3.2 AIR QUALITY

An Air Quality Technical Report was prepared for the Proposed Project. This report is summarized below and is included in Appendix B. Impacts related to global climate change and greenhouse gas emissions are discussed in Section 3.6.

3.2.1 Environmental Setting

3.2.1.1 Regulatory Requirements

Air quality is defined by ambient air concentrations of specific pollutants identified by the United States Environmental Protection Agency (USEPA) to be of concern with respect to health and welfare of the general public. The USEPA is responsible for enforcing the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. The CAA required the USEPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the USEPA established both primary and secondary standards for several pollutants (called "criteria" pollutants). Primary standards are designed to protect human health with an adequate margin of safety. Secondary standards are designed to protect property and the public welfare from air pollutants in the atmosphere.

States that are designated nonattainment for the NAAQS are required to develop a State Implementation Plan (SIP), which outlines federally-enforceable rules, regulations, and programs designed to reduce emissions and bring the area into attainment of the NAAQS. In California, the California Air Resources Board (ARB) is the agency responsible for developing the SIP. The responsibility for developing plans and programs for each air basin has been delegated to the local agency responsible for attaining and maintaining air quality standards in that air basin.

The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. The ARB has established the more stringent California Ambient Air Quality Standards (CAAQS) for the six criteria pollutants through the California Clean Air Act of 1988, and also has established CAAQS for additional pollutants, including sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particles. Areas that do not meet the NAAQS or the CAAQS for a particular pollutant are considered to be "nonattainment areas" for that pollutant.

The ARB is the state regulatory agency with authority to enforce regulations to both achieve and maintain the NAAQS and CAAQS. The ARB is responsible for the development, adoption, and enforcement of the state's motor vehicle emissions program, as well as the adoption of the CAAQS. The ARB also reviews operations and programs of the local air districts, and requires each air district with jurisdiction over a nonattainment area to develop its own strategy for achieving the NAAQS and CAAQS. The local air district has the primary responsibility for the development and implementation of rules and regulations designed to attain the NAAQS and CAAQS, as

well as the permitting of new or modified sources, development of air quality management plans, and adoption and enforcement of air pollution regulations.

It is the responsibility of the Eastern Kern Air Pollution Control District (EKAPCD) to ensure that state and federal ambient air quality standards are achieved and maintained in the portion of the Mojave Desert Air Basin (MDAB) under its jurisdiction, which includes the IWVWD. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone (O_3), CO, NO_2, particulate matter with a diameter of 10 microns or less (PM_{10}), particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). These standards were established to protect sensitive receptors from adverse health impacts due to exposure to air pollution. The California Ambient Air Quality Standards (CAAQS) are more stringent than the federal standards. California has also established standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride. Hydrogen sulfide and vinyl chloride are currently not monitored in the MDAB because these contaminants are not seen as a significant air quality problem. CAAQS and National Ambient Air Quality Standards (NAAQS) for each of these pollutants are shown in Table 3.2-1. The Indian Wells Valley is currently considered an unclassifiable/attainment area for the NAAQS for O_3, $PM_{2.5}$, CO, NO_2, SO_2, and lead. The Indian Wells Valley is considered a maintenance area for the NAAQS for PM_{10}. The Indian Wells Valley is also considered a nonattainment area for the CAAQS for O_3 and PM_{10}. A brief description of the criteria pollutants follows.

Ozone. Ozone is considered a photochemical oxidant, which is a chemical that is formed when reactive organic compounds (ROC) and nitrogen oxides, both byproducts of combustion, react in the presence of ultraviolet light. Ozone is present in relatively high concentrations in the Basin. Ozone is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma, and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to ozone.

Carbon monoxide. Carbon monoxide is a product of combustion, and the main source of carbon monoxide in the Basin is from motor vehicle exhaust. CO is an odorless, colorless gas. CO affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. CO can cause health effects to those with cardiovascular disease, and can also affect mental alertness and vision.

Nitrogen dioxide. NO_2 is also a by-product of fuel combustion, and is formed both directly as a product of combustion and in the atmosphere through the reaction of NO with oxygen. NO_2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. NO_2 can also increase the risk of respiratory illness.

Fine particulate matter. Fine particulate matter, or PM_{10}, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Particulate matter in this size range has been determined to have the potential to lodge in the lungs and contribute to respiratory problems. PM_{10} arises from a variety of sources, including road dust, diesel exhaust, combustion, tire and break wear, construction operations, and windblown dust.

