TESTIMONY OF THE NO MORE POWER PLANT COALITION MEMBER ORGANIZATIONS FOR THE MARCH 10, 2010 HEARING URGING THE REGIONAL BOARD TO DIRECT STAFF TO PREPARE A RESCISSION ORDER OF CA0001368, ORDER NO. R9-2004-0154 FOR DYNEGY SOUTH BAY, LLC SOUTH BAY POWER PLANT.

The organizations that constitute the *No More Power Plant Coalition* include: Environmental Health Coalition, San Diego Coastkeeper, South Bay Forum, Southwest Chula Vista Civic Association, Coastal Environmental Rights Foundation, San Diego Audubon Society, San Diego Chapter of the Sierra Club, and the San Diego Chapter of the Surfrider Foundation. Our organizations represent over 25,000 residents of the San Diego region. This testimony is provided in support of our request for the Regional Water Quality Control Board (Regional Board) to, finally, bring an end the 50 years of devastation brought on the Bay from the SBPP.

To ensure the end of impacts to beneficial uses of the bay from power plant discharges, we request the Board:

- Direct staff to bring back a Tentative Order for prohibition of the discharge as of June 1, 2010 and rescission of the Order.
- Hold any future hearings or workshops on this issue in Chula Vista per the State's guidance on environmental justice.
- Direct staff to implement the current permit requirements to mitigate known adverse impacts to the Bay.

OUTLINE OF ISSUES

1. There has been no valid assessment of true background (pre-discharge) conditions in South San Diego Bay; therefore the baseline of all subsequent studies is flawed and unrepresentative.

2. Forty-five years of regulation and study was fundamentally flawed due to the mischaracterization of a large portion of South Bay as part of the power plant and not part of the Bay requiring protection of beneficial uses.

3. The Regional Board and other agencies have found that the discharge from the South Bay Power Plant has adversely impacted, and will continue to adversely impact, beneficial uses and water quality in South San Diego Bay.

4. The adverse impacts will continue as long as Units 1 & 2 continue to discharge. Impacts of the cooling system and discharge result from heat, chlorine use, impingement, entrainment, ecological disruptions, toxic materials, and cumulative impacts will not cease until the discharge is ended.

5. There is no legitimate need for the power produced by Units 1 & 2 in 2010 and after. Conditions for removal of the RMR made by ISO and Duke in 2004 have all been met.

6. The Water Board has the legal authority and mandate to end this discharge.

7. As a matter of environmental justice the discharge should be terminated.

8. Analysis of the feasibility of plant improvements have not occurred or have been compromised because of representations of the limited remaining life of the plant.

RATIONALE

1. **There has been no valid assessment of true background (pre-discharge) conditions in South San Diego Bay; therefore the baseline of all subsequent studies is flawed and unrepresentative.**

    a. ***All environmental studies began years after the power plant began discharges.***

As noted in the Fact Sheet for Order No. 2004-0154, the SBPP began operation in 1960.[1] The regulatory history of the Plant is contained in the Regional Board's records. Regional Board Resolution 69-R3, adopted on January 14, 1969, is the earliest Regional Board regulatory document for the plant. Order No. 74-91, adopted by the Regional Board on December 9, 1974 is the first permit to regulate the discharge from the plant pursuant to the Federal Clean Water Act.

In adopting Resolution 69-R3, the Regional Board made findings describing the fact that the power plant was already in operation and using bay water prior to regulation under this permit:

> *2. At the present time, the South Bay Power Plant has three units in operation which have a reported combined electrical generating capacity of approximately 530,000 kilowatts (kW).*
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> *3. Bay water is used for cooling purposes throughout the plant at the present rate of 274,500 gallons per minute (gpm).* [2]

Resolution 69-R3 further describes two reports that were considered in regulating the discharge from the SBPP:

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[1] Fact Sheet for Order No. 2004-0154
[2] Resolution 69-R3, page 2

Marine Organisms of South San Diego Bay and the Ecological Effects of Power Station Cooling Water Discharge, prepared for San Diego Gas & Electric Company by Environmental Engineering Laboratory, December **1968**. (emphasis added)

A Study of the Distribution of Heat Additions to South San Diego Bay, California, prepared for San Diego Gas & Electric Company by Marine Advisors, December **1968**. (emphasis added)[3]

These reports represent the first known efforts to assess the impacts of the discharge from the SBPP on South San Diego Bay—again, **a full eight years after the power plant was already in operation.**

However, the plant was already considered by the US Department of the Interior to be one of two sources of pollution in the South Bay.[4]

b. Previous Findings of 'no impact' are flawed due to lack of representative baseline of the ecological conditions of the Bay prior to the power plant cooling system commencement.

In 2004, Duke Energy South Bay, LLC, then operators of the Plant, submitted the following report pursuant to Federal Clean Water Act Section 316(a). Section 1.5.1 of that report states in part:

> 1.5.1 Background
> In 1972 and 1973, San Diego Gas and Electric (SDG&E), the plant's previous owner and operator, conducted a thermal effects study as required by the State Water Resources Control Board. The study concluded that the existing elevated-temperature wastes discharged from SBPP had caused no prior appreciable harm to the aquatic community of San Diego Bay or to the beneficial uses of those waters (Ford et al. 1973).[5]

The thermal effects study was conducted in response to the California Thermal Plan, first adopted as a policy on January 7, 1971, then updated in 1975. The Thermal Plan requires that:

> 3. Existing and future dischargers of thermal waste shall conduct a study to define the effect of the discharge on beneficial uses and, for existing discharges, determine design and operating changes which

[3] Resolution 69-R3, page 2
[4] Parrish and Mackenthum, 1968, *San Diego Bay. An Evaluation of the Benthic Environment. October 1967.* Biology and Chemistry Section, Technical Advisory & Investigations Branch, Federal Water Pollution Control Administration, U. S. Department of Interior, pp. 21, iv.
[5] South Bay Power Plant Cooling Water System Effect on San Diego Bay, Volume I: Compliance with Section 316(a) of the Clean Water Act for the South Bay Power Plant, August 12, 2004.

> would be necessary to achieve compliance with the provisions of this plan.[6]

The results of the thermal effects study were considered by the Regional Board in determining that the discharge from the South Bay Power Plant met the requirements of the Thermal Plan for an "Existing Discharge": "Elevated temperature waste discharges shall comply with limitations necessary to assure protection of beneficial uses. "[7]

These studies, and others, conducted beginning in 1968, **were all performed <u>after</u> the discharge from the South Bay Power Plant had commenced.** As a result, any conclusions regarding impacts on the discharge on water quality and beneficial uses in South San Diego Bay are speculative at best. In all cases, they reference an already impacted condition as the 'baseline'.

c. Biodiversity and Ecosystem Health and Alteration were never adequately assessed due to lack of baseline.

Ecosystems are by nature extremely complex systems in which many, many relationships exist. The SBPP has been disrupting the natural ecosystem for 50 years, since it began operating in the 1960s. Certain of these disruptions are easy to identify, but most are unknown. The impacts of the discharge have altered the ecosystem in the South Bay so that it is populated with species present because of their ability to withstand the warmer water. Annual studies from 1977 to 1994 have confirmed that diversity of benthic (bottom dwelling) marine life is significantly reduced in the South Bay in areas directly affected by the plant's discharge.[8]

One such fundamental alternation could be the fact that the dominant fish species near the plant is now the round stingray (*Urolophus halleri*), which is a voracious feeder on a wide spectrum of benthic animals.[9] Species that cannot withstand the high temperatures have become reduced in abundance or eliminated in the areas of the discharge.

In their 2005 analysis, *Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plant*, the California Energy Commission acknowledged the poor state of our understanding of impacts in the past:[10]

> Most of these power plants were constructed prior to 1980 when, as discussed above, and (sic) there was little knowledge of once-through cooling impacts on

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[6] Thermal Plan, p.7

[7] Thermal Plan, p. 4

[8] EA Engineering, Science, and Technology, 1995, *South Bay Power Plant Receiving Water Monitoring Program with Emphasis on the Benthic Invertebrate Community (1977-1994),* Prepared for San Diego Gas and Electric Company, San Diego, California.

[9] *Application for Renewal of the NPDES Permit for Duke Energy South Bay LLC's South Bay Power Plant*, 2001, Submitted to the Regional Water Quality Control Board, Appendix G, p. 13; Richard F. Ford, personal communication, 2001.

[10] *Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants*, California Energy Commission, June, 2005, page 9. Document # CEC-700-2005-013

> the marine environment. Thus, as with fishing, it was reasonable to assume that power plant impacts would be negligible. [11]

We now know that the impacts are not negligible and that beneficial uses are, and will continue to be, significantly impacted by the discharge to bay water by the SBPP whether it is from one, two or four units.

In the ensuing years, several studies were done and impacts noted in spite of the comparison to the impacted baseline. These findings are detailed in *Deadly Power: A case for eliminating the impacts of the South Bay Power Plant on San Diego Bay and ensuring better environmental options for the San Diego/Tijuana region*, 2001[12] and herby entered into the record.

The South San Diego Bay Enhancement Plan, a comprehensive study of South San Diego Bay was published in 1990 and funded by the Port District and the California Coastal Conservancy. It spoke to the tremendous ecological significance of the San Diego Bay,

> Ecologically it is also considered one of the most important embayments of the California coast. San Diego Bay is a major spawning area for ocean and bay fish and is a significant part of the Pacific flyway for annual migratory birds which use the bay for feeding, nesting or resting.[13]

This study further found that many of the functions of Southern California habitat types are present in South San Diego Bay, including but not limited to: Protected, shallow-water, tidal bay-bottom habitats, eelgrass bed, intertidal flats and coastal saltmarshes, essential wildlife habitat, spawning habitat and nursery grounds and protected areas for forage fish and some commercial species (California halibut, starry flounder, white sea bass) and many others.[14]

Also in 1990, the city of Chula Vista filed a preliminary report to the State Energy Resources, Conservation and Development Commission outlining a variety of concerns about the power plant.[15]

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[11] *Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants*, California Energy Commission, June, 2005, page 9. Document # CEC-700-2005-013

[12] Carlin, E. et al, *Deadly Power: A Case for eliminating the impacts of the South Bay Power Plant on San Diego Bay and ensuring better environmental options for the San Diego/Tijuana region.*, Chapter 2, December 2, 2001, Full Document can be found in RB files and at http://www.environmentalhealth.org/PDFs/PDFs_Archive/DeadlyPowerReport.pdf

[13] MacDonald, et al, South San Diego Bay Enhancement Plan, Executive Summary, p. 2 , March, 1990.

