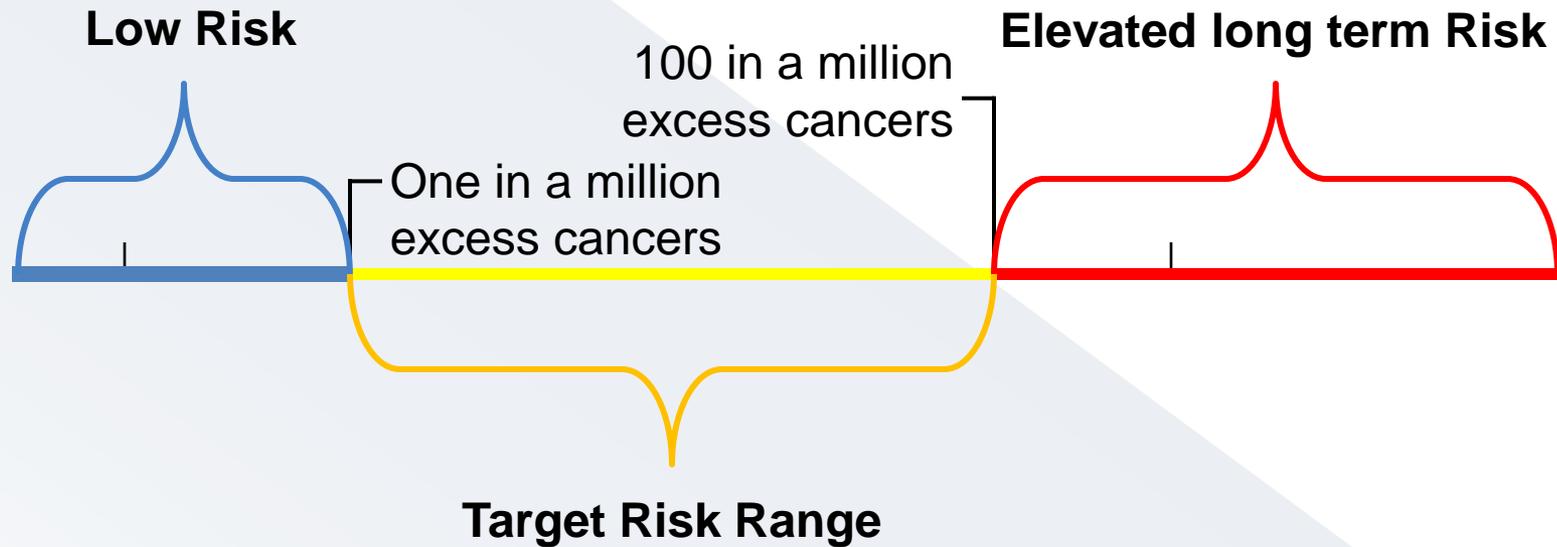
# Risk Assessment

- Good at identifying what chemicals need to be removed from the soil, water and air to protect your health. Powerful tool for EPA to prioritize a site for funding.
- Results are estimates not certainties
- There is no such thing as zero cancer risk, so EPA uses a target risk range as a basis for action

In a population of 1,000,000 people, approximately 30% will develop some form of cancer  
= 300,000

- 1 in a million extra cases = 300,00**1**
- 10 in a million extra cases = 300,0**10**
- 100 in a million extra cases = 300,**100**