Table 3.2-1
Ambient Air Quality Standards

Pollutant	Average Time	California Standards		National Standards		
		Concentration	Measurement Method	Primary	Secondary	Measurement Method
Ozone (O_3)	1 hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	--	--	Ethylene Chemiluminescence
	8 hour	0.070 ppm (137 $\mu g/m^3$)		0.075 ppm (147 $\mu g/m^3$)	0.075 ppm (147 $\mu g/m^3$)	
Carbon Monoxide (CO)	8 hours	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Spectroscopy (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Spectroscopy (NDIR)
	1 hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Average	0.030 ppm (56 $\mu g/m^3$)	Gas Phase Chemiluminescence	0.053 ppm (100 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)	Gas Phase Chemiluminescence
	1 hour	0.18 ppm (338 $\mu g/m^3$)		0.100 ppm (188 $\mu g/m^3$)	--	
Sulfur Dioxide (SO_2)	24 hours	0.04 ppm (105 $\mu g/m^3$)	Ultraviolet Fluorescence	--	--	Pararosaniline
	3 hours	--		--	0.5 ppm (1300 $\mu g/m^3$)	
	1 hour	0.25 ppm (655 $\mu g/m^3$)		0.075 ppm (196 $\mu g/m^3$)	--	
Respirable Particulate Matter (PM_{10})	24 hours	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	150 $\mu g/m^3$	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		--	--	
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	15 $\mu g/m^3$	--	Inertial Separation and Gravimetric Analysis
	24 hours	--		35 $\mu g/m^3$	--	
Lead (Pb)	30-day Average	1.5 $\mu g/m^3$	Atomic Absorption	--	--	Atomic Absorption
	Calendar Quarter	--		1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	
	3-month Rolling Average	--		0.15 $\mu g/m^3$	0.15 $\mu g/m^3$	

ppm= parts per million
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3= milligrams per cubic meter
Source: California Air Resources Board, www.arb.ca.gov.

