



# Campbell Industries Facility

**Location:** 8th Avenue and Harbor Drive, San Diego, CA 92101

**Facility Description:** Campbell Industries performed ship repair and construction at its San Diego Bay facility. Operations included metal preparation and fabrication (cutting, welding, abrasive blasting, and painting).

**Health Risk Assessment Summary**

<b>Year:</b>	1995
<b>Cancer Risk:</b>	154 in a million
<b>Chronic Index:</b>	0.83
<b>Acute Index:</b>	17

**Pollutants of Concern**

<b>Cancer Risk:</b>	Hexavalent chromium ( <a href="#">ARB compound summary</a> , <a href="#">EPA hazard summary</a> )
<b>Acute Non-cancer Risk:</b>	Copper ( <a href="#">ARB compound summary</a> )

Air Toxics  
"Hot Spots"  
Program

## 1995 Health Risk Assessment Summary for the Campbell Industries Facility

8th Avenue and Harbor Drive, San Diego, California

### 1.0 Introduction

The health risk assessment (HRA) estimates potential public health risks for the Campbell Industries facility located at the Foot of 8th Avenue and Harbor Drive in San Diego, California. It was prepared in accordance with requirements of the California Air Toxics "Hot Spots" Information and Assessment Act and is based on estimated facility emissions for the 1995 calendar year.

Potential cancer as well as non-cancer offsite health impacts were evaluated. The results of the HRA were used to evaluate the applicability of public notification and risk mitigation requirements specified in San Diego Air Pollution Control District Rule 1210. A public notification was



Figure 1 – General Facility Location

performed, however, no risk mitigation measures are required as Campbell discontinued ship repair operations September 1999.

### 1.1 Facility Description and Emissions

The Campbell Industries facility is located at the Foot of 8th Avenue and Harbor Drive in San Diego. The facility constructs and repairs commercial boats. Figure 1 shows the facility location and Figure 2 provides a more detailed view of the facility including facility boundary and emission source locations used in the HRA.

Various processes used at the facility emit a variety of toxic air contaminants which were quantified by the District for the 1995 calendar year.



Figure 2 – Facility Diagram

### Campbell Marine Emission Inventory Results

	<b>1991 Emission Estimates (lbs)</b>	<b>1995 Emission Estimates (lbs)</b>	<b>Difference (lbs)</b>
Benzene	46	3	- 43
1,3-Butadiene	40	0	- 40
Butanol	0	1,700	1,700
Cadmium	2	<1	- 2
Chromium, Hexavalent	<0.1	0.60	0.60
Copper	1	151	150
Ethyl Benzene	0	63	63
Glycol Ethers	10,739	0	- 10,739
Formaldehyde	8	9	1
Isocyanates	0	134	134
Lead	1	<1	- 1
Manganese	109	5	- 104
Methyl Chloroform	0	3	3
Methyl Isobutyl Ketone	0	1,990	1,990
Nickel	17	<1	- 17
Propylene	101	0	- 101
Toluene	2	0	- 2
Trimethylbenzene	0	10	10
Vinyl Chloride	559	0	- 559
Xylenes	2,180	2,020	- 160
Zinc	9	49	40

- Trace quantities (<1 lb/yr) of arsenic, barium, beryllium, cobalt, mercury, polycyclic aromatic hydrocarbons, selenium, toluene, and zinc are also emitted from this site.
- Several emission calculation procedures commonly applicable to the shipbuilding industry were significantly updated prior to the 1995 evaluation.
- A health risk assessment has been completed for this site's 1995 emissions.
- Most of the operating permits for this site were retired in 1999. Shipbuilding activities at this location have ceased.

## 1.2 Health Risk Assessment Procedure

This refined health risk assessment evaluates cancer risk and non-cancer chronic and acute health hazard indices for the point of maximum impact as well as residential, occupational and sensitive receptors. The HRA was prepared in accordance with The California Air Pollution Control Officers Association (CAPCOA) Air Toxics “Hot Spots” Program (Revised 1992) Risk Assessment Guidelines, and the Guidelines for Preparing Health Risk Assessments in Accordance with the Requirements of the Air Toxics “Hot Spots” Information and Assessment Act, San Diego Air Pollution Control District, December 16, 1997.

