11/15/06 Bd Mtg Item ___
San Gabriel River TMDL
Deadline: 10/27/06 12pm

Department of Water and Power the City of Los Angeles

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October 27, 2006

Song Her
Division of Water Quality
State Water Resources Control Board
1001 I Street Sacramento, CA 95814

Sent via e-mail

Dear Ms. Her:

Subject: Comments regarding the San Gabriel River Metals TMDL

The Los Angeles Department of Water and Power (LADWP) appreciates the opportunity to review and submit comments on the proposed Basin Plan amendment and related documents for the metals and selenium TMDL for the San Gabriel River and its tributaries. Enclosed are LADWP's comments for your consideration (Enclosure).

LADWP has found that the Los Angeles Regional Water Quality Control Board (RWQCB) did not adequately assess all the impacts of TMDL implementation in the Lower San Gabriel River (LSGR), nor did the RWQCB either investigate or conduct studies to address the major sources of copper in the LSGR. Such a review should result in a sustainable, holistic view of all waters affecting LSGR. A more complete discussion of this concern is provided in the enclosure. Furthermore, because the 1999 Consent decree did not identify the LSGR segment (estuary) as impaired for copper, there was no need to expedite a copper TMDL without providing a comprehensive environmental impact review.

As also discussed in greater detail in the enclosure, it appears as though the RWQCB has not followed the proper CEQA steps and evaluated all reasonable alternatives such as source control, assigned a copper wasteload allocation (WLA) to a de minimis source rather than the major source, did not allow intake credits given the existing hydrology, and did not estimate and provide a reasonable schedule for implementing the alternatives.

For the above reasons, copper in the LSGR must be removed from the TMDL. However, LADWP also requests that if, despite the above arguments, the TMDL is to be approved with copper WLAs in the LSGR, the TMDL documents *must first be revised* to include the following considerations:

1. A Phased TMDL is needed, which contains a schedule for the development process
2. A TMDL implementation schedule for LSGR after the final WLAs are determined
3. Intake credits must be allowed
4. Source control must be discussed as a viable and essential implementation practice
5. In the Environmental Analysis (CEQA Checklist), the following were not adequately considered by the RWQCB:
    a. Source control measures and their impacts to the region as well as the State
    b. Increased greenhouse gases as a consequence of the zero discharge option
    c. Increased copper in Alamitos Bay as a consequence of the zero discharge option
    d. Impacts of looking for alternative sources of cooling water
6. Also in the revised CEQA Checklist:
    a. The RWQCB needs to consider the negative consequences caused by power plant modifications with sufficient reason before dismissing them.
    b. The RWQCB is incorrect in stating that there would be **no** need for new systems or substantial alterations to power or natural gas utilities. There will most definitely be some remediation measures for HnGS that might cost more than $500 million.
7. All references to estuary must be changed to LSGR.

These and other issues are discussed in greater detail in the enclosure.

Conclusion

LADWP is committed to providing cost effective and sustainable power to the residents of Los Angeles and other cities within the Basin as well as the reducing fossil fuel use, as directed by new legislation. LADWP believes that the TMDL documents as written holds the rate payers unfairly and unjustly responsible for pollution that LADWP did not create.

If you have any questions or require additional information, please contact Clayton Yoshida at (213) 367-4651.

Sincerely,

Susan M. Damron
Manager of Wastewater Quality Compliance

CL: bdc
Enclosure
c/enc: Clayton Yoshida

Enclosure

Comments on the Total Maximum Daily Loads for Metals and Selenium – San Gabriel River and Impaired Tributaries

Introduction

The City of Los Angeles Department of Water and Power (LADWP) has reviewed the proposed Basin Plan Amendment (BPA), staff report, CEQA analysis, and draft resolution for the Total Maximum Daily Loads for Metals and Selenium for the San Gabriel River and Tributaries. In its review, LADWP has found a number of concerns regarding the TMDL's implementation, cost, and the environment. These concerns may negatively affect water quality, power plant operations, and the environment within the Los Angeles Basin. **LADWP therefore requests that copper in the Lower San Gabriel River (LSGR) be removed from the TMDL documents**.

LADWP is a discharger to the lower San Gabriel River (LSGR) via the Haynes Generating Station (HnGS). LADWP is committed to the goal to reduce fossil fuel in accordance with recent state legislation to reduce greenhouse gas production by twenty-five percent by 2020. However, LADWP is required to maintain backup generating capacity using fossil fuels to support periods of high power usage as well as periods when green power usage has limited availability. Thus, HnGS, with its design capacity of over 1600 megawatts, has a vital and irreplaceable role in meeting the power needs of the Los Angeles Basin. In light of HnGS' role, LADWP has the following concerns:

1. CEQA Analysis

LADWP appreciates that the CEQA checklist was revised to address the likelihood of some impacts to the environment and aesthetic factors that will appear with the implementation of the TMDL in LSGR. However, not all impacts were addressed or addressed adequately.

Source Control

The Los Angeles Regional Water Quality Control Board (RWQCB) did not include source control in the CEQA checklist and discussion. Source control is the best and most realistic implementation measure because sources within the Long Beach Marina such as boats, ships, etc., have copper-containing paint as protection from biofouling. The significance of this copper source stems from the fact that the intake water for the Haynes Generating Station is derived from the Long Beach Marina and subsequently passes through the plant to be discharged into the LSGR. LADWP believes this is a large source of copper to the Long Beach Marina and Alamitos Bay, which is ultimately loaded into the LSGR, should be properly addressed via source control measures. Therefore, the the State Water Resources Control Board (SWRCB) should direct the RWQCB to conduct an analysis of implementation requirements for boats, ships and

business owners and the impacts thereof and include the analysis in the CEQA analysis document.

Circulation

Suggested implementation measures at power plants such as relocating the outfall of HnGS (and possibly the AGS as well) or construction of cooling towers would deprive the flood control channel of the flow presently provided by the power plant discharges. If the RWQCB wished to avoid this environmental impact, it would have to find a way to replace the water in the channel now provided by the power plants. The RWQCB's legal authority to require the power plants themselves to replace the lost flow in the channel is doubtful. Moreover, the water used to replace the missing discharge flows would have to come from somewhere; the source of the replacement water would have to be known and its environmental impact considered. Remediation of this impact by pumping more water from Alamitos Bay (or other ocean location) to fill the flood control channel may not improve the copper loading in the channel. This is especially so if the copper is already present in Alamitos Bay water or introduced by upstream dischargers or rainfall runoff. In any event, the RWQCB's consideration of the environmental impacts that might result from relocating the outfalls of the generating stations has not been adequately considered.

The CEQA checklist completely fails to address the significant environmental impacts of creating an outfall or conversion to alternative cooling strategies. Attachment 11 details the additional issues and associated impacts to plant and wildlife, noise, aesthetics, existing housing, increased energy consumption, and the protection and sustainability of the beneficial uses within the LSGR.

It is well known that the health of the Alamitos Bay can be attributable to the circulation provided by both generating stations. If that circulation were to cease, the inner portions of the Bay (the Long Beach Marina, the Marine Stadium, etc.,) would become stagnant in much the same way as Mother's Beach in the Marina del Rey or the Dana Point Harbor Marina. This would not only severely degrade water quality, it would also significantly affect the health, sustainability, and composition of the aquatic biological community. At the same time, the ecological make up of the LSGR would also be significantly impacted with the cessation of power plant discharges. Historic (pre-power plant) information about the flood control channel indicates that, except for particularly wet years, the mouth of the channel was dammed by a sand bar most years. This created a situation where the channel was essentially dry with interspersed puddles.

Today, it is possible that absent power plant discharges, there is enough upstream freshwater effluent discharges to maintain an open channel with the ocean; however, a ribbon width of water may only be 10 to 12 inches deep, as opposed to a current water depth of 8 to 10 feet across the entire 300-foot wide channel. In either of these potential scenarios, the aquatic, benthic, and intertidal habitats would be significantly and permanently changed.

Water Sources for Wet Cooling Towers
LADWP expressed concern over the difficulty of obtaining water for a wet (or hybrid) closed cycle cooling system. RWQCB appeared to dismiss this difficulty as a minor problem by suggesting that LADWP work with the Los Angeles Integrated Resources Plan to obtain recycled water or stormwater and store the water in a holding lake. The impacts of these suggestions have not been fully appreciated by the RWQCB. The CEQA document should discuss the issues of capturing, transporting, and storing cooling water and the need for additional real estate to construct structures for these purposes. SWRCB should document the fact that the volumes of water required would have to flow at rates similar to existing cooling systems, with pipes that are approximately 20 feet in diameter. This is necessary in order to maintain a similar heat transfer efficiency, which affects energy production efficiency.

Increased Greenhouse Gases
LADWP requests that an additional impact, increased production of greenhouse gases, be added to the explanatory section of the CEQA checklist. Greenhouse gases will be increased if closed-cycle cooling is required as a remediation because the lower efficiency will require increased fuel per amount of power generated.

Increased Copper in Alamitos Bay
As mentioned above under cost vs. benefit, the lack of circulation caused by elimination of once-through cooling may cause the copper concentrations in Alamitos Bay to increase. LADWP asks that this consideration be included in the CEQA analysis, with possible mitigation measures and their impacts.

Change in Water Chemistry
Lastly, it is also likely that the water quality chemistry of the LSGR would also change. Presently, the water within the channel can consist of up to 2.2 billion gallons per day of power plant effluent, of which 99.9 percent is seawater withdrawn from Alamitos Bay and approximately 268.5 million gallons per day of point and non-point dry season freshwater input, of which sewage treatment plant effluent is the predominant component.

Recommendation 1: LADWP recommends that the RWQCB update the CEQA analysis with the details provided in Attachment 11. In addition, the RWQCB must add the following statement to the explanatory section of the CEQA checklist: "Since the once-through cooling at the power plants along SGR provides beneficial circulation, which supports aquatic life with low toxicity from the effluent; the implementation alternatives to remove once-through cooling can have detrimental effects on aquatic life."

Recommendation 2: LADWP recommends that since source control is the only reasonable and just way to mitigate copper where the majority of

copper is in the influent of a generating station, an evaluation of the measures to implement source control be provided in the CEQA analysis.

Recommendation 3: LADWP recommends that the CEQA discussion should be updated to fully appreciate the magnitude of installing a wet, closed-cycle cooling system, including storage space for coolant, pumping requirements, relocation of existing conduits, and the need for more land to accomplish this effort.

Recommendation 4: LADWP recommends that the SWRCB modify the CEQA checklist to express that there will be major power plant renovations with significant impact. In the latest version of the CEQA checklist, RWQCB stated that there would be no need for new systems or substantial alterations to power or natural gas utilities (question 16). The explanation provided by the RWQCB was a non sequitur and erroneously cut and pasted to item 16 of Section IV. If there is truly no need for new systems or substantial alterations, this contradicts many of the inferences contained in the TMDL documents.

Recommendation 5: LADWP recommends that the RWQCB update the CEQA analysis to indicate that greenhouse gas production would increase if an alternative to zero discharge is chosen as a mitigation measure.

Recommendation 6: Lastly, LADWP recommends that the RWQCB update the CEQA analysis to include mitigation of circulation loss in Alamitos Bay caused by zero discharge. Furthermore, the RWQCB should not dismiss the impact of loss of circulation by speculating that natural conditions would return. Nor should the benefits provided power plant circulation as described by the MBC study (Attachment 10) be dismissed. These impacts should be included in the CEQA document.

2. Phased TMDL

LADWP requests that this TMDL be modified to a Phased TMDL. USEPA has written guidance on phased TMDLs (http://www.epa.gov/owow/tmdl/tmdl_clarification_letter.html) and many TMDLs have been written throughout the nation with both phased development and phased implementation strategies.

A phased TMDL is a method that allows for river cleanup by allowing WLAs and LAs to be refined as new information from studies is acquired. The phased TMDL also affects implementation by allowing stepped reductions and ongoing ambient compliance monitoring in situations involving much uncertainty over benefits received from various degrees of river cleanup.

LADWP proposes a phased approach for copper in the LSGR for both TMDL development and implementation. Phase 1 would include a special study to determine the actual contribution of copper from the Haynes Generating Station

(HnGS) and the other copper sources to the influent of HnGS. Wasteload allocations (WLAs) could then be calculated for HnGS as well as the WLAs and load allocations (LAs) for the other sources.

The result of the Phased TMDL should include wasteload allocations (WLAs) that are commensurate with the pollutant contribution of each source and each source's ability to reduce the pollutant in a practicable manner. USEPA has allowed phased TMDLs throughout the United States. For example, Snake River in Idaho had a phased TMDL in order to address various stages of implementation. Salmon Falls River in Maine had a phased TMDL for a Phased TMDL for Phosphorus, BOD5, TSS, and Ammonia that has WLAs in phase 1, and if the WLAs are not in compliance after five years, there would be a phase 2. Arbor Lake in Iowa also had a phased TMDL for siltation and nutrients, which allows for the targets to be revisited and adjusted as new data and information are available. Davis Creek in Missouri has a TMDL for ammonia, DO and BOD5 that allows more water quality data to be gathered to further evaluate point and non-point source pollution.

Use of a phased TMDL is an acknowledgement that resources are finite, watershed issues are complex, and not all problems can be solved immediately. Adopting a phased TMDL approach involves: (1) performing the best assessment possible using available data and relatively simple analyses, (2) implementing the most cost-effective controls as soon as possible, (3) monitoring to determine if goals are achieved, (4) applying state-of-the-science approach if goals are not achieved, and (5) adjusting controls if goals are still not achieved.

Recommendation: Due to the unknowns regarding the sources of copper in the HnGS influent, LADWP requests that copper in the LSGR be removed from the TMDL documents. However, if copper in the LSGR is to be included in the TMDL documents, LADWP recommends the documents be revised to include a phased approach for copper. This would allow for more information to be gathered regarding the sources of copper in the power plant influent, and also correctly determine WLAs for the sources and their respective contributions.

3. Implementation Schedule

LADWP requests that a implementation schedule be added to the Basin Plan Amendment for this TMDL. As mentioned in LADWP's June 19, 2006 comment letter, most if not all copper is in the intake to the once-through cooling systems of HnGS. Since replacement of any copper condensers and other equipment will not mitigate the copper levels and since HnGS cannot realistically be taken off-line in its entirety, a TMDL implementation schedule is needed to provide for planning, funding, procurement, EIR, approvals, demolition, and construction. Furthermore, these activities are expected to be conducted in a phased manner, so that the residents of the Los Angeles Basin are not significantly impacted by loss of power.

LADWP estimates that conducting additional source studies, planning, funding, procurement, EIR, approvals, demolition, and construction would take at least 8 years for a partial implementation of replacement of copper condensers at HnGS.

The TMDL implementation schedule must be inserted into the Basin Plan amendment for the TMDL because compliance schedules in NPDES permits have a sunset requirement, which ends all compliance schedules in the year 2010.

Recommendation 1: LADWP recommends that an 8 to 10-year TMDL-based implementation schedule be inserted into the Basin Plan Amendment. At the end of the implementation period, the RWQCB can reconsider the schedule based on progress and unforeseen difficulties in the planning and construction process.

Recommendation 2: Due to the unknowns regarding the sources of copper in the HnGS influent, LADWP requests that copper in the LSGR be removed from the TMDL documents. However, if copper in the LSGR is to be included in the TMDL documents, an implementation schedule should be provided to address all sources of copper in the influent of the generating stations. Potential sources include boats in the marina, maintenance areas, and ships near the marina. Products used for boat maintenance may also be considered as sources. This schedule can be reassessed after reevaluating progress.

4. LADWP Copper Data

The Haynes Generating Station (HnGS) withdraws once-through cooling water from the San Pedro Bay via the Alamitos Bay. From June of 2003 through the present, LADWP has collected influent, effluent, and upstream (7th Street Bridge) samples for conducting its reasonable potential analysis (RPA). Likewise, AES has collected for its Alamitos Generating Station (AGS), influent, effluent, and downstream (Pacific Coast Highway) samples over the same time period. The upstream location generally represents receiving water not under the influence of the power plant discharges.

Table 1 summarizes the copper data from LADWP's RPA studies for the HnGS (See Attachment 1 for a map showing the location of the plant). In the table, Influent means the source water originating from San Pedro Bay via Alamitos Bay and entering into the plant. A table of the complete RPA data can be found in Attachment 2.

Table 1. Summary of Haynes Reasonable Potential Data for Copper (2003 – present)

Date	Influent/Effluent difference (ppb)	Receiving water upstream (ppb) [1]	Receiving water downstream (ppb)[2]
6/03	nd	na	2.52
9/03	3.6	6.2	1.5
10/03	-0.2	7.3	na
11/03	3.4	9.8	3.3
2/04	-3.1	22.2	2.17
3/04	3.7	50.0	na
4/04	-3.3	13.5	2.18
8/04	1.3	9.3	2.17
11/04	4.0	6.0	2.2
2/05	-1.5	7.4	2.56
6/05	-2.0	5.2	2.64
9/05	-0.9	5.3	2.66
11/05	1.8	6.4	1.87
2/06	2.4	10.7	1.94

nd = non detect na = not available
Analytical variability = +/- 5.0 ppb

[1] location = 7th Street Bridge
[2] location = Pacific Coast Highway

From Table 1 it can be seen that 13 out of 13 upstream values are above the CTR criteria of 3.7 ppb and zero out of 12 downstream values are above the CTR criteria. Also, the average intake and effluent copper concentrations are the same, within the limits of analytical variability of +/- 5 ppb. There are six instances in the data record shown in Table 1 where the discharge water apparently has a lower copper concentration than the intake water (see the first monitoring event in 2003, for example). While we do not suggest that the HnGS actually removes copper from the water, this example does show the significant analytical variability in testing for metals in saltwater. Thus, it is apparent that HnGS does not appear to be "adding" significant amounts of copper into the receiving water. Moreover, the copper concentrations do not exceed the CTR criteria downstream of the power plants.

If HnGS is not the source of copper in the LSGR, then the source must be found by studying other inputs. One possibility might be boat hulls in Alamitos Bay, which could contribute copper through leaching to the San Pedro Bay water. The Southern California Coastal Waters Research Project (SCCWRP) study *Extent and Magnitude of Copper Contamination in Marinas of the San Diego Region, California* (SCCWRP Technical Report 483, March 2006) found that copper exceedances in the marinas that were studied covered 86 percent of the marina area. Moreover, "increasing dissolved copper concentrations correlated with increasing toxicity and these copper concentrations were high enough to account for virtually all of the observed toxicity." Conditions in Alamitos Bay may be similar to the San Diego region marinas, except for the beneficial circulation that

the power plants provide. Other potential copper sources should also be investigated by the RWQCB in determining the method to address the toxicity issue of concern.

Recommendation 1: As mentioned previously, LADWP recommends either deleting copper from the TMDL documents or conducting a Phased TMDL to assess the contribution of sources to HnGS influent. Also, LADWP recommends that the SWRCB delete the incorrect WLAs for copper in the LSGR and state in the BPA that copper WLAs will be recalculated when an assessment of contributing sources of copper is complete. In addition, the copper implementation schedule must not start until USEPA approves the §303(d) listing.

Recommendation 2: When the true sources of copper in LSGR have been identified through scientific studies, LADWP recommends that the SWRCB direct RWQCB staff to involve stakeholders from the property owners, boat owners and other potential discharges to the Alamitos Bay so that they can participate in the development of the TMDL once the LSGR has been listed as impaired. Participants are to be made aware of product substitution options without copper as well as their implementation schedule. Paint manufacturers should also be informed about this TMDL and be allowed to participate in discussions.

5. Data Gaps and Missing Information Make Development of a TMDL for the LSGR Inappropriate at this Time.

Due to current numerous data gaps, LADWP believes that the TMDL documents (Basin Plan Amendment, Staff Report, and CEQA Analysis) are incomplete as written. The missing information includes: 1) a study on boats in the Long Beach Marina as sources of copper in the LSGR; 2) the SCCWRP watershed modeling study for the estuary due in December 2006; and 3) the LADWP hydrodynamic study report soon to be completed as required by Finding 19 in the June 10, 2004 permit modification of the HnGS. These important information sources are critical to developing a scientifically accurate understanding of the hydrodynamics within the LSGR, including the proper classification of this river segment. More importantly, the sources are needed to understand the proper copper loading sources. Preparation of a TMDL at this time is premature and inappropriate, and will result in a flawed TMDL. LADWP believes that the RWQCB must consider these information sources prior to the development of a TMDL.

Recommendation: The results of SCCWRP's watershed modeling study, to be released later in 2006, will be necessary to develop accurate WLAs for the upstream sources. The RWQCB should use this data to develop a more accurate TMDL document. In addition, the LADWP's hydrodynamic study will provide a better understanding of the conditions in the LSGR with continuous flow provided by the power plants.

6. Existing Information shows a Lack of Beneficial Use Impact

The receiving water monitoring data conducted by the power plants over the last two decades has shown that the beneficial uses of the LSGR are being protected and are not impaired. As discussed below, toxicity tests performed on the HnGS effluent, which contains the elevated copper influent levels from the Alamitos Bay, have shown a lack of toxicity for many years.

Sediment Quality

Another potential concern that the RWQCB or other interested parties may have is the possible buildup of copper in the sediment of the LSGR and in San Pedro Bay beyond the LSGR over time. This concern may be founded on the assumption that sediment is generally more or less immobile, remaining stationary while pollutants adsorb to sediment particles over months and years to a point where beneficial uses may be threatened. In the case of the San Gabriel River, however, the sediment is not stationary. High flow rates periodically "flush out" the sediment in the LSGR. In fact, significant scouring has occurred in the river channel downstream of the end of the concrete apron. Field investigations and measurements of the water surface elevation indicate that this scour is on the order of six (6) feet below the original "as-built" channel bottom. By periodically cleansing the river channel of sediment, these high flows reduce the possibility that contaminants will accumulate in the LSGR sediment to levels that threaten the area's designated beneficial uses.

Measurements of copper concentrations in sediments in the river channel and in San Pedro Bay just outside of the river channel confirm this. Copper concentrations in LSGR and offshore sediment are shown in Table 2. Sediment sampling locations are shown in Attachment 1B. It is interesting to note that all the concentrations are below the Effects Range-Low (ERL) screening level for copper of 34 mg/kg with the exception of station B11, which is slightly higher but well below the Effects Range-Median (ERM) of 270 mg/kg, which is used by the SWRCB for the §303(d) listing via the State's Listing Policy. Control of copper levels in the Alamitos Bay would likely improve the copper values at station B11.

Table 2: Sediment copper concentration sampling history (mg/kg)

Year	Upcoast			River Mouth Area			Downcoast			River		
Location	B6	B3	B7	B1	B4	B8	B2	B5	B9	B10	B11	B12
2005	6.32	8.48	27.5	17.4	20.3	5.35	5.14	5.63	8.39	10.6	11.4	11.2
2004	4.8	8.3	12	9.4	11	4.4	4.4	4.7	8.1	6.5	19	8.5
2003	na	na	na	9.3	11	na	5.5	5.6	na	14	25	9.8
2002	6.9	9.7	19	16	13	4.3	7.1	6.1	8.9	43	110	9

2001	8.7	8.5	24	12	19	6.1	6.3	8.7	7.6	18	25	15
2000	7.9	6.3	15	12	10	5.9	4.8	5.4	7.1	na	na	na
Mean	6.92	8.26	19.5	12.7	14.1	5.21	5.54	6.02	8.02	18.4	38.1	10.7

Data Source: Bob Krivak, LADWP. 6/15/06. "na" = not analyzed.

Recommendation: The SWRCB should acknowledge that receiving water monitoring data illustrating beneficial uses are protected, data indicating the lack of copper toxicity, and the data indicating the low sediment impact by copper are all evidence that there is no urgent need to develop a TMDL at this time. If the TMDL is approved as drafted, there would be negative impacts, such as greater impact from upstream sources, degradation of Alamitos Bay due to lack of circulation, and reduction of habitat value in the LSGR; and increased greenhouse gas emissions. These and other impacts are detailed in the CEQA analysis (Comment 1).

7. Intake credits

Due to the high circulation provided by the cooling process (for the foreseeable future), the waters used for cooling are effectively drawn from and discharged to one waterbody, the San Pedro Bay. Allowing intake credits will help LADWP implement its long range plans for HnGS (currently being studied) while correctly addressing the fact that the HnGS is not the original source of copper.

The TMDL notes that the HnGS may not be able to meet its wasteload allocation for copper without replacing its condensers or relocating the outfall. But reductions to meet a wasteload allocation are unfair if the copper issuing from the plant was already present in the intake water from Alamitos Bay.

Federal law, if not state law, allows for "intake credits" to account for pollutants in intake water. The basis of the NPDES permit requirement is that the discharger must "add" a pollutant to a water of the United States; this does not occur when the discharger merely passes on pollutants that were already present in the intake water. In such a case the discharger would be entitled to an intake credit from technology-based permit limits under federal law, 40 CFR 122.45(g), so long as the intake water was drawn from the same body of water into which the discharge was made. There is no federal law requirement that a discharger remove pollutants that were already in the water due to natural causes or upstream pollution.

For permit limits based on water quality standards (such as limits derived from TMDLs), essentially the same principle applies. The best federal guidance is in the Great Lakes Water Quality Guidance regulations, particularly 40 CFR Part 132, Appendix F, Procedure 5, section E.3.a, which allows a facility, provided certain conditions are met, to discharge a mass and concentration of the

pollutant that are no greater than the mass and concentration of the pollutant identified in the facility's intake water ("'no net addition limitations").

When a refusal to allow intake credits is coupled with a disproportionate allocation of load to upstream dischargers based on their "reasonable expectations" (discussed below), the result is an unfair TMDL allocation.

In the case of the HnGS, the data show decisively that much of the copper in the effluent is present in the intake water. Of 14 measurements made from June 2003 through February 2006 (a period of almost three years), in six cases the concentration of copper in effluent was less than the concentration in the intake, suggesting that the generating station was actually removing, rather than adding, copper. When the upstream concentration was measured at the same times, the data showed that 13 out of 13 times (one of the 14 measurements was "not available") the upstream values exceeded the CTR criterion of 3.7 ppb. At the same times, none of the downstream concentrations was above the CTR criterion.

LADWP has examined data from both the influent and effluent at the HnGS (Table 1). It appears that copper in the influent is very near and sometimes greater in concentration than in the effluent. Since concentrations of the influent and effluent are similar, intake credits should be allowed for the power plants. This fact should be clearly discussed and identified in the TMDL documents.

