AIR QUALITY AND CANCER INCIDENCE ASSESSMENT OF IRWINDALE, CALIFORNIA

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EXECUTIVE SUMMARY

Soil Water Air Protection Enterprise (SWAPE), in collaboration with the Cancer Surveillance Program, found that the Irwindale area has no significant excess of breast, prostate, colon, and lung/oropharyngeal cancers relative to neighboring census tracts, Los Angeles County, and California. In fact, Irwindale was found to have lower cancer incidence than surrounding census tracts, Los Angeles County, and California.

Since its founding in 1860, the City of Irwindale has remained a small, close-knit community of about 1,500 residents. The City is roughly 9.5 square miles, with approximately one percent dedicated to residential use, about 46% to industry and business, and the remainder consisting of open space, roads and railroads, government buildings, and vacant space. Despite its small residential population, approximately 40,000 people are employed by businesses residing within Irwindale's borders. Irwindale has long been home to mining and rock operations, and is bounded by the 605 Highway to the West, the 210 to the North, and the 10 Freeway to the south. Winds typically blow to the north and west.

According to the California Cancer Registry (CCR), a cancer cluster is an excess of cases of a particular cancer that has been determined to be unusual when compared to expected cancer incidence patterns. In this analysis, annual age-adjusted incidence rates are used to evaluate whether an excess exists. Annual age-adjusted incidence rates are the number of new cancer cases diagnosed each year per 100,000 people, with different age groups noted for more realistic comparisons between populations. A cancer cluster is characterized by how the excess occurs, whether within a certain group of people, location, or time period. To transition from a suspected cancer cluster to a confirmed cluster, the perceived excess must be labeled as statistically significant (not due to chance alone) by public health officials. SWAPE collaborated with the University of California Cancer Surveillance Program (USC CSP) to explore differences in cancer incidence and risk factors between Irwindale and its surroundings.

The Cancer Surveillance Program manages a database of all cancer diagnoses, recorded by the patient's residential address within Los Angeles County, and reports these data to the California Cancer Registry. In addition to total cancer cases, four common cancers were evaluated from 2001 through 2010: breast, colon, lung and oropharyngeal, and prostate. Other cancers could not be evaluated for confidentiality reasons, because they occurred in such low numbers. Annual

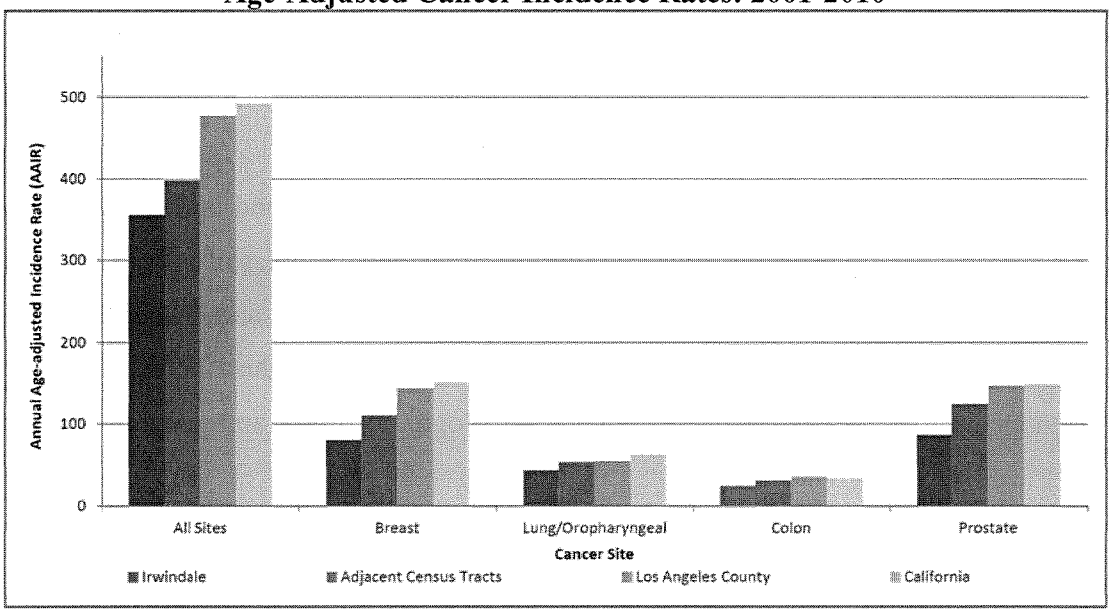
age-adjusted incidence rates were calculated for Irwindale, bordering census tracts, Los Angeles County, and California. Irwindale's rates were then evaluated against the rates of the other three regions (**Table 1**).

Table 1: Comparison of Irwindale Cancer Incidence Rates vs. Neighboring Communities, Los Angeles County, and California: 2001 – 2010

Site	Surrounding Census Tracts	Los Angeles County	California
All Cancers	0.89:1	0.74:1	0.72:1
Breast	0.73:1	0.55:1	0.53:1
Lung/ Oropharyngeal	0.81:1	0.80:1	0.70:1
Colon	0.79:1	0.69:1	0.72:1
Prostate	0.70:1	0.59:1	0.58:1

As shown in **Figure 1**, Irwindale's rates were less than the other regions for all four cancers. The Cancer Surveillance Program concluded that the City does not possess an unusually high or low incidence rate for all cancers.

Figure 1: Irwindale, Adjacent Census Tracts, Los Angeles County, and California Annual Age-Adjusted Cancer Incidence Rates: 2001-2010



SWAPE gathered and evaluated available air monitor and facility emissions data from South Coast Air Quality Management District (SCAQMD) and US EPA to investigate whether Irwindale is exposed to significant pollution relative to its surroundings. Facility and regional monitoring data show no significant causes for concern. SCAQMD air monitors measure levels

of air pollution, which are then used to calculate an Air Quality Index score, to give the public an idea of the air quality in that region. San Gabriel Valley 2001–2012 Air Quality Index values obtained from SCAQMD were labeled as 'Unhealthy' less than three percent of the time. The EPA Toxic Release Inventory (TRI) is a database of annual emissions reported by facilities nationwide. 2012 emissions data for Los Angeles County industries show that the highest emitting facility in Irwindale ranked 68th on the county-wide list, and no other sites were in the top 100 emitters. The largest source on the list was more than 500 times greater than the Irwindale facility. In addition, it is difficult to quantify individual contributions to air quality, as Irwindale is surrounded by businesses in neighboring towns, busy freeways, and accumulation of smog from the rest of the Los Angeles Basin due to prevailing winds. SWAPE also reviewed scientific reports examining common risk factors for four cancers in this analysis. While environmental pollutants can play a role in cancer incidence, the extent to which pollution contributes to cancer risk can vary between individuals and scientific reports. A large amount of literature cites lifestyle and behavioral factors such as diet, exercise, tobacco use, alcohol consumption, and occupation as having more significant impacts upon these four cancers, compared to environmental pollution. Available literature and data, along with the City's low incidence rates relative to its surroundings, indicate that Irwindale residents are not at an elevated risk of developing cancer due to environmental pollution.

SWAPE recommends a proactive approach to maintain citizen health and industry compliance. Cancer risk can be significantly minimized by increasing public awareness of preventative health measures such as making changes to diet, exercise, and substance use, and ensuring workplace health and safety. In addition, SWAPE recommends that future industrial development be designed to incorporate the best available control technologies to reduce ambient air pollution.

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List of Acronyms

AAIR	Age-Adjusted Incidence Rate
ACS	American Cancer Society
AQI	Air Quality Index
BPOU	Baldwin Park Operable Unit
CAPs	Criteria Air Pollutants
CO	carbon monoxide
COPD	chronic obstructive pulmonary disease
HAPs	Hazardous Air Pollutants
IARC	International Agency for Research on Cancer
LARWQCB	Los Angeles Regional Water Quality Control Board
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory (U.S. EPA Database)
NO2	nitrogen dioxide
NOx	oxides of nitrogen
O3	ozone
PAHs	polycyclic aromatic hydrocarbons
Pb	lead
PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene
PM	particulate matter
ppbv	parts per billion by volume
SEER	National Cancer Institute Surveillance, Epidemiology, and End Results Program
SO2	sulfur dioxide
SWAPE	Soil / Water / Air Protection Enterprise
TRI	Toxic Release Inventory (U.S. EPA Database)
TCE	trichloroethylene
US EPA	United States Environmental Protection Agency
USC CSP	University of Southern California Cancer Surveillance Program
USGS	United States Geological Survey
VOCs	volatile organic compounds
WHO	World Health Organization

1. INTRODUCTION

1.1. PURPOSE AND ORGANIZATION OF REPORT

This report includes an analysis of cancer and air quality in the City of Irwindale. SWAPE was retained by the City of Irwindale to identify any significant differences in cancer incidence and pollution exposures of the City relative to its surroundings. Air quality measurements reported for the San Gabriel Valley region are examined, in addition to city- and county-wide pollution releases. Available data regarding Irwindale cancer incidence is compared to that of adjacent census tracts, Los Angeles County, and California. **Section 2** provides a description of Irwindale's environmental setting and demographics. In **Section 3**, data, methods, and general limitations are defined. Information pertaining to the identification of and misconceptions surrounding cancer clusters, as well as common cancer risk factors, are outlined in **Section 4**. Air quality, air pollution, and cancer incidence analyses are summarized and discussed in **Section 5.**

1.2. QUALIFICATIONS

I received a B.A. in Environmental Studies from the University of California at Santa Barbara in 1991, an M.S. in Environmental Science from the University of California at Berkeley in 1995, and a Ph.D. in Soil Chemistry from the University of Washington in 1999. I am a founder and principal environmental consulting scientist at SWAPE. In addition to my education, I have extensive experience in evaluating the fate and transport of environmental contaminants, risk and exposure assessment of contaminants released from pollution sources, and monitoring and modeling of pollution sources that may cause impacts on human health and ecological systems. I use my education, experience, knowledge and expertise to conduct field investigations and prepare risk assessments. I have performed investigation and assessment for both governmental and private entities concerning risks to human health and properties due to contamination from pesticides, polychlorinated biphenyls (PCBs), petroleum hydrocarbons, polycyclic aromatic hydrocarbons, dioxins/furans, volatile organics, chlorinated solvents, perchlorate, heavy metals, asbestos, perfluorooctanoic acid, and other hazardous substances.

I obtained much of my experience in evaluating contaminated sites while working for the United States Navy. I served as a Remedial Project Manager for the Navy Base Realignment and

Closure (BRAC) Team, South West Division on Treasure Island, California. While working for BRAC, I managed many sites with environmental contamination concerns, including a large tract of land with PCBs contamination on Treasure Island in San Francisco Bay, California. I also worked on Camp Pendleton remediating the soils during a 26 mile petroleum pipeline improvement project.

I have taught on the subject of environmental health at the University of California at Los Angeles (UCLA) for many years. I have been presenting courses at UCLA on environmental contaminants, exposure assessment, and related subject matter since 2002. I also regularly attend and speak at professional environmental conferences on various subjects involving environmental contamination and mitigation/remediation.

I have recently co-authored several books concerning environmental contamination and best practices in the chemical industry. These publications include "The Risks of Hazardous Waste" (2011), "Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry" (2011), "Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries" (2010), and "Handbook of Pollution Prevention and Cleaner Production, Best Practices in the Petroleum Industry" (2009). I have also published extensively on other scientific studies of contaminant fate and transport and treatment technologies.

1.3. REVIEWED MATERIALS AND GENERAL LIMITATIONS

SWAPE has collected and reviewed scientific literature and data from regulatory agencies concerning common cancer risk factors, air quality, and environmental pollution. Documents that have been reviewed by SWAPE and used in preparation of this preliminary report were obtained from the following sources:

- U.S. EPA, Toxic Release Inventory (TRI) Database;
- U.S. EPA, National Emissions Inventory (NEI) Database;
- South Coast Air Quality Management District (AQMD);
- University of Southern California Cancer Surveillance Program (CSP);

- California Cancer Registry (CCR);
- USA Today's Smokestack Effect Special Report;
- Other sources.

Emissions data reviewed within this report are not representative of all industries and emissions in the San Gabriel Valley Region, because certain industries or facilities are exempt based upon industry category or size. Emissions data reported to the EPA may also be conservative, as they are self-reported by facilities. In the 2002 and 2005 NEI databases, some values are estimated based upon past reports. The NEI and TRI databases, however, are the most complete publicly-available resources documenting industrial pollution in the United States.

Some incompleteness was present in historical daily Air Quality Index data, perhaps due to instrument error. In addition, Irwindale lacks its own in-town monitoring station, so comparisons were made over a larger area encompassing multiple cities. Air quality data from two monitoring stations in the nearby cities of Azusa and Glendora are assumed to be most representative of Irwindale.

The present analysis described in this report does not include a retrospective exposure assessment for historical and existing groundwater contamination that was first identified in the Azusa and Irwindale area in the late 1970's. The groundwater contamination, which is briefly described below, has been addressed through several decades of work by environmental regulatory agencies, water companies, and responsible parties to design and construct treatment systems that ensure clean water for public consumption.

Groundwater in the greater San Gabriel Valley Basin contains several areas of contamination that have been defined through several decades of environmental investigations and regulatory compliance actions. These investigations have been primarily directed by the United States Environmental Protection Agency (U.S. EPA) and the Los Angeles Regional Water Quality Control Board (LARWQCB). These large groundwater contamination plumes in the San Gabriel Valley Basin are primarily impacted by commonly-used, industrial solvents, such as tetrachloroethylene (PCE) and trichloroethylene (TCE), which were first discovered in the City of Azusa in 1979. U.S. EPA declared portions of the San Gabriel Valley Basin as four separate Superfund sites in 1983 after discovering the contamination. The City of Irwindale is located in

the immediate area where one of these groundwater Superfund site plumes is likely to have originated. This particular plume is referred to as the Baldwin Park Operable Unit (BPOU).