[14] Ibid, MacDonald et al, p.16-17

[15] Preliminary Report of the City of Chula Vista In the matter of The Notice of Intention of San Diego Gas & Electric company to file and application for certification of a combined-cycle electric generating facility and related facilities known as the combined-cycle project, No. 89-NOI-1, August 17, 1990, MacDonald, Goodwin, Winges, consultants. Pp III 20-23.

> South San Diego Bay....has already been substantially impacted by the cooling water system of the South Bay Power Plant...The present power plant cooling system has three major areas of adverse impact to Bay organisms: (a) direct mortality of organisms due to impingement on the water intake screens; (b) direct mortality due to entrainment through the power plant and resulting in thermal shock; and (c) both lethal and non-lethal impacts due to the thermal plume as it exits the plant and spread across south San Diego Bay. These latter impacts are obviously most pronounced within the thermal discharge channel, which represents a significant portion of the available shallow-water habitat of south San Diego Bay.... [16]

d. Previous Findings of protection of beneficial uses were based on compromised data and cannot be relied on.

These impacts, over the period of 50 years, are cumulatively significant. The status of the science on the impacts, however, is highly suspect for two reasons. First, virtually all of the data collected on the impacts of the plant use a baseline of ecological health during time periods when the plant was in operation. This skews the data to protect a status quo that is already damaged by plant operations. Second, virtually all of the studies were funded in whole or in-part by the power plant operators. Scientific assessment funded by a discharger with a very significant interest in the outcome renders the studies and the conclusions highly suspect.

Scientists have frequently challenged the sufficiency of biological studies that were done after the power plant operations began. Dr. Richard Ford, Professor Emeritus of Biology, San Diego State University has qualified analyses that he has done based on the existing studies stating "However, all of these studies have occurred since the plant has been in operation. Because of this, no pre-operational baseline studies of the South Bay have been possible."[17]

2. Forty-five years of regulation and study was fundamentally flawed due to the mischaracterization of a large portion of South Bay as part of the power plant and not part of the Bay requiring protection of beneficial uses.

a. Compliance point has historically been far removed from discharge point

Another failure in our scientific and regulatory system plagued the South Bay for upwards of 40 years. The Board has heard arguments that the discharge has historically shown no impacts to beneficial uses. However, there is some very important history about what has constituted the 'discharge channel' in the past. The bulk of the studies and early discharge permits considered the most impacted area of the South Bay to be part of the power plant's discharge channel and

[16] Ibid, Preliminary Report, p. III-20

[17] *Recommended Options for maximum water temperature limits and minimum dissolved oxygen limits at a compliance point for discharges from the South Bay Power Plant in San Diego Bay, necessary to protect beneficial uses*; Prepared for the San Diego Bay Council, Dr. Richard Ford, PhD., April 4, 2003, page 1

not part of the Bay and so did not consider known impacts to beneficial uses in that area as relevant.

Google Map of 32 36 33 N, 117 6 49 W

Although today, the discharge is monitored somewhat closer to the actual point of discharge that has not generally been the case. For nearly the first 40 years of power plant regulation, from the inception of the plant until 2004, a vast area of the southeastern area of South San Diego Bay was designated as "the discharge channel" and not the Bay.[18] The 'discharge point' or end of the discharge channel was at 32 36 33 N and 117 6 49 W.[19] As seen in the Google map above, this location is far out in the middle of the southern portion of the Bay.[20] The official "point of discharge" was located one mile from the actual point of discharge at the end of the rock jetty in the middle of the South Bay.[21] Because of this, the beneficial uses were not fully protected for waters in the discharge channel. While the Plant was not granted an official mixing zone, by having a compliance point so far from the point of discharge, dilution was de facto allowed.

Regional Board staff member Bruce Posthumus presented the issue at the 1996 hearing:

> "The second category of issues are those issued related to the discharge channel. A discharge channel is the area, the southeasternmost portion of the San Diego Bay, south and east of the jetty that separates the intake channel from the discharge channel.
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> The existing and previous permits for the South Bay Power Plant define the point of discharge to be near the end of the jetty which extends into San Diego Bay from the

[18] NPDES Order 85-09, Finding 23, page 7; NPDES Order 74-91, Finding 2, page 1; and, Finding 23, Order 96-05, p. 9
[19] NPDES Order 85-09, Finding 23, page 7; NPDES Order 74-91, Finding 2, page 1; and, Finding 23, Order 96-05, p. 9
[20] Map of Discharge Channel of the South Bay Power Plant, Fact Sheet for Tentative Order 2001-283, Attachment 4, and Earth Tech, South Bay Power Plant Facility Map.
[21] Map of Discharge Channel of the South Bay Power Plant, Fact Sheet for Tentative Order 2001-283, Attachment 4, and Earth Tech, South Bay Power Plant Facility Map.

> South Bay Power Plant and which separate the plant's intake and discharge channel. **In other words, those permits consider the discharge channel to be part of the plant rather than part of San Diego Bay.**
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> In so doing, **those permits did not recognize waters in the** discharge channels – pardon me, waters in the **discharge channel as water of the state or waters of the United States where beneficial uses and water quality were to be protected**." (emphasis added) [22]

As a result, when studies were conducted in the 1970's and 1980's they repeatedly found the plant was not significantly impacting South Bay because:

> thermal effluent from the South Bay Power Plant had no major adverse effects on the benthic communities beyond the end of the cooling channel..."[23] and "...no significant ecological effects caused by the operation of the South Bay Power Plant at any location outside of the cooling channel[24]

Precisely because the Permit did not consider impacts in the cooling or discharge channel, the beneficial uses were left unprotected.

In spite of this mischaracterization, several studies did demonstrate impacts were occurring in the 'channel'. [25] During 1968-73, the cooling water use was permitted for 434 million gallons per day (mgd). Even then, the studies showed that stations near the thermal effluent had "considerably different chemical, physical, and biological characteristics than did those of all other stations"[26] but no regulatory action was taken due to how the discharge channel was defined.

Other researchers noted this same problem. MacDonald noted in the Preliminary Report on the SDG&E NOI,

> SDG&E presently maintains that the cooling water outflow channel (the discharge channel...) is "a part of the power plant" and thus exempt from impact considerations. Whether or not this is appropriate from a RWQCB regulatory approval process remains to be confirmed during the RWQCB approval process. From the broader perspective of the biological values and sensitivity of South Bay marine habitats, such an exemption is clearly not appropriate, however. This discharge channel area incorporates many acres of prime biological shallow water and intertidal habitat. The warm-water discharge substantially reduces

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[22] Transcript of item 10 San Diego Gas & Electric, South Bay Power Plant, Discharge of once-through cooling water and other Wastes to San Diego Bay: Permit Reissuance, Regional Water Quality Control Board hearing, June 13, 1996, Testimony of Bruce Posthumus, p. 11.

[23] Ford and Chambers (1974) cited in Duke Application, Appendix G, p.24

[24] Lockheed Center for Marine Research cited in Duke Application, Appendix G, p.24

[25] Ford and Chambers (1974) cited in Duke Application, Appendix G, p. 24

[26] Lockheed cited in Duke Application, Appendix G, p.24

> both species diversity and biomass of organisms living within this area, and probably also significantly impacts fish and bird populations.[27]

Unfortunately, the Regional Board did not begin to rectify this problem until 1996. However, the demonstrated continuing impact to *all* areas of the bay substantially undermines the argument that the power plant has operated for decades without impacts. The channel designation also allowed a large dilution of the impacts before compliance is determined. This equates with a de-facto mixing zone for the power plant. While the law allows for mixing zones, certain demonstrations must be made by the discharger before permission for a mixing zone is granted. No such zone has ever been formally granted by the Regional Board. However, the size of the historical discharge channel was, in reality, a large sacrifice zone where for decades negative impacts to beneficial uses were allowed. [28]

There was some improvement in Order 96-05. The renewal succeeded in relocating the "discharge compliance point" at the edge of the power plant property line, still about 100 feet from the actual discharges—for all constituents **but temperature**. The temperature compliance point was still located 300 yards downstream from the actual discharge point.[29]

In the last renewal, the compliance point was moved to be yet closer to the discharge point. Now, we know that the claims that the power plant discharges do not impact the bay were really just manipulation of where 'compliance' was monitored. The discharges continue to impact the habitat and water quality in myriad ways as detailed elsewhere in this letter.

b. Mischaracterization drove lack of limitations for key constituents

For the bulk of the permit issuances, several important constituents were not monitored for, or lacked limitations, specifically dissolved oxygen (DO) and temperature. It is a given that if an impacted is not looked for, it will not be found. Even when monitoring occurred, what constituted the area needing protection drove the finding (or lack thereof) of impacts.

The Fact Sheet for the 2004 permit points this out relative to studies on dissolved oxygen (DO), "The DO studies in the 1970s also did not consider the discharge channel to be part of south San Diego Bay."[30]

The issue has another aspect that is never appropriately accounted for in assessing impacts. In most cases, a waste stream created by a discharger is discharged into a waterbody. The regulatory structure is designed to minimize or eliminate the impacts of this added waste stream on the receiver waterway. However, in this case, the power plant essentially diverts the bay into the plant, adds chemicals for the purpose of killing marine life, adds waste heat to the at a level high enough to be toxic to marine life, then returns this heavily altered and degraded

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[27] **Op. cit.**, Preliminary Report from the city of Chula Vista, p. III-15

[28] See attached graphic showing the 'point of discharge' at the end of the rock jetty and the hatched area covering the large portion of the bay designated as 'power plant discharge channel'.

[29] NPDES Order 96-05, Monitoring and Reporting Program. P. M-6

[30] Fact Sheet, NDPES 2004 permit, p.41

water to the Bay. There is no denying that the waste the power plant adds to the Bay water causes ecological damage-- **it is added for that very reason.** And these impacts will continue as long as there are power plant units operating a once-through cooling system in the South Bay.

3. The Regional Board and other agencies have found that the discharge from South Bay Power Plant has adversely impacted, and will continue to adversely impact, beneficial uses and water quality in South San Diego Bay.

