AES REDONDO BEACH L.L.C. GENERATING STATION

Marine Mammal Protection Act
Small Take Permit Application

JANUARY 2001

Prepared for:

Redondo Beach, L.L.C.

AES REDONDO BEACH L.L.C.
GENERATING STATION

Prepared by:

MBC *APPLIED ENVIRONMENTAL SCIENCES*
COSTA MESA, CALIFORNIA

Marine Mammal Protection Act
Application for Small Take Permit
AES Redondo Beach L.L.C. generating station
Redondo Beach, California

27 February 2001

James Lecky
Asst. Regional Administrator for Protected Resources
National Marine Fisheries Service
501 W. Ocean Blvd, Ste. 4200
Long Beach, CA 90802-4213

RE: Request for Small Take Permit - AES Redondo Beach L.L.C. generating station
Small Take Exemption Permit Application

Dear Mr. Lecky:

AES Redondo Beach L.L.C., owner of the AES Redondo Beach L.L.C. generating station, hereby submits the enclosed application, pursuant to Section 101(a)(5)(A) of the Marine Mammal Protection Act. The application requests a small take exemption permit for the incidental lethal taking of small numbers of pinnipeds (harbor seals, California sea lions, and northern elephant seals) as a result of plant operations.

AES Redondo Beach L.L.C. generating station generates 1,310 megawatts of electrical power for the people of southern California. Formerly known as the Redondo Generating Station, Southern California Edison (SCE) sold the plant to AES Corporation, and transfer of ownership was completed in May 1998. As described in the application, the plant draws ocean water through intake structures located in King Harbor and at the entrance to King Harbor to provide cooling for the plant's condensers and other necessary components. The Units 1-6 intake structure is located approximately 1,000 ft offshore within the King Harbor breakwater at a bottom depth of 30 ft, and the Units 7-8 intake structure is located 1,988 ft offshore in approximately 45 ft of water. The cooling water is pumped back to the ocean through an offshore discharge structure. Small numbers of Pacific harbor seals and California sea lions have been found in the station's intake forebay as an apparent result of their entering the intake structure and then being drawn through the intake tunnel.

The intake and discharge structures associated with the cooling water system of the AES Redondo Beach L.L.C. generating station were specifically designed and located to minimize their environmental effects, particularly with respect to thermal discharge and fish entrapment. Since 1977, SCE and AES Redondo Beach L.L.C. have observed and reported the entrainment of pinnipeds at the plant to the National Marine Fisheries Service (NMFS), Southwest Region.

A total of 37 pinnipeds have been entrained at the plant since 1977, a rate of less than two animals per year. Incidental takes at the AES Redondo Beach L.L.C. generating station have had negligible effects on pinniped stocks and the ability of the pinniped populations to reach and maintain their optimum sustainable levels, and are only a very small fraction of the total number of reported non-natural mortalities that occur annually. Nonetheless, AES Redondo Beach L.L.C., in consultation with the NMFS Southwest Region, has concluded that it is advisable to submit this application for an exemption from the Marine Mammal Protection Act of February, 1995, for small takes.

In parallel with the submittal of the exemption permit application, AES Redondo Beach L.L.C. continues to evaluate effective, implementable means to minimize pinniped entrainment. Marine mammal exclusion bars, currently installed on the intake structure, act as visual cues to deter animals from entering the intake structure. Marine mammal rescue cages, in use since the mid-1970s, allow the safe release of live animals from inside the plant.

AES Redondo Beach L.L.C. respectfully requests that NMFS issue the exemption for the maximum period allowed by law. If you have any questions on this matter, please do not hesitate to contact me at (310) 318-7445.

Sincerely,

AES Redondo Beach L.L.C. generating station

Jimmy Chavez

Santiago E. Chavez
CHMM, REP

AES REDONDO BEACH L.L.C. GENERATING STATION

Marine Mammal Protection Act
Small Take Permit Application

27 February 2001

Prepared for:
AES Redondo Beach L.L.C.
1100 North harbor Drive
Redondo Beach, California 90277

Prepared by:
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Costa Mesa, California 92626

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APPLICATION

1. A DETAILED DESCRIPTION OF THE SPECIFIC ACTIVITY OR CLASS OF ACTIVITIES THAT CAN BE EXPECTED TO RESULT IN INCIDENTAL TAKINGS OF MARINE MAMMALS.

Incidental live and lethal takings of seals and sea lions have occurred and are expected to continue as a result of the operation of the AES Redondo Beach L.L.C. generating station circulating water system (CWS). Formerly called the Redondo Generating station, AES Redondo Beach L.L.C. generating station is a subsidiary of AES Corporation, and is operated by Southern California Edison Company (SCE) personnel. Transfer of ownership of the generating station from SCE to AES was completed as of 16 May 1998. AES Redondo Beach L.L.C. generating station, located on the southern California coast in the city of Redondo Beach, consists of eight fossil-fueled steam-electric generating units with a total capacity of 1,310 megawatts (Mw) (Figure 1). Two units (Units 5 & 6) are rated at 175 Mw each, and two units (Units 7 & 8) are rated at 480 Mw each. Units 1-4, which had a capacity of 74 Mw each, were taken off-line in 1990.

The live and lethal takes occur when pinnipeds enter one of three of the submerged cooling water intake structures. The two intake structures for Units 1-6 are located in King Harbor, Redondo Beach, California, and the intake structure for Units 7 & 8 is located at the mouth of King Harbor (Figure 1). Some proportion of those pinnipeds entering the intake structures become entrained in the CWS as the cooling water is drawn through the intake conduits to the plant. Continuous cooling water flow is necessary for generation of electricity and for the safety of the plant.

Design and history of AES Redondo Beach L.L.C. Generating Station's cooling water system.

Ocean water for cooling purposes is supplied to the AES Redondo Beach L.L.C. generating station via three cooling water systems: one serving Units 1-4, one serving Units 5 & 6, and one serving Units 7 & 8. The flow is directed to three screening facilities within the plant: one screening facility serving Units 1-4; the second and third serve Units 5 & 6 and Units 7 & 8, respectively.

Units 1-4 and Units 5 & 6

Eight circulating water pumps, each rated at 22,000 gallons per minute (gpm), served Units 1-4 with a maximum design flow of 176,000 gpm (approximately 253 million gallons per day [mgd]). The eight pumps supply 174,000 gpm to the main condensers and 2,000 gpm for cooling of auxiliary plant equipment.

Four circulating water pumps, each rated at 36,750 gpm, serve Units 5 & 6 for a maximum design flow of 144,000 gpm (approximately 212 mgd). Approximately 137,000 gpm is supplied to the main condensers and 7,000 gpm to the auxiliary heat exchangers.

The two intakes that supply cooling water to Units 1-4 and Units 5 & 6 are located approximately 305 m (1,000 ft) offshore and 47 m (153 ft) from each other within the King Harbor breakwater at a bottom depth of 9.1 m (30 ft). Crossover conduits interconnect the Units 1-5 and Units 5 & 6 intake systems and allow water to flow to the Units 1-4 and Units 5 & 6 screenwells from either or both of the two intake structures. Two common discharges serving Units 1-4 and Units 5 & 6 are located offshore outside the breakwater.