# Risk Analysis for Cancer (total risk of all chemicals measured)



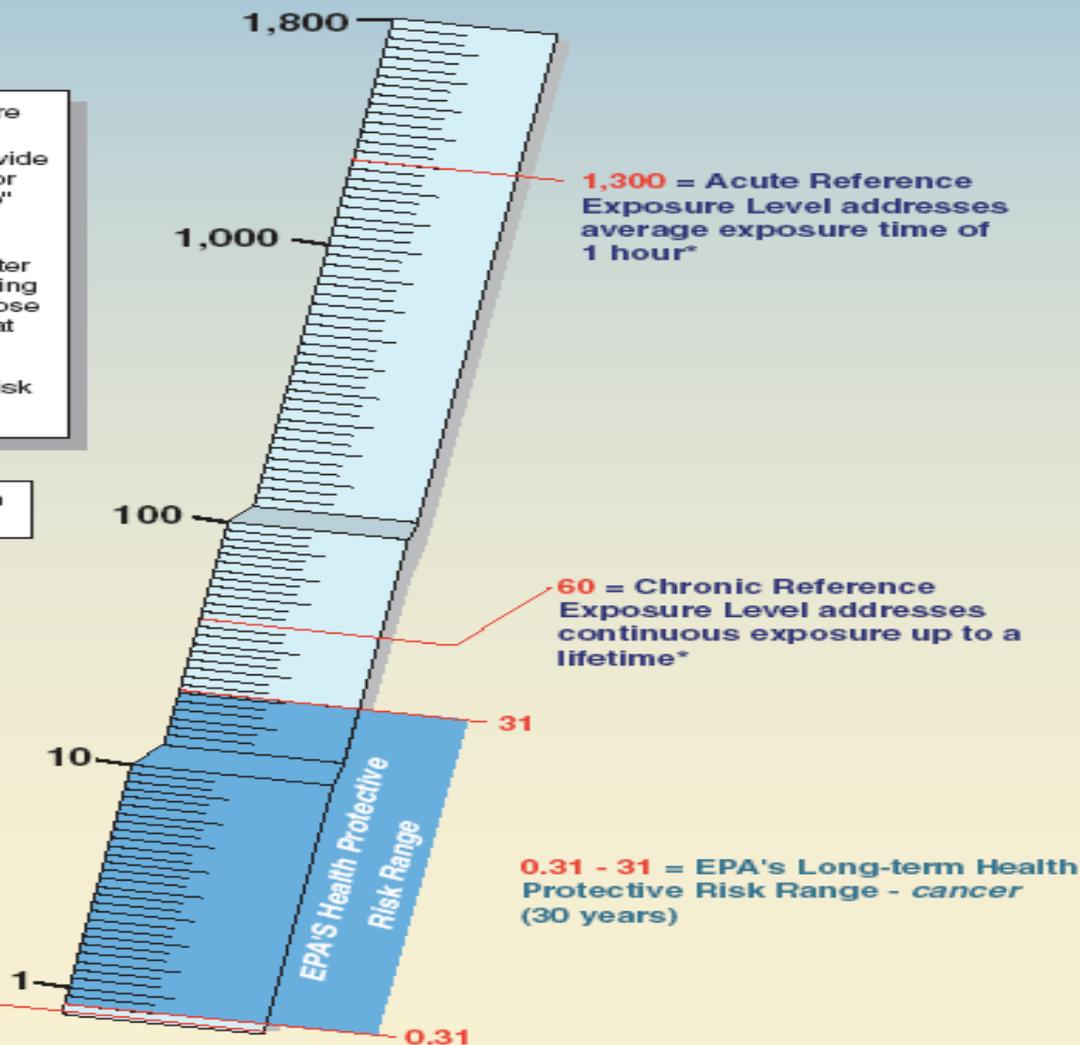
# RESIDENTIAL RISK SCREENING LEVELS FOR BENZENE IN AIR

Health-based screening levels are used to guide the investigation

- Set at protective levels to provide a sufficient margin of safety for everyone, including "sensitive" individuals (children and pregnant women)
- Benzene in air at a level greater than the health-based screening levels does not necessarily pose a health risk, but indicates that additional evaluation may be warranted to determine if a potentially significant health risk could exist

\* Office of Environmental Health Hazard Assessment (OEHHHA)

0.16 = Laboratory Detection Limit



Units in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )

# AMCO What was measured

- ⦿ All Chemicals in air from all sources
- ⦿ All Chemicals in soil
- ⦿ All Chemicals in water
- ⦿ ALL Chemicals detected were used in risk assessment

