4.2 AIR QUALITY

4.2.1 Introduction and Methodology

The primary focus of this section is to outline existing air quality conditions, plans and guidelines regulating the quality of air and how the proposed project may impact existing and future air quality conditions within northern San Diego County.

This section was written with the aid of the April 2005 Air Quality Impact Analysis prepared for the project by Scientific Resources Associated. This report is contained in APPENDIX D to this EIR. Methods used to generate specific impact calculations are contained in the technical report.

4.2.2 Existing Conditions

Climate and Meteorology

The climate of San Diego County is dominated by a semi-permanent high-pressure cell located over the Pacific Ocean. This cell influences the direction of prevailing winds (westerly to northwesterly) and maintains clear skies for much of the year. The high-pressure cell also creates two types of temperature inversions that may act to degrade local air quality.

Subsidence inversions occur during the warmer months as descending air associated with the Pacific high pressure cell comes into contact with cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. The other type of inversion, a radiation inversion, develops on winter nights when air near the ground cools by heat radiation and air aloft remains warm. The shallow inversion layer formed between these two air masses also can trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce ozone, commonly known as smog.

Ambient Air Quality Standards

Air quality at any location is dependent on the regional air quality and local pollutant sources. Regional air quality is primarily a function of Air Basin topography and wind patterns.

Air quality is defined by ambient air concentrations of specific pollutants identified by the United States Environmental Protection Agency (EPA) to be of concern with respect to health and welfare of the general public. The EPA is responsible for enforcing the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. The CAA required the EPA 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 EPA established both primary and secondary standards for several pollutants (called "criteria" pollutants), including O_3, CO, NO_2, particulate matter with a diameter of 10 microns or less (PM_{10}), $PM_{2.5}$, sulfur dioxide (SO_2), and lead (Pb). 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.

The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. The California Air Resources Board (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. Hydrogen sulfide and vinyl chloride are currently not monitored in the Basin because these contaminants are not seen as posing a significant air quality problem.

CAAQS and NAAQS for O_3, CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, Pb, sulfates, hydrogen sulfide, and vinyl chloride are shown in *Table 4.2-1*. A brief description of each of the criteria pollutants and their potential health effects 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 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 San Diego Air Basin (SDAB) 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.

TABLE 4.2-1
AMBIENT AIR QUALITY STANDARDS

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	0.12 ppm (235 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$)	Ethylene Chemiluminescence
	8 hour	--		0.08 ppm (157 $\mu g/m^3$)	0.08 ppm (157 $\mu g/m^3$)	
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	--	Gas Phase Chemiluminescence	0.053 ppm (100 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)	Gas Phase Chemiluminescence
	1 hour	0.25 ppm (470 $\mu g/m^3$)		--	--	
Sulfur Dioxide (SO_2)	Annual Average	--	Ultraviolet Fluorescence	0.03 ppm (80 $\mu g/m^3$)	--	Pararosaniline
	24 hours	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (365 $\mu g/m^3$)	--	
	3 hours	--		--	0.5 ppm (1300 $\mu g/m^3$)	
	1 hour	0.25 ppm (655 $\mu g/m^3$)		--	--	
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 ArithmeticMean	20 $\mu g/m^3$		50 $\mu g/m^3$	50 $\mu g/m^3$	
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	--		65 $\mu g/m^3$	--	
Sulfates	24 hours	25 $\mu g/m^3$	Ion Chromatography	--	--	--
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 $\mu g/m^3$	
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence	--	--	--
Vinyl Chloride	24 hours	0.010 ppm (26 $\mu g/m^3$)	Gas Chromatography	--	--	--

Ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
Source: California Air Resources Board July 2003

Fine Particulate Matter. Particulate matter, or PM_{10}, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Fine particulate matter, or $PM_{2.5}$, refers to particulate matter with an aerodynamic diameter of 2.5 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} and $PM_{2.5}$ arise from a variety of sources, including road dust, diesel exhaust, combustion, tire and break wear, construction operations, and windblown dust. PM_{10} and $PM_{2.5}$ can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. Fine particulate matter ($PM_{2.5}$) is 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.

Sulfates. Sulfates are the fully oxidized ionic form of sulfur. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features. The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide. H_2S is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard will result in exposure to a very disagreeable odor. In

1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

Vinyl Chloride. Vinyl chloride, a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans.

Areas that do not meet the NAAQS or the CAAQS for a particular pollutant are considered to be "non-attainment areas" for that pollutant. The SDAB is an attainment area for the NAAQS for all criteria pollutants except for O_3 measured over an 8-hour period. The SDAB is currently classified as a non-attainment area under the CAAQS for O_3 and PM_{10}.

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 non-attainment 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. The San Diego County Air Pollution Control District (SDAPCD) is the local agency responsible for the administration and enforcement of air quality regulations for San Diego County.