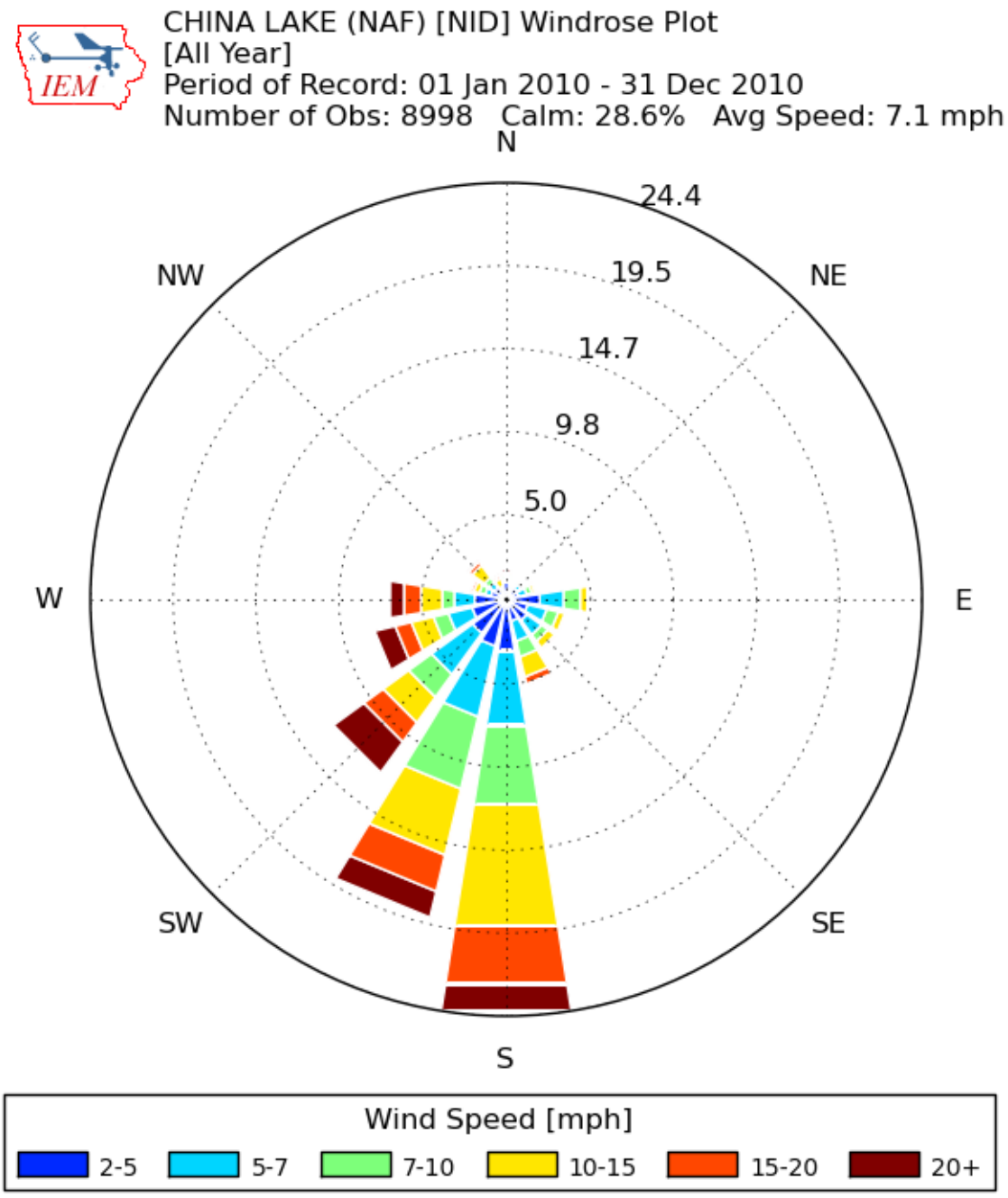

Figure 3.2-1 Wind Rose, NAWS China Lake

PM_{10} can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. In 1997, the U.S. EPA proposed a new standard for $PM_{2.5}$, which is particulate matter with an aerodynamic diameter of 2.5 microns or less. These finer particulates are considered to have the potential to lodge deeper in the lungs.

Sulfur dioxide. SO_2 is a colorless, reactive gas that is produced from the burning of sulfur containing fuels such as coal and oil, and by other industrial processes. Generally, the highest concentrations of SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

Lead. Lead in the atmosphere occurs as particulate matter. Lead has historically been emitted from vehicles combusting leaded gasoline, as well as from industrial sources. With the phase out of leaded gasoline, large manufacturing facilities are the sources of the largest amounts of lead emissions. Lead has the potential to cause gastrointestinal, central nervous system, kidney, and blood diseases upon prolonged exposure. Lead is also classified as a probable human carcinogen.

3.2.1.2 Regional Climate

Annual average temperatures in the Proposed Project area, as measured at Inyokern, range from an average minimum temperature of 47.2 degrees Fahrenheit to an average maximum temperature of 80.5°F. December is the coldest month, with average minimum temperatures of 30.2°F. July is the hottest month in the area, with average maximum temperatures reaching 102.7°F. The average annual precipitation in the area is 4.17 inches, with the majority of the precipitation occurring in the winter months. Occasional heavy rains occur in the summer months. The climate of the area is characterized as high desert. The nearest meteorological monitoring station for which a wind rose is available is located at NAWS China Lake. Figure 3.2-1 presents a wind rose for the China Lake station showing the prevailing wind directions in the project vicinity.

3.2.1.3 Existing Air Quality

The closest ambient air quality monitoring station to the Proposed Project is the Ridgecrest monitoring station, which measures PM_{10} and $PM_{2.5}$. The nearest monitoring station to the project site that measures O_3 is located in Mojave. CO, NO_2, and SO_2 are not measured in the immediate vicinity of the Proposed Project site, and are not considered to be pollutants of concern in the area. Ambient concentrations of criteria pollutants measured at these monitoring stations during the period 2008 to 2010 are presented in Table 3.2-2. Ambient air concentrations were compared with the CAAQS and NAAQS.

