



Flame Spray, Inc.

Location: 4674 Alvarado Canyon Road, San Diego, CA 92110

Facility Contact: Larry Suhl, President

Facility Description: Located along the north side of Interstate 8 approximately 2200 feet east of Fairmount Avenue, the facility applies specialized industrial metallic and ceramic coatings.

Health Risk Assessment Summary

Year: 1995
Cancer Risk: 40 in a million
Chronic Index: 0.14
Acute Index: 30.23

Pollutants of Concern

Cancer Risk: Hexavalent chromium ([ARB compound summary](#), [EPA hazard summary](#))
Nickel ([ARB compound summary](#), [EPA hazard summary](#))

Acute Non-cancer Risk: Nickel (endpoint = immune system)
([ARB compound summary](#), [EPA hazard summary](#))
Copper ([ARB compound summary](#))

Air Toxics
'Hot Spots'
Program

1995 Health Risk Assessment Summary for the Flame Spray, Inc. Facility

4674 Alvarado Canyon Road, San Diego, California

1.0 Introduction

Flame Spray, Inc. has recently been required to notify schools, residents, and businesses in the area that air quality emissions levels of potentially hazardous materials have been exceeded. The following information is being provided in response to your request for additional information about the Flame Spray facility and health risk assessment (HRA).

1.1 Facility Description

The Flame Spray facility is located at 4674 Alvarado Canyon Road in San Diego, California. The facility is situated along the north side of Interstate 8, approximately 0.75 miles east of Interstate 15. Figure 1 displays the location of the facility. The immediate area surrounding the facility is commercial/industrial, within buildings located to the east, west, and north of the site. The facility lies on sloping terrain in a recessed area. The nearest residential areas are located on hilltops approximately 0.2 miles to the north and south of the facility.

The facility serves all of San Diego with specialized metallic and ceramic coatings. These coatings, when applied to components create surfaces that can resist corrosion, erosion, wear, or provide electrical conductivity or coatings that reduce heat transfer. By applying these types of coatings, component life can be greatly increased. Coatings are applied

