ATTACHMENT 19

PILLSBURY WINTHROP LLP
MARGARET ROSEGAY #96963
50 Fremont Street
Post Office Box 7880
San Francisco, CA 94120-7880
Telephone: (415) 983-1000
Facsimile: (415) 983-1200

Attorneys for Petitioner
DUKE ENERGY SOUTH BAY LLC

STATE WATER RESOURCES CONTROL BOARD

OF THE STATE OF CALIFORNIA

In the Matter of the Petition of DUKE ENERGY SOUTH BAY LLC Order No. R9-2004-0154 Waste Discharge Requirements, NPDES Permit No. CA0001368 California Regional Water Quality Control Board, San Diego Region	No. <u>DECLARATION OF DAVID L. MAYER IN SUPPORT OF VERIFIED PETITION FOR REVIEW AND REQUEST FOR HEARING</u>

I, David L. Mayer, declare as follows:

1. I am President at Tenera Environmental LLC ("Tenera"), a private consulting firm that specializes in analysis of marine resource assessments and environmental impact monitoring. I have held this position since 2003. Except where stated to be based upon information and belief, the statements made in this declaration are based upon my personal knowledge. If called as a witness to testify with respect to matters stated in this affidavit, I could and would competently do so under oath.

2. I have a Ph.D. in Fisheries and Quantitative Sciences from the University of Washington, with a focus on analyzing and modeling the relationships of water temperatures and hydrodynamics on aquatic communities. I have over 33 years experience

in environmental consulting, specializing in studies of marine and freshwater systems. I have particular expertise in the areas of aquatic temperature and flow regimes, and their effects on ecological systems. I have provided expert advice and testimony in agency hearings and workshops on the results of water quality, thermal and ecological modeling, and have conducted field research, prepared reports and testified on thermal discharge effects at a majority of California's power plants including Humboldt Bay, Pittsburg, Contra Costa, Potrero, Moss Landing, Morro Bay, Diablo Canyon, Ormond Beach, Long Beach, Huntington Beach, San Onofre, Encina and South Bay. My research at Diablo Canyon Power Plant included the design and operation of California's largest thermal effects laboratory and implementation of the longest continuous monitoring program of thermal effects. In my capacity as President of Tenera, I direct a group of research scientists and engineers who provide contract services of environmental assessments and computer analysis in the disciplines of air quality, water quality, ecology, hazardous materials, and environmental risk assessment.

3. Tenera was retained by Duke Energy South Bay LLC in May 2002 to evaluate the thermal effects of the discharge from the South Bay Power Plant ("SBPP") on benthic (mud-dwelling) communities in the vicinity of the discharge.[1] The study was conducted in connection with Duke Energy's application for renewal of the National Pollutant Discharge Elimination System ("NPDES") permit for SBPP, in accordance with the directives set forth in a Water Code section 13267 letter issued by the Executive Officer of the San Diego Bay Regional Water Quality Control Board ("Regional Board") on May 24, 2002. The purpose of the study was to update the Clean Water Act section 316(a) studies previously conducted by San Diego Gas & Electric Company ("SDG&E"), and in

[1] Benthic marine organisms reside within and on the surface of unconsolidated bottom sediments and typically include numerous species of annelid worms, bivalve and gastropod mollusks, various types of crustaceans, echinoderms, and lesser known but equally important groups such as nematode, nemertean, and phoronid worms. Together they comprise the first step in the food chain, converting organic matter from the overlying water column into secondary food production for higher trophic level predators such as fishes and shorebirds.

particular to determine whether a "balanced indigenous community" exists in south San Diego Bay. A draft workplan was submitted to the Regional Board, the U. S. Fish & Wildlife Service and the National Marine Fisheries Service, and was revised in accordance with comments received from the agencies. The workplan was approved on October 19, 2002.

4. In addition, Duke Energy retained Merkel & Associates to conduct a study of eelgrass distribution in south San Diego Bay. This study was also required by the Regional Board's May 24, 2002 section 13267 letter and was designed to follow up on eelgrass studies conducted in 2000 by SDG&E.

5. A draft 316(a) report was submitted to the Regional Board and the resource agencies for review and comment on March 20, 2004, and a final report, entitled "Duke Energy South Bay Power Plant Cooling Water System Effects on San Diego Bay, Vol. 1: Compliance with Section 316(a)of the Clean Water Act," was submitted to the Regional Board in May 2004. The final report included the results of Tenera's study, which was an analysis of empirical data collected in the field, and Merkel's study, which involved modeling potential distributions of eelgrass based on temperature and turbidity of the water.

6. In adopting Order No. R9-2004-0154, the Regional Board found that the temperature of the power plant's cooling water discharge did not adequately protect receiving water beneficial uses. See Findings 14, 15 and 19 of the Order. These findings appear to have been based on a gradient of declining species diversity index values of benthic organisms in the immediate vicinity of the SBPP discharge.

I. *SUMMARY OF 2003 STUDY.*

7. This declaration reviews the 2003 study data and findings for purposes of (i) highlighting the nature and extent of SBPP thermal effects based on species diversity indices; (ii) creating an understanding of the statistical and scientific meaning and significance of diversity indices; and (iii) comparing the effects observed at SBPP with discharge-related changes in benthic diversity indices that have been found by other

California regional boards to afford reasonable protection of beneficial uses at other California shoreline thermal discharges. The 2003 study results do not support the Regional Board's findings regarding impairment of beneficial uses in south San Diego Bay.

