

## DOCKETED

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Appendix 5.1D  
Risk Assessment Support Data

# Health Risk Assessment Support Data

## Health Risk Assessment Process, Goals, Assumptions, and Uses

“In recent years, the public has become increasingly aware of the presence of harmful chemicals in our environment. Many people express concerns about pesticides and other foreign substances in food, contaminants in drinking water, and toxic pollutants in the air. Others believe these concerns are exaggerated or unwarranted. How can we determine which of these potential hazards really deserve attention? How do we, as a society, decide where to focus our efforts and resources to control these hazards? When we hear about toxic threats that affect us personally, such as the discovery of industrial waste buried in our neighborhood or near our children’s school, how concerned should we be?”

Health risk assessment is a scientific tool designed to help answer these questions. Government agencies rely on risk assessments to help them determine which potential hazards are the most significant. Risk assessments can also guide regulators in abating environmental hazards. Members of the public who learn the basics of risk assessment can improve their understanding of both real and perceived environmental hazards, and they can work more effectively with decision makers on solutions to environmental problems.

Chemicals can be either beneficial or harmful, depending on a number of factors, such as the amounts to which we are exposed. Low levels of some substances may be necessary for good health, but higher levels may be harmful. Health risk assessments are used to determine if a particular chemical poses a significant risk to human health and, if so, under what circumstances. Could exposure to a specific chemical cause significant health problems? How much of the chemical would someone have to be exposed to before it would be dangerous? How serious could the health risks be? What activities might put people at increased risk?

If it were possible to prevent all human exposure to all hazardous chemicals, there would be no need for risk assessment. However, the total removal of harmful pollutants from the environment is often infeasible or impossible, and many naturally occurring substances also pose health risks. Risk assessment helps scientists and regulators identify serious health hazards and determine realistic goals for reducing exposure to toxics so that there is no significant health threat to the public.

Estimating the hazards posed by toxic chemicals in the environment involves the compilation and evaluation of complex sets of data. Government regulators, therefore, turn to specialists to perform or assist with risk assessments. These specialists include scientists with degrees in toxicology (the study of the toxic effects of chemicals) and epidemiology (the study of disease or illness in populations) as well as physicians, biologists, chemists, and engineers.

The term “health risk assessment” is often misinterpreted. People sometimes think that a risk assessment will tell them whether a current health problem or symptom was caused by exposure to a chemical. This is not the case. Scientists who are searching for links between chemical exposures and health problems in a community may conduct an epidemiologic study. These studies typically include a survey of health problems in a community and a comparison of health problems in that community with those in other cities, communities, or the population as a whole.

Although they are both important, health risk assessments and epidemiologic studies have different objectives. Most epidemiologic studies evaluate whether *past* chemical exposures may be responsible for documented health problems in a specific group of people. In contrast, health risk assessments are

used to estimate whether current or future chemical exposures will pose health risks to a broad population, such as a city or a community. Scientific methods used in health risk assessment cannot be used to link individual illnesses to past chemical exposures, nor can health risk assessments and epidemiologic studies prove that a specific toxic substance caused an individual's illness.

The U.S. Environmental Protection Agency (U.S. EPA) is a leading risk assessment agency at the federal level. In California, the Office of Environmental Health Hazard Assessment (OEHHA) in the California Environmental Protection Agency (Cal/EPA) has the primary responsibility for developing procedures and practices for performing health risk assessments. Other agencies within Cal/EPA, such as the Department of Pesticide Regulation and the Department of Toxic Substances Control, have extensive risk assessment programs of their own but work closely with OEHHA.

The Department of Pesticide Regulation uses risk assessments to make regulatory decisions concerning safe pesticide uses. The Department of Toxic Substances Control uses risk assessments to determine requirements for the management and cleanup of hazardous wastes. OEHHA's health risk assessments are used by the Air Resources Board to develop regulations governing toxic air contaminants, and by the Department of Health Services to develop California's drinking water standards. These agencies' decisions take into account the seriousness of potential health effects along with the economic and technical feasibility of measures that can reduce the health risks.

Health risk assessment requires both sound science and professional judgment and is a constantly developing process. Cal/EPA is nationally recognized for developing new procedures that improve the accuracy of risk assessments. Cal/EPA also works closely with U.S. EPA in all phases of risk assessment.

The risk assessment process is typically described as consisting of four basic steps: hazard identification, exposure assessment, dose-response assessment, and risk characterization. Each of these steps will be explained in the following text.

## Hazard Identification

In the first step, hazard identification, scientists determine the types of health problems a chemical could cause by reviewing studies of its effects in humans and laboratory animals. Depending on the chemical, these health effects may include short-term ailments, such as headaches; nausea; and eye, nose, and throat irritation; or chronic diseases, such as cancer. Effects on sensitive populations, such as pregnant women and their developing fetuses, the elderly, or those with health problems (including those with weakened immune systems), must also be considered. Responses to toxic chemicals will vary depending on the amount and length of exposure. For example, short-term exposure to low concentrations of chemicals may produce no noticeable effect, but continued exposure to the same levels of chemicals over a long period of time may eventually cause harm.

An important step in hazard identification is the selection of key research studies that can provide accurate, timely information on the hazards posed to humans by a particular chemical. The selection of a study is based upon factors such as whether the study has been peer reviewed by qualified scientists, whether the study's findings have been verified by other studies, and the species tested (human studies provide the best evidence). Some studies may involve humans that have been exposed to the chemical, while others may involve studies with laboratory animals.

Human data frequently are useful in evaluating human health risks associated with chemical exposures. Human epidemiologic studies typically examine the effects of chemical exposure on a large number of people, such as employees exposed to varying concentrations of chemicals in the workplace. In many cases, these exposures took place prior to the introduction of modern worker-safety measures.

One weakness of occupational studies is that they generally measure the effects of chemicals on healthy workers and do not consider children, the elderly, those with pre-existing medical conditions, or other sensitive groups. Since occupational studies are not controlled experiments, there may be uncertainties

about the amount and duration of exposure or the influence of lifestyle choices, such as smoking or alcohol use, on the health of workers in the studies. Exposure of workers to other chemicals at the same time may also influence and complicate the results.

Laboratory studies using human volunteers are better able to gauge some health effects because chemical exposures can then be measured with precision. But these studies usually involve small numbers of people and, in conformance with ethical and legal requirements, use only adults who agree to participate in the studies. Moreover, laboratory studies often use simple measurements that identify immediate responses to the chemical but might miss significant, longer-term health effects. Scientists can also use physicians' case reports of an industrial or transportation accident in which individuals were unintentionally exposed to a chemical. However, these reports may involve very small numbers of people, and the level of exposure to the chemical could be greater than exposures to the same chemical in the environment. Nevertheless, human studies are preferred for risk assessment, so OEHHA makes every effort to use them when they are available.

Because the effects of the vast majority of chemicals have not been studied in humans, scientists must often rely on animal studies to evaluate a chemical's health effects. Animal studies have the advantage of being performed under controlled laboratory conditions that reduce much of the uncertainty related to human studies. If animal studies are used, scientists must determine whether a chemical's health effects in humans are likely to be similar to those in the animals tested. Although effects seen in animals can also occur in humans, there may be subtle or even significant differences in the ways humans and experimental animals react to a chemical. Comparison of human and animal metabolism may be useful in selecting the animal species that should be studied, but it is often not possible to determine which species is most like humans in its response to a chemical exposure. However, if similar effects were found in more than one species, the results would strengthen the evidence that humans may also be at risk.

## Exposure Assessment

In exposure assessment, scientists attempt to determine how long people were exposed to a chemical; how much of the chemical they were exposed to; whether the exposure was continuous or intermittent; and how people were exposed—through eating, drinking water and other liquids, breathing, or skin contact. All of this information is combined with factors such as breathing rates, water consumption, and daily activity patterns to estimate how much of the chemical was taken into the bodies of those exposed.

People can be exposed to toxic chemicals in various ways. These substances can be present in the air we breathe, the food we eat, or the water we drink. Some chemicals, due to their particular characteristics, may be both inhaled and ingested. For example, airborne chemicals can settle on the surface of water, soil, leaves, fruits, vegetables, and forage crops used as animal feed. Cows, chickens, or other livestock can become contaminated when eating, drinking, or breathing the chemicals present in the air, water, feed, and soil. Fish can absorb the chemicals as they swim in contaminated water or ingest contaminated food. Chemicals can be absorbed through the skin, so infants and children can be exposed simply by crawling or playing in contaminated dirt. They can also ingest chemicals if they put their fingers or toys in their mouths after playing in contaminated dirt. Chemicals can also be passed on from nursing mothers to their children through breast milk.