The intake structures for Units 1-4 and Units 5 & 6 each consist of a 3.0-m (10-ft) inside diameter (ID) inlet conduit and a 9.4-m by 7.6-m (31-ft by 25-ft) velocity cap, suspended 1.2 m (4 ft)

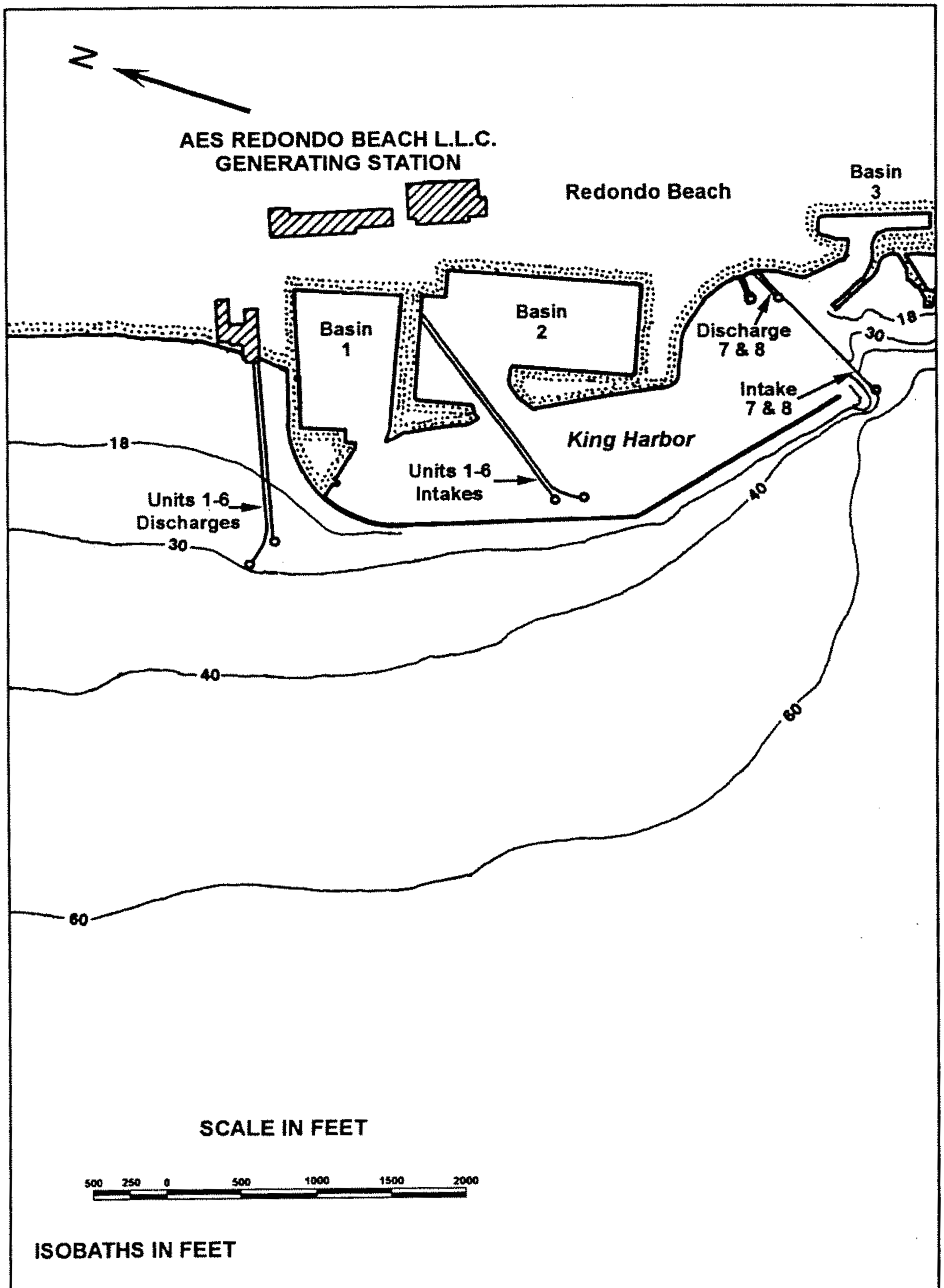

Figure 1. Location of AES Redondo Beach L.L.C. generating station.

above a 5.3-m (17.3-ft) ID vertical riser (Figure 2). The elevation of the intake riser lip is -4.9 m (-16 ft) Mean Lower Low Water (MLLW). This configuration allows the relatively large flow of seawater to be drawn into the conduit at a relatively low velocity. Average velocity at the Units 1-4 intake is 0.46 meters per second (m/s). Average intake velocity at the Units 5 & 6 intake is 0.37 m/s. Low intake velocity and horizontal intake current provided by the velocity cap minimize the entrainment of marine organisms.

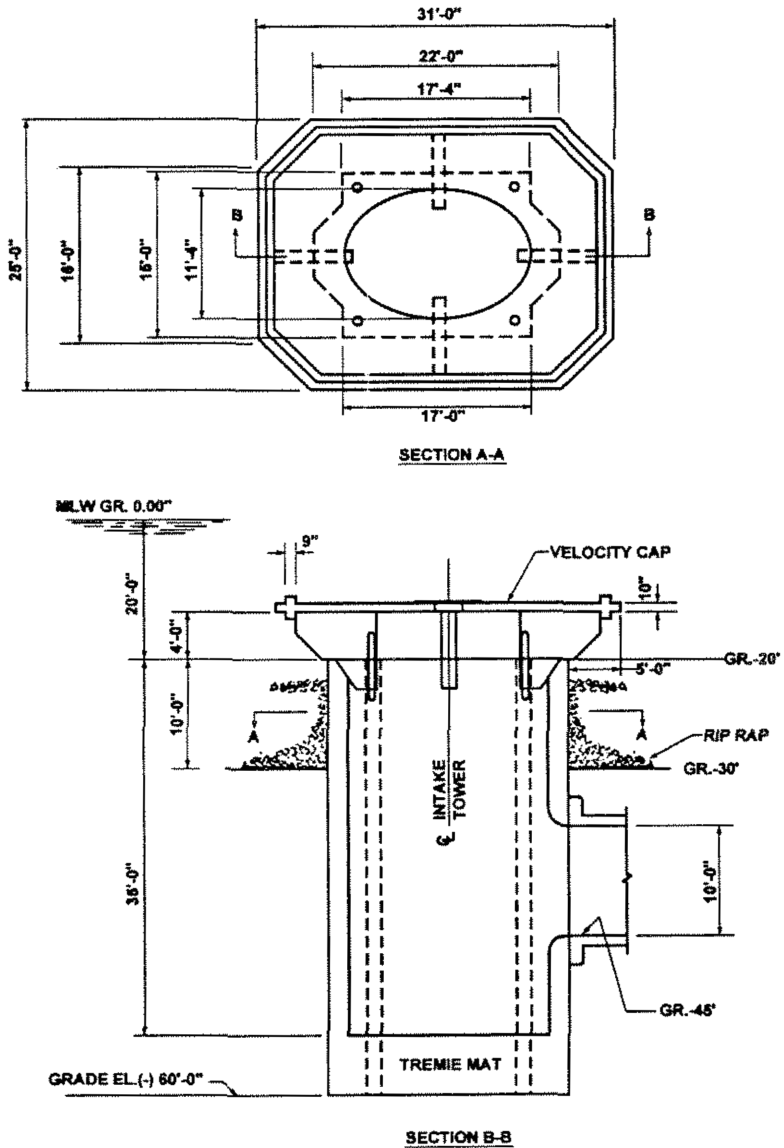

Figure 2. Layout of velocity cap (top) and profile of the Units 1-6 intake structures (bottom). AES Redondo Beach L.L.C. generating station.

