4.4 WATER

Would the proposal result in:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	☐	☐	☒	☐
b) Exposure of people or property to water-related hazards such as flooding?	☐	☐	☐	☒
c) Discharge into surface waters or other alteration of surface water quality (e.g., temperature, dissolved oxygen, or turbidity)?	☐	☐	☒	☐
d) Changes in the amount of surface water in any water body?	☐	☐	☒	☐
e) Changes in currents, or the course or direction of water movements?	☐	☐	☒	☐
f) Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations, or through substantial loss of groundwater recharge capability?	☐	☐	☒	☐
g) Altered direction or rate of flow of groundwater?	☐	☐	☒	☐
h) Impacts to groundwater quality?	☐	☐	☒	☐
i) Substantial reduction in the amount of groundwater otherwise available for public water supplies?	☐	☐	☒	☐

Edison power plants use and discharge water in areas for which the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCB) have designated beneficial uses. The environmental setting describes the water resources and their quality in the region and in the vicinity of the 12 power plants under study. The setting discussion is largely taken from Edison's Technical Resources Document (Entrix, 1997) after verification by Environmental Science Associates.

SETTING

Regional Setting

This section first describes the regional environmental setting for marine waters, followed by a description of groundwater use by inland stations.

Marine Waters

Physiography, climate, and general oceanography all contribute to the general character of the Southern California Bight. Any effects of thermal discharges into coastal waters are influenced by the complex interactions of these factors as well as by the nature of the biota present. All these factors have natural long- and short-term cycles as well as periodic components. Winds, tides, and currents are particularly important since they determine to the greatest extent the actual fate of the thermal effluent. The physiography and currents of the region are discussed below. Other important features of the marine waters are tides, up welling, temperature, dissolved oxygen, salinity and pH.

Physiography

The general orientation of the coastline of the Southern California Bight, between Point Conception and the Mexican border, is northwest to southeast. The coastline is predominantly cliffed and broken by the coastal plains in the Oxnard-Ventura, Los Angeles, and San Diego areas. The coastal region is drained by many relatively small streams that normally flow only during rain storms. Only a small part of the storm runoff ever reaches the ocean, most being impounded by dams and diverted for other uses.

Water circulation and oceanographic characteristics of the coastal region are strongly influenced by eight offshore islands. The mainland shelf is narrow, ranging in width from less than 2 to more than 11.2 miles and averaging approximately 4.4 miles. Seaward of the mainland shelf is an irregular and geologically complex region know as the continental borderland. The borderland is composed of basins and ridges that extend from near the surface to depths of more than 7,874 feet.

Currents

Water in the north Pacific Ocean is driven eastward by prevailing westerly winds until it impinges on the western coast of North America, where it divides and flows north and south. The southern component is the California Current, a diffuse southeastward-flowing water mass. No true western boundary of this current exists, but more than 90% of the southeastward transport is within 450 miles of the California coast. South of Point Conception, the current diverges. One branch turns northward and flows inshore through the Channel Islands, forming the inner edge of the Southern California Counter Current. The flow pattern is complicated by small eddies within the Channel

Island region that fluctuate seasonally, being more developed in summer and autumn and weak or occasionally absent in winter and spring.

Currents in the near-shore area are affected by many factors, including wind, weather, tide, local topography, density structure, and offshore oceanic currents. The latter, which are super-imposed on the tidal motion, usually have a strong diurnal component in response to local wind patterns. Therefore, short-term observations of currents near the coast often vary in both direction and speed as a result of combined wind-induced and tidal motions.

Inland Waters

Regional groundwater basins include the Upper Santa Ana River, Chino, and Lower Mojave River Basins. Groundwater quality in the Upper Santa Ana River basin, a 30-square-mile area, is generally of good quality; however, groundwater quality is poor in areas near dairies, areas with leaking underground storage tanks, and agricultural areas affected by fertilizer and pesticides. Well yields range from an average of 100 gallons per minute (gpm) to a maximum of 750 gpm. The San Bernardino and Highgrove power plants use groundwater from this basin.

Groundwater quality in the Chino Basin also is generally good. This groundwater basin, which has 11.5 million acre-feet (af) of storage capacity, is a sub-basin of the Upper Santa Ana River groundwater basin. Claims to groundwater in the Chino Basin have been legally reviewed, and a system of water allocation was developed to ensure that the basin is protected from depletion and possible overdraft conditions. The Chino groundwater basin is recharged with imported surface water from the State Water Project. The Etiwanda power plant uses water from this basin.

The Lower Mojave River groundwater basin, a 300-square-mile basin with approximately 5.1 million af of storage capacity, has been significantly overused and is overdrafted (i.e., consumption exceeds natural and artificial recharge). Both excellent quality and poor-quality water is found at various depths in the basin. The Cool Water power plant draws water from this basin. Claims to groundwater in the Lower Mojave River groundwater basin have been legally reviewed, and Edison has entered into a stipulated agreement to ensure that the basin is protected from depletion and possible overdraft conditions.

Local Setting

The following section discusses the water resources and water quality at the individual power plants. The section is organized by coastal or seawater-cooled power plants and inland or freshwater-cooled power plants.

Coastal Power Plants

The coastal seawater-cooled power plants include Alamitos, El Segundo, Huntington Beach, Long Beach, Mandalay, Ormond Beach, and Redondo. The site-specific discussion for each station presented below describes the environmental setting and existing water resources, the current water uses and cooling systems, and the wastewater discharge permit. The cooling systems for coastal power plants are summarized in Table 4.4.1, and the National Pollution Discharge Elimination System (NPDES) permits and their effluent discharge limitations are summarized in Table 4.2.2.

The Elwood plant is air cooled and does not use water except for injection to control opacity (density) of the air emissions plume. The plant does not discharge wastewater.

Typical Seawater-Cooled Power Plant

Water-dependent processes at seawater-cooled power plants generally include plant cooling, heat treatments, boiler blowdown, water demineralizing, boiler fireside and wall cleaning, oil storage, and sanitary waste storage and treatment.

The most common plant cooling methods for coastal thermal power plants is once-through cooling using seawater. This process typically uses the most water at coastal power plants. Water is drawn into an intake structure, screened to minimize entrainment of fish and debris, and then delivered into the condenser chamber, where the cooling water absorbs heat. The most significant impact on water quality from once-through cooling is the change in water temperature. Water temperature increases of up to 20-25°F are common for many thermal electric power plants. NPDES permits establish upper thermal limits that are based on the plant's maximum generation capacity.

The NPDES permits issued for the seawater-cooled power plants take into account the design temperature of the plants, and include consideration of the natural variation of surface water temperatures in the vicinity of the plants. The NPDES permits establish maximum temperature limits for discharge at each coastal plant.

Heat treatment is a reverse-flow process used for controlling marine organisms (e.g., mussels) that grow inside conduits and can inhibit the flow of water to the plant. Sodium hypochlorite is regularly used to minimize growth in the condensers.

Boiler blowdown is a watery residue of excess steam in boilers that is a source of increased salts. Boiler blowdown is disposed of after several cycles of power generation. The wastewater is conveyed to a retention basin, where it is monitored before being discharged to the ocean or stream. The brine created by demineralization of boiler water are typically discharged to a retention basin before discharge to receiving waters.

A variety of chemicals are used to clean the boiler walls, including hydrochloric, formic, and hydroacetic acids. The wastes from boiler cleaning are conveyed to a storage pond, where lime is added to adjust the pH levels and precipitate dissolved metals. The sludge generated from this

TABLE 4.4.1 COASTAL POWER PLANTS SEAWATER COOLING SYSTEM SUMMARY

Power Plant	Unit	Cooling Water Volume (gpm)	Pumps	Intake Location	Intake Depth (ft.)	Discharge Location	Discharge Depth (ft.)
Alamitos	1,2	144,000	4	Cerritos Channel	Surface	San Gabriel River	Surface
	3,4	272,000	4	Cerritos Channel	Surface	San Gabriel River	Surface
	5,6	467,600	4	Cerritos Channel	Surface	San Gabriel River	Surface
El Segundo	1,2	144,000	4	Ocean	30 MLLW	Ocean	26 MLLW
	3,4	276,800	4	Ocean	30 MLLW	Ocean	20 MLLW
Huntington Beach	1,2,3	356,600	6	Ocean	12 MLLW	Ocean	25 MLLW
Long Beach	8R,9	181,100	2	Long Beach Inner Harbor	12-42	Long Beach Inner Harbor	Surface
Mandalay	1,2	170,000	4	Ocean (Oxnard Marina)	Surface	Ocean	Shoreline
Ormond Beach	1	238,000	2	Ocean	35 MLLW	Ocean	30 MLLW
	2	238,000	2	Ocean	35 MLLW	Ocean	30 MLLW
Redondo	1,2,3,4	176,000	8	King Harbor	20 MLLW	Ocean	25 MLLW
	5,6	144,000	8	King Harbor	20 MLLW	Ocean	25 MLLW
	7,8	468,000	4	Ocean	20 MLLW	King Harbor	20 MLLW

NOTE: MLLW = Mean lower low water

TABLE 4.4.2 EDISON COASTAL POWER PLANT NPDES PERMITS SUMMARY

Power Plant	Permit Number	Order Number	Expiration Date	Outfall Number	Receiving Water	Allowable Maximum Flow (mgd)	Allowable Maximum Temperatures (°F)	pH Maximum	Maximum Chlorine Levels (mg/L)	
									Total Residual	Free
Alamitos	CA0001139	94-128	11/10/99	001	San Gabriel River	210.5	105	All outfalls have a maximum pH range of 6-9, and cannot change natural pH levels>0.2 units.	0.2/0.45*	0.5
				002	San Gabriel River	389	105		0.2/0.45*	0.5
				003	San Gabriel River	683.1	105		0.2/0.45*	0.5
Discharge route: low-volume waste flow into retention basins that discharge to the outfalls with the cooling water. In-plant drains must pass through oil water separators prior to entering the retention basins.										
El Segundo	CA0001147	94-129	11/10/99	001	Santa Monica Bay	605.6	105	All outfalls have a maximum pH range of 6-9, and cannot change natural pH levels>0.2 units.		
				002	Santa Monica Bay	207	105		0.2/0.4	0.5
Discharge route: low-volume waste flow into retention basins that discharge to the outfalls with the cooling water. In-plant drains must pass through oil water separators prior to entering the retention basins.										

(Continued)

TABLE 4.4.2 EDISON COASTAL POWER PLANT NPDES PERMITS SUMMARY (Continued)

Power Plant	Permit Number	Order Number	Expiration Date	Outfall Number	Receiving Water	Allowable Maximum Flow (mgd)	Allowable Maximum Temperatures (°F)	pH Maximum	Maximum Chlorine Levels (mg/L)	
									Total Residual	**Free**
Huntington Beach	CA0001163	93-58	10/1/98	001	Pacific Ocean, offshore	516	<30 °F above natural ocean temperatures	6-9, and discharge cannot change natural pH levels >0.2 units.	0.2	0.5
Discharge route: low-volume waste flow into retention basins that discharge to the outfalls with the cooling water. In-plant drains must pass through oil water separators prior to entering the retention basins.										
Long Beach	CA0001171	94-130	11/10/99	001	Back channel, Long Beach Harbor	265	105	6-9, and discharge cannot change natural pH levels >0.2 units.	0.2	0.5
Discharge route: all low-level wastes are routed to the retention basin prior to entering the outfall. Low-level wastes from groundwater dewatering, the oil recovery system, and the tank farm drains must pass through an oil water separator before entering the retention basin. The retention basin is discharged with cooling water through Outfall 00.1. Low-volume waste comprise approximately 4 mgd.										
Mandalay	CO0001180	94-131	11/10/99	001	Pacific Ocean	255.3	106	6-9, and discharge cannot change natural pH levels >0.2 units.	0.2/0.365*	0.5
Discharge route: low-volume waste flow into retention basins that discharge to the outfalls with the cooling water. In-plant drains must pass through oil water separators prior to entering the retention basins.										

(Continued)

TABLE 4.4.2 EDISON COASTAL POWER PLANT NPDES PERMITS SUMMARY (Continued)

Power Plant	Permit Number	Order Number	Expiration Date	Outfall Number	Receiving Water	Allowable Maximum Flow (mgd)	Allowable Maximum Temperatures (°F)	pH Maximum	Maximum Chlorine Levels (mg/L) Total Residual	Maximum Chlorine Levels (mg/L) Free
Ormond Beach	CA0001198	94-132	11/10/99	001	Pacific Ocean	688.2	105	6-9, and discharge cannot change natural pH levels >0.2 units.	0.2/0.399*	0.5
Discharge route: low-volume waste flow into retention basins that discharge to the outfalls with the cooling water. In-plant drains must pass through oil water separators prior to entering the retention basins.										
Redondo	CA0001201	94-133	11/10/99	001	Pacific Ocean, offshore	463	106	All outfalls have a maximum pH range of 6-9, and cannot change natural pH levels more than 0.2 units.	0.2/0.633	0.5
				002	King Harbor	674	106		0.2/0.422	0.2
Discharge route: low-volume waste flow into retention basins that discharge to the outfalls with the cooling water. In-plant drains must pass through oil water separators prior to entering the retention basins.										