To estimate exposure levels, scientists rely on air, water, and soil monitoring; human blood and urine samples; or computer modeling. Although monitoring of a pollutant provides excellent data, it is time consuming, costly, and typically limited to only a few locations. For those reasons, scientists often rely on computer modeling, which uses mathematical equations to describe how a chemical is released and to estimate the speed and direction of its movement through the surrounding environment. Modeling has the advantage of being relatively inexpensive and less time consuming, provided all necessary information is available and the accuracy of the model can be verified through testing.

Computer modeling is often used to assess chemical releases from industrial facilities. Such models require information on the type of chemicals released, facilities' hours of operation, industrial processes that release the chemicals, smokestack height and temperature, any pollution-control equipment that is used, surrounding land type (urban or rural), local topography and meteorology, and census data regarding the exposed population.

In all health risk assessments, scientists must make assumptions in order to estimate human exposure to a chemical. For example, scientists assessing the effects of air pollution may need to make assumptions about the time people spend outdoors, where they are more directly exposed to pollutants in the ambient air, or the time they spend in an area where the pollution is greatest. An assessment of soil contamination may require scientists to make assumptions about people's consumption of fruits and vegetables that may absorb soil contaminants.

To avoid underestimating actual human exposure to a chemical, scientists often look at the range of possible exposures. For example, people who jog in the afternoon, when urban air pollution levels are highest, would have much higher exposures to air pollutants than people who come home after work and relax indoors. Basing an exposure estimate on a value near the higher end of a range of exposure levels (closer to the levels experienced by the jogger than by the person remaining indoors) provides a realistic worst-case estimate of exposure. These kinds of conservative assumptions, which presume that people are exposed to the highest amounts of a chemical that can be considered credible, are referred to as "health-protective" assumptions.

The exposure estimates for the project analysis were conducted using HARP2. HARP2 (version 2.0.3) is currently the approved model for use in assessing health risks from facilities such as the SERC project.

## Dose-Response Assessment

In dose-response assessment, scientists evaluate the information obtained during the hazard identification step to estimate the amount of a chemical that is likely to result in a particular health effect in humans.

An established principle in toxicology is that "the dose makes the poison." For example, a commonplace chemical like table salt is harmless in small quantities, but it can cause illness in large doses. Similarly, hydrochloric acid, a hazardous chemical, is produced naturally in our stomachs but can be quite harmful if taken in large doses.

Scientists perform a dose-response assessment to estimate how different levels of exposure to a chemical can impact the likelihood and severity of health effects. The dose-response relationship is often different for many chemicals that cause cancer than it is for those that cause other kinds of health problems.

The dose-response estimates for the project analysis were conducted using HARP2 (version 2.0.3).

## Cancer Effects

For chemicals that cause cancer, the general assumption in risk assessment has been that there are no exposures that have "zero risk" unless there is clear evidence otherwise. In other words, even a very low exposure to a cancer-causing chemical may result in cancer if the chemical happens to alter cellular functions in a way that causes cancer to develop. Thus, even very low exposures to carcinogens might increase the risk of cancer, if only by a very small amount.

Several factors make it difficult to estimate the risk of cancer. Cancer appears to be a progressive disease because a series of cellular transformations is thought to occur before cancer develops. In addition, cancer in humans often develops many years after exposure to a chemical. Also, the best information available on the ability of chemicals to cause cancer often comes from studies in which a limited number of laboratory animals are exposed to levels of chemicals that are much higher than the

levels humans would normally be exposed to in the environment. As a result, scientists use mathematical models based on studies of animals exposed to high levels of a chemical to estimate the probability of cancer developing in a diverse population of humans exposed to much lower levels. The uncertainty in these estimates may be rather large. To reduce these uncertainties, risk assessors must stay informed of new scientific research. Data from new studies can be used to improve estimates of cancer risks.

## Non-cancer Effects

Non-cancer health effects (such as asthma, nervous system disorders, birth defects, and developmental problems in children) typically become more severe as exposure to a chemical increases. One goal of dose-response assessment is to estimate levels of exposure that pose only a low or negligible risk for non-cancer health effects. Scientists analyze studies of the health effects of a chemical to develop this estimate. They take into account such factors as the quality of the scientific studies, whether humans or laboratory animals were studied, and the degree to which some people may be more sensitive to the chemical than others. The estimated level of exposure that poses no significant health risks can be reduced to reflect these factors.

## Risk Characterization

The last step in risk assessment brings together the information developed in the previous three steps to estimate the risk of health effects in an exposed population. In the risk characterization step, scientists analyze the information developed during the exposure and dose-response assessments to describe the resulting health risks that are expected to occur in the exposed population. This information is presented in different ways for cancer and non-cancer health effects, as explained below.

### Cancer Risk

Cancer risk is often expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer-causing substance over a 70-year lifetime. For example, a cancer risk of one in one million means that in a population of one million people, not more than one additional person would be expected to develop cancer as the result of the exposure to the substance causing that risk.

An individual's actual risk of contracting cancer from exposure to a chemical is often less than the theoretical risk to the entire population calculated in the risk assessment. For example, the risk estimate for a drinking-water contaminant may be based on the health-protective assumption that the individual drinks two liters of water from a contaminated source daily over a 70-year lifetime. However, an individual's actual exposure to that contaminant would likely be lower due to a shorter time of residence in the area. Moreover, an individual's risk not only depends on the individual's exposure to a specific chemical but also on his or her genetic background (i.e., a family history of certain types of cancer); health; diet; and lifestyle choices, such as smoking or alcohol consumption.

### Non-cancer Risk

Non-cancer risk is usually determined by comparing the actual level of exposure to a chemical to the level of exposure that is not expected to cause any adverse effects, even in the most susceptible people. Levels of exposure at which no adverse health effects are expected are called "health reference levels," and they generally are based on the results of animal studies. However, scientists usually set health reference levels much lower than the levels of exposure that were found to have no adverse effects in the animals tested. This approach helps to ensure that real health risks are not underestimated by adjusting for possible differences in a chemical's effects on laboratory animals and humans; the possibility that some humans, such as children and the elderly, may be particularly sensitive to a chemical; and possible deficiencies in data from the animal studies.

Depending on the amount of uncertainty in the data, scientists may set a health reference level 100 to 10,000 times lower than the levels of exposure observed to have no adverse effects in animal studies. Exposures above the health reference level are not necessarily hazardous, but the risk of toxic effects increases as the dose increases. If an assessment determines that human exposure to a chemical exceeds the health reference level, further investigation is warranted.

Risk managers rely on risk assessments when making regulatory decisions, such as setting drinking water standards, or developing plans to clean up hazardous waste sites. Risk managers are responsible for protecting human health, but they must also consider public acceptance, as well as technological, economic, social, and political factors, when arriving at their decisions. For example, they may need to consider how much it would cost to remove a contaminant from drinking water supplies or how seriously the loss of jobs would affect a community if a factory were to close due to the challenge of meeting regulatory requirements that are set at the most stringent level.

Health risk assessments can help risk managers weigh the benefits and costs of various alternatives for reducing exposure to chemicals. For example, a health risk assessment of a hazardous waste site could help determine whether placing a clay cap over the waste to prevent exposure would offer the same health protection as the more costly option of removing the waste from the site.

One of the most difficult questions of risk management is: How much risk is acceptable? While it would be ideal to completely eliminate all exposure to hazardous chemicals, it is usually not possible or feasible to remove all traces of a chemical once it has been released into the environment. The goal of most regulators is to reduce the health risks associated with exposure to hazardous pollutants to a negligibly low level.

Regulators generally presume that a one-in-one million risk of cancer from life-long exposure to a hazardous chemical is an “acceptable risk” level because the risk is extremely low compared to the overall cancer rate. If a drinking water standard for a cancer-causing chemical were set at the level posing a “one-in-one million” risk, it would mean that not more than one additional cancer case (beyond what would normally occur in the population) would potentially occur in a population of one million people drinking water meeting that standard over a 70-year lifetime.

Actual regulatory standards for chemicals or hazardous waste cleanups may be set at less stringent risk levels, such as one in 100,000 (not more than one additional cancer case per 100,000 people) or one in 10,000 (not more than one additional cancer case per 10,000 people). These less stringent risk levels are often due to economic or technological considerations. Regulatory agencies generally view these higher risk levels to be acceptable if there is no feasible way to reduce the risks further.”<sup>1</sup>

The following tables summarize the results of the HRA performed by the proposed SERC facility.

**Table 5.1D-1. Criteria and Air Toxic Pollutants Emitted from SERC Facility**

NO <sub>x</sub>	Acetaldehyde	Hexane (n-hexane)
CO	Acrolein	Naphthalene
VOC*	Benzene	Propylene
SO <sub>x</sub>	1,3-Butadiene	Propylene oxide
PM10/PM2.5	Ethylbenzene	Toluene
Ammonia	Formaldehyde	Xylene
PAHs		

<sup>1</sup> *A Guide to Health Risk Assessment*, CalEPA-Office of Environmental Health Hazard Assessment, 1001 I Street, Sacramento, CA. 95812, (est. 2001).