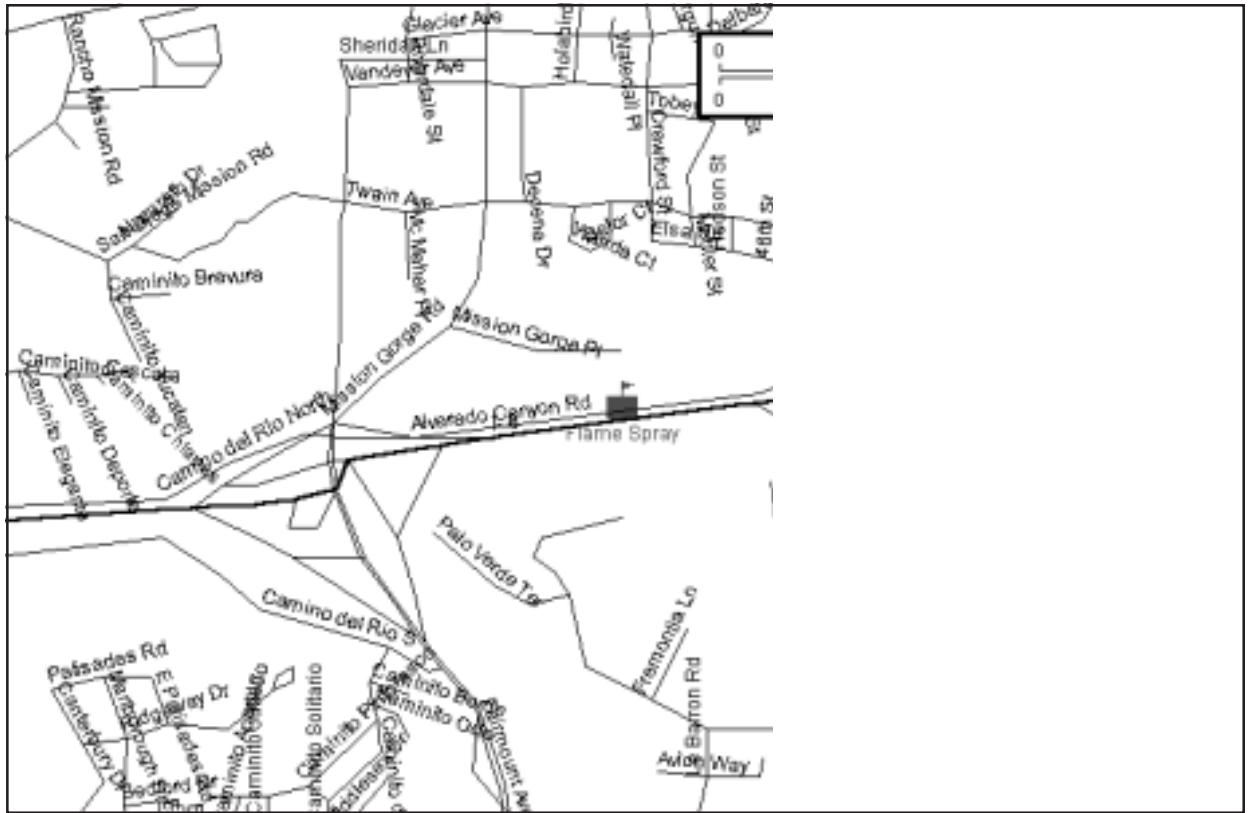


Figure 1 – Facility Location

by melting the metal or ceramic coating material and spraying the molten particles onto a part. The spray stream is normally about 1" in diameter. Typically, the parts are large and only a very small area of the component is coated. The facility conducts the coating operations inside of five (5) enclosed spray booths which are vented to emission control devices. These emission control devices reduce the emissions that are released into the atmosphere by collecting most (but not all) of the overspray that occurs during the coating process.

1.2 Health Risk Assessment Procedure

The HRA 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. Adverse health effects are reported as “excess lifetime cancer risk”, “population excess cancer burden”, or as a “total hazard index”. Excess lifetime cancer risk is the maximum estimated increased risk of cancer at a specific location 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 (70 years) of exposure to chemical emissions. Population excess cancer burden is an estimate of the increased number of cancer cases as a result of exposure to emitted substances.

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.

Excess individual lifetime cancer risk and total hazard indices were quantified at the point of maximum impact (PMI), and for the maximum exposed individual (MEI). The MEI 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

The goal of the health risk assessment is to estimate the impacts on public health caused by emissions of regulated toxic substances. The SDAPCD prepared an emissions inventory for the Flame Spray facility based on engineering calculations and usage records from 1995. Table 1 summarizes the total emissions from the facility that were evaluated in the health risk assessment.

Substance	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)
Chromium (hexavalent)	0.59	0.017
Copper	8.89	2.09
Manganese	0.23	0.033
Nickel	2.41	0.88
Zinc	181	7.4

Flame Spray was required by the SDAPCD to prepare a health risk assessment based upon the 1995 emissions inventory and an approved HRA protocol. The health risk assessment used a mathematical model called Industrial Source Complex Short Term 3 (ISCST3) to simulate the atmospheric dispersion and transport of the emissions from the facility into the surrounding community. This model was developed by the United States Environmental Protection Agency (USEPA) and was approved for use in the health risk assessment by the SDAPCD. The ISCST3 model uses information about the weather (meteorology), emission sources, local land use, and terrain to estimate the concentration of pollutants in the atmosphere at receptor locations surrounding the facility.

Next, a second model called ACE 2588 was used to estimate potential cancer and non-cancer (acute and chronic) public health impacts associated with exposure to pollutant concentrations predicted by the ISCST3 model. The results of the health risk assessment for cancer, acute, and chronic health effects were submitted to the SDAPCD and State of California for review and approval. Since the estimated cancer and acute public health impacts represent significant health risks, the facility was required to provide public notification. Table 2 summarizes the cancer risk at the point of maximum impact (PMI) as well as the maximum exposed individual resident (MEIR) and the maximum exposed individual in an occupation setting (MEIO). Note, the maximum residential individual excess lifetime cancer risk is based upon continuous exposure to emissions from the facility over a 70 year time period.