NOTES: mgd = million gallons per day.
N/A = not applicable/available.
s = summer temperatures.
m = winter temperatures.
mg/L = milligrams per liter.
°F = degrees Fahrenheit.
*requirements if Section 301g variance

process typically has low concentrations of heavy metals and is considered a hazardous waste. These wastes are recycled as flux at an Arizona copper smelter.

Oils, greases, and other lubricants are used for lubricating pump bearings. Special pipe systems carry oily residues and waters to a central storage pond at most plants, where a mechanical oil water separator is used to recover the oil. Sanitary wastes are also collected and treated at some generation plants and then are discharged to the ocean.

Alamitos

Existing Water Resources

The Alamitos power plant is adjacent to the San Gabriel River Flood Control Channel near the southeastern boundary of Los Angeles County. The Haynes power plant, operated by Los Angeles Department of Water and Power (LADWP), is located directly across the San Gabriel Flood Control Channel from the Alamitos power plant. Both stations discharge thermal water to the San Gabriel River Flood Control Channel which empties into the eastern end of San Pedro Bay between Alamitos Bay to the west and Anaheim Bay to the east.

The water quality in San Pedro Bay is influenced by a complex interaction of oceanographic and meteorological conditions with short and long period cyclical variations. Winds, tides, and currents typically exert the greatest effect on coastal waters. However, currents and wave surge in San Pedro Bay are reduced and do not enhance dispersion of the discarded thermal effluent. Natural surface water temperatures in San Pedro Bay range from 12.5°C (54.5°F) to 25.3°C (77.5 °F) annually. Salinity in the near-shore portions of San Pedro Bay show marked seasonal variation, ranging annually from 25.0 to 33.6 parts per thousand (ppt). Dissolved oxygen (DO) concentrations range from five to 14 mg/l. Normal pH values in San Pedro Bay range from 7.8 to 8.3 units.

The waters of Alamitos Bay are isolated from open coast circulation; water exchange depends on tidal flow through the harbor entrance. The removal of large volumes of water by both power plants for cooling purposes increases the influx of ocean water through the harbor entrance and into Alamitos Bay. Solar heating and limited mixing in the water column may cause water temperatures in Alamitos Bay to exceed ambient levels observed along the open coast. The bay is unaffected by the thermal discharge from the plants since the flow from the San Gabriel River generally moves down coast away from the harbor entrance. The direction of flow at the mouth of the San Gabriel River is down coast, where incoming waves and longshore currents are not inhibited by breakwaters.

Water quality in the San Gabriel River near the power plants is affected by hydrology, currents, stormwater runoff, and industrial discharges. Surface water temperatures in the river are typically warmer than those in San Pedro Bay. The shallow depth of the river, solar radiation, and input of warm water from the power plants contribute to this temperature differential.

Flow in the lower San Gabriel River Flood Control Channel reach is dominated by effluent from several municipal wastewater treatment facilities and urban runoff. Coyote Creek is also an important but intermittent feeder to the San Gabriel River. Its confluence is approximately four miles upstream from the river mouth. In addition, flow in the river is affected by tidal influence, which extends upriver approximately 3.1 miles from the river mouth (approximately 1.25 miles upstream from the power plants). The station cooling water discharges to the river are within the tidal prism.

The lower San Gabriel River is extensively modified and lined with concrete to channel flow for flood control purposes. The flood control channel was built by the U.S. Army Corps of Engineers and is maintained by the Los Angeles County Flood Control District. The concrete-lined flood control channel has a maximum design capacity of 13,000 million gallons per day (mgd).

Existing Thermal Effects. Between November 1971 and December 1972, Edison and LADWP conducted a thermal effects study for the Alamitos power plant and the Haynes power plant to comply with Section 316(a) of the Clean Water Act. The study measured the surface areas and the horizontal and vertical extensions of the 1°F and 4°F elevated temperature field around the outfall in the San Gabriel River Flood Control Channel and in the near-shore ocean at the channel mouth. The study indicated that the water in the channel was well mixed, and the thermal field was not observed to extend deeper than five to 10 feet below the surface after passing the channel entrance. Based on shoreline temperature measurements, the 4°F elevated temperature field seldom touched the shore except in the immediate vicinity of the channel entrance. The 1°F elevated temperature field normally came in contact with the shoreline for distances approximately one mile upcoast and downcoast of the channel entrance. The study concluded that the Alamitos and Haynes power plants were in compliance with the Thermal Plan and that beneficial uses of the receiving waters are protected, as required by Section 316(a) of the Clean Water Act.

Existing Wastewater Discharges. Wastewater discharge reports for the Alamitos power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. No temperature exceedances of the cooling water discharge occurred during this time period. The Alamitos power plant was in compliance with the discharge limitations specified in the NPDES permit during this time period.

Current Water Uses

The largest volume water use at the Alamitos power plant is ocean water used non-consumptively for once-through plant cooling. The cooling system for each generating unit pair draws ocean water from surface water canals that branch off the Los Cerritos Channel. The Los Cerritos Channel is connected to San Pedro Bay through the Long Beach Marina-Alamitos Bay Complex.

Ocean water for cooling purposes is supplied to the Alamitos power plant via three cooling water systems: one serving Units 1 and 2, one serving Units 3 and 4, and one serving Units 5 and 6.

Each cooling water system incorporates screen systems designed to remove trash, algae, marine life, and other material from the cooling water. After screening, the water is pumped to the station's condenser units.

The intake structure for Units 1 and 2 draws water from the surface to a depth of nine feet below mean lower low water (MLLW). The water is drawn through the intake structure by four pumps that provide 137,000 gpm to the main condensers and 7,000 gpm to auxiliary heat exchangers for cooling of the plant equipment. After passing through the condensers, the water temperature is raised 14.2°C (25.6°F).

The cooling water intake structure for Units 3 and 4 draws water from the surface to a depth of 14 feet MLLW. It is located in an extension of the canal servicing Units 1 and 2. Water is drawn through this intake structure by four pumps that provide 259,000 gpm to the main condensers and 13,000 gpm to auxiliary heat exchangers. After passing through the condensers, the water temperature is raised 12.1°C (21.8°F).

Cooling water for Units 5 and 6 is provided by a separate canal extending from the Los Cerritos Channel. This canal branches off to two separate but identical intake structures, one serving Unit 5 and one serving Unit 6. Both intake structures draw water from the surface to a depth of 20 feet MLLW. Water is drawn through the intake structures by two pumps per structure. The pumps provide a total of 404,200 gpm to both units' main condensers, 48,400 gpm to auxiliary turbine condensers, and 15,000 gpm to plant heat exchangers. After passing through the condensers, the water temperature is raised 10°C (18°F).

After passing through the plant’s steam condensers, the heated water is discharged via sluiceways to the San Gabriel River at three points approximately two miles upstream of the river mouth, or 2,000 feet north of Westminster Avenue. The discharges to the river are through channel bank outfalls located in the west river bank.

The Haynes power plant also discharges once-through cooling water via sluiceways to the San Gabriel River at three locations approximately 1.9 miles upstream from the river mouth.

The Alamitos power plant also handles and discharges water used for other purposes besides cooling. This water is considered low-volume wastewater and consists of water from boiler blowdown, air preheater and boiler fireside washing, yard drains, fuel oil tank enclosures, hydrostatic test water, and oil water separator wastes. The low-volume wastes are discharged to retention basins. Water from the retention basin is mixed with the cooling water for discharge.

Freshwater consumption at the station is limited to drinking water, other domestic uses, and in-plant uses, such as boiler make-up. Edison reports freshwater consumption to the U.S. Geological Survey (USGS) every five years. In 1990 and 1995, the Alamitos power plant used 228,200,000 and 165,227,096 gallons of water, respectively.

Wastewater Discharge Permit

The Alamitos power plant discharges water under NPDES Permit No. CA0001139, Los Angeles RWQCB Order No. 94-128, which expires on November 10, 1999. The permit is based on design capacity operation or full capacity operation of the power plant. At full capacity, the station is allowed to discharge 1,282.8 mgd.

The NPDES permit identifies the following beneficial uses of the receiving waters for the San Gabriel River Tidal Prism: industrial service supply, water contact and non-contact water recreation, ocean commercial and sport fishing, marine habitat, preservation of rare and endangered species, and saline water habitat.

The NPDES permit also establishes a receiving water monitoring program, consisting of periodic biological surveys, sediment sampling, and chemical surveys of the receiving waters at locations around the wastewater outfall. The NPDES permit designates 12 monitoring and sampling stations in the receiving waters. Nine stations are located in San Pedro Bay offshore of the San Gabriel River, and three stations are located in the San Gabriel River around the power plant.

The discharge limitations specified in the NPDES permit for the Alamitos power plant allow a maximum temperature discharge of 105°F during normal plant operation. During heat treatment, the allowable temperature limit is increased to 125° F. The pH of the effluent water must range between 6.0 and 9.0 pH units. The discharge limitations for total residual chlorine is 0.45 mg/l and for free available chlorine is 0.50 mg/l. Effluent limitations for toxic constituents in the NPDES permit are based on the Ocean Plan and were calculated using a minimum dilution ratio (parts seawater to one part effluent) of 4.5 to 1, except for residual chlorine. (Los Angeles RWQCB 1994a.)

The discharge constraints in the NPDES permit conform with the water quality control plan, except that residual chlorine effluent limitations are greater than the 40 CFR Part 423 guidelines (0.20 mg/l) and the Ocean Plan objectives (0.10 mg/l and 0.064 mg/l for Discharges 001 and 002, respectively). At times of peak load, the chlorine levels in the once-through cooling water have been as high as 0.22 mg/l; however, chlorination bioassay studies showed no significant adverse impact on the receiving water as a result of the chlorine levels in the discharge (Los Angeles RWQCB 1994a). The SWRCB and EPA have approved a variance from the residual chlorine limitations.

El Segundo

Existing Water Resources

El Segundo power plant is located in Santa Monica Bay, in the City of El Segundo. The power plant is approximately five miles north of King Harbor and five miles south of Marina del Rey

Harbor and Ballona Creek. The El Segundo power plant uses seawater from Santa Monica Bay for cooling purposes.

Water quality in Santa Monica Bay is affected by the physiography, climate, and hydrography of the southern California coastal region. Natural surface water temperatures in Santa Monica Bay vary between 11.7°C (53.1°F) and 22.2°C (72.0°F) annually, and may be expected to vary between 1.0 and 2.0°C in summer and between 0.3 and 1.0°C in winter. Salinity in Santa Monica Bay ranges from 33.0 to 34.0 ppt. DO concentrations in Santa Monica Bay range from approximately five to 12 mg/l. Normal pH values in Santa Monica Bay range between 8.0 and 8.5 units.

Despite the relative abundance of aquatic and terrestrial life in and around Santa Monica Bay, the Bay's habitats have been significantly altered and degraded. For example, only approximately 5% of the area's historical wetlands acreage still exist. Pollution of coastal waters has led to a decline in species and a commercial fishing ban on white croaker in certain areas. In addition, although the use of dichloro, diphenyl, trichloroethane (DDT) was banned in 1971, residues of this pesticide still bio-accumulate in the tissues of invertebrates, fish, birds, and marine mammals.

Water quality immediately offshore of the El Segundo power plant is affected by stormwater runoff, industrial discharges, and ship traffic. In addition, climatological parameters, such as solar radiation, humidity, and wind, influence the condition of the receiving water.

Groundwater beneath the El Segundo power plant has been contaminated with petroleum hydrocarbons by the Chevron refinery located east of the station. Chevron USA, Inc. maintains a system of wells and piping at the power plant for extracting hydrocarbon-contaminated groundwater from beneath the station. The system at the power plant is part of a larger system designed to recover hydrocarbons that have migrated from the Chevron refinery to beneath adjacent properties, including the El Segundo power plant. The station's system consists of 10 recovery wells distributed over the northern two-thirds of the power plant. The contaminated groundwater is pumped back to the Chevron refinery for treatment.

Existing Thermal Effects. Between November 1971 and November 1972, Edison conducted a thermal effects study for the El Segundo power plant to comply with Section 316(a) of the Clean Water Act. The study measured the surface areas and horizontal and vertical extensions of the 1° and 4°F elevated temperature field around the outfall in the offshore open waters of Santa Monica Bay. The study indicated that the outfalls affect the temperature of a limited area of Santa Monica Bay: surface water heated 1°F above natural conditions covered a mean of 39 acres. The area enclosed by a 4°F elevated temperature field was usually too small to measure (less than 10 acres), except for the May 1972 survey when it reached 15 acres. The 4°F field seldom extends beyond 1,000 feet from the outfall. The heat added from the El Segundo power plant represents a minor contribution to the total heat budget of Santa Monica Bay.

Current Water Uses

The largest water use at the El Segundo power plant is seawater used non-consumptively for once-through plant cooling. The station is permitted to use 605.6 mgd when operating at design capacity. Ocean water for cooling purposes is supplied to the power plant via two concrete conduits, one serving Units 1 and 2, and one serving Units 3 and 4.