Table 5.1D-2. Health Effects Significant Threshold Levels

	Significance Thresholds	
	SCAQMD	State of California
Cancer risk per million	≤ 1.0 without T-BACT ≤ 10.0 with T-BACT	≤ 1.0 without T-BACT ≤ 10.0 with T-BACT
Acute HI	1.0	1.0
Chronic HI	1.0	1.0
Cancer burden	0.5	1.0

The other assumptions used in running the HARP program were as follows:

- Emission rates for non-criteria pollutants are taken from AFC Section 5.1, and from Appendix 5.1A.
- Number of residents affected is based upon the updated 2014 population data for those census tracts or portions of census tracts which lie within the maximum impact receptor radius of the proposed facility.
- All receptors were treated as residential receptors, which allows for the assumption that the MIR (same as the PMI), if assumed residential, will represent the highest risk and no other receptor will show risks higher than the MIR/PMI. Worker values are typically modeled based on the OEHHA recommended 25-year exposure period. In the case of SERC, the 70 year MIR risk values were almost two orders of magnitude below the SCAQMD significance level, and as such adjusting these risk levels for a worker location provides little useful information.
- Deposition velocity is taken to be 0.02 m/s, as recommended by ARB for controlled emission sources.
- Fraction of residents with home/gardens is the HARP2 default value which is likely conservatively high for the urban area near the project site.

The HARP2 program is a tool that assists with the programmatic requirements of the Air Toxics Hot Spots Program, and it can be used for preparing health risk assessments for other related programs such as air toxic control measure development or facility permitting applications. HARP2 is a computer based risk assessment program which combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. Use of HARP2 promotes statewide consistency in the area of risk assessment, increases the efficiency of evaluating potential health impacts, and provides a cost effective tool for developing facility health risk assessments. HARP2 may be used on single sources, facilities with multiple sources, or multiple facilities in close proximity to each other.

The receptor grid used in HARP2 was a combination of the following:

- All identified grid receptors as input from the AERMOD analysis
- All identified sensitive receptors within the primary impact area as defined by the AERMOD analysis

The HARP2 program results for acute and chronic inhalation and chronic non-inhalation exposures, cancer burden and individual cancer risk for the facility sources are included in the CD with this Appendix. The results of the HARP2 calculations are summarized below.

The modeling results show that the maximum modeled cancer risk from SERC operations is expected to be  $1.40 \times E^{-8}$  (MIR). This risk is well below the SCAQMD significance value of 10 per million. T-BACT for simple cycle combustion turbines is the use of clean fuels (natural gas) and the installation and operation of a CO catalyst. These T-BACT technologies are proposed for SERC, and as such, the

significant risk threshold for SERC is 10 in a million. The chronic and acute non-cancer hazard indices are 0.000104 and 0.00144, respectively at the cancer MIR (same as the PMI). Both are well below the significant impact level of 1.0. Detailed calculations and results for each significant receptor are included in the modeling results, which are being submitted electronically.

**Table 5.1D-3. Health Risk Assessment Summary – Operations**

Turbines		
Risk Category	Facility Values	Applicable Significance Thresholds*
Cancer Risk at MIR/PMI	1.40 <sup>-8</sup>	See Table 5.1D-2 above.
Chronic Hazard Index at Cancer MIR/PMI	0.000104	
Cancer Burden	0	
Acute Hazard Index at Cancer MIR/PMI	0.00144	

Note:

Cancer/Chronic/Acute MIR/PMI – Receptor 2617

Table 5.1D-4 presents a summary of risk and health data for the nearest residential, worker, and other sensitive receptor types.

**Table 5.1D-4. Summary of Risk and Health Data**

Receptor Type	Receptor #	UTM E	UTM N	Cancer Risk	Chronic HI	Acute HI
MIR/PMI	2617	409000	3741360	1.40 <sup>-8</sup>	0.000104	0.00144
MEIR	8003	409045	3741578	1.04 <sup>-8</sup>	0.0000774	0.00106
MEIW*	8008	409012	3741221	8.01 <sup>-9</sup>	0.0000156	0.00125
Nearest school	8012	409311	3741517	1.01 <sup>-8</sup>	0.0000748	0.000868
Nearest health facility	8051	411233	3744268	4.24 <sup>-9</sup>	0.0000314	0.000357
Nearest daycare	8064	407611	3740470	1.95 <sup>-9</sup>	0.0000211	0.000751
Nearest convalescent home	8071	408716	3742848	3.69 <sup>-9</sup>	0.0000273	0.000536

\* MEIW risk has not been adjusted for a 25-year exposure due to the insignificance of the 70-year risk value.

Notes:

The impact area cancer burden is calculated at 0.0.

The MIR/PMI lies approximately 0.2 mile (1,056 feet) from the plant site.

The calculated health effects as summarized above do not exceed the district significance threshold values, therefore the health effects would be considered “not significant” and may even be “zero”.

Risk Assessment input and output files are included on the modeling CD. Due to the length of the HRA input and output files, hard copies are not provided in this appendix.

## Construction HRA

A construction screening HRA was performed using the following assumptions as follows:

- The first three highest impacted receptors were chosen to represent the potential risks posed by construction related DPM emissions.

- Cancer risk and chronic hazard indices were computed using HARP2.
- A cancer inhalation unit risk value of  $0.0003 (\mu\text{g}/\text{m}^3)^{-1}$  was used.
- A cancer chronic inhalation REL of  $5.0 (\mu\text{g}/\text{m}^3)^{-1}$  was used.
- No acute inhalation REL exists for diesel PM.

The construction analysis was run using HARP2, diesel particulate matter emissions, individual receptors, and the Tier 2 analysis option for a period of 1 year (12 months, construction period is estimated to be 11 months)(OEHHA, 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines, Chapter 8, Section 8.2.10).

Table 5.1D-5 presents the results of the screening level assessment of health risks from the construction phase for the first three highest MIR/PMI receptors.

**Table 5.1D-5. Construction Screening HRA Summary**

Receptor Type	Receptor #	UTM E	UTM N	Cancer Risk*	Chronic HI
MIR/PMI #1	1946	408760	3741220	$4.15^{-6}$	0.00550
MIR/PMI #2	2000	408780	3741220	$4.15^{-6}$	0.00549
MIR/PMI #3	1892	408740	3741220	$4.11^{-6}$	0.00544

\*HARP 2 - Tier 2 defined construction period of 1 year.

With respect to emissions from diesel fueled engines, use of the diesel PM exposure factors noted above are approved by CARB for the characterization of diesel engine exhaust and subsequent risk exposures. The diesel PM factor includes the range of fuel bound, and potentially emitted metals, PAHs, and a wide variety of other semi-volatile substances.

CARB notes the following in the diesel exhaust risk identification documents:

- The surrogate for whole diesel exhaust is diesel PM. PM10 is the basis for the potential risk calculations.
- When conducting an HRA, the potential cancer risk from inhalation exposure to diesel PM will outweigh the potential non-cancer health effects.
- When comparing whole diesel exhaust to speciated diesel exhaust, potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated compounds. For this reason, there will be few situations where an analysis of multi-pathway risk is necessary.

The following tables and figures are presented at the end of this appendix:

- Table 5.1D-6: Census Tract Numbers and Population Data
- Table 5.1D-7: Sensitive Receptor Listing for the Primary Impact Area
- Table 5.1D-8: OEHHA/CARB Risk Assessment Health Values
- Figure 5.1D-1: Sensitive Receptor Map<sup>2</sup>
- Figure 5.1D-2: Census Tracts in the Immediate Impact Area

<sup>2</sup> The receptor numbers on the receptor map are keyed to the receptor numbers on Table 5.1D-7.