The closure of Units 3 and 4 of the SBPP is a positive development and will reduce, but not eliminate, negative impacts to beneficial uses of the Bay. The permit, until rescinded, will allow 225 million gallons a day to be processed through the plant, continuing its harmful impacts on marine life.

As our understanding of the Bay has improved, so has our assessment of what damages it. These assessments have clearly, and formally, been established in the official record by the Regional and State Boards.

The discharge from the South Bay Power Plant is regulated by Order No. 2004-0154. In adopting Order No. 2004-0154 the Regional Board included findings acknowledging these adverse impacts.

Findings No. 14 and 15 addressed the impacts of the discharge on South San Diego Bay:[31]

> Waste Discharge Impacts
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> 14. The biotic communities in the immediate vicinity of the discharge point and in the discharge channel have been degraded by exposure to the once-through-cooling water discharge from the SBPP. The degradation to the biotic communities is due to several factors, including elevated temperature, flow volume, and flow velocity.
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> The degradation to biotic communities includes a lower diversity of benthic invertebrates residing in the near field stations of the discharge channel compared to those in reference stations outside the discharge channel. Furthermore, certain invertebrate species (including polychaete worms and amphipods) are largely absent in near field stations of the discharge channel. These species were found in abundant quantities in reference stations outside the discharge channel. The absence of these species from the discharge channel demonstrates that these species cannot survive under the warm thermal regimes of the discharge channel and were being adversely impacted.
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> In addition to a degradation of benthic invertebrates, up to 104 acres of critical eelgrass habitat has been precluded from the discharge channel and other areas of south San Diego Bay due to the redistribution of turbidity in the Bay from the SBPP discharge.
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> 15. The Beneficial Uses (as defined by the *Basin Plan*) that may be impaired due to the effect of the SBPP discharge on water quality include: Estuarine Habitat; Marine Habitat; Wildlife Habitat; Preservation of Rare and Endangered Species; Preservation of Biological Habitats of Special Significance; and Shellfish Harvesting. It is evident that the impacts on Beneficial Uses due to the discharge of once-through-cooling water cannot be completely eliminated except through termination of the discharge. The adverse impacts are due to the individual and combined effects of the elevated temperature and the volume and velocity of the discharge.

[31] NPDES Order 2004-0154

In addition, Finding No. 19 addressed both the adverse water quality impacts of the discharge and the inadequacy of the current permit limits to protect the beneficial uses of South San Diego Bay:[32]

> 19. Pursuant to CWA Section 316(a) the existing thermal discharge limitations (average daily Delta T = 15 degrees F and instantaneous maximum Delta T = 25 degrees F) applicable to the SBPP discharge are not more stringent then necessary for protection and propagation of a "balanced indigenous community" within the discharge channel. These thermal limitations, however, do not fully ensure protection of water quality needed for attainment of the beneficial uses of south San Diego Bay as required by the *Basin Plan* and *State Thermal Plan*.
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> The SBPP discharge channel exhibits a lower overall diversity of benthic invertebrates and the absence of certain indigenous invertebrate species (polychaete worms and amphipods). Furthermore, up to 104 acres of eelgrass habitat (critical to the protection and propagation of indigenous communities) have been precluded from the discharge channel and other areas of south San Diego Bay due to the redistribution of turbidity in the Bay from the SBPP discharge.
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> Measures to mitigate the detrimental impacts of the SBPP discharge to the discharge channel are needed. Measures to restore the Beneficial Uses of south San Diego Bay and to rehabilitate the damage caused to the biological resources of the Bay are also necessary.

In addition to these specific findings, the California Energy Commission (CEC) also made findings about once-through cooling impacts.[33]

Findings:

- Once-through cooling with seawater is an effective and relatively inexpensive cooling method for coastal power plants.
- Withdrawal of sea water for once-through cooling systems kills marine organisms by drawing them with the sea water through the power plant (entrainment) and by pinning them against the intake screens (impingement).
- The sea water entrained by power plants is habitat with high biodiversity. Millions of eggs and larvae of marine fishes and invertebrates are removed with sea water used for cooling.
- Impingement results in the death of large fishes and invertebrates and its impacts are similar to those of a fishery.
- The thermal impacts of particular plants have been large when discharges occur in bays and estuaries with reduced mixing or into the open coast where heated water quickly contacts rocky habitat.
- Each once-through cooling system may interact with other impacts to stress coastal ecosystems in ways that are not well understood.

The beneficial uses that are impacted by the cooling system impacts are: Estuarine Habitat; Marine Habitat; Preservation of Rare and Endangered Species; Preservation of Biological

[32] NPDES Order 2004-0154

[33] *Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants*, California Energy Commission, June, 2005, page 10. Document # CEC-700-2005-013

Habitat of Special Significance; and Shellfish Harvesting.[34] The 2004 Order notes that, "the Adverse Impacts are due to the individual and combined effects of the elevated temperature and the volume and velocity of the discharge."[35]

In addition, it must be recognized that continuing to operate a cooling system that kills and damages and deliberately adds toxic chemicals to the water for the purpose of killing marine life means that beneficial uses are not being protected.

a. Independent Analysis of discharger report reaffirmed significant adverse impacts due to power plant discharge.

Pisces Conservation Ltd. is an international consulting firm that has conducted studies assessing the biological impacts of the intake and discharge of cooling waters from power plants throughout the world, including many in the United States. Many of the previously cited findings by the Regional Board in the current permit were a result of review of the studies reported in the 316 reports submitted to the Regional Board. In 2004, the Bay Council commissioned Pisces to review the same studies and draft documents submitted by Duke Energy South Bay, LLC pursuant to Federal Clean Water Act Section 316(a) and (b) (Pisces Report). [36]

Among others, the Pisces Report found that,

- The SBPP discharge did not meet standards for either old or new 316 (a) or 316 (b) standards.
- The discharge is having an Adverse Environmental Impact and has failed on most of the steps required to avoid an Adverse Environmental Impact as defined by EPA.
- Impacts are related to impingement and entrainment, temperature, biocides in outflow water, collection of dead animals, attraction of predators and scavengers, oxygen content of discharge water, and increased sediment load.
- Chlorine biocide concentrations well below permitted levels are known to damage bacterial and photosynthetic activity and to kill or suppress reproduction in zooplankton.
- The distribution and abundance of nematode and oligochaetes indicates that the ecosystem near the outfall already has reduced biodiversity and is highly stressed. As much as 27% of some larval fish are currently entrained by the SBPP—impacts of this magnitude are unsustainable.
- About 10% of the eelgrass in the Bay has already been lost and it is likely that a larger area is growing and reproducing sub-optimally.
- Evidence refutes the often-quoted concept of surplus production as an argument that losses caused by the plant are accounted for by nature.

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[34] Order 2004-0154 Finding 15
[35] Order 2004-0154 Finding 15
[36] Seaby, R.M.H, Notes on the South Bay Power Plant (SBPP) 316 a & b application, Pisces Conservation Ltd., July 29, 2004, Executive Summary, p.3

b. This Regional Board has already spoken unequivocally and directly to the adverse impacts.

In answering the question about what to do about these impacts, the Regional Board was equally clear:

> It is evident that the impacts on Beneficial Uses due to the discharge of once-through-cooling water **cannot be completely eliminated except through termination of the discharge**.[37] (emphasis added)

It has been firmly, and unequivocally, established in the record and the science that the SBPP's OTC system and discharges to the Bay cause **negative impacts to the beneficial uses of the bay and will not be stopped without cessation of the discharge**.

4. The adverse impacts will continue as long as Units 1 & 2 continue to discharge. Impacts of the cooling system and discharge result from heat, chlorine use, impingement, entrainment, ecological disruptions, toxic materials, and cumulative impacts will not cease until the discharge is ended.

a. The unique physical nature of the South Bay exacerbates heat and toxic impacts.

It is important to understand why the cooling system is so deadly to marine life in South Bay. South San Diego Bay is a special and highly sensitive environment. The area supports a wide variety of aquatic habitats, including submerged lands, eel grass beds, mud flats and salt marsh. Its shallow waters and long tidal prism (circulation) make the South Bay a sensitive marine environment, highly vulnerable to heat (thermal), chemical and other pollution sources. Depth, with the exception of the shipping channel, is 1 to 4 meters deep. The South Bay water circulation is very low; it takes approximately 40 days for the tides to exchange the water.[38]

The South Bay environment is the most vulnerable in the summer because of naturally high water temperatures and in the spring when entrainment has the most negative impacts.

Being very shallow, solar heating during the summer plus the heated cooling water from the power the water temperature can exceed 90 degrees Fahrenheit. Duke/Fluor's analysis of 2001 indicated that temperatures from units 1 and 2 have exceeded 100 degrees F.[39]

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[37] Waste Discharge Requirements for Duke Energy, Order R9-2004-0154, Finding 15

[38] John Largier, Re. John Largier report San Diego Bay Circulation
http://www.waterboards.ca.gov/sandiego/water_issues/programs/bay_cleanup/docs/finalrpt.pdf

[39] Mark Hays, Manager of Environmental Health and Safety, Duke Energy California Operations, to John Robertus, EO Regional Water Board, May 7, 2001, Attachment 3.

b. Waste heat discharged in the water from the SBPP causes adverse impacts

Heat is one of the deadliest aspects of the power plant discharge. Historically, water temperatures discharged from the plant have reached over 100 degrees F,[40] a lethal temperature for fishes, shellfish, and other marine life. Higher water temperatures also reduce the amount of oxygen in the water, and at the same time increase the metabolic rates of animals, which in turn increases their oxygen demand. In fact, the metabolic rate has been shown to double every 10 degrees C (18 degrees F).[41] Thus, animals have a higher need for oxygen but there is less available in the water.

In a detailed analysis of the research of impacts to marine communities from power plant discharge, Dr. Richard Ford found that:

> Evidence from both intertidal and subtidal sampling indicated that elevated water temperatures caused by the thermal effluent had adverse impacts to bay organisms that inhabited the discharge channel, particular during late summer and early fall months.[42]

More specifically, studies on various benthic organisms, such as clams, by J.M. Merino showed impacts[43] and are discussed under Benthic Impacts below.