From the SIP §1.4.4: "A RWQCB may consider priority pollutants in intake water on a pollutant-by-pollutant and discharge-by-discharge basis when establishing water quality-based effluent limitations, provided that the discharger has demonstrated to the satisfaction of the RWQCB that the following conditions are met:"

Table 3. SIP Requirements for Intake Credits and Power Plant Conformity

SIP Section 1.4.4 requirement	**Is the condition met for the power plant discharge area?**
(1) The observed maximum ambient background concentration, as determined in section 1.4.3.1, and the intake water concentration of the pollutant exceeds the most stringent applicable criterion/objective for that pollutant;	Yes. In Table 4, influent and effluent both exceed the proposed target of 3.7 µg/L
(2) The intake water credits provided are consistent with any TMDL applicable to the discharge that has been approved by the RWQCB, SWRCB, and U.S. EPA	Yes, does not conflict with any existing TMDLs
(3) The intake water is from the same water body as the receiving water body	Yes, influent water is drawn from San Pedro Bay via the Alamitos Bay

SIP Section 1.4.4 requirement	Is the condition met for the power plant discharge area?
	and is returned to the San Pedro Bay via the LSGR.
(3)(a) The ambient background concentration of the pollutant in the receiving water, excluding any amount of the pollutant in the facility's discharge, is similar to that of the intake water	Yes, Table 1 and Table 4 confirm the similarity of the copper concentrations.
(3)(b) There is a direct hydrological connection between the intake and discharge points	Yes, Intake is San Pedro Bay water drawn through Alamitos Bay.
(3)(c) The water quality characteristics are similar in the intake and receiving waters	Yes; influent and effluent appear to be very similar
(3)(d) The intake water pollutant would have reached the vicinity of the discharge point in the receiving water within a reasonable period of time and with the same effect had it not been diverted by the discharger	Yes, the copper in the intake location, Alamitos Bay, would ultimately end up in San Pedro Bay even if not diverted.
(4) The facility does not alter the intake water chemically or physically in a manner that adversely affects water quality and beneficial uses	Yes, LADWP has been required to perform toxicity studies on its effluent, and these show low or no toxicity. Again, Table 1 indicates that HnGS is not altering the intake water.
(5) The timing and location of the discharge does not cause adverse effects on water quality and beneficial uses that would not occur if the intake water pollutant had been left in the receiving water body.	Yes

Table 4. Intake and Outfall Concentrations of Copper*

	Copper (µg/L)						
	Intake	Outfall 001A	Outfall 001B	Outfall 002A	Outfall 002B	Outfall 003A	Outfall 003B
2001	<5	ND	<5	<5	<5	<5	<5
2001	23.3	38.0	29.4	29.5	18.5	16.5	16.4
2002	13	24	19	17	19	20	22
2002	<5	<5	<5	<5	<5	<5	<5
2003	28	15.0	13.0	14.0	16.0	ND	ND
2003	4.3	5.2	4.9	8.6	ND	6.4	7.4
2004	15.9	17.4	15.2	15.7	ND	18.2	20.9
2004 week 1	13	ND	14	ND	ND	ND	13
2004 week 2	11	ND	12	ND	ND	ND	12
2004 week 3	12	17	28	ND	ND	ND	14
2004 week 4	7.4	8.8	9	ND	ND	ND	ND
5/4/2005	16.3	23.6	ND	20.1	17.2	ND	ND
5/11/2005	14	20.2	ND	ND	ND	ND	ND
5/18/2005	8.1	12.3	ND	ND	ND	16.4	9.5
5/23/2005	8.8	10.9	11.0	11.9	9.1	9.7	10.9
5/26/2005	25.5	ND	12.9	11.1	12.5	10.2	11.8
5/31/2005	9.1	ND	31.5	10.6	11.6	10.5	10.6
11/1/2005	7.6	8.6	9.3	ND	ND	10	9.9
11/8/2005	5.9	8.2	8.1	ND	ND	ND	7.9
11/15/2005	6.1	5.6	7.0	ND	6.6	ND	5.7
11/22/2005	6.7	9.0	9.2	8.2	6.8	ND	8.4
11/29/2005	8.4	11	9.0	9.4	8.9	ND	9.9
	12.2	14.5		13.4		12.3	
Average		13.5					

*Semi-annual DMR data

According to the SIP, "Where the above conditions are met, the RWQCB may establish effluent limitations allowing the facility to discharge a mass and concentration of the intake water pollutant that is no greater than the mass and concentration found in the facility's intake water."

Recommendation: Due to the similarity between influent and effluent at the power plants, as well as the continuous, permanent circulation benefits provided by the power plants (Table 1), which has been ongoing since the 1950s, LADWP requests that intake credits be allowed. The BPA should be updated to allow intake credits for the power generating stations in the LSGR.

8. Development of a TMDL for the Lower San Gabriel River (LSGR) is Inappropriate Since the LSGR is Not Listed on the 303(d) List.

In comments on the recent Los Angeles River Metals TMDL, many stakeholders noted that it was not appropriate or legal to develop a TMDL for unlisted reaches.

The RWQCB response to the stakeholders was that, "The proposed TMDL does not regulate all metals in all reaches. Instead, the RWQCB has the authority to assign allocations to upstream reaches in order to meet TMDLs for downstream impaired reaches. Reach 1 is listed for cadmium, copper, lead and zinc. The RWQCB can therefore assign waste load allocations to all upstream reaches and tributaries in order to meet the TMDL in Reach 1." (Emphasis added). However, unlike the Los Angeles River example above, the LSGR **situation is not the same**. Here, instead of developing an allocation for an upstream, unimpaired reach that eventually flows into an impaired reach, the RWQCB has bypassed Clean Water Act (CWA) §303(d)(3) by developing a TMDL for an unlisted waterbody.

RWQCB has stated that it has the authority to determine TMDLs on unimpaired waterbodies (City of Arcadia et al., Los Angeles Regional Water Quality Control Board et al, the Court of Appeals upheld the Regional Board's authority to establish TMDLs for the Los Angeles River Estuary before it was formally listed on the 303(d) list. (135 Cal.App.4th at 1418-1420.) However, the Federal Clean Water Act prescribes two different standards for TMDL development, one for waters that are identified on a State's 303(d) list and another for waters that are not. The listing of impaired waters triggers § 303(d)(1)(C), which compels a state to develop TMDLs for impaired waters. These TMDLs must be established at levels "necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." Id.

Unlisted waters, on the other hand, have entirely different TMDL requirements. Under CWA § 303(d)(3), a state is required to develop non-binding, informational TMDLs for these waters. Informational TMDLs are established not at levels necessary to achieve water quality standards, like the TMDLs required under 303(d)(1), but rather at levels that would "assure protection and propagation of a balanced indigenous population of fish, shellfish and wildlife. "It is well established that the latter standard is more flexible than the former (e.g., the variance provision under CWA § 316(a) allows violations of state water quality standards when the discharge will assure protection and propagation of a balanced indigenous population of fish, shellfish and wildlife). Moreover, informational TMDLs established under CWA § 303(d)(3), unlike those under 303(d)(1), are not binding for NPDES or other regulatory purposes.

Since the lower reach of the San Gabriel River is not identified on California's 303(d) list as impaired for metals, the RWQCB's only option under federal law is to establish a non-binding, informational TMDL. Nonetheless, the RWQCB's staff proposes to make the San Gabriel TMDL a binding TMDL under the different, and inapplicable, standard of CWA § 303(d)(1)(C). This action overstepped the RWQCB's authority.

Not the least of the LADWP's objections to imposing TMDL-based requirements on non-listed waters is that it deprives interested parties of the chance to comment. When a water body is proposed for 303(d) listing, dischargers to the water body are put on notice that requirements may be imposed in their future permits, and they can submit comments and participate in the regulatory process. This opportunity is denied when a listing is done only for stream segments far downstream, and then requirements are later imposed upstream on unlisted segments.

LADWP believes that had the RWQCB properly undertaken a listing process, data and information could have been presented indicating a lack of impairment within the LSGR, despite elevated copper levels. LADWP has years of receiving water monitoring data that indicates a viable, healthy ecosystem within the LSGR, and years of effluent chronic toxicity data conducted containing the elevated influent copper levels drawn in from the Alamitos Bay and yet with no instances of toxicity. Since there is no consent decree deadline for copper, there is no legal necessity to develop the copper portion of the TMDL for the LSGR at this time. The RWQCB could properly take the time to review all the available information and determine whether a TMDL is truly warranted. LADWP requests that the RWQCB delete the WLAs for copper in the LSGR due to lack of an administrative record or comment period for a § 303(d) listing, and for a failure to consider all sources of copper (as mentioned in Comment 4, infra.).

Recommendation: Since the LSGR is not listed as impaired for copper, the administrative requirements for an impairment listing have not been met, and the public has not had the opportunity to submit separate comments on the listing decision. Therefore, LADWP recommends WLAs not be developed in this TMDL at this time. Furthermore, the 1999 Consent Decree does not require the immediate mitigation of copper. This allows for the TMDL for copper in the LSGR to be handled more appropriately, with a Phased TMDL development and implementation as well as the development of a "informational TMDL" as directed by the Clean Water Act.

9. Lower San Gabriel River is Not an Estuary

LADWP requests that references to "estuary" in the TMDL documents be replaced with "Lower San Gabriel River" (LSGR). The reason for this unusual request is that classifying LSGR as an embayment rather than an estuary addresses thermal issues in future permits. LADWP is concerned that referring to LSGR as an estuary in this TMDL may cause precedent that will forestall the correction of an error in the Basin Plan. The conditions of the LSGR, which have not changed since the generating stations began operation in the 1950's, are more like an embayment when using both scientific and regulatory definitions. Whether or not the State Water Resources Control Board (SWRCB) agrees, LADWP believes that "LSGR" is an appropriate neutral term that can be used while LADWP works with RWQCB to change the Basin Plan. The following discussion provides LADWP's reasoning for the request:

The proposed Basin Plan Amendment, staff report, CEQA analysis, and draft resolution for the San Gabriel River (SGR) Metal TMDL are predicated on the premise that the river segment downstream of Willow Street to the mouth of the river is an "estuary." The Staff Report on page 25 further references an exchange of memorandum between the RWQCB and the State Water Resources Control Board (SWRCB) purporting to have redefined or reclassified the discharge from the Haynes and Alamitos Generating Stations as estuarine, and therefore, "falling under the jurisdiction of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) and the CTR". This segment of the SGR, referenced in these comments as the LSGR, is not an estuary, and in fact an estuary does not exist anywhere within the SGR. Furthermore, LADWP challenges the legitimacy and legality of any supposed redefinition or reclassification of the power plant discharge based solely on the exchange of memorandum between the RWQCB and the SWRCB.

9A. Purported Haynes Discharge Reclassification

The TMDL Staff Report states that the Haynes discharge has been reclassified so as to be regulated under the SIP/CTR. LADWP has consistently disputed this reclassification commencing with its letter of April 17, 2003 to Mr. Dennis Dickerson of the RWQCB (Attachment 3).

Commencing with a June 4, 2001 memorandum from the RWQCB Executive Officer, Dennis Dickerson, to the SWRCB Executive Officer, Celeste Cantu, the RWQCB sought guidance from the SWRCB on the applicability of the SIP/CTR to various power plants within the Los Angeles region, including the HnGS. The SWRCB's response, in a July 18, 2001 memorandum (Attachment 4), concluded that HnGS should be regulated as an estuarine discharge under the SIP/CTR. This determination was based solely on the SIP definition of an estuary and the location of the discharge. Two additional memoranda exchanges between the RWQCB and the SWRCB occurred on October 25 and December 11, 2002 (Attachments 5 and 6, respectively) in which further clarifications were sought and given.

LADWP was informed for the first time of these informal communications and the consequences they would have on the future permitting fate of the HnGS in a January 15, 2003 letter from the RWQCB (Attachment 7). In this letter, LADWP was informed that HnGS had been reclassified as an estuarine discharge by the SWRCB and they would be regulating the facility as such. At no time was LADWP made aware of these earlier memorandum exchanges nor given the opportunity for input. LADWP's April 17, 2003 letter argued that the RWQCB's January 15th letter and enclosed memoranda offered no factual basis or record of consideration for the reclassification other than regulatory definition and discharge location. LADWP stated its belief that reclassifying HnGS based solely on the regulatory definition and the location of the discharge ignored over four

decades of settled regulatory history, was inconsistent with the facts relative to the facility, and disputed historical and scientific environmental findings. (A complete copy of the April 17, 2003 comment letter, with all enclosures, was also provided to Ms. Christine Bailey and Mr. Philip Isorena of the SWRCB.)

An attempt to reclassify the HnGS discharge without proper prior notification to LADWP and undertaking a public process (including notification, solicitation of comments, a response to comments, and a hearing) violates LADWP's rights to due process. The RWQCB determined long ago that, given the unique circumstances in this part of the channel, that these are ocean waters. The RWQCB confirmed this in 2000, even after adoption of the 1994 Basin Plan and the 2000 SIP/CTR. It would be arbitrary and capricious to change this classification now, and it would certainly be arbitrary and capricious to change it without a full airing of the hydrological facts and appropriate process of law. LADWP requests that this proper noticing and hearing process take place on its own merits and not be bundled with this TMDL proceeding. Timely notice and an opportunity to be heard at a meaningful time and in a meaningful manner are the very minimum required for due process. More importantly, LADWP believes that the dry weather copper TMDL portion of the SGR Metal TMDL should be placed on hold until the significant issues of the appropriate receiving water designation and power plant classification have been resolved.

LADWP restated its dispute regarding the purported discharge reclassification in comments dated May 19, 2004 submitted to the RWQCB on a revision of the HnGS waste discharge requirements within the existing NPDES Permit to allow for the discharge of once-through cooling water from the Unit 8 condenser (Attachment 8). In response to these comments, Finding 19 was added to the permit modifications adopted by the RWQCB on June 10, 2004. Finding 19 discusses a discharger-proposed study that is to examine the existing receiving water classification and a subsequent RWQCB review of the study to "determine whether changes are merited to the receiving water classification or beneficial uses". It is LADWP's interpretation, therefore, that the purported discharge classification is still pending and that no determination should properly be made until the study has been submitted to, and reviewed by, the RWQCB.

Until the RWQCB has reviewed the hydrodynamic study referenced above, and any additional relevant technical and scientific information regarding the proper classification of the HnGS discharge that may be provided, the current classification as an ocean discharge prevails. Furthermore, the fundamental issue of whether the LSGR is an estuary clearly has substantial import to LADWP; but also, with this TMDL, to other entities regulated by the proposed TMDL. LADWP believes that the dry weather copper TMDL portion of the SGR Metal TMDL should be placed on hold until the significant issues of the appropriate receiving water designation and power plant classification have been resolved.

Regulatory and Permitting History of HnGS has been Consistently Applied as an Ocean Discharge

The RWQCB first regulated HnGS in 1959 with Board Order 59-56 for the discharge of treated sanitary waste from site construction activities. The first generating unit was commercially brought on line in 1962, and additional units followed annually through 1967. The facility was regulated by a series of board orders and waste discharge requirements until the first NPDES Permit was issued in 1974. Throughout the 44 years of settled regulatory history, the facility has continuously been regulated as an ocean discharge.

The regulatory definition of an estuary, as set forth in the Thermal Plan (1971, 1972), the Enclosed Bays and Estuary Policy (EBEP) (1974), the Ocean Plan (1972, 1978, 1983, 1990, 1997, 2001), and the SIP/CTR is generally the same and has remained constant since each document's inception and throughout subsequent revisions. The USEPA and SWRCB recognized that although an aerial view of the water bodies suggests an estuarine condition, the continuous pumping of approximately 2200 MGD (12 million cubic feet per hour) of seawater created unusual conditions equivalent to direct ocean discharge. If the RWQCB, and the SWRCB in its oversight role, had truly considered the discharge to be estuarine, it would have written the 1974 permit under the 1974 EBEP, approved the Thermal Effects Study under Provision 5 (not Provision 3) of the Thermal Plan, would not have established a mixing zone and dilution factor as an ocean discharge, and would not have approved a site-specific water quality criterion for chlorine via an Ocean Plan exception.

The latter two actions required direct and specific involvement and decision making from the SWRCB staff. The permitting of HnGS in accordance with the Ocean Plan was done for five successive NPDES permitting cycles. This can only mean that the RWQCB, the SWRCB, and EPA considered this facility an ocean discharge; and, therefore, appropriately regulated it under the Ocean Plan. Therefore, since the definition of an estuary has not been modified and the HnGS facility discharge has not been relocated, the basis for the reclassification of the discharge must be clearly supported and documented by the RWQCB and the SWRCB.

Until there is a formal reclassification of the discharge, the RWQCB should continue to treat discharges from the Haynes and Alamitos Generating Stations as existing ocean discharges, including with the attendant dilution credit of 4.5 and with a mixing zone that extends from the LSGR into the San Pedro Bay as developed from detailed oceanographic surveys and scientific studies (See Attachment 3). This dilution credit should be applied in both this TMDL proceeding, despite the TMDL's indication to the contrary regarding the possibility of a dilution credit, and in the existing NPDES permit until determined

otherwise. The LADWP letter to the Regional Board dated April 17, 2003, provides additional detail in this regard (See attachment 3).

9B. The Lower San Gabriel River Does Not Satisfy the Regulatory or Biological Definition of an Estuary

All regulatory definitions of an "estuary" hinge predominantly on the existence of a mixing zone of fresh and ocean water where the freshwater encounter with the ocean occurs at or near the mouth of the river. This condition does not occur in the LSGR. What does occur in the vicinity of the river mouth is the mixing of a thermal ocean power plant discharge with the ocean water of the San Pedro Bay. At an upstream location (approximately 2.5 miles), freshwater from point and non-point wastewater discharges (predominantly from sewage treatment plants) encounters as much as 2.2 billion gallons of power plant seawater effluent from LADWP's Haynes and AES' Alamitos Generating Stations. Thus, the true freshwater/saltwater interface or wedge that exists in the LSGR is between the power plant seawater effluent and the upstream freshwater discharges. Absent a significant storm event, the upstream freshwater never encounters ocean water from San Pedro Bay, and the regulatory definition of an estuary is never fulfilled. During a significant storm event, it is possible for rainwater to meet the ocean waters of the San Pedro Bay; however, this occurrence is very seldom and certainly does not occur for a major portion of the year (see Thermal Plan estuary definition, emphasis added).

As detailed by Flow Science (2006) (Attachment 9), the lower reaches of the San Gabriel River cannot properly be classified as an estuary. An estuary is characterized by an interface between freshwater flow from the land and tidally driven ocean water, with the attendant tidal exchange. However, flow from the LSGR to San Pedro Bay occurs only in the downstream direction. The cooling water flows through the generating stations prevent ocean water from San Pedro Bay from entering the LSGR. Because net flow is always to the sea, even on a rising tide, there is no interface between tidally driven ocean water and freshwater from upstream. Rather, the saltwater-freshwater interface is an interface between the cooling water effluent from the generating station (which originates in San Pedro Bay and is drawn into the plant via Alamitos Bay) and the reclaimed water from upstream wastewater treatment facilities during dry weather conditions. The salinity of the water within the LSGR, which is power plant effluent, averages 33.5 parts per thousand and thus approximates the salinity of ocean water. Therefore, the LSGR is more accurately described as an embayment (seawater bound by distinct headlands, the sides of the flood control channel, and the limit of the saltwater/freshwater wedge). Although an estuary historically did occur during wet weather conditions, flows from the San Gabriel River did not historically meet the ocean during dry weather conditions. Further, extensive channelization has relocated the San Gabriel River Channel, so that the historical estuary ceased to exist when this channelization occurred, prior to about 1947, and therefore prior to the construction of the HnGS. This set of

circumstances has also been evaluated by MBC Applied Environmental Services (MBC), who similarly concluded that the LSGR has neither the physical nor ecological characteristics of an estuary.

It is also important to note that the 2006 Flow Science document states that any freshwater mixing from Publicly Owned Treatment Works (POTW) and urban runoff above the power plants is overwhelmed by the saltwater input from the power plants. "While salinity data indicate the presence of a freshwater-saltwater wedge within the lower San Gabriel River upstream of this embayment, there is no tidally-driven water exchange between the river and the open ocean, so that a key element of an estuary is no longer present." Also, "Even during a rising tide the flow of water is from the channel to the bay. The minimum channel flow occurs at high tide and is about 4 million cubic feet per hour." Because of this, the study concluded "there is no tidal prism," and "therefore there would seem that there can be no functionally equivalent estuary."

In 2003 MBC conducted a literature review to determine historical conditions of the LSGR (Attachment 10, *Lower San Gabriel River Environmental Assessment*, MBC, April 2003). The study included physical characteristics, biological characteristics, and adverse and beneficial effects of the power plants' discharge. MBC also reviewed historical information to determine what the river would look like if power plant discharge were to cease. The study concluded "The most important component in the scientific definition is variable salinity. The definition calls for substantial mixing of fresh and saltwater in a transitional area between the freshwater and saltwater influences during a significant portion of the year and the presence of adequate nutrients to ensure a large phytoplankton population. Here in a relatively protected area, an estuarine community can develop and primary productivity is high because of nutrient runoff into the system. None of these factors are present in the SGR [San Gabriel River]. As the only mixing of fresh and saltwater takes place above the generating stations and there is no transitional area anywhere along the channel from the generation stations to the discharge at the mouth of the river."

9C. The 1994 Basin Plan Designation of the Engineered Channels as an Estuary

The 1994 Basin Plan contains the following footnote for the San Gabriel River Estuary: "*These areas are engineered channels. All references to Tidal Prisms in Regional Board documents are functionally equivalent to estuaries*". As previously noted above, there is, in fact, no tidal prism, in the generally accepted sense of the words, within the LSGR because there is no tidal flow into the flood control channel. Thus, in this sense there is no functionally equivalent estuary. Therefore, because there is no transition from freshwater to brackish to saltwater, and because the water never reverses direction due to the tides, LADWP is certain that the LSGR is not an estuary, but rather an embayment.

The proposed reclassification of discharges to the LSGR as estuarine is not only a discretionary action that requires supporting information, but also requires environmental review. Despite recent efforts by LADWP and its consultants, LADWP is unable to locate any relevant supporting documentation that supports the RWQCB's 1994 Basin Plan reclassification of the LSGR to an estuary or that the impacts of such a reclassification were assessed. LADWP's comments in Section 8, and the corresponding Attachment 10, discuss some of the adverse impacts that could occur if an estuary classification or the TMDL caused the power plants to cease discharging to the LSGR. In short, it is LADWP's belief that the proposed reclassification would result in potentially significant impacts to: 1) the marine environment due to changes in both water quality and water flow volumes and circulation changes in the Alamitos Bay and the LSGR; 2) plant and animal life within both the Alamitos Bay and LSGR; 3) recreational and land use opportunities; 4) socio-economics; and 5) energy generation. These impacts must be assessed, evaluated, considered, released for public review and comment, and mitigated by the RWQCB and SWRCB prior to any reclassification.

9D. Summary of LADWP's Estuary Designation Concerns

LADWP believes that in the case of LSGR the power plants (see Attachment 1 for map) discharge to the San Pedro Bay, not an estuary. LADWP believes the scientific and legal definitions of "estuary" are not met due to the unique conditions caused by the power plants discharges, which has occurred since 1956 and 1962 for AGS and HnGS, respectively. The historical information provided in both the Flow Science Technical Memorandum (2006) and the MBC Report (2003) demonstrate that a functional estuary has not existed since 1925. Moreover, as stated in the Flow Science Technical Memorandum, the "Available salinity and temperature data in the lower reaches of the San Gabriel Flood Control Channel indicate that the lowest reach of the San Gabriel River Flood Control Channel, which includes that section of channel containing the power plant discharges, is actually an embayment. While salinity data indicate the presence of a freshwater-saltwater wedge within the lower San Gabriel River upstream of this embayment, there is no tidally-driven water exchange between the river and the open ocean. In fact, even during a rising tide, the flow of water continues from the channel to the bay, so that a key element of an estuary is not present."

Recommendation: As mentioned above, LADWP requests that any and all references to the Haynes discharge being considered estuarine be deleted since no formal reclassification process has yet to take place. LADWP also requests that all references within the TMDL staff report, Basin Plan Amendment, and Resolution to "Estuary" be changed to "Lower San Gabriel River."

10. Linkage Analysis, Tidal "Exchange," and Dilution Credits

Section 5.5 (p. 36) of the TMDL staff report makes the assumption that some volume of water is exchanged between the LSGR and the open sea over the course of every tidal cycle; this volume is referred to as the tidal prism. Insofar as flow is always out when the power plant pumps are on, and flow in the LSGR downstream of the power plant outfalls (during dry weather) is almost exclusively plant effluent, the assumption of tidal exchange is false. No tidal prism exists in the LSGR. Preliminary results from two hydrological studies by Flow Science and Southern California Coastal Water Research Project show that the water in the LSGR never changes direction and always flows out to the Bay. Therefore, the volume calculations reported in the TMDL staff report are irrelevant.

It seems that the only reason the RWQCB performed the calculations was to make the following statement in the staff report: "For the Estuary, the linkage analysis demonstrates that power plant flow comprises the majority of the volume of water in the Estuary and that and [sic] the ocean water provides no excess assimilative capacity" (p. 38). This conclusion in the RWQCB Staff Report is equivalent to finding that the plant discharge does not merit a dilution credit. Certainly, the vast majority of water in the LSGR during dry weather is effluent discharged from the DWP and AES power plants. However, the RWQCB's conclusion that the power plants should thereby not obtain a dilution credit for their discharge does not necessarily follow for several reasons.

First, it is unclear that the LSGR in fact, constitutes an "estuary" (See Comment 9 addressing this point). If it is not an "estuary" but rather an embayment, as discussed below, then it does not make sense to evaluate the merits of a dilution credit based on the volume of the "estuary." There is simply no such entity and no such volume with which to compare the power plant discharge volume.

Second, the relevant water body to which this effluent discharge volume should be compared in assessing the merits of a dilution credit is San Pedro Bay (i.e., the ocean). In fact, the discharge has always been regulated as an ocean discharge, and HnGS has been granted a dilution credit of 4.5 on this basis in the past. Indeed, regulating the discharge as an ocean discharge and granting a dilution credit has produced no known harm to beneficial uses in the waterway. With a dilution credit of 4.5, the applicable CTR saltwater criteria would apply downstream of the mixing zone (i.e., in the ocean), potentially further eliminating the need to develop a TMDL in the "estuary" (which development is not even justified on the basis of the data presented in the TMDL staff report, as the section below suggests).

Recommendation: Due to flows from the generating stations causing circulation between San Pedro Bay, Alamitos Bay, and LSGR in excess of 2.2 billion gallons per day (existing since the 1950s), LADWP believes that the hydrology of the LSGR is an embayment based on scientific and legal

definitions. Therefore, LADWP recommends that currently allowed dilution credits be retained in the TMDL documents.

11. State's Antidegradation Policy

The Staff Report concludes that the TMDL is in compliance with State's Antidegradation Policy from SWRCB Resolution 68-16, stating: "The proposed TMDL will not degrade water quality, and will in fact improve water quality as it is designed to achieve compliance with existing, numeric water quality standards." Since the RWQCB did not properly and adequately consider the impacts to both LSGR and Alamitos Bay from a zero discharge scenario, this statement may not be correct. Table 5 describes the antidegradation concerns related to any implementation plan that would stop existing once-through cooling water usage by the power plants.

