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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 MREC. 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 5.9.5 contains references cited or consulted in preparing this section. Appendix 5.1D contains the HRA support data.

Mission Rock is proposing to construct and operate a 285 MW (nominal rated) simple-cycle power plant consisting of five GE LM6000 PG Sprint CTGs, an emergency fire pump system, and associated support equipment. A complete description of the MREC is presented in Section 2.0.

Air will be the dominant pathway for public exposure to chemical substances released by the MREC. 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 MREC will be located in Ventura County within the South Central Coast Air Basin. The MREC site is situated approximately 3 miles southwest of downtown Santa Paula, California, between Mission Rock Road and Shell Road The site lies south of SR-126 (Santa Paula Highway). The site lies approximately 2.5 miles northeast of the junction of SR-126 and SR-118. SPZ lies approximately 3 miles to the northeast, and the Ventura County Jail lies approximately 900 feet due west of the site.

The MREC site is situated in Ventura County census tract 0005.00, which has a population value of 1867 individuals per the 2010 census.

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	306264, 3799566	203
Residence-South	306144, 3795267	421
Residence-East	306531, 3798541	189

Table 5.9-1 Nearest Sensitive Receptors By Receptor Type

Receptor Type	UTM Coordinates (East/North), m	Elevation, (feet above mean sea level)
Residence-West	304929, 3797623	175
Residence-R1a*	306551, 3798554	189
Residence-R1b*	306529, 3798630	190
Residence-R2*	306325, 3798714	186
Worker	306257, 3798462	185
School	306381, 3800656	244
Hospital/Health Facility	297887, 3789325	61
Daycare Center	None Identified	-
Convalescent Home	295842, 3793169	165
Jail/Detention Center	305532, 3798464	189

Source: All coordinates from Google Earth (center location of each receptor location).

1 The nearest school is approximately 1.25 miles (6,600 feet) from the MREC site, therefore no VCAPCD Risk notifications are required.

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

*Residential locations identified in the noise survey added for completeness.

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 1990 through 2008, the average concentrations for the top 10 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 Central Coast Air Basin. CARB-estimated emissions inventory values for the top 10 TACs for 2008 are presented in Table 5.9-2. Data for years subsequent to 2008 are not available from CARB at this time. Mission Rock 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 MREC site.

Table 5.9-2 Top 10 TAC Emissions-2008

TAC	Statewide Emissions (tons/year)	South Central Coast Air Basin Emissions (tons/year)	VCAPCD Emissions (tons/year)
Acetaldehyde	9103	386	161
Benzene	10794	573	246
1,3 Butadiene	3754	186	68
Carbon tetrachloride	4.04	<0.01	0
Chromium 6	0.61	<0.03	<0.01
Para-Dichlorobenzene	1508	61	33
Formaldehyde	20951	917	380
Methylene Chloride	6436	307	157
Perchloroethylene	4982	168	71
Diesel PM	35884	927	436

Source: California Almanac of Emissions and Air Quality-2009, CARB-PTSD.

5.9.2 Environmental Analysis

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

5.9.2.1 Significance Criteria

Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). 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.

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 May 2015 (Carb, 2015).

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 MREC is expected to take approximately 23 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 MREC. 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).

5.9.2.3 Operational Phase Effects

Environmental consequences potentially associated with the operation of the MREC 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 MREC turbines, and IC engine are listed in Table 5.9-3.

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

Criteria Pollutants
PM
CO
SOx
NOx
VOC
Lead
Noncriteria Pollutants (Toxic Pollutants)
Ammonia
PAHs
Acetaldehyde
Acrolein
Benzene
1-3 Butadiene
Ethylbenzene
Formaldehyde
Hexane (n-Hexane)
Naphthalene
Propylene
Propylene Oxide
Toluene
Xylene
Diesel Particulate Matter

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/Device	Each Turbine	5 Turbines	Fire Pump
Ammonia	3.77	18.9	-
Total PAHs (BaP)	0.0000267	0.000134	-
Acetaldehyde	0.00452	0.0226	-
Acrolein	0.000721	0.0036	-
Benzene	0.00136	0.00679	-
1-3 Butadiene	0.0000487	0.000243	-
Ethylbenzene	0.00363	0.0181	-
Formaldehyde	0.201	1.0	-
Hexane	0.0287	0.144	-
Naphthalene	0.000147	0.00074	-
Propylene	0.0855	0.428	-
Propylene Oxide	0.00328	0.0164	-
Toluene	0.0147	0.0736	-
Xylene	0.00725	0.0362	-
Diesel PM	-	-	0.07

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

Pollutant/Device	Each Turbine	5 Turbines	Fire Pump
Ammonia	9430	47150	-
Total PAHs (BaP)	0.0662	0.331	-
Acetaldehyde	11.2	56	-
Acrolein	1.79	8.93	-
Benzene	3.37	16.8	-
1-3 Butadiene	0.121	0.603	-
Ethylbenzene	8.98	44.9	-
Formaldehyde	498	2490	-
Hexane	71.2	356	-
Naphthalene	0.365	1.83	-
Propylene	212	1060	-
Propylene Oxide	8.13	40.7	-
Toluene	36.5	183	-
Xylene	18	90	-
Diesel PM	-	-	3.78

Emissions of criteria pollutants will adhere to NAAQS and CAAQS as discussed in Section 5.1, Air Quality. The MREC also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under VCAPCD rules. Offsets will be required because the MREC will 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 MREC 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 MREC 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).

