

## **SOURCE INVENTORY**

### **CATEGORIES #60, #86-#91 & #795-#802**

#### **REFINERY & MARINE LOADING OPERATIONS**

**Other Refinery Loading Operations (60)**

**Marine Vessel Lightering (86-87)**

**Marine Vessel Ballasting (88-90)**

**Marine Vessel Cleaning & Gas Venting (91)**

**Refinery Tanker / Barge Loading (795-798)**

**Non-Refinery Tanker / Barge Loading (799-802)**

### **1999 EMISSIONS**

#### *Introduction*

Category #60 includes all refinery loading operations other than tanker and barge loading. This category accounts for emissions mostly from loading racks and railroad / truck tank car loading.

The following categories include evaporation emissions due to handling of all organic products at marine loading facilities.

Categories #86 and #87 account for evaporation emissions due to the transfer of cargo (organic materials) from larger ships to smaller ships and barges. Lightering is necessary because large ships are unable to navigate the shallow waters of the San Francisco Bay.

Categories #88 - 90 account for evaporation emissions due to ballasting crude oil, gasoline, and other materials. Ballasting is the process of pumping sea water into petroleum holding tanks to make a vessel more stable. When water is pumped into a tank, the contaminated vapor in the tank is displaced into the atmosphere.

Category #91 accounts for emissions from gas venting. When a tank vessel unloads its product, organic vapors are left in the compartments. Frequently, vessels vent these vapors to the atmosphere for safety reasons..

Categories #795 - 798 account for all evaporative emissions from loading/unloading of gasoline, crude oil and other organic products from marine vessels at the oil refineries. Categories #799 - #802 account for evaporative emissions from loading/unloading of gasoline and crude oil from all non-refinery operations.

#### *Methodologies*

##### **Area Sources:**

Sources within categories #86 and #87 were surveyed to obtain the throughputs (in 1000 gallons) transferred in 1999. The monthly variations and county distributions were also obtained from these surveys. Emission factors were obtained from ARB's Emission Inventory Procedural Manual.

For categories #88 - #90, the amount of material transferred was estimated from data found in the U.S. Army Corps of Engineers' 1998 Waterborne Commerce of the United States, Part 4--Waterways and Harbors-Pacific Coast, Alaska and Hawaii. The 1999 throughput for Crude Oil Ballasting (Category 88) was estimated using a growth profile from the Oil Supply Outlook for California; the 1999 throughputs Gasoline and Other Material Ballasting (Categories 89 and 90, respectively) was assumed to be the same as the 1998 figures. The emission factors were obtained from CARB's Emission Inventory Procedural Manual.

For Category #91, the amount of gas vapors vented was based on the amount of product (assume crude oil and gasoline) transferred as calculated in Categories #88 and #89.

Point Sources:

Categories #60 and #795 through #802 contain point sources permitted by the District. The District updates the data each year on a source-by-source basis using as input:

1. Process material throughputs as reported by the companies.
2. Emissions factors (these may be source specific factors reported by the companies or source test results or general factors, from the AP-42).
3. Emission control factors (device-specific or general).

For point sources, the county, month, and day factors are obtained from the information in the data bank on each plant's location, seasonal usage, and days per week of operation.

## **TRENDS**

### *History*

Prior years' growth factors for these categories were based on historical data and energy reports.

### *Growth*

The projected growth for the Marine Vessel Lightering and Ballasting categories (Cat. 86-90), the Marine Vessel Cleaning & Gas Venting category (Cat. 91), and the Non-Refinery Tanker/Barge Loading categories (Cat. 799-802) were based on 1998 fuels report from the California Energy Commission. The projected growth for all the other categories was taken from the December 1990 energy report by Parvenu & Getz Inc. that predicted a US petroleum consumption growth of approximately one percent per year. The introduction of reformulated gasoline with lower vapor pressure will help in reducing evaporation emissions.

### *Control*

Categories #86 - #87: District Regulation 8-46 (Marine Vessel to Marine Vessel Loading) became effective on July 1, 1991. Beginning in 1992, the overall control efficiency was estimated to be 95%.

Categories #795 - #802: District Regulation 8-44 (Marine Vessel Loading Terminals) became effective July 1, 1991. In 1993, the overall control efficiency was estimated to be 96%.