Table 5. State and Federal Antidegradation Policy Requirements and Draft TMDL Compliance

Antidegradation requirements	Does the Draft TMDL comply?
Actions affecting water quality must be consistent with the maximum benefit to the people of the state	No. The TMDL implementation might degrade water quality by reducing circulation in both the LSGR and Alamitos Bay, and the LSGR water quality would be reflective of the upstream freshwater quality. If a zero-discharge implementation option is used, there would be increased costs to both power users of this region as well as the rest of the State via purchased power from LADWP in times of need.
Actions affecting water quality must not unreasonably affect present and anticipated beneficial use of such water	No. A zero-discharge scenario can impact or eliminate the existing beneficial uses of the water body. Beneficial uses such as marine habitat would cease to exist. Species composition and diversity would be impacted or reduced by the TMDL implementation (reduced water volume and circulation). Sediment may accumulate at the mouth of the river, blocking or reducing flow during the dry season, as it did historically.
Actions affecting water quality must not result in water quality less than that prescribed in water quality plans and policies	No. Some pollutants may be reduced, but low flow due to implementation measures would be detrimental to water quality. Furthermore, upstream

	concentrations are currently diluted by the 2.2 BGD of once-through cooling seawater. This dilution would be lost, possibly resulting in increased pollutant concentrations. The Alamitos Bay water quality would also degrade.
Actions affecting water quality are subject to the Federal Antidegradation Policy	Yes. Degradation of waters with pollutant concentrations much lower than criteria would not be of concern for the LSGR.

Recommendation: In the Staff Report, under Antidegradation, acknowledge that the impacts associated with a zero-discharge scenario could significantly and negatively impact and degrade water quality and beneficial uses.

12. Cost Analysis

12A. Outfall Cost

Costs for a hypothetical outfall to discharge cooling water from the HnGS and AGS can be estimated as follows. To handle 2200 MGD of flow, a pipe or tunnel approximately 24 or 25 feet in diameter would be required, or an equivalent capacity in two or three smaller pipes. Offshore (shoreline into the ocean) construction costs for a pipeline or tunnel of this type can be estimated at $ 38,000 per linear foot. This cost is based upon historical offshore construction data for relatively short outfalls (higher unit cost). The cost data was updated to ENR 8500 and extrapolated to the size considered. The unit costs also consider the possibility of using several conduits with the same carrying capacity (Luciano Meiorin, Parsons Corporation, personal communication, June 16, 2006). In addition, a pipeline or tunnel would have to be constructed from the plant to the shoreline; costs for this pipeline would be somewhat lower per linear foot. Thus, assuming two miles to the shoreline and two miles of offshore construction, plus associated costs with a tie-in to existing facilities and construction of an underwater diffuser and including a 30% contingency, construction costs of the hypothetical outfall option suggested by the RWQCB would be approximately $850 million. This alternative would also require a substantial increase in pump discharge head to overcome the friction loss of four miles of new pipe flow. This would mean replacement of circulating water pumps with several times larger horsepower requirements, new electrical supply, and possibly re rating the pressure systems of the condensers and piping to withstand the increased pressure requirements. Including all the costs associated with the design, construction management, environmental permitting (assuming it could be permitted), public hearings and workshops, and associated activities, costs for such a facility would likely rise to about $1 billion. Of course, this cost estimate is speculative, and could vary depending upon the length of the outfall pipe, the length and configuration of the diffuser, geotechnical conditions, and

environmental hazards, choice of route and diffuser locations, among other factors. Actual costs could be significantly higher. In any case, the RWQCB's estimate of $300 million is much lower than actual anticipated costs for such a massive facility.

The Los Angeles County provided the following estimate based on the need for an additional ocean outfall for the Joint Water Pollution Control Plant. "The cost for an ocean outfall can vary widely depending on many factors, including: the length, depth, alignment and size of the outfall; the local geology; depth to the groundwater table; method of construction of the outfall; and the depth in the ocean in the area of the outfall. The Sanitation Districts have not yet begun a public process on this proposed project, so the budgetary estimate is for preliminary purposes only. That being said, the Sanitation Districts anticipate that the new outfall would be between nine and 17 miles in length and would cost $1 to $1.5 billion."

12B. Cooling Towers

In 2004, LADWP did an analysis of the cost of various alternatives to our current once-through cooling process The analysis found the installation of wet cooling towers would cost, at a minimum, $210 million dollars and the installation of dry cooling towers would be no less than $465 million dollars. The capital costs did not take into account some feasibility issues regarding installation of new cooling water pipes throughout the plant, which would make both wet and dry towers extremely costly to install. These pipes would have to be at least 8 feet in diameter (20 feet for dry cooling) and would require gutting and demolishing major portions of the existing plant (including the administration building) in order to have adequate space for construction. As mentioned in the CEQA Analysis, the ability to site either of these cooling systems is highly suspect with numerous environmental impacts from demolition, construction, and plant operation (e.g., noise, aesthetics, air quality, drift, fogging, and water quality) to the adjacent residential communities of Leisure World and Island Village and the recreational and commercial businesses within the Long Beach Marina.

12C. Sewer Line

The construction of a sewer line would be necessary if a zero-discharge scenario (ocean outfall or alternative cooling system) is required since it is highly unlikely that plant process wastewater (e.g., boiler blowdown, cooling tower blowdown, etc.) could be discharged to the LSGR. Currently, HnGS does not have a sewer connection. At this time, LADWP is unable to provide a cost estimate for the installation of a sewer line because most sewer lines in the area are already running at near capacity and so LADWP can find no entity willing to accept the wastewater. The problem then becomes, finding a sewer system that could accept low volume industrial waste flows. Assuming this problem could be

overcome, the distance to the sewer system connection point might be significant, and this would require installation of a number of pumping stations.

12D. Copper Condenser and Heat Exchanger Replacement

A cost assessment for replacing the copper tubes in the once-through cooling condensers was performed for both titanium and specialized stainless steel alloy tubing. The tube replacement included removal of the existing tubes from four units. In the analysis, the different heat transfer capability of the two materials was considered. Since thinner tubes would be required for improved heat transfer, additional tubing support would be needed. Other heat exchangers made of copper exist, and therefore their replacement costs are included in the estimate.

Total estimated cost using titanium tubes is $22 million. Total estimated cost using stainless steel is $19 million. The cost is in June 2006 dollars and projections are for a 10% increase in total cost per year due to the increases in material cost.

12E. Costs of Water Effects Ratio (WER) and Translator Studies

Costs for a WER study for the LSGR can be estimated by using a similar estimate for a WER for the Los Angeles River (Table 6).

Table 6. Estimated WER Study Costs For the Los Angeles River – this includes five reaches.

Item	Estimated Cost, $
Laboratory tests, 5 sites during summer with 3 events plus 3 sites during winter with two events including toxicity with one species, copper analysis, and Biotic Ligand Model (BLM) components	279,000
Water Quality Monitoring	82,000
Data Analysis and Report Preparation	134,000
Stakeholder Meetings and Work Plan Creation	100,000
Total	595,000

If a WER study is scaled back to only the LSGR, costs could be less, depending on the number of sampling locations recommended by the study team.

A Translator study (to determine the conversion from total metals to dissolved) cost for the Los Angeles River near the POTWs was $108,000, but the cost could

be more for the LSGR stakeholders (or other reaches of SGR) if the relationship between total and dissolved metal is found to have a low or uncertain correlation.

12F. The Economic Value Provided by Natural Sources

In 2005, LADWP requested the Woods Hole Group to study the economic value of "services" provided by natural resources and the impacts of those services on resource users if zero discharge is achieved. Ecological services include, but are not limited to, the physical, biological, and chemical functions of an individual resource or habitat. Human use services include, but are not limited to, recreational activities and property value.

Regarding potential ecological service loss, the study concluded "Assuming that 100 percent of the ecological services currently provided by Alamitos Bay, Colorado Lagoon, and the San Gabriel River are lost under an alternative pumping regime, the upper bound of ecological losses can be expressed as approximately 356 acres of aquatic habitat per year. Assuming the power plants continue to operate under an alternative pumping scenario in perpetuity, present value losses would be equivalent to approximately 11,900 present value acre-years. Note, however, that the potential ecological costs associated with alternative pumping scenarios do not directly correspond to the ecological benefits provided by the system under the current pumping regime. Rather, the ecological benefits currently provided are the ecological services provided by the Bay with a two billion gallon-per day intake, *minus* the ecological detriment caused by those intakes (e.g., impingement and entrainment)."

As for human use services, "The economic analysis of human use services at risk in Alamitos Bay, Colorado Lagoon, and the San Gabriel River under an alternative pumping scenario consists of two distinct and separate measures: a benefits transfer measure and a regional economic modeling measure. Using a benefits transfer approach, which estimates the social welfare benefit experienced by resource users (in this case recreational boaters and beach goers), the maximum economic value associated with potential cessation of boating and beach use within the assessment area is approximately $11.4 million per year. Applying a regional economic model to quantify the dollar value of goods and services produced and employment generated by consumer expenditures, the current level of economic activity associated with recreational boating and beach use within the assessment area is approximately $125.5 million per year. It is important to note that social welfare (i.e., consumer surplus) and regional economic impacts (i.e., revenues and employment) measure different things, and cannot be summed or compared directly. Instead, these analyses are complementary, providing two different perspectives on the economic activity generated by these recreational activities.

"Overall, the magnitude of services provided by Alamitos Bay, Colorado Lagoon, and the San Gabriel River that are at risk under an alternative pumping regime is

significant. Specifically with regard to human use services, a relatively small change in pumping regime could have a disproportionately large effect on the economic value of those services. The magnitude of a potential change in ecological services due to a change in pumping regime, however, is indeterminate at this time."

12G. Source Control Costs

The RWQCB failed to assess the costs associated with controlling the source of the copper levels associated with the influent from Alamitos Bay. Indeed, controlling copper from the source would benefit both the health of the Alamitos Bay and the LSGR. Further, it is likely that a more cost-effective and less environmentally damaging alternative would be controlling the pollution at its source rather than requiring treatment via the cooling water system of the power plants. This alternative needs to be evaluated from both a regulatory and environmental alternative analysis perspective

Recommendation: These costs, information, and alternative project analyses should be incorporated into the CEQA analysis. RWQCB should recognize in the CEQA analysis that an ocean outfall or retrofitting existing portions of the HnGS with alternative cooling (wet or dry cooling towers) would be infeasible without demolition of much of the plant, and is therefore cost-prohibitive. The SWRCB needs to have the RWQCB state that the most economical option for the power plants, replacing copper condensers and heat exchangers, may not be an effective implementation measure if copper from the Alamitos Bay (e.g., boat hulls) is not addressed due to the loading from anti-fouling paint.

Recommendation: LADWP recommends that SWRCB direct the RWQCB to undertake a cost analysis of product substitution for anti-fouling paint users and paint manufacturers.

13. Evaluation of a Water Body Using Total Recoverable Data is Inappropriate

It is not appropriate to evaluate a water body based on total recoverable metals by applying a translator value to calculate dissolved metal concentration. The CTR intended translators should be used only to calculate permit limits or to calculate the criteria per USEPA. The use of a translator to evaluate a water body using total recoverable metals data introduces error due to ambient suspended solids. The RWQCB should reconsider impairment decisions for this TMDL based solely on dissolved metals data. Further, monitoring requirements for the reaches of any river should include dissolved metals.

Recommendation: The RWQCB responded that due to data gaps total recoverable metals data is acceptable. However, the CTR recognized that waterbodies should be evaluated using dissolved metals because of the bioavailability issue. LADWP recommends that SWRCB have the RWQCB

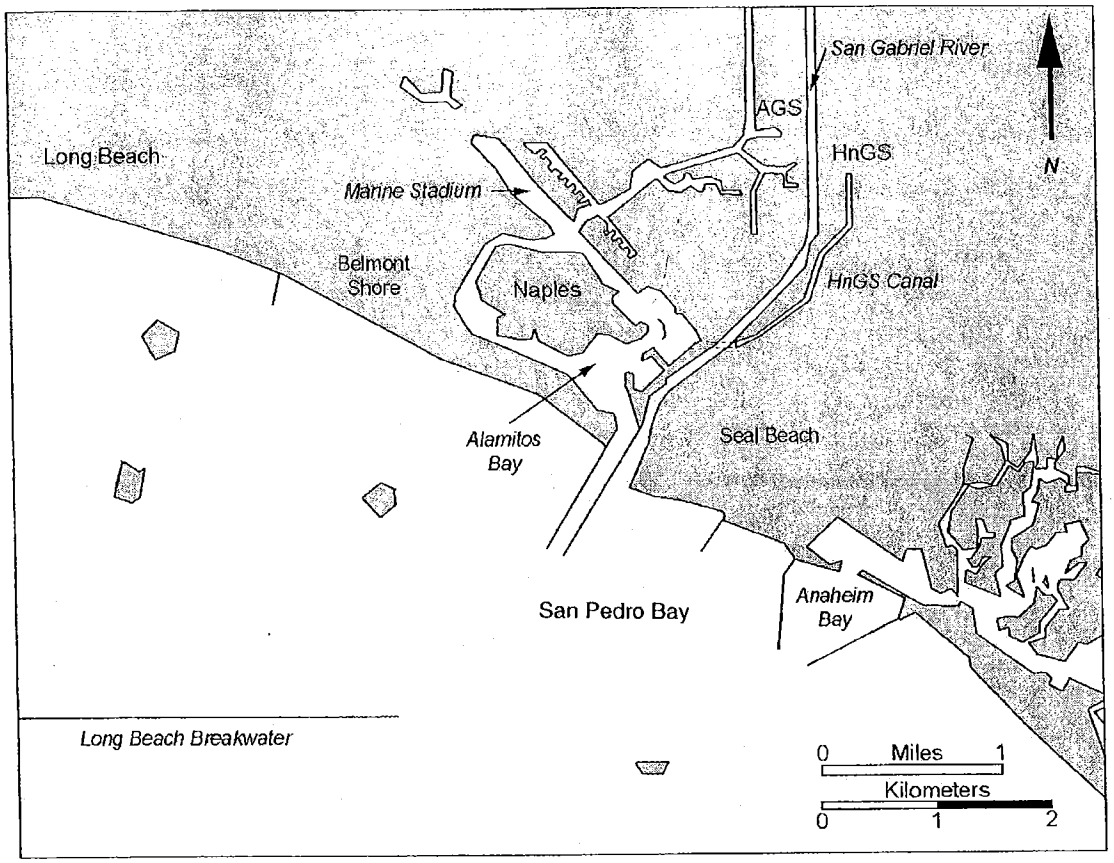
re-evaluate the impairment based on dissolved metals data and also reconsider the TMDL based on new dissolved metals data. Any data gaps should be addressed during the Phased TMDL process.

Conclusion

The continued operation of the HnGS represents an essential and irreplaceable component in LADWP's operating system. Therefore, LADWP's concerns regarding the development of an adequate TMDL and to the environmental and cost impacts to the region are critical to the continued integrity of the Southern California electric grid.

Based on LADWP's RPA data, it is unlikely that re-tubing the condensers and replacing the copper heat exchangers will be successful in achieving compliance with the copper TMDL. This is because RWQCB failed to consider the intake area of the Alamitos Bay as a source of copper (paint from boat hulls). The wet or dry cooling tower alternatives would most likely cause disruptive CEQA concerns, such as noise and problems with aesthetics, loss of species diversity, cause stagnation in the adjacent Alamitos Harbor, and incur exorbitant costs for power users in this region. Construction of an outfall would be economically infeasible. These concerns could have serious ramifications for the ability for LADWP to provide reliable power from a source within the Los Angeles Basin. Finally, implementation of options other than once-through cooling would create stagnant conditions in both the Alamitos Bay and the end of the river, which may negatively affect beneficial uses.

Given that monitoring has shown minimal toxicity, receiving water sediment has low concentrations of copper, and there is no critical consent decree schedule for copper in the LSGR, LADWP requests that SWRCB consider the issues presented here and revise the Basin Plan Amendment, Proposed Resolution, and Staff Report accordingly, and also delete copper from the TMDL for LSGR until data and information gaps are filled. Also, since the RWQCB did not adequately address the CEQA process, SWRCB should consider a Phased TMDL approach and include a TMDL implementation schedule in the Basin Plan Amendment since CTR implementation schedules sunset in the year 2010.



HnGS = Haynes Generating Station.
AGS = Alamitos Generating Station.

Attachment 2

Reasonable Potential Analysis - Copper Results (µg/L)

Haynes Generating Station

Year	Sample Date	Sample Location								
		Intake	001A	001B	002A	002B	003A	003B	RW10	RW12
2003	6/30	<4	<4						<4	2.52
	9/3	10.7		14.3					6.2	1.51
	10/30	9.8				9.6			7.3	
	11/13	8.5					11.9		9.8	3.3
2004	2/18	14.1						11	22.2	
	2/12									2.17
	3/9	12.5			16.2				50.0	
	4/30	15.7			12.4				13.5	
	5/18									2.18
	8/18	9.4					10.7		9.3	2.17
	11/30	7.2	11.2						6	
	11/22									2.2
2005	2/17	9.0			8.5				7.4	2.56
	6/8	12.8				10.8			5.2	
	5/24									2.64
	9/14	9.1					8.2		5.3	
	8/18									2.66
	11/8	5.7						7.5	6.4	
	11/10									1.87
2006	2/9	10.3					12.7		10.7	
	2/16									1.94

Notes: Influent sampled from Intake Structures 001 - 003.

Effluent Sampled from Haynes Outfalls 001A - 003B.

Receiving Water Sampled from:

RW10 - located mid-channel below 7th Street Bridge.

RW12 - located mid-channel below Pacific Coast Highway Bridge.

Department of Water and Power the City of Los Angeles

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Mayor

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FRANK SALAS, *Chief Administrative Officer*

April 17, 2003

Mr. Dennis Dickerson
Executive Officer
Regional Water Quality Control Board
Los Angeles Region
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Dear Mr. Dickerson:

Subject: Haynes Generating Station Units 3 and 4 Combined Cycle Repowering Project
Additional Data Needs

This is in response to your letter dated January 15, 2003, which indicated an intent to change the water body classification for the Haynes Generating Station (HnGS) from an ocean discharge (its classification for nearly three decades) to an estuary discharge. Prompted by the need to modify the existing NPDES permit for LADWP's current repowering efforts associated with HnGS Units 3 and 4, the Regional Board requested LADWP to submit additional information in order for your staff to assess the water quality impacts of the proposed reclassification of the facility. Specifically, this letter requested information in two areas: (1) a study demonstrating that modification of the cooling water intake structure location would not adversely impact the aquatic environment; and (2) monitoring, engineering studies, etc. that addressed the facility's ability to comply with various Regional and State plans in light of the State's proposed reclassification of the power plant from an ocean discharge to estuarine.

LADWP submitted a draft scope of study for the cooling water intake study on February 14, 2003 and requested an extension for a response to the second information item request. Briefly, the second information item requested LADWP to address how it would comply with the Thermal Plan's maximum discharge temperature limit of 86°F for estuaries, the California Toxics Criteria absent dilution credits from a mixing zone, and the Basin Plan residual chlorine limit if EPA did not continue the 301(g) variance in light of the proposed reclassification. Enclosed with this letter is LADWP's response to the State's proposed reclassification of HnGS, which includes a brief overview of any efforts LADWP would undertake, if necessary.

The January 15th letter and its attached memoranda that LADWP has been provided to date offer no factual basis or record of consideration for the reclassification proposal other than regulatory definitions and discharge location. LADWP believes that reclassifying these facilities based solely on the regulatory definition and the location of the discharge ignores nearly three decades of settled regulatory history, is inconsistent with the facts relative to HnGS, and disputes historical and scientific environmental findings.

LADWP believes that further discussion on this proposed reclassification is warranted and requests an executive level meeting to discuss these issues. Additionally, LADWP is available to meet with your staff or State Board staff to discuss any of the information presented in the enclosure.

If you have any questions or require any additional information, please feel free to contact me at (213) 367-0279.

Sincerely,

Susan M. Damron
Manager of Wastewater Quality Compliance

SMD: bdc
c/enc.: Susan M. Damron

Mr. Philip Isorena, NPDES Unit Chief w/ enclosure
State Water Resource Control Board
Division of Water Quality
1001 I Street, 15th Floor
Sacramento, Ca 95814

Ms. Christine Bailey, Unit Chief – Inland Surface Water Planning w/ enclosure
State Water Resources Control Board
Division of Water Quality
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Enclosure for the April 17, 2003 letter.

Los Angeles Department of Water and Power Response to the Proposed Reclassification of Haynes and Harbor Generating Stations from Ocean Discharges to Estuarine and Bay Discharges

As the following discussions will show, the Los Angeles Department of Water and Power (LADWP) had no written notice of the proposed reclassification before receiving the January 15, 2003 letter, nor has it been given any opportunity for input. In light of the important ramifications of any reclassification of the Haynes Generating Station (HnGS) and Harbor Generating Station (HGS), we believe it is essential that the Los Angeles Regional Water Quality Control Board (Regional Board) first allow LADWP an initial, informal opportunity to explain why such reclassification is neither required by applicable rules nor appropriate in light of the specific facts at HnGS. For all of the reasons discussed below, LADWP strongly objects to any such reclassification which would represent an abrupt and unsupported departure from nearly thirty years of settled regulatory interpretation by all of the state and federal agencies with jurisdiction over the HnGS and HGS NPDES permits.

Procedural Background on Reclassification

The Regional Board, after hearing testimony on whether to approve the renewal of the NPDES permit for HnGS in May of 2000, requested staff to engage the State Water Resources Control Board (State Board) on the question of whether HnGS should be regulated as an ocean or estuarine discharge. Regional Board staff subsequently submitted a memo dated June 4, 2001 to the State Board seeking a determination as to whether the newly adopted California Toxics Rule (CTR) and State Implementation Plan (SIP) were applicable to the discharges from nine generating stations located in the Los Angeles Region. The State Board responded in its memo dated July 18, 2001. That memo recited the definition of enclosed bays and estuaries and went on to say that based on the **definitions in the SIP and the location of the wastewater discharge**, "four" of the nine power plants would be subject to CTR/SIP jurisdiction.

Subsequent clarifying memos specifically relative to LADWP's HnGS and AES' Alamitos Generating Station (AGS) from the Regional Board to the State Board dated October 25, 2002 and from the State Board to the Regional Board dated December 11, 2002, provided comments on the applicability of temperature and mixing zone constraints and the continued applicability of the federal Section 301(g) variance for chlorine. Prompted by LADWP's current repowering efforts associated with HnGS Units 3 and 4, the Regional Board, in its letter dated January 15, 2003, notified LADWP in writing of the State Board's and Regional Board's reclassification decision and requested LADWP to submit a scope of work for any biological or engineering studies, monitoring, or requests to agencies as determined necessary to comply with this reclassification.

The letter and its attached memoranda that LADWP has been provided to date offer no factual basis or record of consideration for the reclassification proposal other than a bare

recitation of regulatory definitions and description of the discharge location. LADWP believes that reclassifying HnGS based solely on the regulatory definition and the location of the discharge ignores nearly three decades of settled regulatory history, is inconsistent with the facts relative to HnGS, and disputes historical and scientific environmental findings. For purposes of this response, LADWP will focus primarily on HnGS and its reclassification to an estuarine discharge, but many of the same arguments apply to LADWP's Harbor Generating Station (HGS) located nearby in the Los Angeles-Long Beach Harbor.

Regulatory Definitions

The regulatory definition of an estuary, as set forth in the Thermal Plan (1971, 1972) [1], Enclosed Bays and Estuary Policy (1974) [2], the Ocean Plan (1972, 1978, 1983, 1990, 1997, 2001), and the SIP/CTR (2001) are generally the same. The SIP/CTR definition is as follows:

> Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean water. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and sea water. Estuarine waters include, but are not limited to, the Sacramento-San Joaquin Delta as defined by Section 12220 of the California Water Code, Suisan Bay, Carquinez Strait downstream to Carquinez Brdge and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay Rivers.

(Emphasis added.)

These definitions, as they appear in their respective plans or policies, have remained constant since each document's inception and throughout subsequent revisions. They were not changed by the CTR/SIP, nor, to the best of LADWP's knowledge, did the CTR rulemaking record raise the issue of possible power plant reclassification or consider the attainability, necessity, or costs associated with any reclassification.

At the time HnGS received its first NPDES permit in 1974, the estuary definitions in the Thermal Plan, Enclosed Bays and Estuary Policy (EBEP), and the Ocean Plan all were in place. Yet despite this, the 1974, 1977, 1984/85, 1990, 1995, and 2000 NPDES permits all were written based on the Ocean Plan. If the Regional Board had truly considered HnGS to be on an estuary, it would have written the 1974 permit under the 1974 EBEP and approved the Thermal Effects Study under Provision 5 of the Thermal Plan. The permitting of HnGS and HGS in accordance with the Ocean Plan was done for five successive permitting cycles despite the language in the Ocean Plan which states that it is not to be used for Enclosed Bays or Estuaries[3]. This can only mean that the Regional

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[1] See Reference 1
[2] See Reference 2
[3] See Reference 3

Board, the State Board, and EPA considered these facilities as ocean discharges; and, therefore, appropriately regulated them under the Ocean Plan.

Classification of the Lower San Gabriel River

All the regulatory definitions of an estuary hinge predominantly on the existence of a mixing zone of fresh and ocean water where the fresh water encounter with the ocean water occurs at the mouth of the river. It is presumed that the mixing zone exists somewhere between the mouth of the river and a point upstream where the tidal influence from the sea water ceases to influence or mix with the fresh water. The EBEP further qualifies the mixing zone as one that exists during a major portion of the year. These conditions do not occur in the Lower San Gabriel River.

What does occur at the mouth of the river is the mixing of an ocean discharge with ocean water from San Pedro Bay. All of the water within the Lower San Gabriel River is essentially thermal ocean water that extends upstream from the river mouth to a location somewhere below the Seventh Street Bridge. The TSD (pg.74) characterizes an estuary as "having a main channel reversing flow." However, as discussed in the attached report by MBC Applied Environmental Sciences (MBC), the volume of power plant discharge prevents the upstream migration of the ocean water beyond the mouth of the river. The tidal flux observed in the SGRTP is the result of the discharge water responding to the tidal elevation of the bay. The MBC report states, "The height of the tide acts as a dam that retards the flow of the channel... Heated discharge water is essentially stored in the channel on flood tide and then released on the following ebb tide." (See Reference 23) During times other than a storm event, the actual mixing zone where ocean water meets and mixes with fresh water is upstream of the AGS outfall nearest to the Seventh Street Bridge.

As the Regional Board appropriately characterized in its March 23, 1982 memo to the State Board requesting approval of the dilution factor for AGS, the flood control channel is a large surface channel discharge. (See Reference 14) Hence, the SGRTP does not satisfy the regulatory definition of an estuary, which was appropriately recognized by the Regional and State Board regulators of yesteryear in the crafting of the 1974, 1977, and 1985 NPDES permits and which was rightly carried forward in the 1990, 1995 and 2000 permits.

