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Private Client Sector
Sacramento Area Office
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833
916.920.0300
www.ch2m.com

May 23, 2017

Mr. John Heiser
Project Manager
Siting, Transmission and Environmental Protection Division
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512

Subject: Stanton Energy Reliability Center (16-AFC-1)
Stanton Energy Reliability Center, LLC's Response Response Staff Data Requests A34-A35 and Revised Human Health Risk Assessment

Dear John:

Attached in response to California Energy Commission Staff Data Requests A34-A35 are Stanton Energy Reliability Center, LLC's revisions to the human health risk assessment modeling done for the Stanton Energy Reliability Center (16-AFC-1) Application for Certification (AFC). The risk assessment was revised based on the SCAQMD's request to remove the control efficiency on hazardous air pollutants.

Included in this submittal are:

- Revised AFC Section 5.9, Public Health, clean version
- Revised AFC Section 5.9 Public Health, redline version showing changes
- Electronic human health risk assessment modeling files (submitted separately on CD-ROM)

Please contact me at 916-798-8232 if you have questions about this matter.

Sincerely,

Douglas M. Davy, Ph.D.
Project Manager

Attachment

cc: Kara Miles, W Power, LLC
Paul Cummins, Wellhead Electric Company, Inc.
Scott Galati, Dayzen, LLC
Gregory Darvin, Atmospheric Dynamics

5.9 Public Health

This section presents the methodology and results of a HRA performed to assess potential effects and public exposure associated with airborne emissions from the routine operation of the Stanton Energy Reliability Center (SERC). Section 5.9.1 describes the affected environment. Section 5.9.2 presents an environmental analysis of the operation of the power facility and associated facilities. Section 5.9.3 discusses cumulative effects. Section 5.9.4 discusses mitigation measures. Section 5.9.5 presents applicable LORS, permit requirements, schedules, and agency contacts. Section 5.9.6 contains references cited or consulted in preparing this section. Appendix 5.1D contains the HRA support data.

The SERC will be a nominal 98-MW natural gas-fired EGT plant consisting of two General Electric (GE) LM6000 PC SPRINT natural gas-fired combustion turbine generators (CTGs) and related facilities, with integrated batteries for hybrid operation and clutch gear for synchronous condenser operation. Project elements include the generation equipment, battery array, and connections to natural gas, municipal water supply, and the electrical grid. There is no diesel-fueled emergency equipment proposed for the site. A complete description of the SERC is presented in Section 2.

Air will be the dominant pathway for public exposure to chemical substances released by the SERC. Emissions to the air will consist primarily of combustion by-products produced by the new combustion turbines and the fire pump engine. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling, however, direct inhalation is considered the most likely exposure pathway. The HRA was conducted in accordance with guidance established by the California OEHHA and the CARB.

Combustion byproducts with established CAAQS or NAAQS, including NO_x, CO, and fine particulate matter (PM10/PM2.5) are addressed in Section 5.1, Air Quality. However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks associated with the potential accidental release of stored acutely hazardous materials are discussed in the Hazardous Materials Handling section.

5.9.1 Affected Environment

The SERC will be located in Orange County within the South Coast Air Basin. The SERC site is located at 10711 Dale Avenue (west side of street) in the city of Stanton, Ca. The site lies approximately 1,100 feet south of West Cerritos Avenue and 1,400 feet north of Katella Avenue. The south boundary of the site is adjacent to the UPRR right-of-way and tracks which crosses the immediate project region from east to west. The site lies directly across Dale Avenue from the SCE Barre Peaker and substation facility.

The SERC site is situated in Orange County census tract 0878.03, which has a population value of 5,998 individuals per the 2014 census update. Section 2 contains the detailed project description, location maps, and other related technical data.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools, both public and private, day care facilities, convalescent homes, and hospitals are of particular concern. A partial list of the nearest sensitive receptors based upon receptor type, are listed in Table 5.9-1. Residences and worker receptors are not technically defined as “sensitive receptors” by OEHHA. Nearby receptors of these types are included in Table 5.9-1 for informational purposes only. Appendix 5.1D, delineates data on the population by census tract within a 6-mile radius of the site, as well as a comprehensive list of sensitive receptors analyzed in the HRA.

Table 5.9-1. Nearest Sensitive Receptors by Receptor Type

Receptor Type	UTM Coordinates (East/North), m	Elevation, (feet above mean sea level)
Residence-North	409045, 3741578	76
Residence-East-Southeast	408837, 3741138	70
Residence-East	409295, 3741267	80
Residence-West	408445, 3741209	69
Residence-Northwest	408661, 3741578	72
Residence-Southwest	408456, 3740480	76
Residence-South	408899, 3740672	74
Worker	408776, 3741256	68
School	408831, 3741710	74
Hospital	407933, 3743250	73
Daycare	408349, 3742001	75
Nursing Home	408911, 3739688	72
Pre-School	408867, 3743741	76

Source: All coordinates from Google Earth (center location of each receptor location). Image date (2/2/2016).

The nearest school is approximately 0.32 miles (~1690 feet) from the SERC site, therefore no SCAQMD Risk notifications are required.

See Appendix 5.1D for a complete list of sensitive receptors analyzed in the HRA.

Air quality and health risk data presented by CARB in the 2009 Almanac of Emissions and Air Quality for the state shows that over the period from the mid-1990s through 2009, the average concentrations for the most prominent TACs have been substantially reduced, and the associated health risks for the state are showing a steady downward trend as well. This same trend is expected to have occurred in the South Coast AQMD. Air toxics emissions data derived from the SCAQMD 2012 AQMP (which is the basis for the MATES IV Study-May 2015) were used to define the estimated air basin emissions of the most prominent air toxic pollutants in relationship to those TACs identified as emitted from the proposed facility. Other than the MATES IV study, SERC is not aware of any recent (within the last 5 years) public health studies related to respiratory illnesses, cancers or related diseases concerning the local area within a 6-mile radius of the SERC site.

Table 5.9-2. TAC Emissions-2012 AQMP (MATES IV)

TAC	~SCAQMD Emissions (lbs/avg day)	~SCAQMD Emissions (tons/year)	SERC Estimated Emissions (tons/year)
Acetaldehyde	6,636.9	1,211	0.00404
Benzene	12,031.7	2,196	0.00121
1,3 Butadiene	2,573.6	470	0.0000435
Acrolein	ND	ND	0.000644
Ethyl Benzene	ND	ND	0.00324
Hexane	ND	ND	0.0257
Formaldehyde	18,885.8	3,447	0.180

Table 5.9-2. TAC Emissions-2012 AQMP (MATES IV)

TAC	~SCAQMD Emissions (lbs/avg day)	~SCAQMD Emissions (tons/year)	SERC Estimated Emissions (tons/year)
Naphthalene	695.9	127	0.000132
PAHs	ND	ND	0.0000239
Toluene	54,510.4	9,948	0.0132
Propylene	ND	ND	0.0764
Propylene oxide	0.7	0.13	0.00293
Xylenes	ND	ND	0.00648

Source: SCAQMD AQMP 2012, MATES IV Final Draft Report, May 2015 (Table 3-4).

5.9.2 Environmental Analysis

The environmental effects on public health from construction and operation of the SERC are presented in the following sections.

5.9.2.1 Significance Criteria

5.9.2.1.1 Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years which is equivalent to the projected Project lifetime). Carcinogens are not assumed to have a threshold below which there would be no human health effect. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10 in a million due to a project is considered to be a significant effect on public health. For example, the 10 in a million risk level is used by the Air Toxics Hot Spots (AB 2588) program and Proposition 65 as the public notification level for air toxic emissions from existing sources. When evaluating cancer risks from a single facility it is important to note that the overall lifetime risk of developing cancer for the average male in the United States is approximately 1 in 2, or 500,000 per million, and about 1 in 3, or 333,333 per million for the average female. In California, from 2007 to 2011 the cancer incidence rates were 49.92 per million for males and 39.63 per million for females. The cancer death rates in California in the same period (2007-2011) were 18.68 per million for males, and 13.73 per million for females.