Existing Air Quality

The APCD operates a network of ambient air monitoring stations throughout San Diego County. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The nearest ambient monitoring stations to the project site are the Oceanside Mission Avenue monitoring station, which measured O_3 and NO_2 until 2001; the Camp Pendleton Monitoring Station, which measures O_3 and NO_2; the Escondido Monitoring Station, which measures O_3, NO_2, PM_{10}, $PM_{2.5}$, and CO; and the San Diego 12th Avenue station (which is the closest station that measures SO_2).

Because they are located in more developed areas that are likely to experience higher levels of traffic congestion and emission sources than the project site, data from the Escondido and San Diego 12th Avenue monitoring stations are likely to exhibit higher ambient concentrations than the project area. Ambient concentrations of pollutants over the last three years are presented in *Table 4.2-2*.

Table 4.2-2. Ambient Air Quality Levels Measured at Local Monitoring Stations

Pollutant	State Standards	Federal Standards		Year	Concentration	Monitoring Station
		Primary	Secondary			
Ozone (O_3)	0.09 ppm 1-hour	0.12 ppm 1-hour	0.12 ppm 1-hour	2001 2002 2003	0.10 ppm 0.08 ppm 0.09 ppm	Oceanside Camp Pendleton Camp Pendleton
	--- 8-hour	0.08 ppm 8-hour	0.08 ppm 8-hour	2001 2002 2003	0.09 ppm 0.07 ppm 0.08 ppm	Oceanside Camp Pendleton Camp Pendleton
Carbon Monoxide (CO)	20 ppm 1-hour	35 ppm 1-hour	--- 8-hour	2001 2002 2003	8.5 ppm 8.5 ppm 8.9 ppm	Escondido Escondido Escondido
	9 ppm 8-hour	9 ppm 8-hour	--- 8-hour	2001 2002 2003	5.11 ppm 3.9 ppm 10.64 ppm	Escondido Escondido Escondido
Nitrogen Dioxide (NO_2)	470 $\mu g/m^3$ 1-hour	--- 1-hour	--- 1-hour	2001 2002 2003	180 $\mu g/m^3$ 205 $\mu g/m^3$ 178 $\mu g/m^3$	Oceanside Camp Pendleton Camp Pendleton
	--- annual average	100 $\mu g/m^3$ annual average	100 $\mu g/m^3$ annual average	2001 2002 2003	30 $\mu g/m^3$ 24 $\mu g/m^3$ 23 $\mu g/m^3$	Oceanside Camp Pendleton Camp Pendleton
Sulfur Dioxide (SO_2)	655 $\mu g/m^3$ 1-hour	--- 1-hour	--- 1-hour	2001 2002 2003	136 $\mu g/m^3$ 73 $\mu g/m^3$ 94 $\mu g/m^3$	San Diego San Diego San Diego
	--- 3-hour	--- 3-hour	1,300 $\mu g/m^3$ 3-hour	2001 2002 2003	94 $\mu g/m^3$ 39 $\mu g/m^3$ 50 $\mu g/m^3$	San Diego San Diego San Diego
	105 $\mu g/m^3$ 24-hour	365$\mu g/m^3$ 24-hour	--- 24-hour	2001 2002 2003	31 $\mu g/m^3$ 18 $\mu g/m^3$ 21 $\mu g/m^3$	San Diego San Diego San Diego
	--- annual average	80$\mu g/m^3$ annual average	--- annual average	2001 2002 2003	7.8 $\mu g/m^3$ 7.8 $\mu g/m^3$ 10.4 $\mu g/m^3$	San Diego San Diego San Diego
Respirable Particulate Matter (PM_{10})	50 $\mu g/m^3$ 24-hour	150 $\mu g/m^3$ 24-hour	150 $\mu g/m^3$ 24-hour	2001 2002 2003	72 $\mu g/m^3$ 50 $\mu g/m^3$ 179 $\mu g/m^3$	Escondido Escondido Escondido
	20$\mu g/m^3$ annual average	50$\mu g/m^3$ annual average	50$\mu g/m^3$ annual average	2001 2002 2003	30.6 $\mu g/m^3$ 25.1 $\mu g/m^3$ 32.7 $\mu g/m^3$	Escondido Escondido Escondido
Fine Particulate Matter ($PM_{2.5}$)	--- 24-hour	65$\mu g/m^3$ 24-hour	--- 24-hour	2001 2002 2003	60 $\mu g/m^3$ 53.6 $\mu g/m^3$ 69.2 $\mu g/m^3$	Escondido Escondido Escondido
	12$\mu g/m^3$ annual average	15$\mu g/m^3$ annual average	--- annual average	2001 2002 2003	17.5 $\mu g/m^3$ 16 $\mu g/m^3$ 14.2 $\mu g/m^3$	Escondido Escondido Escondido

Source: www.arb.ca.gov/aqd/aqd.htm (all pollutants except 1-hour CO and 1-hour and 3-hour SO_2)
www.epa.gov/air/data/monvals.html (1-hour CO, Escondido Station; 1-hour and 3-hour SO_2, 12th Avenue Station)

Federal standards for 1-hour ozone, nitrogen dioxide, sulfur dioxide and annual PM_{10} were not exceeded for the time period from 2001 through 2003. Federal standards for 8-hour ozone in 2001, 24-hour PM_{10} in 2003, and 24-hour and annual $PM_{2.5}$ in 2001 and 2002 were exceeded, as measured at various local monitoring stations.