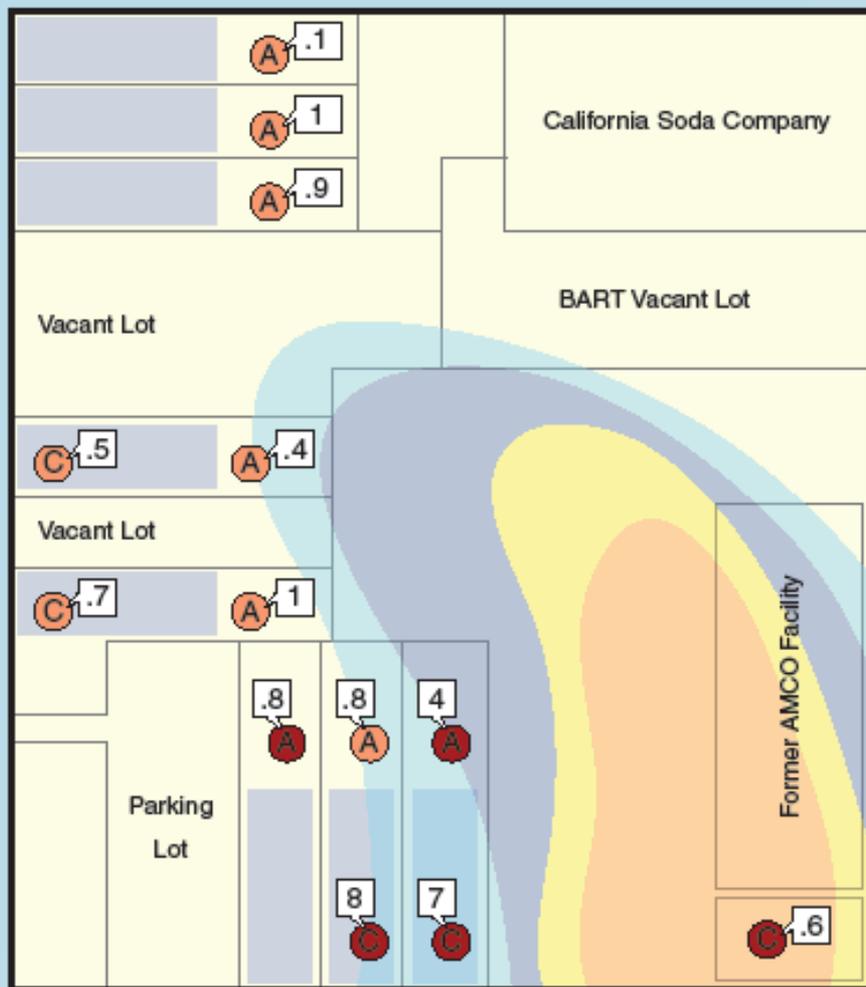


AMCO CHEMICAL  
SUPERFUND SITE

# Crawlspace and Ambient Air

Based on data from September 2004 – June 2009

**A**.5 Lewis Street Combined Background Data  
(Several blocks to the east)



South Prescott Park Playground  
Background Data **A**.5

**C** Crawlspace

**A** Ambient Air

**●** 100-1,000 people in 1,000,000  
(excess lifetime cancer risk)

**●** 10-100 people in 1,000,000  
(excess lifetime cancer risk)

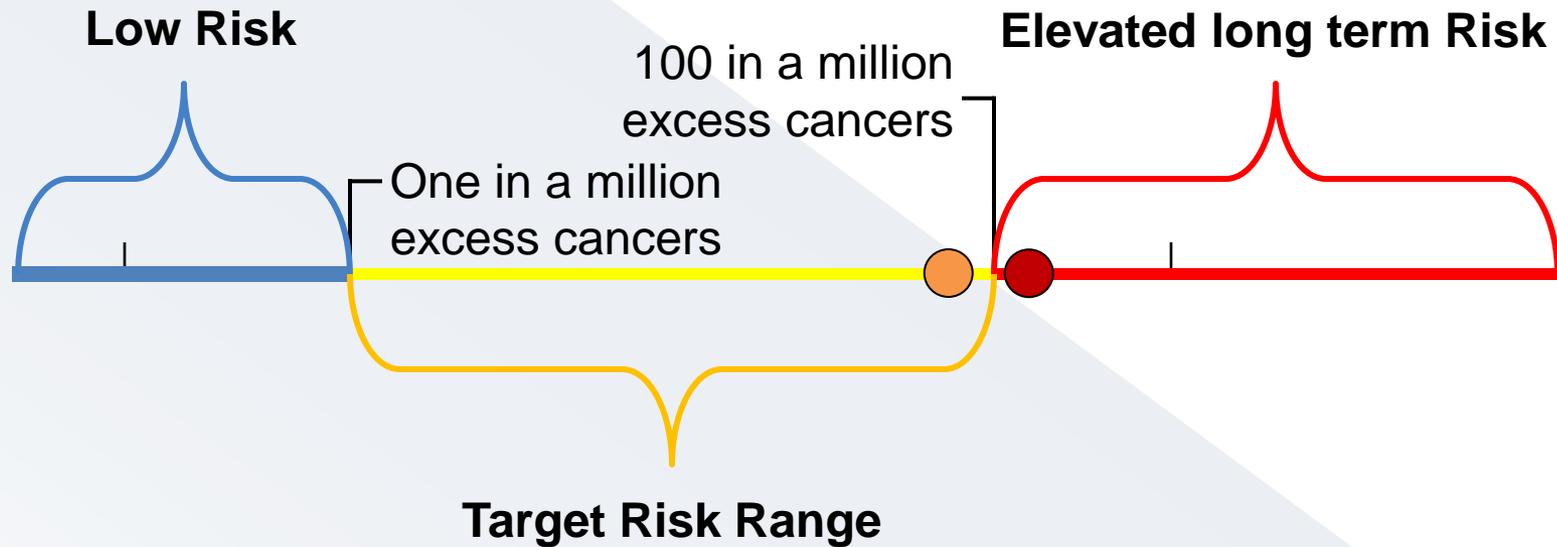
EPA's recommendation in this community is to take action when excess lifetime cancer risk exceeds 1 in 1,000,000.

Chemicals Posing Cancer Risk and their Screening Levels	Concentrations Detected
Benzene (0.31 - 31 $\mu\text{g}/\text{m}^3$ )	0.4 - 16 $\mu\text{g}/\text{m}^3$
Carbon tetrachloride (0.41 - 41 $\mu\text{g}/\text{m}^3$ )	0.4 - 6 $\mu\text{g}/\text{m}^3$
Tetrachloroethene (0.41 - 41 $\mu\text{g}/\text{m}^3$ )	0.1 - 9 $\mu\text{g}/\text{m}^3$
Trichloroethene (1.2 - 120 $\mu\text{g}/\text{m}^3$ )	0.03 - 14 $\mu\text{g}/\text{m}^3$
Vinyl chloride (0.16 - 16 $\mu\text{g}/\text{m}^3$ )	ND - 3 $\mu\text{g}/\text{m}^3$

**2** Non Cancer Health Hazard  
(for example worsening of asthma symptoms, headache)  
>1 Could pose health risk and needs to be investigated.

Chemicals Posing Non-Cancer Health Hazard and their Screening Levels	Concentrations Detected
1,2,4-Trimethylbenzene (7 $\mu\text{g}/\text{m}^3$ )	0.32 - 34 $\mu\text{g}/\text{m}^3$
1,3,5-Trimethylbenzene (6 $\mu\text{g}/\text{m}^3$ )	0.11 - 11 $\mu\text{g}/\text{m}^3$
Naphthalene (3.1 $\mu\text{g}/\text{m}^3$ )	ND - 5 $\mu\text{g}/\text{m}^3$

# Risk Analysis for Cancer (total risk of all chemicals measured)



# Other Potential Health Risks

- High risk remains from soil exposure for anyone who might live or work at the actual AMCO Facility if the pavement is removed
- Homegrown produce