5.9.2.1.2 Non-Cancer Risk

Non-cancer health effects can be classified as either chronic or acute. In determining the potential health risks of non-cancerous air toxics, it is assumed there is a dose of the chemical of concern below which there would be no effect on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this HRA, all hazard quotients were summed regardless of target organ. This method leads to a conservative, upper-bound assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated March 2016 (Carb, 2016).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the exposure duration is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by the acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposures to air toxics.

5.9.2.2 Construction Phase Effects

The construction phase of the SERC is expected to take approximately 11 months (followed by several months of startup and commissioning). No significant public health effects are expected during the construction phase. Strict construction practices that incorporate safety and compliance with applicable LORS will be followed (see Section 5.9.5). In addition, mitigation measures to reduce air emissions from construction effects will be implemented as described in Section 5.1, Air Quality, and Appendix 5.1E.

Temporary emissions from construction-related activities are discussed in Section 5.1, Air Quality and Appendix 5.1E. Construction-related emissions are temporary and localized, resulting in no long-term effects to the public.

Small quantities of hazardous waste may be generated during the construction phase of the SERC. Hazardous waste management plans will be in place so the potential for public exposure is minimal. Refer to the Waste Management, for more information. No acutely hazardous materials will be used or stored on-site during construction (see the Hazardous Materials Handling section). To ensure worker safety during construction, safe work practices will be followed (see the Worker Safety section).

A screening health risk assessment was conducted for the construction period based upon diesel particulate matter emissions. The results of this analysis show no significant impact on public health and are presented in Appendix 5.1D.

5.9.2.3 Operational Phase Effects

Environmental consequences potentially associated with the operation of the SERC are potential human exposure to chemical substances emitted to the air. The human health risks potentially associated with these chemical substances were evaluated in a HRA. The chemical substances potentially emitted to the air from the SERC turbines are listed in Table 5.9-3.

Table 5.9-3. Chemical Substances Potentially Emitted to the Air from the SERC

Criteria Pollutants	**Noncriteria Pollutants (Toxic Pollutants)**		
PM	Ammonia	Ethylbenzene	Propylene
CO	Acetaldehyde	Formaldehyde	Propylene oxide
SOx	Acrolein	Hexane (n-hexane)	Toluene
NOx	Benzene	Naphthalene	Xylene
VOC	1,3-Butadiene	PAHs	

Note:

PAH = polynuclear (or polycyclic) aromatic hydrocarbon

Tables 5.9-4 and 5.9-5 present the estimated toxic pollutant emissions from the facility processes.

Table 5.9-4 Toxic Pollutant Emissions Estimates (lbs/hr)

Pollutant	Each Turbine	2 Turbines
Ammonia	3.30	6.60
Total PAHs (BaP)	0.0011	0.0022
Acetaldehyde	0.0857	0.1714
Acrolein	0.0018	0.0035
Benzene	0.0016	0.0032
1-3 Butadiene	0.0002	0.0004
Ethylbenzene	0.0125	0.0250
Formaldehyde	0.1747	0.3495
Hexane	0.1233	0.2466
Naphthalene	0.0007	0.0013
Propylene	0.3671	0.7342
Propylene Oxide	0.0014	0.0028
Toluene	0.0455	0.0910
Xylene	0.0266	0.0532

Table 5.9-5 Toxic Pollutant Emissions Estimates (lbs/year)

Pollutant	Each Turbine	2 Turbines
Ammonia	2977	5953
Total PAHs (BaP)	0.9555	1.911
Acetaldehyde	74.78	149.56
Acrolein	1.533	3.066
Benzene	1.384	2.767
1-3 Butadiene	0.1820	0.3639
Ethylbenzene	10.9264	21.8528
Formaldehyde	152.47	304.94
Hexane	107.602	215.204
Naphthalene	0.5816	1.1633
Propylene	320.313	640.627
Propylene Oxide	1.2131	2.4262
Toluene	39.7172	79.4344
Xylene	23.2238	46.4475

Emissions of criteria pollutants will adhere to NAAQS and CAAQS as discussed in Section 5.1, Air Quality. The SERC also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under SCAQMD rules. Offsets will not be required because the SERC will not be a major source under the Districts NSR rule. Finally, air dispersion modeling results (presented in Section 5.1, Air Quality) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the SERC is not anticipated to have a significant effect on public health from emissions of criteria pollutants.

Potential effects associated with emissions of toxic pollutants to the air from the SERC are summarized in Appendix 5.1D. The HRA was prepared using guidelines developed by OEHHA and CARB, as implemented in the latest version of the Hotspots Analysis and Reporting Program (HARP) model (Version 2.0.3, ADMRT Ver. 16217).

5.9.2.4 Public Health Effect Study Methods

Emissions of toxic pollutants potentially associated with the SERC were estimated using emission factors approved by CARB and EPA. Concentrations of these pollutants in air potentially associated with SERC emissions were estimated using the AERMOD dispersion modeling program. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in an HRA, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in the air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the maximum impact receptor (MIR, same as the point of maximum impact-PMI). The hypothetical MEI is an individual assumed to be located at the MIR location, where the highest concentrations of air pollutants associated with SERC emissions are predicted to occur, based on the air dispersion modeling. This location was assumed to be equivalent to a residential receptor exposed for the maximum project lifetime of 70 years. Human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any location in the vicinity of the SERC. The highest offsite concentration location represents the MIR.

Health risks potentially associated with concentrations of carcinogenic air pollutants were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime (an exposure period conservatively longer than the proposed project lifetime of 30 years). In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in the air over a 70-year lifetime. Evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in the air was performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in the air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in the air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in the air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB/OEHHA, 2016), and are presented in Table 5.9-6.

Emissions of the various toxic and/or HAPs are delineated in detail in Appendix 5.1A.

Table 5.9-6. Toxicity Values Used to Characterize Health Risks (Inhalation)

Compound	Unit Risk Factor $(\mu g/m^3)^{-1}$	Chronic Reference Exposure Level $(\mu g/m^3)$	Acute Reference Exposure Level $(\mu g/m^3)$	8 Hour Reference Exposure Level $(\mu g/m^3)$
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, 9/2016.

5.9.2.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the SERC MIR (PMI #1) location is estimated to be 1.65 × 10^{-7}. Excess lifetime cancer risks at this level are unlikely to represent significant public health effects that require additional controls of facility emissions. Risks higher than 1 × 10^{-6} may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population, and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed in Table 5.9-7, Health Effects Significant Threshold Levels for SCAQMD. Risks associated with pollutants potentially emitted from the SERC are presented in Table 5.9-8. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 5.1D. As described previously, human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the SERC.

Table 5.9-7. Health Effects Significant Threshold Levels for SCAQMD

Risk Category	Risk Threshold
Significant Health Risk	1 × 10^{-6} without TBACT 10 × 10^{-6} with TBACT Acute/Chronic HI >= 1 Cancer Burden >= 0.5

Per SCAQMD Rule 1401.

Table 5.9-8 SERC HRA Summary

Receptor Type	Receptor #	UTM E	UTM N	Cancer Risk*	Chronic HI	Acute HI
MIR (PMI 1)	2617	409000	3741360	1.65E-7	.0000969	.00166
PMI 2	2674	409020	3741380	1.65E-7	.0000965	.00159
PMI 3	2673	409020	3741360	1.64E-7	.0000964	.00163
MEIR	8003	409045	3741578	1.23E-7	.0000721	.00122
MEIW[1]	8008	409012	3741221	9.43E-8	.0000553	.00144
Nearest School 1	8046	408825	3741680	5.09E-8	.0000298	.00128
Nearest School 2	8012	409311	3741517	1.19E-7	.0000696	.00100
Nearest Health Facility	8051	411233	3744268	4.99E-8	.0000292	.000411
Nearest Daycare	8064	407611	3740470	3.35E-8	.0000196	.000864
Nearest Convalescent Home	8071	408716	3742848	4.34E-8	.0000255	.000617

*30 year risk values.
[1]MEIW values have not been adjusted for a 25 year exposure due to the insignificance of the 30 year risk values.