Approximately 144,000 gpm of seawater enter Units 1 and 2. The cooling water is supplied to the units via a 10-foot inside diameter concrete conduit that originates approximately 2,600 feet offshore and draws water from an approximate depth of 30 feet below MLLW. The maximum permitted flow through Units 1 and 2 is 207 mgd. After passing through the condensers, the temperature of the cooling water is elevated 12.2°C (22°F) when Units 1 and 2 are operated at full load. The temperature increase is less when operating at lower loads. The warmed water is discharged to the Pacific Ocean through a 10-foot diameter conduit that terminates approximately 1,900 feet offshore at a depth of 26 feet below MLLW.

Existing Wastewater Discharges

Wastewater discharge reports for the El Segundo power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. No temperature exceedances of the cooling water discharge occurred during this time; however, some wastewater discharges from the station’s water treatment plants exceeded permit limitations during 1993. The parameters that exceeded the discharge limitation are biological oxygen demand (BOD), total suspended solids (TSS), total settleable solids, and oil and grease. These exceedances were minor, and the problems were corrected by making operational adjustments to the treatment plants.

Approximately 276,800 gpm of seawater enter Units 3 and 4 through a shared conduit that originates approximately 2,600 feet offshore and draws water from a depth of approximately 30 feet below MLLW. The maximum permitted flow through Units 3 and 4 is 399 mgd. After passing through the condensers, the temperature of the cooling water is elevated 12.2°C (22°F). The temperature increase is less when operating at lower loads. The warmed water is discharged to the Pacific Ocean through a 12-foot inside diameter conduit that terminates approximately 2,100 feet offshore at a depth of 20 feet below MLLW.

The plant also handles and discharges low-volume wastewater used for other purposes besides cooling. Discharges consist of water from pre-treated chemical metal cleaning wastes, treated sanitary wastes, floor drain wastes, hydrostatic test waste, rainfall runoff, and boiler blowdown. All discharge water is treated and mixed with the cooling water before final discharge.

The low-volume wastes are pretreated prior to discharge. Chemical metal cleaning wastes are pretreated through a mobile lime treatment unit. Sanitary wastes are treated in two aerobic digestion plants. Floor drain wastes and rainfall run-off are passed through an oil water separator before discharge.

Freshwater consumption at the station is limited to drinking water, other domestic uses, and in-plant uses. In 1990 and 1995, the El Segundo power plant used 113,873,000 and 142,810,000 gallons of freshwater, respectively.

Wastewater Discharge Permit

The El Segundo power plant discharges water under NPDES Permit No. CA0001147, Los Angeles RWQCB Order No. 94-129, which expires on November 10, 1999. The permit is based on design capacity operation or full capacity operation of the power plant.

The NPDES permit identifies the following beneficial uses of the receiving waters in the near-shore zone of Santa Monica Bay: industrial service supply, navigation, water contact recreation and non-contact water recreation, ocean commercial and sport fishing, preservation of areas of special biological significance, preservation of rare and endangered species, marine habitat, shellfish harvesting, and fish spawning. The beneficial uses of the receiving waters in the offshore zone of Santa Monica Bay are: industrial service supply, navigation, water contact recreation and non-contact water recreation, ocean commercial and sport fishing, preservation of rare and endangered species, marine habitat, and shellfish harvesting.

The NPDES permit also establishes a receiving water monitoring program, consisting of periodic biological surveys, sediment sampling, and chemical surveys of the receiving waters at locations around the wastewater outfall. The NPDES permit designates 12 monitoring and sampling stations in the receiving waters around the power plant.

The discharge limitations specified in the NPDES permit for the El Segundo power plant allow a maximum temperature discharge of 105°F during normal plant operation. During heat treatment, the allowable temperature limit is increased to 110°F. The pH of the effluent water must range between 6.0 and 9.0 pH units. Effluent limitations for toxic constituents in the NPDES permit are based on the Ocean Plan and were calculated using a minimum dilution ratio (parts seawater to one part effluent) of 12 to 1 for discharges from Units 1 and 2, and 18 to 1 for discharges from Units 3 and 4. No numerical limits are presented in the NPDES permit for toxic constituents not used at the El Segundo power plant.

The discharge constraints in the NPDES permit conform with statewide water quality control plans, except that residual chorine effluent limitations are greater than the 40 CFR Part 423 guidelines (0.2 mg/l) and the Ocean Plan objectives (0.19 mg/l for discharge from Units 1 and 2, and 0.278 mg/l for Units 3 and 4). At times of peak load, the chlorine levels in the once-through cooling water have been as high as 0.53 mg/l; however, chlorination bioassay studies showed no significant adverse impact on the receiving water as a result of the chlorine levels in the discharge. The SWRCB and EPA have approved a variance from the residual chlorine limitations.

Huntington Beach

Existing Water Resources

The Huntington Beach power plant is located on the coast in the City of Huntington Beach in Orange County. The City of Huntington Beach is on the floodplain drained by the Santa Ana River, which empties into the ocean approximately 1.5 miles downcoast from the power plant. The coast near the Huntington Beach power plant is fronted by a broad sandy beach and is backed by lowlands. The power plant draws from and discharges ocean water for cooling purposes to the open waters of the Pacific Ocean.

The Huntington Beach power plant is located in Region 8, Santa Ana RWQCB. Region 8 includes open ocean waters from Long Beach to San Clemente. The quality of marine waters in this region varies from good to excellent. Water quality varies due to numerous industrial discharges in the region, including treated water from the Orange County Sanitation District's sewage treatment plant.

The Huntington Beach power plant exchanges water for cooling purposes directly with the open ocean waters of the Southern California Bight. Ocean temperatures in the Southern California Bight normally range from 12.8°C (55°F) in winter to 19.4°C (67°F) in summer. Salinity in the open waters offshore of the station are fairly uniform and normally range from 33 to 34 ppt. DO concentrations range from approximately 5 to 13 mg/l. The pH values recorded during two surveys conducted offshore of the power plant in March and September 1978, ranged between 7.3 and 8.5 pH units.

Existing Thermal Effects. Between October 1971 and December 1972, Edison completed a thermal effects study for the Huntington Beach power plant. The study was completed to comply with Section 316(a) of the Clean Water Act. The study measured the surface areas and the horizontal and vertical extensions of the 1°F and 4°F elevated temperature field around the outfall in the offshore open ocean waters. The study indicated that elevated temperature field is not in contact with the ocean substrate except along the shore and immediately adjacent to the discharge structure. The thermal field extended to a depth of 10-15 feet below the surface. The maximum horizontal extent of the 4°F thermal field was approximately 4,000 feet; however, for 50% of the survey, it extended only approximately 1,000 feet. The surface area of the 4°F and the 1°F elevated temperature fields averaged slightly less than 62 and 2,200 acres, respectively. The study concluded that to the extent that the objectives and provisions of the water quality control plan apply, the Huntington Beach power plant is in compliance with the Water Quality Control Plan for Control of Temperature in Ocean Waters.

Existing Wastewater Discharges. Wastewater discharge reports for the Huntington Beach power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. During this 3 year period, there were 12 TSS exceedances, two chlorine exceedances, and one oil and grease exceedance. The elevated TSS concentrations occurred in stormwater runoff that drained from the yard drains. These yard drains have since been rerouted to discharge to the retention basin, allowing the solids to settle out before the water is discharged with the cooling water. The chlorine exceedances were the result of operator error and have been remedied with additional employee training. The oil and grease exceedance is believed to be the result of cross contamination of the sample because all previous and subsequent samples were within effluent limits.

Current Water Uses

The largest volume water use at the Huntington Beach power plant is seawater used for once-through plant cooling. The station is permitted to discharge 516 mgd of once-through cooling water when operating at design capacity. Ocean water for cooling purposes is supplied to the station via a single cooling water system.

Approximately 356,600 gpm of seawater are drawn into the power plant by eight circulation pumps, each rated at approximately 44,000 gpm. Seawater enters Units 1 through 4 from an offshore intake via a 14-foot inside diameter concrete conduit. The cooling water intake structure is located approximately 1,650 feet offshore; water is drawn in through a velocity cap located 15.8 feet above the ocean floor or at a depth of 11.7 feet below MLLW. The water is then routed to the steam condensers, where the water temperature is elevated approximately 10°C (18°F) when the units are operating at full load. The temperature increase is less when operating at lower loads. The warmed water is discharged to the Pacific Ocean through Discharge Serial No. 001. This discharge consists of a 14-foot inside diameter concrete discharge conduit that extends approximately 1,500 feet offshore. The discharge is at a depth of approximately 25 feet below MLLW.

Units 1 through 4 have closed cooling systems to cool auxiliary equipment in each plant. The closed system uses demineralized water that is cooled by part of the main cooling water stream and is then diverted to a heat exchanger and subsequently returned to the main cooling water flow. Units 1 through 4 each divert approximately 9,750 gpm, for a total of 39,000 gpm. This water is elevated in temperature about 4.6°C (8.3°F).

The plant also handles and discharges water used for other purposes besides cooling. These waters are generated from low-volume in-plant waste streams and consist of water from boiler blowdown, air preheater and boiler fireside washing, yard and in-plant drains, reverse osmosis electro/deionization pretreatment filters and softeners, and rinse waters and any other waterborne residues derived from the cleaning of equipment. These water discharges are not continuous and are discharged through Discharge Serial Nos. 003 and 004, which are routed into the cooling water discharge in Discharge Serial No. 001.

The power plant also discharges treated stormwater runoff from the fuel oil storage areas through Discharge Serial Nos. 002 and 005 to the Huntington Beach Flood Control Canal.

Freshwater consumption at the station is limited to drinking water, other domestic uses, and minor in-plant uses. Municipal water is supplied to the Huntington Beach power plant by the City of Huntington Beach. The City of Huntington Beach has 10 wells that draw water from the lower Santa Ana groundwater basin, which is not adjudicated. The city's groundwater use is regulated by the Orange County Water District. Edison reports freshwater consumption to the USGS every 5 years. In 1990 and 1995, the Huntington Beach power plant used 212,860,000 and 96,107,000 gallons of freshwater, respectively.

Wastewater Discharge Permit

The Huntington Beach power plant discharges water under NPDES Permit No. CA0001163, Central Coast RWQCB Order No. 93-58, which expires on October 1, 1998. The permit issued for the Huntington Beach power plant is based on design capacity operation or full capacity operation of the power plant.

The NPDES permit identifies the following beneficial uses of the receiving waters offshore of the power plant: industrial service supply, navigation, water contact and non-contact water recreation, ocean commercial and non-freshwater sport fishing, marine habitat, and shellfish harvesting.

The NPDES permit also establishes a receiving water monitoring program, consisting of periodic biological surveys, sediment sampling, and chemical surveys of the receiving waters at locations around the wastewater outfall. The NPDES permit designates 14 monitoring and sampling stations in the receiving waters around the Huntington Beach power plant.

The discharge limitations specified in the NPDES permit for the Huntington Beach power plant limit the maximum temperature discharge to 30°F greater than the intake temperature during normal plant operation. During heat treatment, the allowable temperature limit is increased to 125 °F. The pH of the effluent water must range between 6.0 and 9.0 pH units. The discharge limitation for total residual chlorine is 0.20 mg/l. Effluent limitations for toxic constituents in the NPDES permit are based on the Ocean Plan and were calculated using a minimum dilution ratio (parts seawater to one part effluent) of 7.5 to 1 for the power plant.

The discharge constraints in the NPDES permit conform with statewide water quality control plans. The SWRCB granted an exception to the Ocean Plan residual chlorine limit.

Long Beach

Existing Water Resources

The Long Beach power plant is on Terminal Island in Long Beach Harbor. Long Beach Harbor is located in Los Angeles County and is bounded by the Cities of San Pedro, Wilmington, and Long Beach. The power plant draws from and discharges water to the Long Beach Harbor.

Long Beach Harbor encompasses approximately 700 acres and is part of the large Los Angeles Harbor complex that serves international shipping traffic. Terminal Island and areas immediately bordering the harbor serve many diverse industries, including petroleum production, manufacturing, and shipping. The outfall for the Long Beach power plant is one of several industrial outfalls into the harbor. Further inland, but within the harbor’s drainage area, are residential areas, manufacturing plants, and other potential sources of materials that may affect the quality of water and sediment in the harbor.

Long Beach inner harbor in San Pedro Bay has been posted with health warnings against the consumption of fish and shellfish because high DDT and PCB levels were detected in fish. Poor circulation and long flushing times hamper the dilution and transport of contaminants to the ocean.

Water quality at the power plant and in Long Beach Harbor is affected by a combination of hydrology, currents, stormwater runoff, industrial discharges, and shipping traffic. Natural surface water temperatures measured in Long Beach harbor in a May and October 1972 study was 17°C (62.6°F) and 17.8°C (64.0°F), respectively. Salinity in the Los Angeles-Long Beach Harbor ranges from 30.0 to 34.3 ppt. The greatest variations were observed in the inner harbors, with maximum values in summer and minimum during winter storms. Surface water DO concentrations in San Pedro Bay adjacent to the Long Beach Harbor normally range from four to 12 mg/l. Normal pH values in Long Beach Harbor range between 8.0 and 8.6 units. Normal pH values in San Pedro Bay adjacent to Long Beach Harbor range from 7.8 to 8.3 units.