Table 3.2-2
Background Air Quality Data (2008-2010)[1]

Pollutant	Averaging Time	2008	2009	2010	NAAQS	CAAQS	Monitoring Station
Ozone	8 hour	0.102	0.084	0.083	0.075	0.070	Mojave
	1 hour	0.112	0.101	0.092	-	0.08	Mojave
PM_{10}[2]	Annual Arithmetic Mean	23.9	23.9	20.4	-	20 µg/m^3	Ridgecrest
	24 hour	57.0	46.3	52.6	150 µg/m^3	50 µg/m^3	Ridgecrest
$PM_{2.5}$	Annual Arithmetic Mean	7.0	5.7	5.0	15 µg/m^3	12 µg/m^3	Ridgecrest
	24 hour	26.8	14.2	19.5	35 µg/m^3	-	Ridgecrest

[1] parts per million unless otherwise indicated
[2] California averages reported for PM_{10}
Source: www.arb.ca.gov (all pollutants except 1-hour CO and 1-hour and 3-hour SO_2)
www.epa.gov/air/data/monvals.html (1-hour CO and 1-hour and 3-hour SO_2)

Exceedances of the state and federal O_3 standards have been recorded at the Mojave monitoring station; that portion of eastern Kern County has been designated a nonattainment area for the NAAQS by the US EPA. It is likely that O_3 concentrations are lower in the Proposed Project area. Exceedances of the state PM_{10} standards have been recorded at the Ridgecrest monitoring station within the past three years.

3.2.1.4 Toxic Air Contaminants

Cancer Risk. One of the primary health risks of concern due to exposure to toxic air contaminants (TACs) is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because it is currently believed by many scientists that there is no "safe" level of exposure to carcinogens, that is, any exposure to a carcinogen poses some risk of causing cancer. Health statistics show that one in four people will contract cancer over their lifetime, or 250,000 in a million, from all causes, including diet, genetic factors, and lifestyle choices.

Noncancer Health Risks. Unlike carcinogens, for most noncarcinogens it is believed that there is a threshold level of exposure to the compound below which it will not pose a health risk. The California Environmental Protection Agency (CalEPA) and California Office of Environmental Health Hazard Assessment (OEHHA) have developed reference exposure levels (RELs) for noncarcinogenic TACs that are health-conservative estimates of the levels of exposure at or below which health effects are not expected. The noncancer health risk due to exposure to a TAC is assessed by comparing the estimated level of exposure to the REL. The comparison is expressed as the ratio of the estimated exposure level to the REL, called the hazard index (HI).

3.2.2 Thresholds of Significance

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the State CEQA Guidelines. These thresholds have been adopted by the EKAPCD in their CEQA Guidelines (Kern County Air Pollution Control District (KCAPCD) 1996). According to the CEQA Guidelines, a proposed project would not have a significant impact on air quality if operation of the proposed project would:

1. Emit less than offsets trigger levels set forth in Subsection III.B.3 of EKAPCD's Rule 210.1 (New and Modified Source Review Rule).

2. Emit less than 137 pounds per day of NOx or ROG from motor vehicle trips (indirect sources only).

3. Not cause or contribute to an exceedance of any California or National Ambient Air Quality Standard.

4. Not exceed the District health risk public notification thresholds adopted by the KCAPCD Board.

5. Be consistent with adopted federal and state Air Quality Attainment Plan.

These thresholds have been adopted in EKAPCD Rule 208.2. The EKAPCD has adopted guidelines for CEQA (KCAPCD 1996) that provide guidance on significance of air quality impacts. Quantitative thresholds based on offset thresholds within EKAPCD Rule 210.1, Section III.B.3, are proposed in the guidelines to evaluate potential significance of impacts. These quantitative thresholds are as follows:

- PM_{10} – 15 tons per year
- SO_x – 27 tons per year
- VOCs – 25 tons per year
- NOx – 25 tons per year

The EKAPCD has also adopted a threshold of 137 lbs per day of NOx or ROG from motor vehicle trips as a significance thresholds. In addition, the EKAPCD has published *Suggested Air Pollutant Mitigation Measures for Construction Sites for Kern County APCD* (KCAPCD 2007) that provide mitigation measures to reduce emissions of fugitive dust.

The EKAPCD's most recently adopted air quality management plan is its Ozone Air Quality Attainment Plan (AQAP)(KCAPCD 1992). The most recent Implementation Progress Report on the Plan was prepared by the EKAPCD in 2005 (KCAPCD 2005). That document demonstrated that EKAPCD has adopted all control measures identified in the AQAP into its Rules and Regulations, and is demonstrating further progress toward attainment of the ambient air quality standards.

The EKAPCD has also adopted fugitive dust control requirements in its Rule 402. As required by Senate Bill 656, the EKAPCD is currently reviewing the State's list of most readily available, feasible, and cost-effective fugitive dust control measures designed to

reduce PM exposure. To date the EKAPCD has not adopted additional fugitive dust control rules, but will adopt measures into its Rules and Regulations as appropriate.