The SGRTP also does not meet the biological definition of an estuary. The MBC report states, "Pritchard (1967) gives us the definition that 'An estuary is a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage'". The MBC report goes on to state, "other salient features are the rise and fall of the tides, muddy substrates, high turbidity level, nutrients, high planktonic productivity, and variable salt concentrations. The most important component in the scientific definition is variable salinity." MBC reports that none of the biological factors that make an estuary an estuary are present in the SGRTP. MBC states, "As the only mixing of fresh and salt water takes place above the generating stations and there is no transitional area anywhere

along the channel from the generating stations to the discharge at the mouth of the river, it would appear that the only area an estuarine environment exists is above the generating stations. Below this area, there are no quiet areas, primary productivity is not high and there is little to no freshwater influence which would allow a community to develop." Thus it would appear that the San Gabriel River in the vicinity of the HnGS and AGS discharges does not fit the biological or geophysical definition of an estuary. LADWP concludes that the reclassification of the HnGS and AGS discharges from ocean discharges to estuarine discharges is without merit and should be reversed.

Permitting History

Overview

From the time HnGS received its first regulatory permit, Board Order 59-56, to the present NPDES permit (Order 00-081), it has been recognized that the discharge was into the San Gabriel River Tidal Prism (SGRTP)[4]. Yet from 1959 to 2002, the Regional Board has chosen to regulate the discharge as an ocean discharge. Over the more than four decades, LADWP has not modified the discharge from the facility or its location. During this time, the Regional Board, the State Board, and USEPA have issued six NPDES permits, approved the Thermal Effects Study under Provision 3 of the Thermal Plan[5], approved the Section 316(b) Entrainment and Impingement Study, approved mixing zones and dilution factors, and approved a site-specific effluent limit for total residual chlorine, all with the understanding, recognition, and concurrence that HnGS was an ocean discharge. The same can be said for HGS.

The 1974 NPDES permit recognizes that HnGS discharges into the SGRTP and states that the terms and conditions of the order were in compliance with the Basin Plan and the Thermal Plan. With the adoption of the 1974 permit on December 16, 1974, the Regional Board had in place, its Basin Plan which the permit says contained Water Quality Objectives (WQO) for the SGRTP[6], the 1971 Thermal Plan which the permit says contained WQO for the SGRTP[7], the 1974 EBEP with directives on how to permit enclosed bays and estuaries, and the 1972 Ocean Plan which specifically stated that it was not to be used for the permitting of enclosed bays and estuaries.

The 1977 NPDES permit was the first permit to include specific numeric effluent limitations. These limitations (both daily maximum and thirty-day average) were based on the 1972 Ocean Plan water quality criteria and were derived in accordance with the guidance provided in the 1972 Ocean Plan. The 1977 permit was also the first permit to include effluent limits based on the 1974 Steam Electric Effluent Guidelines and Standards. As with the 1974 permit, the 1977 permit found that:

- the HnGS discharge was into the SGRTP (Finding 3);
- the Thermal Plan had temperature objectives for the tidal prism (Finding 11);

[4] See Reference 4
[5] See References 5
[6] See Reference 6
[7] See Reference 7

- and the 1975 Basin Plan contained WQO for waters of the SGRTP and that the requirements contained in the order were necessary to assist in meeting those objectives.

For the first time, the 1977 permit: cited the Ocean Plan; **classified the discharge as an existing ocean discharge**[8]; and found that the Thermal Effects Study had been completed and found to be in compliance with **Thermal Plan Provision 3 (existing ocean discharges)**[9]. The permit also found that the beneficial uses were being protected and that the discharge was in conformance with the Basin Plan and the Ocean Plan.[10]

EPA Region 9, via a letter dated September 15, 1976 to the Regional Board Executive Officer, commented on the 1977 draft NPDES permits for nine coastal generating stations (including both HnGS and HGS) with respect to the monitoring and reporting requirements for certain **Ocean Plan** limited constituents[11]. This letter acknowledged the use of the Ocean Plan for the permitting of HnGS and HGS and provided additional guidance on language that should be incorporated into the permit. Additionally, in a fact sheet attached to a Regional Board May 3, 1977 letter to EPA regarding a steam electric effluent limit variance, the Regional Board identifies LADWP as having three coastal power plants all subject to regulation under the Ocean Plan. The fact sheet reports, "These Plans [LA Basin Plan and Ocean Plan] were approved by EPA and as such are the water quality control plans regulating discharges to coastal waters."[12]

Although the Regional Board had issued the 1977 permit in accordance with the Ocean Plan regulations, LADWP officially requested of the Regional Board, via letter dated July 28, 1978, "that the governing regulations for the wastewater discharges from the Scattergood and Haynes Generating Stations be those of the California Water Resources Control Board's Water Quality Control Plan for Ocean Waters of California, as revised January 1978."[13] Mr. Dennis Dasker of the Regional Board responded to this letter on August 10, 1978 stating, "We will review your request and, as appropriate, will prepare a tentative revised Order for consideration by the Board at a future Board hearing."[14] The next NPDES permit that was authored by the Regional Board, which was prepared in accordance with the Ocean Plan, was the 1984, and subsequently revised, 1985 permits.

The 1984 and 1985 NPDES permits were adopted with the same facts and findings in evidence as those that were stated in the 1974 and 1977 permits. Two additional findings relative to HnGS and HGS plant operation and their classification as ocean discharges came into existence. Those findings were regarding the establishment of mixing zones and dilution factors for use in calculating effluent limits per the Ocean Plan guidelines; and the filing for an Ocean Plan exception and federal Section 301(g) variance for the discharge of higher Total Residual Chlorine levels. A more detailed discussion of these issues will be addressed later in this document.

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[8] See References 8
[9] See Reference 5
[10] See Reference 9
[11] See reference 10
[12] See Reference 27
[13] See Reference 11
[14] See Reference 12

The 1978 Ocean Plan introduced the method for calculating effluent limitations based on a mathematical equation that included a variable for initial dilution. The 1978 Ocean Plan also extensively discussed the definition of, and the method for deriving, the minimum initial dilution. At that time, as it still is today, the Ocean Plan offered the discharger the option of proposing an alternative model for assessing initial dilution subject to Regional Board and State Board review, analysis, and approval. The Southern California Edison (SCE) utility, then owner of six of the nine coastal power plants in the Los Angeles Region, submitted to the State Board an alternative method of calculating initial dilution for shallow water submerged discharges. The State Board, in a memorandum to the Regional Board dated March 13, 1980, approved the alternative method and established several dilution factors[15]. The Regional Board, in a memorandum to the State Board dated March 23, 1982, **recognized that the Ocean Plan Table B Guidelines anticipated the need to develop alternative approaches to determining initial dilution factors**, concurred with the initial dilution factors already approved by the State Board in their March 13, 1980 memo, and proposed for State Board concurrence, three additional dilution factors (which included HnGS)[16]. LADWP subsequently submitted the documentation necessary to support the derivation of a dilution factor for HGS on August 11, 1983. The 1984 Permits, subsequently revised in 1985, for HnGS and HGS established effluent limits based on the approved initial dilution factors of 4.5 and 3.1, respectively.

In accordance with the federal guidelines for seeking a variance from a Best Available Technology (BAT) effluent limit for a non-conventional pollutant (chlorine), and as an outgrowth of the process to establish initial dilution factors, LADWP and SCE sought along parallel paths, an exception to the Ocean Plan for the total residual chlorine effluent limit and a Section 301(g) CWA variance from the BAT Steam Electric Guideline Effluent Limit. A permanent exception from the Ocean Plan was granted in 1988.

In the above two brief discussions about mixing zones/dilution factors and about chlorine exceptions/variances, it is important to note that the Regional Board and the State Board were intimately involved in the review, analysis, and approval process under the regulatory scheme set forth under the Ocean Plan. At no time during any of the ongoing efforts did the Regional Board, the State Board, or EPA -- or any stakeholder, to the best of LADWP's knowledge -- question the appropriateness of conducting these efforts in accordance with the Ocean Plan.

The 1990, 1995, and for HnGS, the 2000 NPDES permits have been adopted with the above noted facts and findings still in place. The 1990 permit found that the Regional Board had approved the Ocean Plan exception request for a modified chlorine effluent limit at the hearing to adopt Order 85-35 and that the State Board had approved a temporary exception in Order 86-42[17]. The 1990, 1995, and 2000 permits recognize that the State Board, in Order 88-80, granted a permanent exception to the Ocean Plan for a

[15] See Reference 13
[16] See Reference 14
[17] See Reference 15

modified total residual chlorine limit[18]. The 1990 and 1995 permits continued to indicate that a decision on the federal Section 301(g) variance was pending from EPA. One notable addition to the 2000 HnGS permit was the issuance of the federal Section 301(g) Variance by EPA on May 13, 1998.

EIR for HnGS Units 3 and 4 Repowering

In 2001, LADWP embarked upon an effort to repower Units 3 and 4 at HnGS. LADWP initiated its California Environmental Quality Act process with the transmittal of the Notice of Preparation (NOP) to all interested agencies, including the Regional Board, in order to solicit their input at the start of the CEQA process. The NOP was sent to the State Clearinghouse on December 5, 2001 where it was subsequently routed to Mr. Jonathan Bishop at the Regional Board. LADWP separately submitted a copy of the NOP directly to Mr. Dennis Dickerson, Executive Officer of the Los Angeles Regional Board, on December 12, 2001[19]. LADWP received comments from four respondents, none of whom was the Regional Board[20].

LADWP proceeded to prepare and file a draft Environmental Impact Report for the HnGS Unit 3 and 4 Repowering Project to all interested parties for their review and comment[21]. Once again, LADWP submitted documentation to the State Clearinghouse, and specifically Mr. Dennis Dickerson via FedEx on March 18, 2002. As part of the CEQA process, LADWP received comments from seven respondents, none of whom was the Regional Board[22]. LADWP evaluated the potential impacts from the project and determined appropriate mitigation measures based on the understanding that the facility would be regulated in the same manner as it had been over the last four decades. The EIR was finalized and approved by LADWP's Board of Water and Power Commissioners on July 2, 2002. During the entire EIR process, the Regional Board never commented, nor did they notify LADWP of the State Board reclassification of HnGS in order for LADWP to consider and evaluate any potential impacts to the project or the environment as a consequence. An Abatement Order issued by the South Coast Air Quality Management District on August 29, 2000 required LADWP to reduce NOx emissions and specified in-service dates for four repowering projects, of which HnGS Units 3 and 4 was one. In order to meet these in-service dates, LADWP proceeded with entering into contractual agreements totaling approximately $340 million dollars for the repowering project, commencing construction approximately September of 2002. On January 15, 2003, LADWP received its first written notification from the Regional Board of the reclassification of HnGS via the letter from Mr. Dennis Dickerson[23].

The January 15, 2003 letter asked LADWP to address several issues in light of the reclassification, three of which dealt with the cooling water discharge. These issues

[18] See Reference 16
[19] See Reference 17
[20] See Reference 18
[21] See Reference 19
[22] See Reference 20
[23] See Reference 21

related to: (1) how LADWP proposed to ensure that HnGS would comply with the thermal discharge limits applicable to estuarine discharges; (2) how LADWP proposed to ensure that the HnGS effluent would comply with the water quality criteria in the CTR absent a mixing zone or dilution credits; and (3) how LADWP proposed to address the continued applicability of the federal Section 301(g) Variance. Prior to responding directly to these questions, LADWP would like to review the regulatory history of each of these issues.

Thermal Issues

As has been discussed above, all the Regional Board Orders (1959 – to the present) have recognized the discharge location as the SGRTP, and they have consistently recognized that the Thermal Plan and the various Basin Plans over the years have established WQO for the SGRTP that have been incorporated into the various permits. These same permits have asserted over the years that with the inclusion of these WQO's, the water quality and beneficial uses of the receiving water have been protected.

Once adopted, the Thermal Plan required existing dischargers of thermal waste to conduct a study to define the effect of the discharge on beneficial uses and to determine whether, based on the study results, design or operating changes would be necessary to comply with the Plan. The Thermal Effects Studies were also intended to provide data to the Regional Boards so that the WDRs could be revised as necessary and they could be used to establish a framework for conducting future receiving water monitoring of the thermal discharge.

The Regional Board issued study specifications unique to each of LADWP's coastal generating stations on November 22, 1971. As such, the studies that were carried out in accordance with the study specifications were unique and site-specific to the water body, the location of the discharge, and the operational characteristics of the plant. The HnGS specification clearly indicated that the location of the discharge was into the SGRTP and had a specific addendum to address that fact.[24] The addendum required that additional information be gathered to assess the cumulative effect of the discharges from both the HnGS and AGS. Vertical water column profiles were established in the SGRTP at five separate locations. At each location, three stations were established across the width of the river. Vertical profile data were collected hourly over a 25-hour period at both ebb and flood tides and were used to determine the percent of the cross-sectional area within the tidal prism that exhibited temperature above ambient. Other objectives of the HnGS Thermal Study, conducted quarterly over a one year period, were to identify the facility discharge location relative to the receiving water; define the area thermally affected (during both an ebb and flood tide) down to within 1° F over ambient; determine San Pedro Bay temperature profiles and define shoreline contact, if any; and identify, size and enumerate fish, benthic, and intertidal species describing species diversity, abundance, and percent frequency.

[24] See Reference 22

The Thermal Effects Study was a thorough and complete evaluation of the biology and thermal extent of the discharge within the tidal prism, the San Pedro Bay, and the shoreline/intertidal areas. It can clearly and explicitly be seen that the Thermal Study Specifications and the accompanying Addendum thoroughly explored the thermal aspects of the discharge and the upstream AGS facility within the tidal prism and the ultimate receiving waters of the San Pedro Bay. With this underlying information, after review of the Thermal Effects Study for HnGS, the Regional Board recognized the Study as having been conducted in accordance with the Regional Board Specifications and in conformance with **Provision 3 of the Thermal Plan.** The Regional Board, after review of the Study, found that the discharge from the facility was **in compliance with the Thermal Plan** and that the study demonstrated that the beneficial uses of the receiving water were being protected[25].

In fulfillment of the Thermal Plan's requirement that: "All waste discharge requirements adopted for discharges of elevated temperature wastes shall be monitored in order to determine compliance with effluent or receiving water temperature requirements. Furthermore, for significant thermal discharges as determined by the Regional Board ... expanded monitoring programs, to be carried out either on a continuous or periodic basis, designed to assess whether the source continues to provide adequate protection to beneficial uses..." (Thermal Plan Implementation Provision 8), LADWP conducted receiving water monitoring studies in 1978, 1980, 1986, 1988 and annually since 1990. The NPDES permits issued since 1977 have all specifically found that the beneficial uses are being protected. Accordingly, LADWP asserts that it has demonstrated compliance with the Thermal Plan.

The SGRTP has, over that last four decades with the thermal discharges from both the HnGS and AGS, established an ecosystem adapted for and thriving in a warm water habitat. LADWP requested MBC Applied Environmental Sciences to perform an environmental assessment (then and now) of the Lower San Gabriel River.[26] In short, the assessment found that the presence of the thermal discharges from HnGS and AGS have given rise to a productive marine ecosystem that otherwise would not exist. The benthic infaunal population in 1954, prior to the existence of both thermal discharges, was characterized by 12 different species. Today, over 140 species have been identified in the SGTRP. The fish populations that have been found are warm water tolerant and appear to have adapted to both the thermal discharge and a fluctuating saline environment. They are generally representative of a warm water habitat with fluctuating salinity. Near the mouth of the river, the warmer than ambient waters attract a variety of fishes that are considered tropical or subtropical. The warmer water found in the lower river, mouth of the river, and directly off coast of the river mouth provide a major breeding ground for round stingray and a desired habitat for occasional sitings of green sea turtles, gray whales, California sea lions, and bottlenose dolphin. LADWP asserts that while the elevated temperatures within the river can be detrimental to some organisms and can prevent others from colonizing, a unique, healthy and viable warm water habitat has been

[25] See Reference 5
[26] See Reference 23

created and that there is an absence of appreciable harm from the HnGS and AGS discharges.

Mixing Zones and Dilution Factors

The Thermal Effects Study illustrated an important finding regarding the mixing hydraulics between the discharge and the receiving water. As noted in greater detail in the MBC "San Gabriel River Environmental Assessment" (See Reference 23), the 1971 Thermal Effects Study demonstrated that the cooler ocean water from the San Pedro Bay extended no further up the San Gabriel River than at the mouth. Essentially, the discharges from both the HnGS and AGS (maximum design flow of 2.2 billion gallons per day) create a dam at the mouth of the river precluding any upstream migration of the ocean tidal waters. The Thermal Study also reported that the water within the Lower San Gabriel River was well mixed vertically and that as the thermal field from the generating station discharges progressed downstream, it extended no further than depths of five to ten feet after passing the mouth of the river. It can be seen that the flood control channel (Lower San Gabriel River) essentially acts as a discharge channel for the heated power plant discharges where the mixing interface between the discharge and the receiving water (i.e., the zone of initial dilution) occurs at the mouth of the river.

Consistent with the above description, the Regional Board, in its March 23, 1982 memo to the State Board seeking approval of the AGS dilution factor, characterized the discharge from AGS, and by association, HnGS, as "a large surface channel discharge". (See Reference 14) The discharges from the Long Beach Generating Station and HGS were characterized as "near surface channel discharges." The calculation and derivation of the dilution factor for HnGS, using the State and Regional Board approved flux-weighted-average method for surface discharges, was based on the fact that the rapid **mixing** between the discharge and the receiving water **was occurring at the river mouth**. The zone of initial dilution is defined as the location where rapid and irreversible turbulent mixing of wastewater occurs with the receiving water; for HnGS, this was identified to be at the river mouth. The Technical Support Document for Water Quality-Based Toxics Control (TSD) describes a mixing zone as one which estimates the distance from the outfall to a point where the effluent mixes completely with the receiving water.

Despite the existence of the 1974 EBEP which addressed initial dilution, and the 1983 Ocean Plan which precluded its use for enclosed bays and estuaries, the Regional Board and State Board proceeded to consider mixing zones and dilution under the regulatory structure of the Ocean Plan. In so doing, the State Board and the Regional Board recognized: the Ocean Plan Table B Guidelines' anticipated the need to establish dilution factors in order to establish effluent limits; that the available methods were not appropriate for power plant discharges; that the methods proposed by the LADWP and SCE for their power plant discharges were acceptable; and that the dilution factors that had been derived were appropriate. These dilution factors, which were derived under the Ocean Plan regulations for ocean discharges, were subsequently approved by the Regional Board, the State Board, and EPA.

Based on the above discussions, LADWP believes that a mixing zone and the previously approved dilution factors are appropriate to the discharge. There has been no change to the morphology of the channel and the discharge volumes have remained unchanged over

time such that the original thermal data that was used as a tracer for the mixing zone model remain valid. Data from the Thermal Effects Study demonstrated that mixing does not occur in the flood control channel but at the river mouth. That the channel acts as a discharge channel carrying the heated effluent essentially undisturbed to the mouth of the river where it undergoes rapid mixing with the receiving water. The Study further concluded that the receiving water did not migrate upstream any further than the mouth of the river due to the volume of discharge water that essentially acted as a dam at the entrance to the river.

Modified Effluent Limit for Total Residual Chlorine

For the reasons previously put forward, LADWP firmly believes that the discharges from HnGS and HGS are ocean discharges subject to regulation under the Ocean Plan. As such, the permanent Ocean Plan exception and the 301(g) variance issued to each facility are valid. The 301(g) variances for both facilities recognize that they are ocean discharges, and the HnGS 301(g) variance further reflects that the discharge is into the SGRTP.

The studies conducted to substantiate the modified effluent limit, including the receiving water field studies and the laboratory toxicity bioassays, were site specific for each facility and water body. The toxicity studies were based on species indigenous to the receiving water body in the vicinity of the discharge and were dosed at the alternate total residual chlorine (TRC) level for that facility. Each variance was specific to the facility, to the discharge, and the water body into which the effluent was discharged. In essence, LADWP performed a site-specific water quality-based effluent limit derivation. EPA made this same observation during the approval process for the biomonitoring study. EPA stated, "We support the requirements of [State Board] Resolution 86-42 for a comprehensive biomonitoring study ... Such a study is consistent with EPA's recent 'Policy for the Development of Water Quality-Based Effluent Limitations for Toxic Pollutants.'"[27] Accordingly, even if the discharges were not to be considered ocean discharges subject to Ocean Plan regulation, the underlying scientific studies supported, and the Regional Board and the State Board concurred, a site-specific water quality criterion and effluent limit.

The State exception and Federal variance were premised on the non-conventional, non-conservative nature of chlorine. The State Board recognized that "the ocean contains organic and inorganic constituents which readily reduce chlorine to its non-toxic chloride oxidation state."[28] The State Board noted that historical information suggested that chlorine could be converted to a non-toxic form by 80% and if that occurred with the power plant discharges, which were only seeking about a one-third increase in the criterion, they would "easily meet" the Ocean Plan WQO.[29] The State Board indicated that studies (a monitoring program) would be needed to quantify this deactivation and to demonstrate that a modified effluent would be protective of the environment.

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[27] See Reference 24
[28] See Reference 25
[29] See Reference 26

Therefore, the purpose of study was to acquire scientific data regarding the discharge of oxidants to the marine environment and to determine their potential impact on the environment. It was also important to confirm that the most sensitive life stages had been examined and that lower trophic level impacts didn't exist. The study allowed for the quantification of the non-conservative nature of chlorine.

Accordingly, the studies consisted of conducting chronic toxicity bioassays on sensitive life stages of three indigenous species (fish, invertebrate, and plant). Tests were conducted to capture seasonal variability and test species were dosed in the lab to the maximum modified effluent level. EPA also requested studies to determine whether chlorine by-products were formed and at what level in order to determine whether they were persistent and, if so, whether they could impact the environment. EPA also required a field study to quantify the chlorine level detected with distance from the point of discharge.

The study demonstrated that the modified effluent limit would meet the State WQO for TRC and would adequately protect beneficial uses. The field studies found that chlorine by-products within the mixing zone would not pose an unacceptable risk to the environment and that the by-products were not detected outside the mixing zone. The field studies also found that chlorine was not detected in the receiving water further away than 75 feet from the discharge bubble and at 75 feet, the TRC concentration was 0.02mg/l.

The Regional Board, during the 1985 permitting process had conditionally approved the modified effluent limits. The 301(g) variance for HnGS sites that, "At a hearing on June 24, 1985, the Los Angeles RWQCB adopted Order No. 85-35 which amended the discharge limitation for total residual chlorine and directed this Order to be forwarded to the SWRCB for its concurrence. The RWQCB based its determination of bioassay results; receiving water data; ..and a chlorine dissipation study..." (HnGS 301(g) variance, page 11) The State Board provided concurrence in Resolution No. 88-80 which found that the modified effluent limit of 0.413 for HnGS and 0.377 for HGS would be adequate to protect beneficial uses, have a minimal impact of the receiving water, and meet the State WQO for chlorine which is intended to protect against acute and chronic toxicity.

EPA, in the 301(g) variance, sited all of these findings and documented that the modified effluent limit complied with all of the federal criteria for issuance of a variance for the requirement to meet the BAT under the Steam Electric Guidelines for the discharge of TRC.

Irrespective of the decision on whether the discharges from the HnGS and AGS are in fact ocean discharges, LADWP believes that the efforts undertaken to substantiate the 301(g) variance will be upheld and the modified effluent limitation for TRC will stand.

Potential Scope of Work

LADWP intends to vigorously challenge the reclassification of HnGS and HGS; however, in the event this challenge is unsuccessful, and to comply with the request stated in the January 15, 2003, LADWP provides the following outline for the efforts that it would pursue.

LADWP would pursue a thermal variance for the HnGS discharge in accordance with the General Water Quality Provision 4 of the Thermal Plan. LADWP believes that the information from the Thermal Effects Study, along with the information that has been gathered in all the receiving water monitoring studies since the Thermal Effects Study to the present will justify that the thermal discharge does not impair water quality and does not impact beneficial uses. The Regional Board, the State Board, and EPA have repeatedly confirmed this finding in all the NPDES permits that have been issued.

Should the current, or any, mixing zone and corresponding dilution factor be disallowed, LADWP would request the application of intake credits to the discharge. LADWP is currently planning to embark upon a sampling program as recently required by the Regional Board under a Water Code Section 13267 request. The sampling program, in addition to sampling the effluent and receiving water, would identify and quantify the contaminants present in the intake water. With the pollutants of concern being heavy metals, most notably copper, LADWP will be replacing the current copper/nickel alloy condenser tubes of Units 3 and 4 with titanium condenser tubes for the new steam turbine via the repowering efforts. LADWP may consider future efforts at HnGS that would replace the remaining copper/nickel condensers with titanium condensers. Lastly, LADWP may consider whether it wishes to embark upon developing site-specific water quality objectives by conducting a Water Effects Ratio and/or translator study or any other applicable and appropriate study. Should LADWP pursue any or all of these options, it would seek interim limits and a compliance schedule.

LADWP believes it has completed an extensive and rigorous TRC monitoring program that demonstrated that the current modified effluent limit is protective of the environment, protective of beneficial uses, and protective of sensitive aquatic organisms. Chronic toxicity studies conducted since completion of this monitoring program have consistently demonstrated no toxic effect. Having received Regional Board and State Board concurrence for the modified effluent limit and recognition that it was protective of water quality and beneficial uses (as noted in the 301(g) variance), and knowing that the study conducted was equivalent to the derivation of a site-specific Water Quality-Based Effluent Limit, LADWP would approach EPA for confirmation that the variance remains in effect despite the reclassification.