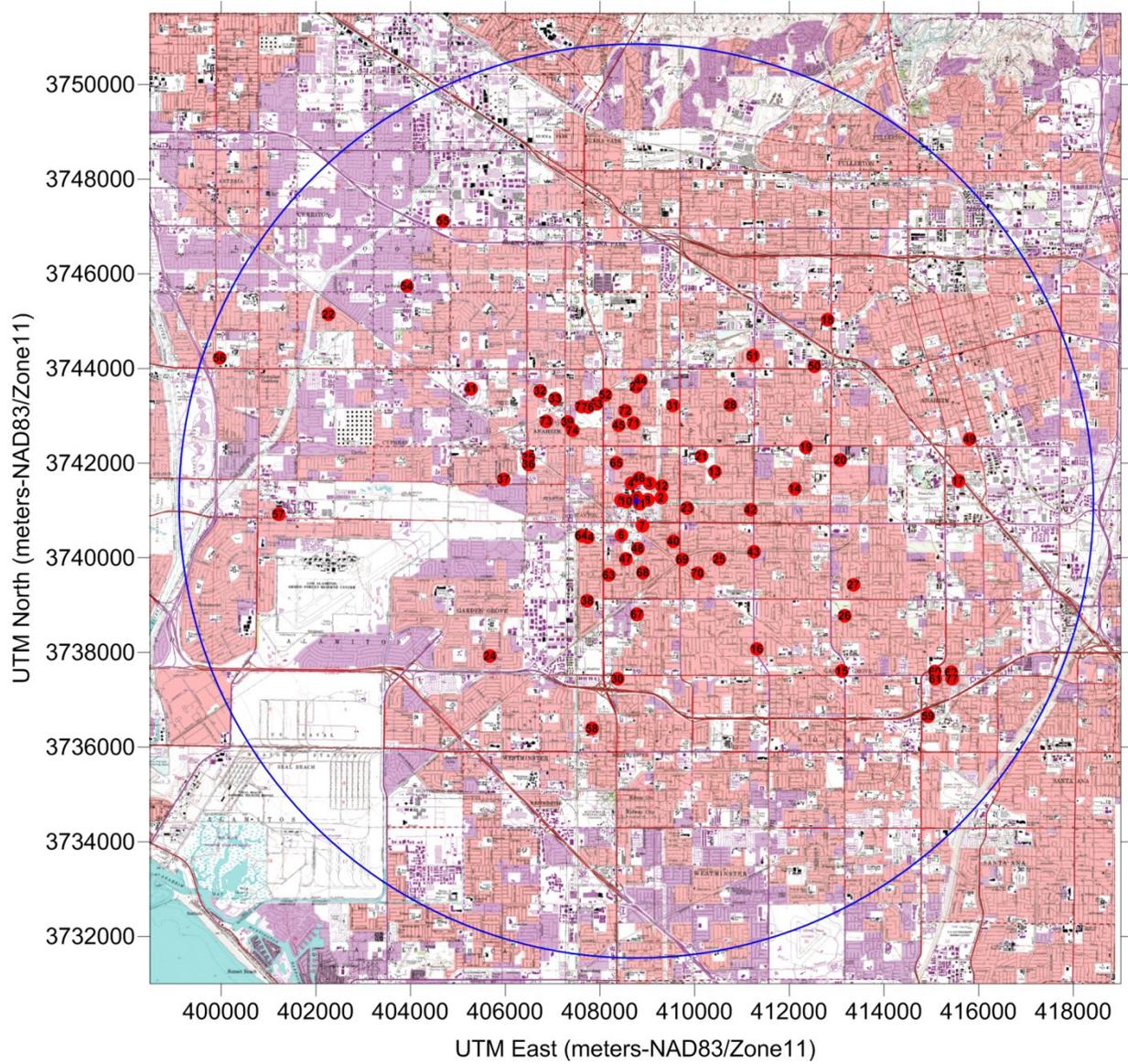


Figure 5.1D-1. Sensitive Receptor Map



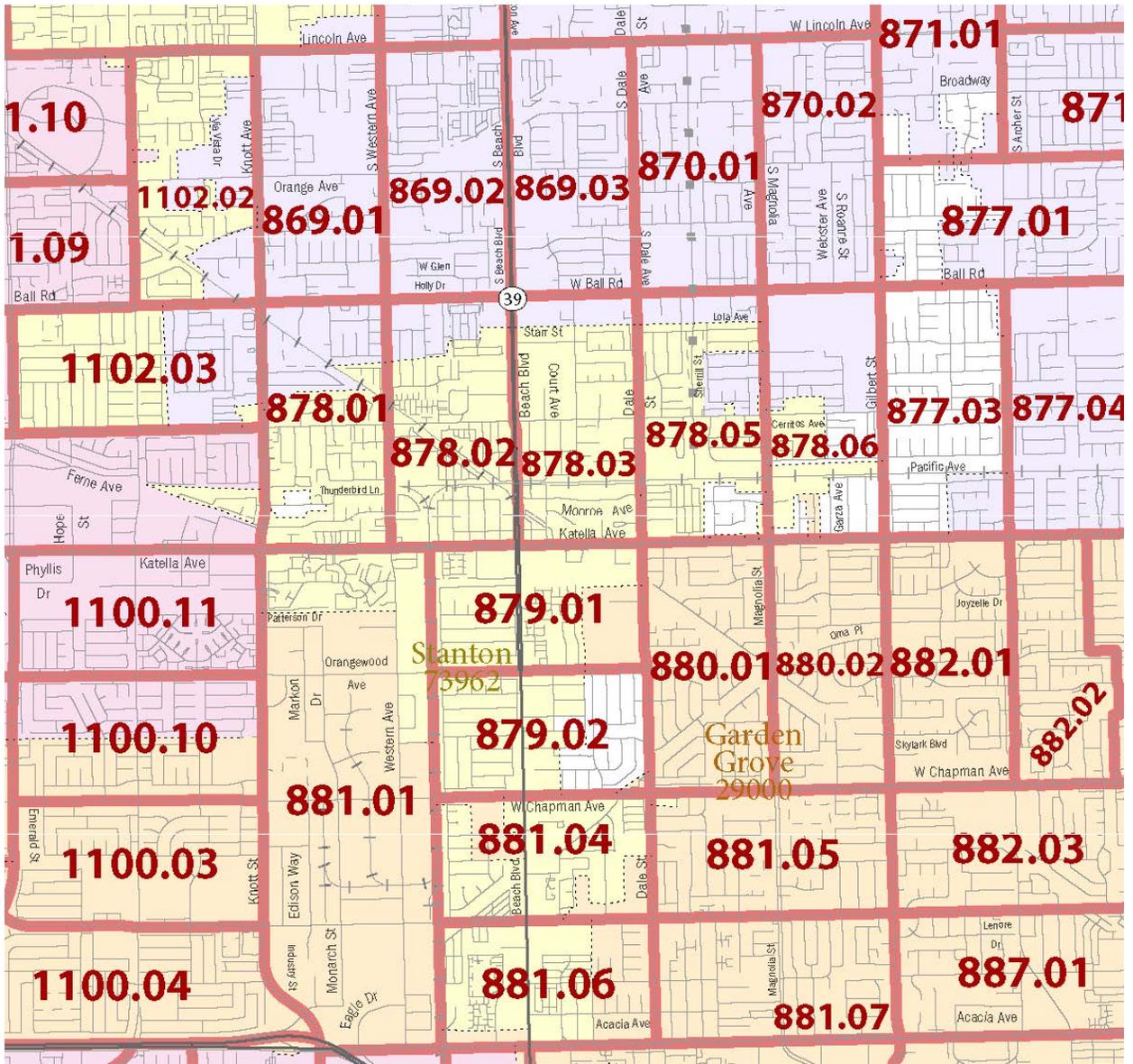


Figure 5.1D-2. Census Tracts in the Immediate Project Impact Area  
*The SERC facility is located in census tract 878.03*



## 2014 Census Tract Population Data-Orange County, CA.

Census Bureau Website-American FactFinder-August 11, 2016

<b>Tract #</b>	<b>Population Estimate</b>
Census Tract 11.01, Orange County, California	4353
Census Tract 11.02, Orange County, California	3085
Census Tract 11.03, Orange County, California	4557
Census Tract 12.01, Orange County, California	5655
Census Tract 12.02, Orange County, California	3994
Census Tract 13.01, Orange County, California	6698
Census Tract 13.03, Orange County, California	5604
Census Tract 13.04, Orange County, California	3729
Census Tract 14.01, Orange County, California	5614
Census Tract 14.02, Orange County, California	5579
Census Tract 14.03, Orange County, California	3073
Census Tract 14.04, Orange County, California	4029
Census Tract 15.01, Orange County, California	6432
Census Tract 15.03, Orange County, California	5746
Census Tract 15.04, Orange County, California	4775
Census Tract 15.05, Orange County, California	7089
Census Tract 15.06, Orange County, California	4019
Census Tract 15.07, Orange County, California	4616
Census Tract 16.01, Orange County, California	7882
Census Tract 16.02, Orange County, California	4520
Census Tract 17.04, Orange County, California	7456
Census Tract 17.05, Orange County, California	4477
Census Tract 17.06, Orange County, California	3648
Census Tract 17.07, Orange County, California	7598
Census Tract 17.08, Orange County, California	3460
Census Tract 18.01, Orange County, California	5359
Census Tract 18.02, Orange County, California	8268
Census Tract 19.01, Orange County, California	3126
Census Tract 19.02, Orange County, California	3053
Census Tract 19.03, Orange County, California	3420
Census Tract 110, Orange County, California	6029
Census Tract 111.01, Orange County, California	4442
Census Tract 111.02, Orange County, California	4469
Census Tract 112, Orange County, California	3911
Census Tract 113, Orange County, California	4741
Census Tract 114.01, Orange County, California	2017
Census Tract 114.02, Orange County, California	2345
Census Tract 114.03, Orange County, California	6390
Census Tract 115.02, Orange County, California	3998
Census Tract 115.03, Orange County, California	1709
Census Tract 115.04, Orange County, California	5987
Census Tract 116.01, Orange County, California	7848
Census Tract 116.02, Orange County, California	5402
Census Tract 117.07, Orange County, California	6224
Census Tract 117.08, Orange County, California	4047
Census Tract 117.09, Orange County, California	4280