Cooling water is conveyed from the intake structures through an underground horizontal conduit 3.05-m (10-ft) in diameter to the Units 1-4 or Units 5 & 6 vertical-walled screen and pump chambers within the plant. After passing through their respective condensers, flows are discharged through the two common 3.0-m (10-ft) diameter discharge conduits serving Units 1-4 and Units 5

& 6. Warmed cooling water is discharged to Santa Monica Bay through two discharge structures terminating 396 m (1,299 ft) and 445 m (1,460 ft) from shore, respectively, just outside the King Harbor breakwater. Waters are discharged at a depth of approximately 6.1 m (20 ft) through 4.27-m (14-ft) ID vertical risers, located in approximately 10.7 m (35 ft) of water.

Products of other plant systems join the cooling water stream prior to discharge. Condenser biofouling is controlled by treating the cooling water with chlorine before it passes through the condenser tubes. Chlorine concentrations in the discharged water are controlled at a level to be in compliance with existing National Pollutant Discharge Elimination System (NPDES) permit limitations. Other inplant waste streams, such as fireside and air preheater washes, condensate demineralizer regeneration wastes, miscellaneous floor drains, boiler and evaporator blowdown, fuel oil area drains, inplant drainage including rainfall runoff, and aquaculture experimental research laboratory wasters, are combined, after treatment, with the cooling water and discharged to the ocean. Chemical metal cleaning wastes are periodically generated, collected, and processed through a contractor-owned mobile lime treatment unit (LARWQCB 1994). The treated effluent is transferred to settling basins where it mixes with low-volume waste streams. Oily floor drain wastes are first passed through oil/water separators, then pumped to the retention basin prior to discharge.

The Units 1-4 intake tunnel terminates at the plant in a large sedimentation basin (forebay) in the screenwell structure. The cooling water is then directed from the basin through trash bars and vertical traveling screens which prevent debris, fish, and invertebrates from entering the CWS. Small debris, fish, and macroinvertebrates are prevented from entering the cooling water system by conventional 3/8-in. mesh vertical traveling screens. Design velocity through the screens is 0.49 m/s. Debris, fish, and invertebrates are removed from the screens by high-pressure sprays and conveyed to trash baskets for disposal.

The Units 5 & 6 intake tunnel terminates at the plant in a large sedimentation basin in the screenwell structure. The Units 5 & 6 screenwell structure is similar and has the same trash rack and traveling screen layout as the Units 1-4 structure, except the design velocity through the screens is 0.58 m/s. Debris, fish, and invertebrates are removed from the screens by high-pressure sprays and conveyed to trash baskets for disposal.

Units 7 & 8

Eight circulating water pumps, each rated at 117,000 gpm, serve Units 7 & 8 for maximum design flow of 468,000 gpm (approximately 674 mgd). Approximately 404,200 gpm is supplied to the main condensers, 48,400 gpm to the auxiliary turbine condensers, and 15,000 gpm to turbine plant heat exchangers.

The cooling water intake structure for Units 7 & 8 is located just outside the mouth of King Harbor 606 m (1,988 ft) offshore in approximately 14 m of water. The intake structure consists of a 4.27-m (14-ft) ID inlet conduit and a 10.4-m by 8.2-m (34-ft by 27-ft) velocity cap, suspended 1.2 m (4 ft) above a 7.5-m (24.6-ft) ID vertical riser (Figure 3). The elevation of the intake riser lip is -9.1 m (-30 ft) MLLW. This configuration allows the relatively large flow of seawater to be drawn into the conduit at a relatively low velocity; average velocity at the intake is 0.76 m/s. Low intake velocity and horizontal intake current provided by the velocity cap minimize the entrainment of marine organisms. Cooling water is conveyed from the intake structure through an underground horizontal conduit 4.27-m (14-ft) in diameter to a vertical-walled forebay. The Units 7 & 8 screenwell structure has the same type and configuration of trash racks, traveling screens, and pumps as the Units 5 & 6 structure, except the design through-screen velocity is 0.79 m/s.

After passing through their respective condensers, cooling flows are combined in a single 4.27-m (14-ft) diameter underground discharge conduit an conveyed approximately 44.8 m (147 ft) offshore within King Harbor. Warmed cooling water is discharged at a depth of about 6.0 m (20 ft) through a vertical riser similar to the intake structure without the velocity cap.

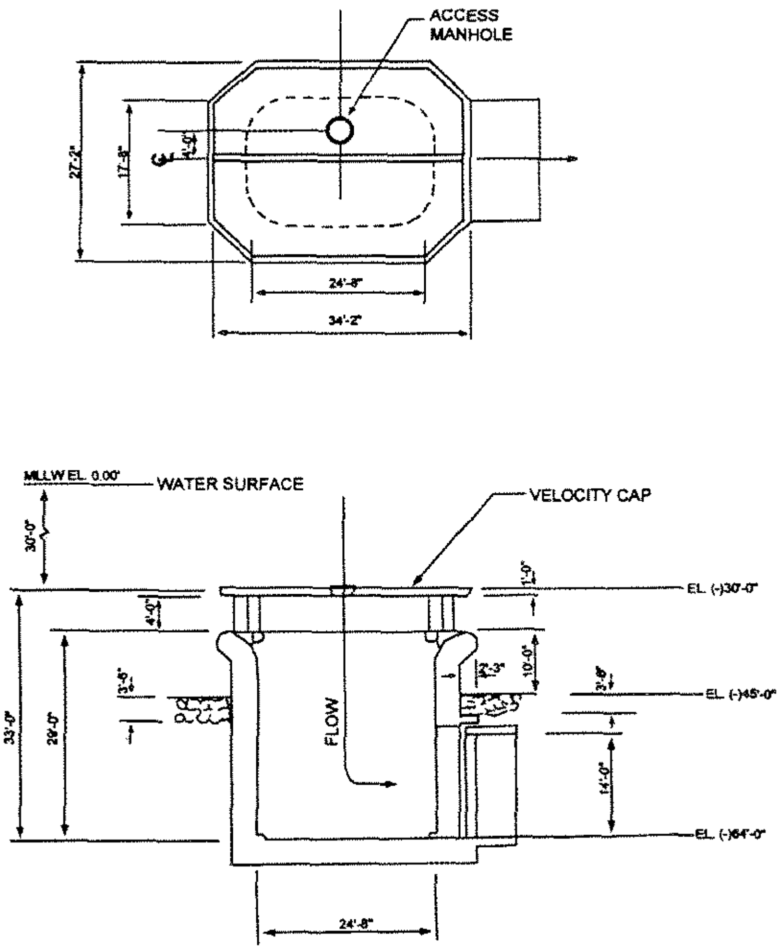

Figure 3. Layout of velocity cap (top) and profile of the Units 7 & 8 intake structure (bottom). AES Redondo Beach L.L.C. generating station.

Products of other plant systems join the cooling water stream prior to discharge. Condenser biofouling is controlled by treating the cooling water with chlorine before it passes through the condenser tubes. Chlorine concentrations in the discharged water are controlled at a level to be in compliance with existing National Pollutant Discharge Elimination System (NPDES) permit limitations. Other inplant waste streams, such as fireside and air preheater washes, condensate demineralizer regeneration wastes, miscellaneous floor drains, boiler and evaporator blowdown, fuel oil area drains, inplant drainage including rainfall runoff, and aquaculture experimental research laboratory wasters, are combined, after treatment, with the cooling water and discharged to the ocean. Chemical metal cleaning wastes are periodically generated, collected, and periodically processed through a contractor-owned mobile lime treatment unit (LARWQCB 2000). The treated effluent is transferred to settling basins where it mixes with low-volume waste streams. Oily floor drain wastes are first passed through oil/water separators, then pumped to the retention basin.