5.9.2.4 Public Health Effect Study Methods

Emissions of toxic pollutants potentially associated with the MREC were estimated using emission factors approved by CARB and EPA. Concentrations of these pollutants in air potentially associated with MREC emissions were estimated using the HARP dispersion modeling module. 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). The hypothetical MEI is an individual assumed to be located at the MIR location, where the highest concentrations of air pollutants associated with MREC 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 70-year period. Human health risks associated with emissions from the MREC 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 MREC. 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. 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, 2015), and are presented in Table 5.9-6.

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	-
Diesel Particulate	0.0003	5	-	-

Source: CARB/OEHHA, 2015.

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

5.9.2.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the MREC MIR location is estimated to be 5.24×10^{-6}. 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 VCAPCD. Because the project exceeds the one in a million risk significance level, Toxics BACT (T-BACT) will be applied through the use of a CO Catalyst which will control emissions of VOCs and gaseous hazardous air pollutants. Risks associated with pollutants potentially emitted from the MREC 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 MREC 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 MREC.

Table 5.9-7 Health Effects Significant Threshold Levels for VCAPCD

Risk Category	Risk Threshold
Significant Health Risk	>=10 x 10^{-6} HI >= 1

Per VCAPCD CEQA Guidelines, 2003.

VCAPCD, Engr. Division, Policies and Procedures, July 2002, Air Toxics Review of Permit Applications.

Risk values in excess of 1 x 10^{6} are deemed significant unless T-BACT is applied. If T-BACT is applied, then the significant risk is defined as >= 10 x 10^{6}. This project will incorporate T-BACT through the use of a CO Catalyst.

Table 5.9-8 MREC HRA Summary

	Turbines and Fire Pump	
Risk Category	**MREC MIR Values**	**Applicable Significance Threshold**
Cancer Risk	5.24^{-06}	See values in Table 5.9-7.
Chronic Hazard Index	0.00102	
Acute Hazard Index	0.00179	
Cancer Burden	<0.001867	

Source: MREC Team, 2015.

Notes:

1 MIR effect area lies within Tract 0005.00. MIR receptor lies at the MREC fence line.

MIR receptor is #27, 306273.8, 3798390.

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 lifetime (70 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 x 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 x 10^{-6}, 1 x 10^{-5}, and/or 1 x 10^{-4} isopleth is another potential measure of population burden. The approach used herein is based on this method using the 1 x 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 MREC.

As described previously, human health risks associated with emissions from the MREC 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 5.24 x 10^{-6}. The estimated cancer burden was <0.001867, indicating that emissions from the MREC would not be associated with any increase in cancer cases in the previously defined population. In addition, the cancer burden is less than the VCAPCD significant threshold values. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that MREC 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 MREC 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 MREC.

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} (4 in 10 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 risks to the maximally exposed individual located at the MREC MIR are well below the 10×10^{-6} significance level. In addition, the cancer burden 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 MREC emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstates the risks from MREC 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 MREC.

5.9.2.6 Hazardous Materials

Hazardous materials may be used and stored at the MREC 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 MREC 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 MREC are discussed in the Hazardous Materials Handling section.

The proposed new turbines' SCR systems will use an on-site 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 MREC 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 MREC 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 MREC 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 cooling tower, including the two new cooling tower cells associated with the MREC. These programs would ensure that proper levels of biocide and other agents are maintained within cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup.

The MREC will <u>not</u> have any wet cooling towers, wet surface air condensers, or dry cooling towers. Therefore Legionella is not an issue of concern and no mitigations are required at this time.

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 MREC. 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 MREC indicates that the maximum cancer risk will be approximately 5.24 x 10^{-6} at the point of maximum exposure to air toxics from power facility emissions. The MREC risk level is well below the VCAPCD "significant health risk" thresholds. Non-cancer chronic and acute effects, i.e. hazard index values, are also well below the VCAPCD significance thresholds, as is the estimated cancer burden rate.