# What we did to address cumulative impacts at the Site

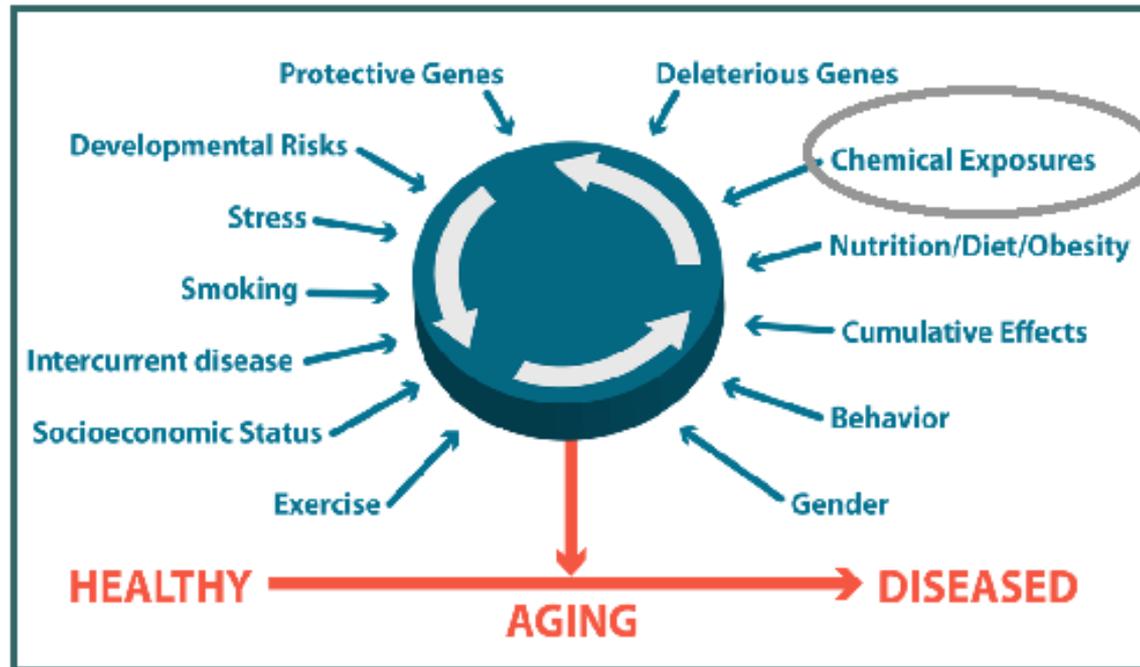
- Recommendation to take action at 1 in a million rather than 100 in a million
- Removal of lead contaminated soil from residential yards
- Soil gas mitigation in homes
- Toxicity information from the California Office of Environmental Health Hazard Assessment
- New lead toxicity information

# Limitations of SFund law

- Why we couldn't move Manuel
- Issues must be elevated to the legislative levels to change the SFund law
- Housing should not be built near freeways: best addressed via zoning laws and/or geographic permitting

# Developing science of cumulative impact analysis

## Interactions of Risk Factors Over the Life Span Determine Individual Health Status



- Each individual has a unique set of risk factors
- No individual is exposed to a single chemical; thus there may also be chemical interactions

# Parkinson's Disease as a Complex Disorder

## ○ Factors Enhancing Vulnerability

- Age
- Genetic background (e.g.,  $\alpha$ -synuclein, DJ1, parkin)
- Boxing
- Farming
- Drinking Well Water
- Pesticide Exposure
- Gender
- Diet

## ○ Protective Factors

- Gender
- Smoking
- Caffeine
- Exercise
- Diet



# Many environmental factors

**Cumulative  
Impact**

=

## **Exposures**

Contact with pollutants  
e.g. ozone ,  
BAP, brominated flame  
retardents

+

## **Public Health Effects**

Health conditions  
influenced by exposure  
e.g. low birth weight,  
asthma, cardiovascular  
disease, cancer

+

## **Environmental Effects**

Conditions that could  
affect health  
e.g. waste sites  
brownfields, Sfund  
AMCO “

X

**Sensitive  
population  
+  
Socioeconomic  
factors**



# Cumulative Impacts

- "Cumulative impact means exposures, public health or environmental effects from the combined emissions and discharges, in a geographical area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socio-economic factors, where applicable and to the extent data are available."
- California Office of Environmental Health Hazard Assessment (OEHHA) framework document. It originally came from the Cal/EPA interagency working group.

# Contact Information

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