During the early period of the discovery of the groundwater contamination present in the BPOU area, a large number of public water supply wells were found to be impacted. Subsequently, the public water systems that operated these wells were forced to shut down or construct treatment systems to remove the groundwater contaminants to acceptable standards prior to distribution in the public water system. U.S. EPA selected an overall cleanup plan for the Baldwin Park area in 1994 and this plan was updated in 1999. U.S. EPA reached agreement on a cleanup plan in 2002.

The BPOU groundwater cleanup remedy includes four large groundwater pump and treat systems capable of extracting and treating approximately 32 million gallons per day of contaminated groundwater. Historical exposure assessment associated with possible exposures to groundwater contaminants is not within the scope of this analysis. Furthermore, within the context and time frame of the existing cancer cluster assessment, it is not likely that exposures to this specific groundwater contamination have occurred.

2. BACKGROUND

2.1. ENVIRONMENTAL SETTING

The City of Irwindale is located within the East San Gabriel Valley region of Los Angeles County, California (see **Figure 2.1**). The San Gabriel Valley is just south of the San Gabriel Mountains, and northeast of the City of Los Angeles. The area consists of 47 cities and unincorporated areas and is home to extensive industry and business.

Since its founding in 1860, the City of Irwindale has remained a small, close-knit community of about 1,400 residents. About 700 businesses are located in Irwindale, including Ready Pac Produce, Charter Communications, Southern California Edison, Decorative Specialties, Miller Brewing Company, and California Community News. In total, Irwindale business and industry employs about 40,000 people daily and constitute the largest percentage of Irwindale's land use.[1] Processing and mining operations covered roughly 83% of the city's non-publicly-owned land in 1999.[2] Other notable companies include Miller Brewing Company, Pepsi, Huy Fong Foods, and Ready Pac Produce.[3]

2.2. IRWINDALE DEMOGRAPHICS

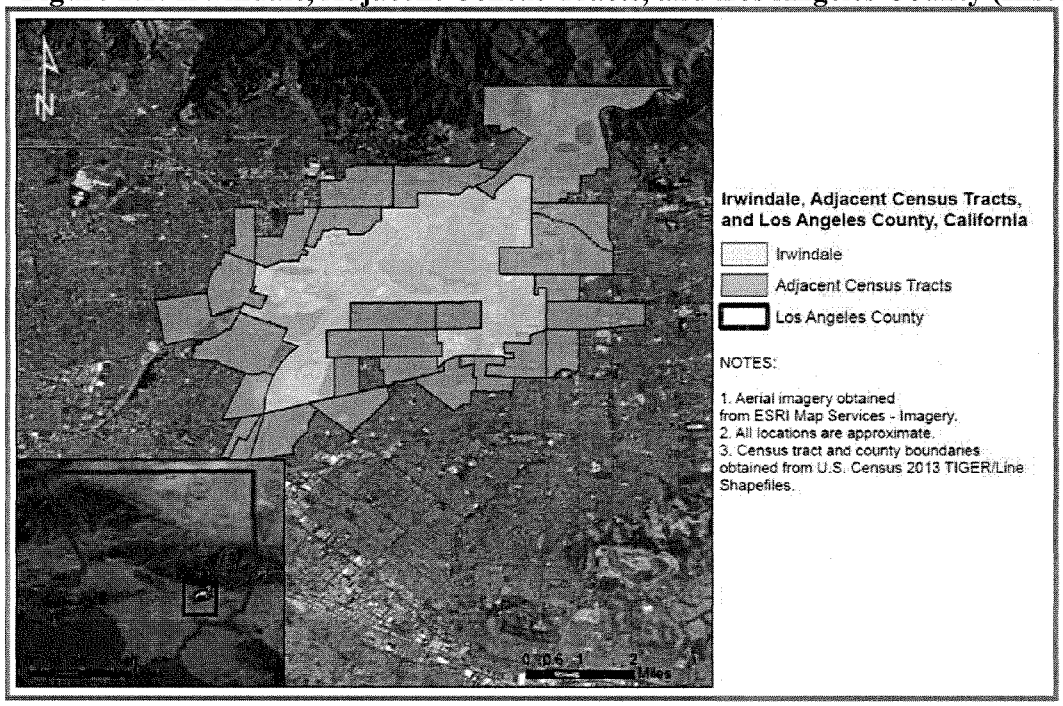
As of the 2010 Census, the population of Irwindale was about 1,400, with roughly 58.6 percent of the population identifying as white, 2% Native-American, 2.4% Asian, 0.8% African-America, 0.6% Pacific Islander, 4.8% two or more races, and the remainder (31.5%) from other races. The majority of the population (approximately 90.6%) identified as Hispanic or Latino. The largest age group (about 27.9% of the population) includes residents between 25 and 44 years of age. Children under the age of 18 and people 65 years or older constitute about 26.2% and 10.6% of the population, respectively.[4]

The City of Irwindale consists of one census tract and three zip codes. Irwindale is roughly 9.5 square miles in area, with approximately one percent of land dedicated to residential use, about 46% to industry and business, and the remainder consisting of open space, roads and railroads, government buildings, and vacant space.[1]

The City is bounded by 27 census tracts, and neighbors Azusa, Baldwin Park, Duarte, El Monte, Monrovia, and West Covina in addition to several unincorporated regions.[5] On average,

Irwindale temperatures range between 51 and 78 degrees Fahrenheit, and the City sees about 1.5 inches of rainfall per month.[1] From 2003 to present, winds have typically blown from the south and east.[6] The City is bounded by the 605 Highway to the West, the 210 to the North, the 10 Freeway to the south, and is located just south of the San Gabriel Mountains.

Figure 2.1: Irwindale, Adjacent Census Tracts, and Los Angeles County (Inset)



2.3. IRWINDALE AND SURROUNDING AREA SCHOOLS

In 2008, USA Today and the University of Massachusetts-Amherst Political Economy Research Institute published an inventory, titled "The Smokestack Effect", of United States schools, ranked by air quality based upon local pollutant exposures reported to the 2005 US EPA Toxics Release Inventory. The ranking is represented in a national percentile format. A percentile score of one percent indicates that a particular score is among the top one percent of schools with the worst air quality, whereas a score in the 99th percentile would correspond to a school that has better air quality than nearly all other US schools.[7] One Irwindale school is included in this special report, with a 54th percentile ranking, meaning it experiences better air quality than 54% of United States schools and is relatively close to the national average school air quality. Percentiles range between 20 and 59, 57 and 63, 51 and 67, 49 and 66, 66 and 71, and 55 and 62;

for Azusa, Baldwin Park, Duarte, El Monte, Monrovia, and West Covina Schools, respectively.[8] Based upon the ranges reported in these cities, San Gabriel Valley schools are relatively similar to the average air quality experienced at schools across the nation.

3. METHODS AND APPROACH

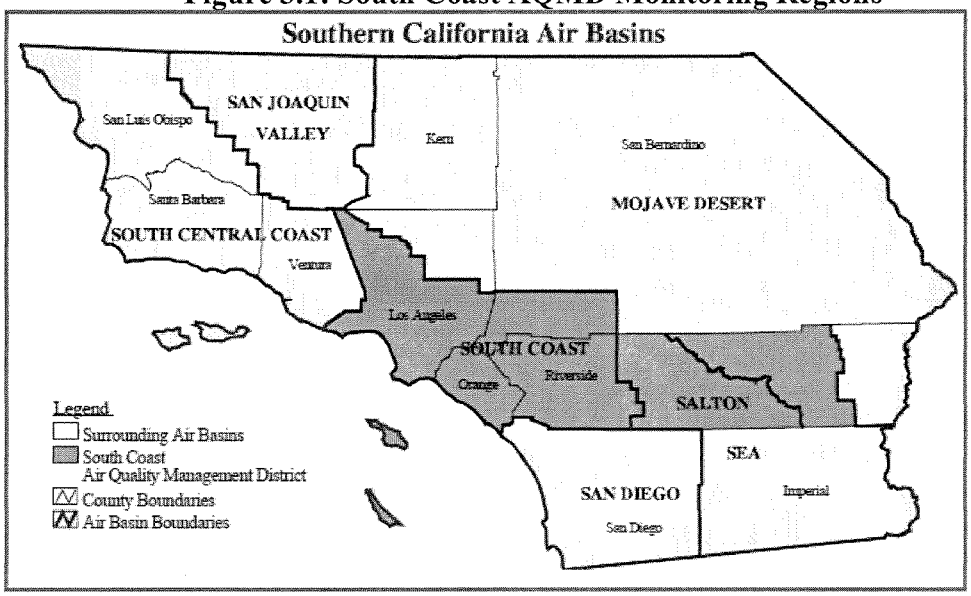
3.1. AIR POLLUTION AND AIR QUALITY

In evaluating air pollution of the area, SWAPE utilized two types of data: air monitoring data and emissions releases from facilities.

South Coast Air Quality Management District Monitoring Network

The South Coast Air Quality Management District (SCAQMD) is responsible for oversight and regulation of air quality in an area of Southern California comprised of portions of Los Angeles County, Riverside County, San Bernardino County, and all of Orange County (**Figure 3.1**). The map below displays the geographic extent of the district, highlighted in blue. The agency's objective is to attain state and federal clean air standards by implementing programs and strategies for mitigating releases of air contaminants from stationary and mobile sources. Air quality in the SCAQMD is measured at monitoring stations located throughout the district that record concentrations of air pollutants subject to state and federal regulations.

Figure 3.1: South Coast AQMD Monitoring Regions



Source: South Coast Air Quality Management District Annual Air Quality Monitoring Network Plan, 2013.

Daily reports of air quality are characterized by a value referred to as the Air Quality Index. The Air Quality Index (AQI) is a metric devised by the Environmental Protection Agency (EPA) that communicates the level of public health concern attributed to the collective measurement of five

(5) major air pollutants regulated by the Clean Air Act: sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), ground-level ozone (O3), and particulate matter (PM10 and PM2.5). Concentrations of these five air contaminants (as well as Lead) are regulated on the federal level by the National Ambient Air Quality Standards (NAAQS). The AQI represents a comparison of each of the compounds to their respective NAAQS.

The AQI is calculated on a scale from 0-500, with higher values indicating greater levels of public health concern. **Figure 3.2** is provided on the AirNow.gov webpage and explains the significance of AQI value ranges.

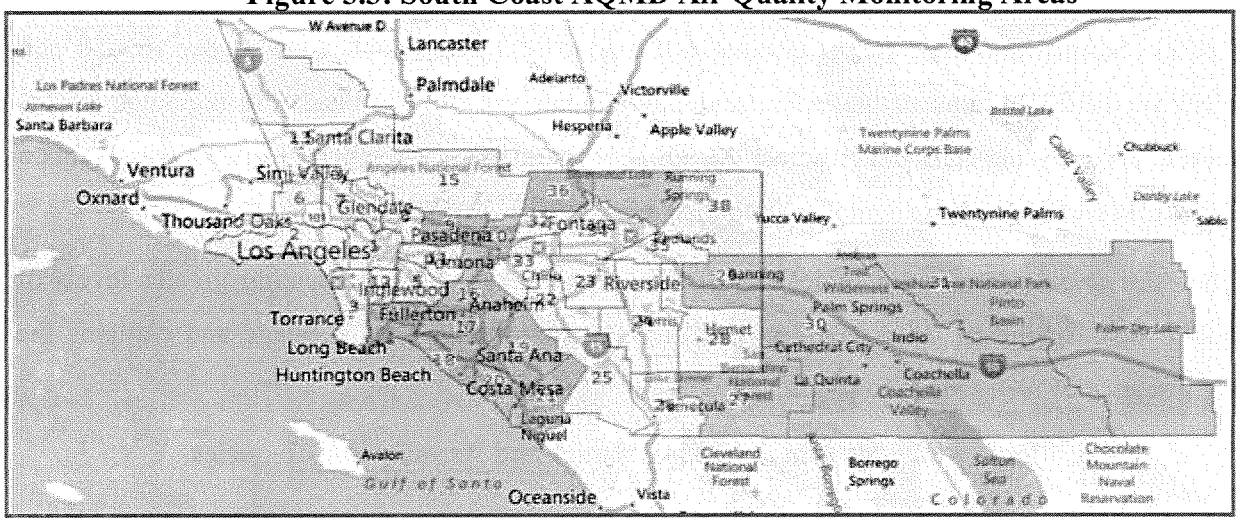
Figure 3.2: Air Quality Index Values and Associated Categories

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0 to 50	Air quality is considered satisfactory, and air pollution poses little or no risk
Moderate	51 to 100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151 to 200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201 to 300	Health warnings of emergency conditions. The entire population is more likely to be affected.
Hazardous	301 to 500	Health alert: everyone may experience more serious health effects

Source: AirNow.gov, Air Quality Index (AQI) - A Guide to Air Quality and Your Health.

AQI values up to 100 indicate that a NAAQS is not exceeded, and that typically there is no public health concern associated with the air quality. Above 100, the EPA has divided the AQI ratings into four categories, and a greater number of people are affected as the AQI category increases in severity.

Figure 3.3: South Coast AQMD Air Quality Monitoring Areas



Source: South Coast AQMD Air Quality Map, 2013.

Within the SCAQMD, there are 38 different "Areas" for which an AQI score is calculated each day. The City of Irwindale is located in Area 9, referred to as the "East San Gabriel Valley." Region 9 includes Irwindale, Arcadia, Baldwin Park, Covina, Azusa, Glendora, Duarte, Monrovia, Temple City, and overlaps parts of West Covina and El Monte. There are two monitoring stations that are used for AQI measurements within the East San Gabriel Valley. The three SCAQMD Areas adjacent to Area 9 with active monitoring stations are: Area 8 to the west (West San Gabriel Valley); Area 11 to the south (South San Gabriel Valley); and Area 10 to the east (Pomona/Walnut Valley). Each of these three Areas contains one monitoring station through which daily AQI values are recorded. Area 15, the fourth adjacent region to Area 9, lacks a monitoring station and is therefore not evaluated in this report.

In this analysis, daily AQI data is used to compare the Irwindale area with nearby cities. Historical AQI values from 2000 to 2012 were requested from the SCAQMD, for Areas 8, 9, 10, and 11. These regions were chosen to evaluate Irwindale's Air Quality against its immediate surroundings within the San Gabriel Valley area. Approximately 8% of daily AQI data was missing, perhaps due to instrument error.

