



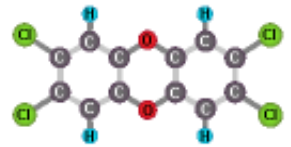
## Santa Clara Valley Urban Runoff Pollution Prevention Program

# DIOXIN CONTROL PROGRAM

The Program's NPDES permit includes water quality-based requirements related to specific pollutants, including dioxins and other pollutants (e.g., mercury and PCBs). The Program has developed a control program to begin reducing or eliminating discharges of dioxins associated with controllable sources from urban runoff conveyance systems. The overall strategy is to focus on pollution prevention measures that address dioxin sources. These measures reduce or prevent the formation of dioxins or their release into the environment.

### What Are Dioxins?

"Dioxin-like compounds" typically refers to a group of chemical compounds with similar chemical structures that share certain biological characteristics. There are three main categories of dioxin-like compounds: polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and certain polychlorinated biphenyl (PCB) congeners with dioxin-like potency that are often referred to as dioxin-like PCBs. PCDDs and PCDFs (collectively referred to as "dioxins" in this fact sheet) are not commercially produced but are unintentional by-products of combustion in the presence of chlorine and chemical production processes involving chlorinated compounds. In contrast, PCBs, including dioxin-like PCBs, were intentionally manufactured for a wide variety of applications, and have different sources and probably a different distribution in local watersheds. The Program has a separate task that addresses PCBs, including dioxin-like PCBs.



### Regulatory Background



The Clean Water Act (CWA) requires that states develop water quality standards protective of human health and the aquatic environment. Section 303(d) of the CWA requires the State to develop and periodically update a list of "impaired" water bodies that do not meet the standards. The 303(d) list designates all segments of San Francisco Bay as impaired by certain dioxin compounds. The primary reason for the listing was an interim advisory on the consumption of fish from the Bay issued by the California Office of Environmental Health Hazard Assessment. There is considerable controversy, however, regarding the potential threats to human health by dioxins. The State of California opposed the 1998 listing of dioxins in the Bay but was overruled by USEPA. In addition, dioxin-like PCBs have been found to contribute most (about 80 percent) of the overall dioxin-like potency in Bay fish (Greenfield et al. 2003).

### Sources of Dioxins

There are many sources of dioxins to environment, including the following examples:

- Diesel exhaust - dioxins are found in diesel fuel and exhaust.
- Wood burning - combustion of wood (e.g., in residential fireplaces, forest fires) results in dioxin emissions due to the presence of trace chlorine in wood.
- 2,4-D - trace dioxins are found in this chlorinated phenoxy compound used as a systemic herbicide for broad-leafed weeds.
- Polyvinyl chloride (PVC) - combustion of PVCs during intentional burning/incineration and accidental fires results in dioxins emissions.
- Garbage burning - many wastes contain chlorine, and their combustion results in dioxin emissions.
- Medical waste incineration - combustion of medical waste (e.g., PVC products) results in dioxin emissions.
- Pentachlorophenol - dioxins have been found as a contaminant in this fungicide used as a wood preservative. Dioxins may be released to the environment during treatment of wood by pentachlorophenol and through volatilization from treated wood (e.g., wood utility poles).
- Paper bleaching - dioxins are formed when chlorine gas is used to bleach paper during the paper production process. Although there are no paper mills in the Bay Area, dioxins emitted by paper mills in other parts of the country could potentially reach the Bay Area, since atmospheric dioxins migrate worldwide.



Based on highly uncertain emission estimates (BAAQMD 2002), larger contemporary sources of dioxins in the Bay Area include diesel exhaust, residential wood burning and use of the pesticide 2,4-D. In addition, a relatively large amount of dioxins possibly remains in the Bay Area environment from practices that were potentially carried out widely in the past. Such activities include garbage burning, medical waste incineration and the use of certain chlorinated pesticides (e.g., pentachlorophenol). Since dioxins are extremely persistent compounds, it will take years to see a reduction of levels in the environment from man-made and natural sources. A large portion of the mass of dioxins in the Bay Area environment may have been released many years ago and current sources may be largely associated with air emissions that are not directly under municipal control. This underscores the inherent challenges for local municipalities to address dioxin discharges in stormwater.