Census Tract 117.10, Orange County, California	3486
Census Tract 117.11, Orange County, California	7789
Census Tract 117.12, Orange County, California	4718
Census Tract 117.14, Orange County, California	890
Census Tract 117.15, Orange County, California	6465
Census Tract 117.16, Orange County, California	5531
Census Tract 117.17, Orange County, California	2959
Census Tract 117.18, Orange County, California	3660
Census Tract 117.20, Orange County, California	6722
Census Tract 117.21, Orange County, California	5086
Census Tract 117.22, Orange County, California	2653
Census Tract 218.02, Orange County, California	7292
Census Tract 218.07, Orange County, California	3957
Census Tract 218.09, Orange County, California	2888
Census Tract 218.10, Orange County, California	4067
Census Tract 218.12, Orange County, California	6117
Census Tract 218.13, Orange County, California	107
Census Tract 218.14, Orange County, California	7035
Census Tract 218.15, Orange County, California	8127
Census Tract 218.16, Orange County, California	4949
Census Tract 218.17, Orange County, California	3824
Census Tract 218.20, Orange County, California	4479
Census Tract 218.21, Orange County, California	6511
Census Tract 218.22, Orange County, California	8731
Census Tract 218.23, Orange County, California	3536
Census Tract 218.24, Orange County, California	2578
Census Tract 218.25, Orange County, California	3223
Census Tract 218.26, Orange County, California	2643
Census Tract 218.27, Orange County, California	3116
Census Tract 218.28, Orange County, California	4389
Census Tract 218.29, Orange County, California	5316
Census Tract 218.30, Orange County, California	5769
Census Tract 219.03, Orange County, California	4210
Census Tract 219.05, Orange County, California	5614
Census Tract 219.12, Orange County, California	4653
Census Tract 219.13, Orange County, California	9494
Census Tract 219.14, Orange County, California	4075
Census Tract 219.15, Orange County, California	4039
Census Tract 219.16, Orange County, California	3453
Census Tract 219.17, Orange County, California	2944
Census Tract 219.18, Orange County, California	4840
Census Tract 219.19, Orange County, California	2619
Census Tract 219.20, Orange County, California	6674
Census Tract 219.21, Orange County, California	4561
Census Tract 219.22, Orange County, California	4966
Census Tract 219.23, Orange County, California	6791
Census Tract 219.24, Orange County, California	4275
Census Tract 320.02, Orange County, California	6375
Census Tract 320.03, Orange County, California	5038

Census Tract 320.11, Orange County, California	1589
Census Tract 320.12, Orange County, California	3836
Census Tract 320.13, Orange County, California	5241
Census Tract 320.14, Orange County, California	6055
Census Tract 320.15, Orange County, California	6626
Census Tract 320.20, Orange County, California	5748
Census Tract 320.22, Orange County, California	7121
Census Tract 320.23, Orange County, California	13388
Census Tract 320.27, Orange County, California	6946
Census Tract 320.28, Orange County, California	3294
Census Tract 320.29, Orange County, California	4608
Census Tract 320.30, Orange County, California	3770
Census Tract 320.31, Orange County, California	3499
Census Tract 320.32, Orange County, California	3059
Census Tract 320.33, Orange County, California	3791
Census Tract 320.34, Orange County, California	5951
Census Tract 320.35, Orange County, California	2303
Census Tract 320.36, Orange County, California	3569
Census Tract 320.37, Orange County, California	5274
Census Tract 320.38, Orange County, California	6251
Census Tract 320.39, Orange County, California	7220
Census Tract 320.40, Orange County, California	2656
Census Tract 320.41, Orange County, California	1000
Census Tract 320.42, Orange County, California	6053
Census Tract 320.43, Orange County, California	3911
Census Tract 320.44, Orange County, California	5767
Census Tract 320.45, Orange County, California	2924
Census Tract 320.46, Orange County, California	5956
Census Tract 320.47, Orange County, California	3641
Census Tract 320.48, Orange County, California	5452
Census Tract 320.49, Orange County, California	9651
Census Tract 320.50, Orange County, California	4894
Census Tract 320.51, Orange County, California	4488
Census Tract 320.53, Orange County, California	8182
Census Tract 320.54, Orange County, California	5223
Census Tract 320.55, Orange County, California	3925
Census Tract 320.56, Orange County, California	7680
Census Tract 320.57, Orange County, California	8040
Census Tract 320.58, Orange County, California	6619
Census Tract 320.59, Orange County, California	10728
Census Tract 320.61, Orange County, California	3610
Census Tract 421.03, Orange County, California	7389
Census Tract 421.06, Orange County, California	1383
Census Tract 421.07, Orange County, California	4571
Census Tract 421.08, Orange County, California	5104
Census Tract 421.09, Orange County, California	5045
Census Tract 421.11, Orange County, California	6171
Census Tract 421.12, Orange County, California	6575
Census Tract 421.13, Orange County, California	4489

Census Tract 421.14, Orange County, California	4449
Census Tract 422.01, Orange County, California	5190
Census Tract 422.03, Orange County, California	7191
Census Tract 422.05, Orange County, California	6838
Census Tract 422.06, Orange County, California	3149
Census Tract 423.05, Orange County, California	3642
Census Tract 423.07, Orange County, California	7215
Census Tract 423.10, Orange County, California	8742
Census Tract 423.11, Orange County, California	5814
Census Tract 423.12, Orange County, California	10169
Census Tract 423.13, Orange County, California	6929
Census Tract 423.15, Orange County, California	5723
Census Tract 423.17, Orange County, California	3112
Census Tract 423.19, Orange County, California	3334
Census Tract 423.20, Orange County, California	5554
Census Tract 423.23, Orange County, California	4187
Census Tract 423.24, Orange County, California	4588
Census Tract 423.25, Orange County, California	3532
Census Tract 423.26, Orange County, California	4584
Census Tract 423.27, Orange County, California	4698
Census Tract 423.28, Orange County, California	2245
Census Tract 423.29, Orange County, California	3905
Census Tract 423.30, Orange County, California	6718
Census Tract 423.31, Orange County, California	5348
Census Tract 423.32, Orange County, California	5673
Census Tract 423.33, Orange County, California	3822
Census Tract 423.34, Orange County, California	5348
Census Tract 423.35, Orange County, California	5945
Census Tract 423.36, Orange County, California	4737
Census Tract 423.37, Orange County, California	3732
Census Tract 423.38, Orange County, California	5025
Census Tract 423.39, Orange County, California	3632
Census Tract 524.04, Orange County, California	1030
Census Tract 524.08, Orange County, California	6135
Census Tract 524.10, Orange County, California	5557
Census Tract 524.11, Orange County, California	4941
Census Tract 524.15, Orange County, California	4209
Census Tract 524.16, Orange County, California	4106
Census Tract 524.17, Orange County, California	8645
Census Tract 524.18, Orange County, California	14312
Census Tract 524.19, Orange County, California	3493
Census Tract 524.20, Orange County, California	22648
Census Tract 524.21, Orange County, California	5472
Census Tract 524.22, Orange County, California	4527
Census Tract 524.23, Orange County, California	5838
Census Tract 524.24, Orange County, California	4746
Census Tract 524.25, Orange County, California	5244
Census Tract 524.26, Orange County, California	9139
Census Tract 524.27, Orange County, California	5119