Existing Thermal Effects. Between May 1972 and January 1973, Edison completed a thermal effects study for the Long Beach power plant to comply with Section 316(a) of the Clean Water Act. The study measured the surface areas and the horizontal and vertical extensions of the 1°F and 4°F elevated temperature field around the outfall in Long Beach Harbor. The study indicated that the thermal field extended between 5 and 10 feet below the surface and that the elevated temperature field was only in contact with the substrate along the shoreline during plant operation. The mean surface area of the 4°F thermal field was five acres during the first study and extended 400 feet up channel and 280 feet down channel from the discharge. The 4°F thermal field was not observed during the second study. The mean surface area of the 1°F thermal field was 140 acres during the first study. The study concluded that the Long Beach power plant was in compliance with the Thermal Plan and that beneficial uses of the receiving waters are protected, as required by Section 316(a) of the Clean Water Act.

Existing Wastewater Discharges. Wastewater discharge reports for the Long Beach power plant for 1994 and 1995 were reviewed to determine compliance with the NPDES permit limitations. No temperature exceedances of the cooling water discharge occurred during this time period, and the Long Beach power plant was in compliance with the discharge limitations specified in the NPDES permit.

Current Water Uses

The largest volume water use at the Long Beach power plant is seawater used non-consumptively for once-through plant cooling. The station is permitted to use 265 mgd of once-through cooling water when operating at design capacity. Ocean water for cooling purposes is supplied to the station via an intake structure located in the northeast corner of the station at the west bank of Back Channel Long Beach Harbor. The intake draws water from an opening that is between 12 and 42 feet below the surface of the water.

Approximately 180,000 gpm of seawater enter Units 8R and 9 when the station is operating. Each unit has two circulation pumps, and both pumps are used when the units are operating. The pumps for Units 8R and 9 are rated at 41,000 and 49,000 gpm, respectively. After passing through the steam condensers, the temperature of the cooling water from Unit 8R is elevated 7.2°C (13°F) and the temperature of the cooling water from Unit 9 is elevated 7.8°C (14°F). The warmed water is discharged to the Long Beach Harbor Channel through a channel bank outfall structure at Berth 114.

The plant also handles and discharges water used for other purposes besides cooling. This water is considered low-volume wastewater and consists of water from boiler blowdown, air preheater and boiler fireside washing, yard drains, fuel oil tank enclosures, hydrostatic test water, and oil water separator wastes. The low-volume wastes are discharged to retention basins. Water from the retention basin is mixed with the cooling water for discharge.

Freshwater consumption at the station is limited to drinking water, other domestic uses, and minor in-plant uses. Edison reports freshwater consumption to the USGS every five years. In 1990 and 1995, the Long Beach power plant used 180,040,000 and 79,044,000 gallons of freshwater, respectively.

Wastewater Discharge Permit

The Long Beach power plant discharges water under NPDES Permit No. CA0001171, Los Angeles RWQCB Order No. 94-130, which expires on November 10, 1999. The permit issued for the power plant is based on design capacity operation or full capacity operation of the power plant.

The NPDES permit identifies the following beneficial uses of the receiving waters for Long Beach Harbor: industrial service supply, non-contact water recreation, ocean commercial and sport fishing, marine habitat, preservation of rare and endangered species, navigation, and saline water habitat.

The NPDES permit also establishes a receiving water monitoring program, consisting of periodic biological surveys, sediment sampling, and chemical surveys of the receiving waters at locations around the wastewater outfall. The NPDES permit designates eight monitoring and sampling stations in the receiving waters around the Long Beach power plant.

The discharge limitations specified in the NPDES permit for the Long Beach power plant allow a maximum temperature discharge of 105°F during normal plant operation. During heat treatment, the allowable temperature limit is increased to 110° F. The pH of the effluent water must range between 6.0 and 9.0 pH units. The discharge limitation for total residual chlorine and free available chlorine is 0.355 mg/l. Effluent limitations for toxic constituents in the NPDES permit are based on the Ocean Plan and were calculated using a minimum dilution ratio (parts seawater to one part effluent) of 3.2 to 1 for Discharge Serial No. 001 and 7 to 1 for Discharge Serial No. 002. No numerical limits are presented in the NPDES permit for toxic constituents not used at the Long Beach power plant.

The discharge constraints in the NPDES permit conform with RWQCB water quality control plans. At times of peak demand during defouling treatment, residual chlorine levels have exceeded permit levels in the once-through cooling water system, however, chlorination bioassay studies showed no significant adverse impact on the receiving water as a result of the chlorine levels in the discharge.

Mandalay

Existing Water Resources

The Mandalay power plant is on the coast of California approximately three miles west of the City of Oxnard in Ventura County. The power plant intake is located in a canal which draws water from Oxnard Marina two miles south. The station discharges ocean water used for cooling purposes to the Pacific Ocean immediately offshore of the station.

The Mandalay power plant is located on the coastal plain of the Ventura Basin approximately 18.8 miles northwest of Point Mugu and 1.9 miles south of the Santa Clara River. The Ventura Basin is defined by the Ventura River delta to the north and the barrier beaches at Point Mugu to the south. Prominent natural features along this portion of the California Coast include the sand dunes along Mandalay Beach, the marshes and lagoon on the naval reservation near Point Mugu, and the straight sandy beaches interrupted by the Ventura Marina, Channel Islands Harbor, and the Harbor at Port Hueneme.

The Mandalay power plant exchanges water for cooling purposes directly with the open ocean waters of the Southern California Bight. Natural surface water temperatures at nearby Ormond Beach between July 1970 and January 1973 ranged from 11.4°C (52.5°F) in December 1971 to 22 °C (71.6°F) in August of the same year. During 1970-1971, minimum and maximum surface water temperatures at a control station offshore of the Mandalay power plant were 11.6°C (52.9°F) and 22.7°C (72.9°F). Mean surface salinity at the Ventura Marina between 1965 and 1971 ranged from 24.1 ppt during a period of high stormwater runoff to a high of 33.9 ppt. Yearly salinity averages were approximately 33.5 ppt. DO concentration in surface waters off Ormond Beach between July 1970 and January 1973 ranged from 7.3 to 11.0 mg/l. Maximum pH values recorded during four quarterly surveys offshore of Mandalay between December 1973 and September 1974 ranged from 8.0 to 8.6 units.

Existing Thermal Effects. Between November 1971 and January 1973, Edison completed a thermal effects study for the Mandalay power plant to comply with Section 316(a) of the Clean Water Act. The study measured the extent of the dispersal area of the thermal additive and the factors affecting the distribution and dispersal of waste heat. Maximum surface water temperatures at the 1,000-foot semi-circle from the station effluent were approximately 2°F warmer than at the control station for quarterly surveys. Surface temperatures on the 1,000-foot semi-circle exceeded the historical maximum at Hueneme during three surveys, when natural background temperatures were higher than normal. Vertical temperature profiles through the outfall perpendicular to shore and parallel to shore indicate that the expression of the plume is limited to the littoral zone.

Existing Wastewater Discharges. Wastewater discharge reports for the Mandalay Beach power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. During this time, only the total residual chlorine discharge was exceeded in January and February 1995 and in May 1994, the quarterly toxicity test exceeded the six-month median concentration. The chlorine exceedances were due to a misunderstanding of the permit requirements and subsequent analyses showed that permit conditions were being met. Due to an oversight, no additional follow-up samples were collected for the toxicity test; however, subsequent quarterly samples in August and November 1994 were within permit limits.

The Mandalay power plant consists of two steam electric-, natural gas-, or oil-fueled generating units rated at 215 MW each and one gas turbine rated at 140 MW. The total plant capacity is 570 MW; however, the plant operated at only 23% capacity in 1995.

Current Water Uses

The largest volume water use at the Mandalay power plant is seawater used for once-through plant cooling. The station is permitted to use 255.3 mgd of once-through cooling water when operating at design capacity.

Cooling water used by the power plant comes from the Edison Canal, which originates from the Channel Islands Harbor three miles downcoast of the power plant. Edison sprays chlorine-based algaecide to the Edison Canal periodically during spring and summer to control undesirable algae growth that could clog the intake screens and impede the pumping of cooling water through the power plant. No adverse water quality impacts have been observed due to the algaecide application.

Ocean water is supplied to the station at a flow rate of 170,000 gpm. The cooling water enters a screen structure at the station end of the Edison Canal and passes through trash bars that remove large debris. Seawater is then pumped to the station's two condenser units, one for each generating unit. The temperature of the water is elevated 11.6°C (20.9°F) after passing through the condenser unit when the station is operating at full capacity. The heated water is returned to the ocean across the beach through a rock-lined discharge canal.

Approximately 9,800 gpm of the main cooling water flow are diverted before it reaches the steam condensers and is directed to an auxiliary heat exchanger, which is used to cool distilled water used in auxiliary station equipment. The temperature of this water is elevated approximately 5°C (9°F) before it is returned to join the main stream in the cooling water discharge conduit. An additional 3,200 gpm are diverted to an auxiliary cooling water heat exchanger for the gas turbine unit, where its temperature is elevated a maximum of 9°C (16.2°F). This turbine unit is operated approximately 250 hours per year.

The plant also handles and discharges water used for other purposes besides cooling. This water is considered low-volume wastewater and consists of water from boiler blowdown, air preheater and boiler fireside washing, yard drains, fuel oil tank enclosures, hydrostatic test water, and oil water separator wastes. The low-volume wastes are discharged to retention basins, except for water from the yard drains. Water from the retention basin and the yard drains are mixed with the cooling water for discharge.

Freshwater consumption at the station is limited to drinking water, other domestic uses, and minor in-plant uses. Municipal water is supplied to the Mandalay power plant by the Calleguas Water District and the United Conservation District. Edison reports freshwater consumption to the USGS every five years. In 1990 and 1995, the Mandalay power plant used 45,750,000 and 54,194,000 gallons of freshwater, respectively.

Wastewater Discharge Permit

The Mandalay power plant discharges water under NPDES Permit No. CA0001180, Los Angeles RWQCB Order No. 94-131, which expires on November 10, 1999. The permit issued for the Mandalay power plant is based on design capacity operation or full capacity operation of the power plant.

The NPDES permit identifies the following beneficial uses of the receiving waters offshore of the power plant: industrial service supply, navigation, water contact and non-contact water recreation, ocean commercial and sport fishing, shellfish harvesting, marine habitat, and preservation of rare and endangered species. In addition to these uses, the beneficial uses identified for the near-shore zone include: industrial service supply, navigation, water contact and non-water contact recreation, ocean commercial and sport fishing, preservation of areas of special biological significance, preservation of rare and endangered species, shell fish harvesting, and marine habitat.

The NPDES permit also establishes a receiving water monitoring program, consisting of periodic biological surveys, sediment sampling, and chemical surveys of the receiving waters at locations around the wastewater outfall. The NPDES permit designates 17 monitoring and sampling stations in the receiving waters around the Mandalay power plant.

The discharge limitations specified in the NPDES permit for the Mandalay power plant allow a maximum temperature discharge of 106°F during normal plant operation. During heat treatment, the allowable temperature limit is increased to 125°F. The pH of the effluent water must range between 6.0 and 9.0 pH units. The discharge limitation for total residual chlorine and free available chlorine is 0.365 and 0.5 mg/l, respectively. Effluent limitations for toxic constituents in the NPDES permit are based on the Ocean Plan and were calculated using a minimum dilution ratio (parts seawater to one part effluent) of 26 to 1 for Discharge Serial No. 001.

The discharge constraints in the NPDES permit conform with statewide water quality control plans, except that residual chlorine effluent limitations are greater than 40 CFR Part 423 guidelines (0.20 mg/l) and the Ocean Plan objective (0.084 mg/l). At times of peak load, the chlorine levels in the once-through cooling water have been as high as 0.32 mg/l; however, chlorination bioassay studies showed no significant adverse impact on the receiving water as a result of the chlorine levels in the discharge. The SWRCB and EPA have approved a variance from the residual chlorine limitations.

Ormond

Existing Water Resources

The Ormond Beach power plant is located on the coast of California approximately 2.3 miles southeast of the entrance to Port Hueneme in Ventura County. The power plant draws from and discharges ocean water used for cooling purposes to the Pacific Ocean immediately offshore of the station.

The Ormond Beach power plant is located on the coastal plain of the Ventura Basin, which is defined by two coastal features: the barrier beaches at Point Mugu (7.1 miles to the south) and the delta of the Ventura River (13.1 miles to the north). Prominent natural features along this portion of the California Coast include the sand dunes along Mandalay Beach, the marshes and lagoon on the naval reservation near Point Mugu, and the straight sandy beaches interrupted by the Ventura Marina, Channel Islands Harbor, and the Harbor at Port Hueneme.