REFERENCES

1. The Thermal Plan provides, in its entirety: "Waters at the mouths of streams which serve as mixing zones for fresh and ocean water. Mouths of streams which are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters will generally be considered to extend from a bay or open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and saltwater occurs in the open coastal waters. The waters described by this definition include but are not limited to the Sacramento-San Joaquin Delta as defined by Section 12220 of the California Water Code, Suisan Bay, Carquinez Strait downstream to Carquinez Brdge and appropriate areas of Smith River, Klamath River Mad River, Eel River, Noyo River, and Russian River." [The Ocean Plan definition is essentially identical.]
2. The Enclosed Bays and Estuary Policy defines an estuary as follows: "Estuaries, including coastal lagoons, are waters at the mouths of streams which serve as mixing zones for fresh and ocean water during a major portion of the year. Mouths of streams which are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters will generally be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters shall be considered to extend seaward if significant mixing of fresh and saltwater occurs in the open coastal waters. Estuarine waters include, but are not limited to, the Sacramento-San Joaquin Delta as defined by Section 12220 of the California Water Code, Suisan Bay, Carquinez Strait downstream to Carquinez Brdge and appropriate areas of Smith River, Klamath River Mad River, Eel River, Noyo River, and Russian River."
3. "This Plan is not applicable to discharges to enclosed bays and estuaries or inland waters nor is it applicable to vessel wastes, or the control of dredging spoil." (Ocean Plan – Introduction)(1972, 1978, 1983, 1990, 1997, 2001)
4. "Whereas, this Board has caused the following investigation to be made with respect to the proposed waste discharge:
   2.) In accordance with administrative procedures established by this Board copies of the Report of Proposed Waste Discharge were submitted to interested government agencies for comments, suggestions, or recommendations, and the following replies have been received:
      b) A letter from the Los Angeles County Flood Control District, dated July 10, 1959, which states is part 'The proposed point of discharge for the wastes into the San Gabriel River is within the tidal prism. It is suggested, therefore, that the discharge limitations be in accordance with water quality objectives established by your Board and Regional Water Pollution Control Board No. 8 for waters of the tidal prism of the San Gabriel River.'"
      d) A communication from the Department of Water Resources, State of California, dated July 22, 1959, which states in part, 'We believe that discharge requirements should be in conformance with your Resolution

No. 53-1, which adopted water quality objectives for the tidal prism of the San Gabriel River.'" (HnGS Order 59-56, 1959)

5. Finding 15 states: "City of Los Angeles, Department of Water and Power, conducted a thermal effects study in conformance with Implementation Provisions 3 of the Thermal Plan, and in accordance with specifications prepared by this Regional Board, to determine compliance with the Thermal Plan. Based on a review of that Thermal Effects Study, it is determined that the discharges from this facility are in compliance with this Plan in that the study demonstrated that the beneficial uses of the receiving waters and areas of special biological significance are being protected." (Thermal Plan Provision 3 is for existing and new coastal discharges.) (1977 Permit, Order 77-70)(Also found in 1984/85, 1990, 1995, and 2000 permit findings)
6. Finding 6 states: "An Interim Water Quality Control Plan for the Santa Clara and Los Angeles River Basins was adopted by the Board on June 10, 1971, and updated on December 13, 1972. The Interim Basin Plan contains water quality objectives for the San Gabriel River." (1974 Permit, Order 74-550)
7. Finding 7 states: "The State Water Resources Control Board adopted the Water Quality Control Plan for Control of Temperatures in the Coastal and Intrastate Waters and Enclosed Bays and Estuaries of California. This plan contains objectives for the San Gabriel River Tidal Prism." (1974 Permit, Order 74-550)
8. Finding 10 states: "For the purpose of compliance with ocean discharge standards, the discharges from Haynes Steam Plant have been classified as ocean discharges prior to 1970." (1977 Permit, Order 77-70)
9. Finding 20 states: "Review of existing receiving water monitoring data and the Thermal Effects Study indicates that the beneficial uses of the receiving water are being protected. ..... The discharge is in conformance with the Water Quality Control Plan for the Los Angeles River and with the Ocean Plan." (1977 Permit, Order 77-70)
10. EPA Region 9 letter from R. L. O'Connell, Director of the Enforcement Division to Raymond Hertel, Los Angeles Regional Board Executive Officer dated September 15, 1976 states, in part: "This office has completed its review of the revised tentative permits..., we have the following comments: ....The discharge monitoring and reporting requirements for certain Ocean Plan limited constituents state that ...." (See Attachment 1 to this Fact Sheet)
11. LADWP letter dated July 28, 1978, see Attachment 2 to this Fact Sheet.
12. Regional Board letter dated August 10, 1978, see Attachment 3 to this Fact Sheet.
13. State Board March 13, 1980 memo, see Attachment 4 to this Fact Sheet.
14. Regional Board March 23, 1982 memo, see Attachment 5 to this Fact Sheet.
15. Finding 19 states: "On September 5, 1984, LADWP submitted a request for exception from the effluent limitations contained in the Ocean Plan in accordance with Chapter VI, Provision F, of the Ocean Plan. The Regional Board, at a hearing held on June 24, 1985, adopted Order No. 85-35 which amended the discharge limitation for total chlorine residual and directed this order be forwarded to the State Board for its concurrence in the Ocean Plan exception.

On May 22, 1986, the State board adopted Resolution No. 86-42, granting a temporary exception from the Ocean Plan for total chloring residual limitations. In compliance with requirements in Resolution No. 86-42, LADWP conducted a biological screening program to assess toxicity of chlorine discharges from its power plants. The study included screening of test organisms, bioassay protocols, and chronic toxicity of the power plant effluents." (1990 Permit, Order 90-027)

16. Finding 20 states: " On July 21, 1988, the State Board adopted Resolution No. 88-80 which granted an exception to the California Ocean Plan for total residual chlorine limitations. On August 8, 1988, the State Board requested EPA to review and concur with the Resolution.", (1990 Permit, Order 90-027)
17. NOP distribution list, see Attachment 6 to this Fact Sheet.
18. List of NOP respondents, see Attachment 7 to this Fact Sheet.
19. List of draft EIR recipients, see Attachment 8 to this Fact Sheet.
20. List of draft EIR respondents, see Attachment 9 to this Fact Sheet.
21. Regional Board letter dated January 15, 2003, see Attachment 10 to this Fact Sheet.
22. HnGS Thermal Study Specification and Addendum, see Attachment 11 to this Fact Sheet.
23. MBC Applied Environmental Sciences. 2003. Lower San Gabriel River Environmental Assessment. 22p. See Attachment 12 to this Fact Sheet.
24. EPA letter from Judith Ayres dated August 4,1986, see Attachment 13 to this Fact Sheet.
25. State Board Memorandum dated September 13,1984, see Attachment 14 to this Fact Sheet.
26. State Board Fact sheet to Resolution 86-42 dated June 3,1986, see Attachment 15 to this Fact Sheet.
27. Fact sheet to Regional Board Letter dated May 3, 1977 to Douglas Costle, EPA Administrator, see Attachment 16 to the Fact Sheet.

Attachment 1 for the April 17, 2003 letter enclosure.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

In Reply: E-4-2
Refer to: 863.4C

SEP 15 1976

Mr. Raymond Hertel
Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
107 South Broadway, Room 9026
Los Angeles, CA 90012

Reference: Proposed NPDES Permits for Southern California Edison Facilities, Mandalay Generating Station #CA0001180; Redondo Generating Station #CA0001201; El Segundo Generating Station #CA0001147; Alamitos Generating Station #CA0001139; Long Beach Generating Station #CA0001171; and Long Beach Generating Station Incorporating Cooling Towers #CA0057380; also Proposed NPDES Permits for City of Los Angeles Department of Water and Power Facilities, Harbor Steam Plant #CA0000361, Haynes Steam Plant #CA0000353, and Scattergood Steam Plant #CA0000370.

Dear Mr. Hertel:

This office has completed its review of the revised tentative permits for the facilities referenced above, prepared by your office. In accordance with Section III.5.(b) of the Memorandum of Understanding, we have the following comments relevant to all of the referenced permits:

1. The monitoring and reporting requirements specify that discharge temperatures are to be monitored hourly. The flow rates and nature of these discharges dictate that in order to adequately determine compliance with effluent limitations contained in the permits, continuous temperature monitoring is essential.

2. The discharge monitoring and reporting requirements for certain Ocean Plan limited constituents state that: "A certification that this constituent has not been added to Discharge Serial No. . . . may be submitted in lieu of an analysis." In order to safeguard against the unknown presence in the discharge of any of the subject constituents in concentrations exceeding those specified by the Ocean Plan, monitoring at a frequency of at least once annually should be required.

Hg/20

If you have any questions concerning these comments, please refer your staff to Mr. Thomas Kremer of the Permits Branch at (415)556-3454.

Sincerely,

for William H. Crews

R. L. O'Connell
Director, Enforcement Division

cc: Mr. Bill Dendy, CA State WRCB, Sacramento

(12-5)

Attachment 2 for the April 17, 2003 letter enclosure.

July 28, 1978

Mr. Raymond M. Hertel
Executive Officer
California Regional Water Quality
Control Board
Los Angeles Region
107 South Broadway, Suite 4027
Los Angeles, California 90012

Dear Mr. Hertel:

Effluent Limitations Variance Request (Revised)
National Pollutant Discharge Elimination
System Permits CA0000353 and CA0000370
Haynes and Scattergood Generating Stations

By letter dated January 24, 1977, we requested a variance on the federal effluent limitations for Harbor, Haynes and Scattergood Generating Stations, and enclosed a copy of our variance request report. Subsequently, we became aware of the interpretations for metal cleaning wastewater as set forth in the Intra-Regional memorandum of June 17, 1975, written by Mr. J. William Jordan of the Environmental Protection Agency, Region III. By letter dated March 24, 1977, we requested a clarification of this matter. Your letter of April 14, 1977, informed us of your concurrence with Mr. Jordan's interpretation of metal cleaning wastewater classifications. This affected much of the contents of that variance report. In addition, Harbor Generating Station is no longer relevant in the report as its small quantity of wastewater is now being discharged into the sanitary sewer system.

We are enclosing a revised variance request report that basically reflects these aforementioned changed conditions. This revised report still supports our request for alternative effluent limitations. In essence, we are requesting that the governing regulations for the wastewater discharges from our Haynes and Scattergood Generating Stations be those of

the California Water Resources Control Board's Water Quality Control Plan for Ocean Waters of California, as revised January 1978. It is our contention that this would result in greater cost effectiveness, while at the same time, the beneficial uses of the receiving waters would be protected.

There is no fundamental change from the original submittal. If there is any additional information or clarification needed during your review, please contact Mr. Shigeo Yuge on 481-8650.

Sincerely,

ORIGINAL SIGNED 7-31-78
JAMES L. MULLOY

JAMES L. MULLOY
Chief Electrical Engineer
and Assistant Manager

SY:as

Enclosure

cc: 1 attached

Mr. S. Yuge

bcc w/attachment:
E. A. Schlotman
James L. Mulloy (2)
M. Frankel
John A. Novobilski
H. L. Holland
Robert C. Burt
R. E. Bradley
Patrick P. Wong
H. J. McWhirter
J. P. Schneider
E. G. Gladbach

Attachment 3 for the April 17, 2003 letter enclosure.

(12.5)

STATE OF CALIFORNIA—RESOURCES AGENCY
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
107 S. BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012
(213) 620-4460

H.E.H.

AUG 10 1978

AUG 18 1978 E.G.G. E.G.G.

AUG 16 1978 PPW

P. P. W.

AUG 16 1978

City of Los Angeles
Department of Water and Power
Box 111
Los Angeles, California 90051

ATTENTION: Mr. James L. Mulloy
Chief Electrical Engineer and Assistant Manager

RE: Effluent Limitations Variance Request (Revised)

Gentlemen:

Your letter of July 28, 1978, transmitted copies of a revised report on an effluent limitations variance request for the NPDES permits for the Haynes and Scattergood Generating Stations, and requested that the governing regulations for the wastewater discharges from these stations be those of the California Ocean Plan, as revised January 1978.

We will review your request and, as appropriate, will prepare a tentative revised Order for consideration by the Board at a future Board hearing. You will receive a copy of the tentative Order and Agenda notice prior to the hearing.

Very truly yours,

RAYMOND M. HERTEL
Executive Officer
By

Dennis Dasker

DENNIS DASKER
Senior Water Resource
Control Engineer

cc: Environmental Protection Agency, Region IX
State Water Resources Control Board, Legal Division
ATTN: Mr. Harry M. Schueller

8/16/78
c: H. L. Holland
o: Gen. Files via JLM, CAE
lv

J. L. M.

AUG 15 1978

AUG 18 1978 E.G.G.

AUG 18 1978 R. G. E.

INTERNAL MEMO

Attachment 4 for the April 17, 2003 letter enclosure.

TO: Regional Board Executive Officers, Regions 4, 8 and 9

FROM: Harry M. Schueller, Chief Legal Division

DATE: MAR 13 1980

SIGNATURE:

SUBJECT: INITIAL DILUTION - POWER PLANT DISCHARGES

We have reviewed the estimated initial dilutions submitted by Southern California Edison for their power plants. In addition, we have prepared an estimate for Southern California Edison's Mandalay plant and the Scattergood plant of the City of Los Angeles, DWP.

The plume model is not applicable to such discharges. To find a suitable method for predicting the initial dilution for these shallow, single large ports with vertical discharge to the surface, we must first look at the definition in the Ocean Plan.

> "For shallow water submerged discharges, . . . , characteristic of cooling water wastes . . . , turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of the discharge ceases to produce significant mixing of the wastes, or the diluting plume reaches a fixed distance from the discharge to be specified by the Regional Board, whichever results in the lower estimate for initial dilution."

With this definition, it is recognized that this type of discharge cannot be treated the same as the normal deep municipal outfall with a diffuser. We have reviewed various studies and presently feel that surface temperature measurements probably represent as good a method as any for determining when "significant mixing" ceases. When the rate of change of the temperature difference between the discharge and receiving water is no longer significant then we are assuming that significant mixing has also decreased.

Based on our review we expect the dilution ratios for most of these shallow water submerged discharges to be in the range of 5-11 depending on the Froude number. The estimated initial dilutions submitted by Southern California Edison were within this general range and can be used in issuing their permits. Specifically the estimates are:

SWRCB 326(3-75)

Surname | 3/10/80 | 3/10/80

Plant	Estimated Initial Dilution
El Segundo Units 1-2	10
El Segundo Units 3-4	7.5
Ormand Beach	7.5
Huntington Beach	7.5
San Onofre Unit 1	10
Redondo Beach Units 1-6	12.5
Redondo Beach Units 7-8	8
City of Los Angeles, DW&P Scattergood	7.5
Southern California Edison Mandalay	3

The estimate for Mandalay which is a surface discharge near the ocean's shoreline is based on the procedure provided in the State Board's Table B Guidelines-Ocean Waters of California.

We will continue our review of literature to determine more precise means of estimating initial dilutions for submerged shallow water discharges and are certainly open to any methods dischargers may develop for these type of discharges.

Attachment

cc: ✓Southern California Edison
P. O. Box 800
Rosemead, CA 91770

Los Angeles Department of
Water and Power
P. O. Box 111
Los Angeles, CA 90051

Environmental Protection Agency
Region IX
215 Fremont Street
San Francisco, CA 94105

State of California

Memorandum

California Regional Water Quality Control Board
Los Angeles Region

Attachment 5 for the April 17, 2003 letter enclosure.

To : State Water Resources Control Board,
Division of Technical Services
Attn: Mr. Walter Pettit

Date: March 23, 1982

File :

From : Los Angeles Region

Subject: Minumum Initial Dilution Factors for Alamitos, Long Beach, and Mandalay Southern California Edison Generating Stations

We have reviewed the subject document which describes a procedure for estimating minimal initial dilution (D_m) factors and proposes initial dilution factors for four Southern California Edison Generating Plants. We have omitted San Onofre from our consideration since it is not located in Region 4.

The Ocean Plan Table B Guidelines anticipated the need for alternative approaches for determining minimum initial dilution factors, particulary with respect to surface discharges. The Dm factors and method of determination are being submitted by Edison for approval in accordance with Ocean Plan Guidelines.

Southern California Edison has previously obtained approval for using the flux-weighted-average dilution approach for those of its discharges with shallow offshore submerged discharges. This approach is being modified to be applicable to the specific conditions of Alamitos, Long Beach, and Mandalay Generating Plants.

Each of these plants has unique discharge conditions. Long Beach has a near-surface channel discharge, Alamitos has a large surface channel discharge and Mandalay has an across-the-beach channel discharge.

The rationale for using the flux-weighted-average method appears appropriate. We have checked the calculations, as far as possible, using the data provided in the submittal. Our calculations confirm the values proposed for Long Beach (5.9), Alamitos (7.8), and Mandalay (5.2). However, we note that it is necessary to use the third decimal place of the averaged flux-weighted concentration to arrive at their figures for the Estimated Initial Dilution. Using the values reported as Estimated Flux-Weighted Concentration (Tables 1 & 2) to determine Estimated Initial Dilution will result in slightly different D_m values.

We have no objection to the approach described in the subject document and recommend approval of the following D_m values:

Alamitos	7.8
Long Beach	5.9
Mandalay	5.2

If you have any questions, please contact Dr. Lewis Schinazi or Dr. David Carlson of my staff.

Raymond M. Hertel

RAYMOND M. HERTEL, Executive Officer

cc: Southern California Edison, Attn: Dr. Michael M. Hertel

Attachment 6 for the April 17, 2003 letter enclosure.

NOP Distribution List

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County of Los Angeles
Regional Planning Dept.
Kerwin Chih
320 West Temple St.
Room 1348
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California Coastal Commission
Energy and Ocean Resources Unit
Ms. Alison J. Dehmer, Manager
45 Fremont Street
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2300 Beverly Manor Road
Seal Beach, CA 90740
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Attachment 7 for the April 17, 2003 letter enclosure.

Notice of Preparation Respondents

1. California Department of Transportation, Stephen J. Buswell, Branch Chief, Transportation Planning Office, dated 12/26/01.

2. California Department of Fish and Game, Donald R. Chadwick, Habitat Conservation Supervisor, dated 1/4/02.

3. California Coastal Commission, Steve Smith, PhD., Program Supervisor, CEQA Section, dated 12/21/01.

4. City of Seal Beach, Joseph E. Porter, III, Chairman, Environmental Quality Control Board, dated 12/19/01.

Attachment 8 for the April 17, 2003 letter enclosure.

HAYNES DRAFT EIR MAILING LIST

California State Clearinghouse
Office of Planning and Research
CEQA Documents
1400 Tenth Street
Sacramento, CA 95814
(916) 322-2318
15 copies
15 NOA's
via FedEx

Mr. Brad Henderson
California Department of Fish and Game
Post Office Box 1879
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Los Angeles, CA 90013
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via FedEx

Mr. Stephen J. Buswell
Department of Transportation
District 7, Regional Planning
IGR/CEQA Branch
120 South Spring Street
Los Angeles, CA 90012
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via FedEx

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Energy and Ocean Resources Unit
California Coastal Commission
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Chairman, Environmental Quality Control Board
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City of Long Beach
Planning and Building Development Services
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Long Beach, CA 90802
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*Mr. Kelvin Lew provided one (1) copy of the Draft EIR each to the City of Los Angeles Clerk and to the County of Los Angeles Clerk.
**Please note that NOA was included in each EIR that was sent out.

HAYNES DRAFT EIR MAILING LIST

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Mr. William Keese
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512
1 copy
1 NOA
via FedEx

*Mr. Kelvin Lew provided one (1) copy of the Draft EIR each to the City of Los Angeles Clerk and to the County of Los Angeles Clerk.
**Please note that NOA was included in each EIR that was sent out.

Attachment 9 for the April 17, 2003 letter enclosure.

Haynes Generating Station Repowering Project

Final Environmental Impact Report Response to Comments

(SCH #2001121013)

Los Angeles Department of Water and Power
Corporate Environmental Services

July 2002

The public review period for the HnGS Repowering Project began on March 19, 2002, and ended on April 19, 2002, lasting approximately 30 days. A Notice of Completion was filed with the State Clearinghouse along with 15 copies of the Draft EIR for state agency review on March 18, 2002. In addition, copies of the Draft EIR were mailed and/or distributed directly to agencies, County and City of Los Angeles Clerk's offices, groups, and two local libraries for review. Notices of Availability of the Draft EIR were also sent to agencies. The Notice of Availability was published in the Los Angeles Times newspaper and on the LADWP website. The entire Draft EIR was also posted on the LADWP's website. Additionally, copies of the Draft EIR and other report reference materials were maintained at LADWP offices at 111 North Hope Street, Room 1044, Los Angeles, California, 90012-2694.

The persons and/or agencies that submitted written comments on the Draft EIR are listed below. The letters are numbered to allow for easy reference and location.

1. City of Seal Beach, William J. Doane, Mayor, and James E. Porter III, Chairman, Environmental Quality Control Board, dated April 8, 2002.
2. California Department of Toxic Substances Control, Harlan R. Jeche, Unit Chief, Southern California Cleanup Operations – Glendale Office, dated April 11, 2002.
3. California Coastal Commission, Tom Luster, Energy and Ocean Resources Unit, dated April 15, 2002.
4. William G. Hurley, Seal Beach resident, dated April 16, 2002.
5. Mr. and Mrs. Norman C. Brady, Jr., Seal Beach residents, dated April 18, 2002.
6. City of Long Beach, Gerhardt (Gerry) H. Felgemaker, Environmental Officer, dated April 18, 2002.
7. California Energy Commission, William J. Keese, Chairman, dated April 19, 2002.

Attachment 10 for the April 17, 2003 letter enclosure.

Winston H. Hickox
Secretary for Environmental Protection

California Regional Water Quality Cont

Los Angeles Region

(50 Years Serving Coastal Los Angeles and Ventura Counties)

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Internet Address: http://www.swrcb.ca.gov/rwqcb4

Gray Davis
Governor

January 15, 2003

Susan Damron, Wastewater Manager
Department of Water and Power
City of Los Angeles
111 North Hope Street
Los Angeles, CA 90051

Via Certified Mail
Returned Receipt Requested
No. 7000 0520 0024 7127 8726

Dear Ms. Damron:

HAYNES GENERATING STATION UNITS 3 AND 4 COMBINED CYCLE REPOWERING PROJECT (NPDES No. CA0000353) – ADDITIONAL DATA NEEDS

This letter is a follow-up to our meeting on January 7, 2003 at the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) office. At that meeting we reiterated our request for information needed to assess the water quality impacts of Haynes Generating Station (HnGS), owned and operated by the Los Angeles Department of Water and Power (DWP). The Regional Board staff requested that DWP addresses the following issues:

1. **Cooling Water Intake Structure.** DWP must demonstrate that the proposed relocation and other modifications to the cooling water intake pumps will not adversely impact the aquatic environment in the intake channel. In particular, DWP must demonstrate that, with the proposed pumping configuration:

   A. Total intake water volume will not exceed the baseline water volume; and

   B. New intake water velocity profile in the channel (new condition) will not exceed the existing intake water velocity profile of 0.5 ft/sec (baseline condition). In the event that the new condition will exceed the baseline condition, DWP must demonstrate that it will continue to comply with the existing 316(b) guidelines for cooling water intake structures.

2. **Cooling Water Discharges.** On December 11, 2002 (attachment), the State Water Resources Control Board (State Board) determined that HnGS and the nearby AES Alamitos Generating Station (Alamitos) are not eligible for a mixing zone dilution credit, except for intake water credit. This determination may significantly alter the allowable pollutants discharge at HnGS.

   A. The cooling water discharges must comply with the Water Quality Control Plan for Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan). In particular, the discharge water temperature rise cannot exceed 20 °F, with a maximum discharge temperature of no greater than 86 °F. The DWP must demonstrate compliance of the existing

units and the proposed new units either through operational modifications or the implementation of alternative technologies.

B. The United States Environmental Protection Agency (EPA) has granted HnGS a 301(g) variance for allowable chlorine concentration discharge. DWP must seek and secure a determination by the EPA as to the continued applicability of the 301(g) variance in light of the above referenced State Board determination. In the event that EPA invalidates the 301(g) variance, the DWP must demonstrate compliance with the Regional Board Basin Plan provision for residual chlorine concentration not to exceed 0.1 mg/L. The DWP must demonstrate compliance of the existing units and the proposed new units with either operational modifications or implementation of alternative bio-control technologies.

C. The DWP must demonstrate that, in the absence of dilution credit, except for intake water credit, the discharge water priority pollutants comply with the California Toxics Rule (CTR) and the Policy for Implementation of the California Toxics Rule for Inland Surface Waters, Enclosed Bays and Estuaries (SIP). The DWP must demonstrate compliance of the existing units and the proposed new units with either operational modifications, or removal of process waste streams from the cooling effluent, or the implementation of alternative wastewater treatment technologies.

The Regional Board staff recommend that a scope of work be submitted by DWP for all proposed monitoring, engineering studies, and requests to the EPA and other state and federal agencies needed to comply with the above requirements. This information must be submitted to the Regional Board no later than February 14, 2003.

Should you have any questions, please contact Dr. Tony Rizk at (213) 576-6756.

Sincerely,

Dennis A. Dickerson
Executive Officer

Attachment: State Water Resources Control Board Memorandum from Stan Martinson, Chief Division of Water Quality, to California Regional Water Quality Control Board, Los Angeles Region, Dennis Dickerson, Executive Officer, dated December 11, 2002 – Alamitos Generating Station, AES Corporation (NPDES No. CA00001139) and Haynes Generating Station, Los Angeles Department of Water and Power (NPDES No. CA0000353)

cc: See attached mailing list

MAILING LIST

Environmental Protection Agency, Region 9, Permit Section (WTR-5)
Ms. Robin Stuber, USEPA, Region 9
Mr. Tom Huetteman, Clean Water Act Compliance, EPA, Region IX
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Services, Division of Ecological Services
NOAA, National Marine Fisheries Service
Mr. Michael Lauffer, Office of Chief Counsel, State Water Resources Control Board
Mr. Robert Sams, Office of Chief Counsel, State Water Resources Control Board
Mr. James Maughan, Division of Water Quality, State Water Resources Control Board
California Department of Fish and Game, Marine Resources, Region 5
Mr. Tom Luster, California Coastal Commission
Mr. Bill Tippets, Department of Fish and Game
California Department of Health Services, Environmental Branch
Ms. Vera Melnyk Vecchio, Drinking Water Field Operations Branch, State Department of Health Services
Ms. Marianne Yamaguchi, Santa Monica Bay Restoration Project
Mr. Roger Johnson, California Energy Commission
Mr. Paul Richins, California Energy Commission
Mr. Dave Abelson, California Energy Commission
Mr. James Reede, California Energy Commission
Dr. Mark Gold, Heal the Bay
Mr. David Beckman, Natural Resources Defense Council
Mr. Steve Fleischli, Santa Monica BayKeeper
Mr. Terry Tamminen, Environment Now
Los Angeles County, Department of Public Works, Environmental Programs Division
Los Angeles County, Department of Health Services
City of Long Beach, Department of Public Works
City of Los Angeles, Stormwater Management Division
City of Los Angeles, Bureau of Sanitation, Industrial Waste Management
Mr. Steve Maghy, Environmental Affairs, AES Alamitos Generating Station

State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5463 • Internet Address: http://www.swrcb.ca.gov

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

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TO: Dennis Dickerson, Executive Officer
Los Angeles Regional Water Quality Control

FROM: Stan Martinson, Chief
DIVISION OF WATER QUALITY

DATE: DEC 11 2002

SUBJECT: ALAMITOS GENERATING STATION, AES CORPORATION (NPDES NO. CA00001139) AND HAYNES GENERATING STATION, LOS ANGLES DEPARTMENT OF WATER AND POWER (NPDES NO. CA0000353)

Below is our response to three questions you asked in your memorandum dated October 25, 2002 to Celeste Cantú.

1. Should Alamitos and Haynes Power Plants be allowed a cooling water ratio except for intake water credits as provided by the " Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (SIP)?

   No, since SIP does not address cooling water relative to thermal impacts and the Thermal Plan does not describe cooling water ratios. However, if you are referring to dilution credits for priority pollutants, you are correct. According to your October 25, 2002 memorandum, the volume or flow rate of the river is the limiting factor. The upstream dry weather flows are relatively minor (30 MGD) compared to the discharges (2,200 MGD combined). The capacity of the estuary below the outfall based upon the dimensions provided in your memorandum is only 300,000,000 gallons, which suggests that even with tidal flushing, the effluent would dominate the water body and severely limit any dilution available from marine inputs. There are no general mixing zone provisions in SIP that would necessarily prevent the designation of a mixing zone based upon the information provided with one exception– that mixing zones cannot overlap. The solution may be to designate a mixing zone for just one or two of the most critical discharge points as we believe your memorandum indicated that there are nine outfalls associated with the two plants. If you are asking about thermal impact zones, which are allowed under the Thermal Plan, it depends upon the type of discharge. The estuarine criteria in the Thermal Plan differ based upon whether the discharges are defined as either new or existing. Existing discharges must not (1) exceed the receiving water temperature by more then 20° F, (2) raise water temperature in more than 25 percent of the

cross-sectional area by more then 1° F above the natural receiving water temperature, or (3) raise surface water temperatures by more then 4° F at anytime or anyplace. The criteria for new discharges are more stringent. Within estuaries, thermal waste from new discharges must not exceed the receiving water temperature by more then 4° F and must meet the all the criteria described above for existing discharges. Given that the effluent temperature reaches 100° F it is unlikely that they could meet the Thermal Plan objectives for either type of discharge.