Incidental takings by cooling system intakes.

Because of the underwater, offshore location of the intake structures, pinnipeds have not been directly observed entering the velocity cap. Since horizontal intake velocities are relatively low (0.76 m/s or less), it is reasonable to assume the following sequence of events leads to the entrainment of a live mammal in the CWS (it is possible that pinniped carcasses are entrained in the CWS). The mammal swims into the intake velocity cap in search of or in pursuit of prey, or out of natural curiosity. Once inside the velocity cap, the flow rate increases as the mammal approaches the center vertical riser that connects to the intake conduit. Increasing current velocity and transition from horizontal flow through the velocity cap to vertical flow downward through the riser shaft causes the mammal to be drawn into the riser. Vertical currents are not normally encountered in the pinnipeds environment. This, combined with a sudden lack of light and confinement in the CWS, disorients the animal and prevents an effective escape response, especially for young, immature pinnipeds. As a result, the pinniped is unable to exit, and 1) drowns or is fatally injured in transit from the intake structure to the forebay, 2) survives transit to the forebay and succumbs in the forebay due to exhaustion, illness, or disease, or 3) survives transit to the forebay and is removed by a specialized cage designed for rescuing pinnipeds. Healthy seals are subsequently released to the ocean. Visibly ill or injured seals are transported to specialized facilities for further observation and/or treatment prior to being released.

2. THE DATE(S) AND DURATION OF SUCH ACTIVITY AND THE SPECIFIC GEOGRAPHICAL REGION WHERE IT WILL OCCUR.

The location of the AES Redondo Beach L.L.C. generating station intake structures, where the takes occur, are illustrated in Figure 1. The Units 1-4 and Units 5 & 6 intake structures are located approximately 305 m from shore and 47 m apart from each other within King Harbor, Redondo Beach, California. The Units 7 & 8 intake structure is located 606 m from shore at the mouth of King Harbor.

Though marine mammal entrainments likely began after the commencement of operations at the AES Redondo Beach L.L.C. generating station, records of entrainments started in 1976. A power plant operated at the site of the current generating station in the early 1900s.

Pinniped (seal and sea lion) takes at AES Redondo Beach L.L.C. generating station were first reported in March 1976 (Table 1). Of the 37 recorded pinniped entrainments between March 1976 and June 2000, 20 were reported during summer months (June [10], July [5], and August [5]). Four entrainments occurred in March, and four in May. Sixteen individual California sea lions and 21 harbor seals have been entrained in these 25 years. Of the sixteen California sea lions, eight were found dead, four were found live, and the status of the other four sea lions, all entrained in 1976, is unknown (Table 2). Of the 21 entrained harbor seals, seven were found dead and 14 were found alive and subsequently released.

Seven of the 37 takes were reported in 1983, and four in 1992. During these two years with the highest recorded seal takes, large-scale El Niño-Southern Oscillation (ENSO) events were affecting southern California waters. These years saw major declines in the estimated California sea lion pup counts (U.S. stock), and lesser declines in estimated harbor seal pups (California stock) (Forney et al. 2000). It is likely that during these years, weakened pinnipeds come closer to shore in search of food and are more likely to encounter intakes of coastal generating stations. Carcasses of dead animals are likely to be entrained during this period, as well.

Based on this history of seal and sea lion takes in the Redondo Beach area, it is reasonable to assume that seal/sea lion takes will continue throughout the plant's operating life, especially during summer months. Estimated populations of both species continue to increase.

Table 1. Number and condition of pinnipeds entrained at the AES Redondo Beach L.L.C. generating station, 1976 to 2000.

	Harbor seals		California sea lions	
Year	released unharmed	found dead	released unharmed	found dead
1976	-	-	4 entrained, fate unknown	
1977	-	-	-	-
1978	-	-	-	-
1979	-	-	-	1
1980	1	-	1	-
1981	2	-	-	-
1982	-	1	-	-
1983	3	-	-	4
1984	2	-	-	-
1985	-	-	1	-
1986	-	-	1	-
1987	-	-	-	-
1988	-	-	-	-
1989	-	-	-	-
1990	-	-	-	-
1991	1	1	-	-
1992	5	1	-	-
1993	-	-	-	2
1994	-	-	-	-
1995	-	2	-	-
1996	-	-	-	-
1997	-	-	1	1
1998	-	-	-	-
1999	-	-	-	-
2000	-	2	-	-
Total	**14**	**7**	**4**	**8**
			4 unknown	

3. THE SPECIES AND NUMBERS OF MARINE MAMMALS LIKELY TO BE FOUND WITHIN THE ACTIVITY AREA.

The marine mammal species most likely to be affected by the operation of the AES Redondo Beach L.L.C. generating station are the California sea lion (*Zalophus californianus*), Pacific harbor seal (*Phoca vitulina*), and northern elephant seal (*Mirounga angustirostris*). Populations of these three species off the southern California coast have continued to increase since the passage of the Marine Mammal Protection Act (MMPA) in 1972. Exceptions include decreases in productivity during El Niño years (e.g. 1983, 1992, and 1998).

California sea lions and harbor seals are usually observed by biologists offshore of the AES Redondo Beach L.L.C. generating station during annual NPDES monitoring surveys (MBC 1979, 1981, 1986, 1988-1999). They are often seen hauled out on the breakwater, hauled out on the harbor entrance bell buoy, or swimming around the bait receiver usually located near the Units 1-6 intake structures. Elephant seals have not been sighted during these surveys, though a northern elephant seal carcass was observed on the beach in El Segundo, California (approximately four miles upcoast of King Harbor) in the early 1990s (R. Moore 2000, pers. comm.).

Year 2000 population estimates derived for the three pinniped species likely to occur in the study area are from Forney et al. (2000).

Table 2. History of marine mammal takes at AES Redondo Beach L.L.C. generating station, 1976 to 2000.