The Ormond Beach power plant exchanges water for cooling purposes directly with the open ocean waters of the Southern California Bight. Monthly mean surface water temperatures offshore of the Ormond Beach power plant range from 13.3°C (55.9°F) in February and March to 16.7°C (62.1° F) in August. Mean maximum surface water temperatures are 14.4°C (57.9°F) during winter and 22.2°C (72°F) during summer. Mean surface salinity at the Ventura Marina between 1965 and 1971 ranged from 24.1 ppt during a period of high stormwater runoff to a high of 33.9 ppt. Yearly salinity averages were approximately 33.5 ppt. DO concentration in surface waters off Ormond Beach between July 1970 and January 1973 ranged from 7.3 to 11.0 mg/l. Maximum pH values recorded during four quarterly surveys offshore Ormond Beach between December 1973 and September 1974 ranged from 8.0 to 8.6 units.

Existing Thermal Effects. Edison completed a thermal effects study for the Ormond Beach power plant to comply with Section 316(a) of the Clean Water Act. The study measured the surface areas and the horizontal and vertical extensions of the 1°F and 4°F elevated temperature field around the outfall in the offshore open ocean waters. The study indicated that elevated temperature water contacts the bottom occasionally but only in the vicinity of the discharge structure. The thermal field extended to a depth of 10-15 feet below the surface, approximately 500 feet from the discharge. Surface temperatures in the vicinity of the discharge averaged 1.1°F to 2.6°F warmer than at a control station located downcoast. Surface water temperature 4°F above ambient was not observed to extend beyond the 1,000 feet radius more than 25% of the time. The mean surface area of the 4°F thermal field above background averaged 16 acres and ranged from one to 80 acres. The corresponding area of the 1°F thermal field averaged 290 acres and ranged from 60 to 560 acres. The study demonstrated that waste discharges from the power plant are in compliance with the Thermal Plan and that beneficial uses of the receiving waters are protected, as required by Section 316(a) of the Clean Water Act.

Daily temperature monitoring records for the Ormond Beach power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. During this time, the station incurred one exceedance of the maximum cooling water discharge temperature. On August 27, 1994, the station discharged water with a temperature of 106°F from 1750 hours to 1841 hours, for a total of 51 minutes. The temperature exceedance was the result of a high inlet temperature while the unit was operating at a high load. The outlet water temperature was lowered by reducing the unit load.

Existing Wastewater Discharges. Wastewater discharge reports for the Ormond Beach power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. During this time, no exceedances of the discharge parameters were incurred, and the station was in compliance with the NPDES permit discharge limitations.

The Ormond Beach power plant is currently applying for an addendum to its NPDES permit to allow a 5°F temperature increase in the water discharge temperature. At times of peak load operation, the effluent water temperature has approached the discharge limitation temperature. This occurs only when the influent water temperature is abnormally high during warm summer months of July and August. The station will ramp down power production to prevent a permit exceedance when water discharge temperature nears the discharge limit.

Current Water Uses

The largest volume water use at the Ormond Beach power plant is seawater used non-consumptively for once-through plant cooling. The station is permitted to use 688.2 mgd of once-through cooling water when operating at design capacity.

Ocean water for cooling purposes is supplied to the station through a four-foot inside diameter concrete conduit at a flow rate of 475,000 gpm. The intake structure is located 1,950 feet offshore at a water depth of about 35 feet MLLW. Seawater is then pumped to the stations' two condenser units, one for each generating unit. The temperature of the water is elevated 16.7°C (30°F) after passing through the condenser unit when the station is operating at full capacity. The heated water is returned to the ocean through a 14-foot inside diameter conduit that terminates 1,350 feet offshore. The water discharge is directed upward from a depth of 29.5 feet MLLW.

Approximately 20,000 gpm of the main flow are diverted to two auxiliary heat exchangers that are used to cool treated distilled water for other plant equipment. The temperature of this water is elevated approximately 5.6°C (10°F) before it is returned to the main cooling water discharge conduit.

The plant also handles and discharges water used for other purposes besides cooling. This water is considered low-volume wastewater and consists of water from boiler blowdown, air preheater and boiler fireside washing, yard drains, fuel oil tank enclosures, hydrostatic test water, and oil water separator wastes. The low-volume wastes are discharged to retention basins, except for the yard drain. Water from the retention basin is mixed with the cooling water for discharge. Yard drains discharge into large open areas north and south of the station. The yard drains have valves that are normally closed except when needed to drain rain water.

Freshwater consumption at the station is limited to drinking water, other domestic uses, and minor in-plant uses. Municipal water is supplied to the Ormond Beach power plant by the Calleguas Water District and the United Conservation District. Edison reports freshwater consumption to the USGS every five years. In 1990 and 1995, the Ormond Beach power plant used 196,150,000 and 79,599,000 gallons of freshwater, respectively.

Wastewater Discharge Permit

The Ormond Beach power plant discharges water under NPDES Permit No. CA0001198, Los Angeles RWQCB Order No. 94-132, which expires on November 10, 1999. The permit issued for the Ormond Beach power plant is based on design capacity operation or full capacity operation of the power plant.

The NPDES permit identifies the following beneficial uses of the receiving waters offshore of the power plant: industrial service supply, navigation, water contact and non-contact water recreation, ocean commercial and sport fishing, shellfish harvesting, marine habitat, and preservation of rare and endangered species. The beneficial uses identified for the near-shore zone include: industrial service supply, navigation, water contact and non-water contact recreation, ocean commercial and sport fishing, preservation of areas of special biological significance, preservation of rare and endangered species, shell fish harvesting, and marine habitat.

The NPDES permit also establishes a receiving water monitoring program consisting of periodic biological surveys, sediment sampling, and chemical surveys of the receiving waters at locations around the wastewater outfall. The NPDES permit designates nine monitoring and sampling stations in the receiving waters around the Ormond Beach power plant.

The discharge limitations specified in the NPDES permit for the Ormond Beach power plant allow a maximum temperature discharge of 105°F during normal plant operation. During heat treatment, the allowable temperature limit is increased to 125° F. The pH of the effluent water must range between 6.0 and 9.0 pH units. The discharge limitation for total residual chlorine and free available chlorine is 0.399 and 0.5 mg/l, respectively. Effluent limitations for toxic constituents in the NPDES permit are based on the Ocean Plan and were calculated using a minimum dilution ratio (parts seawater to one part effluent) of 6.5 to 1 for Discharge Serial No. 001.

The discharge constraints in the NPDES permit conform with the RWQCB statewide water quality control plans, except that residual chlorine effluent limitations are greater than the 40 CFR Part 423 guidelines (0.20 mg/l) and the Ocean Plan objective (0.068 mg/l) (Los Angeles RWQCB 1994f). At times of peak load, the chlorine levels in the once-through cooling water have been as high as 0.26 mg/l; however, chlorination bioassay studies showed no significant adverse impact on the receiving water as a result of the chlorine levels in the discharge. The SWRCB and EPA have approved a variance from the residual chlorine limitations.

Redondo

Existing Water Resources

The Redondo power plant is located adjacent to King Harbor in the City of Redondo Beach on the southern shore of Santa Monica Bay. The power plant draws from and discharges water to Santa Monica Bay and King Harbor.

Water quality in Santa Monica Bay is affected by the physiography, climate, and hydrography of the southern California coastal region. Natural surface water temperatures in Santa Monica Bay vary between 11.7°C (53.1°F) and 22.2°C (72°F) annually, and may be expected to vary between 1.0 and 2.0°C in summer and 0.3 and 1.0°C in winter. Salinity in Santa Monica Bay ranges from 33.0 to 34.0 ppt. DO concentrations in Santa Monica Bay range from approximately five to 12 mg/l. Normal pH values in Santa Monica Bay range between 8.0 and 8.6 units.

Despite the relative abundance of aquatic and terrestrial life in and around Santa Monica Bay, the Bay's habitats have been significantly altered and degraded. For example, only approximately 5%

of the area's historical wetlands acreage still exists. Pollution of coastal waters has led to a decline in species and a commercial fishing ban on white croaker in certain areas. In addition, although the use of DDT was banned in 1971, residues of this pesticide still bio-accumulate in the tissues of invertebrates, fish, birds, and marine mammals.

Water quality immediately offshore of the power plant is affected by stormwater runoff, industrial discharges, and ship traffic. In addition, climatological parameters (e.g., solar radiation, humidity, and wind) influence the condition of the receiving water.

Water inside of King Harbor is essentially isolated from open coastal circulation and from normal wave- and surf-induced turbulence. The exchange of water with open ocean is limited but is enhanced by both tidal flow through the harbor entrance and the withdrawal of large volumes of cooling water. Solar heating, limited vertical mixing, and the reduced exchange of open water leads to naturally elevated water temperatures in the harbor, especially in the shallow mooring basins.

Existing Thermal Effects. Between November 1971 and January 1973, Edison completed a thermal effects study for the Redondo power plant to comply with Section 316(a) of the Clean Water Act. The study measured the surface areas and the horizontal and vertical extensions of the 1°F and 4°F elevated temperature field around the outfalls in Santa Monica Bay and King Harbor. The vertical profile measurements indicated that the elevated temperature field is not in contact with the ocean substrate except along the shore and harbor breakwater. The study demonstrated that waste discharges from the power plants are in compliance with the Thermal Plan and that beneficial uses of the receiving waters are protected, as required by Section 316(a) of the Clean Water Act.

Daily temperature monitoring records for 1993, 1994, and 1995 were reviewed. During this period, the only exceedance of the temperature discharge limitation occurred on October 16 and 17, 1995, in water discharged from Discharge Serial No. 001. On these dates, the water temperature of the discharge was 108.6°F (for 9 hours) and 114°F (for five hours), respectively. The temperature exceedance occurred during times when a generating unit was running at high load operations and one of the circulating pumps for the unit was out of service. The circulating water provided by one pump did not generate sufficient cooling water to reduce the effluent water temperature. The high temperature was resolved by placing a circulating pump from an adjoining unit in service, and the temperature dropped to within permit limits.

The Redondo power plant is currently applying for an addendum to its NPDES permit to allow a 5 °F temperature increase in the water discharge temperature. At times of peak load operation, the effluent water temperature has approached the discharge limitation temperature. This occurs only when the influent water temperature is abnormally high during warm summer months of July and August. The Redondo power plant will ramp down power production to prevent a permit exceedance when water discharge temperature nears the discharge limit.

Existing Wastewater Discharges. Wastewater discharge reports for the Redondo power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. During this time, no exceedances of the discharge parameters were incurred, and the station was in compliance with the NPDES permit discharge limitations.

Current Water Uses

The largest volume water use at the Redondo power plant is seawater used non-consumptively for once-through plant cooling. The station is permitted to use 1,146 mgd of once-through cooling water when operating at design capacity.

Ocean water for cooling purposes is supplied to the station via two cooling water systems, one serving Units 1 through 6, and one serving Units 7 and 8. The flow is directed to three screening facilities within the plant. One screening facility serves Units 1 through 4, the second and third facilities serve Units 5 and 6, and Units 7 and 8, respectively. After screening, the water is pumped to two steam condensers.

Approximately 320,000 gpm of seawater enter Units 1 through 6 from King Harbor through two 9.8-foot inside diameter concrete conduits. The intake conduits originate approximately 1,600 feet offshore and draw water from an approximate depth of 20 feet below MLLW. After passing through the condensers, the temperature of the cooling water is elevated 12.8°C (23°F) in Units 5 and 6 when the units are operating at full load. The temperature increase is less when operating at lower loads. The warmed water is discharged to the Pacific Ocean through Discharge Serial No. 001. This discharge consists of two conduits that extend approximately 1,600 feet offshore and discharge at an approximate depth of 25 feet MLLW.

Approximately 468,000 gpm of seawater are supplied to Units 7 and 8 through a 14-foot inside diameter concrete conduit that originates approximately 1,000 feet offshore and draws water from the mouth of King Harbor at an approximate depth of 20 feet MLLW. After passing through the condensers, the temperature of the water is elevated 12.0°C (21.6°F) when the units are operating at full load. The temperature increase is less when operating at lower loads. The warmed water is discharged to King Harbor through Discharge Serial No. 002. The discharge consists of a 14-foot inside diameter concrete conduit that terminates about 300 feet off the beach at King Harbor in Redondo Beach at a depth of approximately 20 feet below MLLW.

The plant also handles and discharges water used for other purposes besides cooling. This water is considered low-volume wastewater and consists of water from boiler blowdown, air preheater and boiler fireside washing, yard drains, fuel oil tank enclosures, hydrostatic test water, and oil water separator wastes. The low-volume wastes are discharged to retention basins. Water from the retention basin is mixed with the cooling water for discharge.

The station also discharges small amounts of groundwater generated by dewatering activities. The property is a former marsh and low-lying area. Because groundwater elevations range from surface grade to five feet below ground surface, the station must keep three groundwater pumping wells running in the area of the fuel oil tanks to keep the area from becoming submerged. The water recovered is pumped into the Units 5 and 6 intake system.

Freshwater consumption at the station is limited to drinking water, other domestic uses, and minor in-plant uses. Edison reports freshwater consumption to the USGS every five years. In 1990 and 1995, the Redondo power plant used 194,240,000 and 122,231,000 gallons of freshwater, respectively.

Wastewater Discharge Permit

The Redondo power plant discharges water under NPDES Permit No. CA0001201, Los Angeles RWQCB Order No. 94-133, which expires on November 10, 1999. The permit issued for the Redondo power plant is based on design capacity operation or full capacity operation of the power plant.