2. Should Alamitos and Haynes Power Plants be required to meet the limits in the Basin Plan, Thermal Plan, and SIP at the cooling water discharge point?

   This is correct. With no available dilution, Basin Plan and SIP objectives must be met at end of pipe. If the discharger can identify one or two critical outfalls that discharge relatively low flows so that some dilution from upstream receiving water flow is available, then you may be able to justify a mixing zone for those one or two outfalls. The Thermal Plan has both end of pipe and receiving water objectives that must be met regardless of whether a mixing zone has been designated for priority pollutants. In addition, the Thermal Plan allows for limited thermal impact zones as described previously. It should be noted that both the Thermal Plan and SIP allow for case by case exceptions; therefore, if the discharger provided the appropriate justification, exceptions could allow the discharge to continue in compliance with the State Water Code and Federal Clean Water Act. There is typically no such exception language in the Basin Plans; therefore, the discharger would have to evaluate the feasibility of developing site specific objectives for basin plan objectives or evaluate the beneficial uses and possibly conduct a use attainability analysis.

3. Are Alamitos and Haynes Power Plants eligible for interim limits along with a compliance schedule to enable these plants to come into compliance while continuing to provide reliable electrical energy to the State?

   Yes, this is correct for California Toxic Rule (CTR) criteria. We refer you to your Basin Plan for non-CTR criteria concerning whether a compliance schedule is an available regulatory tool.

If I can be of any further assistance, please contact me at (916) 341-5458. You may also contact Jim Maughan, Chief of the Regulatory Section, at (916) 341-5522.

Winston H. Hickox
Secretary for Environmental Protection

California Regional Water Quality Control Board

Los Angeles Region

(50 Years Serving Coastal Los Angeles and Ventura Counties)

320 W. 4th Street, Suite 200, Los Angeles, California 90013
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Gray Davis
Governor

To: Celeste Cantú, Executive Director
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812

From: Dennis Dickerson, Executive Officer
California Regional Water Quality Control Board, Los Angeles Region
320 West 4th street, Suite 200
Los Angeles, CA 90013

Date: October 25, 2002

Subject: **ALAMITOS GENERATING STATION, AES CORPORATION (NPDES No. CA00001139) AND HAYNES GENERATING STATION, LOS ANGELES DEPARTMENT OF WATER AND POWER (NPDES No. CA0000353)**

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) staff are reviewing the above permits in the context of direction provided in the State Water Resources Control Board (State Board) memorandum dated July 18, 2001 (attachment 1). The applicability of the dilution ratio is a key issue for Regional Board consideration in the development of NPDES permits for the Los Angeles region coastal power plants.

Regional Board staff understand that:

1. The following generating stations fall under the jurisdiction of the California Toxics Rule (CTR), 40 CFR, Appendix A, part 423, and the Policy for Implementation of the Toxics Standard for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP):
   - Alamitos generating station (Alamitos),
   - Haynes generating station (Haynes),
   - Long Beach generating station (Long Beach),
   - Harbor generating station (Harbor), and
   - Redondo generating stations units 7 & 8 (Redondo).

2. Some provisions in the SIP may provide flexibility for these facilities. Such provisions may include compliance schedules and intake water credits.

3. A determination must be made, on a case-by-case basis, as to the dilution ratio allowed for each of these facilities.

4. Other constituents, such as temperature and chlorine are regulated under the Basin Plan and applicable water quality standards and regulations, including variances issued by the USEPA.

Regional Board staff will soon be processing a permit for the Haynes and Alamitos power plants due to:

1. The Los Angeles Department of Water and Power (DWP) plan to modernize Haynes;

2. The physical proximity of Alamitos to Haynes; and

3. The need to revise permits to be in conformance with the new regulations.

Accordingly, we are requesting that the State Board review the discharge of both Alamitos and Haynes for the purpose of allowable dilution ratio.

The Regional Board finds that:

1. The State Board classified Alamitos and Haynes as ocean dischargers and authorized an initial dilution ratio of 4.5, dated May 4, 1984.

2. The U.S. EPA issued to Alamitos and Haynes a variance for chlorine based on the State Board classification as ocean discharge, and authorized discharge water chlorine concentration of up to 0.413 mg/L, dated May 13, 1998.

3. The Regional Board renewed the NPDES permits for these plants with effluent limits for temperature and other pollutants based on the dilution ratio of 4.5, dated June 29, 2000.

4. The San Gabriel River estuary is a soft bottom channel extending from the Pacific Ocean to the tidal prism. The channel is approximately 3.2 miles long, 250 feet wide and 15 feet deep.

5. Upstream dry weather flows (receiving water) to the estuary at the tidal prism is on the order of 30 million gallons per day (MGD). The dry weather flows are primarily drainage from Los Coyotes wastewater treatment plant and the Long Beach wastewater treatment plant, as per the NPDES permit maximum allowable discharge for these two wastewater treatment plants.

6. Alamitos and Haynes power plants are the only known industrial dischargers, with nine (9) outfall locations, in the estuary, approximately 2.0 miles upstream from the river mouth.

7. Haynes discharges approximately 1,000 MGD of cooling water and process wastewater. Alamitos discharges approximately 1,200 MGD of cooling water and process wastewater. The combined effluent from the two power plants is approximately 2,200 MGD of cooling water and process wastewater.

8. The river flow to the power plant effluent ratio is approximately 0.014, as calculated per findings 5 and 7 above.

9. Alamitos and Haynes pollutant loadings include toxics, temperature, and chlorine. The maximum effluent temperature is on the order of 100 degrees F. The chlorine concentration is on the order of 0.4 mg/L.

10. The Regional Board Basin Plan limits chlorine loading for estuarine dischargers to a maximum of 0.1 mg/L and requires that the residual chlorine shall not persist in the receiving waters at any concentration that causes impairment of beneficial uses.

11. The California Thermal Plan limits the power plant cooling water discharge to a net temperature increase from the intake temperature of less than 20 degrees F, with the discharge temperature upper limit of 86 degrees F.

Following direction provided in your July 18, 2001 letter, discussions with your staff, and review of all applicable laws, ordinances, regulations, standards, and directives, the Regional Board concludes that, to protect the aquatic environment in the San Gabriel River Estuary:

1. Alamitos and Haynes should not be allowed a cooling water dilution ratio, except for intake water credits as provided by the SIP;

2. Alamitos and Haynes should be required to meet the limits in the Basin Plan, the Thermal Plan, and the SIP at the cooling water discharge locations; and

3. Alamitos and Haynes are eligible for interim effluent limits along with a compliance schedule to enable these plants to come into compliance while continuing to provide reliable electrical energy source for the State of California.

The Regional Board staff request State Board staff to perform appropriate evaluations and provide a written response and concurrence regarding the dilution ratio for these power plants.

Given the importance of Haynes and Alamitos power plants to the generation needs in Los Angeles, and DWP Haynes modernization plans, we respectfully request that the State Board staff expedite the review and concurrence as soon as possible.

If I can be of any assistance, please contact me at (213) 576-6605. Alternatively, please feel free to contact Dr. Tony Rizk at (213) 576-6756.

Attachment:

1. State Water Resources Control Board Memorandum from Celeste Cantú, Executive Director to California Regional Water Quality Control Board, Los Angeles Region, date July 18, 2001 – Review of power plant discharges into enclosed bays and estuaries

Winston H. Hickox
Secretary for
Environmental
Protection

State Water Resources Control Board

Executive Office
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The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at http://www.swrcb.ca.gov.

TO: Dennis Dickerson
Executive Officer
Los Angeles Regional Water Quality
Control Board

ORIGINAL SIGNED BY

FROM: Celeste Cantú
Executive Director
EXECUTIVE OFFICE

DATE: JUL 18 2001

SUBJECT: APPLICABILITY OF THE POLICY FOR IMPLEMENTATION OF TOXICS STANDARDS FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA (SIP) TO DISCHARGERS FROM GENERATING STATIONS IN THE LOS ANGELES REGION

This is in response to your June 4, 2001 memorandum, which is seeking State Water Resources Control Board direction for possible applicability of the California Toxics Rule (CTR) and SIP for regulating discharges from nine specified generating stations located within the Los Angeles Region.

As you noted, in May 2000, the U. S. Environmental Protection Agency promulgated the CTR. The CTR established priority pollutant water quality criteria for "inland surface waters and enclosed bays and estuaries" (40 CFR Section 131.38).

The SIP implements the CTR, National Toxics Rule criteria, and applicable priority pollutant objectives in Regional Water Quality Control Board (RWQCB) Basin Plans. Together, these priority pollutant criteria, existing beneficial use designations, and the SIP comprise water quality standards and implementation procedures for priority toxic pollutants in inland surface waters, enclosed bays, and estuaries.

The SIP defines enclosed bays as:

> "Indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less

than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters." (SIP, 2000)

Based on the definitions found in the SIP, four of the nine generating stations identified in your memorandum would fall under CTR/SIP jurisdiction. The location of the wastewater discharge is the determining factor. These four are: (1) Alamitos/Haynes facility, which discharges into the San Gabriel River; (2) Long Beach facility, which discharges into the inner harbor; (3) Harbor facility, which discharges into the Cerritos Channel of the inner harbor; and (4) Redondo Beach units 7-8 (only).

If necessary, some provisions of the SIP may provide flexibility for these facilities. These provisions can be found in sections such as compliance schedules, intake water credits, and case-by-case exceptions.

The CTR and SIP only address priority toxic pollutants listed in 40 CFR, Appendix A to Part 423. Other constituents, such as chlorine, continue to be regulated according to your Basin Plan and other applicable water quality standards regulations.

The dilution ratios approved in the May 4, 1984 memorandum may still be appropriate for these generating stations. These dilution factors were based on studies completed in 1984.

If you have any questions, please feel free to contact Christine Bailey, Chief of the Freshwater Standards Unit, Division of Water Quality, at (916) 341-5571, or Gordon Innes, Senior Water Resources Control Engineer, Regulation Unit, Division of Water Quality, at (916) 341-5517.

cc: Sheila Vassey
Office of the Chief Counsel

D:MCCANN:jhisen/chi/jhisen
6/28/01; 6/29/01; 7/2/01; 7/10/01; 7/12/01
c:\hurst\data\division\ & c:\hisaj\Controls2001:T-255 – DEM Applicability of SIP.doc

Attachment 11 for the April 17, 2003 letter enclosure.

STATE OF CALIFORNIA—RESOURCES AGENCY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION

107 SOUTH BROADWAY, SUITE 9026
LOS ANGELES, CALIFORNIA 90012

RECEIVED

NOV 23 1971

CIVIL ENGRG. SECT.

November 22, 1971

City of Los Angeles
Department of Water and Power
P. O. Box 111
Los Angeles, California 90012

ATTENTION: Mr. H. J. McWhirter

SUBJECT: Revised Thermal Effect Study and Technical Report Specifications, Haynes Steam Plant (File No. 59-110)

Gentlemen:

Enclosed are revised specifications for a thermal effect study and technical report by your firm. These specifications supersede those sent to you in July 1971.

The revisions in this final set of specifications reflect changes made in the recently revised and adopted "Policy Regarding the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" and discussions held between Board staff members and representatives of your company.

It is understood that in some cases monitoring may have already begun prior to incorporation of the latest revisions. These data will be acceptable to the Board. However, all further monitoring shall be conducted according to the revised specifications. Revised monthly receiving water temperature monitoring shall begin in December 1971. If thermal effect studies have not been initiated by the time the revised specifications are received monitoring shall begin in November 1971, as specified.

As previously indicated, study specifications are intended to be flexible. Minor changes in station location and sampling technique and reporting may be necessary following Board analysis of the first progress report. You will be notified of any changes.

If you have any further questions please do not hesitate to contact us.

Very truly yours,

RAYMOND M. HERTEL
Executive Officer

Enclosure

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

Specifications for
Thermal Effect Study and Technical Report
for
Haynes Steam Plant
City of Los Angeles Department of Water and Power
(File No. 59-110)

GENERAL PROVISIONS

Unless otherwise noted, all sampling, sample preservation and analyses shall be conducted in accordance with the current edition of "Standard Methods for Examination of Water and Wastewater". For specific determinations other techniques may be used if approved in advance by the Executive Officer.

Organizations planning to conduct thermal effect studies and perform analyses also must be approved in advance by the Executive Officer.

FACILITY

I. A description of the discharge facility shall be provided including:

   A. Purpose and function of facility.

   B. Water source and use within facility.

   C. Location of facility in relation to receiving water.

   D. Discharge characteristics:

      1. Type (direct to receiving water, via storm drain or other means, use of retention basin).

      2. Number of discharge points

      3. Depth of terminus (i)

      4. Length of outfall (s)

      5. Diffuser system description.

WASTE EFFLUENT

Wastewater source and method of treatment shall be described:

   A. Describe each type of wastewater; list volume of each.

   B. Describe chemical and physical alteration of water.

   C. Indicate frequency and type of treatment.

MAINTENANCE OPERATIONS

I. Detailed information on plant operations for maintenance of the discharge works shall be reported to the Board. This information shall include but is not limited to:

A. Dates of maintenance operation

B. Duration of operation

C. Temperature of effluent (at least at hourly intervals during operation).

D. Periodic flushing of major equipment

E. Chemical treatment--constituents and volume of waste

F. Dredging of outfall areas

G. Cleaning of intake screens

H. Regular replacement of major components of treatment facility or outfall structures

I. Method of disposal of liquid and solid wastes resulting from maintenance activity

II. The discharger shall provide a review of available alternative methods for maintaining discharge facilities with a comparison of costs and effects on beneficial uses. Methods considered should particularly include use of heat or chemicals to control fouling organisms but may also include dredging of outfall channels or areas near the discharge, cleaning of intake screens and regular replacement of major components of the treatment works or outfall structures.

EFFLUENT MONITORING

I. Rate of Discharge

A. Maximum, minimum, average and total flow of elevated temperature wastes discharged at each discharge point shall be determined daily.

B. When different waste waters constitute the total discharge, the time, duration, maximum, minimum, average and total flow of each shall be determined. The flow of each type of wastewater shall be determined and expressed as a percent of the total flow.

II. Temperature

A. All temperature measurements of elevated temperature wastes shall be made during periods when effluent constituents and discharge rate represent normal operations.

B. Effluent temperatures of each thermal waste discharge shall be measured at least at hourly intervals each day at a representative point prior to confluence with receiving waters.

C. The daily range and mean of each continuous series (hourly measurements) of temperatures shall be reported.

III. Thermal Addition to Receiving Waters

A. Means of the daily effluent temperatures, daily water temperatures at the intake station (see Receiving Water Section) and the daily flow shall be used to calculate thermal addition to receiving waters.

B. Thermal addition to receiving waters shall be based on the difference between the means of daily effluent temperatures and daily intake temperatures and shall be reported as mean daily BTU addition. A mean daily BTU shall be reported separately for periods of normal operation and for periods during heat treatment.

TABLE 1

SUMMARY OF EFFLUENT MONITORING

Parameter	Units	Sample Type	Sample Frequency
Temperature	^{o}F	Hourly measurements over a 24-hour period	Daily
Flow	mgd	--------	Daily
Thermal Addition	BTU	Calculated	Daily

RECEIVING WATER MONITORING

I. Temperature

A. Distribution and reach of elevated temperature in receiving waters

1. Dispersion of heat from waste discharge in receiving waters shall be determined at three-month intervals beginning by November 1971. This determination shall be conducted at times when natural water temperatures represent seasonally normal temperatures. The fourth dispersion study shall be conducted in August 1972 and the last dispersion study shall be conducted in November 1972.

2. Distributional determinations shall be sufficient to define the receiving water area thermally affected under ebb tide and flood tide conditions. This shall include all coastal waters which record temperatues at least 1 F.^{o} above natural.

3. Vertical temperature measurements shall be made at depth intervals which are sufficient to establish thermal gradients and define presence of any thermoclines. Horizontal temperature measurements shall be made at points sufficient to establish at least 3 F.^{o} differences ranging between maximum affected receiving water temperatures and natural temperatures.

4. Shoreline contact of elevated temperatures shall be thermally defined.

5. Surface temperatures shall be measured at depths not greater than one foot. Bottom temperatures shall be measured within one foot of the bottom.

6. Dye techniques and photography may be used to assist in defining the general areas of receiving water affected by elevated temperature wastes.

B. A natural temperature station shall be located at a point where intake water temperatures unaffected by any elevated temperature waste discharge can be measured. Temperatures representative of the entire influent shall be measured at least at hourly intervals each day. The location of this station must be approved by the Executive Officer before monitoring begins.

C. Temperature profiles one foot from the surface to within one foot of the bottom shall be measured monthly at depth intervals sufficient to define temperature gradients.

1. Temperature profiles shall be obtained at the following stations in the tidal prism:

Station RW1 - at or near Seventh Street bridge

Station RW2 - at each point of discharge

Station RW3 - at or near Westminster Avenue bridge

Station RW4 - at or near Pacific Coast Highway bridge

Station RW5 - at or near Central Avenue bridge

Station RW11 - (see description of Benthos sampling station below)

2. At least three temperature profiles shall be measured at each of the above stations across the width of the tidal prism; one in the west third, one in the center, and one in the east third.

3. Temperature profiles shall be obtained at Stations RW7, RW8, and RW12 (see description of Benthos sampling stations below) as follows:

   a) Temperature measurements shall be made along a 500 yard line parallel to shore at the 10-foot depth contour. The line shall be centered such that it is bisected by Stations RW7, RW8 and RW12.

   b) At least 11 temperature profiles shall be measured along the line at 50 yard intervals.

4. The time, tidal cycle, and depth at which temperatures are measured shall be reported.

D. Temperature-depth profiles shall be measured from surface to bottom at two-hour intervals over a complete tidal cycle (approximately 25 hours) every quarter. In addition, velocity and direction of sea and wind currents shall be measured. Temperatures shall be measured at depth intervals of two feet and sea currents shall be measured at intervals sufficient to establish variability with depth.

1. These measurements shall be made at Stations RW7, RW10, RW12, and RW14 (see description of Benthos monitoring stations below).

2. Changes in wind and sea current measurements, temperature and tide shall be reported for the entire 25-hour period.

3. Measurements at all stations shall be made in the same two-hour interval on the same day.

4. Temperature profiles shall be obtained by November 1971, in February 1972, May 1972, August 1972, and November 1972.

II. Benthos

A. Benthos shall be sampled at the following stations during November 1971, May 1972, August 1972, and November 1972.

1. 100 feet up channel from Westminster Avenue bridge (Station RW3)

2. 100 feet up channel from Pacific Coast Highway bridge (Station RW4)

3. 100 feet up channel from Central Avenue bridge (Staion RW5)

4. Opposite the east jetty of the San Gabriel River Tidal Prism and centered between this jetty and the east jetty of Alamitos Bay (Station RW6)

5. On the 10-foot depth contour and at the median distance between San Gabriel River east jetty and the Seal Beach pier (Station Rw7)

6. On the 10-foot depth contour and at the median distance between the Seal Beach pier and the Anaheim Bay west jetty (Station RW8)

7. On the 20-foot depth contour and at the median distance between the Alamitos Bay east jetty and the Anaheim Bay west jetty (Station RW9)

8. On the 30-foot depth contour approximately 1,200 yards seaward of Sea Beach pier (Station RW10)

9. Centered between the east and west jetties of Alamitos Bay 500 yards northeast of the jetty mouth (Station RW11)

10. On the 10-foot depth contour 1,000 yards northwest of the west Alamitos Bay jetty (Station RW12)

11. On the 20-foot depth contour 1,000 yards northwest of the west Alamitos Bay jetty (Station RW13)

12. On the 30-foot depth contour 1,000 yards northwest of the west Alamitos Bay jetty (Station RW14)

B. Benthos shall be sampled with a Petersen dredge, ponar dredge, Van Veen grab or any standard bottom sampling device with a minimum sampling area of 60 square inches.

C. Each sample shall consist of a composite of three random grabs taken at each station. Each grab shall be analyzed separately. The variance in species diversity and abundance among the three grabs shall be reported as number of individuals and species per unit area and shall be based on the average of the three random grabs. Representative subsamples of each grab may be analyzed to obtain estimates of the variation among grabs and of species diversity and abundance. Benthos species shall be reported in rank order of abundance and as percent frequency of occurrence for each composite sample. The Margalev diversity index shall also be computed for each composite sample.

D. Substrate shall be specifically characterized by type (sand-silt, ooze, rocky, etc.) and by the presence or absence of oil deposits.

E. Water temperatures within one foot of the bottom shall be reported for each station and sample period.

III. Fish

A. Fish sampling shall be conducted by trawl in accordance with methods recommended by the Department of Fish and Game at the following locations:

1. Near shore at approximately the 10-foot depth contour between the San Gabriel River east jetty and the Seal Beach Pier (Station RW7)

2. Near shore at approximately the 10-foot depth contour between the Seal Beach pier and the west jetty of Anaheim Bay (Station RW8)

3. On the 20-foot depth contour between the San Gabriel River east jetty and the Anaheim Bay west jetty (Station RW9)

4. On the 30-foot depth contour between the San Gabriel River east jetty and the Anaheim Bay west jetty (Station RW10)

5. On the 10-foot depth contour along Belmont Shore (Station RW12)

6. On the 20-foot depth contour along Belmont Shore (Station RW13)

B. Trawl net dimensions shall be as follows:

1. 25-foot throat width

2. 1.5-inch mesh size (body)

3. 0.5-inch mesh size (liner)

C. Each trawl shall be conducted along an isobath for 10 minutes at a uniform speed of 1.0 to 1.5 knots.

D. The identity, size and number of fish and their distribution in relation to elevated temperatures shall be reported. The number and species of fish affected by abnormal growths such as fin erosion, lesions and papillomas shall be reported also. Fish species shall be reported in rank order of abundance and as percent frequency of occurrence for each trawl. The Margalev diversity index shall also be computed for each trawl.

E. Trawl surveys shall be conducted in November 1971, May 1972, August 1972, and November 1972.

F. All macro-invertebrates and algae collected in trawl surveys shall be identified, enumerated and reported in the same manner as fish species.

G. Bottom temperatures shall be measured at representative points along each trawl track.

H. Historical and current data on fish species abundance and diversity obtained by the City of Seal Beach Public Works Department and the Department of Fish and Game shall be reviewed and reported. These data shall be compared with data collected in this thermal effect study to establish the waste discharge effects on fin fish populations.

IV. Jetty Intertidal Survey

A. Intertidal surveys shall be made during low tide at the following locations:

1. Along the east side of Alamitos Bay west jetty beginning 500 yards from the seaward end of the jetty. (Station I-1)

2. Along the east side of Alamitos Bay east jetty beginning 500 yards from the seaward end of the jetty. (Station I-2)

3. Along the east side of Alamitos Bay east jetty beginning 1,000 yards from the seaward end of the jetty. (Station I-3)

4. Along the west side of the Anaheim Bay west jetty 500 yards from the seaward end of the jetty (Station I-4)

B. Each intertidal survey shall extend shoreward along a transect in the intertidal zone. Six three-foot square quadrats shall be examined at three-foot intervals along the transect for all forms of macroscopic flora and fauna.

C. Species diversity, estimated relative abundance and percent frequency of occurrence shall be reported for each station. Examination of rock jetties shall be documented photographically.

D. Intertidal surveys shall be conducted by a qualified biologist employing the techniques recommended by the University of California's Allan Hancock Foundation.

E. Water temperatures along each transect shall be reported.

F. The jetty intertidal stations shall be contrasted with one another on the basis of species diversity, abundance and percent frequency of occurrence.

G. Intertidal surveys shall be conducted in November 1971, May 1972, August 1972, and November 1972.

V. Underwater Diving Survey

A. Underwater observations of red algae growth shall be made at quarterly intervals along the six to ten-foot depth contour at Stations RW7, RW8, and RW12 (as described in IC3) and within the entire San Gabriel River Tidal Prism.

B. Red algae growth along each transect and in the tidal prism shall be estimated quantitatively using a quadrat sampling technique when visibility and tidal conditions permit.

C. Diving observations shall be made in November 1971, February 1972, May 1972, August 1972, and November 1972.

A summary of receiving water monitoring is presented in Table II.

TABLE II

SUMMARY OF RECEIVING WATER MONITORING

Parameter	Units	Station	Sample Type	Frequency
Temperature				
Heat dispersion	°F	Affected receiving water	Horizontal and vertical point measurements	Quarterly
Influent	°F	Intake station	At least at hourly intervals each day	Daily
Effluent	°F	Outfall station	At least at hourly intervals each day	Daily
Receiving water	°F	RW1-5, RW8, RW11, RW12	Vertical profile	Monthly
Receiving water vertical profile	°F	RW7, RW10	At least at two-hour intervals over 25 hours	Quarterly
Vertical profile	°F	RW12, RW14	At least at two-hour intervals over 25 hours	Quarterly
Benthos	Nos. and diversity	RW3-RW14	Grab	Semiannual and August 1972
Fish	Nos., size diversity, abnormality	RW7-RW10 RW12, RW13	Trawl	Semiannual & August 1972
Benthos & Algae	No. and diversity	Jetties	Intertidal survey	Semiannual & August 1972
Underwater observations	Algae abundance & diversity	Tidal prism, RW7, RW8 RW12	Observation	Quarterly

ADDITIONAL SPECIFICATIONS

I. Results of previous studies or monitoring reports applicable to the time period under study and representative of conditions in the receiving water influenced by waste discharge may be used to assist in determining effects on beneficial uses. Approval to use such information should be obtained from the Executive Officer early in the study. Temperature measurements conducted under current monitoring programs shall not replace the measurements specified in this study, however.

II. Receiving water monitoring shall not be conducted during or immediately subsequent to periods of storms. Receiving water monitoring shall be done, if possible, at times other than those when storm runoff is in the tidal prism.

III. All thermometric devices shall be referenced or calibrated to thermometers which have been certified by the National Bureau of Standards.

IV. Temperatures shall be reported accurately to at least one degree Fahrenheit.

V. Time of sampling and tidal conditions during sampling shall be reported for each series of temperature measurements.

VI. Presence of thermoclines shall be reported and described.

VII. Elevated temperatures of surface waters may be documented using infrared photography.

VIII. Thermal studies shall be initiated no later than November 1971. Sampling and temperature measurements shall be conducted through the month of November 1972.

IX. Sampling and analyses of benthic communities and fish populations shall be conducted by qualified biologists using principles and techniques similar to those used by the Department of Fish and Game.

X. All organisms shall be identified to species insofar as possible.

XI. An analysis of costs and benefits of various intake, maintenance and discharge alternatives shall be conducted. The analysis shall be directed toward reducing the intake of planktonic organisms and fish, preventing thermal waste plumes from touching the ocean substrate or shorelines, dispersing thermal wastes in the water column in areas of pronounced along-shore or off-shore currents and controlling fouling organisms in intake and discharge structures with the least potential for deleterious effects upon beneficial uses.