8. Changes in the productivity and persistence of benthic infauna are related to natural and anthropogenic factors such as water quality, pollutant loading, substrate composition, organic matter content, temperature, oxygen concentration, and interspecific community interactions (Weisberg et al. 1997). Benthic communities have been widely used as pollution indicators because populations are sedentary and respond to local changes in ambient conditions (Smith et al. 2001). The effects of the SBPP discharge on the receiving water benthic community have been investigated in a series of field studies and statistical analyses spanning nearly 30 years.[2] These historical studies all reached essentially the same conclusions: (i) the presence of the discharge has altered the species diversity of mud-dwelling organisms in the discharge channel; and (ii) the nature and extent of thermal effects, based on species diversity indices, is confined to a small nearfield area of the discharge region. Prior studies, however, did not address the question of what significance, if any, these reported changes have for the benthic community in south San Diego Bay, especially given the moderate degree of change and the very small area of marine habitat that is affected.

9. Our understanding of discharge effects has become more refined over the 30-year period. Though science is able to contribute a factual basis and some theory in addressing the issue of significance, in the end the answer is one of reason and judgment. Generally speaking, discharge-related changes (alteration, disturbance) are considered of a reasonable nature if a population is not threatened and the areal extent of the affected receiving water is relatively small. It is my belief that the changes in the benthic community, though clearly detectable, do not necessarily represent a significant change in

---

[2] Benthic invertebrate populations in south San Diego Bay have been quantified in various studies since 1968 (Tenera 2003 V1, p 3.3-2).

the ecological function and productivity of the changed community. Species which are indigenous to San Diego Bay and present in reasonably normal abundances are present in the discharge-altered community and are still functioning in their normal ecological roles as secondary producers, converting organic matter into benthic biomass and food for the higher trophic levels such as fishes and birds.

10. The purpose and design of the Tenera 2003 study was to further investigate the nature and extent of the SBPP discharge effects on benthic communities of marine worms, crustaceans, and mollusks by sampling the kinds of species and their individual abundances as a function of the distance from the discharge, a surrogate for discharge temperature exposure. The studies were conducted during June, July and August (the warmest months of the year) in order to evaluate the effects of the plant's discharge under "worst case" conditions. Given the "worst case" nature of the study design, it must be noted that effects measured during the warmest months of the year are not representative of the cooler months, and can lead to an overestimate of overall discharge effects.

11. The 2003 study entailed an extensive investigation of the influence of the SBPP discharge plume on benthic communities of south San Diego Bay. In order to improve the density of spatial data and thereby increase the study's chances of detecting such community gradients, the study design doubled the number of sampling locations used in the previous studies, and located sampling stations across both vertical and horizontal changes in the bottom elevation where they would be exposed to various discharge temperatures. The data collected from this array of sampling locations allowed a much finer-scale examination of changes in the benthic community closer to SBPP discharge. This element of the study was intended to provide better definition of both the nature and extent of the expected gradient of change in the bottom and intertidal communities than was obtained through prior studies. From the study's results, it is now known that the discharge plume effects are strongly three dimensional due to the buoyant nature of the warm discharge water and the increasing depth of the discharge basin as one moves offshore,

away from the shoreline. The gradient of discharge effects on the bottom community disappears much more rapidly (closer to the point of discharge) than discharge effects in the intertidal community which exists along the refuge island shoreline that parallels the path of the discharge plume as it moves bayward.

12. The sampling stations were located in subtidal and intertidal areas both inside and beyond the zone of contact with the warm water discharge. Because data on the kinds of benthic dwelling species that existed in south San Diego Bay before the SBPP was constructed are not available, a before-and-after measure of SBPP-induced changes cannot be made. Accordingly, the study was designed to measure gradients of change from the point of the shoreline discharge to areas offshore.[3]

13. The area of affected intertidal and subtidal habitat lies between the discharge and sampling stations E7 and T1 (see attached Figure 2.3-1a), a distance of approximately 600 feet. The discharge effects on species diversity are more noticeable in the intertidal area. Intertidal habitat near the discharge is more frequently in contact with warmer water at distances further away from the point of discharge as the plume becomes a buoyant surface phenomenon. The plume's buoyant separation from the bottom also reduces the frequency and extent of warm water contact with the subtidal benthic community. Results from the recent fine-scale monitoring and modeling of SBPP receiving water temperatures[4] illustrate the three-dimensional nature of the SBPP discharge plume. The patterns of thermal plume distribution and dispersion found in these analyses were consistent with the area and pattern of the limited discharge effects. It is reasonable to conclude that periods of

[3] The assumption underlying the gradient-style study design is that changes in the benthic community that occur with increasing proximity to the point of discharge are primarily attributable the SBPP discharge. However, there is some reason to believe that this may not be the case, since previous dredging to deepen the discharge channel has altered the geology of the channel's bottom sediment, and the character and quality of sediments are well known from the scientific literature to have a potentially profound influence on the species composition and abundance of benthic communities. It is also possible that the hypersaline conditions and drainage of the neighboring salt ponds have influenced the benthic habitat and communities in the vicinity of the SBPP discharge.