To evaluate population risk, regulatory agencies have used the cancer burden as a method to account for the number of excess cancer cases that could potentially occur in a population. The population burden can be calculated by multiplying the cancer risk at a census block centroid times the number of people who live in the census block, and adding up the cancer cases across the zone of impact. A census block is defined as the smallest entity for which the Census Bureau collects and tabulates decennial census information; it is bounded on all sides by visible and non-visible features shown on Census Bureau maps. A centroid is defined as the central location within a specified geographic area.

Cancer burden is calculated on the basis of OEHHA (30 year) risks. It is independent of how many people move in or out of the vicinity of an individual facility. The number of cancer cases is considered independent of the number of people exposed, within some lower limits of exposed population size, and the length of exposure (within reason). For example, if 10,000 people are exposed to a carcinogen at a concentration with a $1x10^{-5}$ cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a 1×10^{-5} risk the cancer burden is 1.

There are different methods that can be used as measure of population burden. The number of individuals residing within a 1×10^{-6}, 1×10^{-5}, and/or 1×10^{-4} isopleth is another potential measure of population burden. The approach used herein is based on this method using the 1×10^{-6} isopleth distance and the estimated population values within that established radius. Appendix 5.1D presents the data assumptions used to calculate cancer burden for the SERC.

As described previously, human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than 1.65×10^{-7}. The estimated cancer burden was 0.0, indicating that emissions from the SERC would not be associated with any increase in cancer cases in the previously defined population, i.e., there was no 10^{-6} isopleth, so cancer burden is zero. In addition, the cancer burden is less than the SCAQMD significant threshold values. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that SERC emissions are unlikely to represent a significant public health effect in terms of cancer risk.

The acute and chronic hazard quotients associated with concentrations in air are shown in Table 5.9-8. The acute and chronic hazard quotients for all target organs fall below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant effect to public health. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in the *HARP-2 Users Guides* (HARP, 2015) as well as the *OEHHA 2015 Air Toxics Hot Spots Health Risk Assessment Guidance* document (OEHHA/CARB, 2015). As described previously, human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in the air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the SERC.

Detailed risk and hazard values are provided in the HARP output presented in Appendix 5.1D, (electronic files on CD-ROM).

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans. In other words, the assumption is that humans are as sensitive as the most sensitive animal species. Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero.

An excess lifetime cancer risk of 1×10^{-6} is typically used as a screening threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug

Administration to use quantitative HRA for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a "virtually safe dose," has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below 1×10^{-6} (one in a million), which are called de minimis risks. De minimis risks are historically considered risks of no regulatory concern. Chemical exposures with risks above 4×10^{-3} (four in ten thousand), called de manifestis risks, were consistently regulated. De manifestis risks are typically risks of regulatory concern. The risks falling between these two extremes were regulated in some cases, but not in others (Travis et al 1987).

The estimated lifetime cancer risk to the maximally exposed individual located at the SERC MIR is well below the 10×10^{-6} significance level. In addition, the cancer burden (equivalent to zero) is less than the State of California recommended threshold value of 1.0. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the SERC emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstates the risks from SERC emissions. Based on the results of this HRA, there are no significant public health effects anticipated from emissions of toxic pollutant to the air from the SERC.

5.9.2.6 Hazardous Materials

Hazardous materials may be used and stored at the SERC site. The hazardous materials stored in significant quantities on-site and descriptions of their uses are presented in the Hazardous Materials Handling section. Use of chemicals at the SERC site will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant effects to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate off-site could result in potential effects to the public.

The California Accidental Release Program regulations (CalARP) and CFR Title 40 Part 68 under the CAA establish emergency response planning requirements for acutely hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material. Any RMP-listed materials proposed to be used at the SERC are discussed in the Hazardous Materials Handling section.

The proposed new turbines' SCR systems will use an on-site aqueous ammonia storage and distribution systems. New storage tanks for substances such as ammonia for the SCR system will be installed for the new turbines. An offsite consequence analysis will be performed to assess potential risks to offsite human populations if a spill were to occur.

5.9.2.7 Operation Odors

The SERC is not expected to emit or cause to be emitted any substances that could cause odors.

5.9.2.8 Electromagnetic Field Exposure

Electromagnetic fields (EMFs) occur independently of one another as electric and magnetic fields at the 60-Hz frequency used in transmission lines, and both are created by electric charges. Electric fields exist when these charges are not moving. Magnetic fields are created when the electric charges are moving. The magnitude of both electric and magnetic fields falls off rapidly as the distance from the source increases (proportional to the inverse of the square of distance).

Because the electric transmission lines do not typically travel through residential areas, and based on findings of the National Institute of Environmental Health Sciences (NIEHS) (1999), EMF exposures are not expected to result in a significant effect on public health. The NIEHS report to the U.S. Congress found that “the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm” (NIEHS, 1999).

California does not presently have a regulatory level for magnetic fields. However, the values estimated for the SERC are well below those established by states that do have limits. Other states have established regulations for magnetic field strengths that have limits ranging from 150 milligauss to 250 milligauss at the edge of the right-of-way, depending on voltage. The CEC does not presently specify limits on magnetic fields for standard types and sizes of transmission lines.

5.9.2.9 Legionella

In addition to being a source of potential TACs, the possibility exists for bacterial growth to occur in cooling tower cells, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires’ disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling tower cells and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling tower cells in CCR, Title 22, Section 60303. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not apply to the SERC since it does not intend to use reclaimed water for cooling purposes.

EPA published an extensive review of Legionella in a human health criteria document (EPA, 1999). The EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling tower cells can aid in the transmission of Legionella from water to air. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk – however small – of disease in humans.

In 2008, the Cooling Tower Institute (CTI) issued its revised report and guidelines for the best practices for control of Legionella (CTI, 2008). To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling tower cells, and the overall general control of microbiological populations. Good preventive maintenance is very important in the efficient operation of cooling tower cells and other evaporative equipment. Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. The efficacy of any biocide in ensuring that bacteria, and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures, and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, an appropriate biocide program and anti-biofilm agent monitoring program would be prepared and implemented for the entire wet SAC, including the six new wet SAC cells associated with the SERC. These programs would ensure that proper levels of biocide and other agents are maintained within wet SAC water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup.

The SERC will not have a cooling tower or wet SAC. As such, SERC is not required to prepare and implement a water treatment program designed to reduce the potential for Legionella as noted above.

5.9.2.10 Summary of Effects

Results from the air toxics HRA based on emissions modeling indicate that there will be no significant incremental public health risks from construction or operation of the SERC. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO_2, CO, SO_2, and PM10 will not significantly affect air quality (Section 5.1, Air Quality). Potential concentrations are below the federal and California standards established to protect public health, including the more sensitive members of the population.

5.9.3 Cumulative Effects

The HRA for the SERC indicates that the maximum cancer risk will be approximately 1.40×10^{-8} at the point of maximum exposure (MIR) to air toxics from power facility emissions. The SERC risk level is well below the SCAQMD “significant health risk” thresholds. Non-cancer chronic and acute effects, i.e., hazard index values, are also well below the SCAQMD significance thresholds, as is the estimated cancer burden rate.