Adverse health effects are reported as “excess lifetime cancer risk”, cancer burden, or as a “total hazard index.” Excess cancer risk is the maximum estimated increased risk of cancer following chronic exposure to a chemical suspected of being a human carcinogen, and is expressed as the probability of a person contracting cancer over a lifetime of exposure to chemical emissions.

Non cancer risk is based on the aggregate health impact of toxic air contaminant emissions on specific organs or systems in the body. The potential for health impacts is called hazard indices (HI) and is calculated as the ratio of the estimated exposure to a particular hazardous air pollutant to the reference exposure level (REL) for that compound.

The REL is generally the level at (or below) which no adverse health impacts are expected. The sum of the hazard indices is called the total hazard index (THI) and is an indication of the likelihood of experiencing chronic or acute (non cancer) health effects. A total hazard index of less than one (1.0) is not likely to result in adverse health effects to exposed persons in the population including sensitive individuals. With a THI above one, there is a greater potential that adverse health impacts may result.

Health impacts were quantified at the point of maximum impact (PMI) and for the maximum exposed individual (MEI). The risk is calculated for both the maximum exposed individual resident (MEIR) and the maximum exposed individual worker in an occupational setting (MEIO). In addition, risks are calculated for sensitive receptors in the study area (if any) and the population excess cancer burden is calculated within the zone of impact (ZOI) of the facility.

The PMI represents the maximum estimated risk value at any offsite receptor location including locations at which human exposure would not be expected. For example, a PMI could occur in a vacant field adjacent to the facility even though there may be no (long term) human exposure at that point. Although the estimated risk values are calculated for the PMI, they are not used to determine public notification or risk reduction requirements. The MEIR and MEIO represent the maximum estimated risk value at any offsite receptor location at which people could be exposed at their residence (MEIR) or place of work (MEIO).

## 1.3 Summary of Health Risk Assessment Results

Table 1 summarizes the cancer risks at the point of maximum impact (PMI) as well as the maximum exposed individual resident (MEIR) and the maximum exposed individual in an occupational setting (MEIO).

**Table 1 – Summary of Estimated Excess Risk**

Maximum Individual Cancer Risk	Risk Value	Receptor Location (1983 State Plane Feet - East, North)
PMI	233 in one million	On fence line with Port District property (6282324, 1836792)
MEIR	0.60 in one million	East of facility in 1700 block of Kearny Ave. (6286090, 1836792)
MEIO	154 in one million	On fence line with Port District property (6282324, 1836792)

The maximum estimated cancer risk at an occupied receptor due to emissions from this facility is 154 in one million at the MEIO. The MEIO occurs on the facility fence line between the facility and San Diego Port District property.

The maximum estimated risk a residential location (MEIR) is 0.60 in one million and is located to the east of the facility in the 1700 block Kearny Avenue.

A map showing the estimated residential cancer risk isopleths (areas of equal risk) as well as the MEIR and sensitive receptors (if any) is presented as Figure 3.

A map showing the estimated occupational cancer risk isopleths (areas of equal risk) as well as the MEIO and sensitive receptors (if any) is presented as Figure 4. The cancer risk is primarily due to emissions of hexavalent chromium from welding operations.

The estimated risk value at the MEIO exceeds the cancer risk public notification level (10 in one million) specified in District Rule 1200.