A study by Kellogg (1975) found that mortality rates for benthic species were significantly higher during summer months than mortality rates at a control station and that the water temperature exceeded 102 degrees F.[44]

In addition to heat, the plant releases toxic chemicals in its discharge water, including copper, nickel, zinc, and chromium (primarily from corrosion in the condenser and condenser tubing), and chlorine. Studies have shown that the high temperatures make the effects of these chemicals even more toxic to marine life, for metabolic reasons.[45] As recently as last year, water was discharged at temperatures in excess of 93 degrees.[46]

A May 7, 2001 analysis submitted to the Water Board by Duke/Fluor Daniel demonstrated that Units 1 and 2, operating at full operation, registered actual outlet temperatures of over 101

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[40] NPDES Order R9-2004-0154, Finding 5.

[41] Van't Hoff's Law.

[42] *Recommended Options for maximum water temperature limits and minimum dissolved oxygen limits at a compliance point for discharges from the South Bay Power Plant in San Diego Bay, necessary to protect beneficial uses*; Prepared for the San Diego Bay Council, Dr. Richard Ford, PhD., April 4, 2003, page 1

[43] Merino, J.M. *A Study of the Temperature Tolerances of Adult Solen rosaceus and Tagelus californianus in South San Diego Bay: The Effects of Power Plant Cooling Water Discharge.* 1981

[44] Kellogg, S.D.. 1975 The Ecological and Physiological Effects of Thermal Effluent on *Chione fluctifraga*. Master's Thesis, San Diego State University, cited in *Recommended Options for maximum water temperature limits and minimum dissolved oxygen limits at a compliance point for discharges from the South Bay Power Plant in San Diego Bay, necessary to protect beneficial uses*; Prepared for the San Diego Bay Council, Dr. Richard Ford, PhD., April 4, 2003, page 19

[45] Richard F. Ford, personal communication, 2001; See for example, Capuzzo, Judith M., 1979, "The Effects of Temperature on the Toxicity of Chlorinated Cooling Waters to Marine Animals - A Preliminary Review," *Marine Pollution Bulletin*, Vol 10, pp.45-47.

[46] Dynegy Monitoring and Reporting. Submittal, September 30, 2009, p.4

degrees F (Unit 1) and 106.7 degrees F (Unit 2).[47] This analysis further stated that, "Unit No. 2 is performing worst (sic) than any of the other units based upon measured delta temp. (sic) rise..."[48]

The California Energy Commission analysis also noted the significance of the impact of heat on a marine ecosystem.

> **Thermal Impacts are Site Specific**...The South Bay Power Plant discharges into the southern end of southern San Diego Bay were circulation is very weak. Recent studies indicate thermal impacts include the loss of an estimated 100 acres of eelgrass, and large alterations in benthic invertebrate assemblages...[49]

i. The 1975 California Thermal Plan exempted SBPP due to expectation that plant had limited useable life not because there were no impacts.

California's *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* (Thermal Plan) (originally adopted in 1971) "grandfathered in" several power plant discharges as long as they met certain standards. Standards for existing discharges to designated estuaries were much higher than for enclosed bays. San Diego was determined to be an *"enclosed bay"* for purposes of the Thermal Plan[50]. The cost of upgrading old plants and the expectation these plants would be replaced with newer, cleaner technology factored into the State Board's decision to allow existing discharges, like the SBPP, to continue[51]. It is meaningful that the Thermal Plan prohibited **new** thermal waste discharges having a temperature greater than 4 degrees F above natural temperature of the receiving water[52].

It is misleading on the part of the discharges to pretend that the power plant discharges protects beneficial uses because it complies with the Thermal Plan. Discharges were specifically **exempted** from the levels determined to be necessary to protect beneficial uses.

The discharge from the South Bay Power Plant is classified as an "existing" discharge under the Thermal Plan. As an existing discharge, the discharge from the South Bay Power Plant is not subject to numerical temperature limitations. The Thermal Plan was also, in part, technology-based and the technology has improved significantly since then.

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[47] Mark Hays, Manager of Environmental Health and Safety, Duke Energy California Operations, to John Robertus, EO Regional Water Board, May 7, 2001, Attachment 3.
[48] Ibid. Hays to Robertus.
[49] *Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants*, California Energy Commission, June, 2005, page25. Document # CEC-700-2005-013
[50] *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California*, State Water Resources Control Board, adopted 1975
[51] Legal Memorandum, from Craig Wilson, State Water Resources Control Board, March 24, 1999
[52] Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California, State Water Resources Control Board, adopted 1975.

In a March 24, 1999 memo, responding to a request for a legal interpretation of the Thermal Plan, legal counsel for the State Water Resources Control Board included an explanation of why existing discharges were provided with more lenient requirements:

> Existing thermal discharges were grandfathered-in in the original thermal policy for two reasons. First, it was felt that the investment that would be needed to upgrade the existing facilities to meet more stringent thermal limitations might not be justified, given the age of the facilities. [53] (emphasis added)

It is apparent that the State Board envisioned that the then (1974) existing facilities would not have an infinite life span, but would eventually be replaced by facilities that could comply with more stringent numerical temperature limitations and thus be less damaging to water quality and beneficial uses.

ii. Units 1 and 2 will continue not to comply with the protective Thermal Plan standards that would apply if they were not exempted.

If the discharge were tested against the standard that a new thermal discharge would have to meet, Units 1 and 2 would fail frequently. In comparing the dates in violation of the more protective 4 degree standard, with days that only Units 1 and 2 were chlorinated (a function of operation), the discharge exceeded the standard eight times in June, 2009. [54]

Throughout the history of the power plant, temperature has also not been adequately assessed or limited. Even though between 1974 and 2000 average discharge temperatures have risen over 10 degrees F in both summer and winter, the heat limit is specified as delta temperature (change between intake and discharge temperatures) but **there is no maximum temperature** that the discharge water shall not exceed. Permitted increases in temperature between intake water and water discharged from the SBPP have risen from 12.5 degrees F to 15 degrees F during the time the power plant has operated. Since Duke's request in June, 2001 for an even higher limit (daily average increase to 23 degrees F which was later withdrawn), this issue has become even more urgent. It is clear that the potential exists for discharge temperatures as high as 107 degrees from unit 2 at design flows.[55]

ii. Heat Impacts to Juvenile Halibut Nursery

The California halibut (*Paralichthys californicus)* is important to the ecology and fisheries of southern California. Its population may be threatened by the development of embayments used as nursery habitats. It appears that temperature, reduced turbulence, and sediment characteristics (related to turbulence) are important factors determining whether juvenile

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[53] Legal Memorandum, from Craig Wilson, State Water Resources Control Board, March 24, 1999

[54] Analysis of days where 4 degree standard was exceeded but only Units 1 and/or 2 were chlorinated based on Dynegy Reporting submittal, July, 2009 for June data.

[55] Hays to Robertus, May 7, 2001, Attachment 3.

halibut will settle in an area. Juveniles tend to be found in areas with higher oxygen concentrations[56] and settlement of halibut has been found to decrease rapidly above 22 degrees C (72 degrees F).[57] Contrast this with the fact that heat discharges from Units 1 and 2 can be over 100 degrees F.

A study of the distribution of juvenile halibut revealed that there are many fewer juveniles in San Diego Bay (13,759) as compared to Mission Bay (22,082), yet San Diego Bay is approximately five times the area of Mission Bay.[58] The fish density in shallow water habitats (less than 1 meter in depth) was found to be 21 per hectare in Agua Hedionda, 66 per hectare in Mission Bay, and less than 1 per hectare in San Diego Bay.[59]

Dr. Ford describes the impacts on halibut in South San Diego Bay this way:

> It is important for the reader to note that such avoidance behavior by juvenile P. californicus in South San Diego Bay may be a matter of ecological concern. Even though mobile animals such as the California halibut are able to avoid unsuitably high water temperatures in a thermal plume, this avoidance then prevents them from using the affected, high temperature area as a feeding or resting site.[60]

Juveniles that can't remain in the shallowest, most protected areas, can also be forced out into deeper water where they can be more easily predated by larger fish.

c. Impacts of Chlorine on Marine Life will continue with Units 1 & 2 operating

The South Bay Power Plant uses chlorine in the form of sodium hypochlorite daily to kill plants and animals that would otherwise grow on the cooling water system piping or other surfaces. The use of chlorination in once-through-cooling systems has been questioned since at least 1979.[61] Almost all species of animals are disrupted by chlorine. This effect is exacerbated in a shallow, poorly circulated environment like the South Bay.

i. Units 1 and 2 alone, sterilize biologically rich San Diego Bay with as much as 42 pounds of chlorine a day.

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[56] MBC Applied Environmental Sciences, 1992, *Distribution of Juvenile California Halibut (Paralichthys Californicus) in Bay and Coastal Habitats of Los Angeles, Orange, and San Diego Counties in 1992.* Final Report, pp. 1, viii.
[57] MBC 1991b, as cited in Ibid., p. 1.
[58] Kramer, Sharon Hendrix, 1990, *Habitat Specificity and Ontogenetic Movements of Juvenile California Halibut, Paralichthys californicus, and Other Flatfishes in Shallow Waters of Southern California,* A Dissertation, University of California, San Diego, p. 61.
[59] Kramer, 1997, Memorandum to Laura Hunter, Environmental Health Coalition.
[60] *Recommended Options for maximum water temperature limits and minimum dissolved oxygen limits at a compliance point for discharges from the South Bay Power Plant in San Diego Bay, necessary to protect beneficial uses*; Prepared for the San Diego Bay Council, Dr. Richard Ford, PhD., April 4, 2003, page 25
[61] Majewski and Miller, Eds. 1979. *Predicting effects of power plant once-through cooling on aquatic systems.* A contribution to the International Hydrological Programme, UNESCO, p. 22.

Chlorine is lethal – it is an effective and cheap toxin – that is why it is prevalent as a biocide in industry. For example, a study done on the toxic impacts of chlorination disinfection in a textile wastewater system demonstrated that the effluent wastewater (post chlorination) toxicity was significantly greater than the influent, pre-chlorination wastewater.[62] The disinfection system of a power plant is similarly designed specifically to kill marine life to prevent 'fouling' of the cooling system.