Date Entrained	Date Removed	Intake	Species	Comments
3/5/1976	3/5/1976	7 & 8	California sea lion	
3/8/1976	3/8/1976	7 & 8	California sea lion	
5/3/1976	5/3/1976	7 & 8	California sea lion	
9/11/1976	9/11/1976	7 & 8	California sea lion	
6/21/1979	6/21/1979	7 & 8	California sea lion	Found dead; NMFS tag #A3052.
2/7/1980	2/9/1980	7 & 8	California sea lion	Healthy juvenile, taken to Marine Land.
6/23/1980	6/26/1980	7 & 8	Harbor seal	36" juv. Released on beach by SPCA.
4/15/1981	5/20/1981	7 & 8	Harbor seal	Released unharmed by Animal Control.
6/5/1981	6/5/1981		Harbor seal	Released unharmed.
12/17/1982	12/17/1982	7 & 8	Harbor seal	Removed dead; 150 lb.; 65".
5/10/1983	5/10/1983	7 & 8	California sea lion	Dead; approx. 30 lb.
6/21/1983	6/21/1983	7 & 8	California sea lion	Dead; approx. 100 lb.
6/23/1983	6/23/1983	7 & 8	Harbor seal	Released unharmed to SPCA.
7/27/1983	7/28/1983	7 & 8	Harbor seal	Released unharmed to SPCA; Juv.; ~ 25 lb.
8/5/1983	8/5/1983	7 & 8	Harbor seal	Released unharmed to SPCA. Adult; ~120 lb.
8/12/1983	8/15/1983	7 & 8	California sea lion	Dead; Sent to landfill; approx. 4.5 ft.
12/28/1983	12/28/1983	7 & 8	California sea lion	Dead; no ext. inj. visible; to landfill; 5.5 ft; 250 lb.
3/12/1984	3/12/1984	7 & 8	Harbor seal	Released unharmed to SPCA; 2.5 ft; 25 lb.
3/12/1984	3/13/1984	7 & 8	Harbor seal	Released unharmed to SPCA; no inj.; 4 ft; 75 lb.
4/5/1985	-	7 & 8	California sea lion	Apparent escape during reduced flow conditions.
6/15/1986	7/10/1986	5 & 6	California sea lion	Released unharmed.
5/10/1991	5/10/1991	7 & 8	Harbor seal	Decapitated carcass.
5/13/1991	5/16/1991	7 & 8	Harbor seal	Released unharmed in King Harbor.
7/22/1992	7/22/1992	7 & 8	Harbor seal	Released unharmed in King Harbor.
7/27/1992	7/27/1992	7 & 8	Harbor seal	Released unharmed in King Harbor.
7/27/1992	7/29/1992	7 & 8	Harbor seal	Released unharmed in King Harbor.
8/18/1992	8/18/1992	7 & 8	Harbor seal	Fresh dead; 42"; 35 lb.
8/19/1992	8/19/1992	7 & 8	Harbor seal	Released unharmed in King Harbor.
10/14/1992	10/14/1992	7 & 8	Harbor seal	Released unharmed in King Harbor; 45"; 40 lb.
9/9/1993	9/9/1993	7 & 8	California sea lion	Partially decomposed; 54"; 100 lb.
9/20/1993	9/20/1993	7 & 8	California sea lion	Advanced decomposition; 54"; 100 lb.
6/9/1995	6/9/1995		Harbor seal	Fresh dead; 100 lb.; 48 in.
8/4/1995	8/7/1995	7 & 8	Harbor seal	Long dead; Sent to landfill; 48"; 25 lb.
6/23/1997	6/26/1997	7 & 8	California sea lion	Decomposed; 40"; 40 lb.
7/29/1997	7/29/1997	7 & 8	California sea lion	Released unharmed; 36"; 50 lb.
6/7/2000	6/7/2000	7 & 8	Harbor seal	Long dead; partially decomposed; mangled.
6/7/2000	6/7/2000	7 & 8	Harbor seal	Long dead; decapitated; part. decomposed.

California sea lion

A California sea lion (U.S. stock) population estimate was determined during July 1999. Estimates were determined by counting all pups during the breeding season (because this is the only age class that is ashore in its entirety), and the number of births is estimated from the pup count. Population size is estimated from the number of births and the proportion of pups in the population. The pup count in 1999 (42,388 individuals) was adjusted for an estimated 15% pre-census mortality resulting in an estimated 48,746 live births in the population. The percentage of newborn pups in the population (22.8 to 23.9%) was estimated from a life table derived for the northern fur seal (*Callorhinus ursinus*), which was modified to account for the growth rate of this California sea lion population (5.0 to 6.2% per year). Multiplying the number of pups born by the inverse of these fractions (4.39 to 4.19) results in population estimates ranging from 204,000 to 214,000, respectively. The population has been growing recently, though fishery mortality is increasing.

Harbor seal

A harbor seal (California stock) population estimate was determined during 1995. A population estimate was attempted in 1999, but was unsuccessful due to inclement weather and camera failure. Population size was estimated by counting the number of seals ashore during the peak haul-out period (the May/June molt) and by multiplying this count by the inverse of the estimated fraction of seals on land. Based on the most recent harbor seal counts (23,302 individuals in May/June 1995), the harbor seal population in California in 1995 was estimated at 30,293. The population appears to be growing and fishery mortality is declining.

Northern elephant seal

A complete population count of northern elephant seals is not possible because all age classes are not ashore at the same time. Northern elephant seal population (California breeding stock) was estimated in 1996. Population size was estimated by counting the number of pups produced that year and multiplying by the inverse of the expected ratio of pups to total animals. In 1996, the estimated California stock of northern elephant seal was approximately 84,000 individuals.

4. A DESCRIPTION OF THE STATUS, DISTRIBUTION, AND SEASONAL DISTRIBUTION (WHEN APPLICABLE) OF THE AFFECTED SPECIES OR STOCKS OF MARINE MAMMALS LIKELY TO BE AFFECTED BY SUCH ACTIVITIES.

All species of pinnipeds likely to be affected by the operation of the AES Redondo Beach L.L.C. generating station are protected under the MMPA. None of the pinnipeds are currently listed (state or federal) as threatened or endangered under the Endangered Species Act (CDFG 2000). None of the pinnipeds are listed as depleted under the MMPA, and no populations of these animals are considered a strategic stock under the MMPA. A stock is listed as "strategic" when estimated incidental fisheries mortality exceeds the potential biological removal (PBR). The PBR value is the maximum number of marine mammals, not including natural mortalities, that may be removed from a marine mammal stock while still allowing the stock to maintain or reach its optimum sustainable population.

California sea lion

The California sea lion (*Zalophus californianus*) is composed of three subspecies: *Z. c. wollebaeki* (on the Galapagos Islands), *Z. c. japonicus* (in Japan, but now thought to be extinct), and *Z. c. californianus* (from southern Mexico to southwestern Canada). Following discussions of California sea lion will refer to *Z. c. californianus*.

The subspecies *Z. c. californianus* is divided furthermore into three stocks depending on location of the breeding areas (Forney et al. 2000). The United States stock begins at the U.S./Mexico border and extends northward into Canada. The Western Baja California stock ranges from the U.S./Mexico border southward to the southern tip of the Baja California Peninsula. The third stock, the Gulf of California stock, inhabits the Gulf of California and extends southward and across to the mainland of southern Mexico. Though U.S. rookeries are distant from the major rookeries of western Baja California, males from the Western Baja California rookeries may be found in U.S. waters.

In southern California, sea lions occur primarily at San Miguel and San Nicolas islands, though smaller numbers are found at Santa Barbara, San Clemente, and Anacapa islands, and even fewer are found at Santa Cruz and Santa Catalina islands (Reeves et al. 1992; Stewart and Yochem 1999). California sea lions are most abundant ashore during breeding season (late May through early August), and least abundant in autumn and winter when adult and subadult males, many juveniles, and some adult females forage in areas off central and northern California, Oregon, Washington, and British Columbia, Canada (Stewart and Yochem 1999). Adult male California sea lions return to rookeries in spring (Reeves et al. 1992).

Harbor seal

Two harbor seal (*Phoca vitulina*) subspecies exist in the Pacific: *P. v. stejnegeri* in the western North Pacific, and *P. v. richardsi* in the eastern North Pacific. *P. v. richardsi* ranges from Baja California, Mexico to the Pribilof Islands in Alaska. Three stocks of this subspecies are recognized: the California stock, the Oregon/Washington outer coastal stock, and a stock utilizing inland waters of Washington. In California, there are 400 to 500 harbor seal haulouts on the mainland and on offshore islands.