## ***Dioxin Reassessment***

The degree of health risk to humans from dioxins is controversial. The USEPA is undertaking a scientific reassessment of the health risks of human exposure to dioxins. The National Academy of Sciences (NAS) recently reviewed a draft of the dioxin reassessment. The NAS concluded that although USEPA presented a comprehensive review of the scientific literature, the reassessment may have overstated human cancer risk. The USEPA also understated the uncertainty about the health risks and failed to adequately justify the assumptions used to calculate the risks (NRCNA 2006).

## ***Program Accomplishments***

Since 2002, the Program initiated a number of activities to help encourage and facilitate dioxins pollution prevention by its Co-permittees. As an initial step, the Program reviewed literature on methods used to characterize dioxins in stormwater runoff and surface waters and concentrations typically found in the Bay Area and other areas. The review revealed that dioxins have been found in urban runoff in the Bay Area and other locations, and in sediments in the Bay and other estuaries. It was concluded that existing data are not sufficient to characterize the distribution in urban runoff among Bay Area land uses or calculate loadings to the Bay.

To keep its efforts current, the Program periodically tracks regional, state and federal efforts that address dioxins and encourages Co-permittees to also track and understand these programs. One particularly relevant project is the Association of Bay Area Government's Bay Area Dioxins Project (<http://dioxin.abag.ca.gov>). This regional effort has identified approaches for Bay Area municipalities to reduce the release of dioxins to the environment and implemented demonstration projects for selected pollution prevention strategies.

The Program actively participates in regional collaborative efforts that help address dioxins and other pollutants of concern, including the Bay Area Stormwater Management Agencies Association (BASMAA), the Clean Estuary Partnership (CEP) and the San Francisco Estuary Regional Monitoring Program (RMP). For example, the Program collaborated with other BASMAA agencies to develop an introductory report on dioxins for Bay Area stormwater agency managers and other interested parties. The report emphasizes issues related to urban runoff in the Bay area, including regulatory context, impacts, sources, pathways, review of relevant Bay Area, national and international studies, and qualitative review of potential stormwater controls ([www.scvurppp-w2k.com/dioxins.htm](http://www.scvurppp-w2k.com/dioxins.htm)). Another recent regional collaborative effort was the CEP's Conceptual Model / Impairment Assessment report on dioxins in San Francisco Bay. The report provides a detailed analysis of the status of the impairment and associated uncertainties, and presents a conceptual model that describes sources, estimated loads, and processes that affect the fate of dioxin compounds in the Bay ([www.cleanestuary.org/publications/#Dioxin](http://www.cleanestuary.org/publications/#Dioxin)).

Most recently, the Program developed and distributed a survey to identify dioxins pollution prevention actions currently implemented by Co-permittees and any related policies, resolutions or ordinances already adopted. The survey revealed that Co-permittees currently implement a wide range of activities that help prevent the formation of dioxins or their release to the environment. Measures implemented may help address potentially larger contemporary sources of dioxins in the Bay Area, including diesel exhaust, residential wood burning and use of the pesticide 2,4-D. For example, most Co-permittees are implementing policies for purchasing alternative fuel vehicles and equipment (e.g., compressed natural gas, biodiesel, and electric). Additional policies and ordinances limit or prohibit the use of wood-burning appliances and fireplaces. Co-permittees also generally have well-established Integrated Pest Management programs that discourage the use of pesticides (e.g., 2,4-D) ([www.scvurppp-w2k.com/dioxins.htm](http://www.scvurppp-w2k.com/dioxins.htm)).

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The Program will continue to participate in regional collaborative efforts and work cooperatively with other stakeholders to address dioxins and other pollutants of concern - an important part of the overall effort to improve water quality in San Francisco Bay.

References cited available upon request.



SCVURPPP is an association of the thirteen cities and towns (Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, Sunnyvale) in the Santa Clara Valley, together with Santa Clara County and the Santa Clara Valley Water District. Program participants share a common permit to discharge stormwater to South San Francisco Bay.