United States Environmental Protection Agency Toxics Release Inventory

Each year, facilities report potentially hazardous releases, in pounds per year, to the US EPA Toxics Release Inventory (TRI). This inventory is mandatory for all federal facilities and certain utility, manufacturing, mining, wholesale, publishing, and hazardous waste facilities. These

facilities must report if they employ more than ten full-time equivalent employees, or manufacture or process over 25,000 pounds or otherwise use over 10,000 pounds, of a TRI-designated chemical in a year. Facilities releasing chemicals in amounts greater than established levels must report annual amounts of emissions or disposal of any of the more than 650 chemicals covered by the program. Los Angeles County facilities ranked by total releases were collected for the years 2001 through 2012 to assess how Irwindale facilities compared to facilities throughout the county.

United States Environmental Protection Agency National Emissions Inventory

The US EPA National Emissions Inventory (NEI), similar to TRI, is a database of facility releases. This data is compiled for air releases only. Releases of Criteria Air Pollutants (CAPs) or Hazardous Air Pollutants (HAPs) are reported to the NEI, which then releases a report every three years. Each NEI represents annual emissions, in tons per year, averaged over the three-year reporting period. In investigating Irwindale pollution sources, NEI data was found to list some facilities not reported in the TRI, so additional analysis was conducted using 2002 and 2005 NEI data. Annual emissions for the two reporting years were totaled and compared between Irwindale and its neighbors: Azusa, Baldwin Park, Duarte, El Monte, Monrovia, and West Covina. Criteria air pollutants and hazardous air pollutants are analyzed separately. Criteria air pollutants include particulate matter (PM), nitrogen oxides (NOX), ozone (O3), carbon monoxide (CO), volatile organic compounds (VOCs), and sulfur dioxide (SO2). Hazardous air pollutants, pollutants suspected or confirmed to cause cancer or other serious health and environmental effects, are also reported by these cities. It should be noted that some cities' reporting values were substituted from previous reports. Each city's reported data contained some substitution of values from previous NEI reports, except for Baldwin Park and Duarte's 2002 HAP data. A breakdown of emissions per Irwindale facility is also provided, in **Appendix C**.

3.2. CANCER INCIDENCE

Cancer incidence data is available at the national, state, and county level. United States cancer statistics are managed by the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. State cancer incidence data is reported to the SEER Program by the

California Cancer Registry (CCR), which is a compilation of data reported by California counties.[9]

University of Southern California Cancer Surveillance Program

SWAPE contacted the University of California Cancer Surveillance Program (USC CSP) to explore differences in cancer incidence between Irwindale and its surroundings. The Cancer Surveillance Program manages a database of all cancer diagnoses within Los Angeles County, and reports these data to the CCR and SEER Program. Cases reported to the CSP are the basis for county-wide analyses using patient age, year of diagnosis, sex, and race/ethnicity.[10] Cases are assigned to census tracts based upon the residential address of the patient at the time of diagnosis. The CSP is considered the authoritative body for evaluating any suspected cancer clusters in Los Angeles County.

In this case, the annual age-adjusted incidence rate (AAIR) of Irwindale is compared to its surroundings for several cancer types. Annual age-adjusted incidence rates are the number of new cancer cases diagnosed each year per 100,000 people, weighted by age. In this standard cohort comparison, the CSP calculated 2001-2010 AAIRs for five cancer sites: all, breast, colon, lung and oropharyngeal, and prostate. Other cancers, which occurred in such low numbers, could not be disclosed for confidentiality reasons. Annual age-adjusted incidence rates were calculated for four regional breakdowns: Irwindale, all census tracts sharing a border with Irwindale, Los Angeles County, and California. Next, the AAIR of Irwindale was compared to each of the other three regional denominations, to assess whether Irwindale had a significant excess of cancer incidence. Annual age-adjusted incidence rates in this analysis were calculated for each cancer site by summing all cases from each region, then dividing these cases into five-year age groups. Population data from the 2010 US Census was also divided into five-year age groups. These case and population counts were then used to calculate a rate for each age group. Next, all age group rates were combined and weighting was performed based upon 2000 US Census age distributions. Weighting by age distribution, or age-adjustment, is performed to avoid confounding due to age.

3.3. LITERATURE REVIEW

Definitions and evaluation of cancer clusters, in addition to common misconceptions, are described in more detail below. Existing literature regarding cancer incidence and common risk factors for the cancers of interest was reviewed to evaluate the degree of contributions that age, genetics, lifestyle, and environmental pollution have upon cancer risk.

4. LITERATURE REVIEW

4.1. CANCER INCIDENCE

According to the California Cancer Registry, a cancer cluster is an excess of cases of a particular cancer that has been determined to be unusual when compared to expected cancer incidence patterns. A cancer cluster is characterized in how the excess occurs, whether within a certain group of people, location, or time period.

To transition from a suspected cancer cluster to a confirmed cluster, the perceived excess must be determined to be statistically significant by public health officials.[11] In California, cancer clusters are evaluated according to CCR procedure. Once a cluster is reported, basic information is gathered such as amount, location, time period, and types of cases, in addition to the contact information of the reporter and how they became aware of the cases.[12] Before initiating an investigation, health officials provide the informant with educational materials regarding cancer incidence in their area, common risk factors, and national organizations to refer to for further information. If an increase in cancer frequency, occurrence of a rare form, or occurrence within a distinct population is confirmed, and any of these three events is documented along with a carcinogenic agent, registered cases, and a probable route of exposure, a statistical evaluation is deemed necessary. It is important to note that a statistical evaluation is performed to determine whether the perceived increase in cancer cases is truly in excess relative to expected patterns. Statistically significant increases do not identify the cause nor do they rule out chance, they simply confirm an excess of cancer.[11] If an excess is identified, the cause can be a combination of a wide range of factors, such as occupational and environmental exposure, lifestyle choices, or family history and genetics.

Further uncertainty is added by a lack of agreement regarding the degree of contribution of different variables to cancer risk and incidence. McGuinn et al. (2012) discusses how differences in environmental contribution estimates are mostly due to the variation of factors that are encompassed within a given study's definition of environmental exposure. In a review of over 250 reports, estimates of the contribution of environmental factors to cancer rates ranged from one to one hundred percent. Most reports defining environmental exposures as "air, water, food, and soil pollutants" resulted in smaller environmental risk estimates, whereas those which used

broader terms (including lifestyle and occupational exposure) concluded with higher estimates of environmental contribution to cancer occurrence.[13] In this analysis, environmental exposure is defined as air pollutants, to avoid any confusion regarding environmental pollutant contributions to cancer risk. Contributions of environmental pollution, fitness, substance use, genetics, and occupation to risks of developing common cancers are reviewed in existing literature.

4.2. CONTRIBUTING FACTORS

Of all cancer types, five to ten percent stem from inherited genetic mutations.[14] The remaining 90-95% are therefore influenced by other factors, such as environmental, occupational, and lifestyle exposures. In a 1996 report, the Harvard School of Public Health attributed 68% of overall cancer causes to lifestyle factors such as tobacco use (30%), diet, alcohol consumption, and exercise, 13% to genetics and family history, and 19% to occupational sources, two percent of which is attributed to pollution.[12] As demonstrated by multiple studies, if changes in lifestyle and occupational settings are made, cancer risk can be decreased dramatically.

Family History and Age

Overall, cancer risk tends to increase with age and family history. Breast cancer is more common in older, female patients. After age and gender, breast cancer risk is influenced by genetics in 5-10% of cases.[15] Prostate cancer risk, like breast cancer, rises with age, with most cases being diagnosed in men between 65 and 74 years of age.[16,17] Family history is also cited to play a role for the cancers evaluated in this study.[18,19,20,21] Other factors appear to have a greater role, however. For example, while family history of breast cancer can have a doubling effect upon risk, the majority of cases (85%) occur in women who lack a family history of breast cancer.[18]

Fitness

Up to 14% of male cancer-related deaths and 20% of cancer deaths in females are linked to being overweight or obese.[14] Incorporating a healthy diet and exercise into one's daily life has been observed to be inversely associated with colon cancer risk.[22,23] Boutron-Rualt et al. (2001) observed an increased colon cancer risk in subjects that exercised infrequently and had a high caloric intake.[24] In a 2002 review of epidemiologic studies investigating exercise and cancer risk, the majority of studies to date for colon, breast, prostate, and lung cancer risk reduction found

convincing, probable, or possible associations. Colon and breast cancer risk reduction were most convincingly linked with increased exercise, whereas prostate and lung cancer studies saw probable and possible associations, respectively.[25] The contribution of diet varies depending on intakes of differing amounts of fat, calories, foods, or vitamins. Poor diet and increases in weight both raise breast cancer risk, although the agreement of the extent of their contributions is limited.[26,27] Relative risks associated with high total fat intake and breast cancer ranged from 0.49 to 1.72, 0.29-5.43, and 0.90-1.28 for those with high total fat intakes, according to three dietary reviews.[28,29,30] Vitamin A and Vitamin D coupled with adequate sunlight exposure have been associated with breast cancer risk reductions of 22% (in premenopausal women) and 25-60%, respectively.[31,32] Higher intakes of beans and lentils were associated with decreased prostate cancer risks of 52% in participants that consumed them more than three times per week compared to less than once per month.[33] Colon cancer risk factors demonstrated in multiple reports include poor diet and lack of exercise, and, in men, increased waist circumference.[34,35] Body mass index (BMI) increases along with smoking were associated with increased colon cancer risk when compared to both male and female smokers with lower BMIs.[36] Healthy diet and exercise are essential preventative measures, as increases in mortality due to colon, breast, prostate, liver, and pancreas cancers have been observed in those who are overweight or obese.

Tobacco and Alcohol Use

In 1986, the International Agency for Research on Cancer (IARC) named tobacco smoke as the major cause of "cancers of the lung, oral cavity, pharynx, larynx, oesophagus (squamous-cell carcinoma), pancreas, urinary bladder and renal pelvis", with lung cancer being the "most common cause of death from cancer in the world." Tobacco smoke is cited as reasonably causing about one third of all cancer-related deaths in the United States[37]. Exposure to secondhand smoke has also increased the risk of lung cancer in non-smokers.[38,39] Lung cancer risks increase with duration of use and exposure intensity due to depth of inhalation and smoking device used.[40] A 2001 study of 106 patients with primary adenocarcinoma of the lung observed a high fraction (87%) of smokers within the participants.[41] Another study also mentions cigarette use in nearly 90% of lung cancer diagnoses.[14] According to the American Cancer Society (ACS), alcohol consumption along with tobacco use can have synergistic effects upon the risk of developing cancers of the larynx and hypopharynx. The ACS advises citizens to avoid tobacco

and alcohol, especially in combination; and to ensure adequate workplace ventilation and nutrition.[42]

The contribution of tobacco smoke to breast and colon cancer risk is more debated in the scientific community. Suggested effects of tobacco smoke on breast cancer risk are still relatively unclear.[18] Smoking, secondhand smoke, and alcohol consumption all raise breast cancer risk, although the agreement of the extents of their contributions is limited.[43,44] Studies vary from conclusions of no effect[45] to observations of both decreased and increased risk in female smokers who carry $BRCA_1$ or $BRCA_2$ gene mutations.[44,46] Several studies conclude that tobacco smoke has little to no independent effect on breast cancer; rather, its contribution to risk has been confounded by alcohol consumption,[45] or it increases risk in women that are more genetically susceptible.[44, 47, 48] Potter et al. (1993) concludes that the most significant environmental exposure affecting colon cancer incidence is represented by tobacco smoke inhaled from cigars and pipes.[49] However, cigarette smoke is also shown to increase colon cancer risk in women who smoked more than 35 pack-years or more than 20 cigarettes daily.[36]

The effect of alcohol consumption, while more certain than other lifestyle-related factors, also varies widely across studies. Alcohol consumption increases risk of breast and colorectal cancer, and, when coupled with smoking, can have synergistic effects upon the risks of developing cancer in the oral cavity, pharynx, and esophagus. An average alcohol consumption of more than 60g per day was associated with a relative risk of 9.2 [95% CI, 2.8-31.0] for cancer in the upper gastrointestinal tract.[50] In the upper aerodigestive tract, alcohol consumption alone has been observed to cause 25-68% of cancers.[14] Breast cancer risk due to high alcohol consumption was demonstrated to range between 28 and 72 percent in participants who consumed more than 15 grams of alcohol each day, while another study saw a risk of 52% in participants consuming just over 5 grams of alcohol per day, compared to non-drinkers.[51, 52] In an analysis of 53 epidemiological studies, the risk of developing breast cancer increased by an average of 7.1% with every 10 gram increase in daily consumption, however, this same study found that smoking had little or no effect.[45] An intake of two or more alcoholic drinks per day has been shown to increase colon cancer risk,[53, 54] while other studies have failed to demonstrate statistically significant links between the two.[49] Prostate cancer has not been found to be significantly influenced by alcohol consumption.[55]

Environmental Pollution

Air pollutant contributions are possible for a multitude of ambient and occupational exposures. Occupational exposures to pesticides, solvents, and polycyclic aromatic hydrocarbons (PAHs) have been found to increase breast cancer to various extents. Male exposure to combustion products such as 1,3-butadiene, 1,2-dibromomethane, 1,2-dichloroethane, and benzene for more than three months were associated with an odds ratio of 2.2, which increased to 2.5 when a ten-year lag time was incorporated.[56] According to the Silent Spring Institute, breast cancer studies in human regarding risks attributable to environmental pollutants have been relatively limited due to difficulties in quantifying oftentimes widespread exposures, and variations in individual traits across participants.[57] Lung cancer appears to have the strongest association with air pollutant exposure. The strongest evidence between air pollutants and lung cancer can be observed in occupational exposure studies. Benzene, asbestos, fibers, metals, coal tar, and substances present in wood dust and paint are all linked to cancer of the lung or nasal cavity. Aluminum production, boot and shoe manufacture and repair, coal gasification, coke production, furniture and cabinet making, haematite mining, iron and steel founding are listed by the IARC as causing cancer in the lung and nasal cavity. About 20% of cancer cases in people working in mining, agriculture, or industry can be attributable to occupational carcinogens. Indoor air pollution also increases lung cancer incidence, especially in poorly ventilated buildings.[58]