State standards for nitrogen dioxide and sulfur dioxide were not exceeded for the time period from 2001 through 2003. State standards were exceeded for the following criteria pollutants: 1-hour ozone in 2003, 24-hour and annual PM_{10} from 2001 through 2003, and annual $PM_{2.5}$ from 2001 through 2003.

Concentrations of CO at the Escondido monitoring station tend to be among the highest in the San Diego Air Basin, due to the fact that the monitor is located along East Valley Parkway, which is a congested area in downtown Escondido. This station measures higher concentrations of CO when compared to historical measurements elsewhere in San Diego County; therefore, the background data are not likely to be representative of background ambient CO concentrations at the project site, which is located in a less developed area and next to the Pacific Ocean. Since 2000, CO has not been monitored at other stations in northern San Diego County. The state 8-hour CO standard was exceeded once at the Escondido monitoring station during 2003; however, the exceedance occurred during the Cedar Fire event.

Sensitive Receptors

Sensitive populations (sensitive receptors) are more susceptible to the effects of air pollution than the general population. Sensitive populations who are in proximity to localized sources of toxins and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, child-care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

Residential areas surround the proposed desalinization facility to the south, north, and east of Agua Hedionda Lagoon. The Carlsbad State Beach area to the west is used for recreation. Cannon Park is located to the south of the facility at the intersection of Cannon Road and Carlsbad Blvd. The closest K-8 school to the facility is the St. Patrick's Catholic School, which is located approximately one mile north of the facility. Other sensitive receptors also exist along the pipeline construction routes.

Toxic Air Contaminants (TACs)

TACs, often termed "non-criteria" pollutants, do not have established ambient air standards. The SDAPCD implements TAC controls through Federal, State and local programs. At the Federal level, TACs are regulated by EPA under Title III of the Federal CAA. At the State level, the ARB has designated all 189 federal hazardous air pollutants as TACs, under the authority of AB 1807. The Air Toxics Hot Spots Information and Assessment Act (AB 2588) requires inventories and public notices for facilities that emit TACs. Under SDAPCD Rule 1200, new, relocated, or modified facilities that would emit TACs are required to undergo a health risk assessment to demonstrate that impacts to nearby receptors would not be significant.

4.2.3 Significance Criteria

A potentially significant impact to air quality would occur if the project caused one or more of the following:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; and/or
- Create objectionable odors affecting a substantial number of people.

SDAPCD's Rule 20.2 air quality thresholds were used to determine if the proposed project may emit levels of air pollutants that would be considered potentially significant. These thresholds provide quantitative emission limits above which a potential source may have a significant impact on the ambient air quality. Thresholds for CO, NO_x, PM_{10}, and SO_x, which are based on SDAPCD's Rule 20.2, are shown in *Table 4.2-3*. The SDAPCD does not have thresholds for ROC; therefore, thresholds for ROC are based on the South Coast Air Quality Management District's CEQA Air Quality Handbook.

In July 1997, EPA issued NAAQS for fine particles ($PM_{2.5}$). The standards include an annual standard set at 15 micrograms per cubic meter, based on the three-year average of annual mean $PM_{2.5}$ concentrations and a 24-hour standard of 65 micrograms per cubic meter, based on the three-year average of the 98th percentile of 24-hour concentrations. EPA's standards were challenged by the American Trucking Association, the U.S. Chamber of Commerce, and state and business groups. In February of 2001, the Supreme Court upheld EPA's authority under the Clean Air Act to set NAAQS that protect the American public from harmful effects of air pollution. In March of 2002, the D.C. Circuit Court rejected all remaining legal challenges to EPA's 1997 ambient air quality standards for $PM_{2.5}$.

TABLE 4.2-3
Rule 20.2 Air Quality Significance Thresholds

Pollutant	Emission Rate		
	lbs/hr	*lbs/day*	*tons/year*
Carbon Monoxide (CO)	100	550	100
Oxides of Nitrogen (NOx)	25	250	40
Particulate Matter (PM_{10})	-	100	15
Oxides of Sulfur (SOx)	25	250	40
Reactive Organic Compounds (ROC)[1]	-	55/75[1]	15

1 ROC thresholds are from the SCAQMD CEQA Air Quality Handbook for operational activities the significance threshold is 55lbs./day and for construction, the SCAQMD CEQA Air Quality Handbook recommends a significance threshold for ROC of 75 lbs/day.