[4] Tenera 2003, page 3.3-4.

elevated discharge temperatures, particularly in the late summer, have caused most of the change in the benthic community species diversities observed at stations E7 and T1.[5] However, it is also reasonable to expect that the discharge flow has altered the composition and distribution of sediment and waterborne organic matter, habitat characteristics that are also important factors in the species composition and diversity of benthic communities.

14. The lower benthic species diversity as noted above at stations E7 and T1 in the immediate vicinity of the SBPP discharge is reflected by both a small reduction in the number of species and a significant increase in the abundance of a few of the species.[6] Specifically, the study concluded"[7]

- There was no clear gradient in total number of taxa per station as a function of distance from the discharge at subtidal stations. The station nearest the discharge, SE7, had a relatively high number of species (46) in August compared to the average at all stations for the same period (38.1 per station) (see report Table 3.3-1).[8]
- There was no clear gradient in total numbers of individuals per station as a function of distance from the discharge at subtidal stations. Abundances at

---

[5] A species diversity index is a mathematical measure of species diversity in a community. Diversity indices provide more information about community composition than simply the number of species present by taking into account the relative abundances of different species. As an example, two communities of 100 individuals each are composed of 10 different species. Community A has 10 individuals of each species; and Community B has one individual each of nine species, and 91 individuals of the tenth species. Although both communities have exactly the same number of species and individuals, by taking into account the relative abundance of each species, Community A has the highest species diversity index. The species diversity index of a community does not depend on the number of species, but on the evenness with which individuals are distributed among the different species.

[6] Even so, the resulting diversity indices at these two stations are not unusually low for shallow marine embayments (about 50 percent of normal for this area of San Diego Bay).

[7] A summary of community parameters including species richness, total number of taxa, biomass, diversity, evenness, and a benthic response index is presented for the subtidal and intertidal stations during July, August, and September 2003 in Tables 3.3.1 and 3.3.2.

[8] Tenera 2003, p 3.3-7.

the four stations closest to the discharge were generally less than half those of the reference stations (see report **Table 3.3-2**).[9]

- There was no consistent pattern in the distribution of total <u>subtidal</u> biomass and no obvious gradient as a function of distance from the discharge. A lack of pattern resulted from lower marine worm biomass near the discharge, combined with offsetting biomass of other types of benthic organisms.
- Intertidal biomass showed no consistent trends related to distance from the discharge.[10]
- Mean diversity at <u>subtidal</u> stations was generally low at the two stations closest to the discharge, SE7 and ST1. During all months sampled there was a significant trend of decreasing diversity within the discharge channel as distance from the discharge decreased ($p<0.05$; **Figure 3.3-3**).[11]
- The lowest intertidal faunal diversities were also recorded at stations closest to discharge (see report **Table 3.3-2**), but there was no significant trend among sampling stations as a function of distance from the discharge.

15. The results of the 2003 Tenera study demonstrate and agree with all of the previous investigators' reported findings that the extent of SBPP discharge-related changes in subtidal benthic communities is limited to a near-field area extending approximately 100 m (300 ft) from the discharge. Thermal effects measured in the intertidal area extended approximately 600 feet from the point of discharge, or twice the distance of the subtidal effects. An analysis of data collected from 1977–1980 concluded that there were "no undesirable or adverse ecological effects to the soft bottom benthos associated with the operation of the SBPP" (LES 1981). A complete summary review of the long-term receiving water monitoring data included surveys over a 17-year period from 1977–1993

---

[9] Tenera 2003, page 3.3-8.

[10] *Ibid.*

[11] Tenera 2003, page 3.3-9.

(Ogden Environmental and Energy Services Co., Inc. 1994) concluded that the stations within the discharge channel and nearest the power plant (E5 and E7) had lower numbers of infaunal taxa and lower species diversity than control stations, indicating a localized effect of the power plant. (See **Figure 2.3-1a**)

16. None of the previous studies or the 2003 study found discharge-related effects which suggested changes in the SBPP receiving water benthic community that were unreasonable or unexpected given the size and location of the permitted discharge. Nor was evidence found that the observed changes indicated an ecological loss of beneficial use of the receiving water as marine habitat. To the contrary, evidence was found that even in the nearfield discharge area, a normal range of fully functioning marine habitat exists. This evidence is apparent in both the results of SBPP benthic community studies that focus on the very small area of marine habitat that is affected by the discharge, and in the results of the 2003 fisheries studies (and many previous studies) that have demonstrated a highly abundant and diverse fish community in the immediate vicinity of the discharge, well within the nearfield area where we have found changes in the benthic community. The presence of such a productive and fully functioning marine habitat in the vicinity of the SBPP discharge would be expected given the highly localized, limited extent of discharge-related change.

17. Results of the 2003 SBPP receiving water studies found no evidence of ecological impairment of the receiving water beneficial uses, including intertidal and subtidal habitat at discharge-affected stations E7 and T1. Fishes[12], birds, and wildlife were observed in abundance throughout the discharge area. The presence of the abundant fish

---

[12] Tenera 2003, page 3.4-14. The discharge channel is a unique environment that shows some similarity to other back-bay environments, while also providing conditions that allow for unusual species occurrences, atypical juvenile abundances, and seasonal use patterns. The unique temperature environment of the channel may provide a warm water refuge area for several Bay species during the winter, but may similarly preclude some species from full use of the area during the hottest portions of the summer months. The site provides a warm haven for fish and for green sea turtles in winter, as well as for interesting Panamic province species such as the diamond stingray, California halfbeak, California needlefish, bonefish, and shortfin corvina.

populations in the SBPP discharge flow provides a valuable prey base for the successful U.S. Fish and Wildlife (USFWS) refuge for least terns that is immediately adjacent to the SBPP discharge. Results of the 2003 comparison of the number of species, density, and biomass of fish populations between the SBPP discharge and three other similar southern California bay settings are shown in attached **Figure 3.4-4.** In every comparison, the measures of fisheries resources in the SBPP discharge are as great or greater than the comparison sites.