Census Tract 524.28, Orange County, California	6648
Census Tract 525.02, Orange County, California	6525
Census Tract 525.05, Orange County, California	4841
Census Tract 525.06, Orange County, California	2583
Census Tract 525.11, Orange County, California	5734
Census Tract 525.13, Orange County, California	6104
Census Tract 525.14, Orange County, California	6000
Census Tract 525.15, Orange County, California	9105
Census Tract 525.17, Orange County, California	10871
Census Tract 525.18, Orange County, California	4061
Census Tract 525.19, Orange County, California	4231
Census Tract 525.20, Orange County, California	3384
Census Tract 525.21, Orange County, California	5279
Census Tract 525.22, Orange County, California	4328
Census Tract 525.23, Orange County, California	4086
Census Tract 525.24, Orange County, California	8818
Census Tract 525.25, Orange County, California	16374
Census Tract 525.26, Orange County, California	4469
Census Tract 525.27, Orange County, California	8965
Census Tract 525.28, Orange County, California	3897
Census Tract 626.04, Orange County, California	14850
Census Tract 626.05, Orange County, California	3193
Census Tract 626.10, Orange County, California	6836
Census Tract 626.11, Orange County, California	4667
Census Tract 626.12, Orange County, California	8084
Census Tract 626.14, Orange County, California	15805
Census Tract 626.19, Orange County, California	4147
Census Tract 626.20, Orange County, California	5046
Census Tract 626.21, Orange County, California	5496
Census Tract 626.22, Orange County, California	4236
Census Tract 626.25, Orange County, California	4444
Census Tract 626.26, Orange County, California	3147
Census Tract 626.27, Orange County, California	3555
Census Tract 626.28, Orange County, California	3683
Census Tract 626.29, Orange County, California	2717
Census Tract 626.30, Orange County, California	1597
Census Tract 626.31, Orange County, California	3213
Census Tract 626.32, Orange County, California	3949
Census Tract 626.33, Orange County, California	6461
Census Tract 626.34, Orange County, California	5623
Census Tract 626.35, Orange County, California	4556
Census Tract 626.36, Orange County, California	3563
Census Tract 626.37, Orange County, California	4531
Census Tract 626.38, Orange County, California	6302
Census Tract 626.39, Orange County, California	7609
Census Tract 626.40, Orange County, California	3614
Census Tract 626.41, Orange County, California	5016
Census Tract 626.42, Orange County, California	2701
Census Tract 626.43, Orange County, California	6760

Census Tract 626.44, Orange County, California	8601
Census Tract 626.45, Orange County, California	6800
Census Tract 626.46, Orange County, California	3390
Census Tract 626.47, Orange County, California	4223
Census Tract 626.48, Orange County, California	2680
Census Tract 626.49, Orange County, California	3101
Census Tract 627.01, Orange County, California	2904
Census Tract 627.02, Orange County, California	4740
Census Tract 628, Orange County, California	3688
Census Tract 629, Orange County, California	1598
Census Tract 630.04, Orange County, California	5758
Census Tract 630.05, Orange County, California	1193
Census Tract 630.06, Orange County, California	3018
Census Tract 630.07, Orange County, California	6710
Census Tract 630.08, Orange County, California	833
Census Tract 630.09, Orange County, California	1564
Census Tract 630.10, Orange County, California	7747
Census Tract 631.01, Orange County, California	2845
Census Tract 631.02, Orange County, California	6294
Census Tract 631.03, Orange County, California	2717
Census Tract 632.01, Orange County, California	3763
Census Tract 632.02, Orange County, California	3818
Census Tract 633.01, Orange County, California	3042
Census Tract 633.02, Orange County, California	4088
Census Tract 634, Orange County, California	4770
Census Tract 635, Orange County, California	7319
Census Tract 636.01, Orange County, California	4035
Census Tract 636.03, Orange County, California	6038
Census Tract 636.04, Orange County, California	4112
Census Tract 636.05, Orange County, California	5142
Census Tract 637.01, Orange County, California	5498
Census Tract 637.02, Orange County, California	5033
Census Tract 638.02, Orange County, California	2919
Census Tract 638.03, Orange County, California	4595
Census Tract 638.05, Orange County, California	2393
Census Tract 638.06, Orange County, California	3984
Census Tract 638.07, Orange County, California	4839
Census Tract 638.08, Orange County, California	5968
Census Tract 639.02, Orange County, California	6957
Census Tract 639.03, Orange County, California	3952
Census Tract 639.04, Orange County, California	5042
Census Tract 639.05, Orange County, California	4700
Census Tract 639.06, Orange County, California	6500
Census Tract 639.07, Orange County, California	8753
Census Tract 639.08, Orange County, California	5328
Census Tract 740.03, Orange County, California	3918
Census Tract 740.04, Orange County, California	8648
Census Tract 740.05, Orange County, California	7767
Census Tract 740.06, Orange County, California	5875

Census Tract 741.02, Orange County, California	6133
Census Tract 741.03, Orange County, California	5414
Census Tract 741.06, Orange County, California	6091
Census Tract 741.07, Orange County, California	5478
Census Tract 741.08, Orange County, California	5014
Census Tract 741.09, Orange County, California	4023
Census Tract 741.10, Orange County, California	4123
Census Tract 741.11, Orange County, California	5875
Census Tract 742, Orange County, California	9051
Census Tract 743, Orange County, California	4208
Census Tract 744.03, Orange County, California	6164
Census Tract 744.05, Orange County, California	5399
Census Tract 744.06, Orange County, California	3325
Census Tract 744.07, Orange County, California	6961
Census Tract 744.08, Orange County, California	5855
Census Tract 745.01, Orange County, California	7109
Census Tract 745.02, Orange County, California	5947
Census Tract 746.01, Orange County, California	8653
Census Tract 746.02, Orange County, California	9113
Census Tract 747.01, Orange County, California	7670
Census Tract 747.02, Orange County, California	6478
Census Tract 748.01, Orange County, California	6297
Census Tract 748.02, Orange County, California	6621
Census Tract 748.03, Orange County, California	8912
Census Tract 748.05, Orange County, California	5434
Census Tract 748.06, Orange County, California	5215
Census Tract 749.01, Orange County, California	9689
Census Tract 749.02, Orange County, California	6796
Census Tract 750.02, Orange County, California	8625
Census Tract 750.03, Orange County, California	7387
Census Tract 750.04, Orange County, California	5515
Census Tract 751, Orange County, California	10286
Census Tract 752.01, Orange County, California	6446
Census Tract 752.02, Orange County, California	5781
Census Tract 753.01, Orange County, California	6250
Census Tract 753.02, Orange County, California	4172
Census Tract 753.03, Orange County, California	3106
Census Tract 754.01, Orange County, California	3820
Census Tract 754.03, Orange County, California	7534
Census Tract 754.04, Orange County, California	5386
Census Tract 754.05, Orange County, California	3212
Census Tract 755.04, Orange County, California	4371
Census Tract 755.05, Orange County, California	3854
Census Tract 755.06, Orange County, California	3433
Census Tract 755.07, Orange County, California	5764
Census Tract 755.12, Orange County, California	3587
Census Tract 755.13, Orange County, California	5759
Census Tract 755.14, Orange County, California	4010
Census Tract 755.15, Orange County, California	15681

Census Tract 756.03, Orange County, California	3920
Census Tract 756.04, Orange County, California	7521
Census Tract 756.05, Orange County, California	5376
Census Tract 756.06, Orange County, California	7280
Census Tract 756.07, Orange County, California	5885
Census Tract 757.01, Orange County, California	7511
Census Tract 757.02, Orange County, California	3350
Census Tract 757.03, Orange County, California	4069
Census Tract 758.05, Orange County, California	4309
Census Tract 758.06, Orange County, California	6304
Census Tract 758.07, Orange County, California	3769
Census Tract 758.08, Orange County, California	3589
Census Tract 758.09, Orange County, California	3059
Census Tract 758.10, Orange County, California	3184
Census Tract 758.11, Orange County, California	3156
Census Tract 758.12, Orange County, California	6565
Census Tract 758.13, Orange County, California	5114
Census Tract 758.14, Orange County, California	3191
Census Tract 758.15, Orange County, California	4983
Census Tract 758.16, Orange County, California	3720
Census Tract 759.01, Orange County, California	4067
Census Tract 759.02, Orange County, California	6738
Census Tract 760, Orange County, California	8687
Census Tract 761.01, Orange County, California	10308
Census Tract 761.02, Orange County, California	7751
Census Tract 761.03, Orange County, California	8665
Census Tract 762.01, Orange County, California	6627
Census Tract 762.02, Orange County, California	6234
Census Tract 762.04, Orange County, California	4243
Census Tract 762.05, Orange County, California	7148
Census Tract 762.06, Orange County, California	4414
Census Tract 762.08, Orange County, California	5382
Census Tract 863.01, Orange County, California	7141
Census Tract 863.03, Orange County, California	6706
Census Tract 863.04, Orange County, California	4735
Census Tract 863.05, Orange County, California	4457
Census Tract 863.06, Orange County, California	3979
Census Tract 864.02, Orange County, California	5960
Census Tract 864.04, Orange County, California	7315
Census Tract 864.05, Orange County, California	6975
Census Tract 864.06, Orange County, California	4246
Census Tract 864.07, Orange County, California	6519
Census Tract 865.01, Orange County, California	4404
Census Tract 865.02, Orange County, California	6753
Census Tract 866.01, Orange County, California	9564
Census Tract 866.02, Orange County, California	6551
Census Tract 867.01, Orange County, California	9213
Census Tract 867.02, Orange County, California	6528
Census Tract 868.01, Orange County, California	3313