The NPDES permit identifies the following beneficial uses of the receiving waters for King Harbor: industrial service supply, non-contact water recreation, ocean commercial and sport fishing, marine habitat, and preservation of rare and endangered species. In addition to these uses, the beneficial uses identified for the near-shore zone include navigation, water contact recreation, preservation of areas of special biological significance, shell fish harvesting, and fish spawning.

The NPDES permit also establishes a receiving water monitoring program, consisting of periodic biological surveys, sediment sampling, and chemical surveys of the receiving waters at locations around the wastewater outfall. The NPDES permit designates 16 monitoring and sampling stations in the receiving waters around the Redondo power plant.

The discharge limitations specified in the NPDES permit for the Redondo power plant allow a maximum temperature discharge of 106°F during normal plant operation. During heat treatment the allowable temperature limit is increased to 125° F. The pH of the effluent water must range between 6.0 and 9.0 pH units. The discharge limitation for total residual chlorine is 0.633 and 0.422 for Discharge Serial Nos. 001 and 002, respectively. The discharge limitation for free available chlorine is 0.5 and 0.2 mg/l for Discharge Serial Nos. 001 and 002, respectively. Effluent limitations for toxic constituents in the NPDES permit are based on the Ocean Plan and were calculated using minimum dilution ratios (parts seawater to one part effluent) of 11.5 to 1 for Discharge Serial No. 001 and 7 to 1 for Discharge Serial No. 002. No numerical limits are presented in the NPDES permit for toxic constituents not used at the Redondo power plant.

The discharge constraints in the NPDES permit conform with statewide water quality control plans, except that residual chlorine effluent limitations are greater than the Ocean Plan objectives (0.10 mg/l and 0.064 mg/l for Discharge Serial Nos. 001 and 002, respectively). At times of peak load, the chlorine levels in the once-through cooling water have been as high as 0.22 mg/l; however, chlorination bioassay studies showed no significant adverse impact on the receiving water as a result of the chlorine levels in the discharge. The SWRCB has approved an exception from the residual chlorine limitations.

Inland Power Plants

The inland power plants under study are Cool Water, Etiwanda, Highgrove, and San Bernardino power plants. Site-specific discussions below provide a description of the existing water resources, the current water uses, and the wastewater discharge permit requirements. A summary of the inland facility wastewater discharge permits and their effluent limitations is presented in Table 4.4.3.

Typical Inland Groundwater-Cooled Plant

Power plants in areas with limited surface water supplies use groundwater for cooling and typically have several deep wells that tap aquifers located several hundred feet below. Cooling at groundwater-cooled plants is similar to that at seawater-cooled plants, except that cooling towers are used as the primary heat exchanger for evaporation at groundwater-cooled plants. In the evaporative cooling process, heat is removed from the condenser by circulating water through the condenser. Water lost through evaporation must be replaced; therefore, these power plants are heavy users of water.

TABLE 4.4.3: EDISON INLAND FACILITY NPDES PERMITS AND COOLING WATER DISCHARGES

Power Plant	Permit Number	Order Number	Expiration Date	Outfall Number	Receiving Water	Allowable Maximum Flow (mgd)	Allowable Maximum Temperatures (°F)	pH Maximum	Maximum Chlorine Levels (mg/L)	
									Total Residual	**Free**
Cool Water	N/A	6-84-20	N/A	N/A	N/A	0.82	N/A	N/A	N/A	N/A
Note: Power plant discharges to five on-site clay-lined evaporation ponds.										
Etiwanda	POTW #10358	N/A	N/A	N/A	Sanitary Sewer LA County Sanitation District	3.36	120	6-12.5	N/A	N/A
Note: The discharge is to the sanitary sewer and the permit is issued by the Chino Basin Municipal Water District. The permit allows for the discharge of cooling tower water and other facility sources; however, surface runoff is not allowed in the discharge and the discharge may not contain volatile hydrocarbons. Rainwater (surface water) collected within the storage tank impound areas is allowed to evaporate.										
Highgrove	CA001555	94-95	9/1/99			0.611				
				001	Evaporation pond with overflow into Santa Ana River	N/A	95	6.5-8.5	0.1	N/A
				002	Lake Cadena which overflows into the Santa Ana River	N/A	95	6.5-8.5	0.1	N/A
				003	Riverside Canal	N/A	N/A	6.5-8.5	N/A	N/A
Note: Power plant is used only in summer and has intermittent discharges.										
San Bernardino	CA0001210	94-8	3/1/99				2.1	95		
				001	Santa Ana River	1.075	95	6.5-9	0.1	20
				002	Riverside Canal	1.075	N/A	6.5-9	0.5	65
Note: Power plant is used only in summer and has intermittent discharges.										

NOTES: mgd = million gallons per day. N/A = not applicable/available.
s: = summer temperatures. w = winter temperatures.
mg/L = milligrams per liter. °F = degrees Fahrenheit.
* requirements if Section 301g variance is not passed/requirements if passed.

Cooling tower and boiler blowdown are treated and reused at certain power plants because water supplies are limited and groundwater pumping costs are high. This recycling of water varies from plant to plant, but most plants can cycle water approximately 2.5 times before it must be discharged from the system. Other water-dependent operational processes include feed water demineralization, boiler cleaning, and oil storage.

Boiler blowdown is a watery residue of excess steam in boilers that is a source of increased salts. Boiler blowdown is disposed of after several cycles of power generation. The wastewater is conveyed to a retention basin, where it is monitored before being discharged The brine created by demineralization of boiler water are typically discharged to a retention basin before discharge to receiving waters.

A variety of chemicals are used to clean the boiler walls, including hydrochloric, formic, and hydroacetic acids. The wastes from boiler cleaning are conveyed to a storage pond, where lime is added to adjust the pH levels and precipitate dissolved metals. The sludge generated from this process typically has low concentrations of heavy metals and is considered a hazardous waste. These wastes are recycled as flux at an Arizona copper smelter.

Oils, greases, and other lubricants that are used for lubricating pump bearings, circuit breakers, and transformers also require cleaning; special pipe systems carry oily residues and waters to a central storage pond at most plants, where a mechanical oil water separator is used to recover the oil.

Cool Water

Existing Water Resources

Edison's Cool Water power plant is located just north of Highway 40 adjacent to the town of Daggett, approximately 10 miles east of Barstow in San Bernardino County, California. The power plant is located on Edison-owned land known as the Cool Water Ranch. The power plant uses groundwater as cooling water and discharges the cycled water to evaporative ponds.

The Cool Water power plant and other facilities on the Cool Water Ranch comprise the ninth largest water user in the Lower Mojave River Basin. All water used on the Cool Water Ranch is pumped from groundwater wells located on site.

The Mojave River Basin is in a state of overdraft, where water resources are insufficient to meet the expanding needs of the communities in the basin. It is believed that total water use in the Mojave River System exceeds available supply by approximately 68,000 acre-feet (af) per year. The overdraft has lowered the water table in many areas in the basin.

In May 1990, the City of Barstow and the Southern California Water Company filed a lawsuit against over 100 entities that pump groundwater from the Mojave River Basin upgradient of the

City of Barstow. In turn, one of those parties (the Mojave Water Agency) filed a cross complaint against all the major water users in the basin, including Edison. The Mojave Water Agency lawsuit involved hundreds of water users in the Mojave River Basin that annually pumped over 10 af of water. The outcome of the lawsuit was that Edison, along with most other parties involved, signed a stipulation to agree upon a reasonable method for managing the basin water resources. The stipulation reduces the amount of water available at no cost to all major water users in the basin.

The stipulation establishes a Free Production Allowance of water based on the maximum production for each party between 1986 and 1990. For the first five years of the stipulation agreement, every party's Free Production Allowance will be reduced by 5%. If after five years the basin has not achieved a safe annual yield, the Free Production Allowance will continue to be reduced up to 5% annually until the basin achieves a safe annual yield. Any party that exceeds the Free Production Allowance must pay a water replacement fee that will be used to purchase water for importation into the basin. Edison entered the Mojave River Basin Adjudication Stipulated Judgment on March 6, 1996.

Groundwater beneath the station is reported to be at an average depth of 130 feet below ground surface and of good quality. Cool Water power plant staff reported that no known groundwater contamination exists beneath the station.

The Cool Water Ranch also has a central receiver solar generating facility, Solar Two, with a 10 MW rate capacity. Daggett Leasing, Inc., owns and operates two additional solar generating facilities on the property, SEGS I and II.

Current Water Uses

Water is used at the Cool Water Ranch for both industrial and agricultural purposes. The industrial water use entails the operation and maintenance of the various electric generating units and associated sanitary and landscape needs at the generating facilities and on-site administrative offices. The greatest water use at the facility is for evaporative cooling of heated water from the generating units. Therefore, annual water usage is highly dependent on the amount of electricity generated at the facilities at the Cool Water Ranch.

The agricultural water use is associated with the irrigation of the alfalfa fields. The alfalfa is grown by a farmer who leases parts of the ranch open areas surrounding the generating facilities. The alfalfa farming operation also provides effective dust control for the generating facilities.

Between 1986 and 1994, the average annual amount of industrial water used at the Cool Water Ranch was 2,735 af, and the largest annual industrial water use was 4,565 af. Between 1986 and 1994, the average annual agricultural water use at the Cool Water Ranch was 5,252 af, and the largest annual agricultural water use was 5,858 af. Combining the Cool Water Ranch's greatest industrial and agricultural annual water uses during the 1986-1990 period totals 10,423 af of water. This water is Edison's base annual production amount.

Cool Water has six groundwater wells that supply groundwater for cooling, irrigation, and other water uses on the property. One well supplies potable water to the station; however, the station uses bottled water for drinking water. Five other wells are used for agricultural irrigation purposes. A reported total of 11 usable groundwater monitoring wells are located around the retention ponds and outlying areas of the station.

Wastewater from the Cool Water power plant is discharged to five interconnected clay-lined ponds with a surface area of 130 acres. Each pond is lined with 12 inches of bentonite clay. The wastewater discharged by the power plant and the solar power plants to the ponds includes cooling tower blowdown, boiler blowdown, demineralizer regeneration wastewater, boiler cleaning wastewater, clarifier sludge, water softening unit wastewater, and minor amounts of stormwater. The design capacity of the evaporation ponds is theoretically calculated at 0.8 mgd.

Sanitary Sewage is discharged to an on-site septic tank and drainage system.

Wastewater Discharge Permit

The Cool Water power plant is under the jurisdiction of the Lahontan RWQCB. The station discharges a maximum of 0.82 mgd of industrial wastewater to five existing clay-lined evaporation ponds under the terms of Board Order No. 6-84-29, adopted by the Lahontan RWQCB on March 8, 1984. This order is still the current permit for wastewater discharges at the Cool Water power plant, although the Lahontan RWQCB is processing an updated permit, expected in 1997.

Etiwanda

Existing Water Resources

The Etiwanda power plant is located in the City of Rancho Cucamonga, San Bernardino County. The power plant pumps groundwater from the Upper Santa Ana River Basin for use as cooling water and subsequently discharges water to the Chino Basin Municipal Water District.

The Santa Ana River is divided into six reaches by the Santa Ana RWQCB. Each reach is generally a separate hydrologic and water quality unit. The Etiwanda power plant is located within the drainage area of Reach 5 of the Santa Ana River. Reach 5 extends from Seven Oaks Dam to San Bernardino to the San Jacinto Fault (Bunker Hill Dike), which marks the downstream edge of the Bunker Hill groundwater basin. Most of this reach tends to be dry, except during periods of storm flow. This channel is largely operated as a flood control facility.

The Etiwanda power plant overlies the Chino I groundwater subbasin within the Upper Santa Ana River Basin. The TDS concentration in this subbasin is five mg/l. The basin plan TDS objective for groundwater in this subbasin is 220 mg/l.

Current Water Uses

All the water used at the Etiwanda power plant is supplied by three on-site groundwater wells and water purchased from the Metropolitan Water District (MWD). The station has adjudicated rights to 1,000 af per year from the Chino groundwater basin. The station also augments its groundwater supply through temporary water right transfers from other existing groundwater users in the basin.

The station also purchases Colorado River water from MWD via the district's Upper Feeder Canal. In 1991, the station purchased 3,000 af of Colorado River water from MWD. Colorado River water is used during winter months when the water cost is lower. During summer months, power plant water use depends more on its groundwater source due to the greater cost of Colorado River water during the summer period.

In 1993, the Etiwanda power plant purchased over 546 million gallons of water from MWD and pumped over 156 million gallons of water from the on-site groundwater supply wells. In 1994, the station purchased over 575 million gallons from MWD and pumped over 622 million gallons from the on-site groundwater supply wells. In 1995, the station purchased over 119 million gallons from MWD and pumped over 756 million gallons of water from the on-site groundwater supply wells.

The largest water use at the facility is for evaporative cooling. The remaining water uses are for general station maintenance and operation. This water is discharged as low-volume wastewater. The low-volume wastewater includes, but is not limited to, wastewater from cooling water blowdown, floor drainage, cooling tower basin cleaning wastes, boiler wastes, metal cleaning processes, equipment washdowns, and miscellaneous sumps.