18. Findings 14, 15 and 19 of Order No. R9-2004-0154 concluded that the low species diversity index of benthic organisms, primarily marine worms, indicated that the SBPP discharge temperature limits do not protect receiving water beneficial uses. However, Tenera's 2003 study and analysis of benthic species diversity in the SBPP discharge area in fact reported a very localized change in the diversity of benthic species.[13] These localized changes are clearly seen at the two stations closest to the discharge, SE7 and ST1 (see attached **Figure 3.3-3,** which summarizes the results of both intertidal and subtidal species diversity analyses). As also seen in **Figure 3.3-3**, there is no evidence of discharge-related effects on average benthic species diversity among all of the other intertidal and subtidal sampling locations including those in the SBPP discharge area and reference stations, which are graphically lower on average than the discharge area species diversities.[14]

19. In summary, the 2003 study corroborated the conclusions reached in the prior SBPP studies and concluded that the benthic community in the vicinity of the SBPP discharge, though composed of slightly more of one indigenous species than another, is fully functional and typical of similar south Bay benthic communities. This Regional Boards findings do not comport with this conclusion.

---

13 *Ibid.*

14 A low evenness index of species diversity in July, August and September at Station E7 was mainly due to the dominance of nematodes, oligochaetes, and *Musculista senhousia* in the samples even though the overall number of taxa was higher than the average.

II. ***COMPARISON OF SBPP DISCHARGE EFFECTS WITH THOSE OF OTHER COASTAL POWER PLANTS IN CALIFORNIA.***

20. Other NPDES-permitted shoreline cooling water discharges in California that exhibit near-field changes in receiving water species have been found to be acceptable by other regional boards and regulatory agencies. These relevant precedents were not taken into account by the Regional Board. The significance of the SBPP discharge-related effects may be assessed by comparing these effects to cooling water discharge-related effects of the Morro Bay Power Plant (MBPP) and Diablo Canyon Power Plant (DCPP) in the Central Coast Region.

21. The elevated cooling water temperatures of the MBPP's shoreline discharge have altered the shallow intertidal community for a distance of approximately 700 feet along the base of Morro Rock. The extent of this change has been judged to be of a reasonable extent by the Central Coast Regional Board, the California Energy Commission (CEC), the California Department of Fish and Game (CDFG), and a number of experts from several academic institutions. Similarly, the intertidal and subtidal benthic changes due to the elevated temperatures of the DCPP shoreline cooling water discharge have been extensively studied and analyzed. The receiving waters include Diablo Cove, an open coast rocky shore habitat that supports luxuriant kelp forests and other subtidal kelps, attached algae, fish and abalone. In determining the reasonable extent of discharge-related change, the Regional Board allowed significant change in a distance of 1,400 feet from the discharge, taking into account the size of the discharge. By comparison, the size of the SBPP affected intertidal area is approximately 600 feet from the discharge (subtidal effects are limited to half the distance of intertidal effects, or 300 feet). This represents less than one percent (by area) of the south bay marine habitat.

22. Not only is the extent of SBPP discharge-related change in species diversity significantly smaller than reasonable and acceptable changes at California's other shoreline discharges, but the South Bay species that comprise the diversity indices are by necessity

species that are able to tolerate the great range of environmental conditions of typical of California's enclosed bay, sloughs and estuaries. Many of these species also have short life cycles, producing many generations in a single year.[15, 16, 17] Species of marine worms that live in bay mud, including those species that the Regional Board cited as evidence that the SBPP receiving water beneficial uses are not being protected, are able to tolerate extremes of salinity, temperature and dissolved oxygen through their unique physiological and behavioral adaptations. In this sense they need less environmental stability (receiving water quality protection) to flourish than the open coast benthic species found in the DCPP and MBPP receiving waters. Yet the SBPP permit affords more protection to the South Bay species.

23. The reasonable and allowable extent of discharge-related at the MBPP and DCPP is not only larger than SBPP, but the nature of reasonable change includes shifts in abundant populations of attached algae to invertebrate dominated benthic communities. However the modified communities at both sites are fully functional in an ecological sense, and there is no indication that the beneficial uses of either of the receiving water marine habitats have not been protected. Similar to the nature of SBPP discharge-related changes reported in over 30 years of benthic studies, changes at the MBPP and DCPP locations reflect warm water discharge conditions favoring one indigenous species over another. At the MBPP discharge site, the sand-tube dwelling polychaete, *Phramatopoma californica,* has colonized the rocky shore for several meters from the point of discharge. The striking

---

[15] Warren (1976) noted that spawning occurred throughout the year in, with all oocytes being released at a single spawning. Warren, L.M., 1976. A population study of the polychaete *Capitella capitata* at Plymouth. *Marine Biology*, **38**, 209-216.