Of all cancer cases, 1-4% is accepted to be due to air, water, and soil pollution. Many studies investigating air pollutant-related cancer incidence have focused upon urban environments, with the lungs as the cancer site of interest. Varying degrees of associations have been observed. In a study adjusted for smoking, BMI, education, and alcohol intake, lung cancer incidence was observed to increase by 37% in participants exposed to NO2 concentrations 100 ug/m^3 higher than participants in less polluted areas.[59] Nyberg et al., (2000) also found a significant link between air pollution and lung cancer, primarily in those exposed to high levels of NO2, while observing a weaker relationship due to SO2 exposure. For participants exposed to twenty-year NO2 average concentrations greater than 29.3 ug/m3, lung cancer risks increased, even more rapidly if the participants were former or current smokers.[60] Levels of ambient NO2 in Montreal were found to increase prostate and post-menopausal breast cancer risks.[61,62] Despite links to increased risk, NO2 is not listed as a carcinogen, though it is an indicator of traffic-related

pollution. Another study involving 6,338 Californian participants showed frequent levels of PM10 concentrations exceeding 100 ppb could significantly increase male lung cancer incidence. SO2 levels were also strongly associated with lung cancer in both males and females.[63] While industrial facilities can be unhealthy point sources, attention must also be paid to improving traffic conditions and fuel efficiency, as there is growing evidence suggesting that traffic-related pollution is a significant risk factor. In developed countries, industrial emissions have mostly decreased over time while traffic-related emissions have become more of a concern.[58]

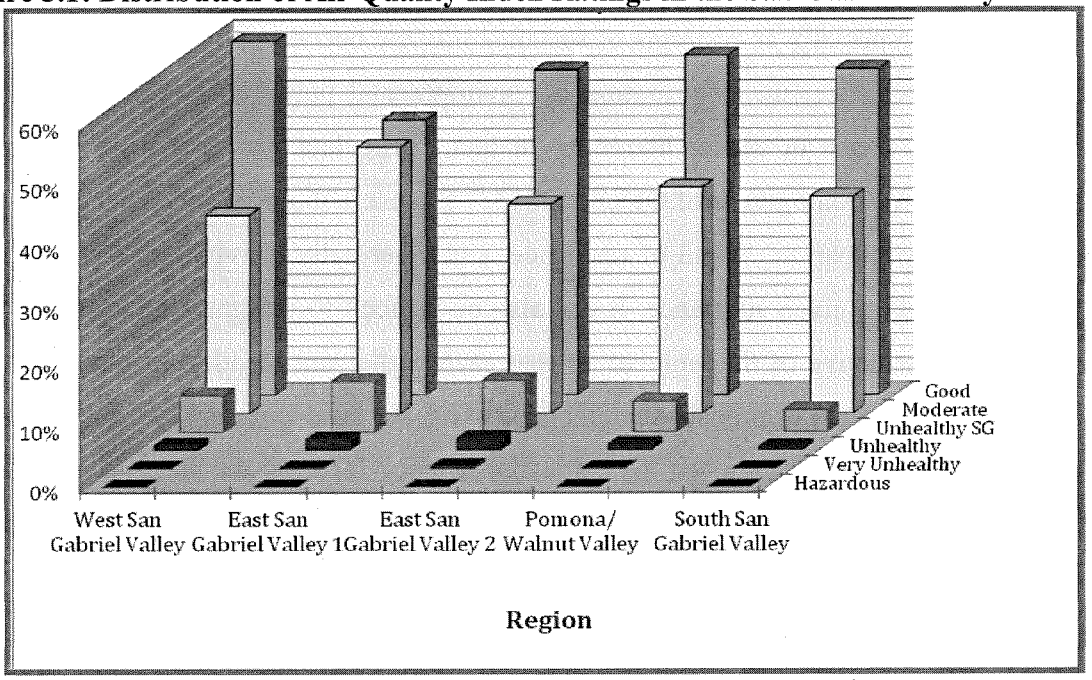
It is difficult to structure studies surrounding cancer risk factors, especially when quantifying each study participant's true exposures. Cancer incidence attributable to air pollution is receiving increased attention, especially as concepts of sustainability are becoming more widely accepted. Despite mounting evidence, the contribution of environmental pollution is perhaps the most widely debated risk factor in cancer literature. In fact, particulate matter has only just been identified as a known carcinogen as of October 2013.[64] Exposure to air pollutants depends upon residential address, occupation, length of residence, and other daily activities that may bring a person in contact with a given substance. It can also be difficult to designate an air monitoring station that is representative of the ambient air that each participant breathes in throughout the day. Hundreds of confirmed or probable carcinogens exist, but even exposure to these chemicals may have no noticeable effect due to the large opportunity for variance in cancer incidence caused by the complex interactions between risk factors. For all cancer risk factors, there is still much work to be done to identify how significantly each contributes to cancer incidence, both individually and in combination.

5. RESULTS

5.1. AIR QUALITY INDEX

Daily AQI values from 2000-2012 were obtained from the SCAQMD for Areas 8, 9, 10, and 11 to examine the regional scale of air pollution in the San Gabriel Valley. The data were organized into the five air quality classifications as presented in the Air Quality Index for each of the Areas. **Figure 5.1** displays the percentage of days over the thirteen year duration that fell into each air quality category.

Figure 5.1: Distribution of Air Quality Index Ratings in the San Gabriel Valley 2000-2012



Source: South Coast Air Quality Management District, Public Records Request # 74719

Acceptable air quality (AQI < 100, "Good" or "Moderate) was recorded with the following prevalence by Area:

8) 91.45%
9.a) 89.68%
9.b) 88.48%
10) 93.62%
11) 89.85%

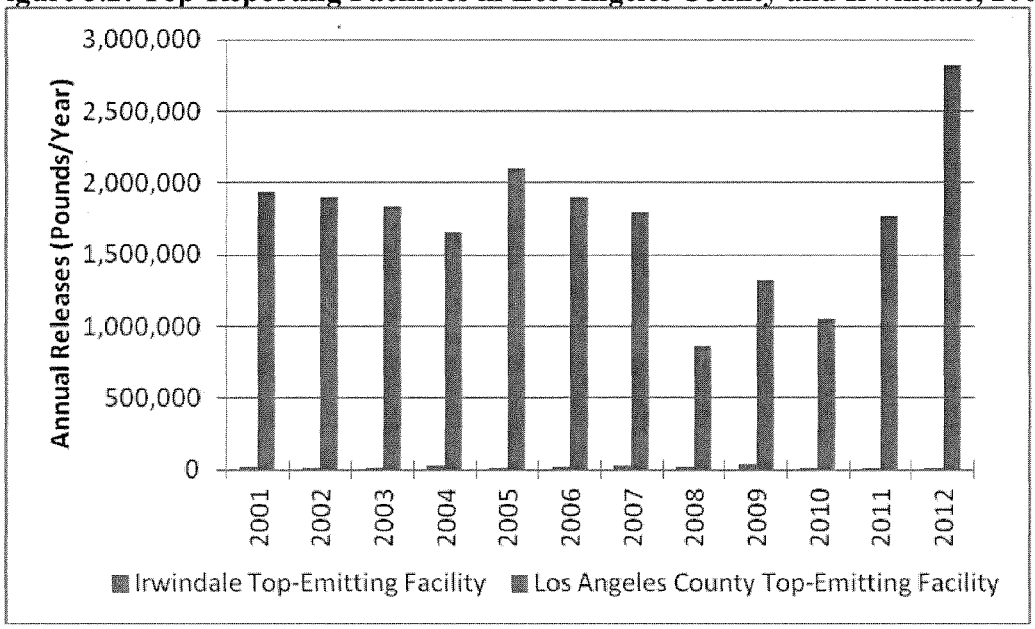
In general, there is no distinguishable contrast between the East San Gabriel Valley and the surrounding SCAQMD Areas with regards to AQI monitoring for Criteria Air Pollutants (CAPs).

Furthermore, of the chemicals constituting the AQI, only certain constituents of airborne particulate matter (primarily diesel) are associated with carcinogenic health effects. Therefore there is no discernible increased air quality concern associated with living in Irwindale from the standpoint of the AQI with regards to environmental exposures to carcinogens.

5.2. FACILITY EMISSIONS

Between 2001 and 2012, approximately 450 Los Angeles County facilities reported emissions to the US EPA Toxics Release Inventory. Out of all reporting facilities in the county, only one or two Irwindale-based facilities were within the top 100 each year. The highest reporting facilities in the county reported emissions 36 to 580 times greater than those of the largest reporting Irwindale site. On average, the highest reporting county site emissions were 90 times greater than those of Irwindale. The greatest difference between the county's top reporting facility and Irwindale's occurred in 2012, during which the highest-emitting site was 500 times greater. As shown in **Figure 5.2**, Irwindale's highest-emitting sites are only a fraction of other facilities within Los Angeles County.

Figure 5.2: Top-Reporting Facilities in Los Angeles County and Irwindale, 2001-2012

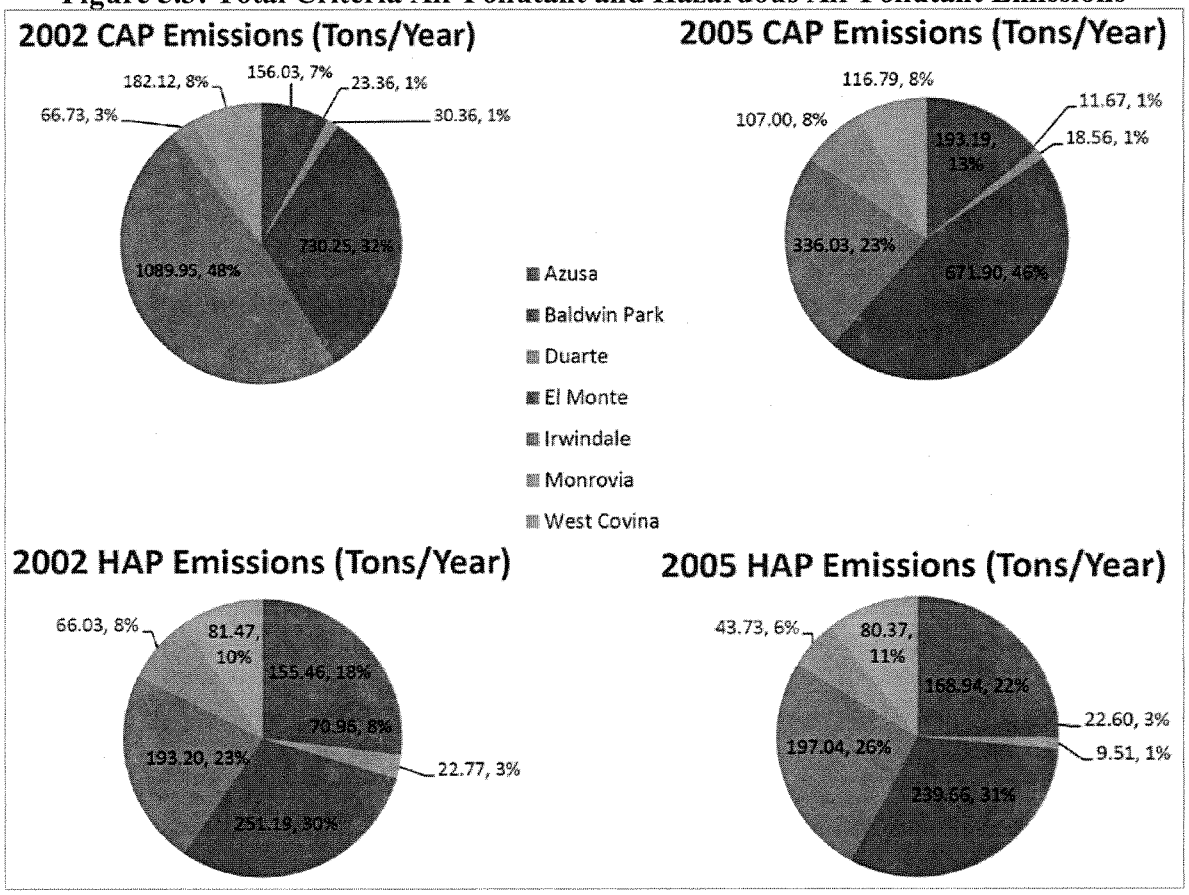


Source: U.S. EPA TRI, 2001-2012.

US EPA 2002 and 2005 National Emissions Inventory annual emissions were totaled and compared for seven cities: Irwindale, Azusa, Baldwin Park, Duarte, El Monte, Monrovia, and

West Covina. **Figure 5.3** displays overall CAP and HAP releases in the seven cities for both reporting periods. In 2002, El Monte emitted the most HAPs, while Irwindale reported the most overall CAPs emissions. In 2005, El Monte emitted the greatest fraction of CAPs and HAPs, 46% and 31%, respectively.

Figure 5.3: Total Criteria Air Pollutant and Hazardous Air Pollutant Emissions



Sources: U.S. EPA NEI, 2002; U.S. EPA NEI, 2005.

Emissions of criteria air pollutants represent the majority of Irwindale's emissions. Besides particulate matter, all CAPs emitted by Irwindale and its surroundings are not listed as known carcinogens. Particulate matter emitted by Irwindale represents less than two percent of CAP and HAP emissions from all seven cities, and was not even the maximum amount emitted out of the cities evaluated. Irwindale facilities emitted mostly carbon monoxide, volatile organic compounds, and nitrogen oxides during both periods. In the 2005 NEI, Irwindale reported CAP emissions were approximately 750 tons per year lower than in 2002 (See **Table 5.1**).