An analysis of the cumulative impacts of the MREC, per CEC practice based on modeling studies conducted by staff, is typically only required if the proposed facility is generally within 0.5 miles of another existing large toxics emissions source. No such sources were identified within the default distance of 0.5 miles. In addition, the cancer risks and non-cancer health impacts estimated for the MREC using conservative assumptions are below significance with minimal predicted impacts to offsite receptors.

In 1998, the OEHHA listed DPM, a primary combustion product from diesel engines, as a TAC, based on its potential to cause cancer, premature deaths, and other health problems. According to CARB and EPA, mobile source emissions account for much of the sources of cancer risk associated with TAC. According to EPA estimates, mobile sources (e.g., cars, trucks, and buses) of TAC account for as much as half of all cancers attributed to outdoor sources of TAC. More recent research illustrates that health risks from DPM are highest in areas of concentrated emissions, such as near ports, rail yards, freeways, or warehouse distribution centers. Additionally, the MATES-III (2008) study conducted by the SCAQMD showed that mobile sources in the South Coast Air Basin represent the greatest contributors to the estimated cancer risks (about 84 percent). This conclusion is most likely true for the counties in the South Central Coast Air Basin (including the VCAPCD).

Standards have been adopted by CARB and EPA to reduce DPM emissions from new on-road heavy-duty vehicles. EPA estimates that, when fully implemented, the program is predicted to result in particulate emission levels and the corresponding health impacts that are approximately 95 percent below baseline levels. In addition, ongoing federal and state diesel motor vehicle emission reduction programs are in place and will continue to significantly reduce DPM emissions. These programs indicate that the MREC's potential health impact will not be cumulatively significant.

5.9.4 Mitigation Measures

5.9.4.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying BACT to the MREC. BACT for the turbines, and fire pump engine, is delineated in Appendix 5.1F.

The MREC location is in an area that is designated by the federal air agencies as non-attainment for ozone and unclassified-attainment for particulate matter. Pursuant to the VCAPCD NSR Rule, offsets are required for the MREC. 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 MREC, (i.e., the use of clean fuels, and an oxidation catalyst on the individual turbines for the control of VOCs and gaseous toxic constituents).

Legionella Mitigation Measure

Since the MREC is not proposing the use of wet cooling towers, there is no need at this time for the development of a Legionella mitigation plan.

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 MREC 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 MREC will be prepared prior to commencement of MREC operations. The RMP will estimate the risk presented by handling affected materials at the MREC 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 MREC 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 MREC are identified in Table 5.9-9. The conformity of the MREC to each of the LORS applicable to public health is also presented in this table, as well as references to the selection locations within this report where each of these issues is addressed. 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	MREC Conformance	Conformance (AFC Section)
CAA Title III	Public exposure to air pollutants	EPA Region 9 CARB VCAPCD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. Emissions of criteria pollutants will be minimized by applying BACT to the MREC.	5.9.1.5, and Appendix 5.1D
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.	5.9.1.5, 5.9.1.6, 5.9.3.3, and Appendix 5.1D
40 CFR Part 68 (RMP) and CalARP Program Title 19	Public exposure to acutely hazardous materials	EPA Region 9 Riverside County Department of Health Services Riverside 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 MREC operations.	5.9.1.6, and Appendix5.1D
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	Riverside County Department of Health Services CARB VCAPCD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank.	5.9.1.6, and Appendix 5.1D
CHSC 25500-25542	Hazmat Inventory	State Office of Emergency Services and Riverside 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	VCAPCD	Participate in the AB2588 inventory and reporting program at the District level.	Appendix 5.1A, Appendix 5.1D, initial reporting TBD by VCAPCD
VCAPCD CEQA Guidelines, 2003	Toxics NSR	VCAPCD	Establishes risk and hazard index values. The facility is expected to comply with these values.	Section 5.1, Section 5.9, Appendix 5.1D
VCAPCD Rule 73	NESHAPS	VCAPCD	Requires compliance with applicable NESHAPs.	Section 5.1 and 5.9
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	MREC Conformance	Conformance (AFC Section)
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to TACs	CARB VCAPCD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.	5.9.1, Appendix 5.1D

5.9.5.1 Permits Required and Schedule

Agency-required permits related to public health include an RMP and VCAPCD Permit to Construct/Permit 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
	VCAPCD	Kerby Zozula Manager, Eng. Division VCAPCD 669 County Square Dr. Ventura, CA. 93003 (805) 645-1421
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

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

Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Public exposure to acutely hazardous materials	EPA Region 9	Gerardo Rios Chief, Permits Section EPA Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974
	Ventura County EHD-CUPA Hazmat Division	David Wadsworth 800 S. Victoria Ave. Ventura, CA. 93009 (805)654-3523

Source: MREC Team, 2015.

5.9.6 References

California Air Resources Board. (CARB). 2015. Consolidated table of OEHHA/ARB approved risk assessment health values. http://arbis.arb.ca.gov/toxics/healthval/contable.pdf

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

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