[16] The opportunist polychaete *Capitella capitata* has both benthic and planktonic larvae and breeds throughout the year; this means it is able to colonize impacted or stressed areas very quickly. Pearson, T.H. & Barnett, P.R. (1987). Long-term changes in benthic populations in some west European coastal areas. Estuaries 10 (3), 220-226.

[17] The amphipod *Corophium volutator* displays one or two generations per year depending on environmental conditions at its location. Olive, P.J.W. (1978). Reproduction and annual gametogenic cycle in *Nephtys hombergi* and *N. caeca* (Polychaeta: Nephtyidae). Marine Biology, 46, 83-90.

sand colonies of this intertidal species are common along California's rocky coast, usually occurring in protected and possibly warmer embayments. It appears that the MBPP discharge temperatures favor the abundance of this habitat-forming species. As found in the SBPP studies where the increased abundance of a few species of worms lowered the benthic community's species diversity indices, the abundance of *P. californica* lowered the benthic community species diversity index at the MBPP discharge without harming, and indeed enhancing, the beneficial use of marine habitat at the site. See attached **Figure 5-8**.

24. A few miles down the coast from the MBPP discharge, the much larger DCPP cooling water discharge has similarly favored the presence and abundance of attached and colonial invertebrate species over species of attached upright algae normally found in Diablo Cove, the power plant's primary discharge receiving water area. These changes favoring the abundance of warm water species over other less tolerant species have also caused lower species diversity without harming the receiving water's beneficial use as marine habitat, albeit by warmer water species.

III. ***SAN DIEGO BAY COUNCIL STUDIES***.

25. Other technical reports that seek to refute the 2003 Tenera report were submitted to the Regional Board by the San Diego Bay Council, an informal coalition of various public interest organizations. These reports were prepared by the British firm, Pisces Ltd., and by Dr. Robert Ford, a retired professor from San Diego State University who previously conducted thermal effects studies for SDG&E. Neither the Pisces report nor Ford's report reviewed, analyzed or even commented upon the lower species diversity of mud-dwelling organisms that the Regional Board relied upon as evidence that receiving water beneficial uses are not protected in the vicinity of the SBPP discharge. Similarly, neither Pisces nor Ford considered the clearly three-dimensional effects of the discharge plume, or the sharp gradient of diminished effects as the warm plume lifts and separates from contact with the benthic community.

26. However, in prior studies conducted by Ford in 1970, 1972 and 1973, Ford found essentially the same type of discharge-related gradient in the benthic community that is identified and discussed in the 2003 Tenera report. Ford's main conclusion from this series of studies was that significant effects on benthic invertebrate assemblages were "restricted primarily to the cooling channel area and to warmer periods of the year" (Ford et al. 1973). An annual SBPP benthic monitoring program from 1977–1993 continued after Ford's initial studies. A subset of Ford's (1972) original 28 stations was monitored at 11 locations during this period. An independent analysis of Ford's studies and the data collected from 1977–1980 concluded that there were "no undesirable or adverse ecological effects to the soft bottom benthos associated with the operation of the SBPP" (LES 1981). A second independent analysis of all of the SBPP benthic data collected through 1993 found again that the stations within the discharge channel and nearest the power plant (stations E5 and E7) (see **Figure 2.3-1**) had lower numbers of infaunal taxa and lower species diversity than control stations, indicating a very localized effect of the power plant. All of the results from this long series of SBPP benthic studies, which include the results of the 1994 independent summary analysis, concluded that the discharge has caused a very localized effect that can be detected as a change in the species diversity of the nearfield benthic community.

27. The author of the Pisces report concludes that "Even if species live within this zone, they **might be** living sub-optimally and **possibly** not be able to reproduce.[18] (emphasis added) This conclusion amounts to no more than speculation or guessing. The author's evidence for this statement — that temperature effects such as increased growth and prolonged growth season are "deleterious" — is not supported by field or laboratory evidence of harm to a balanced indigenous community. In any case, it is not clear how "increased growth and prolonged growth season" would be regarded as an impairment of

---

[18] Pisces 2004, page 16.

beneficial uses. To the contrary, the discharge provides a unique and productive ecological base for the fishes, birds, and wildlife of South Bay ecoregion of San Diego Bay. Pisces also omitted several studies from their review and conclusions.[19,20,21]

28. The Board should not be misled by Pisces' bad science citations to outdated and irrelevant information on the effects of both the DCPP and MBPP discharges. The author of the Pisces report presents findings and a graph from a 1969 siting study for DCPP prepared by Pacific Gas and Electric Company for the Atomic Energy Commission (now the Nuclear Regulatory Commission). We are aware of this "gray" literature even though copies no longer exist; the Pacific Coast Electrical Association has not existed for many years. The study was a hypothetical extrapolation of data for the purposes of estimating the effects of the DCPP cooling water discharge. The actual data and findings on the effects of the DCPP cooling water discharge have been reported in over 30 different reports spanning the last three decades. The effects of the MBPP discharge were exhaustively studied in 2001 and reported in numerous reports and testimony before the CEC. The Central Coast RWQCB recently issued a Tentative Order (TO) with specific findings on the MBPP thermal discharge based on contemporary studies rather than the Pisces paper study. The Central Coast TO and summary of these studies is available on the Internet. Studies of the MBPP thermal discharge were analyzed and presented in reports and expert testimony before the CEC and are available in Duke Energy's Application for Certification of the

---

[19] Adams, J. R., D. G. Price and F. L. Clogston. 1974. An evaluation of the effect of Morro Bay Power Plant cooling water discharge on the intertidal macroinvertebrate community. PG&E, Department of Engineering Research, San Ramon, California. 32 pp.