In the eastern Pacific, harbor seals breed from San Quintin, Baja California, to Nome, Alaska. In southern California, harbor seals haul out and breed on all of the California Channel Islands (Stewart and Yochem 1999). Numbers ashore are greatest during molting (late spring and early summer) and least in winter. Pupping is progressively earlier from Washington and Oregon southward to Baja California, where it takes place in February and March. Harbor seals display fidelity to haul-out grounds from year to year, but they are capable of long-distance movements. Some short movements are likely associated with seasonal availability of prey and breeding. However, in some areas, harbor seals are present throughout the year.

Northern elephant seal

Northern elephant seals (*Mirounga angustirostris*) breed and give birth in California (California breeding stock) and in Baja California (Mexican breeding stock), primarily on offshore islands between December and March. Further discussion focuses on the California breeding stock.

In southern California, northern elephant seal colonies are established on San Miguel and San Nicolas islands, with smaller numbers found on Santa Rosa Island, and in fewer numbers on Santa Barbara and San Clemente islands (Stewart and Yochem 1999). Adults breed at San Miguel and San Nicolas islands from late December through mid-February. Males feed near the Aleutian Islands and in the Gulf of Alaska, while females feed further south (below 45°N). Adult elephant seals return to land to molt between March and August, with males usually returning later than females. While movement among rookeries occurs, most elephant seals return to their natal rookeries when they begin to breed. Weaned pups leave San Nicolas and San Miguel islands in late winter and spring. Most pups move northward, while a few remain near their birth sites or move south during their first year.

5. THE TYPE OF INCIDENTAL TAKING AUTHORIZATION THAT IS BEING REQUESTED (I.E. TAKES BY HARASSMENT ONLY; TAKES BY HARASSMENT, INJURY AND/OR DEATH) AND THE METHOD OF INCIDENTAL TAKING.

The type of incidental taking being requested in this application are incidental takings by harassment, injury, and or/death caused by entrapment of seals in the AES Redondo Beach L.L.C. generating station circulating water system intake as described in Section 1.

Harassment occurs when pinnipeds enter the intake tunnels (as described in Section 1), and are recovered by plant personnel by use of marine mammal cages. Animals in the cages are subsequently released unharmed to the ocean. Though no pinnipeds entrained in the generating station have been observed with external injuries, they can potentially be injured prior to entrainment, or injured once inside the cooling water system. About 50% of the 33 pinnipeds entrained at the AES Redondo L.L.C. generating station were found dead. Cause of death of these animals was not discerned.

6. BY AGE, SEX, AND REPRODUCTIVE CONDITION (IF POSSIBLE), THE NUMBER OF MARINE MAMMALS (BY SPECIES) THAT MAY BE TAKEN BY EACH TYPE OF TAKING IDENTIFIED IN PARAGRAPH (A) (5) (SECTION 5) OF THIS SECTION, AND THE NUMBER OF TIMES SUCH TAKINGS BY EACH TYPE OF TAKING ARE LIKELY TO OCCUR.

Incidental live and lethal takings of seals and sea lions are anticipated to occur as a result of the continued operation of the AES Redondo Beach L.L.C. generating station circulating water system. The anticipated number of takes of California sea lions and harbor seals may increase as a result of the continued population increase in southern California waters. Northern elephant seals have not been taken by the generating station.

California sea lion

A recorded total of 16 California sea lions have been entrained by the generating station since 1976, an average of less than one (0.6) California sea lions per year. Take rates have ranged from zero per year (1977-78, 1987-92, 1994-96, 1998-2000) to four per year (1976, 1983). Of the eight specimens with estimated weights and/or lengths, only two were likely young-of-the-year California sea lions, and the rest were juveniles or adults.

Harbor seal

A recorded total of 21 harbor seals have been entrained by the AES Redondo Beach L.L.C. generating station CWS since 1976. This represents an average of less than one (0.8) harbor seals per year. Take rates have ranged from zero per year (1976-79, 1985-90, 1993-94, 1996-99) to six per year (1992). Of the 10 harbor seals with estimated weights and/or lengths, half (5) were likely young-of-the-year harbor seals.

Northern elephant seal

No known entrainments of northern elephant seals have occurred at the AES Redondo Beach L.L.C. generating station to date. Continued population increases of this species in southern California waters could increase the likelihood of elephant seal entrainments in the cooling water system of the generating station in the future.

7. THE ANTICIPATED IMPACT OF THE ACTIVITY UPON THE SPECIES OR STOCK OF MARINE MAMMAL.

Pinniped species taken at the AES Redondo Beach L.L.C. generating station include California sea lion and harbor seal. Northern elephant seal could potentially become entrained in the cooling water system, but this has not occurred. The continued operation of the AES Redondo Beach L.L.C. generating station is likely to have a negligible effect on the population or stocks of these species.

The Marine Mammal Protection Act (as amended in 1994) requires the National Marine Fisheries Service (NMFS) to produce stock assessment reports for all marine mammal stocks in waters within the U.S. Exclusive Economic Zone. NMFS is also required to estimate the potential biological removal (PBR) for each stock of each species. The PBR value is the maximum number of marine mammals, not including natural mortalities, that may be removed from a marine mammal stock while still allowing the stock to maintain or reach its optimum sustainable population. When the number of mammals removed from the stock exceeds the PBR, the stock is listed as "strategic", and additional conservation strategies are employed. PBR estimates were recently reported by NMFS (Forney et al. 2000).

The PBR for California sea lion (U.S. stock) is 6,591 sea lions per year. Total annual take from sources other than the AES Redondo Beach L.L.C. generating station include 1,131 fishery-related mortalities and 141 other human-related deaths, a total of 1,272 takes. Maximum annual mortality at the AES Redondo Beach L.L.C. generating station was four individuals in 1983, and possibly in 1976 (records do not specify the condition of these animals). This represents 0.3% of the total takes and 0.06% of the current PBR. Continued takes of this species from this source will not significantly affect the status of the U.S. stock of California sea lions.

The PBR for harbor seal (California stock) is 1,678 harbor seals per year. Fishery-related mortalities were not estimated in recent years due to insufficient data. Available data on human-related takes (non-fishery) from 1995 to 1998 includes 41 harbor seal takes, 39 of them lethal. Maximum annual mortality at the AES Redondo Beach Generating Station was six individuals in 1992. This represents less than 0.4% of the PBR. Continued takes of this species from this source is not significantly affecting the status of the stock of harbor seal.

The PBR for northern elephant seal (California breeding stock) is 2,142 animals per year. Although no recorded takes of this species have occurred at the AES Redondo Beach L.L.C. generating station, continued population increases of this species in southern California waters could increase the likelihood of elephant seal entrainments in the cooling water system of the generating station in the future. Estimated annual fishery-related takes are estimated between 33 and 100 individuals per year (1.5% to 4.7% of the PBR, respectively), while there were 9 non-fishery-related takes (8 lethal) from 1995 through 1998. Therefore, any incidental take from the generating station, combined with these incidental takes, would be considered insignificant.

8. THE ANTICIPATED IMPACT OF THE ACTIVITY ON THE AVAILABILITY OF THE SPECIES OR STOCKS OF MARINE MAMMALS FOR SUBSISTENCE USES.

The activity will not have an impact on the availability of marine mammals for subsistence uses, as there is no take of marine mammals for subsistence purposes in California.

9. THE ANTICIPATED IMPACT OF THE ACTIVITY UPON THE HABITAT OF THE MARINE MAMMAL POPULATIONS, AND THE LIKELIHOOD OF RESTORATION OF THE AFFECTED HABITAT.