The station operates a metal cleaning waste retention basin and a wastewater retention basin that receive low-volume wastes. The basins accept these wastewater streams and act as settling ponds prior to discharging the wastewater to the publicly owned treatment works. The station also operates a cooling water reservoir for water supply to the generating units via a gunite canal. The cooling water reservoir is lined and receives make-up water from on-site groundwater wells as needed.

Wastewater Discharge Permit

The power plant discharges wastewater to Los Angeles County Sanitation District (LACSD) No. 21 through the Chino Basin Municipal Water District (CBMWD) non-reclaimable industrial waste lines. This discharge is conducted under the terms of Temporary Non-Reclaimable Waste System Discharge Permit No. 10358 issued by the CBMWD on June 4, 1991. This permit remains current until the issuance of a permanent permit.

The CBMWD discharges to the Los Angeles County wastewater system as part of the Wastewater Reclamation and Solid Waste Management Group of the County Sanitation Districts of Los Angeles County.

The maximum allowable discharge from the power plant to the CBMWD is 3.36 mgd; however, the discharge typically ranges between 1.1 mgd and 3.36 mgd. The discharge consists of cooling water discharge and low-volume wastewater.

The general discharge limitations specified in the wastewater discharge permit allows a maximum temperature discharge of 120°F. The pH of the effluent water must range between 6.0 and 12.5 pH units. The suspended solids in the waste stream may not exceed 450 mg/l.

The station performs quarterly monitoring and sampling of the effluent water to determine compliance with permit conditions. According to quarterly discharge reports for 1993, 1994, and 1995, the station has been in compliance with the CBMWD wastewater discharge permit limitations.

The permit issued by the CBMWD for an industrial wastewater discharge is specific to an industrial discharger for a specific operation at a specific location. A new permit must be obtained if there is a change in ownership. However, the district and the disposal agency may issue a temporary permit to the new owner if there is only a change in ownership of the facility and the operations that generate industrial wastewater and not pretreatment facilities.

The station is a permittee to the Statewide General Industrial Activities Stormwater Discharge Permit, Permit Identification No. 8 36S006396. The station discharges stormwater to the Chadwick Channel that transects the Edison property. The channel also receives stormwater runoff from upstream industrial users. The channel has contained hydrocarbons in the past which are believed to have originated from an off-site oil filter crushing facility. Edison collects water samples from the channel, both upstream and downstream of the Etiwanda power plant, to monitor off-site and on-site stormwater discharges.

Sanitary sewage is discharged to an on-site septic tank and drainage system.

Highgrove

Existing Water Resources

The Highgrove power plant is located in the City of Grand Terrace, San Bernardino County. The power plant pumps groundwater from the Upper Santa Ana River Basin for use as cooling water and subsequently discharges water to the Riverside Canal and the Santa Ana River.

The Santa Ana River is divided into six reaches by the Santa Ana RWQCB. Each reach is generally a separate hydrologic and water quality unit. The wastewater discharged from the

Highgrove power plant is located within Reach 4 of the Santa Ana River. Reach 4 includes the river from Bunker Hill Dike down to Mission Boulevard Bridge in Riverside.

The Highgrove power plant overlies the Riverside I groundwater subbasin of the Upper Santa Ana River Basin. The TDS concentration in this subbasin is 480 mg/l. The basin plan objective for groundwater in this subbasin is 490 mg/l.

Surface water quality at the Highgrove power plant is affected by stormwater runoff containing elevated levels of copper. The power plant has had exceedances of copper, cadmium, and lead concentrations in the effluent water discharge. The source of the elevated copper levels is believed to originate from the adjacent properties. Stormwater from these properties flows into the Edison property and into the settling pond that discharges to the Santa Ana River, Discharge Serial No. 001. During a recent site visit, a discharge to the pond from an adjacent property was observed.

Current Water Uses

The largest water use at the facility is for cooling water when the facility is operating at normal capacity. Since the station only operates a few days a year, however, the greatest water use currently is for low-volume cleaning waste. The low-volume wastewater includes, but is not limited to, wastewater from the wet scrubber air pollution control system, ion exchange water treatment systems, water treatment evaporative blowdown, laboratory and sampling streams, floor drainage, cooling tower basin cleaning wastes, boiler wastes, and blowdown from the recirculating house service water systems.

The Highgrove power plant uses groundwater that is supplied by four wells located on site. Although these four wells have an estimated maximum flow of 1.4 mgd based on the station's designed capacity, in 1993 the station used only 0.16 mgd. Well No. 1 supplies water for domestic and sanitary purposes. Well No. 2 supplies water for all of the in-plant operational needs. Well Nos. 3 and 4 supply water for the cooling water towers. A fifth well supplies irrigation water to the leased agricultural operations on the northeastern portion of the property. Groundwater is at approximately 85 feet below ground surface.

The power plant discharges wastewater through three discharges. Discharge Serial No. 001 discharges to an existing retention pond that overflows into the Santa Ana River, Discharge Serial No. 002 discharges into Lake Cadena that also overflows into the Santa Ana River, and Discharge Serial 003 discharges to the Riverside Canal. Discharge Serials 001 and 002 are tributary to Reach 4 of the Santa Ana River. Water discharged to the Riverside Canal is used downstream for agricultural supply in the Arlington and Temescal groundwater subbasins.

Edison reports its freshwater consumption to the USGS every five years. In 1990 and 1995, the Highgrove power plant used over 26 and over 14 million gallons of water, respectively.

Wastewater discharge reports for the Highgrove power plant for 1993, 1994, and 1995 were reviewed to determine compliance with NPDES permit limitations. The review indicated that the station discharged 1,643,568 and 1,997,207 gallons of water to the Santa Ana River in 1993 and 1995, respectively. No discharge occurred in 1994. The review also indicated that the station incurred discharges that exceed the allowable limit for copper, cadmium and zinc in March, April, and May 1995. The source of these exceedances is believed to be stormwater runoff from adjacent properties.

Sanitary sewage is discharged to an on-site septic tank and drainage system.

Wastewater Discharge Permit

The Highgrove power plant discharges water under NPDES Permit No. CA0001555, Santa Ana RWQCB Order No. 94-45, which expires on September 1, 1999. The permit issued for the Highgrove power plant is based on design capacity operation or full capacity operation of the power plant. The station is permitted to discharge a total of 0.611 mgd.

The NPDES permit identifies the following beneficial uses of the receiving waters for Reach 4 of the Santa Ana River: industrial process supply, groundwater recharge, water contact and non-water contact recreation, warm freshwater habitat, and wildlife habitat. Santa Ana RWQCB identified the following beneficial uses of the receiving waters for the Arlington and Temescal groundwater subbasins: municipal and domestic supply, agricultural supply, industrial process supply, and industrial service supply.

The general discharge limitations specified in the NPDES permit for the Highgrove power plant allows a maximum temperature discharge of 95°F for water discharged to the Santa Ana River. No temperature limit is indicated for water discharged to the Riverside Canal. The pH of the effluent water must range between 6.5 and 8.5 pH units for both discharges. Specific discharge limits are also provided for discharges to the Santa Ana River (Discharge Serial Nos. 001 and 002) and for discharge to the Riverside Canal (Discharge Serial No. 003). The TDS effluent concentration limit for discharges to the Riverside Canal is 840 mg/l and for discharges to the Santa Ana River is 490 mg/l. Any discharges of TDS in excess of the discharge limitation must comply with the Wastewater Offset Program (WOP).

The WOP was established for dischargers who are unable to economically reduce the concentration of TDS and other constituents in their discharge to meet the basin plan objectives. The NPDES permits specify that these dischargers must develop and implement a program to offset TDS discharges in excess of the effluent limits. The program requires that TDS discharges in excess of the effluent limit must be offset by pumping higher concentration TDS groundwater from another source in the subbasin for transport, treatment, and discharge outside of the subbasin.

San Bernardino

Existing Water Resources

The San Bernardino power plant is located in unincorporated San Bernardino County, adjacent to the City of San Bernardino. The power plant pumps groundwater from the Upper Santa Ana River Basin for use as cooling water and subsequently discharges water to the Riverside Canal and the Santa Ana River.

The Santa Ana River is divided into six reaches by the Santa Ana RWQCB. Each reach is generally a separate hydrologic and water quality unit. The wastewater discharged from the San Bernardino power plant is located within Reach 5 of the Santa Ana River. Reach 5 extends from Seven Oaks Dam to San Bernardino, to the San Jacinto Fault (Bunker Hill Dike), which marks the downstream edge of the Bunker Hill groundwater basin. Most of this reach tends to be dry, except during periods of storm flow. This channel is largely operated as a flood control facility.

The San Bernardino power plant overlies the Bunker Hill II groundwater subbasin of the Upper Santa Ana River Basin. The TDS concentration in this subbasin is 290 mg/l, which is also the basin plan objective for groundwater in this subbasin.

All the water used at the San Bernardino power plant is supplied by two on-site wells and by the Gage Canal. The average quality of water supplied to the station is based on a sample collected from groundwater wells in 1993. Analyses of the water indicated the following concentrations: TDS, 184 mg/l; total hardness, 122 mg/l; sodium, 45 mg/l; sulfate, 19 mg/l; chloride, seven mg/l; fluoride, 1.2 mg/l; boron, 0.05 mg/l; and pH, 8.3 units. The quality of this water, with the exception of sodium, meets the basin plan objectives for the Bunker Hill II groundwater subbasin. The basin plan objective for sodium for the Bunker Hill II groundwater subbasin is 30 mg/l.

Edison is a shareholder in the Gage Canal Company. Each shareholder receives water based on their number of shares. Edison has 667 shares. Each share provides the right to approximately 13,000 gallons of water.

Current Water Uses

All the water supplied to the San Bernardino power plant is supplied by two on-site wells and by the Gage Canal. Edison reports its freshwater consumption to the USGS every five years. In 1990 and 1995, the San Bernardino power plant used over 57 and 84 million gallons of water, respectively. In 1990, the volume of water consisted of 1.1 million gallons of water supplied from the Gage Canal and 56 million gallons of water supplied from on-site groundwater wells. In 1995, the volume of water consisted of over 32 million gallons of water supplied from the Gage Canal and over 52 million gallons of water pumped from on-site groundwater wells. Groundwater is reported to exist between 125 and 140 feet below ground surface.

The largest water use at the facility is for cooling water. The remaining water uses are for general station maintenance and operation. This water is discharged as low-volume wastewater. Approximately 1.075 mgd of cooling water blowdown and low-volume miscellaneous waste streams are discharged from the facility on an intermittent basis.

The low-volume wastewater includes, but is not limited to, wastewater from the wet scrubber air pollution control system, ion exchange water treatment systems, water treatment evaporative blowdown, laboratory and sampling streams, floor drainage, cooling tower basin cleaning wastes, boiler wastes, and blowdown from the recirculating house service water systems.

The power plant discharges wastewater through two discharges. Discharge Serial No. 001 discharges to the Santa Ana River, and Discharge Serial No. 002 discharges to the Riverside Canal. A major portion of the discharge from the facility is cooling tower blowdown water that is generally discharged to the Riverside Canal through Discharge Serial No. 002. The Riverside Canal is owned by the City of Riverside, which uses the canal to furnish irrigation water to the Riverside, Arlington, and Temescal areas. When the Riverside Canal is closed for maintenance or repairs, the cooling water is discharged directly to the Santa Ana River through Discharge Serial No. 001.

Discharge Serial No. 001 discharges the low-volume waste, consisting of water generated from the boilers, boiler blowdown, and rainwater runoff, to the Santa Ana River. Sanitary sewage is discharged to an on-site septic tank and drainage system.

Wastewater discharge reports for the San Bernardino power plant for 1993, 1994, and 1995 were reviewed to determine compliance with the NPDES permit limitations. The review indicated that the station discharged 1,697,682 gallons to the Riverside Canal and 1,183,326 gallons to the Santa Ana River in 1993. In 1994 and 1995, the station only discharged water to the Riverside Canal. The discharge volumes were 19,489,124 and 28,632,482 gallons in 1994 and 1995, respectively.

The review also indicated that in 1995 the station had one exceedance of the effluent copper limit and a total of two exceedances of the total filterable residue and sulfate limit. The copper exceedance was a one time event, and subsequent sample analyses have been below effluent limits. The total filterable residue and sulfate exceedances have been attributed to elevated hardness levels in the water. The effluent limits for total filterable residue and sulfate are based on a water hardness level of 122 mg/l. The Edison makeup water has a hardness level in excess of 200 mg/l. The elevated hardness of the makeup water resulted in elevated levels of total filterable residue and sulfate.

Wastewater Discharge Permit

The San Bernardino power plant discharges water under NPDES Permit No. CA0001210, Santa Ana RWQCB Order No. 94-8, which expires on March 1, 1999. The permit issued for the San

Bernardino power plant is based on design capacity operation or full capacity operation of the power plant.