Pacific Gas and Electric Company and Cal Poly San Luis Obispo conducted a study in 1971–1972 to examine the relationship between increased water temperatures along the beach north of the discharge and the community structure (species composition, abundance, and diversity) of the intertidal sand beach fauna.

[20] Pacific Gas and Electric Company. 1973. An evaluation of the effect of cooling water discharges on the beneficial uses of receiving waters at the Morro Bay Power Plant. San Francisco, CA.

[21] Tenera 2001 op cit.

Morro Bay Power Plant Modernization Project and the CEC's recent approval (June 2004) of certification.[22]

I declare under penalty of perjury under the law of the State of California that the foregoing is true and correct. Executed this 10th day of December, 2004 at Lafayette, California.

David L. Mayer

[22] Tenera.. 2001. Morro Bay Power Plant Modernization Project Thermal Discharge Assessment Report. Prepared for Duke submittal to California Energy Commission, Regional Water Quality Control Board, California Department of Fish and Game, California Coastal Commission.

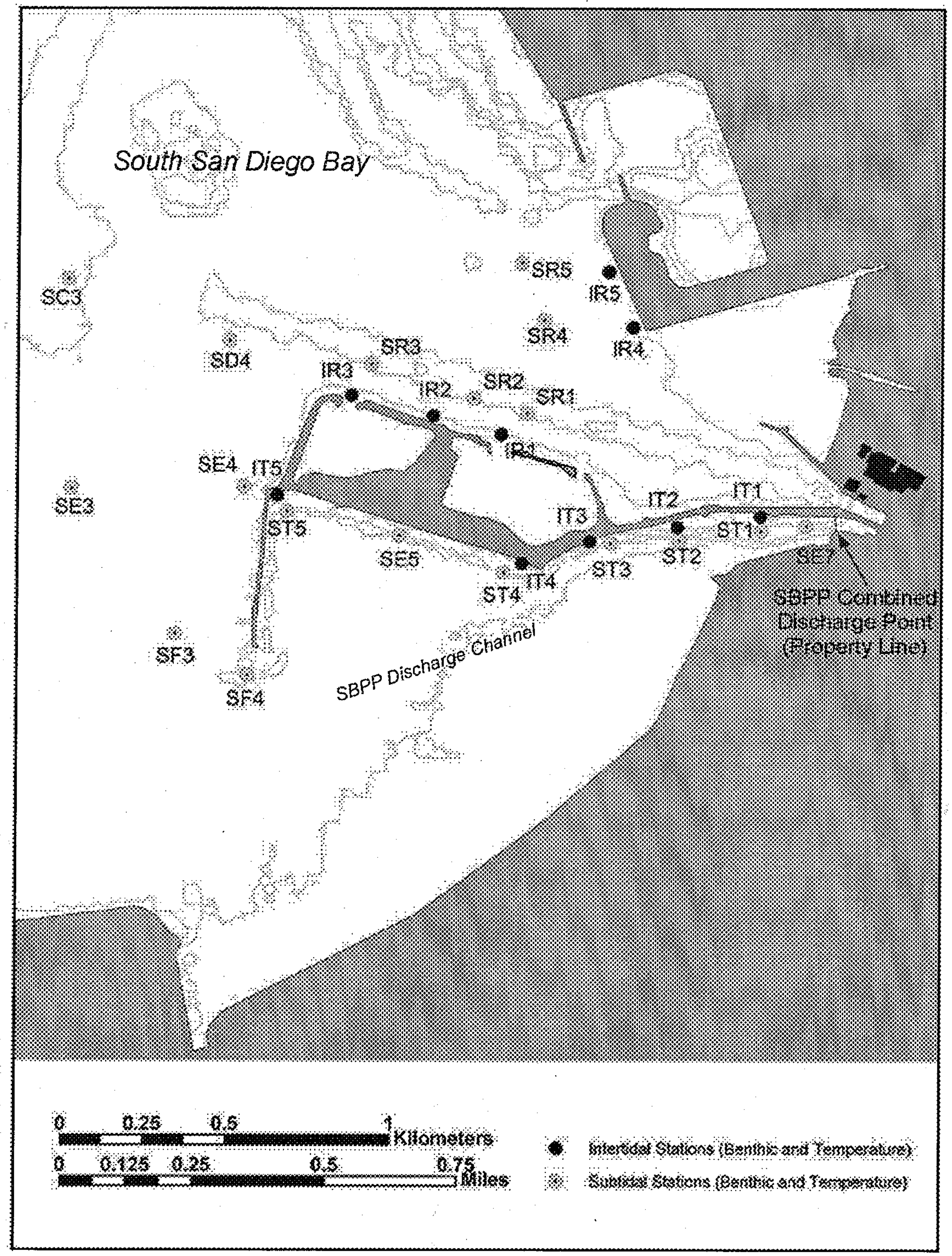

Figure 2.3-1a. Station location map of *in situ* temperature recorders, sediment grain size samples, and benthic biological samples: all stations shown.