On January 5, 2005, EPA took final action to designate attainment and non-attainment areas under the NAAQS for fine particles. The effective date of this rule is April 5, 2005. States and tribes with designated non-attainment areas must submit plans that show compliance with the $PM_{2.5}$ standards. Areas are required to attain clean air as soon as possible but no later than 2010. EPA may grant attainment date extensions of up to five years in areas with more severe $PM_{2.5}$ problems and where emissions control measures are not available or feasible. State, local and tribal governments must detail these control requirements in plans demonstrating how they will meet the $PM_{2.5}$ national air quality standard, known as State or Tribal Implementation Plans, or SIPs/TIPs. States and tribes must submit their plans to EPA within three years after the final designations. Non-attainment areas may be subject to New Source Review and "transportation conformity," which requires local transportation and air quality agencies to coordinate planning to ensure that transportation projects, such as road construction, do not affect an area's ability to reach its clean air goals.

San Diego County, California has been designated by EPA as non-attainment for $PM_{2.5}$. Although there is now a $PM_{2.5}$ standard, adequate tools are not currently available to perform a detailed assessment of $PM_{2.5}$ emissions and impacts at the project level. Further, there are no good sources for the significance thresholds for $PM_{2.5}$ emissions. Until tools and methodologies are developed to assess the impacts of projects on $PM_{2.5}$ concentrations the analysis of PM_{10} will need to be used as an indicator of potential $PM_{2.5}$ impacts.

4.2.4 Impacts

This section analyzes the potential effects the proposed project would have during construction of the onsite facilities and offsite pipeline distribution system, as well as during operation and maintenance of all facilities associated with the proposed project.

Construction-Related Emissions

Construction-related emissions are associated with demolition of structures, fugitive dust generated by site grading and trenching, exhaust from heavy construction equipment, exhaust from delivery trucks and from construction worker vehicle travel. To estimate emissions associated with construction, emission factors from the SCAQMD CEQA Air Quality Handbook (SCAQMD 1993) were used to quantify emissions associated with heavy equipment use, delivery/haul trucks and construction worker commute, as well as fugitive dust generated during construction.

Onsite Facilities

As described in *Section 3.0*, the facilities/structures proposed to be constructed at the desalination plant the Encina Power Station include a 50 MGD desalination facility, intake pump station, and intake and discharge pipelines. Construction of these facilities will involve three general phases: earthwork activities, construction of the structures, and paving and landscaping of work area. The duration of construction for the desalination facility by construction phase is described in *Table 4.2-4*. This table also identifies the amount and type of equipment anticipated for construction of the onsite facilities. The proposed project would also involve demolition of one fuel oil storage tank and remediation of the site currently occupied by the fuel oil storage tank. Duration and construction equipment are included in *Table 4.2-4* for all onsite construction activities, with the exception of the product water pipeline, which will be built as part of the offsite facilities.

TABLE 4.2-4
Construction Activities and Equipment for Onsite Desalination Plant Facilities

Construction Activities by Phase	Duration (months)	Equipment Type	Number
Demolition of Fuel Oil Storage Tank	4.5	Crane	1
		Loader	1
		Excavator	1
		Pump	1
		Construction Crew	10
		Construction Truck Trips	1,190 total
		Cubic Yards Soil Handled	8,300
Site Remediation	2	Excavators	2

TABLE 4.2-4
Construction Activities and Equipment for Onsite Desalination Plant Facilities

Construction Activities by Phase	Duration (months)	Equipment Type	Number
		Construction Crew	12
		Construction Truck Trips	260 total
		Cubic Yards Soil Handled	1,800
Desalination Plant Construction - Earthwork	5	Excavators	3
		Backhoes	3
		Loaders	3
		Graders	2
		Compactors	2
		Construction Crew	20
		Construction Truck Trips	4,310 total
		Cubic Yards Soil Handled	30,150
Desalination Plant Construction - Structures	15	Cranes	3
		Cement/Mortar Mixers	2
		Forklifts	4
		Aerial Lifts	1
		Generator Set	1
		Welders	4
		Construction Crew	40
		Construction Truck Trips	3,580 total
Desalination Plant Construction – Paving and Landscaping	4	Pavers	2
		Rollers	2
		Grader	1
		Construction Crew	15
		Construction Truck Trips	500 total
Intake Pump Station Construction - Earthwork	3	Excavators	2
		Loaders	2
		Pile Drivers	2
		Pumps	4
		Construction Crew	20
		Construction Truck Trips	1,610 total
		Cubic Yards Soil Handled	11,250
Intake Pump Station Construction - Structures	9	Crane	1
		Forklifts	4
		Welders	2
		Pumps	4
		Construction Crew	25
		Construction Truck Trips	1,600 total
Intake Pump Station Construction – Paving	1	Paver	1
		Roller	1
		Construction Crew	10
		Construction Truck Trips	300 total
Intake and Discharge Pipelines Construction - Earthwork	6	Excavators	2
		Trenchers	2
		Loaders	2
		Drill Rig	1
		Construction Crew	15
		Construction Truck Trips	1,300 total
		Cubic Yards Soil Handled	10,440
Intake and Discharge Pipelines Construction – Pipe Laying	6	Loaders	2
		Welders	2
		Crane	1
		Construction Crew	15