Census Tract 868.02, Orange County, California	6073
Census Tract 868.03, Orange County, California	8579
Census Tract 869.01, Orange County, California	8406
Census Tract 869.02, Orange County, California	5778
Census Tract 869.03, Orange County, California	7374
Census Tract 870.01, Orange County, California	5113
Census Tract 870.02, Orange County, California	7504
Census Tract 871.01, Orange County, California	4711
Census Tract 871.02, Orange County, California	5368
Census Tract 871.03, Orange County, California	8033
Census Tract 871.05, Orange County, California	4655
Census Tract 871.06, Orange County, California	5174
Census Tract 872, Orange County, California	8300
Census Tract 873, Orange County, California	9376
Census Tract 874.01, Orange County, California	4142
Census Tract 874.03, Orange County, California	3138
Census Tract 874.04, Orange County, California	3853
Census Tract 874.05, Orange County, California	6140
Census Tract 875.03, Orange County, California	6536
Census Tract 875.04, Orange County, California	7615
Census Tract 875.05, Orange County, California	5542
Census Tract 876.01, Orange County, California	5063
Census Tract 876.02, Orange County, California	7374
Census Tract 877.01, Orange County, California	5707
Census Tract 877.03, Orange County, California	6021
Census Tract 877.04, Orange County, California	5439
Census Tract 878.01, Orange County, California	5654
Census Tract 878.02, Orange County, California	7856
Census Tract 878.03, Orange County, California	5998
Census Tract 878.05, Orange County, California	6241
Census Tract 878.06, Orange County, California	5391
Census Tract 879.01, Orange County, California	3675
Census Tract 879.02, Orange County, California	6167
Census Tract 880.01, Orange County, California	4619
Census Tract 880.02, Orange County, California	3671
Census Tract 881.01, Orange County, California	2141
Census Tract 881.04, Orange County, California	4886
Census Tract 881.05, Orange County, California	3994
Census Tract 881.06, Orange County, California	5292
Census Tract 881.07, Orange County, California	6361
Census Tract 882.01, Orange County, California	4152
Census Tract 882.02, Orange County, California	3397
Census Tract 882.03, Orange County, California	5191
Census Tract 883.01, Orange County, California	7141
Census Tract 883.02, Orange County, California	6277
Census Tract 884.01, Orange County, California	5460
Census Tract 884.02, Orange County, California	4816
Census Tract 884.03, Orange County, California	7737
Census Tract 885.01, Orange County, California	6473

Census Tract 885.02, Orange County, California	4595
Census Tract 886.01, Orange County, California	6363
Census Tract 886.02, Orange County, California	4993
Census Tract 887.01, Orange County, California	6378
Census Tract 887.02, Orange County, California	5949
Census Tract 888.01, Orange County, California	8137
Census Tract 888.02, Orange County, California	5687
Census Tract 889.01, Orange County, California	6570
Census Tract 889.02, Orange County, California	4647
Census Tract 889.03, Orange County, California	9004
Census Tract 889.04, Orange County, California	5401
Census Tract 889.05, Orange County, California	5759
Census Tract 890.01, Orange County, California	7208
Census Tract 890.03, Orange County, California	3944
Census Tract 890.04, Orange County, California	7960
Census Tract 891.02, Orange County, California	7207
Census Tract 891.04, Orange County, California	5348
Census Tract 891.05, Orange County, California	6260
Census Tract 891.06, Orange County, California	3880
Census Tract 891.07, Orange County, California	5512
Census Tract 992.02, Orange County, California	8117
Census Tract 992.03, Orange County, California	6105
Census Tract 992.04, Orange County, California	4207
Census Tract 992.12, Orange County, California	5054
Census Tract 992.14, Orange County, California	3183
Census Tract 992.15, Orange County, California	5155
Census Tract 992.16, Orange County, California	3866
Census Tract 992.17, Orange County, California	2460
Census Tract 992.20, Orange County, California	5282
Census Tract 992.22, Orange County, California	5316
Census Tract 992.23, Orange County, California	5059
Census Tract 992.24, Orange County, California	3365
Census Tract 992.25, Orange County, California	3263
Census Tract 992.26, Orange County, California	4392
Census Tract 992.27, Orange County, California	6749
Census Tract 992.29, Orange County, California	6484
Census Tract 992.30, Orange County, California	4540
Census Tract 992.31, Orange County, California	5549
Census Tract 992.32, Orange County, California	5269
Census Tract 992.33, Orange County, California	3271
Census Tract 992.34, Orange County, California	3408
Census Tract 992.35, Orange County, California	4452
Census Tract 992.37, Orange County, California	3795
Census Tract 992.38, Orange County, California	3997
Census Tract 992.39, Orange County, California	4030
Census Tract 992.40, Orange County, California	5299
Census Tract 992.41, Orange County, California	4413
Census Tract 992.42, Orange County, California	3829
Census Tract 992.43, Orange County, California	4339

Census Tract 992.44, Orange County, California	3498
Census Tract 992.45, Orange County, California	3032
Census Tract 992.46, Orange County, California	3656
Census Tract 992.47, Orange County, California	3428
Census Tract 992.48, Orange County, California	5415
Census Tract 992.49, Orange County, California	4639
Census Tract 992.50, Orange County, California	2927
Census Tract 992.51, Orange County, California	5791
Census Tract 993.05, Orange County, California	7843
Census Tract 993.06, Orange County, California	6120
Census Tract 993.07, Orange County, California	2584
Census Tract 993.08, Orange County, California	5790
Census Tract 993.09, Orange County, California	5299
Census Tract 993.10, Orange County, California	4569
Census Tract 993.11, Orange County, California	3750
Census Tract 994.02, Orange County, California	9152
Census Tract 994.04, Orange County, California	4635
Census Tract 994.05, Orange County, California	4409
Census Tract 994.06, Orange County, California	4637
Census Tract 994.07, Orange County, California	2538
Census Tract 994.08, Orange County, California	4256
Census Tract 994.10, Orange County, California	4336
Census Tract 994.11, Orange County, California	5410
Census Tract 994.12, Orange County, California	4876
Census Tract 994.13, Orange County, California	8077
Census Tract 994.15, Orange County, California	5508
Census Tract 994.16, Orange County, California	4761
Census Tract 994.17, Orange County, California	4145
Census Tract 995.02, Orange County, California	588
Census Tract 995.04, Orange County, California	2828
Census Tract 995.06, Orange County, California	1014
Census Tract 995.08, Orange County, California	4516
Census Tract 995.09, Orange County, California	3688
Census Tract 995.10, Orange County, California	4238
Census Tract 995.11, Orange County, California	3154
Census Tract 995.12, Orange County, California	2976
Census Tract 995.13, Orange County, California	2363
Census Tract 995.14, Orange County, California	5010
Census Tract 996.01, Orange County, California	7404
Census Tract 996.02, Orange County, California	3325
Census Tract 996.03, Orange County, California	6669
Census Tract 996.04, Orange County, California	3621
Census Tract 996.05, Orange County, California	3716
Census Tract 997.01, Orange County, California	6332
Census Tract 997.02, Orange County, California	8094
Census Tract 997.03, Orange County, California	5137
Census Tract 998.01, Orange County, California	5937
Census Tract 998.02, Orange County, California	4710
Census Tract 998.03, Orange County, California	5341

Census Tract 999.02, Orange County, California	4672
Census Tract 999.03, Orange County, California	6058
Census Tract 999.04, Orange County, California	6690
Census Tract 999.05, Orange County, California	3816
Census Tract 999.06, Orange County, California	5247
Census Tract 1100.01, Orange County, California	4289
Census Tract 1100.03, Orange County, California	3389
Census Tract 1100.04, Orange County, California	4970
Census Tract 1100.05, Orange County, California	3286
Census Tract 1100.06, Orange County, California	3187
Census Tract 1100.07, Orange County, California	4772
Census Tract 1100.08, Orange County, California	4557
Census Tract 1100.10, Orange County, California	5006
Census Tract 1100.11, Orange County, California	2970
Census Tract 1100.12, Orange County, California	5063
Census Tract 1100.14, Orange County, California	4883
Census Tract 1100.15, Orange County, California	3575
Census Tract 1101.02, Orange County, California	5780
Census Tract 1101.04, Orange County, California	5782
Census Tract 1101.06, Orange County, California	4062
Census Tract 1101.08, Orange County, California	2838
Census Tract 1101.09, Orange County, California	5243
Census Tract 1101.10, Orange County, California	6045
Census Tract 1101.11, Orange County, California	5837
Census Tract 1101.13, Orange County, California	2435
Census Tract 1101.14, Orange County, California	5038
Census Tract 1101.15, Orange County, California	3435
Census Tract 1101.16, Orange County, California	4899
Census Tract 1101.17, Orange County, California	6083
Census Tract 1101.18, Orange County, California	2637
Census Tract 1102.01, Orange County, California	8064
Census Tract 1102.02, Orange County, California	7357
Census Tract 1102.03, Orange County, California	5380
Census Tract 1103.01, Orange County, California	7298
Census Tract 1103.02, Orange County, California	5520
Census Tract 1103.03, Orange County, California	5252
Census Tract 1103.04, Orange County, California	4378
Census Tract 1104.01, Orange County, California	5250
Census Tract 1104.02, Orange County, California	5422
Census Tract 1105, Orange County, California	8164
Census Tract 1106.03, Orange County, California	8896
Census Tract 1106.04, Orange County, California	7903
Census Tract 1106.05, Orange County, California	6442
Census Tract 1106.06, Orange County, California	4826
Census Tract 1106.07, Orange County, California	4622
Census Tract 9800, Orange County, California	24
Census Tract 9901, Orange County, California	0