Table 5.1: Irwindale Criteria Air Pollutant Releases

Pollutant	2002 Irwindale Annual Emissions (Tons/Year)	Pollutant	2005 Irwindale Annual Emissions (Tons/Year)
CO	860.3	VOC	129.72
VOC	143.4	CO	109.47
NOX	44.85	NOX	41.11
PM-10	19.62	PM-10	29.4
PM-2.5	16.37	NH3	16.26
NH3	4.96	PM-2.5	9.68
SO2	0.45	SO2	0.38
All	**1089.95**	**All**	**336.03**

Sources: EPA NEI, 2002; EPA NEI, 2005.

Irwindale reported 58 and 75 HAPs in the 2002 and 2005 NEIs, respectively. In the 2002 NEI, Irwindale HAP emissions range from$1.24x10^{-8}$ tons per year of fluorine to 111.24 tons per year of toluene. Irwindale emissions reported in the 2005 NEI range from $3.93x10^{-10}$ tons per year of polychlorinated dibenzofurans to 111.52 tons per year of toluene (**Table 5.2**).

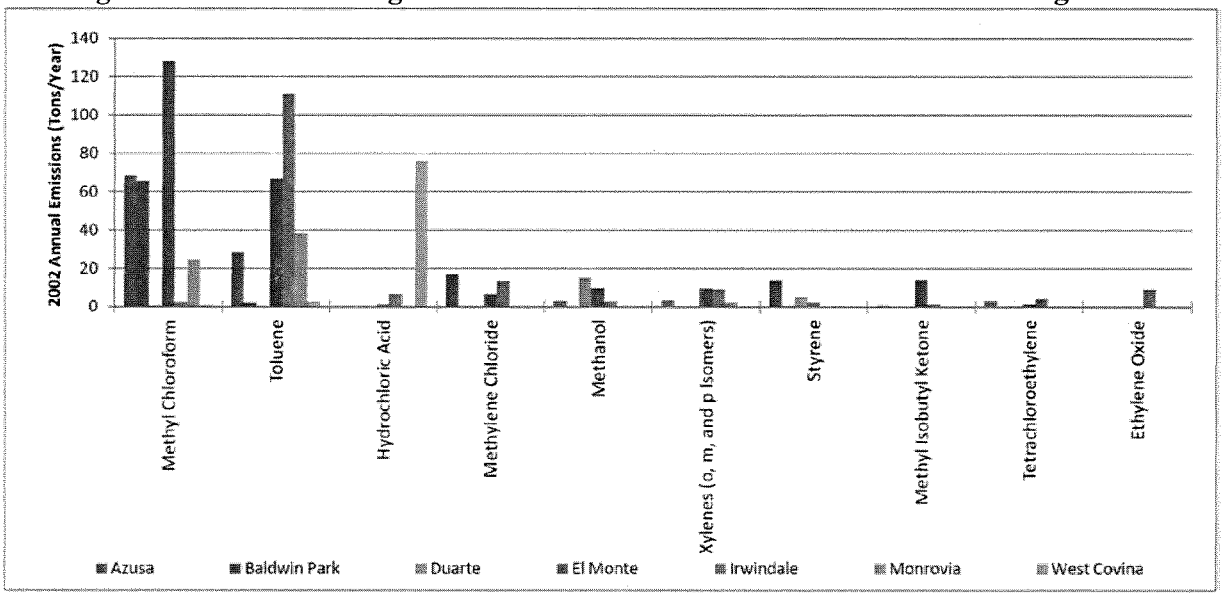
Table 5.2: Irwindale Minimum and Maximum Hazardous Air Pollutant Releases

Year	Least-Emitted Pollutant	Amount (Tons/Year)	Most-emitted Pollutant	Amount (Tons/Year)
2002	Fluorene	$1.24x10^{-8}$	Toluene	111.24
2005	Polychlorinated Dibenzofurans	$3.93x10^{-10}$	Toluene	111.52

Sources: EPA NEI, 2002; EPA NEI, 2005.

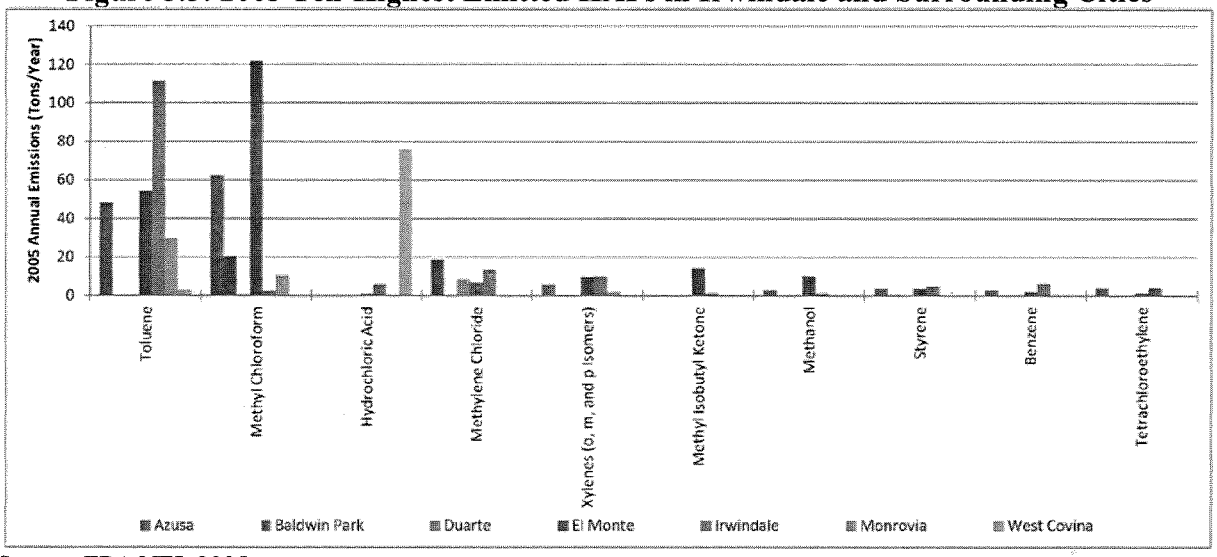
Figures 5.4 & 5.5 display the ten HAPs most reported during both reporting periods. In 2002, methyl chloroform was the most-reported pollutant, with El Monte emitting the greatest fraction, approximately 128 tons per year. In 2005, toluene replaced methyl chloroform as the most-emitted HAP. Irwindale produced the largest portion, about 111 tons per year. Out of all seven cities, Irwindale's most noticeable contribution can be seen in toluene emissions. Toluene represents the majority of Irwindale's HAP emissions, however, this substance is not classified as a carcinogen by the IARC.

Figure 5.4: 2002 Ten-Highest Emitted HAPs in Irwindale and Surrounding Cities



Source: EPA NEI, 2002.

Figure 5.5: 2005 Ten-Highest Emitted HAPs in Irwindale and Surrounding Cities



Source: EPA NEI, 2005.

Of the 87 HAPs reported by all seven cities in 2002, 13 are currently listed as known carcinogens by IARC.[65] Twelve of the 111 HAPs reported in the 2005 NEI are known carcinogens. Overall, Irwindale emissions of known carcinogenic HAPs were approximately three percent of all HAPs emissions within the seven cities during both periods. While Irwindale emissions are not a small portion of local emissions, carcinogenic compounds represent a very slight percentage of emissions from the seven cities evaluated.

5.3. CANCER INCIDENCE

During the ten year period of analysis, 47 cancer cases were diagnosed within the Irwindale census tract. Breast and lung and oropharyngeal cancers each occurred in six of the cases, prostate cancer was diagnosed five times, and colon cancer was diagnosed in three residents. The remaining 27 diagnoses occurred in 21 different anatomic sites, and could not be specified further due to confidentiality purposes. Total diagnoses for each cancer site and region of comparison are provided in **Appendix A**. All diagnoses for Irwindale and the three areas of comparison were adjusted for age and population.

The AAIRs for each cancer site were used to make comparisons between Irwindale and its adjacent census tracts, Los Angeles County, and California. Irwindale AAIRs were divided by the respective AAIRs of the other three regions to obtain ratios between the City and each region (**Table 5.3**). For all cancer sites, Irwindale AAIRs ranged from being 11% to 28% lower than its surroundings. Out of the four cancer sites analyzed, the highest ratio observed, 0.81:1, was that of Irwindale versus adjacent census tracts, for lung and oropharyngeal cancers. The lowest ratio, 0.53:1, was observed between Irwindale and California breast cancer AAIRs.

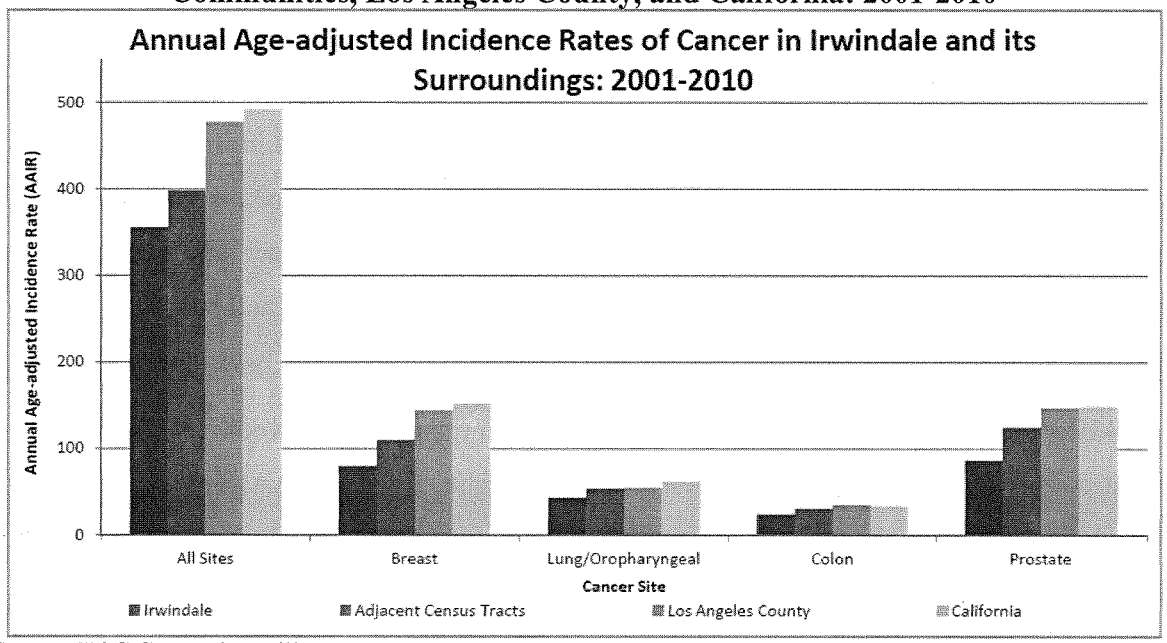
Table 5.3: Irwindale Cancer Incidence Rates vs. Adjacent Tracts, Los Angeles County, and California: 2001 – 2010

Site	Irwindale vs. Surrounding Census Tracts	Irwindale vs. Los Angeles County	Irwindale vs. California
All Cancers	0.89:1	0.74:1	0.72:1
Breast	0.73:1	0.55:1	0.53:1
Lung/Oropharyngeal	0.81:1	0.80:1	0.70:1
Colon	0.79:1	0.69:1	0.72:1
Prostate	0.70:1	0.59:1	0.58:1

Source: USC Cancer Surveillance Program, 2001-2010.

To examine variations in incidence between Irwindale and different regions, three regional areas of comparison were chosen to ensure that certain trends would not be overlooked when comparing diagnoses over regions of differing area. AAIR ratios mostly decreased as the region of comparison grew larger (**Figure 5.6**). Only colon cancer AAIR ratios were observed to decrease then increase as the area of comparison increased.

Figure 5.6: Annual Age-Adjusted Incidence Rates in Irwindale vs. Neighboring Communities, Los Angeles County, and California: 2001-2010



Source: USC Cancer Surveillance Program, 2001-2010.

As shown by **Table 5.3**, Irwindale's incidence rates are less than other regions for all cancers and all regional comparisons. A value less than one indicates that the Irwindale AAIR is below that of the region with which it was compared. The CSP concludes that the City does not possess an unusually high nor low incidence rate for all cancers (see **Appendix B**). The AAIRs of the adjacent tracts are also relatively low when compared to county and state rates. Adjacent census tract AAIRs were 17%, 24%, 13%, 2%, and 15% lower than Los Angeles rates for all, breast, colon, lung and oropharyngeal, and prostate cancers, respectively. Compared to California AAIRs, adjacent census tract values were 19%, 28%, 9%, 14%, and 16% lower, for all, breast, colon, lung and oropharyngeal, and prostate cancers, respectively.

As demonstrated in **Figure 5.6**, relative AAIRs were highest for all four cancer sites when comparing Irwindale to adjacent census tracts. The slight differences between Irwindale and adjacent census tracts relative to the other two regional breakdowns are not unexpected, given the immediate proximity of the adjacent tracts. Los Angeles County and California differ more significantly from Irwindale in geographic area, demographics, and environmental setting; which is reflected in the greater amount of difference between incidence rates of the two regions. However, in all cases, the AAIR ratios are less than one, indicating that Irwindale does not have a significant excess or deficit of cancer diagnoses relative to the three regions of analysis.

6. CONCLUSIONS

Compared to surrounding census tracts, Los Angeles County, and California, Irwindale's cancer incidence is lower than expected. No excess was observed in any single cancer site during the ten-year period of analysis. The slight fraction of known carcinogens emitted in Irwindale and its surroundings, the majority of "Good" and "Moderate" air quality days, and the lack of an excess of cancer incidence demonstrate that industrial emissions have not caused increased cancer incidence in Irwindale. Although the San Gabriel Valley is a region of heavy traffic, multiple industries, and moderate air quality, this pollution appears to have not increased cancer incidence in Irwindale.

Given constantly-evolving scientific knowledge regarding risk factors and their interactions, SWAPE recommends a proactive approach to avoid higher than usual cancer incidences in the future. There are many preventative measures that can be made to significantly lower chances of developing cancer, including maintenance of a healthy diet and weight, regular exercise, and consumption of little to no tobacco and alcohol. Proper ventilation in homes and the workplace can lessen exposure to indoor and outdoor air pollutants. Finally, future industrial development should be designed to incorporate the best available control technologies to reduce ambient air pollution.