TABLE 4.2-4
Construction Activities and Equipment for Onsite Desalination Plant Facilities

Construction Activities by Phase	Duration (months)	Equipment Type	Number
		Construction Truck Trips	160 total
Intake and Discharge Pipelines Construction – Paving	0.5	Paver	1
		Roller	1
		Construction Crew	5
		Construction Truck Trips	50 total

Construction activities at the desalination plant would occur over a 24-month period and some phases of construction would take place simultaneously. To estimate maximum daily emissions, it is assumed that the following stages would occur simultaneously: 1) Desalination plant construction; 2) Intake pump station construction; and 3) Intake and discharge pipeline construction.

The proposed project would generate fugitive dust and exhaust emissions. Earthwork activities and materials handling and disposal are the main source of fugitive dust generated by construction of onsite facilities and contribute to PM_{10} levels. Exhaust emissions are generated by heavy equipment delivery trucks and vehicles used by construction workers to commute to the site.

Table 4.2-5 provides estimates of pollutant emissions for CO, ROC (precursors of ozone), NO_x, SO_x, and PM_{10} resulting from fugitive dust and vehicle exhaust emitted during peak construction of onsite desalination plant facilities. Emission factors from the SCAQMD CEQA Air Quality Handbook were used to calculate pollutant emissions and the calculations are included with the Air Quality Technical Report (see APPENDIX D).

During peak construction of onsite desalination plant facilities, the proposed project would exceed NO_x threshold levels established by the SDAPCD. Construction projects typically result in emissions of NO_x due to the use of heavy equipment and trucks. Emissions of NO_x, while significant during the maximum project construction phases, would be temporary and would not be expected to have a permanent significant impact on the ambient air quality.

TABLE 4.2-5
Maximum Daily Emissions Generated During Construction of Onsite Desalination Plant Facilities (pounds/day)

Emission Source	*CO*	*ROC*	NO_x	SO_x	PM_{10}
Desalination Plant Construction - Structures	97.72	16.98	125.14	10.96	8.09
Intake Pump Station Construction - Structures	73.80	11.13	78.30	7.70	5.32
Intake and Discharge Pipelines Construction – Earthwork	83.42	12.16	119.74	9.44	13.85
Intake and Discharge Pipelines Construction – Pipe Laying	36.94	6.86	64.60	5.51	4.07
TOTAL	**291.88**	**47.13**	**387.78**	**33.61**	**31.33**
Significance Criteria	550	75	250	250	100
Significant?	*No*	*No*	*Yes*	*No*	*No*

Because significant levels of NO_x are temporary and the levels of CO, ROC, SO_x , and PM_{10} do not exceed significance thresholds set by SDAPCD, less than significant impacts to air quality would occur during construction of onsite desalination plant facilities.

Offsite Facilities

The proposed project includes construction of approximately 16 miles of pipelines to distribute the desalinated water to the City of Carlsbad and various local water districts. A combination of construction methods would be employed, including open trench construction and trenchless installation methods, such as micro-tunneling, horizontal directional drilling, boring and jacking.

The project proposes to complete construction of the pipeline distribution system in 20 months. It is anticipated that seven segments of 1,000-foot lengths pipeline would be constructed simultaneously and each segment would take approximately 75 days to install. During peak construction, nine 22.5-person crews would be working.

Pipeline construction will require the use of a backhoe loader, hydraulic hammer, excavator, compactor, crane, front-end loader, welding equipment, tractor and water truck. *Table 4.2-6* lists the various phases involved with the offsite pipeline construction, duration of the phases, and the number and type of equipment required for construction.

TABLE 4.2-6
Construction Activities and Equipment for Offsite Facilities

Operation	Duration (Crew Days)	Labor		Equipment	
Removing Bituminous Pavment, 2" thick	2.1	1	Labor Foreman	1	Backhoe Loader, 48 hp
		2	Laborers	1	Hydraulic Hammer, 1200 lb
		1	Equip Operator, light	1	F.E. Loader, 170 hp
		1	Equip Operator, med	1	Pavement Removal Bucket
Trench Excavation, 1 CY Backhoe	4.0	1	Equip Operator, crane	1	Hydraulic Excavator, 1 cy
		1	Equip Operator Oiler		
Placing Pipe Bedding, 3/4" Rock	1.9	2	Laborers	1	Backhoe Loader, 48 hp
		1	Equip Operator, light		
Compacting Pipe Bedding, 3/4" Rock	3.2	1	Laborer	1	Gas Engine Power Tool
Placing Pipe	36.4	1	Labor Foreman	1	Welder, 300 amp
		2	Laborers	1	Crane, 75 ton
		1	Skilled Worker		
		1	Welder		
		1	Equip Operator, crane		
		1	Equip Operator Oiler		
Backfilling Pipe Trench, 200' haul	12.2	1	Equip Operator, med	1	F.E. Loader, Whl Mntd, 1 cy
		1	Laborer		
Compacting Pipe Trench, Power Tamper	1.6	1	Laborer	1	Gas Engine Power Tool
Compacting Pipe Trench, Vibrating Roller	1.5	1	Equip Operator, med	1	Roller Compactor, 2000 lbs
		1	Laborer		
Placing Base Course, 3/4" Rock	0.9	1	Labor Foreman	1	F.E. Loader, Whl Mntd, 1 cy
		2	Laborers	1	Roller, Vibratory
		1	Equip Operator, med	1	Truck Tractor, 240 hp
		1	Truck Driver, heavy	1	Water Truck, 5000 gal
Placing AC Pavement Over Trench, 2" thk	10.9	1	Labor Foreman	1	Tandem Roller, 5 ton
		4	Laborers		
		1	Equip Operator, light		