**Table 5.1D-7 Sensitive Receptor Listing**

**Sensitive Receptors in the Primary Impact Area**

*(all sites and coordinates from Google Earth unless otherwise noted)*

**Stanton Peaker Project**

Recp #	Receptor ID	UTM Em	UTM Nm	Elev., ft.	Distance from Site			
					meters	feet	miles	
	<b>Site (approx middle point)</b>	<b>408767</b>	<b>3741200</b>	70	na	na		
1	Residence	ESE	408837	3741138	75	93.5	306.8	0.06
2	Residence	E	409295	3741267	80	532.2	1746.3	0.33
3	Residence	N	409045	3741578	76	469.2	1539.5	0.29
4	Residence	NW	408661	3741578	72	392.6	1288.1	0.24
5	Residence	W	408445	3741209	69	322.1	1056.9	0.20
6	Residence	SW	408456	3740480	76	784.3	2573.3	0.49
7	Residence	S	408899	3740672	74	544.2	1785.7	0.34
8	Worker-Offsite (Barre Peaker Site)	E	409012	3741221	75	245.9	806.8	0.15
9	Worker-Offsite (All Metals Pro)	N	408776	3741256	68	56.7	186.1	0.04
10	Worker-Offsite (In-Flight Products)	W	408556	3741195	69	211.1	692.5	0.13
11	Worker-Offsite (Unknown)	S	408836	3741139	70	92.1	302.2	0.06
12	Stepping Stone Learning Center		409311	3741517	74	629.6	2065.8	0.39
13	Salk Elem School		410425	3741820	90	1770.1	5807.8	1.10
14	Madison Elem School		412114	3741463	140	3357.3	11015.4	2.09
15	Concorde College		413110	3737608	88	5636.0	18491.6	3.50
16	Stanton University		411313	3738073	80	4032.4	13230.3	2.51
17	West Coast University		415570	3741622	140	6816.1	22363.5	4.24
18	California Univ. of Mangement		412809	3745026	134	5565.6	18260.8	3.46
19	North OC ROP		412352	3742338	114	3761.3	12340.8	2.34
20	Palm Lane Elem School		413080	3742068	119	4399.5	14434.7	2.73
21	Magnolia High School		410147	3742147	93	1673.7	5491.3	1.04
22	Montessori School		402268	3745139	40	7599.5	24934.0	4.72
23	Walter Elem School		409845	3741055	84	1087.7	3568.8	0.68
24	Garden Park School		405679	3737925	38	4501.3	14768.6	2.80
25	Gilbert Elem School		410522	3739972	79	2142.0	7027.8	1.33
26	Agnes Ware Elem School		413169	3738776	102	5025.3	16487.9	3.12
27	Mark Twain School		413357	3739430	106	4919.5	16140.7	3.06
28	Disney Elem School		410757	3743229	102	2842.0	9324.6	1.77
29	Schweitzer Elem School		408766	3743618	81	2418.0	7933.5	1.50
30	Gospel School		408373	3737441	54	3779.6	12400.8	2.35
31	Maxwell Elem School		409537	3743216	93	2158.0	7080.5	1.34
32	Danbrook Elem School		406740	3743526	65	3085.3	10122.8	1.92
33	Western High School		407057	3743365	69	2758.9	9051.8	1.71
34	Mabel Carver School		407747	3740432	63	1276.8	4189.2	0.79
35	Hansen Elem School		406495	3742122	55	2452.0	8044.9	1.52
36	Savanna School		406496	3741977	53	2400.2	7875.2	1.49
37	Cerritos Elem School		405967	3741660	47	2837.5	9309.9	1.76
38	Wakwham Elem School		407736	3739094	58	2344.8	7693.4	1.46
39	Twila Reid Elem School		407317	3742871	67	2212.4	7258.9	1.37
40	Skylark Elem School		409556	3740351	81	1159.0	3802.7	0.72
41	Cypress College		405274	3743573	55	4222.8	13855.1	2.62
42	Alansar Ed Center		411185	3741016	96	2425.0	7956.4	1.51
43	OC Kids Preschool		411250	3740125	93	2705.7	8877.5	1.68
44	OC Headstart		408867	3743741	76	2543.0	8343.5	1.58
45	Baden-Powell ES		408400	3742800	82	1641.6	5385.9	1.02
46	Pyles ES		408825	3741680	72	483.5	1586.3	0.30
47	Bryant ES		408550	3739980	69	1239.1	4065.6	0.77
48	Rancho Alamitos HS		408800	3740200	79	1000.5	3282.8	0.62
49	Western Medical Center		415811	3742510	150	7164.8	23507.6	4.45
50	Arista Medical Center		412531	3744051	122	4721.9	15492.4	2.93
51	420 CareGivers		411233	3744268	110	3936.2	12914.7	2.45
52	Imaging Center/Anaheim		408120	3743441	75	2332.5	7653.0	1.45
53	West Anaheim Medical Center		407933	3743250	73	2213.2	7261.4	1.38
54	La Palma Hospital		403925	3745742	44	6638.9	21782.2	4.13
55	Kaiser Permanente Hospital Complex		404690	3747121	48	7188.9	23586.8	4.47
56	Tri-City Medical Center		399968	3744221	35	9303.2	30523.7	5.78
57	Los Alamitos Medical Center		401213	3740916	23	7559.3	24802.2	4.70
58	Kindred Hospital Westminster		407833	3736391	45	4898.9	16073.2	3.04
59	Pacific Haven HC Center		414931	3736656	94	7657.9	25125.4	4.76
60	Garden Grove Surgery Center		415078	3737595	108	7268.1	23846.5	4.52
61	Orangethorpe Rehab Hospital		415087	3737444	102	7351.9	24121.5	4.57
62	Garden Grove Medical Center		415421	3737580	109	7575.0	24853.5	4.71
63	Daycare (Alices Preschool)		408191	3739634	63	1668.6	5474.6	1.04
64	Daycare (unknown)		407611	3740470	58	1367.2	4485.8	0.85
65	Daycare (unknown)		408349	3742001	75	903.5	2964.4	0.56
66	Nursing Home		408777	3738810	65	2390.0	7841.7	1.49
67	Nursing Home		408785	3738802	69	2398.1	7868.1	1.49
68	Nursing Home		408911	3739688	72	1518.8	4983.3	0.94
69	Nursing Home		409744	3739967	77	1573.2	5161.5	0.98
70	Nursing Home		410063	3739674	83	2002.1	6568.8	1.24
71	Nursing Home		408716	3742848	83	1648.8	5409.7	1.02
72	Nursing Home		408533	3743103	79	1917.3	6290.8	1.19
73	Nursing Home		406862	3742887	64	2544.6	8348.8	1.58
74	Nursing Home		407426	3742691	64	2005.3	6579.5	1.25
75	Nursing Home		407610	3743193	70	2304.5	7561.0	1.43
76	Nursing Home		407749	3743179	73	2225.5	7301.8	1.38
77	Nursing Home		415439	3737440	105	7658.5	25127.7	4.76

Table 5.1D-8 OEHHHA/CARB Health Risk Assessment Values

<b>Compound</b>	<b>Unit Risk Factor (<math>\mu\text{g}/\text{m}^3</math>)<sup>-1</sup></b>	<b>Chronic Reference Exposure Level (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Acute Reference Exposure Level (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>8 Hour Reference Exposure Level (<math>\mu\text{g}/\text{m}^3</math>)</b>
Ammonia	-	200	3,200	-
Acetaldehyde	0.0000027	140	470	300
Acrolein	-	0.35	2.5	0.7
Benzene	0.000029	3	27	3
1-3 Butadiene	0.00017	2	660	9
Ethylbenzene	0.0000025	2,000	-	-
Formaldehyde	0.000006	9	55	9
Hexane	-	7,000	-	-
Naphthalene	0.000034	9	-	-
PAHs (as BaP)	0.0011	-	-	-
Propylene	-	3,000	-	-
Propylene Oxide	.0000037	30	3,100	-
Toluene	-	300	37,000	-
Xylene	-	700	22,000	-

Source: CARB/OEHHA, 2016.