Table 2 – Summary of Excess Cancer Risk

Maximum Individual Cancer Risk	Risk Value	Receptor Location (UTM Coordinates)
PMI	344 in one million	491250 Easting, 3626800 Northing
MEIR	40 in one million	491450 Easting, 3626700 Northing
MEIO	7 in one million	491200 Easting, 3627100 Northing

The maximum estimated cancer risk at an occupied receptor due to emissions from this facility is 40 in one million at the MEIR. The MEIR occurs at a residence approximately 0.2 miles south of the Flame Spray facility on Toyon Rd. The maximum estimated risk at an occupational location (MEIO) is 7 in one million and is located immediately north of the facility on Alvarado Canyon Rd. A map showing Cancer and Acute Non-Cancer Risk isopleths is presented as Figure 2. Isopleths are lines of equal risk. The cancer risk isopleth in Figure 2 surrounds the area where residential cancer risk is equal to or greater than 10 per million. The acute non-cancer risk isopleth surrounds an area where the acute health hazard index is equal to or greater than one.

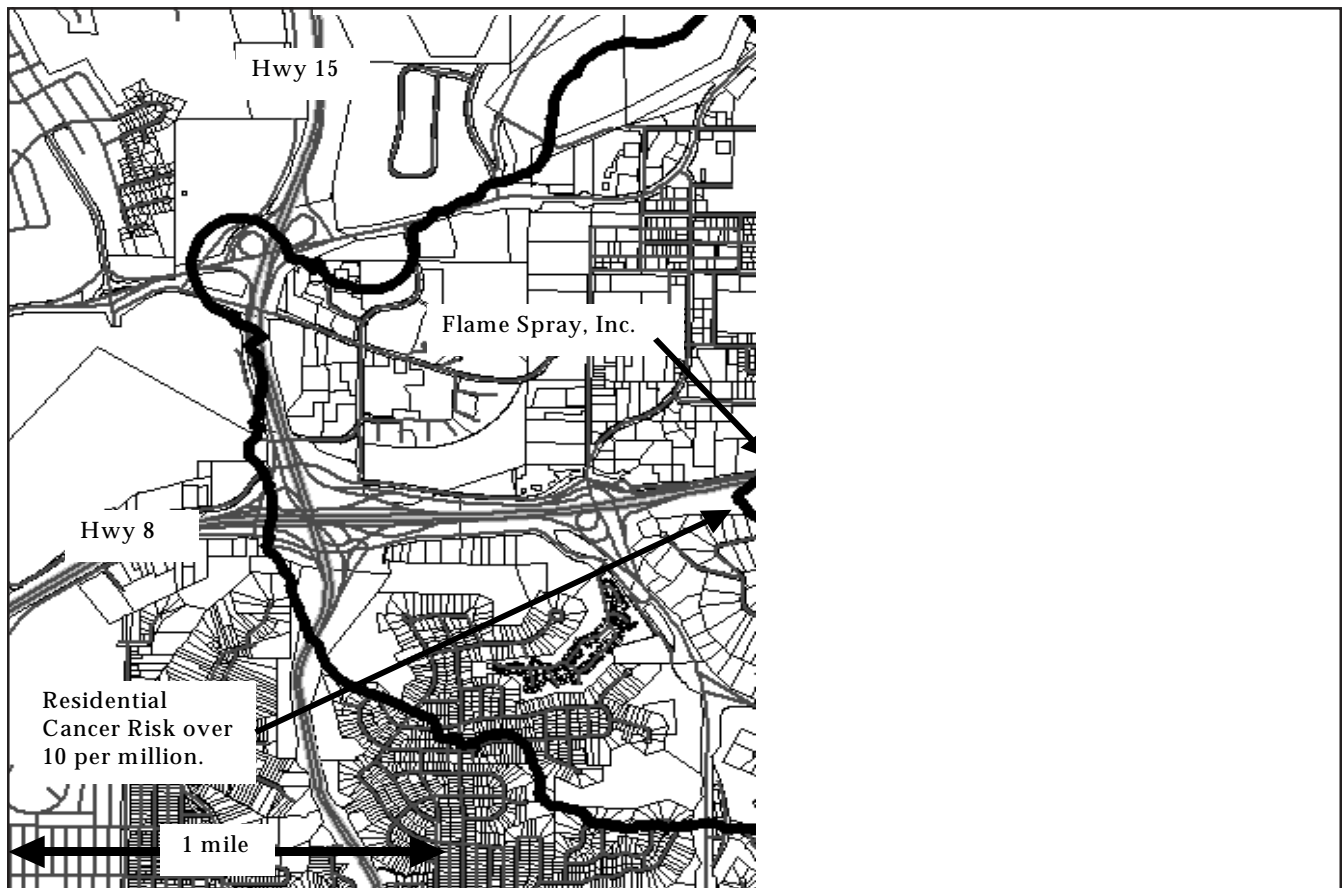


Figure 2 – Cancer and Non-cancer Risk Isopleths

The cancer risk is primarily due to emissions of hexavalent chromium from thermal spray operations. The estimated risk value at the MEIR (based on 1995 emissions) exceeds the cancer risk public notification level (10 in one million) specified in District Rule 1200.

The estimated cancer burden is 0.05. Cancer burden (for both residents and workers) was calculated for each census tract. Estimated cancer burden (0.05) is significantly less than the cancer burden public notification level (1.0) specified in District Rule 1200.

Table 3 summarizes the estimated chronic and acute non-cancer health risks.

Table 3 – Summary of Estimated Chronic and Acute Non-cancer Health Risks			
Health Risk	Hazard Index (THI)	Receptor Location (UTM Coordinates)	
Chronic	PMI	1.203	491250 Easting, 3626800 Northing
	MEIR	0.138	491450 Easting, 3626700 Northing
	MEIO	0.052	491200 Easting, 3627100 Northing
Acute	PMI	155	491150 Easting, 3626840 Northing
	MEIR	30.23	491200 Easting, 3626750 Northing
	MEIO	30.23	491200 Easting, 3626750 Northing