Construction-related truck trips would be required to deliver pipe, fill material and asphalt and remove spoils produced during trenching activities. A maximum of 108 truck trips per day, traveling an average of 9.2 miles roundtrip from the work site to the spoils repository site, McClellan Palomar Airport, would occur during construction of the pipeline distribution system. Haul trucks would carry approximately 14 cubic yards of spoil per truck trip.

Construction of the pipeline would result in an increase in pollutant emissions. Calculations of the emissions associated with pipeline construction assumed the longest pipeline route, the Faraday (blue) alignment option (see *Figure 3-5, Offsite Water Delivery Facility Pipelines and*

Pump Station), would be selected. It was also assumed that it would be unlikely that all nine crews would be simultaneously placing base material, the activity resulting in the most air emissions, on the same day throughout the duration of pipeline construction. The more likely construction scenario for any given workday would involve a number of crews either placing the pipeline in the trench or backfilling the trench. These activities are the longest in duration and the likelihood of several crews simultaneously performing these activities is greater than all nine crews placing base material, which takes less than one day to complete. Therefore, the worst-case scenario (all nine crews laying base material) is not considered to be a reasonable assumption and is therefore not analyzed. Calculations are based on the following construction scenario: two crews placing base material, four crews laying the pipeline in the trench, and three crews backfilling the trench.

Table 4.2-7 provides estimates of pollutant emissions for CO, ROC (precursors of ozone), NO_x, SO_x, and PM_{10} resulting from fugitive dust, vehicle exhaust emitted during construction of offsite pipelines, and simultaneous construction of nine pipeline segments. Emission factors from the SCAQMD CEQA Air Quality Handbook are used to calculate levels of pollutant emissions and the calculations are included with the Air Quality Technical Report (see APPENDIX D*)*.

TABLE 4.2-7
Estimated Maximum Daily Emissions Generated
During Construction of Offsite Pipelines (pounds/day)

Emission Source	*CO*	*ROC*	*NO_x*	*SO_x*	*PM_{10}*
Fugitive Dust	-	-	-	-	21.21
Truck Traffic – 108 Trucks/day	8.10	2.07	29.94	0.42	1.03
Simultaneous Construction of 7 pipeline segments	192.72	24.83	255.95	23.59	15.98
TOTAL	**200.82**	**26.90**	**285.89**	**24.01**	**38.22**
Significance Criteria	550	75	250	250	100
Significant?	*No*	*No*	*Yes*	*No*	*No*

Based on the estimated maximum daily emissions, emissions of NO_x during simultaneous construction of nine pipeline segments would be above the significance criteria. Construction projects typically result in emissions of NO_x due to the use of heavy equipment and trucks. Emissions of NO_x, while significant during peak construction activities, would be temporary and would not be expected to have a permanent significant impact on the ambient air quality. Therefore, less than significant impacts to air quality would occur as a result of offsite pipeline distribution system.

The project proposes to conduct the offsite pipeline construction concurrently with onsite construction of the desalination plant facilities. During construction for both onsite and offsite facilities, emissions of NO_x would be above the significance threshold. Emissions of CO, ROC (precursors of ozone), SO_x, and PM_{10} would not exceed the significance thresholds established by the SDAPCD.

The project construction would not conflict or obstruct the implementation of the San Diego Regional Air Quality Strategy (RAQS) or applicable portions of the State Implementation Plan (SIP) because emissions generated by project construction would be temporary. Furthermore, due to the fact that the construction phase of the project is short-term in nature, project construction would not result in emissions that would violate any long-term air quality standard or contribute substantially to an existing or projected air quality violation. The proposed project would not result in a cumulatively considerable net increase of PM_{10} or exceed quantitative thresholds for O_3 precursors, NO_X and ROCs.

Air Toxics "Hot Spots"

Diesel exhaust particulate matter is known to the state of California to contain carcinogenic compounds. The risks associated with exposure to substances with carcinogenic effects are typically evaluated based on a lifetime of chronic exposure, which is defined in the California Air Pollution Control Officers' Association (CAPCOA) Air Toxics "Hot Spots" Program Risk Assessment Guidelines (CAPCOA 1993) as 24 hours per day, 7 days per week, 365 days per year, for 70 years.