In addition to its direct lethal effects, chlorine forms by-products that are themselves toxic. Chlorine is known to break down, complex with other substances, and form new compounds such as chlorinated organic compounds, such as trihalomethanes and haloacetic acids, also known as disinfection by-products[63],[64]. These disinfection by-products can remain toxic for aquatic life for long periods. [65]

Chlorinated products also have sublethal effects on fish, invertebrates, and other marine organisms need to be assessed for the SBPP discharge, and factored in to regulatory limits.[66] Chlorinated cooling waters have been found to cause significant sublethal stress to some organisms, so that measurements of surviving organisms underestimate chlorine toxicity.[67]

The Regional Board staff has long been concerned about the chlorine use:

> Here is a pollutant that SDG&E intentionally puts into cooling water several times daily for purposes killing marine organisms yet monitoring is required only twice a month, during one chlorination cycle, when the SDG&E thinks the concentrations are likely to be highest, by means of grab samples....[68]

The importance of these sublethal effects was outlined in the Pisces Report, which also found that the Duke Study failed to fully assess the impact of chlorine in the discharge:

> It is concluded in the Duke studies that the phytoplankton community will not be impacted by contact with the effluent plume because of the temperature tolerance of the species present. This may or may not be true. However, no

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[62] Chen et al. 2001. Increased toxicity of textile effluents by a chlorination process using sodium hypochlorite. Water Science and Technology Vol 43 No2 pp 1–8. 2001

[63] Jolley, R. L. 1975, "Chlorine-containing organic constituents in sewage effluents," *J. Water Poll. Control Fed.*, Vol. 47, p. 601-618, as cited in Majewski and Miller, op cit., p. 22.

[64] Jenner, H.A., J. L. Taylor, M. van Donk, M. Khalanski. Chlorination by-products in chlorinated cooling water of some European coastal power stations. Marine Environmental Research Volume 43, Issue 4, June 1997, Pages 279-293

[65] Gehrs et al, 1974, "Effects of stable chlorine-containing organics on aquatic environments." *Nature,* Vol. 249, p. 675-676, as cited in Majewsi and Miller,op cit., p. 22.

[66] Capuzzo, Judith M. et al, *Chlorinated Cooling Waters in the Marine Environment: Development of Effluent Guidelines, p. 161-163.*

[67] Ibid., p. 162.

[68] Email communication from Regional Water Board staff Bruce Posthumus to Staff Attorney John Richards, September 7, 1998

> consideration is given to other properties of the plume, in particular the presence of chlorine biocide. Residual chlorine in the discharge will be allowed up to the permitted concentration of 0.2 mg/l (milligrams per litre). Davis & Coughlan (1978) demonstrated that photosynthetic activity was considerably reduced at residual chlorine levels well below 0.2 mg/l and concluded that bacterial activity was suppressed at chlorine levels below detection levels. While chlorination will only be intermittent, there will be periods when the effluent will impact the local phytoplankton community.
>
> Similar concerns to those expressed above also apply to the zooplankton. Zooplankton show severe metabolic and reproductive suppression after exposure to chlorine levels as low as 0.01 mg/l in seawater (Goldman et al. 1978). Davis & Coughlan (1978) reported that 48 hours after exposure to a concentration between 0 and 0.25 mg/l, 22% of adult copepods were dead. [69]

Like many energy production facilities, Dynergy uses considerable amounts of chlorine in its day to day operations. Using August 11, 2009 reports by Dynegy the total amount of chlorine used in each unit during that day was 21.06 pounds per unit or a total of 42 pounds per day.[70] Furthermore, there is data to suggest that chlorine use can be much higher. In the past, reported chlorination of Units 1 and 2 was much higher than 2009 and could rise to those levels again. For example, on several days in August 2001 Unit 1 used 40.72 pounds of chlorine and Unit 2 used 35.1 or a combined total of over 75 pounds each day.[71]

Coastal power plants that use once through cooling technology can rapidly dilute the chlorinated compounds and the intake and discharge water volumes represent a small percentage of the overall water body. South San Diego Bay does not have this luxury. The combination of shallow waters and poor circulation mean that rapid dilution cannot be used as a justification to allow continued discharge of pollution to the South Bay.

The plant uses more chlorine in summer, compounding the effects of higher summer water temperature, less dissolved oxygen, and the greater toxicity of other chemicals. In August of 2001, the SBPP reported use of 4119 pounds of chlorine that month.[72]

d. Impacts of Entrainment and Impingement

Many State agencies have recognized the damaging impacts of impingement and entrainment. Impingement is the killing or weakening of marine life trapped on screens or other intake

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[69] 2004, Pisces Report, p.8-9

[70] Dynegy Discharge Monitoring and Reporting Program dated September 30, 2009, Daily Chlorine Usage Log for August 11, 2009

[71] Chlorine Usage at SBPP, August 2001 provided by Regional Water Board Staff Hashim Navaroli to EHC.

[72] San Diego Regional Water Quality Control Board staff, personal communication, 2001. Chlorine Usage at SBPP, August 2001 provided by Regional Water Board Staff Hashim Navaroli to EHC.

structures. Entrainment is the killing of eggs, larvae, and adults when water drawn from the natural environment through a power plant.[73] The SBPP intake within the San Diego Bay acts as a suppressor on the ecosystem by continually removing and killing a wide variety of organisms. Because intakes tend to kill disproportionately large numbers of small animal and juveniles, they tend to impoverish the standing crop in the lower trophic levels towards the base of the ecosystem. The ecosystem, as a result, distorts due to the unnatural mortality.[74] This action is devastating to the biologically rich water 'habitat' of the South Bay.

The importance of coastal waters is well-described in the California Energy Commission OTC report[75]:

> ***Sea Water Is Habitat, Not Just Water***
>
> What is killed during entrainment? The shallow, well mixed, well lit, and nutrient rich estuarine and coastal marine waters are highly productive and diverse ocean habitats. They contain a variety of small, photosynthetic plants (phytoplankton) and numerous small animals (zooplankton; e.g., copepods) that reside entirely in the water, and other zooplankton that are the young stages (eggs and larvae) of larger, adult animals that live in the water or on the bottom – fishes, abalone, crabs, lobsters, and clams, among many others (Figure 3). The larvae commonly depend on phytoplankton and other zooplankton in the water for food as they grow. Coastal waters are also habitat for gametes, spores and seeds of many types of seaweed, sea grasses, and marsh plants, the adults of which live attached to intertidal and shallow subtidal bottoms.

Shallow bays and estuaries are among the most ecologically productive and are the nursery areas for many species. Systematic sterilization of the high percentages of sea water habitat has a significant impact on the ability of the South Bay to perform its ecological functions.

To estimate the impact of the once through cooling water by the power plant it is necessary to estimate the volume of water that is circulated through the cooling system compared to the volume of the source water surrounding the power plant taking into consideration the tidal exchange of the water in South Bay. We relied on the Tenera report on the SBPP (prepared for the 2004 permitting cycle) for the volume of the source water to determine the percentage of water passing through the power plant. Comparing that data with the SBPP cooling water flow for 600 MGD and 225 MGD for one day and for 40 days, the time for tidal exchange of South Bay.[76] In a 40 day time period, at 600 MGD the SBPP circulates 61% of the surrounding bay water. And at 225 MGD, the new maximum permitted limit, it circulates 23% of the South Bay water. **This means that 23% of the South Bay water will be heated, denuded of marine life through impingement and entrainment, and sterilized with chlorine compounds prior to discharge.**

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[73] Op. Cit. 2005, California Energy Commission Report, p.1

[74] 2004 Pisces Report, p. 16

[75] Op. Cit. CEC report, p. 11

[76] Ed Kimura, Analysis of Tenera data analysis using data in Table 2.3-1 in Vol II

i. May through August are the most damaging months for entrainment impacts to South Bay.

It might seem reasonable that operating fewer units or operating them less of the time automatically equals less impact. However, low capacity does not mean low impacts to marine life because **the timing of the impacts drives the severity** in many cases. This was made clear in the State Water Board's July 2009 Draft Substitute Environmental Document (DSED), in support of their Proposed *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, which shows that the operating capacity utilitization rate (CUR) is often not an indicator of damage to a marine environment. The DSED states:

> A facility's CUR is not necessarily indicative of the impact it may have on the aquatic environment since the potential for harm is not equally distributed throughout the year, particularly for entrainment; spawning typically peaks in spring and early summer throughout the state....Data show, however, that is it possible to operate less that 15 percent of the time and cause a greater impact than would be assumed if entrainment was uniform at all times.[77]

This is key for San Diego Bay given the extreme 'back bay' shallow water nature of where the water is taken from and discharged. Again the DSED shows the significant differences in the larval fish abundance between bay harbor environments and open ocean.

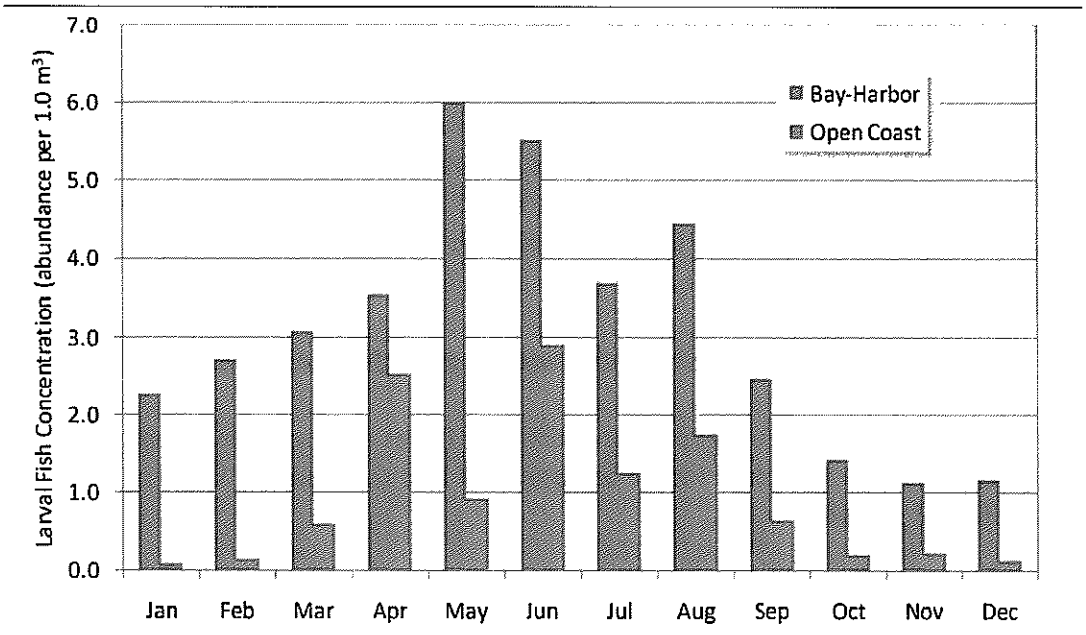

Figure 13: Larval Fish Concentrations at Southern OTC Facilities[78]

[77] State Water Board's July 2009 Draft Substitute Environmental Document (DSED), in support of their Proposed *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, p. 51 http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/cwa316/draft_sed.pdf

[78] Ibid. DSED, p.52.