REPORTING

Temperature data shall be reported as follows:

I. The range and mean of each daily continuous temperature record (hourly determinations) shall be graphically presented as a plot of temperature versus time for the entire study period. Figures should be arranged to compare average daily influent and natural surface temperatures and temperature ranges with effluent and receiving water surface temperatures, respectively. The hourly temperature difference between intake and effluent water shall be computed and reported as mean daily ΔT.

II. Temperature-depth profiles shall be graphically presented as a plot of depth versus temperature. Figures should compare temperature profiles of natural temperature station(s) with receiving water stations. When applicable, tabular presentation of temperature-depth profiles will be acceptable.

III. Distribution and ultimate reach of temperatures above natural in the receiving waters shall be identified graphically by plotting at least 3 F.° isotherms which range from maximum temperatures at the outfall area to natural temperatures a given distance from the outfall. Cross-sectional isotherms at the receiving water stations shall be used to show vertical distribution of elevated temperatures in receiving waters. Figures shall be drawn to scale and shall show distribution of elevated temperatures for both flood and ebb tide conditions. Distributional determinations for different times shall be reported separately.

IV. The percent of the cross-sectional area of tidal prisms and estuaries exhibiting temperatures above natural resulting from waste discharge shall be reported.

V. All raw data, including hourly temperatures, daily flow rates, and individual temperature profiles at all stations shall be presented in tabular form and reported as appendices.

VI. Results and conclusions of the thermal study shall be reported in narrative form. The effects of the waste discharge on beneficial uses shall be reported as beneficial, adverse, unknown, or no significant effect. All supporting data shall be presented in the technical report. If available, an estimate of the change in beneficial uses before and after waste discharge shall be provided. Data collected in this study shall be compared with data presented in prior studies of the same receiving waters to show physical, chemical, and biological changes with time and to define the effects on beneficial uses.

VII. Progress reports of thermal effect studies shall be submitted to the Board in the month following the end of each three-month period. The first report will be due not later than February 29, 1972. This report shall include the results of the first elevated temperature distribution study over ebb and flood tide. The data submitted in the first report may be used by the Board to make necessary revisions.

VIII. The final summary report of thermal effects on beneficial uses shall be submitted to this Regional Board prior to April 1, 1973.

Each report shall contain the following completed declaration:

"I declare under penalty of perjury that the foregoing is true and correct.

Executed on the_____day of_____at_____.

_____(Signature)

_____(Title)"

Ordered by: Raymond M. Hertel

RAYMOND M. HERTEL
Executive Officer

ADDENDUM I

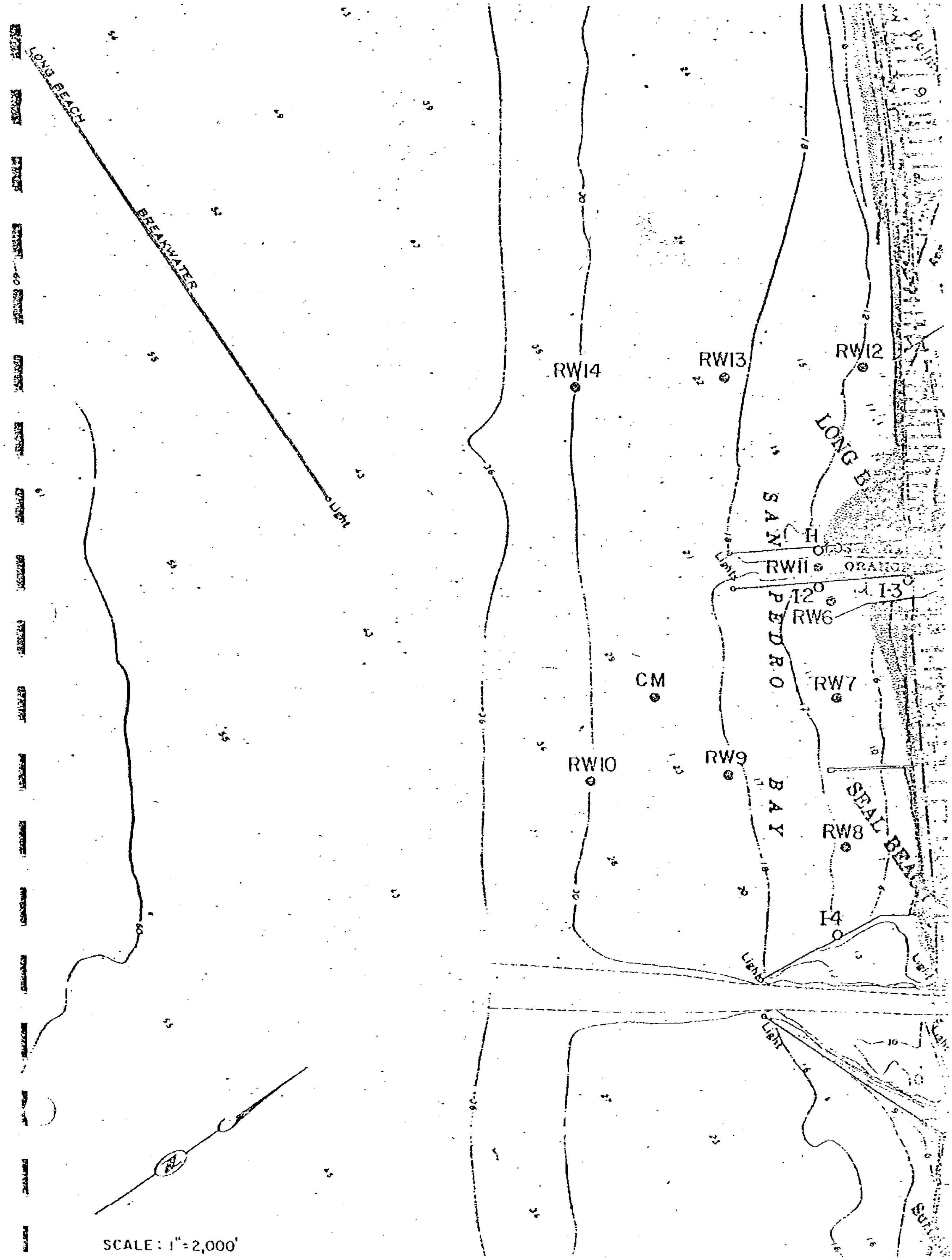
The present specifications set forth by the Regional Water Quality Control Board do not provide for the collection of sufficient data to evaluate the effect of the thermal discharges from the Los Alamitos Generating Station. Additional data will be collected in accordance with the techniques outlined in the Regional Water Quality Control Board specifications and as listed herein.

a. Temperature Profiles. Vertical profiles of temperature will be obtained at sufficient locations across the San Gabriel River Channel at each of the receiving water stations to determine what percent of the cross-sectional area of the tidal prism exhibits temperatures above ambient. These measurements will be obtained quarterly under high and low tidal conditions during the thermal dispersion studies. Vertical profiles of temperature will be obtained at stations RW 2 (under 7th Street bridge) and RW 1 (under San Diego Freeway) at times when these stations are accessible from a survey vessel along with at least 10 additional stations outside the San Gabriel River. The location of these stations will be determined after consultation with SCE and an evaluation of previous studies.

b. Current Measurements. Measurements of current speed and direction will be obtained using two ducted *in situ* current meters. The meters will be installed near the surface and at 15 feet of depth at a station located outside the San Gabriel River in approximately 25 feet of depth at station CM as shown on Fig. 1. The meters will be installed quarterly during the thermal dispersion studies and will continuously record currents while the thermal measurements are obtained.

c. Other Discharges. Investigate the quantity and quality of other waste-waters discharged in San Gabriel River Channel upstream and downstream of the Los Alamitos Generating Station. The Sanitation Districts of Los Angeles County will be discharging approximately 40 mgd of secondary effluent down the San Gabriel River from two water renovation plants located several miles up the channel. Dissolved oxygen levels in this flow will be above 5 ppm and BOD levels are expected to be low.

The north fork of the Coyote Creek however has an inflow of approximately 10 to 15 mgd of wastes from dairies and dairy pasture-land which has a relatively high BOD and which may be exerted in a relatively short time after reaching the elevated temperature area of the thermal discharges. Sufficient BOD data will be obtained during the quarterly surveys to define the quality of the flows in the San Gabriel River.

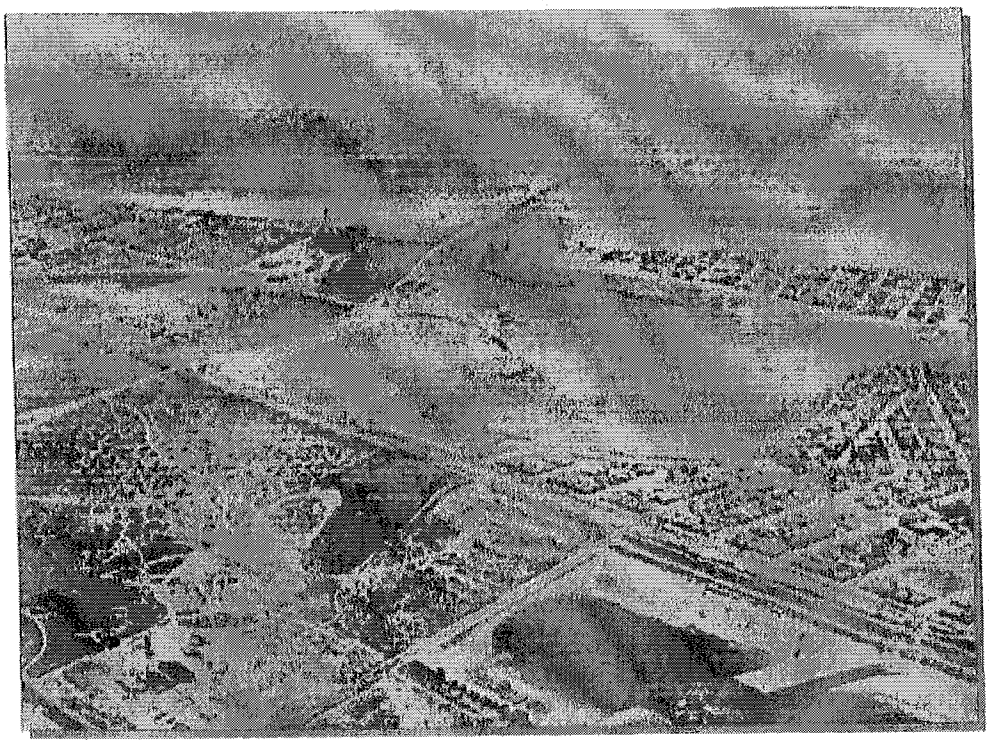


LONG BEACH BREAKWATER
Light
RW14
RW13
RW12
SAN PEDRO BAY
H
RW11
I-2
I-3
RW6
CM
RW7
RW10
RW9
RW8
SEAL BEACH
I4
Light
Light
SCALE: 1"=2,000'

FIG. 1 : LOS ALAMITOS THERMAL EFFECT STUDY MONITORING STATIONS

This is the cover for Attachment 12 to the April 17, 2003 letter enclosure; to see the rest of this document, refer to Attachment 10 to this letter.

LOWER SAN GABRIEL RIVER ENVIRONMENTAL ASSESSMENT



Prepared for:

Los Angeles Dept. of Water and Power
111 North Hope Street
Los Angeles, CA 90012

Prepared by:

MBC Applied Environmental Sciences
3000 Redhill Avenue
Costa Mesa, CA 92626

April 2003

Attachment 13 for the April 17, 2003 letter enclosure.

United States
Environmental Protection
Agency

Regional Administrator
215 Fremont Street
San Francisco CA 94105

Region 9
Arizona, California
Hawaii, Nevada
Pacific Islands

EPA

August 4, 1986

Mr. Don Maughan
Chairman
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95801

Dear Mr. Maughan:

This is in response to the letter of June 12, 1986 from Ray Walsh to Frank Covington requesting EPA concurrence with State Board Resolution No. 86-42. This Resolution amends the effluent limits for chlorine residual required by the Water Quality Control Plan for the Ocean Waters of California (Ocean Plan) of nine southern California steam-electric generating stations. We have reviewed Resolution 86-42 and have concluded that, on the basis of the scientific literature and monitoring studies concerning the fate of chlorine discharged to the marine environment, the Ocean Plan water quality criteria for chlorine residual will be satisfied by these effluent limits. On the same basis, we concur with the State Board's conclusion that beneficial uses will be maintained and protected through compliance with these effluent limits by Southern California Edison and the Los Angeles Department of Water and Power.

Certain questions remain unanswered, however, concerning the precise chemistry of chlorine in sea water, the adequacy of analytical techniques to measure chlorine and chlorine-produced oxidants in the marine environment and the adequacy of biomonitoring methods used previously to determine the impacts of chlorine discharges on marine biota. We support the requirements of Resolution 86-42 for a comprehensive biomonitoring study of chlorine discharges from these nine generating stations. Such a study is consistent with EPA's recent "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants." The Technical Support Document for Water Quality-Based Toxics Control and the State's efforts in the Marine Bioassay Project should provide the basis for such a study. We request that, as the biomonitoring study is developed and results are produced for interpretation, appropriate members of my staff be consulted and involved in any decisions concerning the structure, procedures and results of the study.

In addition, upon completion of the study and analysis of its results, these amendments to the effluent limits for total chlorine residual in the SCE and LADWP permits which are less stringent than those required by the Ocean Plan must be reconsidered and

DWQ rec'd
AUG 8 1986

revised, if necessary. We look forward to working with the State and the two dischargers to implement this study. Should you wish to discuss this further, do not hesitate to contact me or have your staff call Catherine Kuhlman of my staff at (415) 974-8285.

Sincerely,

John Wise

JUDITH E. AYRES
for Regional Administrator

cc: Mr. Robert P. Ghirelli
Executive Officer, Los Angeles
Regional Water Quality Control Board

Attachment 14 for the April 17, 2003 letter enclosure.

State of California

Memorandum

To : Robert Currelli
Executive Officer
Los Angeles Regional Board

Date : SEP 13 1984

RECEIVED
SEP 18 1984
C.D.H.
C: JWS ✓
SD

From : STATE WATER RESOURCES CONTROL BOARD

Subject: INITIAL DILUTION RATIOS FOR SOUTHERN CALIFORNIA EDISON AND LOS ANGELES DEPARTMENT OF WATER AND POWER

Southern California Edison (SCE) and Los Angeles Department of Water and Power (LADWP) proposed an in-situ method in March 1982 for determining initial dilution ratios for several of their cooling water discharges. When the method was originally proposed, the 1978 Ocean Plan was in force. It required the State Board Executive Director to approve or disapprove the proposed method. On that basis, we reviewed the SCE-LADWP method.

While we recognize the proposed method as a valid analytical approach, it does not agree with the definitions of initial dilution contained in the Ocean Plan. The issue appears to be one of regulation interpretation, and not technical in substance.

The proposed method takes into account dilution which occurs after "the momentum induced velocity of the discharge ceases to produce significant mixing of the waste...". The initial dilution ratios proposed by SCE and LADWP do represent a flux-weighted average of dilution as the plume crosses a plane perpendicular to the plume centerline. However, all flow except that along the plume centerline reaches the edge of the zone of initial dilution (ZID) before crossing the plane. Therefore, we cannot accept the method as consistent with the Ocean Plan.

Since submission of the proposed initial dilution method, the State Board has adopted a revised Ocean Plan (1983). It provides for Regional Board discretion in accepting the proposed method. However, since the method seems inconsistent with the definition of initial dilution, an exception to the Ocean Plan would have to be approved by the State Board. Exceptions can be granted if (1) the exception will not compromise protection of ocean waters for beneficial uses and (2) the public interest is served.

SCE and LADWP are most concerned about the resulting effluent limitation for total chlorine residual. Oxidized chlorine is not a conservative pollutant in the environment. The ocean contains organic and inorganic constituents which readily reduce chlorine to its non-toxic chloride oxidation state.

Formula (1) on page 7 of the Ocean Plan does not take this deactivation into account. Only dilution is considered. If in-situ or laboratory studies can quantify the deactivation of chlorine by mixing with dilution water, formula (1) could be modified respectively. This course of action would also require an exception to the basin plan. However, the required study would provide evidence that Table B, "Toxic Materials Limitations" are met at the edge of the ZID and, consequently, beneficial uses are protected.

Original Signed By:
Michael H. Campos
Executive Director

cc: Mr. Michael R. Nevel
Southern California Edison
P.O. Box 800
Rosemead, CA 91770

Mr. Carl D. Haase
Los Angeles Department
of Water and Power
111 North Hope Street
Los Angeles, CA 90051

Attachment 15 for the April 17, 2003 letter enclosure.

STAFF REPORT
BY THE
DIVISION OF WATER QUALITY
STATE WATER RESOURCES CONTROL BOARD

TEMPORARY OCEAN PLAN EXCEPTION TO THE WATER QUALITY CONTROL PLAN, OCEAN WATERS OF CALIFORNIA, FOR NINE SOUTHERN CALIFORNIA ELECTRICAL GENERATING STATIONS: HAYNES, HARBOR, SCATTERGOOD, ALAMITOS, EL SEGUNDO, LONG BEACH, MANDALAY, ORMOND BEACH, AND REDONDO

Introduction

The 1972 Water Quality Control Plan for Ocean Waters of California (Ocean Plan) contained no receiving water quality objectives for chlorine. However, it did contain effluent quality requirements which specified that discharge chlorine concentrations were not to exceed 1.0 mg/l more than 50 percent of the time and not to exceed 2.0 mg/l more than 10 percent of the time. The 1978 version of the Ocean Plan introduced the concept of initial dilution as contained in the current Ocean Plan and established receiving water quality objectives for chlorine. The nine above-named facilities had NDPES permits adopted in 1977. Those permits did not require renewal until 1982. Delays in renewing the permits and negotiations to determine appropriate initial dilution values resulted in permit issuance in 1985. Consequently, the concept of initial dilution and the receiving water quality objectives for chlorine as applied to the nine above-named facilities was translated into effluent limitations for the first time with permit reissuance in 1985.

The resulting effluent limitations cannot be dependably met by these nine facilities without costly physical modifications to the condensor systems or installation of a predischarge dechlorination system. With this realization, the chlorine water quality objectives and dilution equation (equation 1, page 7, Ocean Plan, 1980) came under more scrutiny. It was very quickly realized that the dilution equation did not consider the non-conservative nature of chlorine. On that basis, Southern California Edison (SCE) and Los Angeles Department of Water and Power (LADWP) requested an exception to the Ocean Plan as provided for under Chapter VI, Section F.

Following is a brief background of the events which have led to this request and an analysis of the key issues.

BACKGROUND

The Table B Guidelines, Ocean Waters of California, 1978 specify the use of the mathematical computer model PLUME for calculation of initial dilution for submerged discharges and describes a graphical method for surface discharges. Unfortunately, these methods are not applicable to these nine facilities. PLUME assumes initial dilution complete when the discharge reaches the surface. However, the submerged discharges represented by these facilities are shallow, have a lot of momentum remaining and continue to dilute rapidly after reaching the surface. The specific graphical procedure for surface

discharges assumes discharge to an infinitely deep ocean so that ocean water can be entrained from both sides and the bottom without any impediment. The surface discharges represented by these facilities are to areas too shallow to apply this procedure. Therefore, it was mutually agreed to explore the use of alternative procedures.

SCE and LADWP submitted two methods of calculating initial dilution: one for surface discharges and the other for submerged discharges. The surface discharge procedure was applied to Haynes, Harbor, Alamitos, Long Beach, and Mandalay. Aerial infared photography and ground truth data from boat transects was used to plot isotherms of the thermal discharge at each of the five facilities for various tidal conditions. Centerline dilution was plotted, as a function of distance from the discharge, and the end of initial dilution was graphically determined. A flux-weighted averaging procedure was then used to determine an overall plume initial dilution ratio. A factor of 1.5 was used to average in the vertical (linear assumption) and a factor of $\sqrt{2}$ was used for horizontal averaging (Gaussian assumption). This is consistent with generally accepted procedure and U. S. Environmental Protection Agency, Region 9 (EPA) determinations of initial dilution. It results in multiplying the centerline initial dilution values by 2.12 to obtain overall plume dilution. The State Board Executive Director disallowed the horizontal averaging as inconsistent with the narrative definition of initial dilution in the Ocean Plan. Further a definitional difference of dilution resulted in reducing the submitted initial dilution factors by unity. This resulted in approved initial dilution factors 42 percent to 50 percent lower than those submitted by SCE and LADWP.

The submerged discharge procedure was less controversial. It was applied to Scattergood, El Segundo, Ormond Beach, and Redondo. It is a mixture of laboratory studies on submerged jets and assumptions of in-situ conditions. Since it was applied to a radially spreading surface jet, the concept of horizontal, flux-weighted averaging was not applicable and the $\sqrt{2}$ factor was not used. The initial dilution factors submitted for these discharges were approved after they were reduced by unity to correct the previously mentioned definitional difference. This resulted in approved initial dilution factors 5 percent to 12 percent lower than those submitted by SCE and LADWP.

In September 1984, a final determination on initial dilution values was officially transmitted to the Executive Officer of the California Regional Water Quality Control Board, Los Angeles Region (Los Angeles Regional Board) by the State Board's Executive Director. That transmittal recognized the non-conservative nature of chlorine and suggested that the State Board would be willing to hear a request for an Ocean Plan exception on that basis.

After the final determination on initial dilution, both SCE and LADWP submitted requests to the Los Angeles Regional Board for an Ocean Plan exception. They requested an increase in their initial dilution ratios to the values originally submitted for approval. After reviewing the submission, the Los Angeles Regional Board staff recommended granting the exception. On June 24, 1985, the Los Angeles Regional Board adopted Order No. 85-35, which

allowed increased initial dilution ratios to be applied only to chlorine pending State Board approval of an Ocean Plan exception. This meant that two initial dilution ratios would apply to each discharge. On July 24, 1985, the formal request for an Ocean Plan exception was transmitted to State Board by the Los Angeles Regional Board.

After an initial review of the request and supporting material, State Board staff determined that the exception could not be granted to the initial dilution criteria. Initial dilution ratios are based on the site-specific hydraulics of the discharge structure, characteristics of the whole effluent, and receiving water density profile. It cannot rationally be altered for some constituents since all are diluted to the same amount. However, it did seem clear that, due to the non-conservative nature of chlorine, the maximum discharge limitations for chlorine contained in Los Angeles Regional Board Order No. 85-35 would result in compliance with the Ocean Plan receiving water quality objectives after initial dilution as defined for the whole effluent.

Based on staff's recommendation, State Board adopted Resolution No. 86-42 which allows an exception to the Ocean Plan provision for calculating chlorine effluent limitations from the "Table B" receiving water objectives. The order makes it clear that (1) the receiving water objectives must still be met after initial dilution, (2) initial dilution ratios previously approved by the State Board Executive Director are unaltered, and (3) a monitoring program is required to further quantify the non-conservative nature of chlorine and ensure that beneficial uses are protected.

Following is an analysis of the issues relevant to the Ocean Plan exception. The referenced papers and documents have been attached to aid in review.

ISSUES

1. Issue: Will the Table B receiving water quality objectives for Total Residual Chlorine be met at the edge of the zone of initial dilution (ZID).

   Response: Goldman et al. [1] has shown that approximately 80 percent of the applied chlorine is rapidly inactivated when added to filtered sea water. Attempts to quantify the inactivation (reduction to chloride) of chlorine have been somewhat successful [2, 3, 4, 5]. Hostgaard-Jensen et al. found the reduction of chlorine to be inversely proportional to dilution ratios raised to a power of 2.7 to 1.5, respectively, depending if light or dark reactions were considered [2]. Using their results for chlorine reduction to calculate total residual chlorine values for the worst-case discharge (Mandalay) shows our Ocean Plan methods result in edge of ZID chlorine concentrations only 15 percent of those predicted by the Ocean Plan methods and allowed by Table B. Other methods have similar results. The 80-percent reduction of chlorine reported by Goldman et al. does not account for chlorine reduction by non-filterable organic matter or reduction by surface growth in the diffuser delivery pipe. Most of the chlorine applied to municipal wastewater effluents merely oxidizes

organic matter and is concommitantly reduced to chloride. SCE and LADWP tried to determine residual chlorine levels of the diffuser outlets of seven of their facilities [6]. Of 36 outfall surveys, 21 had no detectable total reduced oxidants (TRO).

It seems clear that equation 1 on page 7 of the Ocean Plan is conservative. Best estimates indicate that at least 80 percent of the remaining chlorine is reduced to chloride upon dilution. Therefore, it follows that State Board Resolution No. 86-42, which at most doubles allowed chlorine discharges, will not compromise the receiving water quality objectives for chlorine contained in Table B of the Ocean Plan.

2. Issue: Will the maximum chlorine discharge concentrations approved in State Board Resolution No. 86-42 protect beneficial uses?

Response: Since it has already been demonstrated that the chlorine water quality objective will be met at the edge of the ZID, the response to this issue focuses on chlorine-produced oxidants (CPO) and their toxicity and the quantity of oxidizing power that is consumed merely oxidizing organic matter. As previously indicated, SCE and LADWP have attempted to measure diffuser concentrations of TRO. This measurement includes most of the CPO. Most of the samples contained TRO below the level of detection (0.08 mg/l) which is near the Ocean Plan allowable edge of ZID level (0.037 mg/l to 0.059 mg/l) for chlorine [6] demonstrating that much of the oxidizing power in the chlorine is already exhausted by organic matter in the diffuser delivery pipe before dilution begins. This is significant since compliance sampling points are land based upstream of the diffuser pipe.

It is extremely difficult to estimate the organic uptake of oxidizing power in ocean waters since no analytical method accurately measures all chlorine produced oxidants [7]. Estimates could be made based on the instantaneous uptake found by Davis and Coughlan [3, 4]. Their estimate would allow an organic uptake of up to 1.3 mg/l for our worst-case discharge (Mandalay). This appears to be an over estimate. Even if quantitative estimates could be made, they would necesarily depend on the intake water and dilution water organic content. However, it does seem clear that based on experience with organic uptake of chlorine during the disinfection process in freshwater, a qualitative statement can be made; a significant amount of the discharge oxidation power is harmlessly dissapated by reaction with organic matter. The obvious next question relates to the portion which is not "harmlessly reduced" to a lower oxidation state.

The same difficulty with quantification confounds this problem. Grove et al. [8] found that a negligible amount of oxidative power is transformed into chlorinated and brominated compounds. The most abundant is bromoform, which has no inhibitory effect on planktonic algae at concentrations exceeding 32 mg/l [9]. Most of the oxidizing power in chlorine, which is not exhausted on organics by the edge of the ZID, will

likely be found in various inorganic bromine compounds [1, 7, 10]. Relative toxicity and proportions of formed bromine compounds are largely unknown and strongly site and time specific. It appears that most of the bromine is first oxidized to hypobromous acid (Br+1), which then disproportionates to form bromide (Br-1), bromite (Br+3), and bromate (Br+5) compounds [7]. Up to 50 percent of the oxidizing power in brominated compounds has been shown, in some instances to reside in bromate ions [10]. Disproportion reactions which would create two bromate ions from hypobromous acid would also create five non-toxic bromide ions. Bromate ions are also relatively non-toxic showing no inhibition on four planktonic algaes at concentrations up to 16 mg/l.