Diesel exhaust particulate matter would be emitted during the approximately 24 months of facility construction and 20 months of pipeline construction assumed for the project from heavy equipment used in the construction process. Because diesel exhaust particulate matter is considered to be carcinogenic, long-term exposure to diesel exhaust emissions could result in adverse health impacts. However, the construction of the project would result in short-term, temporary emissions of diesel exhaust from construction equipment. Furthermore, the emissions would not occur 24 hours per day, 7 days per week, but would be more likely to occur during working hours (8 to 10 hours per day, six days per week).

The construction phase of the project would not result in the chronic lifetime exposure of sensitive receptors to diesel exhaust from construction equipment. Because of the short-term nature of the construction project, adverse long-term impacts associated with diesel exhaust particulate matter would not occur as a result of project construction.

Operation-Related Project Emissions

Direct Project Emissions

Long-term air emissions associated with operation of the desalination plant consist of vehicle emissions generated during maintenance visits and employee vehicle trips, stationary source emissions produced at the project site, and consumption of electricity and natural gas. The desalination plant would operate 24 hours per day, seven days a week upon completion of construction, which is anticipated in 2008.

Vehicle emissions would be generated by delivery trucks and service trucks traveling to the desalination plant site. A maximum of 12 daily truck trips are expected to occur to provide delivery of supplies, chemicals, equipment and removal of solid waste and solids residuals disposal. Employee commuter trips would also contribute to mobile emissions associated with the operation of the proposed project. It is anticipated that the 8 employees at the desalination plant would make 6 trips per day to and from the site during operation for a total of 48 trips per day. Added to this would be approximately 60 visitor, vendor and contractor trips per day for a total of 120 average daily trips to and from the desalination plant. Other sources of emissions related to operational activities include landscape maintenance at the site, which would occur approximately once a week. *Table 4.2-8* contains estimates of direct pollutant emissions generated by operational activities.

TABLE 4.2-8
Estimated Maximum Direct Daily Emissions Generated
During Operation Of Desalination Plant

Emission Source	CO	ROC	NOx	SOx	PM_{10}
lbs/day					
Landscaping	0.58	0.08	0.01	0.00	0.00
Truck Trips	1.67	0.43	6.17	0.01	0.21
Employee Vehicles	4.96	0.23	0.50	0.00	0.03
TOTAL	**7.21**	**0.74**	**6.68**	**0.01**	**0.24**
Threshold Levels	550	55	250	250	100
Exceeds Threshold Levels	*No*	*No*	*No*	*No*	*No*

Source: EMFAC2002 model for vehicle emissions;

Equipment associated with operation of the desalination plant includes the desalination plant intake water pump station, pretreatment facilities, reverse osmosis system, product water pump station, membrane cleaning system, chemical feed equipment, solids handling equipment, service facilities (*i.e.*, HVAC, lighting), and the Oceanside pump station. All of this equipment will utilize electric power, will not utilize any combustion or other fuel sources, and will not generate any air emissions during their operation.

Indirect Project Emissions

In addition to the above-discussed direct emissions, certain additional indirect emissions may be associated with the operation of the desalination plant. Indirect emissions include emissions associated with the generation of the electrical power consumed by the desalination plant. Based on an evaluation of power usage for the stationary sources listed above, an average of 29.76 mega-watt hours (MWh) of electrical power would be required to operate the desalination plant (Poseidon Resources 2004). During maximum production of desalinated water, a maximum of 35.5 MWh of electrical power would be used (Poseidon Resources 2004). Additionally, the Oceanside pump station would require 0.55 MWh of electricity. The desalination plant will not contain any electrical power generation facilities, and will purchase this electrical power from the local electric utility, or a power generator, broker or seller. At this time no contract has been signed for power purchases from any supplier.

The electrical generation of 30 to 36 megawatts of power to be used by the desalination plant could be associated with additional air pollution emissions created during the generation of this electricity and could be regarded as indirect environmental effects of the desalination plant. Correspondingly, the operation of the desalination facility could also be regarded as associated with an indirect reduction in air pollution emissions due to the elimination of the need for the electrical power due to the reduction in use of existing sources of water that are presently being supplied to water customers who will receive their water from the desalination plant in the future under the proposed project. It is difficult to estimate with certainty what these indirect effects on air pollution might be related to the electricity that will be used by the desalination plant and that is currently being used as part of existing water supplies.