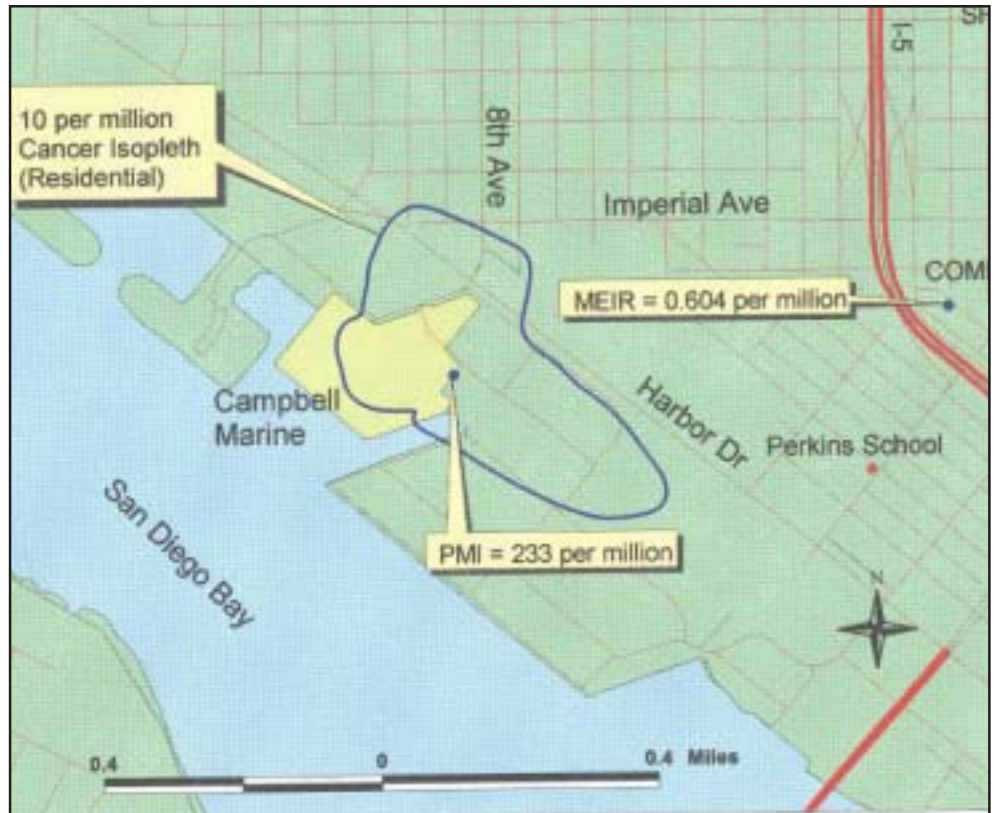


Figure 3 – Residential Cancer Risk – Isopleth, PMI, MEIR

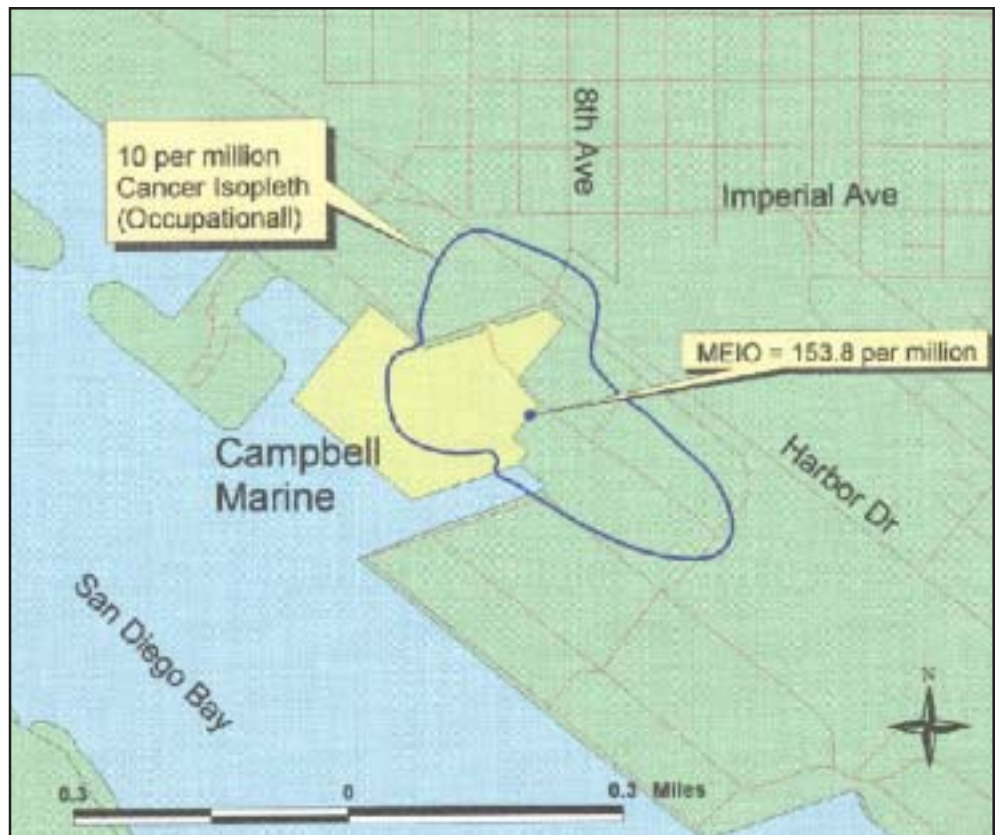


Figure 4 – Occupational Cancer Risk – Isopleth, MEIO

Table 2 summarizes the estimated cancer burden. Two census tracts are within or partially within the one in one million cancer risk isopleth. Cancer burden (for both residents and workers) was calculated for each census tract. Estimated cancer burden (0.03) is less than the cancer burden public notification level (1.0) specified in District Rule 1200.

**Table 2 – Summary of Estimated Cancer Burden**

Census Tract	Cancer Risk	Resident Population	Resident Burden	Worker Population	Worker Burden	Total Burden
50.00	1.50 x 10 <sup>-6</sup>	2602	3.90 x 10 <sup>-3</sup>	7572	1.14 x 10 <sup>-2</sup>	1.53 x 10 <sup>-2</sup>
51.00	1.64 x 10 <sup>-6</sup>	2886	4073 x 10 <sup>-3</sup>	4679	7.67 x 10 <sup>-3</sup>	1.24 x 10 <sup>-2</sup>
<b>Total</b>						<b>2.77 x 10<sup>-2</sup></b>

**Table 3 – Summary of Estimated Chronic and Acute Non-Cancer Health Risks**

Health Risk	Hazard Index (THI)	Receptor Location (1983 State Plane Feet - East, North)
<b>Chronic</b>	PMI	0.83
	MEIR	0.0024
	MEIO	0.83
<b>Acute</b>	PMI	18.8
	MEIR	0.34
	MEIO	17.0

The maximum estimated chronic health hazard index at an occupied receptor due to emissions from this facility is 0.83 at the MEIO. The MEIO occurs east of the facility on the fence line with the Port District property.

The maximum estimated chronic hazard index at a residential location (MEIR) is 0.0024 and is located east of Interstate 5. A map showing the estimated chronic non-cancer risk isopleths (areas of equal risk) as well as the MEIO, MEIR and sensitive receptors in the study area (if any) is presented as Figure 5. Hexavalent chromium emissions from welding operations are the primary contributor to the chronic hazard index. The toxic endpoint is the respiratory system.

The chronic non-cancer total hazard index does not exceed the public notification level and significant risk mitigation level (1.0 THI) specified in District Rule 1210.

The maximum estimated acute health hazard index at an occupied receptor due to emissions from this facility is 17.0 at the MEIO. The MEIO occurs east of the facility on the fence line with the Port District property.

The maximum estimated acute hazard index at a residential location (MEIR) is 0.34 and is located east of Interstate 5. A map showing the estimated acute non-cancer risk isopleths (areas of equal risk) as well as the MEIO, MEIR and sensitive receptors in the study area (if any) is presented as Figure 6. Copper emissions from painting operations at dry docks 1, 2 and 4 are the primary contributors to the acute hazard index. The toxic endpoint is the respiratory system.

This acute non-cancer total hazard index exceeds the public notification level and significant risk mitigation level (1.0 THI) specified in District Rule 1210.