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Appendix A

Cancer Diagnoses in Irwindale and Surrounding Regions 2001-2010

	Irwindale	Adjacent Census Tracts	Los Angeles County	California
All Cancer Sites	47	5,762	451,722	1,800,046
Breast	6	907	75,480	302,776
Lung/Oropharyngeal	6	744	50,401	224,035
Colon	3	432	32,755	121,190
Prostate	5	759	60,242	240,967

Appendix B

University of Southern California
Cancer Surveillance Program
Cancer Incidence Analysis

Keck School of Medicine of USC

USC Cancer Surveillance Program
Department of Preventive Medicine

October 22, 2013

Paul Rosenfeld PhD
Soil Water Air Protection Enterprise
1640 5th Street, Suite 204
Santa Monica CA 90401

Dear Dr. Rosenfeld:

In your capacity as the representative of the City of Irwindale, you have requested on the city's behalf information about the risks from cancer (all sites, breast, lung/oropharyngeal, colon, and prostate) to residents of the city in comparison with surrounding localities (census tracts), the County of Los Angeles as a whole, and the state of California. We are pleased to provide the following information in response to the request.

	Irwindale 2001-2010			Irwindale AAIR relative to that for:		
Site	# (Cases)	Annual Age-adjusted Incidence Rate/100K (AAIR)		Surrounding Census Tracts 2001-2010	Los Angeles County 2001-2010	California 2001-2010
All Sites	**47**	***355.69***		**0.89**	**0.74**	**0.72**
Breast	**6**	***80.21***		**0.73**	**0.55**	**0.53**
Lung/Oropharyngeal	**6**	***43.80***		**0.81**	**0.80**	**0.70**
Colon	**3**	***24.43***		**0.79**	**0.69**	**0.72**
Prostate	**5**	***86.92***		**0.70**	**0.59**	**0.58**

Since the city made this request on the basis of general concerns about air pollution generated by freeway traffic and the local mining industry, it is appropriate to evaluate the biological meaningfulness of each of the 15 comparisons. Although they are consistent in suggesting a relative deficit of cases over the period in Irwindale relative to each comparison population, no measure differs from unity any more than chance would allow. Thus there is no evidence that the citizens of Irwindale are at unusually high (or unusually low) risk from cancer, overall or at any of

the four most common cancer sites.

This information is provided on behalf of the Los Angeles County Cancer Surveillance Program and the California Cancer Registry. We will be happy to respond to any questions that you or representatives of the city might have.

Thomas Mack MD, MPH
Professor, Preventive Medicine and Pathology

Wendy Cozen DO, MPH
Professor, Preventive Medicine and Pathology

Amie Hwang, Ph.D., MPH
Project Manager and Post-doctoral Fellow
Preventive Medicine

CC: Dennis Deapen, Dr.PH, Professor and Director, USC Cancer Surveillance Program
Cyllene Morris, D.V.M, Ph.D., Research Program Director, California Cancer Registry, California State Department of Health Services
Kurt Snipes, Ph.D., Director, California Cancer Registry, California State Department of Health Services

Appendix C

Irwindale Facility Emissions Reported to US EPA National Emissions Inventory

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
All American Asphalt		**6.01**
13646 Live Oak Ln. Irwindale, CA 91706		6.01
Alpha Investment Associates	**30.91**	**30.91**
2501 Bateman Irwindale, CA 91706	30.91	30.91
B & S Enterprises Inc.	**1.57**	**1.57**
1424 E. Arrow Hwy Irwindale, CA 91706	1.57	1.57
Barron Boats		**3.01**
5820 Martin Rd. Irwindale, CA 91706-6213		3.01
Baxter Healthcare Pharmaseal D	**14.12**	**14.12**
4401 Foxdale Ave. Irwindale, CA 91706	14.12	14.12
California Portland Cement Co.	**2.41E-05**	
13000 E. Los Angeles St. Irwindale, CA 91706	2.41E-05	
Calmat Company	**40.02**	**48.98**
16001 Foothill Blvd. Irwindale, CA 91706	2.48	2.48
16005 Foothill Blvd. Irwindale, CA 91706	6.62	15.58
Calmat Disposal Site: 15900 W. Foothill Blvd. Irwindale, CA 9170(	30.91	30.91
Chaparral Concrete Co. Baldwin Park Plant		**1.00E-06**
13000 E. Los Angeles St. Irwindale, CA 91706		1.00E-06
Davis Wire Corp.	**24.53**	**19.93**
5555 Irwindale Ave. Irwindale, CA 91706-2070	24.53	19.93
Famwoods Printing, Inc./Montage Press DB		**3.89**
12758 Schabarum Ave. Irwindale, CA 91706-0000		3.89
Hanson Aggregates West Inc./Irwindale Rock	**2.65**	**18.68**
13550 Live Oak Ave. Irwindale, CA 91706-1317	2.65	18.68
Holliday Trucking Co., Inc.		**0.05**
257 E. Longden Ave. Irwindale, CA 91706		0.05
Home Savings of America/Envir.	**3.63**	**3.63**
4900 Rivergrade Rd. Irwindale, CA 91706	3.63	3.63
Industrial Asphalt	**1.02**	**1.02**
13130 E. Los Angeles St. Irwindale, CA 91706	0.96	0.96
16005 Foothill Blvd. Irwindale, CA 91706	0.06	0.06
Livingston / Graham Irwindale Live Oak Ave.	**0.84**	**0.84**
13550 Live Oak Ave. E. Hwy 605 W Irwindale, CA 91706	0.84	0.84
Longden Ave. Disposal Site	**30.91**	**30.91**
E. Longden Ave. Irwindale, CA 91706	30.91	30.91
Manning Brothers Class III Landfill	**3.87**	**3.87**
16158 Central St. Irwindale, CA 91706	3.87	3.87
Marble Makers Inc.	**3.43**	**8.53**
2310 E. Central Ave. Irwindale, CA 91010	3.43	8.53
Miller Breweries West LP	**997.37**	**175.03**
15801 E. 1st St. Irwindale, CA 91706-2069	997.37	175.03
National Ready Mix Concrete Co.		**3.11E-03**
2620 Buena Vista St. Irwindale, CA 91706		3.11E-03

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Nu-Way Inc.	**30.91**	**33.30**
Live Oak Landfill: 13620 Live Oak Ln. Irwindale, CA 91706-0000		2.39
Owl Rock Site: East Live Oak Ave. Irwindale, CA	30.91	30.91
PTX Industries Inc.	**1.35**	**1.35**
5355 N. Vincent Ave. Irwindale, CA 91706	1.35	1.35
Robertson's Ready Mix	**3.41**	**3.41**
13646 Live Oak Ln. Irwindale, CA 91706	3.41	3.41
San Marino Landfill	**30.91**	**30.91**
212 E. Live Oak Ave. Irwindale, CA 91706	30.91	30.91
Sierra Alloys Co., Inc		**3.71**
5467 Ayon Ave. Irwindale, CA 91706-2044		3.71
Southwest Products Co.	**1.31**	**1.31**
2240 Buena Vista St. Irwindale, CA 91706	1.31	1.31
Specialty Organics Inc.	**3.28**	**3.28**
5263 N. 4th St. Irwindale, CA 91706	3.28	3.28
Standard Concrete Products Inc.		**0.90**
13550 Live Oak Ave. Irwindale, CA 91706-1317		0.90
Sully Miller Contracting Co.	**40.90**	**43.59**
1245 E. Arrow Hwy Irwindale, CA 91706-1302	24.76	33.06
2600 Buena Vista St. Irwindale, CA 91706-0000	16.15	10.53
TRW Sensor Operations	**1.19**	**1.19**
6010 N. Irwindale Ave. Irwindale, CA 91706	1.19	1.19
TRW Technar Inc.	**8.98**	**8.98**
5462 N. Irwindale Ave. Irwindale, CA 91706	8.98	8.98
United Rock Products Corp.	**1.99**	**26.11**
1245 E. Arrow Hwy Irwindale, CA 91706-1302	1.99	26.11
Wedgestone Automotive Corp.	**4.03**	**4.03**
15854 Ornelas Ave. Irwindale, CA 91706	4.03	4.03
Grand Total	**1283.15**	**533.07**

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
All American Asphalt		**6.01**
13646 Live Oak Ln. Irwindale, CA 91706		
2-Methylnaphthalene		1.04E-02
Acenaphthene		1.30E-04
Acenaphthylene		8.00E-05
Acetaldehyde		4.66E-02
Acrolein		1.00E-04
Ammonia		1.19E-01
Anthracene		3.00E-05
Arsenic		6.60E-05
Benz[a]Anthracene		6.81E-07
Benzene		1.89E-03
Benzo[a]Pyrene		4.74E-08
Benzo[b]Fluoranthene		1.38E-06
Benzo[g,h,i,]Perylene		7.30E-08
Benzo[k]Fluoranthene		1.90E-06
Beryllium		2.15E-04
Cadmium		8.54E-05
Carbon Monoxide		2.52E-01
Chromium (VI)		3.72E-06
Chrysene		5.64E-07
Dibenzo[a,h]Anthracene		1.39E-08
Ethyl Benzene		3.20E-01
Fluoranthene		2.00E-05
Fluorene		2.30E-04
Formaldehyde		7.65E-02
Hexane		1.70E-04
Indeno[1,2,3-c,d]Pyrene		4.37E-08
Lead		1.25E-04
Manganese		1.29E-03
Mercury		5.50E-05
Naphthalene		5.25E-03
Nickel		4.36E-04
Nitrogen Oxides		1.86E+00
Phenanthrene		3.75E-04
PM10-PRI		2.23E+00
PM25-PRI		3.74E-01
Pyrene		5.05E-06
Selenium		7.00E-05
Sulfur Dioxide		2.23E-02
Toluene		1.46E-01
Volatile Organic Compounds		1.43E-01
Xylenes (Mixture of o, m, and p Isomers)		3.93E-01

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Alpha Investment Associates	**30.91**	**30.91**
2501 Bateman Irwindale, CA 91706		
1,1,2,2-Tetrachloroethane	2.57E-01	2.57E-01
1,4-Dichlorobenzene	4.25E-02	4.25E-02
Acrylonitrile	4.63E-01	4.63E-01
Benzene	1.19E+00	1.19E+00
Carbon Disulfide	6.08E-02	6.08E-02
Carbon Tetrachloride	8.48E-04	8.48E-04
Carbonyl Sulfide	4.06E-02	4.06E-02
Chlorobenzene	3.88E-02	3.88E-02
Chloroform	4.94E-03	4.94E-03
Ethyl Benzene	6.74E-01	6.74E-01
Ethyl Chloride	1.11E-01	1.11E-01
Ethylene Dibromide	2.59E-04	2.59E-04
Ethylene Dichloride	5.59E-02	5.59E-02
Ethylidene Dichloride		3.20E-01
Ethylidene Dichloride (1,1-Dichloroethane)	3.20E-01	
Hexane	7.80E-01	7.80E-01
Mercury & Compounds	8.07E-05	8.07E-05
Methyl Chloride	8.42E-02	8.42E-02
Methyl Chloroform	8.82E-02	8.82E-02
Methyl Isobutyl Ketone	2.58E-01	2.58E-01
Methylene Chloride	1.67E+00	1.67E+00
Propylene Dichloride	2.80E-02	2.80E-02
Tetrachloroethylene	8.52E-01	8.52E-01
Toluene	2.09E+01	2.09E+01
Trichloroethylene	5.10E-01	5.10E-01
Vinyl Chloride	6.32E-01	6.32E-01
Vinylidene Chloride	2.67E-02	2.67E-02
Xylenes (Mixture of o, m, and p Isomers)	1.77E+00	1.77E+00
B & S Enterprises Inc.	**1.57**	**1.57**
1424 E. Arrow Hwy Irwindale, CA 91706		
Volatile Organic Compounds	1.57	1.57
Barron Boats		**3.01**
5820 Martin Rd. Irwindale, CA 91706-6213		
Volatile Organic Compounds		3.01

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Baxter Healthcare Pharmaseal D	**14.12**	**14.12**
4401 Foxdale Ave. Irwindale, CA 91706		
Ethylene Oxide	9.15E+00	9.15E+00
Formaldehyde	4.10E-02	4.10E-02
Methylene Chloride	4.93E+00	4.93E+00
Toluene	1.00E-03	1.00E-03
California Portland Cement Co.	**2.41E-05**	
13000 E. Los Angeles St. Irwindale, CA 91706		
Cadmium	2.88E-07	
Chromium (VI)	3.82E-06	
Chromium III	9.69E-06	
Lead Compounds (Inorganic)	3.90E-06	
Mercury	6.15E-08	
Nickel	6.35E-06	
Calmat Company	**40.02**	**48.98**
16001 Foothill Blvd. Irwindale, CA 91706		
PM10-PRI	1.48E+00	1.48E+00
PM25-PRI	1.00E+00	1.00E+00
16005 Foothill Blvd. Irwindale, CA 91706		
1,3-Butadiene		5.05E-04
Ammonia		1.07E+00
Arsenic		5.90E-07
Benzene		1.93E-03
Cadmium		5.55E-07
Carbon Monoxide	2.29E+00	3.96E+00
Chromium (VI)		3.70E-08
Formaldehyde		2.45E-03
Lead		3.07E-06
Naphthalene		8.50E-05
Nickel		2.98E-06
Nitrogen Oxides	2.91E+00	2.88E+00
PM10-PRI	4.54E-01	5.31E+00
PM25-PRI	4.54E-01	2.03E+00
Sulfur Dioxide	5.00E-02	4.08E-02
Volatile Organic Compounds	4.60E-01	2.98E-01
Calmat Disposal Site: 15900 W. Foothill Blvd. Irwindale, CA 91706		
1,1,2,2-Tetrachloroethane	2.57E-01	2.57E-01
1,4-Dichlorobenzene	4.25E-02	4.25E-02
Acrylonitrile	4.63E-01	4.63E-01
Benzene	1.19E+00	1.19E+00
Carbon Disulfide	6.08E-02	6.08E-02