A very significant percentage of the waters in the South Bay are impacted. Fish, shellfish and other invertebrates are drawn into the plant, trapped and killed on racks and screens. Early life stages of marine plants and animals are also drawn into the cooling water system, where they are subjected to mechanical damage, as well as chemical, temperature, and pressure shock.

ii. Intake of water at SBPP kills many large fish and juvenile organisms each year.

The SBPP processes many early stage organisms when it intakes water. Most of the organisms that are entrained do not survive. The U.S Department of the Interior studied the impacts of once-through cooling power plants and describes the process well:

> Organisms that are small enough to pass though the plant's intake system are said to be entrained, and many of these organisms may be killed by exposure to mechanical, chemical, or thermal stresses during plant passage. Of particular concern are the early life stages of populations of fish and shellfish that inhabit the adjacent water body or use the area as a spawning or nursery habitat.[79]

Moreover, South Bay is spawning and nursery ground for many fish and invertebrates that are vulnerable to entrainment. Large numbers of early life organisms may be affected because the number of organisms entrained is a function of the water volume and the density of organisms in the water.

However, such losses are not well known because early life stage organisms were not documented before plant started operation. Even without more precise data, evidence shows the ecosystem of the Bay is impacted. South Bay has different composition and abundance of zoological plankton as compared with the rest of the bay.[80] The reduction of plankton is especially worrisome because South Bay is a rare habitat in California and of a type that is disappearing within the state.[81]

iii. SBPP water intake kills and wounds adult fish and invertebrates

The operation of SBPP results in the trapping and killing of fishes and large invertebrates. Adult fishes and invertebrates near the plant intake are drawn in and trapped and killed by either a trash rack or a series of screens.

Duke's submittal by Tenera lists the annual entrainment estimates of "critical fish larvae" from the 1979-80 316(b) demonstration study by SDGE as 2.2 billion gobies, 180 million anchovy and

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[79] Boreman, John and C. Phillip Goodyear, 1978, *An Empirical Transport Model for Evaluating Entrainment of Aquatic Organisms By Power Plants*, Power Plant Project, Office of Biological Services, Fish and Wildlife Services, U.S. Department of Interior, p. iii.

[80] Id. at 10-28

[81] U.S. Department of the Navy, Southwest Division, 1999, *San Diego Bay Integrated Natural Resources Management Plan*, Prepared by Tierra Data Systems, pp. 2-40

14 million silversides (topsmelt), 1.4 million Diamond Turbot, 420,000 Halibut, and 41,000 Black Croaker.[82]

The report follows up with their study to estimate impingement and shows an estimated **2.4 billion fish** and almost 100,000 crabs annually.[83] The estimated impacts represent 1.831 billion gobies, 814.8 million anchovies and 14 million topsmelt. [84]

The impingement estimates in the same Tenera report (Table 4.3-1) conducted from December 2002 to November 2003 (52 surveys) show estimated impingement of over 385,000 fishes annually including 1,791 gobies, 359,420 anchovies and 11,664 silversides (topsmelt). The estimates for both the entrainment and impingement were based on all the 8 intake pumps in operation. [85]

In addition, entrainment may impact ecosystems in the wider San Diego Bay.[86]

More recently, studies continue to show significant losses from entrainment and impingement from the SBPP cooling system. The State Water Board in their Scoping Document noted[87]

> As an example of a conventional power plant, the South Bay Power Plant in San Diego Bay, assuming full operation, has an estimated annual impingement of 390,000 fish, 93 percent of which were anchovies. Impingement of certain invertebrates was also assessed at this plant; an estimated 9,019 crustaceans (shrimps, lobsters, crabs) and cephalopods (octopus and squid) were impinged annually. Annual estimated entrainment for 2003 was 2.4 billion fish larvae. Fish species most represented in the entrainment studies were gobies (arrow, cheekspot, and shadow), anchovy, combtooth, blennies, longjaw, mudsuckers, and silversides (Tenera, South Bay Power Plant PIC, 2005). [88]

iv. The theory of 'Surplus Production' has been conclusively rejected

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[82] Section on **Review of Previous Entrainment Study**, Tenera, SBPP Cooling Water System Effects on San Diego Bay, Volume II: Compliance with Section 316(b) of the Clean Water Act for the South Bay Power Plant, August 12, 2004, Table 3.1-1, page 3.1-2.

[83] Ibid, in Table 3.3-1, p.3.3-2

[84] Ibid, in Table 3.3-1, p.3.3-2

[85] Ibid, in Table 4.3-1, p.4.3-2

[86] Fritz, et al, 1980, *Strategy for Assessing Impact of Power Plants on Fish and Shellfish Populations, Power Plant Project,* Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior, p. 20

[87] *Scoping Document: Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, State Water Resources Control Board, March 2008, p. 13

[88] *Scoping Document: Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, State Water Resources Control Board, March 2008, p. 13

The operation of the SBPP results in a loss of production, either by removal from the system or by organisms living and growing sub-optimally. The Duke studies discount this loss as being surplus production and, as such, conclude that the loss has no effect on the environment because those individuals killed in the power plant, would never have become adults. This is 19th century thinking about how to manage a natural resource. The 'surplus supply' theory fails to consider: the value of larvae in the food chain, that power plant harvesting may result in the exclusion of some predators from the resource, the potential that some fish species rely on variable high production years so that a stable cohort will sustain the population through the leaner years, and if the 'surplus' is being removed by the power plant then something else in the ecosystem is being out-competed.[89] The Board should reject this rationale for additional impacts to the Bay.

e. Discharge causes loss of Eelgrass

Eelgrass (*Zostera marina*) forms a distinct marine habitat providing vital shelter and food for many bay inhabitants. The South Bay contains the vast majority of eelgrass in San Diego Bay, eelgrass is absent in the vicinity of the plant, yet plentiful west of the plant and in other areas of the South Bay. Eelgrass is highly dependent on sufficient light to thrive,[90] and declines in seagrass abundance have been linked to decreasing water transparency.[91]

The SBPP influences the amount of available light in a number of ways. First, by dredging the intake and discharge channels, the power plant has created depths without sufficient light for eelgrass. Second, the discharge increases turbidity of the water which decreases light. Third, the discharge contains 20 percent more suspended solids than the intake water;[92] these solids block light and can deposit on eelgrass leaves where light is required at the plant-leaf surface. Fourth, the plant is increasing the amount of nutrients in the water, which reduces water transparency. Without the power plant discharge, we would expect a resurgence of eelgrass beds.

> Any enhancement of seagrass productivity through improved water quality will lead to improved growth, successful reproduction and an increase in the overall coverage and distribution of seagrasses. In turn this will enhance the fish, shellfish and wildlife resources dependent on seagrass habitat for food and shelter and improve shoreline and benthic stability...[93]

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[89] Op. Cit., Pisces Report, p. 19-23

[90] NOAA, 1991, *The Light Requirements of Seagrasses,* Results and Recommendations of a Workshop, Technical Memorandum NMFS-SEFC-287.

[91] Ibid., p. 5; See also Backman, T.W, and D.C. Barilotti, 1976, "Irradiance reduction: effects on standing crops of the eelgrass *Zostera marina* in a coastal lagoon," *Marine Biology* 34:33-40.

[92] *Application for Renewal,* op cit., Appendix F, p. 5.

[93] NOAA, op cit., pp. 6-7.

Mapping of the South Bay eelgrass beds, consistently show a lack of eelgrass near the discharge channel but show it surviving in areas of equal depth but lacking the extreme influence of the discharge.[94] The Fact Sheet for NPDES permit 2004-0154 summarized recent studies,[95]

> Table 4.2-1 and Figure 4.2-7 of the technical study report identify the predicted turbidity effects and combined effects of turbidity and temperature of the SBPP cooling water flows on eelgrass within south San Diego Bay. The predicted turbidity effects of the SBPP cooling water flows suggests that the SBPP, operating at maximum cooling water circulation rates (i.e. 601.13 MGD) would preclude eelgrass from approximately 104 acres of south San Diego Bay. As shown in Figure 4.2-7 of the technical study report, the predicted 104 acres of south San Diego Bay that would lose eelgrass due to the power plant discharge includes the entire discharge channel and areas of south Bay immediately west and north of the Chula Vista Wildlife Island.
>
> The study indicated that while natural turbidity plays a primary role in dictating the distribution of eelgrass in south San Diego Bay, the high flow rate of the SBPP discharge plays a role in distributing naturally generated turbidity and influencing the distribution and of eelgrass. The study also suggests that there are aggregate effects of turbidity and temperature within near-field portions of the thermal plume of the SBPP. These effects may result in either an absence of eelgrass, or seasonal die-off of eelgrass. In the area of the discharge channel nearest the SBPP, it is believed that summer season discharge temperatures alone may limit the occurrence of eelgrass, and turbidity may not be a significant factor in structuring eelgrass habitat within these areas.

In evaluating the data, Pisces reported that,

> This loss represents about 10% of the eelgrass habitat of the entire bay. If the power plant is excluding eelgrass totally from an area there must be a much larger area that is growing sub-optimally. The loss and sub-optimal growth of eelgrass within the bay is likely to impact on the community structure as a whole.
>
> The loss of eelgrass from an area will significantly change the environment and community of organisms living in that area. In an Order issued by the California Regional Water Quality Control Board, San Francisco Bay Region they state:
>
> > Eelgrass beds are important components of estuarine ecosystems, and have declined from historical levels both globally and in the San Francisco Bay. Eelgrass restoration projects should therefore be encourage in the region in order to increase water clarity, reduce erosion, provide nurseries for fish, and increase habitat for invertebrates, in shallow water coastal habitats.