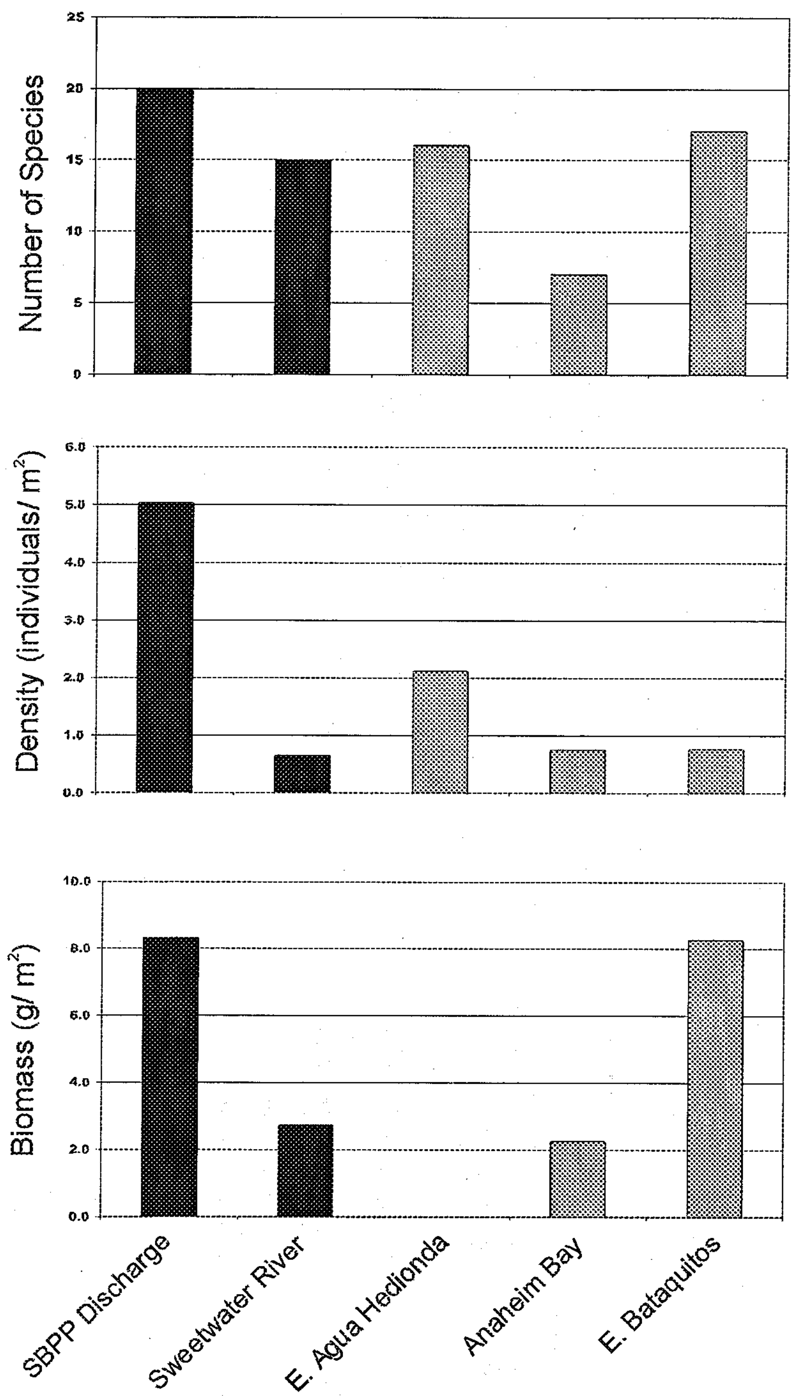

Figure 3.4-4. Number of fish species, density, and biomass at study sites and three reference sites. Agua Hedionda Lagoon data from July 1994 (MEC Analytical Systems 1995) (no biomass reported); Anaheim Bay data from Sept. 1994 (MEC Analytical Systems 1995); Batiquitos Lagoon data from July 2003 (Merkel & Associates 2003, unpublished data).