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Calmat Company	**40.02**	**48.98**
Calmat Disposal Site: 15900 W. Foothill Blvd. Irwindale, CA 91706		
Carbon Tetrachloride	8.48E-04	8.48E-04
Carbonyl Sulfide	4.06E-02	4.06E-02
Chlorobenzene	3.88E-02	3.88E-02
Chloroform	4.94E-03	4.94E-03
Ethyl Benzene	6.74E-01	6.74E-01
Ethyl Chloride	1.11E-01	1.11E-01
Ethylene Dibromide	2.59E-04	2.59E-04
Ethylene Dichloride	5.59E-02	5.59E-02
Ethylidene Dichloride		3.20E-01
Ethylidene Dichloride (1,1-Dichloroethane)	3.20E-01	
Hexane	7.80E-01	7.80E-01
Mercury & Compounds	8.07E-05	8.07E-05
Methyl Chloride	8.42E-02	8.42E-02
Methyl Chloroform	8.82E-02	8.82E-02
Methyl Isobutyl Ketone	2.58E-01	2.58E-01
Methylene Chloride	1.67E+00	1.67E+00
Propylene Dichloride	2.80E-02	2.80E-02
Tetrachloroethylene	8.52E-01	8.52E-01
Toluene	2.09E+01	2.09E+01
Trichloroethylene	5.10E-01	5.10E-01
Vinyl Chloride	6.32E-01	6.32E-01
Vinylidene Chloride	2.67E-02	2.67E-02
Xylenes (Mixture of o, m, and p Isomers)	1.77E+00	1.77E+00
Chaparral Concrete Co. Baldwin Park Plant		**1.00E-06**
13000 E. Los Angeles St. Irwindale, CA 91706		
Lead & Compounds		1.00E-06

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Davis Wire Corp.	**24.53**	**19.93**
5555 Irwindale Ave. Irwindale, CA 91706-2070		
1,3-Butadiene		5.00E-06
Ammonia		1.60E+00
Arsenic		4.00E-08
Benzene	8.40E-04	5.80E-04
Cadmium		3.75E-08
Carbon Monoxide	5.43E+00	3.82E+00
Chromium (VI)		2.50E-09
Formaldehyde	1.79E-03	1.30E-03
Hydrochloric Acid	7.68E-01	
Lead		2.08E-07
Naphthalene		2.60E-05
Nickel		9.75E-08
Nitrogen Oxides	1.24E+01	1.27E+01
PM10-PRI	1.17E+00	7.95E-01
PM25-PRI	1.11E+00	6.68E-01
Sulfur Dioxide	9.00E-02	5.34E-02
Toluene	3.85E-03	
Volatile Organic Compounds	3.58E+00	2.54E-01
Xylenes (Mixture of o, m, and p Isomers)	2.86E-03	
Famwoods Printing, Inc./Montage Press DB		**3.89**
12758 Schabarum Ave. Irwindale, CA 91706-0000		
Ammonia		5.35E-01
Volatile Organic Compounds		3.35E+00

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Hanson Aggregates West Inc./Irwindale Rock	**2.65**	**18.68**
13550 Live Oak Ave. Irwindale, CA 91706-1317		
1,3-Butadiene		2.22E-03
Ammonia		1.40E-03
Arsenic		4.82E-05
Benzene		8.20E-03
Beryllium		2.16E-06
Cadmium		4.17E-06
Carbon Monoxide		8.06E+00
Chromium (VI)		1.72E-06
Formaldehyde		9.92E-03
Lead		1.11E-04
Naphthalene		3.15E-04
Nickel		1.04E-04
Nitrogen Oxides		1.03E+00
PM10-PRI	1.80E+00	7.80E+00
PM25-PRI	5.41E-01	1.24E+00
Sulfur Dioxide		2.30E-02
Volatile Organic Compounds	3.10E-01	5.18E-01
Holliday Trucking Co., Inc.		**0.05**
257 E. Longden Ave. Irwindale, CA 91706		
Ammonia		7.50E-04
Arsenic		1.08E-06
Benzene		3.19E-06
Beryllium		9.50E-08
Cadmium		1.08E-06
Carbon Monoxide		8.23E-03
Chromium (VI)		1.27E-09
Formaldehyde		3.35E-04
Lead		5.25E-07
Naphthalene		7.05E-08
Nickel		1.02E-06
Nitrogen Oxides		1.60E-02
PM10-PRI		5.06E-03
PM25-PRI		3.57E-03
Sulfur Dioxide		1.40E-04
Volatile Organic Compounds		1.39E-02

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Home Savings of America/Envir.	**3.63**	**3.63**
4900 Rivergrade Rd. Irwindale, CA 91706		
Carbon Monoxide	2.90E-01	2.90E-01
Nitrogen Oxides	1.16E+00	1.16E+00
PM10-PRI	4.49E-02	4.49E-02
PM25-PRI	4.45E-02	4.45E-02
Sulfur Dioxide	1.00E-02	1.00E-02
Volatile Organic Compounds	2.09E+00	2.09E+00
Industrial Asphalt	**1.02**	**1.02**
13130 E. Los Angeles St. Irwindale, CA 91706		
Benzo[b]Fluoranthene	1.15E-05	
Benzo[k]Fluoranthene	4.98E-06	
Cadmium	8.20E-05	8.20E-05
Dioxins, Total, W/O Individ. Isomers Reported {PCDDS}		2.60E-09
Formaldehyde	4.61E-01	4.61E-01
Lead	4.13E-04	4.13E-04
Manganese	4.55E-01	4.55E-01
Mercury	1.95E-06	1.95E-06
Methyl Chloroform	8.70E-03	8.70E-03
Naphthalene	2.45E-03	2.45E-03
PAH, total	3.50E-03	3.50E-03
Polychlorinated Dibenzofurans, Total		3.93E-10
Radionuclides	5.10E-08	
Radionuclides (Including Radon)		5.10E-08
Toluene	3.07E-02	3.07E-02
16005 Foothill Blvd. Irwindale, CA 91706		
Acetaldehyde	1.35E-02	1.35E-02
Benzene	4.00E-03	4.00E-03
Formaldehyde	9.50E-03	9.50E-03
Lead	2.50E-03	2.50E-03
Manganese	1.00E-03	1.00E-03
Mercury	2.00E-03	2.00E-03
Methyl Chloroform	5.00E-04	5.00E-04
Naphthalene	6.00E-03	6.00E-03
Nickel	5.00E-04	5.00E-04
Toluene	1.20E-02	1.20E-02
Xylenes (Mixture of o, m, and p Isomers)	1.15E-02	1.15E-02

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Livingston / Graham Irwindale Live Oak Ave.	**0.84**	**0.84**
13550 Live Oak Ave. E. Hwy 605 W Irwindale, CA 91706		
1,1,2,2-Tetrachloroethane	6.96E-03	6.96E-03
1,4-Dichlorobenzene	1.15E-03	1.15E-03
Acrylonitrile	1.26E-02	1.26E-02
Benzene	3.24E-02	3.24E-02
Carbon Disulfide	1.65E-03	1.65E-03
Carbon Tetrachloride	2.30E-05	2.30E-05
Carbonyl Sulfide	1.10E-03	1.10E-03
Chlorobenzene	1.05E-03	1.05E-03
Chloroform	1.34E-04	1.34E-04
Ethyl Benzene	1.83E-02	1.83E-02
Ethyl Chloride	3.01E-03	3.01E-03
Ethylene Dibromide	7.02E-06	7.02E-06
Ethylene Dichloride	1.52E-03	1.52E-03
Ethylidene Dichloride		8.69E-03
Ethylidene Dichloride (1,1-Dichloroethane)	8.69E-03	
Hexane	2.12E-02	2.12E-02
Mercury & Compounds	2.19E-06	2.19E-06
Methyl Chloride	2.28E-03	2.28E-03
Methyl Chloroform	2.39E-03	2.39E-03
Methyl Isobutyl Ketone	7.00E-03	7.00E-03
Methylene Chloride	4.54E-02	4.54E-02
Propylene Dichloride	7.60E-04	7.60E-04
Tetrachloroethylene	2.31E-02	2.31E-02
Toluene	5.68E-01	5.68E-01
Trichloroethylene	1.38E-02	1.38E-02
Vinyl Chloride	1.71E-02	1.71E-02
Vinylidene Chloride	7.25E-04	7.25E-04
Xylenes (Mixture of o, m, and p Isomers)	4.80E-02	4.80E-02

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Longden Ave. Disposal Site	**30.91**	**30.91**
E. Longden Ave. Irwindale, CA 91706		
1,1,2,2-Tetrachloroethane	2.57E-01	2.57E-01
1,4-Dichlorobenzene	4.25E-02	4.25E-02
Acrylonitrile	4.63E-01	4.63E-01
Benzene	1.19E+00	1.19E+00
Carbon Disulfide	6.08E-02	6.08E-02
Carbon Tetrachloride	8.48E-04	8.48E-04
Carbonyl Sulfide	4.06E-02	4.06E-02
Chlorobenzene	3.88E-02	3.88E-02
Chloroform	4.94E-03	4.94E-03
Ethyl Benzene	6.74E-01	6.74E-01
Ethyl Chloride	1.11E-01	1.11E-01
Ethylene Dibromide	2.59E-04	2.59E-04
Ethylene Dichloride	5.59E-02	5.59E-02
Ethylidene Dichloride		3.20E-01
Ethylidene Dichloride (1,1-Dichloroethane)	3.20E-01	
Hexane	7.80E-01	7.80E-01
Mercury & Compounds	8.07E-05	8.07E-05
Methyl Chloride	8.42E-02	8.42E-02
Methyl Chloroform	8.82E-02	8.82E-02
Methyl Isobutyl Ketone	2.58E-01	2.58E-01
Methylene Chloride	1.67E+00	1.67E+00
Propylene Dichloride	2.80E-02	2.80E-02
Tetrachloroethylene	8.52E-01	8.52E-01
Toluene	2.09E+01	2.09E+01
Trichloroethylene	5.10E-01	5.10E-01
Vinyl Chloride	6.32E-01	6.32E-01
Vinylidene Chloride	2.67E-02	2.67E-02
Xylenes (Mixture of o, m, and p Isomers)	1.77E+00	1.77E+00

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Manning Brothers Class III Landfill	**3.87**	**3.87**
16158 Central St. Irwindale, CA 91706		
1,1,2,2-Tetrachloroethane	3.21E-02	3.21E-02
1,4-Dichlorobenzene	5.32E-03	5.32E-03
Acrylonitrile	5.79E-02	5.79E-02
Benzene	1.49E-01	1.49E-01
Carbon Disulfide	7.61E-03	7.61E-03
Carbon Tetrachloride	1.06E-04	1.06E-04
Carbonyl Sulfide	5.07E-03	5.07E-03
Chlorobenzene	4.85E-03	4.85E-03
Chloroform	6.17E-04	6.17E-04
Ethyl Benzene	8.43E-02	8.43E-02
Ethyl Chloride	1.39E-02	1.39E-02
Ethylene Dibromide	3.24E-05	3.24E-05
Ethylene Dichloride	6.99E-03	6.99E-03
Ethylidene Dichloride		4.01E-02
Ethylidene Dichloride (1,1-Dichloroethane)	4.01E-02	
Hexane	9.75E-02	9.75E-02
Mercury & Compounds	1.01E-05	1.01E-05
Methyl Chloride	1.05E-02	1.05E-02
Methyl Chloroform	1.10E-02	1.10E-02
Methyl Isobutyl Ketone	3.23E-02	3.23E-02
Methylene Chloride	2.09E-01	2.09E-01
Propylene Dichloride	3.50E-03	3.50E-03
Tetrachloroethylene	1.07E-01	1.07E-01
Toluene	2.62E+00	2.62E+00
Trichloroethylene	6.38E-02	6.38E-02
Vinyl Chloride	7.90E-02	7.90E-02
Vinylidene Chloride	3.34E-03	3.34E-03
Xylenes (Mixture of o, m, and p Isomers)	2.21E-01	2.21E-01
Marble Makers Inc.	**3.43**	**8.53**
2310 E. Central Ave. Irwindale, CA 91010		
Styrene		5.10
Volatile Organic Compounds	3.43	3.43

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Miller Breweries West LP	**997.37**	**175.03**
15801 E. 1st St. Irwindale, CA 91706-2069		
1,3-Butadiene		9.39E-03
Acetaldehyde	1.59E-01	
Acrolein	3.31E-03	
Ammonia	4.96E+00	1.24E+01
Arsenic		5.35E-07
Benzene	4.69E-03	2.60E-02
Cadmium		5.00E-07
Carbon Monoxide	8.45E+02	3.97E+01
Carbon Tetrachloride		2.45E-04
Chlorine	8.31E-01	
Chromium (VI)		3.35E-08
Ethylene Dibromide		2.95E-04
Ethylene Dichloride		1.55E-04
Fluoranthene	1.32E-08	
Fluorene	1.24E-08	
Formaldehyde	3.31E-04	4.85E-01
Glycol Ethers	1.43E-01	
Lead		2.78E-06
Methanol	1.65E+00	
Methylene Chloride		5.70E-04
Naphthalene	4.51E-02	1.75E-03
Nickel		1.31E-06
Nitrogen Oxides	1.49E+01	8.70E+00
PAH, total	4.97E-02	
Phenanthrene	7.51E-08	
Phosphine	1.74E-02	
PM10-PRI	6.96E-01	9.19E-01
PM25-PRI	5.97E-01	9.19E-01
Pyrene	2.21E-08	
Sulfur Dioxide	1.70E-01	7.56E-02
Vinyl Chloride		9.50E-05
Volatile Organic Compounds	1.28E+02	1.12E+02
National Ready Mix Concrete Co.		**3.11E-03**
2620 Buena Vista St. Irwindale, CA 91706		
Lead & Compounds		2.50E-03
Mercury & Compounds		6.05E-04