The maximum estimated chronic health hazard index at an occupied receptor due to emissions from this facility is 0.138 at the MEIR. The MEIR is located south of the facility on Toyon Rd. The maximum estimated chronic hazard index at an occupational location (MEIO) is 0.052 and is located immediately north of the facility on Alvarado Canyon Rd. 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 chronic health impact toxic endpoint for the MEIR and MEIO is the respiratory system.

The maximum estimated acute health hazard index at an occupied receptor due to emissions from this facility is 30.23 at the MEIR and MEIO. The MEIR and MEIO occur approximately 700 feet south of the Flame Spray, Inc. facility on Yerba Santa Drive. The area where estimated acute non-cancer risks (THI) are greater than one is shown on Figure 2. The toxic endpoint is the immune 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.

1.4 Past, Current, and Future Risk Reduction Efforts

The HRA indicated risk levels for total acute non-cancer health hazard index are above significant risk mitigation levels. Therefore a risk reduction audit and plan shall be required.

All of the spraying is currently performed in enclosed spray booths designed to collect the overspray from the coating process. Each spray booth uses a water wash system to reduce the emissions from the facility. For some materials sprayed, the particulate collection efficiency falls short of reducing the emissions below public notification levels. In order to address this important situation, the facility has already done the following to reduce emissions:

1. Since the first emissions inventory and health risk assessment, one new high efficiency particulate air filter has been tested and installed.
2. Prior to the most recent risk assessment, the type of materials previously sprayed that contained the listed toxic substances were reduced by 25%.
3. A high percentage of the listed materials are now sprayed in the new high efficiency spray booth.

In addition, the facility is currently working to further reduce emissions. Flame Spray, Inc. has spent and budgeted over \$750,000 to have all spray booths converted to high efficiency dry type collection systems that will collect the dry particles generated and produce air emissions quality that is substantially below the SDAPCD public notification re-