An analysis of the cumulative impacts of the SERC, per CEC practice based on modeling studies conducted by staff, is typically only required if the proposed facility is generally within less than 0.5 mile of another existing major or large toxics emissions source. No such sources were identified within the default distance of 0.5 miles. A search of the CARB Air Toxics Emissions Inventory database showed three sources in the Stanton area that are currently tracked by the SCAQMD, as follows:

- All Metals Processing, 8401 Standustrial Street
- Cr and R Inc., 11292 Western Avenue
- Cr Transfer, various locations in Stanton

Only one of the above facilities is within a 0.5-mile radius of the SERC site (i.e., All Metals Processing). None of the facilities is a major source of HAPs or air toxic pollutants.

In addition, the SCE Barre Peaker site is located directly east of the SERC site, across Dale Ave. This facility is a single simple-cycle turbine (LM6000 PC) peaker facility which is only allowed to combust 489 mmscf/yr of natural gas. This firing rate is less than the firing rate for one of the SERC turbines, and as such the air toxics emissions would be significantly less than the SERC facility, and not major.

In addition, the cancer risks and non-cancer health impacts estimated for the SERC using conservative assumptions are well below significance with minimal predicted impacts to offsite receptors.

5.9.4 Mitigation Measures

5.9.4.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying BACT to the SERC. BACT for the turbines is delineated in Appendix 5.1F.

The SERC facility is not expected to trigger the offset requirements of Regulation XIII, Rule 1304. Pursuant to the SCAQMD NSR Rule, offsets are not required for the SERC. Therefore, further mitigation of emissions is not required to protect public health.

5.9.4.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of BACT/T-BACT at the SERC, (i.e., the use of clean fuels, selective catalytic reduction for NOx control, and an oxidation catalyst on the individual turbines for the control of CO, VOCs, and gaseous toxic constituents).

5.9.4.2.1 Legionella Mitigation Measure

Since the SERC is not proposing the use of a cooling tower or wet SAC, a Legionella mitigation plan is not required.

5.9.4.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in the Hazardous Materials Handling section. Potential public health effects from the use of hazardous materials are only expected to occur as a result of an accidental release. The facility has many safety features designed to prevent and minimize effects from the use and accidental release of hazardous materials. The SERC site will include the design features listed below.

- Curbs, berms, and/or secondary containment structures will be provided where accidental release of chemicals may occur.
- A fire-protection system will be included to detect, alarm, and suppress a fire, in accordance with applicable LORS.
- Construction of all storage systems will be in accordance with applicable construction standards, seismic standards, and LORS.

If required, a RMP for the SERC will be prepared prior to commencement of SERC operations. The RMP will estimate the risk presented by handling affected materials at the SERC site. The RMP will include a hazard analysis, off-site consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on the following:

- Proper use of personal protective equipment
- *S*afety operating procedures
- Fire safety
- Emergency response actions

The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for SERC personnel include power facility evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either a collection sump or to holding or neutralization tanks. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

5.9.5 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to the SERC are identified in Table 5.9-9. The conformity of the SERC to each of the LORS applicable to public health is also presented in this table. Table 5.9-9 also summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies.

Table 5.9-9. Summary of LORS – Public Health

LORS	Applicability	Primary Regulatory Agency	SERC Conformance	Conformance (Comments)
CAA Title III	Public exposure to air pollutants	EPA Region 9 CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. TBACT will be applied. Emissions of criteria pollutants will be minimized by applying BACT to the SERC.	Facility will comply with SCAQMD Rule 1401 and Regulation XIII
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings.	Facility will determine Prop 65 status and comply as required
40 CFR Part 68 (RMP) and CalARP Program Title 19	Public exposure to acutely hazardous materials	EPA Region 9 Orange County Department of Health Services Orange County Fire Department	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank. An RMP (if required) will be prepared prior to commencement of SERC operations.	An RMP for the ammonia system will be developed and submitted to the AA for review
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	Orange County Department of Health Services CARB SCAQMD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank.	An RMP for the ammonia system will be developed and submitted to the AA for review
CHSC 25500-25542	Hazmat Inventory	State Office of Emergency Services and Orange County Department of Environmental Health	Prepare all required Hazardous Materials plans and inventories, distribute to affected agencies	See Hazardous Materials Section
CHSC 44300 et seq.	AB2588 Air Toxics Program	SCAQMD	Participate in the AB2588 inventory and reporting program at the District level.	The facility will comply with the SCAQMD AB2588 inventory and reporting program
SCAQMD Rule 1401	Toxics NSR	SCAQMD	Establishes risk and hazard index values. The facility is expected to comply with these values.	The HRA shows compliance with Rule 1401
SCAQMD Regulation X	NESHAPS	SCAQMD	Requires compliance with applicable NESHAPs.	N/A

Table 5.9-9. Summary of LORS – Public Health

LORS	Applicability	Primary Regulatory Agency	SERC Conformance	Conformance (Comments)
CHSC 25249.5	Proposition 65	OEHHA	Comply with all signage and notification requirements.	See Hazardous Materials Section
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to TACs	CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.	HRA indicates health risks are well below the significance levels

5.9.5.1 Permits Required and Schedule

Agency-required permits or plans related to public health include a hazardous materials management plan (HMMP), a risk management plan (RMP) and SCAQMD Permits to Construct/Permits to Operate. These requirements are discussed in detail in the Hazardous Materials Handling section and Section 5.1, Air Quality, respectively.

5.9.5.2 Agencies Involved and Agency Contacts

Table 5.9-10 provides contact information for agencies involved with Public Health.

Table 5.9-10. **Summary of Agency Contacts for Public Health**

Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Public exposure to air pollutants	EPA Region 9	Gerardo Rios Chief, Permits Section EPA Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974
	CARB	Mike Tollstrup 1001 1 Street, 19th Floor Sacramento, CA 95814 (916) 322-6026
	SCAQMD	Mohsen Nazemi, Dep. EO Permitting/Compliance 21865 E. Copley Dr. Diamond Bar, CA. 91765 (909) 396-2662
Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Cynthia Oshita or Susan Long P.O. Box 4010 Sacramento, CA 95812-4010 (916) 445-6900
Public exposure to acutely hazardous materials	Orange County EHD Hazardous Waste Division	Kevin Baitx, HWS-III 1241 E. Dyer Rd. #120 Santa Ana, CA. 92705 (714) 719-2441

Source: SERC Team, 2016.

5.9.6 References

California Air Resources Board. (CARB). 2016. Consolidated table of OEHHA/ARB approved risk assessment health values. http://arbis.arb.ca.gov/toxics/healthval/contable.pdf. September.

Cooling Tower Institute (CTI). 2008. Legionellosis-Guideline-Best Practices for Control of Legionella. WTB-148, July.

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Office of Environmental Health Hazard Assessment/California Air Resources Board. (OEHHA/CARB). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines, Cal-EPA. February.

South Coast Air Quality Management District. (SCAQMD). 2015. *Multiple Air Toxics Exposure Study in the South Coast Air Basin-MATES IV*. May.

South Coast Air Quality Management District. (SCAQMD). 2005. *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act (AB2588)*. July.

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Risk Science Associates, Inc., 2008. Liberty Energy XXIII-Renewable Energy Power Plant Project, Draft EIR, Public Health Section D.11, Aspen Environmental Group, June.

Bay Area Air Quality Management District. (BAAQMD). 2010. Air Toxics NSR Program HRSA Guidelines, Section 2.3. January.

Stanton Peaker Project Team. 2016. Fieldwork, observations, and research.

5.9 Public Health

This section presents the methodology and results of a HRA performed to assess potential effects and public exposure associated with airborne emissions from the routine operation of the Stanton Energy Reliability Center (SERC). Section 5.9.1 describes the affected environment. Section 5.9.2 presents an environmental analysis of the operation of the power facility and associated facilities. Section 5.9.3 discusses cumulative effects. Section 5.9.4 discusses mitigation measures. Section 5.9.5 presents applicable LORS, permit requirements, schedules, and agency contacts. Section 5.9.6 contains references cited or consulted in preparing this section. Appendix 5.1D contains the HRA support data.