The most recent EPA-approved SIP for the EKAPCD is the 1994 SIP, which was approved by EPA in 1997.

The Proposed Project's impacts were evaluated relative to these significance criteria.

3.2.3 Environmental Impacts

The Proposed Project would result in air emissions from both the construction phase due to use of heavy equipment and fugitive dust emissions, and the operational phase due to routine inspection and maintenance activities. The following sections address impacts from both construction and operations.

3.2.3.1 Exceed Emissions Thresholds or Cause a Violation of an Air Quality Standard

To address these significance thresholds under CEQA, an evaluation of the project's emissions during construction and operations was conducted, and the emissions were evaluated based on applicable significance thresholds. Because the EKAPCD has not adopted daily significance thresholds, thresholds proposed by the MDAQMD for the MDAB were used to assess the potential for significant air quality impacts for a maximum daily construction scenario. Annual impacts were evaluated based on the EKAPCD's thresholds.

Construction Impacts. Emissions of criteria pollutants associated with the construction phase of the Proposed Project include the following: fugitive dust generation from site preparation activities, emissions from equipment used to refit Wells 18 and 34 with new pumping units and related power/control equipment to increase capacity, and with well drilling activities at Well 35. Retrofitting activities and well construction would require the use of heavy construction equipment to drill the well and to install pumping units. In addition, installation of a 12- to 16-inch pipeline of up to 400 feet would be required to connect Well 35 to the existing pipeline in Bowman Road. Installation of the pipeline would involve trenching of an approximately 6-foot-deep trench, followed by pipeline installation and backfilling and compacting of the road.

The proposed well site would be cleared of vegetation and graded to prepare it for construction of the well. A fence would be erected around the perimeter of the well site, and construction equipment would be staged within the fenced area. Well drilling would take approximately three to four months. Pumping units, motors, controls, and electric switchgear would be installed following well drilling operations. Following construction of the well, the well would be tested using a temporary diesel-driven pump for approximately one week.

The new well would require chlorination facilities (dosing pump and sodium hypochlorite storage tank with secondary containment) and such additional treatment facilities that may be indicated by water quality testing performed at the time of drilling. In addition,

an approximate one-half to one acre discharge pond would be constructed immediately adjacent to the well.

Emission estimates are based on the CalEEMod Model (SRA 2011). CalEEMod outputs are provided in the air quality technical report (SRA 2011, Appendix B). The estimated construction emissions are shown in Table 3.2-3.

Table 3.2-3
Estimated Construction Emissions IWVWD
Water Supply Improvement Project

Emission Source	ROG	NO_x	CO	SOx	PM_{10}	$PM_{2.5}$
Pounds per Day						
Site Preparation/Discharge Pond						
Fugitive Dust	-	-	-	-	2.06	1.13
Off-Road Equipment	5.19	42.85	22.05	0.04	2.05	2.05
Worker Vehicles	0.12	0.15	1.55	0.00	0.21	0.01
Total	**5.31**	**43.00**	**23.60**	**0.04**	**4.32**	**3.19**
Significance Threshold	137	137	548	137	82	82
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Well Drilling						
Off-Road Equipment	1.76	15.47	13.98	0.02	1.08	1.08
Worker Vehicles	0.06	0.08	0.77	0.00	0.10	0.00
Total	**1.82**	**15.55**	**14.75**	**0.02**	**1.18**	**1.08**
Significance Threshold	137	137	548	137	82	82
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Ancillary Equipment Installation						
Off-Road Equipment	5.47	27.99	18.54	0.03	2.06	2.06
Vendor Trips	0.07	0.72	0.47	0.00	0.06	0.02
Worker Vehicles	0.23	0.31	3.09	0.00	0.42	0.04
Total	**5.77**	**29.02**	**22.10**	**0.03**	**2.54**	**2.12**
Significance Threshold	137	137	548	137	82	82
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Chlorination Facilities Installation						
Off-Road Equipment	5.47	27.99	18.54	0.03	2.06	2.06
Vendor Trips	0.07	0.72	0.47	0.00	0.06	0.02
Worker Vehicles	0.23	0.31	3.09	0.00	0.42	0.04
Total	**5.77**	**29.02**	**22.10**	**0.03**	**2.54**	**2.12**
Significance Threshold	137	137	548	137	82	82
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Well Testing						
Off-Road Equipment	1.40	9.35	6.06	0.01	0.76	0.76
Worker Vehicles	0.07	0.09	0.93	0.00	0.13	0.00
Total	**1.47**	**9.44**	**6.99**	**0.01**	**0.89**	**0.76**
Significance Threshold	137	137	548	137	82	82
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*