The NPDES permit identifies the following beneficial uses of the receiving waters for Reach 5 of the Santa Ana River: agricultural supply, groundwater recharge, hydropower generation, water contact and non-water contact recreation, warm water habitat, and wildlife habitat. The Santa Ana RWQCB identifies the following beneficial uses for the water in the Bunker Hill II groundwater subbasin and for the downstream Arlington and Temescal groundwater subbasins: municipal and domestic supply, agricultural supply, industrial process supply, industrial service supply.

The general discharge limitations specified in the NPDES permit for the San Bernardino power plant allow a maximum temperature discharge of 95°F for water discharged to the Santa Ana River. No temperature limit is indicated for water discharged to the Riverside Canal. The pH of the effluent water must range between 6.5 and 9.0 pH units for both discharges. The TDS effluent concentration limit for discharges to the Riverside canal is 500 mg/l and for discharges to the Santa Ana River is 290 mg/l.

CHECKLIST ISSUES

a) Absorption Rates, Drainage Patterns, and Surface Runoff

Construction envisioned for the project at each power plant includes only minor facilities to separate the new owner's generation facilities from the remaining Edison facilities, such as fencing and access improvements. This construction would not be expected to result in any substantial changes to hydrologic conditions.

Conclusion

The project would result in some minor physical modifications (e.g. fence construction), however, the amount of impermeable surfaces at the plants would not be substantially, if at all changed. These physical changes would thus not have measurable effects on existing absorption rates, drainage patterns, or surface runoff, and the impact of the project would be less than significant.

b) Water-Related Hazards

The project would not include any physical modifications that would involve changes to hydrologic hazards such as flooding.

Conclusion

The project would not result in any physical modifications that would expose people or property to water-related hazards. Therefore, there is no impact from the project.

c) Discharges and Surface Water Quality

Discharges from the plants include water used for cooling, which is raised in temperature, and various wastes from industrial processes, termed "low-volume" wastes.

Low-volume wastes include air preheater and boiler fireside washing waters, boiler cleaning effluents, oily water separator wastes, zeolite softener wastes, condensate polishing and makeup demineralizer water, boiler blowdown, and in-plant drainage. The production of these wastes is not directly linked to annual generation, but occurs as part of scheduled maintenance. As a consequence, no significant change in the production of low-volume waste would be expected from the project (CPUC, 1990).

Discharges as a result of the project would be significant if they would result in violations of State of Federal numerical effluent limitations.

Each generating plant has requirements for stormwater control written into its discharge permit issued by the local Regional Water Quality Control Board, except for Etiwanda which has its own separate permit. The project would not be expected to result in additional significant contamination of stormwater runoff or additional significant runoff volume. However, the project could potentially advance the clean up of contaminated soils at several of the sites. The remediation activities would disturb soils and may result in short term erosion and contamination of runoff. More information on site contamination is provided in the Section 4.9, Hazards, of this Initial Study.

Contamination of runoff from soil remediation activities has the potential to affect surface water quality, but permits may need to be obtained prior to any remediation work, and a remediation plan is usually prepared before such work begins. Remediation plans, and sometimes permits themselves, require that specified precautions be taken during remediation in order to protect human health and the environment. Examples of procedural and operational controls that typically are implemented during remediation activities include covering soil stockpiles to prevent erosion and reduce infiltration, installation of a leachate control system to capture any leachate generated, construction of a containment cell to prevent runoff, installing treatment systems for treating groundwater, surface water, or air containing hazardous substances, collecting and analyzing test samples, watering disturbed areas to reduce dust generation, and wearing proper personal protective equipment to prevent worker contact with contaminated soil or groundwater. Many of these controls are contained in permits requirements that are issued by the regulatory agencies overseeing remediation activities. Whatever entities own these plants, Edison or any future purchaser, they would be subject to the same environmental and worker safety laws, rules, and regulations. The plants, under whatever ownership, would be expected to conform to all pertinent environmental and safety requirements. Therefore, no significant impacts are anticipated from the project.

Coastal Plant Issues

Each of the coastal generating plants are regulated by the Regional Water Quality Control Boards by NPDES permits for both direct discharge to the receiving waters and for stormwater runoff (Stormwater Pollution Prevention Plans). The NPDES permits for each of the coastal plants allow for discharges up to the amount of water required to operate the plant at design capacity. Cooling water discharges from the coastal power plants are the predominant sources of thermal loading to the Pacific Ocean, Santa Monica Bay, and Long Beach Harbor.

The project could result in additional generation of energy and, therefore, require additional water for cooling. The coastal plants take cooling water from the ocean. When a generating unit is in operation, all of the circulation water pumps for that unit normally are utilized, regardless of that units' level of operation. Therefore, a unit in operation uses the same volume of cooling water in any given period regardless of whether it is operating at full capacity or at less than full capacity. If the unit is completely off, some or all of the units' circulation pumps are typically off, although at times a volume of water less than full operation volume is kept circulating for various process needs. Therefore, while additional generation of energy will likely include additional time when the pumps are in full operation and additional water is extracted from the ocean and subsequently discharged, the additional amount of water used would not correlate directly to the increase in generation. Furthermore, these discharges would be in compliance with NPDES permit conditions for flow quantity since the permit flow limits are on a flow rate basis (mgd) and not on a mass loading basis.

Although increased generation by new owners would result in additional discharges of cooling water, the operation of the plants would be constrained by the existing effluent limitations in NPDES permits, which would be transferred to the new owner and would continue to be enforced by the local Regional Water Quality Control Boards. No significant impacts would be expected since the permit limits account for operation at full design capacity. In the event that permit violations occur, the Regional Water Quality Control Boards, which monitor discharges from the plants monthly, would take action to eliminate chronic violations.

Inland Plant Issues

Cool Water

The Cool Water plant discharges to evaporation ponds on site, which are regulated by Waste Discharge Requirements established by the Regional Water Quality Board. The maximum permitted flow to the ponds (0.82 mgd) approximately matches the design capacity of the ponds and the discharges required for full operation. Runoff from the plant is regulated by an NPDES Stormwater Pollution Prevention Plan. No significant impacts from the project would be expected.

Etiwanda

Wastewater from the Etiwanda plant is discharged to the sanitary sewer under permit from the Chino Basin Municipal Water District, which regulates the amount of flow and the quality of the constituents in the discharge. The permit allows up to 3.36 mgd of discharge, the amount of water required to operate the plant at design capacity. Runoff from the plant is regulated by an NPDES Stormwater Pollution Prevention Plan. No significant impacts from the project would be expected.

Highgrove

The Highgrove plant discharges to a retention pond that overflows to the Santa Ana River, then to Lake Cadena which also overflows to the Santa Ana River, and to the Riverside Canal. The facility is authorized by its NPDES permit to discharge up to a total of 0.611 mgd, which is the amount of water required to operate the plant at full capacity. Runoff from the plant is regulated by an NPDES Stormwater Pollution Prevention Plan.

San Bernardino

Wastewater is discharged from the San Bernardino plant to the Santa Ana River and to the Riverside Canal. The station is authorized by its NPDES permit to discharge up to a total of 1.075 mgd, which is the amount of water required to operate the plant at full capacity. Runoff from the plant is regulated by an NPDES Stormwater Pollution Prevention Plan.

Conclusion

In light of the above analyses, the projects' impacts on discharges into surface waters or other alteration of surface water quality would be less than significant.

d) Amount of Surface Water

The inland plants generally obtain water from groundwater sources. Although groundwater levels can influence surface water conditions, the groundwater in the vicinity of the inland plants is sufficiently deep such that fluctuations in groundwater conditions from the project would not be expected to substantially affect surface waters. The coastal plants would not alter the amount of surface water in any water body since the water used from the ocean is ultimately returned to the ocean.

The inland plants draw water from different groundwater basins. Operations of the individual plants would not be expected to have regional impacts on surface water quantity.

Conclusion

The project would not substantially affect surface water quantity at either the coastal or inland plants, or regionally. Therefore, the project impact would be less than significant.

e) Currents and Water Movements

Local Issues

Additional intake of cooling water at the coastal plants and the effects of additional thermal discharges from the project could have a minor impact on ocean currents. Increases in cooling water intakes and discharges from any of the divested plants have the potential to cause changes in the direction or rate of flow of surface waters. However, this potential impact is regulated by the Regional Water Quality Control Boards under Section 316(b) of the Clean Water Act. Power plants are required to perform analyses of currents caused by cooling water intakes, and may be required to institute Best Available Technology (BAT) measures to avoid significant impacts caused by intakes. These studies and the BAT measures are required in the NPDES permit for each plant. Therefore, any impacts related to changes in the direction or rate of flow of surface water would be less than significant.

Regarding the inland plants, additional pumping of groundwater for cooling water could affect groundwater flow. This is discussed further in checklist items 4.4f and 4.4g, below.

Regional Issues

Regional effects on ocean currents would not be expected from the relatively small volumes of water involved. Combined groundwater effects may occur from additional pumping by the San Bernardino, Etiwanda, and Highgrove plants since they extract groundwater from the same groundwater basin, although different subbasins. Regional groundwater effects are discussed further below.

Conclusion

Impacts to surface currents and water movement would be minor and inconsequential. Therefore, the impact is less than significant.

Groundwater movements could be affected, but the impacts would not be expected to be significant, as discussed in checklist item 4.4g, below.

f) Quantity of Groundwaters

Local Issues

The inland plants draw water from various groundwater basins. Increases in cooling water use from the project could impact groundwater conditions, as discussed below.

The Cool Water Station uses groundwater from the Lower Mojave River groundwater basin, an adjudicated, overdrafted basin. Should the amount of water pumped increase as a result of the project, the new owner would have to contribute to a water replacement fee that is used to purchase imported water to replenish the basin. Since the withdrawals are regulated and replacement water would make up additional withdrawals, no significant impact would be expected.

The San Bernardino, Etiwanda, and Highgrove plants obtain cooling water from the Upper Santa Ana River groundwater basin, which is also adjudicated. Additional extraction's that would cause problems in the groundwater basin by exceeding the safe yield of the basin would be offset by importation and percolation of water by the basin watermaster as stipulated in the water rights adjudication to which Edison is a party. The new owners of the plants would be bound by the same judgment and, therefore, the impact would not be significant.

Edison's participation in the above adjudication agreements would transfer to the new owners at the time of sale.

Regional Issues

The San Bernardino, Highgrove, and Etiwanda plants all extract groundwater from the Upper Santa Ana River groundwater basin. The water rights judgment described above would also protect the basin on a regional level and no significant impacts would be expected.

Conclusion

The project could result in additional groundwater extraction's from the Upper Santa Ana River and Lower Mojave River basins. However, these extraction's would be required by water rights judgments to be replaced by imported surface waters. Therefore, no significant impact would be expected.

g) Direction and Flow of Groundwater

Local Issues

Groundwater is not consumed by the coastal plants, so the direction and flow of groundwater would not be affected by the project. However, at the inland plants, the additional pumping described in checklist item 4.4f, above, could change flow characteristics in the Upper Santa Ana River and Lower Mojave groundwater basins. Altering groundwater flow can move contaminants in the basin from one place to another and could cause variations in water level at other wells in the basins.

Regional Issues

As described in checklist item 4.4f, above, the combined additional pumping at the San Bernardino, Etiwanda, and Highgrove plants could affect regional groundwater conditions in the Upper Santa Ana River basin.

Conclusion

The project could require additional groundwater extraction's from the Upper Santa Ana River basin. These extraction's could affect groundwater levels locally at the power plants and regionally in the groundwater basin, and affect the direction and flow of groundwater in the basin. However, existing and binding water rights judgments would require new owners to replace extracted water, which would ensure that no significant impacts would result.

h) Groundwater Quality

Under the terms of the project, Edison would retain liability for all soil and groundwater contamination resulting from Edison activities on site. Property transactions often have a beneficial impact on groundwater quality by hastening the identification and clean-up of contaminated sites. However, the new owners and Edison would be under no obligation to remediate sites unless required by a regulatory agency.

Local Issues

The additional pumping for the project described in checklist item 4.4f, above, could change flow characteristics in the Upper Santa Ana River and Lower Mojave groundwater basins. Altering groundwater flow can move contaminates in the basin from one place to another and could cause variations in water quality in the basins. However, the extracted water would be replaced with imported surface water, which could beneficially impact water quality.

Regional Issues

As described in checklist item 4.4f, above, the combined additional pumping at the San Bernardino, Etiwanda, and Highgrove plants could affect regional groundwater conditions in the Upper Santa Ana River basin, but would not be significant.

Conclusion

The project could have beneficial impacts from the cleanup of contamination. The movement of groundwater caused by project pumping could also be beneficial as groundwater is replaced by imported surface water supplies under the adjudication requirements. No significant adverse impacts are anticipated.

i) Groundwater Available for Public Water Supplies

The additional pumping for the project described in checklist item 4.4f, above, could change flow characteristics in the Upper Santa Ana River and Lower Mojave groundwater basins. The extracted water would be replaced by imported surface water, resulting in no net loss of locally available water supplies.

Conclusion

The project could require additional groundwater extraction's from the Upper Santa Ana River and Lower Mojave River basins. These extraction's could affect groundwater quality and water levels in the basin but would be offset by imported water as stipulated in water rights judgments. No significant impacts are anticipated.