The SERC will be a nominal 98-MW natural gas-fired EGT plant consisting of two General Electric (GE) LM6000 PC SPRINT natural gas-fired combustion turbine generators (CTGs) and related facilities, with integrated batteries for hybrid operation and clutch gear for synchronous condenser operation. Project elements include the generation equipment, battery array, and connections to natural gas, municipal water supply, and the electrical grid. There is no diesel-fueled emergency equipment proposed for the site. A complete description of the SERC is presented in Section 2.

Air will be the dominant pathway for public exposure to chemical substances released by the SERC. Emissions to the air will consist primarily of combustion by-products produced by the new combustion turbines and the fire pump engine. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling, however, direct inhalation is considered the most likely exposure pathway. The HRA was conducted in accordance with guidance established by the California OEHHA and the CARB.

Combustion byproducts with established CAAQS or NAAQS, including NO_x, CO, and fine particulate matter (PM10/PM2.5) are addressed in Section 5.1, Air Quality. However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks associated with the potential accidental release of stored acutely hazardous materials are discussed in the Hazardous Materials Handling section.

5.9.1 Affected Environment

The SERC will be located in Orange County within the South Coast Air Basin. The SERC site is located at 10711 Dale Avenue (west side of street) in the city of Stanton, Ca. The site lies approximately 1,100 feet south of West Cerritos Avenue and 1,400 feet north of Katella Avenue. The south boundary of the site is adjacent to the UPRR right-of-way and tracks which crosses the immediate project region from east to west. The site lies directly across Dale Avenue from the SCE Barre Peaker and substation facility.

The SERC site is situated in Orange County census tract 0878.03, which has a population value of 5,998 individuals per the 2014 census update. Section 2 contains the detailed project description, location maps, and other related technical data.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools, both public and private, day care facilities, convalescent homes, and hospitals are of particular concern. A partial list of the nearest sensitive receptors based upon receptor type, are listed in Table 5.9-1. Residences and worker receptors are not technically defined as “sensitive receptors” by OEHHA. Nearby receptors of these types are included in Table 5.9-1 for informational purposes only. Appendix 5.1D, delineates data on the population by census tract within a 6-mile radius of the site, as well as a comprehensive list of sensitive receptors analyzed in the HRA.

Table 5.9-1. Nearest Sensitive Receptors by Receptor Type

Receptor Type	UTM Coordinates (East/North), m	Elevation, (feet above mean sea level)
Residence-North	409045, 3741578	76
Residence-East-Southeast	408837, 3741138	70
Residence-East	409295, 3741267	80
Residence-West	408445, 3741209	69
Residence-Northwest	408661, 3741578	72
Residence-Southwest	408456, 3740480	76
Residence-South	408899, 3740672	74
Worker	408776, 3741256	68
School	408831, 3741710	74
Hospital	407933, 3743250	73
Daycare	408349, 3742001	75
Nursing Home	408911, 3739688	72
Pre-School	408867, 3743741	76

Source: All coordinates from Google Earth (center location of each receptor location). Image date (2/2/2016).

The nearest school is approximately 0.32 miles (~1690 feet) from the SERC site, therefore no SCAQMD Risk notifications are required.

See Appendix 5.1D for a complete list of sensitive receptors analyzed in the HRA.

Air quality and health risk data presented by CARB in the 2009 Almanac of Emissions and Air Quality for the state shows that over the period from the mid-1990s through 2009, the average concentrations for the most prominent TACs have been substantially reduced, and the associated health risks for the state are showing a steady downward trend as well. This same trend is expected to have occurred in the South Coast AQMD. Air toxics emissions data derived from the SCAQMD 2012 AQMP (which is the basis for the MATES IV Study-May 2015) were used to define the estimated air basin emissions of the most prominent air toxic pollutants in relationship to those TACs identified as emitted from the proposed facility. Other than the MATES IV study, SERC is not aware of any recent (within the last 5 years) public health studies related to respiratory illnesses, cancers or related diseases concerning the local area within a 6-mile radius of the SERC site.

Table 5.9-2. TAC Emissions-2012 AQMP (MATES IV)

TAC	~SCAQMD Emissions (lbs/avg day)	~SCAQMD Emissions (tons/year)	SERC Estimated Emissions (tons/year)
Acetaldehyde	6,636.9	1,211	0.00404
Benzene	12,031.7	2,196	0.00121
1,3 Butadiene	2,573.6	470	0.0000435
Acrolein	ND	ND	0.000644
Ethyl Benzene	ND	ND	0.00324
Hexane	ND	ND	0.0257
Formaldehyde	18,885.8	3,447	0.180

Table 5.9-2. TAC Emissions-2012 AQMP (MATES IV)

TAC	~SCAQMD Emissions (lbs/avg day)	~SCAQMD Emissions (tons/year)	SERC Estimated Emissions (tons/year)
Naphthalene	695.9	127	0.000132
PAHs	ND	ND	0.0000239
Toluene	54,510.4	9,948	0.0132
Propylene	ND	ND	0.0764
Propylene oxide	0.7	0.13	0.00293
Xylenes	ND	ND	0.00648

Source: SCAQMD AQMP 2012, MATES IV Final Draft Report, May 2015 (Table 3-4).

5.9.2 Environmental Analysis

The environmental effects on public health from construction and operation of the SERC are presented in the following sections.

5.9.2.1 Significance Criteria

5.9.2.1.1 Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years which is equivalent to the projected Project lifetime). Carcinogens are not assumed to have a threshold below which there would be no human health effect. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10 in a million due to a project is considered to be a significant effect on public health. For example, the 10 in a million risk level is used by the Air Toxics Hot Spots (AB 2588) program and Proposition 65 as the public notification level for air toxic emissions from existing sources. When evaluating cancer risks from a single facility it is important to note that the overall lifetime risk of developing cancer for the average male in the United States is approximately 1 in 2, or 500,000 per million, and about 1 in 3, or 333,333 per million for the average female. In California, from 2007 to 2011 the cancer incidence rates were 49.92 per million for males and 39.63 per million for females. The cancer death rates in California in the same period (2007-2011) were 18.68 per million for males, and 13.73 per million for females.

5.9.2.1.2 Non-Cancer Risk

Non-cancer health effects can be classified as either chronic or acute. In determining the potential health risks of non-cancerous air toxics, it is assumed there is a dose of the chemical of concern below which there would be no effect on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this HRA, all hazard quotients were summed regardless of target organ. This method leads to a conservative, upper-bound assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated March 2016 (Carb, 2016).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the exposure duration is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by the acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposures to air toxics.

5.9.2.2 Construction Phase Effects

The construction phase of the SERC is expected to take approximately 11 months (followed by several months of startup and commissioning). No significant public health effects are expected during the construction phase. Strict construction practices that incorporate safety and compliance with applicable LORS will be followed (see Section 5.9.5). In addition, mitigation measures to reduce air emissions from construction effects will be implemented as described in Section 5.1, Air Quality, and Appendix 5.1E.

Temporary emissions from construction-related activities are discussed in Section 5.1, Air Quality and Appendix 5.1E. Construction-related emissions are temporary and localized, resulting in no long-term effects to the public.

Small quantities of hazardous waste may be generated during the construction phase of the SERC. Hazardous waste management plans will be in place so the potential for public exposure is minimal. Refer to the Waste Management, for more information. No acutely hazardous materials will be used or stored on-site during construction (see the Hazardous Materials Handling section). To ensure worker safety during construction, safe work practices will be followed (see the Worker Safety section).

A screening health risk assessment was conducted for the construction period based upon diesel particulate matter emissions. The results of this analysis show no significant impact on public health and are presented in Appendix 5.1D.