Emission Source	ROG	NO_x	CO	SOx	PM_{10}	$PM_{2.5}$
Pipeline Installation						
Off-Road Equipment	3.91	25.48	16.73	0.03	2.05	2.05
Vendor Trips	0.04	0.36	0.23	0.00	0.03	0.01
Worker Vehicles	0.15	0.20	2.01	0.00	0.27	0.01
Total	**4.10**	**26.04**	**18.97**	**0.03**	**2.35**	**2.07**
Significance Threshold	137	137	548	137	82	82
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Maximum Simultaneous Daily Construction, Lbs/day						
Total	**15.64**	**84.06**	**63.38**	**0.10**	**7.43**	**6.28**
Significance Threshold	137	137	548	137	82	82
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Total Construction Tons/year						
Total	**0.53**	**3.22**	**2.44**	**0.00**	**0.28**	**0.23**
Significance Threshold	25	25	NA	27	15	15
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*

As shown in Table 3.2-3, emissions associated with construction would be below the significance thresholds and impacts would therefore be less than significant. Project construction would be subject to EKAPCD Rule 402, which requires minimization of fugitive dust emissions through dust control measures during construction. These measures would include application of water or other dust suppressants during construction activities and removal of track-out from paved areas. These measures constitute best management practices for dust control.

Operational Impacts. Operational impacts associated with the Proposed Project include inspection and maintenance activities, which would mainly involve worker vehicle emissions. Minor emissions may be associated with indirect emissions associated with energy use for the electric pumps and maintenance.

Operational emissions would be lower than the construction emissions on both a maximum daily and annual basis, and therefore would be less than significant.

3.2.3.2 Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

According to the EKAPCD's CEQA guidelines, a project's impacts would be significant if its emissions result in exposure of sensitive receptors to emissions exceeding public notification thresholds adopted by the EKAPCD Board. These thresholds include a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1. Risks would be associated with emissions of toxic air contaminants (TACs), such as diesel particulate matter and other substances.

Diesel particulate matter would be emitted during construction. However, because health effects from diesel particulate matter are based on long-term exposure, and construction activities would be short-term and temporary, no significant exposure of

sensitive receptors is anticipated. Furthermore, the nearest sensitive receptor is located approximately 3,500 feet from the Well 35 site.

TACs are emitted in trace amounts from vehicles. Inspection and maintenance activities would not result in significant emissions of TACs, and therefore the project would not expose sensitive receptors to substantial pollutant concentrations. This impact is less than significant.

3.2.3.3 Consistency with Air Quality Management Plan

The applicable Air Quality Management Plan for the Indian Wells Valley is the Ozone Air Quality Attainment Plan (KCAPCD 1992). The most recent Implementation Progress Report on the Plan was prepared by the EKAPCD in 2005 (KCAPCD 2005). That document demonstrated that EKAPCD has adopted all control measures identified in the AQAP into its Rules and Regulations, and is demonstrating further progress toward attainment of the ambient air quality standards. The Proposed Project would comply with applicable rules, and would not conflict with or obstruct implementation of the attainment plan. This impact would be less than significant.

3.2.3.4 Conclusions

Air quality impacts associated with the Proposed Project were evaluated to assess whether the Proposed Project would result in a significant impact on air quality. The main impact is associated with construction activities. Construction criteria pollutants were calculated. Based on the evaluation of criteria pollutants, the project would:

1. Emit less than offsets trigger levels set forth in Subsection III.B.3 of EKAPCD's Rule 210.1 (New and Modified Source Review Rule).

2. Emit less than 137 pounds per day of NOx or ROG from motor vehicle trips (indirect sources only).

3. Not cause or contribute to an exceedance of any California or National Ambient Air Quality Standard.

4. Not exceed the health risk public notification thresholds adopted by the KCAPCD Board.

5. Be consistent with adopted federal and state Air Quality Attainment Plan.

Impacts are therefore less than significant.

3.2.4 Mitigation Measures

No mitigation measures are required.

3.2.5 Residual Impacts After Mitigation

The Proposed Project would not result in residual impacts.

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