[94] San Diego Bay 2008 Eelgrass Survey, US Navy SWDIV Naval Facilities Engineering Command, Port of San Diego, 2008.
[95] Regional Water Board NPDES Fact Sheet for permit 2004-0154, p. 17

> This indicates that the State has recognized the importance of eelgrass and where possible are working to increase the total overall area of this ecotype.[96]

In addition, the US Fish and Wildlife Service stated their concerns to the Regional Board in 2002, "The effect of the SBPP effluent on the distribution of eelgrass in South Bay is of concern. ....We believe the SBPP effluent is a factor affecting the distribution of eelgrass in the South Bay because the effluent alters temperature and turbidity in South Bay."[97]

f. The benthic community impacts are significant and ongoing

The chlorinated, hot water discharge from the SBPP, has many impacts to the benthic organisms in the South Bay many of which are immobile or cannot 'get out of the way' when the conditions are too hot or too toxic. Merino studied bay clam species, the Rosy Razor Clam and the California Jackknife clam in his *A Study of the Temperature Tolerances of Adult Solen rosaceus and Tagelus californianus in South San Diego Bay: The Effects of Power Plant Cooling Water Discharge.* He found many impacts including lower densities than would be expected, significantly higher mortality rates due to higher water temperatures in the thermal plume, and adverse reproductive impacts.[98]

These have been detailed in many studies and by many agencies and were well summarized in the Fact Sheet in 2004[99]:

> The discharge of once-through cooling water to south San Diego Bay has adversely impacted the Beneficial Uses within the SBPP discharge channel, particularly in the area within 1000-1500 feet of the property line. The 2003 updated 316(a) study report, ***SBPP Cooling Water System Effects on San Diego Bay, Volume 1: Compliance with Section 316(a) of the Clean Water Act for the South Bay Power Plant*** confirmed that certain areas of the SBPP discharge channel have detrimental impacts that are attributable to the elevated temperatures and high volumetric flow rates associated with the SBPP discharge (see Section F.2.a of this Fact Sheet for a description of the report and its findings). The report indicates that up to 104 acres of critical eelgrass habitat have been lost because of the redistribution of turbidity in the Bay due to the SBPP discharge. Furthermore, the report indicates that the overall diversity of benthic invertebrates residing in the near field stations of the discharge channel is much lower than at reference stations outside the discharge channel. The studies also indicates that certain invertebrate species (including polychaete worms and amphipods) are largely absent in near field stations of the discharge channel. These species were found in abundant quantities in reference stations outside the discharge channel. The absence of these species from the discharge channel demonstrates that these species could not survive under warm thermal regimes and were being adversely impacted.

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[96] 2004 Pisces Report, p.10

[97] Andrew Yuen for Jim Bartel, USFWS to John Robertus, Regional Water Board, reference # FWS-SD-1872.2, February 22, 2002, p, 2

[98] Merino, J.M. *A Study of the Temperature Tolerances of Adult Solen rosaceus and Tagelus californianus in South San Diego Bay: The Effects of Power Plant Cooling Water Discharge.* 1981.

[99] Fact Sheet p. 17

g. Impacts to sediment by toxic constituent discharges will also continue with Units 1 and 2.

Although the direct discharge of industrial wastes into the Bay ceased in 1996 (after 36 years of discharging to the Bay), the impacts of those discharges have not been assessed or remedied. Metals and other compounds that have accumulated in the sediment have never been addressed or removed.

The analysis done by Tenera to demonstrate sediment and benthic health is now obsolete and cannot be relied on. The Sediment Quality Objectives (SQO) Phase I are now in force. The current modified NPDES does not comply with the new sediment quality objectives. Any future application or consideration must include three new benthic indices in addition to the BRI.

Phase 1 requires: Benthic Indices—The benthic condition shall be assessed using the following methods:

a. **Benthic Response Index (BRI),** which was originally developed for the southern California mainland shelf and extended into California's bays and estuaries. The BRI is the abundance-weighted average pollution* tolerance score of organisms occurring in a sample.

b. **Index of Biotic Integrity (IBI),** which was developed for freshwater streams and adapted for California's bays and estuaries. The IBI identifies community measures that have values outside a reference range.

c. **Relative Benthic Index (RBI),** which was developed for embayments in California's Bay Protection and Toxic Cleanup Program. The RBI is the weighted sum of: (a) several community parameters (total number of species, number of crustacean species, number of crustacean individuals, and number of mollusk species), and abundances of (b) three positive, and (c) two negative indicator species.

d. **River Invertebrate Prediction and Classification System (RIVPACS)**, which was originally developed for British freshwater streams and adapted for California's bays and estuaries. The approach compares the assemblage at a site with an expected species composition determined by a multivariate predictive model that is based on species relationships to habitat gradients.

The RIVPACs index is especially apropos as it compares the site's benthic community with an expected composition (e.g. one without impacts).

h. *Cumulative impacts are significant and militate for rescission*

Unfortunately, we are at the point where any impacts are significant due to the impacted nature of the resources. What was true in 1990, is even more true today:

> ...Cumulative impacts are of very great concern. Viewed from perspective of extreme biological sensitivity, regional scarcity, and steadily increasing regulatory protection, any incremental reductions in quality, or outright loss, of South Bay habitats or biota must be viewed as unacceptable.[100]

The impacts of 50 years of discharge are cumulative in two ways. First, they are cumulative of year after year for the systematic degradation of the ecosystem of South Bay. Second, they are cumulative of the impacts from all the development that has occurred around the bay over the past 50 years. Continued impacts on bay resources pose unacceptable and unnecessary direct and cumulative impacts on the Bay.

All of these impacts provide for more than adequate rationale and findings that the power plant discharges do cause harm to the environment and the beneficial uses this Regional Board is compelled to protect. Each impact provides a solid basis for rescission of the permit.

5. *There is no legitimate need for the power produced by Units 1 & 2 in 2010 and after. Conditions for removal of the RMR made by ISO and Duke in 2004 have all been met.*

a. *Statewide OTC power plants are being phased out*

Retaining the old 'aging' power plant stock in the state is unnecessary. In a 2008 detailed analysis by Jones & Stokes for the State Water Board and the Ocean Protection Council, they stated that, "under all but the most extreme scenarios, more than enough power plants are expected to be operating in 2015 to more than compensate for any or all OTC plant retirements, with a projected 28 percent reserve margin of supply over demand in the Western half of North America"[101].

The most extreme scenarios here include the removal of the two nuclear power plants as well, something that is not under discussion here.

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[100] Preliminary Report of the City of Chula Vista In the matter of The Notice of Intention of San Diego Gas & Electric company to file and application for certification of a combined-cycle electric generating facility and related facilities known as the combined-cycle project, No. 89-NOI-1, August 17, 1990, MacDonald, Goodwin, Winges, consultants. P. III-2

[101] *Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California*; ICF Joes & Stokes, Global Energy Decisions, and Matt Trask, prepared for the California Ocean Protection Council and State Water Resources Control Board, April, 2008, p.2

b. Local Energy Demand no longer needs SBPP

We continue to hold ISO's determination of any 'need' for SBPP is irrelevant to Regional Board deliberations and cannot be relied on as the basis for on-going damage to the Bay. Since Dynegy did not oppose the minor modifications, we can assume that they are in support of rescission of the permit as contemplated in that action.

The energy profile of San Diego is changing quickly. A critical peaking power plant is nearing completion and is expected to be on-line in March which will add 94MW to the local energy mix.[102]

While we support an earlier rescission date, to be meaningful, any rescission of the permit must be adopted before October 1, 2010. In spite of CAISO's promise of a 'transparent' public process[103], CALISO must issue any RMR contract by or on October of 2010 for the contract year 2011. A pre-October date will be important to ensure that CALISO be prevented from causing future mischief by authorizing another RMR contract to the SBPP.

We have previously shared the history of ISO's ever-changing position in our letter of November 30, 2009 which we include in the record by reference.[104]

Board members will remember the chart provided at the September, 2009 hearing:

SAN DIEGO 2010 LOAD & RESOURCE PROFILE

2010 Load	Import Capability (L-1; with SWPL out)	Firm Capacity (in Service)	DR	Non Firm Capacity (573 Otay Mesa and 94 Pala)	Generation contingency (G-1=Otay or G-1=Palomar)	LCR Need (Load – Imports + G-1)	Gen. surplus (Total gen. + CPUC-approved DR - LCR need)	Min. South Bay Gen (708-gen surplus)
5134	2500	2977	85	0	565 firm	3199	-137	**708**
				573 (w Otay Mesa)	573 w non-firm	3207	428	**280**
				667 (w Otay Mesa & Pala)	573 w non-firm	3207	522	**186**

Using the 'simple math' presented to you in September we recalculated the need using the new California Energy Commission reduction in the estimated peak demand for 2010 by 171 MW

[102] ***Almost Complete: Orange Grove peaker plant could be operational in March, officials say***; North County Times, February 5, 2010; http://www.nctimes.com/news/local/fallbrook/article_d72240df-ced8-5ca8-ae91-f454702bacd0.html

[103] Comments of Dennis Peters, CALISO, December 12, 2009 hearing before the Regional Board.

[104] No More Power Plant Coalition Letter, December, 2009.

and new contracts were approved for SDGE by the PUC wiping out any need for any units that use the Bay water for cooling.

Generation Calculation Based On New CEC Peak Demand Estimates[105]

A	B	C	D	E	F	G
CEC's Peak Demand estimates for 2010	**Imports with SWPL out**	**Firm Capacity minus SBPP**	**DR**	**New Capacity by June 1** 573MW Otay 94 MW Pala 25 MW Celerity **TOTAL 692**	**G-1 Contingency Depends on how largest generator is calculated**	**Surplus Energy in the region** **MW OVER peak demand**
Worst day in 10 years) **4963**	2500	2269	85	692	573 Otay	**+10**
Worst day in 5 years **4863**	2500	2269	85	692	573 Otay	**+110**
Worst day in 2 years **4513**	2500	2269	85	692	573 Otay	**+469**

This calculation is conservative and does not include the following expected resources or emergency reserves coming on-line to address future growth.