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Nu-Way Inc.	**30.91**	**33.30**
Live Oak Landfill: 13620 Live Oak Ln. Irwindale, CA 91706-0000		
1,3-Butadiene		2.00E-05
Ammonia		3.15E-04
Arsenic		1.76E-07
Benzene		2.00E-05
Cadmium		1.65E-07
Carbon Monoxide		1.12E-02
Chromium (VI)		1.10E-08
Formaldehyde		1.85E-04
Lead		9.15E-07
Naphthalene		2.17E-06
Nickel		4.29E-07
Nitrogen Oxides		5.16E-02
PM10-PRI		1.38E+00
PM25-PRI		9.43E-01
Sulfur Dioxide		7.80E-04
Volatile Organic Compounds		3.85E-03
Owl Rock Site: East Live Oak Ave. Irwindale, CA		
1,1,2,2-Tetrachloroethane	2.57E-01	2.57E-01
1,4-Dichlorobenzene	4.25E-02	4.25E-02
Acrylonitrile	4.63E-01	4.63E-01
Benzene	1.19E+00	1.19E+00
Carbon Disulfide	6.08E-02	6.08E-02
Carbon Tetrachloride	8.48E-04	8.48E-04
Carbonyl Sulfide	4.06E-02	4.06E-02
Chlorobenzene	3.88E-02	3.88E-02
Chloroform	4.94E-03	4.94E-03
Ethyl Benzene	6.74E-01	6.74E-01
Ethyl Chloride	1.11E-01	1.11E-01
Ethylene Dibromide	2.59E-04	2.59E-04
Ethylene Dichloride	5.59E-02	5.59E-02
Ethylidene Dichloride		3.20E-01
Ethylidene Dichloride (1,1-Dichloroethane)	3.20E-01	
Hexane	7.80E-01	7.80E-01
Mercury & Compounds	8.07E-05	8.07E-05
Methyl Chloride	8.42E-02	8.42E-02
Methyl Chloroform	8.82E-02	8.82E-02
Methyl Isobutyl Ketone	2.58E-01	2.58E-01
Methylene Chloride	1.67E+00	1.67E+00
Propylene Dichloride	2.80E-02	2.80E-02
Tetrachloroethylene	8.52E-01	8.52E-01
Toluene	2.09E+01	2.09E+01

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Nu-Way Inc.	**30.91**	**33.30**
Owl Rock Site: East Live Oak Ave. Irwindale, CA		
Trichloroethylene	5.10E-01	5.10E-01
Vinyl Chloride	6.32E-01	6.32E-01
Vinylidene Chloride	2.67E-02	2.67E-02
Xylenes (Mixture of o, m, and p Isomers)	1.77E+00	1.77E+00
PTX Industries Inc.	**1.35**	**1.35**
5355 N. Vincent Ave. Irwindale, CA 91706		
Carbon Monoxide	2.60E-01	2.60E-01
Nitrogen Oxides	9.20E-01	9.20E-01
PM10-PRI	5.64E-02	5.64E-02
PM25-PRI	4.49E-02	4.49E-02
Sulfur Dioxide	2.00E-02	2.00E-02
Volatile Organic Compounds	5.00E-02	5.00E-02
Robertson's Ready Mix	**3.41**	**3.41**
13646 Live Oak Ln. Irwindale, CA 91706		
Carbon Monoxide	1.25E+00	1.25E+00
Nitrogen Oxides	1.30E+00	1.30E+00
PM10-PRI	3.09E-01	3.09E-01
PM25-PRI	2.68E-01	2.68E-01
Sulfur Dioxide	3.00E-02	3.00E-02
Volatile Organic Compounds	2.49E-01	2.49E-01

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
San Marino Landfill	**30.91**	**30.91**
212 E. Live Oak Ave. Irwindale, CA 91706		
1,1,2,2-Tetrachloroethane	2.57E-01	2.57E-01
1,4-Dichlorobenzene	4.25E-02	4.25E-02
Acrylonitrile	4.63E-01	4.63E-01
Benzene	1.19E+00	1.19E+00
Carbon Disulfide	6.08E-02	6.08E-02
Carbon Tetrachloride	8.48E-04	8.48E-04
Carbonyl Sulfide	4.06E-02	4.06E-02
Chlorobenzene	3.88E-02	3.88E-02
Chloroform	4.94E-03	4.94E-03
Ethyl Benzene	6.74E-01	6.74E-01
Ethyl Chloride	1.11E-01	1.11E-01
Ethylene Dibromide	2.59E-04	2.59E-04
Ethylene Dichloride	5.59E-02	5.59E-02
Ethylidene Dichloride		3.20E-01
Ethylidene Dichloride (1,1-Dichloroethane)	3.20E-01	
Hexane	7.80E-01	7.80E-01
Mercury & Compounds	8.07E-05	8.07E-05
Methyl Chloride	8.42E-02	8.42E-02
Methyl Chloroform	8.82E-02	8.82E-02
Methyl Isobutyl Ketone	2.58E-01	2.58E-01
Methylene Chloride	1.67E+00	1.67E+00
Propylene Dichloride	2.80E-02	2.80E-02
Tetrachloroethylene	8.52E-01	8.52E-01
Toluene	2.09E+01	2.09E+01
Trichloroethylene	5.10E-01	5.10E-01
Vinyl Chloride	6.32E-01	6.32E-01
Vinylidene Chloride	2.67E-02	2.67E-02
Xylenes (Mixture of o, m, and p Isomers)	1.77E+00	1.77E+00
Sierra Alloys Co., Inc		**3.71**
5467 Ayon Ave. Irwindale, CA 91706-2044		
Ammonia		3.31E-01
Benzene		1.45E-04
Carbon Monoxide		6.43E-01
Formaldehyde		3.10E-04
Naphthalene		5.00E-06
Nitrogen Oxides		2.39E+00
PM10-PRI		1.38E-01
PM25-PRI		1.38E-01
Sulfur Dioxide		1.10E-02
Volatile Organic Compounds		5.45E-02

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Southwest Products Co.	**1.31**	**1.31**
2240 Buena Vista St. Irwindale, CA 91706		
Methyl Chloroform	1.29E+00	1.29E+00
p-Dioxane	2.71E-02	2.71E-02
Specialty Organics Inc.	**3.28**	**3.28**
5263 N. 4th St. Irwindale, CA 91706		
Toluene	3.28	3.28
Standard Concrete Products Inc.		**0.90**
13550 Live Oak Ave. Irwindale, CA 91706-1317		
Arsenic		2.00E-05
Beryllium		1.87E-06
Cadmium		1.94E-07
Chromium (VI)		6.35E-08
Lead		2.50E-05
Manganese		4.15E-04
Mercury		6.35E-08
Nickel		8.00E-05
PM10-PRI		5.40E-01
PM25-PRI		3.64E-01
Selenium		2.10E-06

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Sully Miller Contracting Co.	**40.90**	**43.59**
1245 E. Arrow Hwy Irwindale, CA 91706-1302		
2-Methylnaphthalene		8.65E-03
Acenaphthene		1.10E-04
Acenaphthylene		7.07E-05
Acetaldehyde		3.88E-02
Acrolein		3.50E-05
Ammonia		1.27E-01
Anthracene		2.66E-05
Arsenic	7.77E-05	5.57E-05
B[j]Fluoranthene		1.00E-05
Benz[a]Anthracene		9.89E-07
Benzene	4.99E-02	1.59E-03
Benzo[a]Pyrene		9.17E-08
Benzo[b]Fluoranthene		1.32E-06
Benzo[e]Pyrene		1.72E-07
Benzo[g,h,i,]Perylene		1.03E-07
Benzo[k]Fluoranthene		1.64E-06
Beryllium	1.17E-04	1.51E-05
Cadmium	7.08E-04	7.01E-05
Carbon Monoxide	2.35E+00	2.66E+01
Chromium (VI)	6.75E-05	2.66E-07
Chrysene		2.74E-06
Dibenzo[a,h]Anthracene		1.96E-08
Ethyl Benzene		2.67E-01
Fluoranthene		1.62E-05
Fluorene		2.05E-04
Formaldehyde	1.49E-01	6.36E-02
Hexane		9.50E-05
Indeno[1,2,3-c,d]Pyrene		4.66E-08
Lead	4.03E-04	1.07E-04
Manganese	4.66E-03	9.15E-04
Mercury	5.46E-03	4.50E-05
Naphthalene		4.39E-03
Nickel	7.71E-04	3.63E-04
Nitrogen Oxides	6.81E+00	2.18E+00
PAH, total	3.75E-06	
Perylene		4.83E-07
Phenanthrene		3.30E-04
PM10-PRI	7.15E+00	2.61E+00
PM25-PRI	7.00E+00	4.35E-01
Pyrene		8.37E-06
Selenium	7.77E-05	5.51E-05

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Sully Miller Contracting Co.	**40.90**	**43.59**
1245 E. Arrow Hwy Irwindale, CA 91706-1302		
Styrene		1.96E-06
Sulfur Dioxide	4.00E-02	2.38E-02
Toluene		1.21E-01
Volatile Organic Compounds	1.19E+00	3.01E-01
Xylenes (Mixture of o, m, and p Isomers)		3.27E-01
2600 Buena Vista St. Irwindale, CA 91706-0000		
1,3-Butadiene		3.00E-05
2-Methylnaphthalene		1.05E-02
Acenaphthene		2.05E-04
Acenaphthylene		1.21E-03
Acetaldehyde		4.50E-05
Acrolein		2.00E-05
Ammonia		7.55E-02
Anthracene		3.40E-05
Arsenic		7.64E-05
Benz[a]Anthracene		2.65E-05
Benzene	4.87E-03	3.13E-03
Benzo[a]Pyrene		1.43E-06
Benzo[b]Fluoranthene		1.02E-05
Benzo[e]Pyrene		1.54E-05
Benzo[g,h,i,]Perylene		5.05E-06
Benzo[k]Fluoranthene		5.07E-06
Beryllium		1.58E-07
Cadmium		5.52E-05
Carbon Monoxide	2.27E+00	4.65E+00
Chlorine		1.50E-05
Chromium (VI)		5.07E-06
Chrysene		3.12E-05
Dibenzo[a,h]Anthracene		8.85E-09
Ethyl Benzene		3.38E-02
Fluoranthene		8.89E-05
Fluorene		5.60E-04
Formaldehyde		7.42E-02
Hexane		1.29E-01
Indeno[1,2,3-c,d]Pyrene		9.91E-07
Lead		8.87E-05
Manganese	3.48E-03	1.40E-03
Mercury	1.12E-04	3.00E-05
Methanol		2.50E-05
Methyl Chloroform		6.75E-03
Methyl Tert-Butyl Ether		7.00E-05

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
Sully Miller Contracting Co.	**40.90**	**43.59**
2600 Buena Vista St. Irwindale, CA 91706-0000		
Methylene Chloride		2.32E-07
m-Xylene		1.70E-04
Naphthalene	1.21E-01	1.27E-02
Nickel	2.18E-03	1.32E-03
Nitrogen Oxides	2.65E+00	1.78E+00
o-Xylene		6.00E-05
PAH, total	2.92E-03	
Perylene		2.30E-06
Phenanthrene		1.11E-03
PM10-PRI	4.92E+00	2.52E+00
PM25-PRI	4.79E+00	5.15E-01
Pyrene		8.37E-05
Selenium		4.52E-05
Styrene		9.83E-06
Sulfur Dioxide	4.00E-02	1.45E-02
Toluene		2.14E-02
Volatile Organic Compounds	1.34E+00	6.52E-01
Xylenes (Mixture of o, m, and p Isomers)		2.84E-02
TRW Sensor Operations	**1.19**	**1.19**
6010 N. Irwindale Ave. Irwindale, CA 91706		
Chlorine	2.50E-03	2.50E-03
Lead	6.50E-03	6.50E-03
Methanol	5.48E-01	5.48E-01
Methyl Chloroform	6.32E-01	6.32E-01
TRW Technar Inc.	**8.98**	**8.98**
5462 N. Irwindale Ave. Irwindale, CA 91706		
1-Chloro-2,3-Epoxypropane	1.30E-01	
Beryllium	8.04E-01	8.04E-01
Cadmium	7.50E-03	7.50E-03
Chlorine	2.50E-03	2.50E-03
Epichlorohydrin		1.30E-01
Hydrochloric Acid	5.88E+00	5.88E+00
Lead	3.00E-01	3.00E-01
Methanol	6.68E-01	6.68E-01
Methyl Chloroform	1.82E-01	1.82E-01
Methylene Chloride	1.73E-01	1.73E-01
Nickel	8.04E-01	8.04E-01
Xylenes (Mixture of o, m, and p Isomers)	3.06E-02	3.06E-02

Facility Name Reported to NEI	Reported Emissions (Tons/Year): 2002	Reported Emissions (Tons/Year): 2005
United Rock Products Corp.	**1.99**	**26.11**
1245 E. Arrow Hwy Irwindale, CA 91706-1302		
1,3-Butadiene		5.15E-03
Ammonia		3.17E-03
Arsenic		2.08E-05
Benzene		1.89E-02
Beryllium		2.09E-06
Cadmium		7.34E-06
Carbon Monoxide		1.88E+01
Chromium (VI)		1.29E-06
Formaldehyde		2.30E-02
Lead		7.71E-05
Naphthalene		7.45E-04
Nickel		1.01E-04
Nitrogen Oxides		2.33E+00
PM10-PRI	1.46E+00	3.20E+00
PM25-PRI	4.37E-01	6.21E-01
Sulfur Dioxide		5.29E-02
Volatile Organic Compounds	1.00E-01	1.06E+00
Wedgestone Automotive Corp.	**4.03**	**4.03**
15854 Ornelas Ave. Irwindale, CA 91706		
Carbon Monoxide	1.23E+00	1.23E+00
Nitrogen Oxides	1.79E+00	1.79E+00
PM10-PRI	7.41E-02	7.41E-02
PM25-PRI	7.41E-02	7.41E-02
Volatile Organic Compounds	8.60E-01	8.60E-01
Grand Total	**1283.15**	**533.07**