5.9.2.3 Operational Phase Effects

Environmental consequences potentially associated with the operation of the SERC are potential human exposure to chemical substances emitted to the air. The human health risks potentially associated with these chemical substances were evaluated in a HRA. The chemical substances potentially emitted to the air from the SERC turbines are listed in Table 5.9-3.

Table 5.9-3. Chemical Substances Potentially Emitted to the Air from the SERC

Criteria Pollutants	Noncriteria Pollutants (Toxic Pollutants)		
PM	Ammonia	Ethylbenzene	Propylene
CO	Acetaldehyde	Formaldehyde	Propylene oxide
SOx	Acrolein	Hexane (n-hexane)	Toluene
NOx	Benzene	Naphthalene	Xylene
VOC	1,3-Butadiene	PAHs	

Note:

PAH = polynuclear (or polycyclic) aromatic hydrocarbon

Tables 5.9-4 and 5.9-5 present the estimated toxic pollutant emissions from the facility processes.

Table 5.9-4 Toxic Pollutant Emissions Estimates (lbs/hr)

Pollutant	Each Turbine	2 Turbines
Ammonia	3.30	6.60
Total PAHs (BaP)	0.0011	0.0022
Acetaldehyde	0.0857	0.1714
Acrolein	0.0018	0.0035
Benzene	0.0016	0.0032
1-3 Butadiene	0.0002	0.0004
Ethylbenzene	0.0125	0.0250
Formaldehyde	0.1747	0.3495
Hexane	0.1233	0.2466
Naphthalene	0.0007	0.0013
Propylene	0.3671	0.7342
Propylene Oxide	0.0014	0.0028
Toluene	0.0455	0.0910
Xylene	0.0266	0.0532

Table 5.9-4. Toxic Pollutant Emissions Estimates (lbs/hr)

Pollutant	Each Turbine	Two Turbines
Ammonia	3.30	6.60
Total PAHs (BaP)	0.0000229	0.0000459
Acetaldehyde	0.00389	0.00777
Acrolein	0.000619	0.00124
Benzene	0.00117	0.00233
1,3-Butadiene	0.0000418	0.0000836
Ethylbenzene	0.00311	0.00623
Formaldehyde	0.173	0.345
Hexane	0.0247	0.0493
Naphthalene	0.000127	0.000253
Propylene	0.0734	0.147
Propylene oxide	0.00282	0.00564
Toluene	0.0126	0.0253
Xylene	0.00622	0.0124

Table 5.9-5. Toxic Pollutant Emissions Estimates (lbs/year)

Pollutant	Each Turbine	Two Turbines
Ammonia	3,550	7,100
Total PAHs (BaP)	0.0239	0.0478
Acetaldehyde	4.04	8.09
Acrolein	0.644	1.29
Benzene	1.21	2.43
1,3-Butadiene	0.0435	0.0870
Ethylbenzene	3.24	6.48
Formaldehyde	180	360
Hexane	25.7	51.4
Naphthalene	0.132	0.264
Propylene	76.4	153
Propylene oxide	2.93	5.87
Toluene	13.2	26.3
Xylene	6.48	13

Table 5.9-5 Toxic Pollutant Emissions Estimates (lbs/year)

Pollutant	Each Turbine	2 Turbines
Ammonia	2977	5953
Total PAHs (BaP)	0.9555	1.911
Acetaldehyde	74.78	149.56
Acrolein	1.533	3.066
Benzene	1.384	2.767
1-3 Butadiene	0.1820	0.3639
Ethylbenzene	10.9264	21.8528
Formaldehyde	152.47	304.94
Hexane	107.602	215.204
Naphthalene	0.5816	1.1633
Propylene	320.313	640.627
Propylene Oxide	1.2131	2.4262
Toluene	39.7172	79.4344
Xylene	23.2238	46.4475

Emissions of criteria pollutants will adhere to NAAQS and CAAQS as discussed in Section 5.1, Air Quality. The SERC also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under SCAQMD rules. Offsets will not be required because the SERC will not be a major source under the Districts NSR rule. Finally, air dispersion modeling results (presented in Section 5.1, Air Quality) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the SERC is not anticipated to have a significant effect on public health from emissions of criteria pollutants.

Potential effects associated with emissions of toxic pollutants to the air from the SERC are summarized in Appendix 5.1D. The HRA was prepared using guidelines developed by OEHHA and CARB, as implemented in the latest version of the Hotspots Analysis and Reporting Program (HARP) model (Version 2.0.3, ADMRT Ver. 16217).

5.9.2.4 Public Health Effect Study Methods

Emissions of toxic pollutants potentially associated with the SERC were estimated using emission factors approved by CARB and EPA. Concentrations of these pollutants in air potentially associated with SERC emissions were estimated using the AERMOD dispersion modeling program. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in an HRA, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in the air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the maximum impact receptor (MIR, same as the point of maximum impact-PMI). The hypothetical MEI is an individual assumed to be located at the MIR location, where the highest concentrations of air pollutants associated with SERC emissions are predicted to occur, based on the air dispersion modeling. This location was assumed to be equivalent to a residential receptor exposed for the maximum project lifetime of 70 years. Human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any location in the vicinity of the SERC. The highest offsite concentration location represents the MIR.

Health risks potentially associated with concentrations of carcinogenic air pollutants were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime (an exposure period conservatively longer than the proposed project lifetime of 30 years). In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in the air over a 70-year lifetime. Evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in the air was performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in the air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in the air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in the air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB/OEHHA, 2016), and are presented in Table 5.9-6.

Emissions of the various toxic and/or HAPs are delineated in detail in Appendix 5.1A.

Table 5.9-6. Toxicity Values Used to Characterize Health Risks (Inhalation)

Compound	Unit Risk Factor (µg/m^3)$^{-1}$	Chronic Reference Exposure Level (µg/m^3)	Acute Reference Exposure Level (µg/m^3)	8 Hour Reference Exposure Level (µg/m^3)
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, 9/2016.

5.9.2.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the SERC MIR (PMI #1) location is estimated to be 1.6540 × 10^{-78}. Excess lifetime cancer risks at this level are unlikely to represent significant public health effects that require additional controls of facility emissions. Risks higher than 1 × 10^{-6} may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population, and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed in Table 5.9-7, Health Effects Significant Threshold Levels for SCAQMD. Risks associated with pollutants potentially emitted from the SERC are presented in Table 5.9-8. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 5.1D. As described previously, human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the SERC.

Table 5.9-7. Health Effects Significant Threshold Levels for SCAQMD

Risk Category	Risk Threshold
Significant Health Risk	1 × 10^{-6} without TBACT 10 × 10^{-6} with TBACT Acute/Chronic HI >= 1 Cancer Burden >= 0.5

Per SCAQMD Rule 1401.