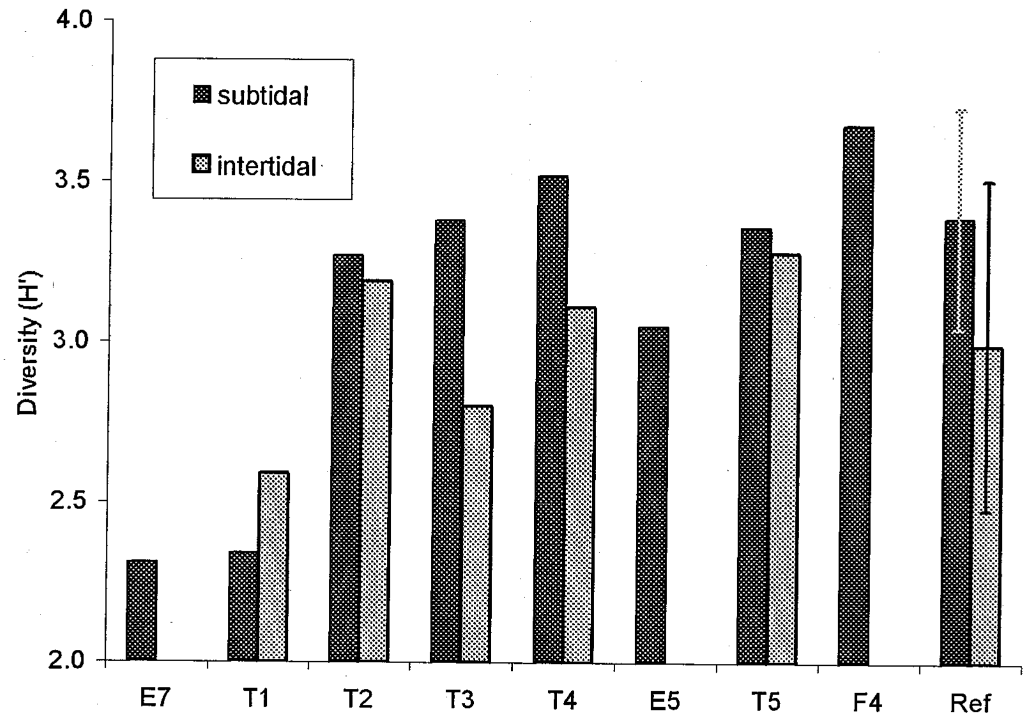

Figure 3.3-3. Infaunal diversity (H') mean per station at SBPP discharge channel stations, August 2003. Reference diversity values are the mean and standard deviation of other sampled subtidal (n=13) and intertidal (n=5) stations in south San Diego Bay.

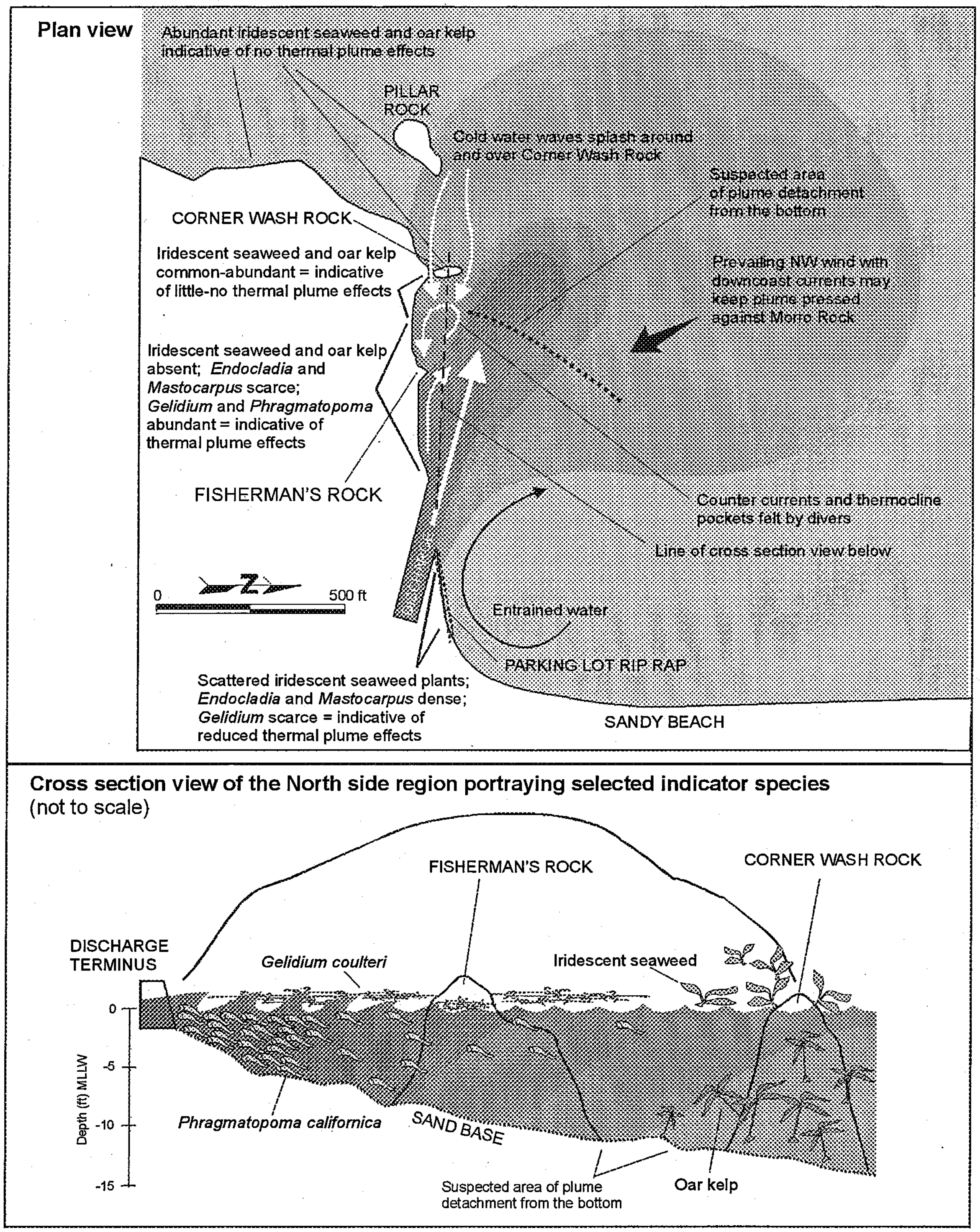

Figure 3. Morro Bay Power Plant discharge area effects. Darker shaded water represents warmer temperatures. Species noted from subtidal horizontal and vertical transect sampling, observations outside the sampling areas, and intertdial observations. (Source Tenera 2001, **Figure 5-8.)**