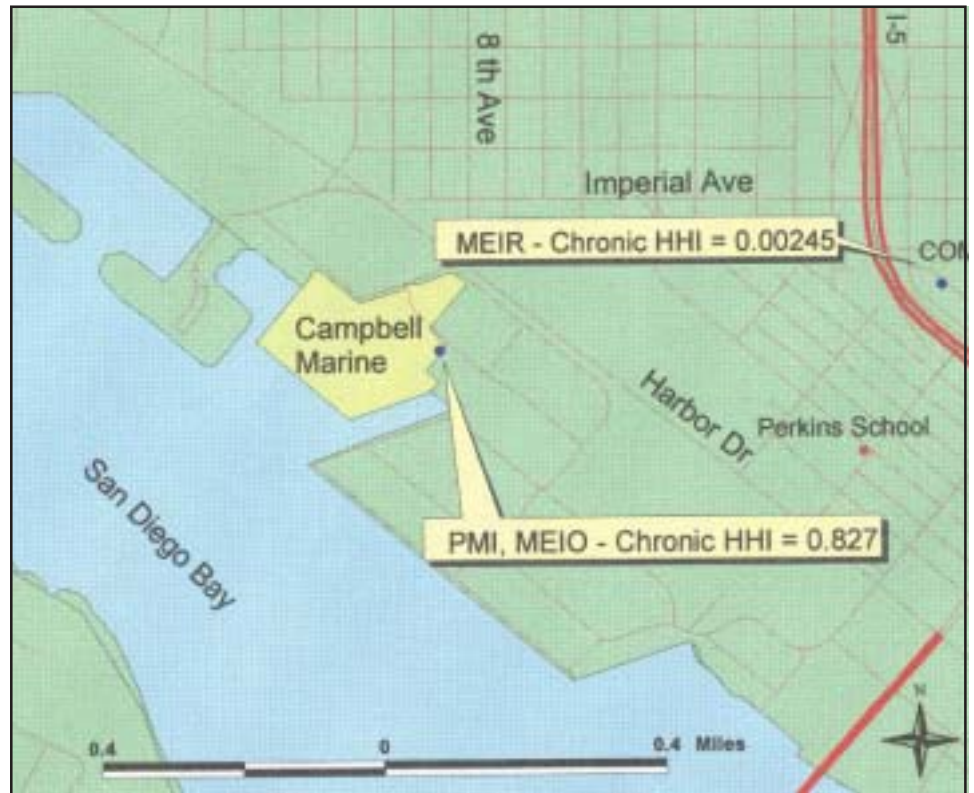


Figure 5 – Chronic Risk - PMI MEIO, MEIR

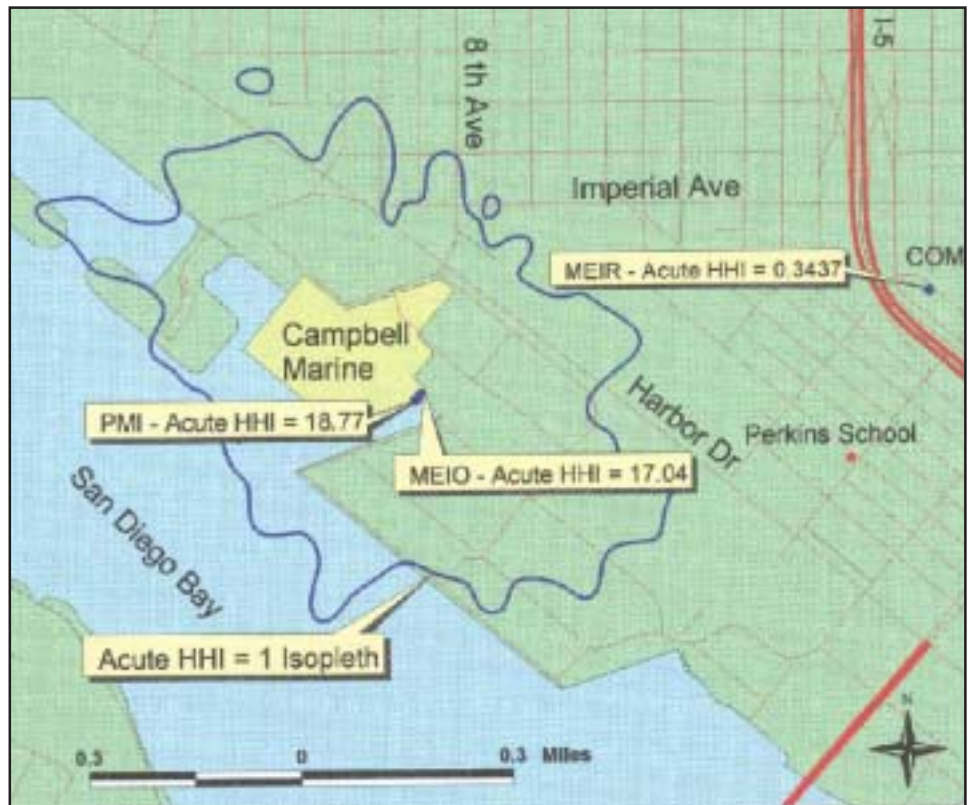


Figure 6 – Acute Risk – Isopleth, PMI, MEIO, MEIR