~~Table 5.9-8. SERC HRA Summary~~

~~Receptor Type~~	~~Receptor #~~	~~UTM E~~	~~UTM N~~	~~Cancer Risk[a]~~	~~Chronic HI~~	~~Acute HI~~
~~MIR (PMI 1)~~	~~2617~~	~~409000~~	~~3741360~~	~~1.40^{-8}~~	~~0.000104~~	~~0.00144~~
~~PMI 2~~	~~2674~~	~~409020~~	~~3741380~~	~~1.40^{-8}~~	~~0.000104~~	~~0.00138~~
~~PMI 3~~	~~2673~~	~~409020~~	~~3741360~~	~~1.40^{-8}~~	~~0.000103~~	~~0.00141~~
~~MEIR~~	~~8003~~	~~409045~~	~~3741578~~	~~1.04^{-8}~~	~~0.0000774~~	~~0.00106~~
~~MEIW[b]~~	~~8008~~	~~409012~~	~~3741221~~	~~8.01^{-9}~~	~~0.0000156~~	~~0.00125~~
~~Nearest school~~	~~8012~~	~~409311~~	~~3741517~~	~~1.01^{-8}~~	~~0.0000748~~	~~0.000868~~
~~Nearest health facility~~	~~8051~~	~~411233~~	~~3744268~~	~~4.24^{-9}~~	~~0.0000314~~	~~0.000357~~
~~Nearest daycare~~	~~8064~~	~~407611~~	~~3740470~~	~~1.95^{-9}~~	~~0.0000211~~	~~0.000751~~
~~Nearest convalescent home~~	~~8071~~	~~408716~~	~~3742848~~	~~3.69^{-9}~~	~~0.0000273~~	~~0.000536~~

~~[a] 70-year risk values.~~
~~[b] MEIW values have not been adjusted for a 25-year exposure due to the insignificance of the 70-year risk values.~~

Table 5.9-8 SERC HRA Summary

Receptor Type	Receptor #	UTM E	UTM N	Cancer Risk*	Chronic HI	Acute HI
MIR (PMI 1)	2617	409000	3741360	1.65E-7	.0000969	.00166
PMI 2	2674	409020	3741380	1.65E-7	.0000965	.00159
PMI 3	2673	409020	3741360	1.64E-7	.0000964	.00163
MEIR	8003	409045	3741578	1.23E-7	.0000721	.00122
MEIW[1]	8008	409012	3741221	9.43E-8	.0000553	.00144
Nearest School 1	8046	408825	3741680	5.09E-8	.0000298	.00128
Nearest School 2	8012	409311	3741517	1.19E-7	.0000696	.00100
Nearest Health Facility	8051	411233	3744268	4.99E-8	.0000292	.000411
Nearest Daycare	8064	407611	3740470	3.35E-8	.0000196	.000864
Nearest Convalescent Home	8071	408716	3742848	4.34E-8	.0000255	.000617

*30 year risk values.
[1] MEIW values have not been adjusted for a 25 year exposure due to the insignificance of the 30 year risk values.

To evaluate population risk, regulatory agencies have used the cancer burden as a method to account for the number of excess cancer cases that could potentially occur in a population. The population burden can be calculated by multiplying the cancer risk at a census block centroid times the number of people who live in the census block, and adding up the cancer cases across the zone of impact. A census block is defined as the smallest entity for which the Census Bureau collects and tabulates decennial census information; it is bounded on all sides by visible and non-visible features shown on Census Bureau maps. A centroid is defined as the central location within a specified geographic area.

Cancer burden is calculated on the basis of OEHHA (~~7~~30 year) risks. It is independent of how many people move in or out of the vicinity of an individual facility. The number of cancer cases is considered independent of the number of people exposed, within some lower limits of exposed population size, and the length of exposure (within reason). For example, if 10,000 people are exposed to a carcinogen at a concentration with a $1x10^{-5}$ cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a 1×10^{-5} risk the cancer burden is 1.

There are different methods that can be used as measure of population burden. The number of individuals residing within a 1×10^{-6}, 1×10^{-5}, and/or 1×10^{-4} isopleth is another potential measure of population burden. The approach used herein is based on this method using the 1×10^{-6} isopleth distance and the estimated population values within that established radius. Appendix 5.1D presents the data assumptions used to calculate cancer burden for the SERC.

As described previously, human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than 1.6540 × 10^{-78}. The estimated cancer burden was 0.0, indicating that emissions from the SERC would not be associated with any increase in cancer cases in the previously defined population, i.e., there was no 10^{-6} isopleth, so cancer burden is zero. In addition, the cancer burden is less than the SCAQMD significant threshold values. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that SERC emissions are unlikely to represent a significant public health effect in terms of cancer risk.

The acute and chronic hazard quotients associated with concentrations in air are shown in Table 5.9-8. The acute and chronic hazard quotients for all target organs fall below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant effect to public health. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in the *HARP-2 Users Guides* (HARP, 2015) as well as the *OEHHA 2015 Air Toxics Hot Spots Health Risk Assessment Guidance* document (OEHHA/CARB, 2015). As described previously, human health risks associated with emissions from the SERC are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in the air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the SERC.

Detailed risk and hazard values are provided in the HARP output presented in Appendix 5.1D, (electronic files on CD-ROM).

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans. In other words, the assumption is that humans are as sensitive as the most sensitive animal species. Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero.

An excess lifetime cancer risk of 1×10^{-6} is typically used as a screening threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug Administration to use quantitative HRA for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a "virtually safe dose," has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below 1×10^{-6} (one in a million), which are called de minimis risks. De minimis risks are historically considered risks of no regulatory concern. Chemical exposures with risks above 4×10^{-3} (four in ten thousand), called de manifestis risks, were consistently regulated. De manifestis risks are typically risks of regulatory concern. The risks falling between these two extremes were regulated in some cases, but not in others (Travis et al 1987).

The estimated lifetime cancer risk to the maximally exposed individual located at the SERC MIR is well below the 10×10^{-6} significance level. In addition, the cancer burden (equivalent to zero) is less than the State of California recommended threshold value of 1.0. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the SERC emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstates the risks from SERC emissions. Based on the results of this HRA, there are no significant public health effects anticipated from emissions of toxic pollutant to the air from the SERC.

5.9.2.6 Hazardous Materials

Hazardous materials may be used and stored at the SERC site. The hazardous materials stored in significant quantities on-site and descriptions of their uses are presented in the Hazardous Materials Handling section. Use of chemicals at the SERC site will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant effects to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate off-site could result in potential effects to the public.

The California Accidental Release Program regulations (CalARP) and CFR Title 40 Part 68 under the CAA establish emergency response planning requirements for acutely hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material. Any RMP-listed materials proposed to be used at the SERC are discussed in the Hazardous Materials Handling section.

The proposed new turbines' SCR systems will use an on-site aqueous ammonia storage and distribution systems. New storage tanks for substances such as ammonia for the SCR system will be installed for the new turbines. An offsite consequence analysis will be performed to assess potential risks to offsite human populations if a spill were to occur.

5.9.2.7 Operation Odors

The SERC is not expected to emit or cause to be emitted any substances that could cause odors.

5.9.2.8 Electromagnetic Field Exposure

Electromagnetic fields (EMFs) occur independently of one another as electric and magnetic fields at the 60-Hz frequency used in transmission lines, and both are created by electric charges. Electric fields exist when these charges are not moving. Magnetic fields are created when the electric charges are moving. The magnitude of both electric and magnetic fields falls off rapidly as the distance from the source increases (proportional to the inverse of the square of distance).

Because the electric transmission lines do not typically travel through residential areas, and based on findings of the National Institute of Environmental Health Sciences (NIEHS) (1999), EMF exposures are not expected to result in a significant effect on public health. The NIEHS report to the U.S. Congress found that "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm" (NIEHS, 1999).

California does not presently have a regulatory level for magnetic fields. However, the values estimated for the SERC are well below those established by states that do have limits. Other states have established regulations for magnetic field strengths that have limits ranging from 150 milligauss to 250 milligauss at the edge of the right-of-way, depending on voltage. The CEC does not presently specify limits on magnetic fields for standard types and sizes of transmission lines.

5.9.2.9 Legionella

In addition to being a source of potential TACs, the possibility exists for bacterial growth to occur in cooling tower cells, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling tower cells and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling tower cells in CCR, Title 22, Section 60303. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not apply to the SERC since it does not intend to use reclaimed water for cooling purposes.

EPA published an extensive review of Legionella in a human health criteria document (EPA, 1999). The EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling tower cells can aid in the transmission of Legionella from water to air. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk – however small – of disease in humans.