The continued operation of the AES Redondo Beach L.L.C. generating station and its cooling water system has had, and is anticipated to have, a negligible impact on the habitat of seals and sea lions. The cooling water system of the generating station has operated under the authorization of, and in accordance with provisions of, the National Pollutant Discharge Elimination System (NPDES) permit issued by the Environmental Protection Agency (EPA).

Other than the continued operation of the cooling water system, there are no AES Redondo Beach L.L.C. generating station activities planned for the offshore area. Therefore, potential seal/sea lion habitat effects are limited to those associated with the physical presence of the intake and discharge structures and the effects of the operation of the cooling water system. These are considered in further discussion.

Continuing studies conducted since 1978 indicate the generating station is not appreciably impacting the fish and macroinvertebrate populations of King Harbor, as populations therein remain healthy, abundant, and diverse (MBC 1979, 1981, 1986, 1988-1999). While the operation of the plant has not affected the distribution of marine life in the harbor, the intake structures do provide habitat for numerous fouling and macroinvertebrate species and fish species, including important prey items of seals and sea lions (MBC 1979, 1981, 1986, 1988-1999). Helvey and Dorn (1981) concluded one of the AES Redondo Beach L.L.C. generating station intake structures "like other artificial reefs, promotes ocean productivity in an otherwise barren location by providing necessary resource requirements for the associated fish assemblage. Although the additional environmental parameter of a constant water current may offer advantages for some species, it does not appear to influence the structure of the intake fish community." The discharge structures also attract fish and invertebrates (MBC 1999).

Waters in King Harbor are generally warmer than the offshore waters of Santa Monica Bay. Warmed effluent from the AES Redondo Beach L.L.C. generating station is usually detected in the vicinity of the discharge(s) in operation during sampling (MBC 1979, 1981, 1986, 1988-1999). However, warm waters rarely extend to other water quality stations within the harbor (a few hundred feet) or out of the harbor into Santa Monica Bay. The discharge of warm water has not modified the habitat of seals or sea lions, other than the potential trophic opportunity provided by the structure as discussed previously.

The operation of the AES Redondo Beach Generating Station requires the presence of intake structures for the conveyance of ocean water for cooling purposes. The Units 1-6 intake structures are located in King Harbor in approximately 9 m of water, and rise approximately 4 m into the water column. The Units 7 & 8 intake structure is located at the mouth of King Harbor in approximately 14 m of water, and rises approximately 4 m into the water column (see Section 1 for further details). These three structures provide entry points for seals/sea lions to the cooling water system of the generating station. The live pinnipeds that become entrained are not able to swim back out either due to disorientation, increased flow velocity in the riser shafts, the confinement of the structure, the lack of ambient light in the intake, or a combination of these factors.

In summary, the only discernible effect the intake structures have had on pinniped habitat is the incidental takes of California sea lions and harbor seals. With respect to restoration, the intake and discharge structures for all units will be capped, removed, or appropriately disposed of as part of the decommissioning of the generating station so that fish, pinnipeds, and recreational divers cannot enter the CWS.

10. THE ANTICIPATED IMPACT OF THE LOSS OR MODIFICATION OF THE HABITAT ON THE MARINE MAMMAL POPULATIONS INVOLVED.

The continued operation of the AES Redondo Beach L.L.C. generating station and its cooling water system has had, and is anticipated to have, an insignificant impact on the habitat of seals and sea lions.

There have been no demonstrated significant changes in the physicochemical conditions in the vicinity of the discharge structures (MBC 1979, 1981, 1986, 1988-1999). It is unlikely there have been any changes in the availability of prey items of pinnipeds or that seal/sea lion behavior has been modified due to operation of the plant. Growth of fouling organisms on the intake structures is controlled, as the intakes are cleaned periodically by qualified divers in accordance with generating station procedures.

As discussed previously, the continued presence of the intake structures does not noticeably modify the habitat of pinnipeds. The intake and discharge structures provide habitat for fish and macroinvertebrates that might not normally be found near these areas, and these animals are important prey items for seals and sea lions. The intake structures serve as a point of entry to the CWS where pinniped mortality has occurred. Pinnipeds, at least adults, do not appear to be involuntarily swept into the intakes. Intake velocities of less than 0.8 m/s (2.6 ft/s) at the velocity caps is less than the 8 to 16 ft/s measured swimming speed of adult pinnipeds.

11. THE AVAILABILITY AND FEASIBILITY (ECONOMIC AND TECHNOLOGICAL) OF EQUIPMENT, METHODS, AND MANNER OF CONDUCTING SUCH ACTIVITY OR OTHER MEANS OF EFFECTING THE LEAST PRACTICABLE ADVERSE IMPACT UPON THE AFFECTED SPECIES OR STOCKS, THEIR HABITAT, AND ON THEIR AVAILABILITY FOR SUBSISTENCE USES, PAYING PARTICULAR ATTENTION TO ROOKERIES, MATING GROUNDS, AND OTHER AREAS OF SIMILAR SIGNIFICANCE.

Options to prevent entrainment of marine life (primarily fish) have been explored in the past, and research of available technologies continues. Complete exclusion of pinnipeds from the cooling water system of the AES Redondo Beach L.L.C. generating station would require either physical barriers or some other method(s) to discourage their presence in the vicinity of the intake structures. With no significant projected impacts from the generating station to pinniped populations, or to sensitive habitat, the primary purpose of any proposed actions will be the prevention of seal/sea lion takes, including live and lethal takes, by the entrapment of these animals in the intake tunnels of the AES Redondo Beach L.L.C. generating station.

In the mid-1970s, specialized cages were designed and deployed at SCE and Los Angeles Department of Water and Power (LADWP) coastal generating stations, including the AES Redondo Beach L.L.C. generating station, to facilitate the safe removal of live pinnipeds from in-plant forebay areas. The cages were redesigned in the late 1980s, and remain in operation today. When in-plant inspections reveal the presence of a pinniped in the CWS, a floating marine mammal cage is safely lowered into the forebay area. In time, the mammal begins to tire and seeks a haul-out site. Since no haul-out structures besides the cage exist in the forebay, the mammal eventually enters the cage, and its weight deploys a treadle that closes a gate, preventing the mammal from exiting. At this time, the cage is lifted out of the forebay by crane, and observations and data are recorded on available data sheets concerning the pinniped. An example of the data sheet is presented as Attachment A. Examples of data recorded include date and time of capture, species of mammal, length and weight, sex, visible abnormalities, and estimated health. Data sheets are filled out and submitted to NMFS, even in cases of deceased animals. Pinnipeds that are visibly unhealthy or injured are transferred to personnel trained in the health and rehabilitation of marine mammals at a designated facility off-site.

In early 1988, marine mammal exclusion bars were installed on the intake structure offshore the generating station, and an improved system was installed in 1990. The system consists of bars deployed across the velocity cap down to the riser bowl, and spaced at 18-in. intervals to prevent marine mammals, and debris, from entering the cooling water system of the generating station. Bars spaced at smaller intervals could potentially clog the intake structure with debris. While not designed to exclude all animals from entering the intake structure, the exclusion bars are designed to aid marine mammals in detecting the intake structure. A seal or sea lion foraging for fish that are schooling or feeding in the vicinity of the intake are likely to be alerted to the physical presence of the intake structure when they encounter the marine mammal exclusion bars.