- Redesignation of G-1 (>200 MW)
- Lake Hodges Pumped Storage 40 MW
- Wellhead peaker 45 MW
- Additional Demand Response
- Any Bull Moose permits
- The 15 MW on-site CT that uses no bay water for cooling.

c. Representations to Federal Energy Regulatory Commission

We do take some heart in the **official** representation that Dynegy has filed with the Federal Energy Regulatory Commission (FERC). In Dynegy's filing to the FERC it is represented that

> ...the CAISO has informed South Bay that it may wish to terminate the RMR Agreement prior to the conclusion of the 2010 Contract Year due to other generation scheduled to become commercial during the term of the 2010 Contract Year.[106]

[105] B+C+D+E-F must equal or exceed A (peak demand) or Imports (minus Southwest Power Link) + in-basin generation + Demand Response – Largest in-basin generator must equal or exceed worst case estimated peak demand

[106] Filings of Dynegy South Bay with the FERC for revisions to their RM rate schedules, October 30, 2009, p.3

Unlike CAISO's other claims, this one is being represented in an official process. This '*other generation*' should be identified and CAISO should be held to their representation. Again, we urge the Regional Board to get clarification about this claim.

The Regional Board should understand that a lucrative contract was issued and justified in part because the RMR contracts were allegedly going away. In our reading of this filing, it appears that Dynegy will recoup upwards of $36 million for non-operational expenses alone[107]. Taken together with the operational funding and their revenue, Dynegy will receive $52 million [108] this year to have two inefficient, environmentally destructive, aged and unneeded power plants on stand by--a good deal for Dynegy, a very bad deal for the Bay and community.

This funding scheme is relevant as Dynegy was not required to do extensive retrofitting and mitigation as part of the 2004 permit because it was supposed to be the last.

d. CALISO has other options for future energy demand

The CALISO would have the Board believe that this situation is dire and, even if they don't need the power plant in 2010 or 2011 (which they don't), then they might need it in months and years beyond. This is not due to a lack of options, only to a lack of willingness to opt for alternatives.

Many analyses have been done showing that the SBPP can be replaced with cleaner, more appropriate technology. Most recently, the alternatives to all the aging coastal power plants were analyzed in a report released in January, 2010. *Green Opportunity: How California can reduce power plant emissions, protect the marine environment, and save money was released by Pacifica Environment*. The report demonstrated that renewables are a cost-effective replacement strategy for California's aging power plants. [109] Among the findings of the report at that most of the aging power plants are used primarily during peak demand times, usually hot summer afternoons, that peak load can be served by solar power, which is most productive on sunny, warm days, as well as by efficiency measures, and that replacing the old fossil-fuel plants with energy efficiency and clean renewables is more cost effective than replacing them with new fossil-fuel plants. They found that new fossil-fuel generation would cost 31 to 39 cents per kilowatt-hour when external costs are included versus green energy replacement at 22 to 29 cents per kwh.[110]

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[107] Ibid, Schedule Q

[108] Ibid, Appendix B, Enclosure 1

[109] Robert Freehling and Suzanne Doering, *Green Opportunity: How California can reduce power plant emissions, protect the marine environment, and save money,* published by Pacifica Environment, November, 2009, released January, 2010.

[110] Freehling and Doering, p.3-4

6. Legal authority exists for the Water Board to end this discharge.

As detailed in our earlier letters, the Regional Board has authority under Water Code Section 13243 and federal regulations[111] to prohibit a discharge. The magnitude of the impacts from this discharge over-rule consideration of impacts on staff resources. The evidence supporting termination of this discharge is abundant and the authority is clear. Best Professional Judgment is an acceptable standard for decision-making and a finding is clear to make to support this action given that your staff has already found that the only way to end the impacts to beneficial uses is to terminate the discharge.[112]

7. As a matter of environmental justice the discharge should be terminated.

a. Polluting power plants are concentrated in environmental justice communities

In the wake of the alleged energy crisis, there was an explosion of power plants construction. Unfortunately, these plants were disproportionately sited in low-income communities of color. In a study that examined the siting of power plants in California, 89% of plants studied were sited in areas that contained over 50% people of color within six miles of the plants. Latinos were particularly over-represented in communities where power plants were sited.[113]

In the South Bay the story is no different, South Bay communities, as defined by the federal government, have the highest percentage people of color and the highest density of pollution emitting power plants.[114] The updated statistics report on 93 census tracts that have their centroid within 6 miles of the SBPP. (not including a portion of the area within the 6-mile radius that is in Mexico) show that this, most-impacted, area in a low-income, community of color. The population is 89% Latino and people of color, versus 56% countywide.[115] Forty percent (40%) of the population is at 200% or less of the federal poverty level, versus 29% of the whole county.[116]

b. South Bay fishing is compromised due to cumulative impacts of past and present discharges to the Bay.

The promise of fishable waterways is also seriously compromised for residents in South Bay area impacted by the power plant. During 2004, EHC conducted a community survey of people

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[111] See C.F.R. Section 122.64 (a) (Deering 2009). Also, San Diego Coastkeeper Letter, December, 2009

[112] 2004 NPDES Fact Sheet, P. 18

[113] Latino Issues Forum. Power Against the People?: Moving Beyond Crisis Planning in California Energy Policy. November 13, 2001.

[114] Joy Williams, Updated Map of Operational Fossil-Fueled MegaWatts per 10,000 people by Metropolitan Statistical Area combining CEC (power plant locations) and SANDAG data (MSA layer), prepared by Environmental Health Coalition, 2010

[115] Based on 2009 estimates by census tract, from SANDAG, downloaded 2/12/2010.

[116] Note: this metric, up to 200% of the federal poverty level, is commonly used instead of straight poverty level, because the federal poverty level is set so low. Based on 2000 Census, by census tract.

fishing from the southernmost piers in the Bay. Survey respondents were largely from low-income communities and many appear to be engaged in subsistence fishing. Among this subpopulation are individuals who fish daily, who catch up to 20 fish at a time, who stew fish, who eat fish parts other than fillets, and who feed fish to their children.

This survey provides the first San Diego-specific data on subsistence fishing. It confirms that estimates made of the quantities of fish eaten by subsistence fishers in other places also apply here. It found a subpopulation of residents who fish from San Diego Bay and eat the fish. Many of these fishers follow a subsistence-type fishing pattern -- they fish on a daily or weekly basis, eat the fish and feed the fish to their children. The majority use cooking methods that do not minimize intake of contaminants that may be in the fish and the majority of people surveyed at the three studies piers were Latino or Filipino. The frequency of fishing and fish eating in our pier fishing population is very different than that of statistically average Americans and may reach or exceed the 161 grams per day level recommended by OEHHA taken from the Santa Monica survey value.[117] A selection of key results indicates any Health Risk Assessment (HRA) based on the assumption that only fillets are consumed or that less than 161 grams per day is consumed understates the human health risk for this group.[118]

To the extent that past discharges of industrial waste from the plant have contaminated fish, that past and current plant discharges have altered the ecological make-up of the South Bay, that certain species like Stingray dominate the fish density, that fish are less available or safe to consume, that a healthy ecosystem does not thrive in South San Diego Bay, due to significant impacts of discharges like those of the South Bay Power Plant and other past and current discharges, there is a cumulative impact to environmental justice communities. Termination of the discharge would alleviate some of these impacts.

c. Other Environmental Justice and Economic Impacts

The public health, economic, and quality of life impacts on the neighborhoods near the power plant are significant. The economic suppression of the power plant has played out in the lack of quality development of or access of communities to their bayfront for decades. More recently, Gaylord Entertainment weighed in against the continued presence of the power plant as inconsistent with their development plans.[119]

Further, tourism and recreation are also great assets and economic generators for local economies again, all undermined by the ongoing presence of the SBPP.

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[117] http://www.oehha.ca.gov/fish/special_reports/consumexec.html
[118] EHC Survey of Fish Consumption on Piers in San Diego Bay, September, 2004
[119] Letter from Gaylord Entertainment to Mayor Cheryl Cox, December, 2006

8. Analyses of the feasibility of plant improvements have not occurred or have been compromised because of representations of the limited remaining life of the plant.

Operators have avoided upgrading the Power Plant cooling system under the ruse that the life of the plant was at an end and it would be retired or replaced. In spite of the fact that adverse impacts from the discharge were well-known and documented, a permit allowing them was issued, requiring no upgrades, retrofits or mitigation and not challenged by the impacted population or their representatives because it was understood that this was the last time any permit would be issued.

Behavior speaks volumes. The record is replete with representations of the City of Chula Vista that the city did not weigh in against the renewal of the plant because there were told that this would be the last time.[120] From the City's August, 2009 letter to the Board:

> Five years ago, as a responsible partner Duke Energy included the City in the process at the very early stages of permit application development. As stated in our letter to Mr. Robertus, the City did not intervene in the RWQCB process and supported Duke and the Port **in minimizing impacts and costs to the SBPP operation** by phasing in minimal standards. That collaboration was based on the founding principle that SBPP would not operate beyond the current lease term, would be decommissioned by February 2010, and **would therefore not need or seek an extended permit form the RWQCB**. Dynegy's current permit request represents a failure to meet that commitment. [121] (emphasis added)

As meaningful, is what was included in the Fact Sheet which formed the basis of the analysis and conditions that the Regional Board relied on....and that clearly was evaluated against the **5-year expected remaining life of the plant.**

This must be underscored. Perhaps the most important statements in the record appear in the Fact Sheet where the feasibility of implementing alternative cooling systems that would protect the Bay was rejected:

> ...Furthermore, the report claimed that the cost/benefit analysis conducted for the wet/dry hybrid cooling towers indicated that the costs (amortized over the **5-year, expected, remaining life of the plant**) were wholly disproportionate to the environmental benefits gained based on the entrainment/impingement data collected in 2003. (emphasis added)[122]

Fish protection improvements were avoided using the same argument.

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[120] Letter to Chula Vista Mayor Cheryl Cox and City Council to Regional Board, August 14, 2009, p.1
[121] Letter to Chula Vista Mayor Cheryl Cox and City Council to Regional Board, August 14, 2009, p.1
[122] Fact Sheet at 32.

> Once again, a cost/benefit analysis conducted for these systems indication that the costs (**amortized over the 5-year, expected, remaining life of the plant**) were wholly disproportionate to the environmental benefits gained..... (emphasis added)[123]

Even the State Water Board Scoping Document did not evaluate improving the South Bay Power Plant because it was assumed that its discharge would soon be ended.

From the local neighborhoods to the state level, we all thought the same thing. Now, we are asking you to end these impacts once and for all. The public has shared its input in over 250 'Why this matters to me" petitions[124] to you and in a letter from many elected officials.[125]

It is time for the Power Plant to go.

[123] Fact sheet at 33.
[124] "Why this matters to me" petitions were submitted into the record at the September and December meetings.
[125] Letter to Regional Board, dated November 11, 2009