In 2008, the Cooling Tower Institute (CTI) issued its revised report and guidelines for the best practices for control of Legionella (CTI, 2008). To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling tower cells, and the overall general control of microbiological populations. Good preventive maintenance is very important in the efficient operation of cooling tower cells and other evaporative equipment. Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. The efficacy of any biocide in ensuring that bacteria, and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures, and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, an appropriate biocide program and anti-biofilm agent monitoring program would be prepared and implemented for the entire wet SAC, including the six new wet SAC cells associated with the SERC. These programs would ensure that proper levels of biocide and other agents are maintained within wet SAC water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup.

The SERC will not have a cooling tower or wet SAC. As such, SERC is not required to prepare and implement a water treatment program designed to reduce the potential for Legionella as noted above.

5.9.2.10 Summary of Effects

Results from the air toxics HRA based on emissions modeling indicate that there will be no significant incremental public health risks from construction or operation of the SERC. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO_2, CO, SO_2, and PM10 will not significantly affect air quality (Section 5.1, Air Quality). Potential concentrations are below the federal and California standards established to protect public health, including the more sensitive members of the population.

5.9.3 Cumulative Effects

The HRA for the SERC indicates that the maximum cancer risk will be approximately 1.40×10^{-8} at the point of maximum exposure (MIR) to air toxics from power facility emissions. The SERC risk level is well below the SCAQMD "significant health risk" thresholds. Non-cancer chronic and acute effects, i.e., hazard index values, are also well below the SCAQMD significance thresholds, as is the estimated cancer burden rate.

An analysis of the cumulative impacts of the SERC, per CEC practice based on modeling studies conducted by staff, is typically only required if the proposed facility is generally within less than 0.5 mile of another existing major or large toxics emissions source. No such sources were identified within the default distance of 0.5 miles. A search of the CARB Air Toxics Emissions Inventory database showed three sources in the Stanton area that are currently tracked by the SCAQMD, as follows:

- All Metals Processing, 8401 Standustrial Street
- Cr and R Inc., 11292 Western Avenue
- Cr Transfer, various locations in Stanton

Only one of the above facilities is within a 0.5-mile radius of the SERC site (i.e., All Metals Processing). None of the facilities is a major source of HAPs or air toxic pollutants.

In addition, the SCE Barre Peaker site is located directly east of the SERC site, across Dale Ave. This facility is a single simple-cycle turbine (LM6000 PC) peaker facility which is only allowed to combust 489 mmscf/yr of natural gas. This firing rate is less than the firing rate for one of the SERC turbines, and as such the air toxics emissions would be significantly less than the SERC facility, and not major.

In addition, the cancer risks and non-cancer health impacts estimated for the SERC using conservative assumptions are well below significance with minimal predicted impacts to offsite receptors.

5.9.4 Mitigation Measures

5.9.4.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying BACT to the SERC. BACT for the turbines is delineated in Appendix 5.1F.

The SERC facility is not expected to trigger the offset requirements of Regulation XIII, Rule 1304. Pursuant to the SCAQMD NSR Rule, offsets are not required for the SERC. Therefore, further mitigation of emissions is not required to protect public health.

5.9.4.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of BACT/T-BACT at the SERC, (i.e., the use of clean fuels, selective catalytic reduction for NOx control, and an oxidation catalyst on the individual turbines for the control of CO, VOCs, and gaseous toxic constituents).

5.9.4.2.1 Legionella Mitigation Measure

Since the SERC is not proposing the use of a cooling tower or wet SAC, a Legionella mitigation plan is not required.

5.9.4.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in the Hazardous Materials Handling section. Potential public health effects from the use of hazardous materials are only expected to occur as a result of an accidental release. The facility has many safety features designed to prevent and minimize effects from the use and accidental release of hazardous materials. The SERC site will include the design features listed below.

- Curbs, berms, and/or secondary containment structures will be provided where accidental release of chemicals may occur.
- A fire-protection system will be included to detect, alarm, and suppress a fire, in accordance with applicable LORS.
- Construction of all storage systems will be in accordance with applicable construction standards, seismic standards, and LORS.

If required, a RMP for the SERC will be prepared prior to commencement of SERC operations. The RMP will estimate the risk presented by handling affected materials at the SERC site. The RMP will include a hazard analysis, off-site consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on the following:

- Proper use of personal protective equipment
- *S*afety operating procedures
- Fire safety
- Emergency response actions

The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for SERC personnel include power facility evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either a collection sump or to holding or neutralization tanks. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

5.9.5 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to the SERC are identified in Table 5.9-9. The conformity of the SERC to each of the LORS applicable to public health is also presented in this table. Table 5.9-9 also summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies.

Table 5.9-9. Summary of LORS – Public Health

LORS	Applicability	Primary Regulatory Agency	SERC Conformance	Conformance (Comments)
CAA Title III	Public exposure to air pollutants	EPA Region 9 CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. TBACT will be applied. Emissions of criteria pollutants will be minimized by applying BACT to the SERC.	Facility will comply with SCAQMD Rule 1401 and Regulation XIII
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings.	Facility will determine Prop 65 status and comply as required
40 CFR Part 68 (RMP) and CalARP Program Title 19	Public exposure to acutely hazardous materials	EPA Region 9 Orange County Department of Health Services Orange County Fire Department	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank. An RMP (if required) will be prepared prior to commencement of SERC operations.	An RMP for the ammonia system will be developed and submitted to the AA for review
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	Orange County Department of Health Services CARB SCAQMD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank.	An RMP for the ammonia system will be developed and submitted to the AA for review
CHSC 25500-25542	Hazmat Inventory	State Office of Emergency Services and Orange County Department of Environmental Health	Prepare all required Hazardous Materials plans and inventories, distribute to affected agencies	See Hazardous Materials Section
CHSC 44300 et seq.	AB2588 Air Toxics Program	SCAQMD	Participate in the AB2588 inventory and reporting program at the District level.	The facility will comply with the SCAQMD AB2588 inventory and reporting program
SCAQMD Rule 1401	Toxics NSR	SCAQMD	Establishes risk and hazard index values. The facility is expected to comply with these values.	The HRA shows compliance with Rule 1401
SCAQMD Regulation X	NESHAPS	SCAQMD	Requires compliance with applicable NESHAPs.	N/A
CHSC 25249.5	Proposition 65	OEHHA	Comply with all signage and notification requirements.	See Hazardous Materials Section

Table 5.9-9. Summary of LORS – Public Health

LORS	Applicability	Primary Regulatory Agency	SERC Conformance	Conformance (Comments)
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to TACs	CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.	HRA indicates health risks are well below the significance levels

5.9.5.1 Permits Required and Schedule

Agency-required permits or plans related to public health include a hazardous materials management plan (HMMP), a risk management plan (RMP) and SCAQMD Permits to Construct/Permits to Operate. These requirements are discussed in detail in the Hazardous Materials Handling section and Section 5.1, Air Quality, respectively.

5.9.5.2 Agencies Involved and Agency Contacts

Table 5.9-10 provides contact information for agencies involved with Public Health.

Table 5.9-10. **Summary of Agency Contacts for Public Health**

Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Public exposure to air pollutants	EPA Region 9	Gerardo Rios Chief, Permits Section EPA Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974
	CARB	Mike Tollstrup 1001 1 Street, 19th Floor Sacramento, CA 95814 (916) 322-6026
	SCAQMD	Mohsen Nazemi, Dep. EO Permitting/Compliance 21865 E. Copley Dr. Diamond Bar, CA. 91765 (909) 396-2662
Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Cynthia Oshita or Susan Long P.O. Box 4010 Sacramento, CA 95812-4010 (916) 445-6900
Public exposure to acutely hazardous materials	Orange County EHD Hazardous Waste Division	Kevin Baitx, HWS-III 1241 E. Dyer Rd. #120 Santa Ana, CA. 92705 (714) 719-2441

Source: SERC Team, 2016.

5.9.6 References

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