Numerous other options, including lights, sound, and marine mammal exclusion bars, have been considered by SCE, and most were considered unfeasible. These options were considered primarily with respect to entrainment of ichthyoplankton and impingement of fish. Installation of flashing lights at the discharge was rejected due to engineering and maintenance feasibility, and the potential to attract more fish to the area. Sound barriers to scare marine mammals away from the intake area were also considered. Again, engineering feasibility in such a dynamic environment and ambivalent test results led to the rejection of this option. Originally, the intake entrance was kept open, as it was assumed there was the potential for any barrier placed across the entrance to become fouled and inhibit the inward flow of seawater. By the late 1980s, there was sufficient evidence that marine mammal exclusion bars would be feasible if placed sufficiently far apart. This engineering option has resulted in the reduction in entrainment and entrapment of marine mammals, as evidenced by the decline in mammal takes since 1988. The improved design of the marine mammal rescue devices, incorporated in the late 1980s, has enhanced rescue operations at several plants in southern California.

Earlier examples of options included modifying the intake structure to a porous dike or offshore caisson design (MBC 1983). However, at the time, neither of these designs had been installed at coastal power plants. These options were removed from consideration due to their relatively low incremental minimization of impinged fish and the associated estimated costs.

12. WHERE THE PROPOSED ACTIVITY WOULD TAKE PLACE IN OR NEAR A TRADITIONAL ARCTIC SUBSISTENCE HUNTING AREA AND/OR AFFECT THE AVAILABILITY OF A SPECIES OR STOCK OF MAMMAL FOR ARCTIC SUBSISTENCE USES, THE APPLICANT MUST SUBMIT EITHER A PLAN OF COOPERATION OR INFORMATION THAT IDENTIFIES WHAT MEASURES HAVE BEEN TAKEN AND/OR WILL BE TAKEN TO MINIMIZE ANY ADVERSE EFFECTS ON THE AVAILABILITY OF MARINE MAMMALS FOR SUBSISTENCE USES.

The activity does not take place in or near a traditional Arctic subsistence hunting area and does not affect the availability of a species or stock of mammal for Arctic subsistence uses.

13. THE SUGGESTED MEANS OF ACCOMPLISHING THE NECESSARY MONITORING AND REPORTING THAT WILL RESULT IN INCREASED KNOWLEDGE OF THE SPECIES, THE LEVEL OF TAKING OR IMPACTS ON POPULATIONS OF MARINE MAMMALS THAT ARE EXPECTED TO BE PRESENT WHILE CONDUCTING ACTIVITIES AND SUGGESTED MEANS OF MINIMIZING BURDENS BY COORDINATING SUCH REPORTING REQUIREMENTS WITH OTHER SCHEMES ALREADY APPLICABLE TO PERSONS CONDUCTING THE ACTIVITY. MONITORING PLANS SHOULD INCLUDE A DESCRIPTION OF THE SURVEY TECHNIQUES THAT WOULD BE USED TO DETERMINE THE MOVEMENT AND ACTIVITY OF MARINE MAMMALS NEAR THE ACTIVITY SITE(S) INCLUDING MIGRATION AND OTHER HABITAT USES, SUCH AS FEEDING.

Currently, daily inspections of the forebay are performed by plant operators. When a live pinniped is observed, a marine mammal cage is lowered into the forebay so the mammal can be rescued quickly. Pinniped carcasses are reported to NMFS and disposed of at an appropriate site. Live pinnipeds are inspected for external injuries. Non-injured animals are normally released at nearby beach sites, while injured or unhealthy animals are released to a qualified rescue organization.

As required by the NPDES permit of the AES Redondo Beach L.L.C. generating station, marine monitoring studies (including but not limited to annual water quality surveys, macroinvertebrate and fish dive surveys, sediment chemistry surveys, and benthic infauna surveys) are conducted offshore the generating station annually. During field activities associated with these programs, presence, abundance and location of marine mammals, such as seals, sea lions, whales, and dolphins, is noted. This information is made available in annual NPDES monitoring reports (MBC 1979, 1981, 1986, 1988-1999).

14. SUGGESTED MEANS OF LEARNING OF, ENCOURAGING, AND COORDINATING RESEARCH OPPORTUNITIES, PLANS, AND ACTIVITIES RELATING TO REDUCING SUCH INCIDENTAL TAKING AND EVALUATING ITS EFFECTS.

AES Redondo Beach L.L.C. continues to explore options related to the reduction of effects on marine life, including marine mammals. AES Redondo Beach L.L.C. expects to attend periodic meetings between the various generating facilities and NMFS to pool knowledge and efforts to reduce entrainment of marine mammals.

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PERSONAL COMMUNICATION

Moore, R. 2000. Project Scientist. MBC *Applied Environmental Sciences*. Costa Mesa, CA.

ATTACHMENT

Marine Mammal Stranding Report

MARINE MAMMAL STRANDING REPORT

SID# ______ (NMFS USE)

FIELD NO.: ______ NMFS REGISTRATION NO.: ______

COMMON NAME: ______ GENUS: ______ SPECIES: ______

EXAMINER

Name: ______ Agency: ______ Phone: ______

Address: ______

LOCATION

State: ______ County: ______

City: ______

Locality Details: ______

*Latitude: ______ N

*Longitude: ______ W

TYPE OF OCCURRENCE

Mass Stranding: ☐ Yes ☐ No # Animals ______

Human Interaction: ☐ Yes ☐ No ☐ ?

Check one:
- ☐ 1. Boat Collision
- ☐ 2. Shot
- ☐ 3. Fishery Interaction
- ☐ 4. Other ______

How determined: ______

Other Causes (if known): ______

DATE OF INITIAL OBSERVATION:

Yr. ______ Mo. ______ Day ______

CONDITION: Check one:
- ☐ 1. Alive
- ☐ 2. Fresh dead
- ☐ 3. Moderate decomp.
- ☐ 4. Advanced decomp.
- ☐ 5. Mummified
- ☐ ?. Unknown

DATE OF EXAMINATION:

Yr. ______ Mo. ______ Day ______

CONDITION: Check one:
- ☐ 1. Alive
- ☐ 2. Fresh dead
- ☐ 3. Moderate decomp.
- ☐ 4. Advanced decomp.
- ☐ 5. Mummified
- ☐ ?. Unknown

LIVE ANIMAL — Condition and Disposition:

Check one or more:
- ☐ 1. Released at site
- ☐ 2. Sick
- ☐ 3. Injured
- ☐ 4. Died
- ☐ 5. Euthanized
- ☐ 6. Rehabilitated and released
- ☐ ?. Unknown

Transported to: ______

☐ Died ☐ Released Date: ______

TAGS APPLIED?: ☐ Yes ☐ No

TAGS PRESENT?: ☐ Yes ☐ No

	Dorsal	Left	Right
Tag No.(s):	______	______	______
Color (s):	______	______	______
Type:	______	______	______
Placement		Front/Rear	Front/Rear

CARCASS — Disposition:

Check one:
- ☐ 1. Left at site
- ☐ 2. Buried
- ☐ 3. Towed
- ☐ 4. Sci. collection: (see below)
- ☐ 5. Edu. collection: (see below)
- ☐ 6. Other ______
- ☐ ?. Unknown

NECROPSIED? ☐ Yes ☐ No

MORPHOLOGICAL DATA:

Sex — Check one:
- ☐ 1. Male
- ☐ 2. Female
- ☐ ?. Unknown

Straight Length: ______ ☐ cm ☐ in ☐ est

*Weight ______ ☐ kg ☐ lb ☐ est

PHOTOS TAKEN? ☐ Yes ☐ No

REMARKS: ______

DISPOSITION OF TISSUE/SKELETAL MATERIAL: ______

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