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Environmental Health

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Dioxin in Oroville Summary and Recommendations

What is Dioxin?

Dioxin and related compounds (polychlorinated dibenzo-p-dioxin (PCDDs), polychlorinated dibenzofurans (PCDFs) and polychlorinated biphenyls (PCBs)), are halogenated aromatic compounds which are toxic industrial pollutants that persist in the environment and accumulate in the fat tissue of animals and humans. Foods of animal origin are the primary source of human exposure to dioxins. In addition to cancer, dioxins have been linked to adverse human health effects such as developmental, immunologic, and endocrine toxicity. The major environmental sources of dioxin are emissions from combustion, incineration, any industrial processes using chlorine, paper mills, and fireplaces. Sources also include naturally occurring events such as volcanic eruptions and forest fires. The aerial transport of these emissions is the primary pathway dioxins enter the environment and food chain. Another source of dioxins in the environment are chlorophenol-based products, such as Pentachlorophenol (PCP), which were widely used as a wood preservative in the past until its use was restricted in 1980. The burning of PCP materials releases dioxin.

Potential Dioxin Sources in Oroville

In the past there were four lumber mills in the South Oroville industrial area which produced pressure treated wood products using PCP and other chemicals. These lumber mills used teepee burners to burn wood waste and it is likely that pressure treated wood waste and sawdust were burned as well. One of the facilities is Koppers Industries, Inc., which is currently a Federal Superfund Cleanup Site. This facility had two large fires, one in 1963 where 20,000 gallons of PCP was released and another in 1987 where approximately 6,000 pounds of PCP was burned, potentially causing an airborne release of dioxin. Other sources may include large industrial incinerators (such as a co-generation electric facility), burning of trash in burn barrels, burning of pressure treated wood for residential heat, using pressure treated sawdust or ash as a soil amendment, and the use of common pesticides/herbicides containing 2,4-Dichlorophenoxyacetic acid (2,4-D) which contain dioxins as a contaminant. However, there is neither definitive data nor evidence that shows how much, if any, these other sources may have contributed to the dispersion of dioxin to the greater Oroville area.

Exposure to Dioxin

Dioxin in the environment is generally spread through aerial transport and is deposited on surface soil, vegetation, and water bodies. Free range foraging animals, such as cows and chickens, are exposed to dioxin through ingestion and inhalation while eating, causing the accumulation of dioxin in the fatty tissue of animals and eggs. Humans can be exposed to dioxin by eating free range meat, fish or dairy products that have significantly greater dioxin levels than those found in the commercial food supply.

Since the Kopper's Fire in 1987, two studies have been completed regarding the dioxin levels in soil and chicken eggs in the greater Oroville area resulting in two published articles. Additionally, the Butte Environmental Council (BEC) conducted sampling of chicken eggs in the greater Oroville area. Results of the studies indicate elevated dioxin levels in chicken eggs in the greater Oroville area as compared to commercial chicken eggs. The dioxin concentrations in soil were determined to be at levels which are considered safe for residential use. The published articles, as well as information regarding the BEC results, can be obtained from the web-links in the *Resources for Additional Information* section of this fact sheet.

How to Reduce Dioxin Exposure

The California Department of Health Services (CDHS) created two fact sheets regarding dioxin and free range foraging chickens. Based on these fact sheets CDHS recommends the following:

- CDHS advises that Oroville residents to **not** eat eggs or meat from free range foraging chickens in the Oroville area. However, if residents choose to eat meat and eggs from foraging chickens, the following steps may be used to potentially reduce dioxin exposure:
 - Do not eat the skin, fat or liver from free range chickens.
 - Eat only the egg whites.
 - Keep chickens in a chicken coop raised off the ground or have a barrier between the chickens and the soil such as concrete, gravel, or straw.
 - Remove any pressure treated wood which may contain PCP from the back yard.
- Do not burn trash in burn barrels or perform open burning of vegetation. Dispose of garbage properly and use a chipper or a green waste facility for vegetation waste.
- Wash home grown fruit and vegetables grown in the greater Oroville area prior to eating.

Resources for Additional Information

United States Environmental Protection Agency, Persistent Bioaccumulative and Toxic (PBT) Chemical Program - Dioxins and Furans: <http://www.epa.gov/pbt/pubs/dioxins.htm>

World Health Organization, Dioxins and their effects on human health: <http://www.who.int/mediacentre/factsheets/fs225/en/>

National Institute of Environmental Health Sciences, Dioxins: <http://www.niehs.nih.gov/health/topics/agents/dioxins/>

Agency for Toxic Substances and Disease Registry (ASTDR), ToxFAQs™ for Chlorinated Dibenzo-p-dioxins (CDDs): <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=363&tid=63>

Koppers Industries, Inc. Superfund Site: <http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0901135>

Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofuran Contamination in Soil and Home-Produced Chicken Eggs Near Pentachlorophenol Sources, Environmental Science & Technology, VOL. 34, NO. 7, 2000 <http://pubs.acs.org/doi/abs/10.1021/es9906103>

Serum polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans among people eating contaminated home-produced eggs and beef, Environmental Health Perspectives, Volume 108, Number 1, January 2000 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637871/>

California Department of Health Services, February 28, 2000, Oroville Area Dioxin Advisory <http://www.ehib.org/papers/oroville-english.pdf>

California Department of Health Services, August 2004, Backyard Chicken Eggs in California: Reducing Risks Questions and Answers <http://www.ehib.org/papers/caeggs8by11c.pdf>

Butte Environmental Council Egg Testing Results: http://www.becnet.org/sites/default/files/file-attachment/Final_Egg_Test_Map_8x11.pdf#overlay-context=dioxin-butte-county

For additional information or specific inquiries you may contact Butte County Environmental Health at (530) 538-7281.