Potential Indirect Emissions Due To Power Generation

The desalination plant would purchase power from the local utility, a power generator or other supplier or suppliers. No decision has been made as to which electrical supplier will be used. Power available from the California electrical suppliers has been estimated by the SCAQMD to have a certain level of emissions associated with each megawatt of power produced. One of the potential sellers of electrical power to desalination plant is the Encina Generating Station, (“EGS”), which is located next to the desalination plant. It is difficult to predict whether any such future power sales by EGS, which has a generating capacity of 965 MWh would have any effect on current or historic levels of operation at Encina. From time to time, EGS may sell power to a variety of different purchasers based on agreements of varying length. Operations depend upon various factors including, but not limited to, power sale contract terms and conditions, the market price for electricity and ancillary services, local needs of the electrical transmission grid operator, the availability of generating equipment, the costs of operating the different generating equipment, including the cost of fuel, and the operating characteristics and capabilities associated with each generating unit.

The future indirect emissions increases associated with the desalination facility would be offset by the reductions in air emissions associated with reduced power consumption based upon the displacement of current water supplies to Carlsbad and other customers of the desalination facility. When these customers switch their water supplies wholly or partially to water produced by desalination plant, this will eliminate the need for the present electrical generation associated with current water supplies. By obtaining their water from the desalination facility, these customers will not need to obtain their water from other sources, such as a different desalination facility, or by water pumped to San Diego County and Carlsbad from the State Water Project or other sources of water. A different desalination facility would be expected to have approximately the same need for electrical power, and the approximately the same indirect air emissions. Current water from the California State Water Project now requires electrical energy for the pumping and treatment of the water. The pumping of State Water Project water now requires approximately 3.200 MWh of electricity per acre foot of water, versus 4.655 (on average) to 5.123 (at maximum load) MWh of electricity per acre foot of water for the production of desalinated water at desalination plant. In other words, the desalination plant running at full capacity would use an average of 30 MWh, while the resulting power savings from decreased use of an equivalent amount of State Water Project supplied by the County Water Authority water would be approximately 20.6 MWh, meaning that the net increase in power use from current conditions could be approximately 9.4 MWh. However, as noted in *Table 4.2-9*, even without consideration of energy savings associated with substituting imported water with desalinated water, impacts would be less than significant.

Table 4.2-9 presents possible direct and indirect emissions associated with the operation of the desalination plant. Likely direct emissions can be calculated with some certainty. However, as discussed above, indirect emissions associated with the desalination plant's power consumption will depend on a variety of factors. The combination of direct emissions from vehicle use and landscaping and indirect emissions associated with a net increase in power consumption to produce this new water supply during the operational phase of the project would result in total emissions that would be less than the significance thresholds and would therefore not have a significant adverse effect on air quality.

TABLE 4.2-9
Estimated Maximum Direct and Indirect Daily Emissions
Generated During Operation of Desalination Plant

Emission Source	CO	ROC	NOx	SOx	PM_{10}
lbs/day					
Landscaping	0.58	0.08	0.01	0.00	0.00
Truck Trips	1.67	0.43	6.17	0.01	0.21
Employee Vehicles	4.96	0.23	0.50	0.00	0.03
Energy Use	285.83	20.01	59.66	32.39	62.88
TOTAL	**293.04**	**20.75**	**66.34**	**32.40**	**63.12**
Threshold Levels	550	55	250	250	100
Total Exceeds Threshold Levels?	*No*	*No*	*No*	*No*	*No*

Project implementation would not conflict with the City of Carlsbad General Plan or Zoning Ordinance, nor would it propose to change any designations. As such, projects consistent with local General Plans are considered consistent with air quality related regional plans, such as the RAQS and the SIP. Thus the project would not conflict with or obstruct implementation of the applicable air quality plans.

As shown in *Table 4.2-9*, total emissions from operations would be less than the significance thresholds. The project would not result in any significant increase of any criteria pollutant for which the project region is non-attainment. Emissions from power generation, which are the main source of emissions associated with project operation, would be within permitted emission levels for the electrical plants which are planned for and regulated by the San Diego Air Pollution Control District, South Coast Air Quality Management District, and other local air pollution control districts. Emissions from other sources associated with the desalination plant operation are minor. Furthermore, the electric power required by the desalination plant is not expected to cause any power supplier to exceed the permitted levels of its emissions. In any event, regulation of and potential mitigation for any changes in air emissions from electrical generating facilities resulting from increased power usage is within the responsibility and jurisdiction of local air pollution control districts in California, not the City of Carlsbad.

The project's construction emissions are above the significance threshold for NO_x; however, construction would be temporary and would not have a long-term impact. Project operational emissions are below the applicable significance thresholds and would therefore not violate any air quality standard or contribute substantially to an existing or projected air quality violation.

The desalination plant does not involve the direct emission of toxic air contaminants and would therefore not have the potential to expose sensitive receptors to substantial pollutant concentrations. Furthermore, the project does not involve any odor-generating sources and is not classified as an odor-generating process (SCAQMD 1993); therefore, the project would not create objectionable odors affecting a substantial number of people. The project's operational impacts are therefore less than significant.

4.2.5 Mitigation Measures

No significant impacts to air quality were identified; therefore, no mitigation measures are required.

4.2.6 Level of Significance After Mitigation

The proposed project would not result in any significant impacts to air quality.