While a case can be made for non-toxic chloride or less toxic bromine compounds being formed as chlorine is reduced, anamolous site-specific conditions can be postulated such that beneficial uses are not adequately protected. However, Los Angeles Regional Board staff has examined the historical monitoring record and found no indication that the chlorine discharge at these sites has adversely affected any beneficial use. Further, SCE has tried to unconfound chlorine impacts from thermal effects by conducting trawls during normal operation and close to high chlorine discharge events [11]. No significant impact on the community composition on health of the demersal fish and benthic infaunal communities present was demonstrated.

In summary, it is virtually impossible to quantitatively determine the toxicity of the intermittantly discharged CPO at the edge of the ZID. However, strong qualitative arguments can be developed to demonstrate that beneficial uses will be protected. Historical monitoring data and special studies indicate no significant impact on beneficial uses attributable to CPO, and this exception contains chlorine discharge concentrations and discharge times more stringent than those which historically have not been shown as a harm to beneficial uses.

3. Issue: Why is there a need for a biomonitoring program?

Response: It is in the public interest to acquire accurate scientific data regarding the discharge of toxicants to the marine environment and their potential impact on the ecosystem. While no data indicates the discharge of chlorinated cooling water at these sites to be a problem, it is not clear that the most sensitive life stages have been examined or that lower trophic level impacts do not exist. The monitoring program should not only verify the adequacy of the chlorine effluent limits in Order No. 86-42 but should also allow quantification of the non-conservative nature of chlorine. Further, some literature [12] indicates that the receiving water quality objectives for intermittent discharges of chlorine in the Ocean Plan have an inadequate data base. These water quality objectives will be the topic of the scheduled Ocean Plan triennial reivew. However, it appears that insufficient data currently exists to

adequately determine, if the exisiting Ocean Plan intermittent chlorine are sufficient to protect all beneficial uses. Data from this study may help eliminate some of the perceived deficiencies.

June 3, 1986

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Attachment 16 for the April 17, 2003 letter enclosure.

STATE OF CALIFORNIA—RESOURCES AGENCY

EDMU... G. BROWN JR., Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD— LOS ANGELES REGION

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OUR FILES NOS.: CA0000353
CA0000361
CA0000370

MAY 3 1977

Honorable Douglas Costle
Administrator
United States Environmental Protection Agency
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Waterside Mall West
Washington, D.C. 20460

SUBJECT: Variances from Effluent Guidelines Limitations for the Steam Electric Power Generating Point Source Category

Dear Mr. Costle:

Enclosed is a rationale and request for variances from effluent limitations contained in 40 CFR 423 - Steam Electric Power Generating Point Source Category Effluent Guidelines and Standards for City of Los Angeles, Department of Water and Power's, Haynes, Harbor, and Scattergood Generating Stations.

This request is made in accordance with the general variance provision contained in 40 CFR 423 and the draft variance procedures of 40 CFR 124.48 (State Program Elements for NPDES) dated January 5, 1976.

In letters dated January 24, and March 9, 1977, City of Los Angeles, Department of Water and Power, requested a variance from the limitations contained in the above-mentioned Guidelines and Standards. City of Los Angeles, Department of Water and Power, has provided evidence regarding fundamental difference as discussed in the attachment.

The California Regional Water Quality Control Board, Los Angeles Region, at a public hearing held April 25, 1977, found that there were fundamental differences and adopted NPDES permits containing alternative effluent limitations subject to approval by the Administrator. A copy of each of those NPDES permits is enclosed.

We would appreciate your prompt review and decision on this request as it will have significant impact on the ongoing design of waste treatment facilities to comply with BPCTCA.

If you have any questions, please contact Mr. Richard Harris of this office.

Very truly yours,

Raymond M. Hertel

RAYMOND M. HERTEL
Executive Officer

cc: Environmental Protection Agency, Region IX
State Water Resources Control Board, Legal Division
ATTN: Mr. Harry Schueller
Los Angeles Regional Board Members
City of Los Angeles, Department of Water and Power
ATTN: Mr. E. G. Gladbach

Enclosures

RATIONALE FOR VARIANCE FROM EFFLUENT GUIDELINES LIMITATIONS
FOR CITY OF LOS ANGELES, DEPARTMENT OF WATER AND POWER'S

HAYNES GENERATING STATION
HARBOR GENERATING STATION
SCATTERGOOD GENERATING STATION

BACKGROUND

City of Los Angeles, Department of Water and Power (DWP) operates three marine coastal steam-electric generating stations within the jurisdiction of this Board. These generating stations currently discharge wastes under requirements (NPDES permits) prescribed by this Board. Department of Water and Power applied for renewal of waste discharge requirements and requested variances from limitations contained in the Steam Electric Power Generating Point Source Category Effluent Guidelines and Standards (40 CFR 423).

FINDINGS BY THE BOARD

On April 25, 1977, the California Regional Water Quality Control Board, Los Angeles Region, adopted the following orders:

Facility	NPDES Permit No.	Order No.
Haynes Generating Station	CA0000353	77-70
Harbor Generating Station	CA0000361	77-71
Scattergood Generating Station	CA0000370	77-72

1. Contained in all of the above orders is a finding that :

   "Raw wastes from metal cleaning processes at (name of individual station) are fundamentally different from raw wastes considered in the establishment of guidelines. The Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Steam Electric Power Generating Point Source Category (EPA 440/1-74/029-a) does not take into consideration the significant effect of complexing and chelating agents on the treatability of raw metal cleaning wastes in establishing the limitation guidelines for this waste category.

2. Contained in the order for Haynes Generating Station is a finding that :

   "The volume of air preheater washing wastes generated are fundamentally different from that considered in the establishment of the effluent limitation guidelines. The higher volumes of waste, due to special operating procedures required by air quality restrictions, would result in higher operating and capital costs for treatment as compared with typical facilities considered in the Development Document."

3. City of Los Angeles, Department of Water and Power, informed the Board that because of the age of the Harbor Generating Station, Unit 1 is scheduled to be retired in 1984 with the final unit retired by 1987. The plant will operate at less than 10 percent of its rated capacity for the next four years and will serve the City for peaking or standby capacity. Because of the plant's short remaining life the Board feels that the application of best practicable control technology currently available for this facility would not be cost effective.

4. The Board found that the best and most current estimates of costs based on Department of Water and Power's preliminary engineering study for application of the best practicable control technology currently available are significantly higher (5 times) than costs outlined in the Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Steam Electric Power Generating Point Source Category (EPA 440/1-74/029-a) for these facilities, even when cost factors related to inflation are disregarded.

5. Finally, the Board found that review of existing receiving water monitoring data and the Thermal Effects Studies indicates that the beneficial uses of the receiving waters are being protected. There would be no significant benefit in terms of water quality to be accrued by the application of inplant industrial waste stream effluent limitations. The discharges are in conformance with the Water Quality Control Plan for the Los Angeles River Basin and with the California Ocean Plan.

Supporting Evidence:

1. Department of Water and Power conducted thermal effects studies for all of its generating stations in conformance with Implementation Provision 3 of the State's Thermal Plan, and in accordance with specifications prepared by this Regional Board, to determine compliance with the Thermal Plan. The results of these studies indicate that present discharge practices protect the beneficial uses of the receiving waters.

   Monitoring reports submitted by Department of Water and Power indicate that discharges from the coastal generating stations currently meet requirements of the Water Quality Control Plan for the Los Angeles River Basin and the State's Ocean Plan. These Plans were approved by EPA and as such are the water quality control plans regulating discharges to coastal waters.

2. Department of Water and Power submitted a cost study for implementation of BPCTCA (copy enclosed). This study showed that based on cost formulas contained in the Development Document (EPA 440/1-74/029a) the cost for instituting BPCTCA at all three generating stations would be $2,390,000 ($1976). However, actual engineering estimates based on hardware specified in the Development Document bring the costs to $12,500,000 ($1976).

Based on the EPA interpretation of what constitutes metal cleaning wastes contained in the June 17, 1975 memorandum signed by Mr. William Jordan, the volume of in-plant streams requiring lime treatment has been reduced substantially. This reduction in volume will change the scope of the project work associated with handling the metal cleaning waste category and may reduce costs.

3. Department of Water and Power has provided evidence that the rigid application of the Environmental Protection Agency's Effluent Limitations Guidelines will result in a higher pollutant load to the environment, increased energy consumption, and substantial non-water quality adverse environmental impacts.

   a. The energy requirements associated with BPCTCA is equivalent to 1,190 barrels of fuel oil annually.

   b. Additional fresh water usage required to operate the equipment is approximately 6.4 million gallons per year.

   c. More than four tons of air pollutants would be released to the atmosphere each year due to application of BPCTCA.

   d. Environmental problems in the disposal of 75,000 ft^3 annually of sludges created in the treatment of the waste streams. The disposal of these sludges is dependent upon the availability of Class I solid waste disposal sites.

   It should be noted that the supporting evidence provided by Department of Water and Power on the non-water quality environmental impacts was based on the previous interpretation of metal cleaning waste categorization.

REQUEST FOR ALTERNATIVE LIMITATIONS

Based on the findings of this Board and the supporting evidence presented, it is requested that the alternative effluent waste discharge limitations contained in the Orders as adopted on April 25, 1977, be approved and the variances granted.

State Water Resources Control Board

Winston H. Hickox
Secretary for Environmental Protection

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The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at http://www.swrcb.ca.gov.

TO: Dennis Dickerson
Executive Officer
Los Angeles Regional Water Quality
Control Board

ORIGINAL SIGNED BY

FROM: Celeste Cantú
Executive Director
EXECUTIVE OFFICE

DATE: JUL 18 2001

SUBJECT: APPLICABILITY OF THE POLICY FOR IMPLEMENTATION OF TOXICS STANDARDS FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA (SIP) TO DISCHARGERS FROM GENERATING STATIONS IN THE LOS ANGELES REGION

This is in response to your June 4, 2001 memorandum, which is seeking State Water Resources Control Board direction for possible applicability of the California Toxics Rule (CTR) and SIP for regulating discharges from nine specified generating stations located within the Los Angeles Region.

As you noted, in May 2000, the U. S. Environmental Protection Agency promulgated the CTR. The CTR established priority pollutant water quality criteria for "inland surface waters and enclosed bays and estuaries" (40 CFR Section 131.38).

The SIP implements the CTR, National Toxics Rule criteria, and applicable priority pollutant objectives in Regional Water Quality Control Board (RWQCB) Basin Plans. Together, these priority pollutant criteria, existing beneficial use designations, and the SIP comprise water quality standards and implementation procedures for priority toxic pollutants in inland surface waters, enclosed bays, and estuaries.

The SIP defines enclosed bays as:

> "Indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less

than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters." (SIP, 2000)

Based on the definitions found in the SIP, four of the nine generating stations identified in your memorandum would fall under CTR/SIP jurisdiction. The location of the wastewater discharge is the determining factor. These four are: (1) Alamitos/Haynes facility, which discharges into the San Gabriel River; (2) Long Beach facility, which discharges into the inner harbor; (3) Harbor facility, which discharges into the Cerritos Channel of the inner harbor; and (4) Redondo Beach units 7-8 (only).

If necessary, some provisions of the SIP may provide flexibility for these facilities. These provisions can be found in sections such as compliance schedules, intake water credits, and case-by-case exceptions.

The CTR and SIP only address priority toxic pollutants listed in 40 CFR, Appendix A to Part 423. Other constituents, such as chlorine, continue to be regulated according to your Basin Plan and other applicable water quality standards regulations.

The dilution ratios approved in the May 4, 1984 memorandum may still be appropriate for these generating stations. These dilution factors were based on studies completed in 1984.

If you have any questions, please feel free to contact Christine Bailey, Chief of the Freshwater Standards Unit, Division of Water Quality, at (916) 341-5571, or Gordon Innes, Senior Water Resources Control Engineer, Regulation Unit, Division of Water Quality, at (916) 341-5517.

cc: Sheila Vassey
Office of the Chief Counsel

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6/28/01; 6/29/01; 7/2/01; 7/10/01; 7/12/01
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California Regional Water Quality Control Board
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From: Dennis Dickerson, Executive Officer
California Regional Water Quality Control Board, Los Angeles Region
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Date: October 25, 2002

Subject: ALAMITOS GENERATING STATION, AES CORPORATION (NPDES No. CA00001139) AND HAYNES GENERATING STATION, LOS ANGELES DEPARTMENT OF WATER AND POWER (NPDES No. CA0000353)

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) staff are reviewing the above permits in the context of direction provided in the State Water Resources Control Board (State Board) memorandum dated July 18, 2001 (attachment 1). The applicability of the dilution ratio is a key issue for Regional Board consideration in the development of NPDES permits for the Los Angeles region coastal power plants.

Regional Board staff understand that:

1. The following generating stations fall under the jurisdiction of the California Toxics Rule (CTR), 40 CFR, Appendix A, part 423, and the Policy for Implementation of the Toxics Standard for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP):
   - Alamitos generating station (Alamitos),
   - Haynes generating station (Haynes),
   - Long Beach generating station (Long Beach),
   - Harbor generating station (Harbor), and
   - Redondo generating stations units 7 & 8 (Redondo).

2. Some provisions in the SIP may provide flexibility for these facilities. Such provisions may include compliance schedules and intake water credits.

3. A determination must be made, on a case-by-case basis, as to the dilution ratio allowed for each of these facilities.

4. Other constituents, such as temperature and chlorine are regulated under the Basin Plan and applicable water quality standards and regulations, including variances issued by the USEPA.

Regional Board staff will soon be processing a permit for the Haynes and Alamitos power plants due to:

1. The Los Angeles Department of Water and Power (DWP) plan to modernize Haynes;

2. The physical proximity of Alamitos to Haynes; and

3. The need to revise permits to be in conformance with the new regulations.

Accordingly, we are requesting that the State Board review the discharge of both Alamitos and Haynes for the purpose of allowable dilution ratio.

The Regional Board finds that:

1. The State Board classified Alamitos and Haynes as ocean dischargers and authorized an initial dilution ratio of 4.5, dated May 4, 1984.

2. The U.S. EPA issued to Alamitos and Haynes a variance for chlorine based on the State Board classification as ocean discharge, and authorized discharge water chlorine concentration of up to 0.413 mg/L, dated May 13, 1998.

3. The Regional Board renewed the NPDES permits for these plants with effluent limits for temperature and other pollutants based on the dilution ratio of 4.5, dated June 29, 2000.

4. The San Gabriel River estuary is a soft bottom channel extending from the Pacific Ocean to the tidal prism. The channel is approximately 3.2 miles long, 250 feet wide and 15 feet deep.

5. Upstream dry weather flows (receiving water) to the estuary at the tidal prism is on the order of 30 million gallons per day (MGD). The dry weather flows are primarily drainage from Los Coyotes wastewater treatment plant and the Long Beach wastewater treatment plant, as per the NPDES permit maximum allowable discharge for these two wastewater treatment plants.

6. Alamitos and Haynes power plants are the only known industrial dischargers, with nine (9) outfall locations, in the estuary, approximately 2.0 miles upstream from the river mouth.

7. Haynes discharges approximately 1,000 MGD of cooling water and process wastewater. Alamitos discharges approximately 1,200 MGD of cooling water and process wastewater. The combined effluent from the two power plants is approximately 2,200 MGD of cooling water and process wastewater.

8. The river flow to the power plant effluent ratio is approximately 0.014, as calculated per findings 5 and 7 above.

9. Alamitos and Haynes pollutant loadings include toxics, temperature, and chlorine. The maximum effluent temperature is on the order of 100 degrees F. The chlorine concentration is on the order of 0.4 mg/L.

10. The Regional Board Basin Plan limits chlorine loading for estuarine dischargers to a maximum of 0.1 mg/L and requires that the residual chlorine shall not persist in the receiving waters at any concentration that causes impairment of beneficial uses.

11. The California Thermal Plan limits the power plant cooling water discharge to a net temperature increase from the intake temperature of less than 20 degrees F, with the discharge temperature upper limit of 86 degrees F.

Following direction provided in your July 18, 2001 letter, discussions with your staff, and review of all applicable laws, ordinances, regulations, standards, and directives, the Regional Board concludes that, to protect the aquatic environment in the San Gabriel River Estuary:

1. Alamitos and Haynes should not be allowed a cooling water dilution ratio, except for intake water credits as provided by the SIP;

2. Alamitos and Haynes should be required to meet the limits in the Basin Plan, the Thermal Plan, and the SIP at the cooling water discharge locations; and

3. Alamitos and Haynes are eligible for interim effluent limits along with a compliance schedule to enable these plants to come into compliance while continuing to provide reliable electrical energy source for the State of California.

The Regional Board staff request State Board staff to perform appropriate evaluations and provide a written response and concurrence regarding the dilution ratio for these power plants.

Given the importance of Haynes and Alamitos power plants to the generation needs in Los Angeles, and DWP Haynes modernization plans, we respectfully request that the State Board staff expedite the review and concurrence as soon as possible.

If I can be of any assistance, please contact me at (213) 576-6605. Alternatively, please feel free to contact Dr. Tony Rizk at (213) 576-6756.

Attachment:

1. State Water Resources Control Board Memorandum from Celeste Cantú, Executive Director to California Regional Water Quality Control Board, Los Angeles Region, date July 18, 2001 – Review of power plant discharges into enclosed bays and estuaries

State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5463 • Internet Address: http://www.swrcb.ca.gov

Attachment 6

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at http://www.swrcb.ca.gov.

TO: Dennis Dickerson, Executive Officer
Los Angeles Regional Water Quality Control

FROM: Stan Martinson, Chief
DIVISION OF WATER QUALITY

DATE: DEC 11 2002

SUBJECT: ALAMITOS GENERATING STATION, AES CORPORATION (NPDES N0. CA00001139) AND HAYNES GENERATING STATION, LOS ANGLES DEPARTMENT OF WATER AND POWER (NPDES N0. CA0000353)

Below is our response to three questions you asked in your memorandum dated October 25, 2002 to Celeste Cantú.

1. Should Alamitos and Haynes Power Plants be allowed a cooling water ratio except for intake water credits as provided by the " Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (SIP)?

   No, since SIP does not address cooling water relative to thermal impacts and the Thermal Plan does not describe cooling water ratios. However, if you are referring to dilution credits for priority pollutants, you are correct. According to your October 25, 2002 memorandum, the volume or flow rate of the river is the limiting factor. The upstream dry weather flows are relatively minor (30 MGD) compared to the discharges (2,200 MGD combined). The capacity of the estuary below the outfall based upon the dimensions provided in your memorandum is only 300,000,000 gallons, which suggests that even with tidal flushing, the effluent would dominate the water body and severely limit any dilution available from marine inputs. There are no general mixing zone provisions in SIP that would necessarily prevent the designation of a mixing zone based upon the information provided with one exception-- that mixing zones cannot overlap. The solution may be to designate a mixing zone for just one or two of the most critical discharge points as we believe your memorandum indicated that there are nine outfalls associated with the two plants. If you are asking about thermal impact zones, which are allowed under the Thermal Plan, it depends upon the type of discharge. The estuarine criteria in the Thermal Plan differ based upon whether the discharges are defined as either new or existing. Existing discharges must not (1) exceed the receiving water temperature by more then 20° F, (2) raise water temperature in more than 25 percent of the

cross-sectional area by more then 1° F above the natural receiving water temperature, or (3) raise surface water temperatures by more then 4° F at anytime or anyplace. The criteria for new discharges are more stringent. Within estuaries, thermal waste from new discharges must not exceed the receiving water temperature by more then 4° F and must meet the all the criteria described above for existing discharges. Given that the effluent temperature reaches 100° F it is unlikely that they could meet the Thermal Plan objectives for either type of discharge.

2. Should Alamitos and Haynes Power Plants be required to meet the limits in the Basin Plan, Thermal Plan, and SIP at the cooling water discharge point?

   This is correct. With no available dilution, Basin Plan and SIP objectives must be met at end of pipe. If the discharger can identify one or two critical outfalls that discharge relatively low flows so that some dilution from upstream receiving water flow is available, then you may be able to justify a mixing zone for those one or two outfalls. The Thermal Plan has both end of pipe and receiving water objectives that must be met regardless of whether a mixing zone has been designated for priority pollutants. In addition, the Thermal Plan allows for limited thermal impact zones as described previously. It should be noted that both the Thermal Plan and SIP allow for case by case exceptions; therefore, if the discharger provided the appropriate justification, exceptions could allow the discharge to continue in compliance with the State Water Code and Federal Clean Water Act. There is typically no such exception language in the Basin Plans; therefore, the discharger would have to evaluate the feasibility of developing site specific objectives for basin plan objectives or evaluate the beneficial uses and possibly conduct a use attainability analysis.

3. Are Alamitos and Haynes Power Plants eligible for interim limits along with a compliance schedule to enable these plants to come into compliance while continuing to provide reliable electrical energy to the State?

   Yes, this is correct for California Toxic Rule (CTR) criteria. We refer you to your Basin Plan for non-CTR criteria concerning whether a compliance schedule is an available regulatory tool.

If I can be of any further assistance, please contact me at (916) 341-5458. You may also contact Jim Maughan, Chief of the Regulatory Section, at (916) 341-5522.

Attachment 7

California Regional Water Quality Control Bo:

Los Angeles Region

(50 Years Serving Coastal Los Angeles and Ventura Counties)

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640
Internet Address: http://www.swrcb.ca.gov/rwqcb4

...u H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

January 15, 2003

Susan Damron, Wastewater Manager
Department of Water and Power
City of Los Angeles
111 North Hope Street
Los Angeles, CA 90051

Via Certified Mail
Returned Receipt Requested
No. 7000 0520 0024 7127 8726

Dear Ms. Damron:

HAYNES GENERATING STATION UNITS 3 AND 4 COMBINED CYCLE REPOWERING PROJECT (NPDES No. CA0000353) – ADDITIONAL DATA NEEDS

This letter is a follow-up to our meeting on January 7, 2003 at the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) office. At that meeting we reiterated our request for information needed to assess the water quality impacts of Haynes Generating Station (HnGS), owned and operated by the Los Angeles Department of Water and Power (DWP). The Regional Board staff requested that DWP addresses the following issues:

1. **Cooling Water Intake Structure.** DWP must demonstrate that the proposed relocation and other modifications to the cooling water intake pumps will not adversely impact the aquatic environment in the intake channel. In particular, DWP must demonstrate that, with the proposed pumping configuration:

   A. Total intake water volume will not exceed the baseline water volume; and

   B. New intake water velocity profile in the channel (new condition) will not exceed the existing intake water velocity profile of 0.5 ft/sec (baseline condition). In the event that the new condition will exceed the baseline condition, DWP must demonstrate that it will continue to comply with the existing 316(b) guidelines for cooling water intake structures.

2. **Cooling Water Discharges**. On December 11, 2002 (attachment), the State Water Resources Control Board (State Board) determined that HnGS and the nearby AES Alamitos Generating Station (Alamitos) are not eligible for a mixing zone dilution credit, except for intake water credit. This determination may significantly alter the allowable pollutants discharge at HnGS.

   A. The cooling water discharges must comply with the Water Quality Control Plan for Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan). In particular, the discharge water temperature rise cannot exceed 20 °F, with a maximum discharge temperature of no greater than 86 °F. The DWP must demonstrate compliance of the existing

units and the proposed new units either through operational modifications or the implementation of alternative technologies.

B. The United States Environmental Protection Agency (EPA) has granted HnGS a 301(g) variance for allowable chlorine concentration discharge. DWP must seek and secure a determination by the EPA as to the continued applicability of the 301(g) variance in light of the above referenced State Board determination. In the event that EPA invalidates the 301(g) variance, the DWP must demonstrate compliance with the Regional Board Basin Plan provision for residual chlorine concentration not to exceed 0.1 mg/L. The DWP must demonstrate compliance of the existing units and the proposed new units with either operational modifications or implementation of alternative bio-control technologies.

C. The DWP must demonstrate that, in the absence of dilution credit, except for intake water credit, the discharge water priority pollutants comply with the California Toxics Rule (CTR) and the Policy for Implementation of the California Toxics Rule for Inland Surface Waters, Enclosed Bays and Estuaries (SIP). The DWP must demonstrate compliance of the existing units and the proposed new units with either operational modifications, or removal of process waste streams from the cooling effluent, or the implementation of alternative wastewater treatment technologies.

The Regional Board staff recommend that a scope of work be submitted by DWP for all proposed monitoring, engineering studies, and requests to the EPA and other state and federal agencies needed to comply with the above requirements. This information must be submitted to the Regional Board no later than February 14, 2003.

Should you have any questions, please contact Dr. Tony Rizk at (213) 576-6756.

Sincerely,

Dennis A. Dickerson
Executive Officer

Attachment: State Water Resources Control Board Memorandum from Stan Martinson, Chief Division of Water Quality, to California Regional Water Quality Control Board, Los Angeles Region, Dennis Dickerson, Executive Officer, dated December 11, 2002 – Alamitos Generating Station, AES Corporation (NPDES No. CA00001139) and Haynes Generating Station, Los Angeles Department of Water and Power (NPDES No. CA0000353)

cc: See attached mailing list

MAILING LIST

Environmental Protection Agency, Region 9, Permit Section (WTR-5)
Ms. Robin Stuber, USEPA, Region 9
Mr. Tom Huetteman, Clean Water Act Compliance, EPA, Region IX
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Services, Division of Ecological Services
NOAA, National Marine Fisheries Service
Mr. Michael Lauffer, Office of Chief Counsel, State Water Resources Control Board
Mr. Robert Sams, Office of Chief Counsel, State Water Resources Control Board
Mr. James Maughan, Division of Water Quality, State Water Resources Control Board
California Department of Fish and Game, Marine Resources, Region 5
Mr. Tom Luster, California Coastal Commission
Mr. Bill Tippets, Department of Fish and Game
California Department of Health Services, Environmental Branch
Ms. Vera Melnyk Vecchio, Drinking Water Field Operations Branch, State Department of Health Services
Ms. Marianne Yamaguchi, Santa Monica Bay Restoration Project
Mr. Roger Johnson, California Energy Commission
Mr. Paul Richins, California Energy Commission
Mr. Dave Abelson, California Energy Commission
Mr. James Reede, California Energy Commission
Dr. Mark Gold, Heal the Bay
Mr. David Beckman, Natural Resources Defense Council
Mr. Steve Fleischli, Santa Monica BayKeeper
Mr. Terry Tamminen, Environment Now
Los Angeles County, Department of Public Works, Environmental Programs Division
Los Angeles County, Department of Health Services
City of Long Beach, Department of Public Works
City of Los Angeles, Stormwater Management Division
City of Los Angeles, Bureau of Sanitation, Industrial Waste Management
Mr. Steve Maghy, Environmental Affairs, AES Alamitos Generating Station

Attachment 8

May 19, 2004

Mr. Dennis Dickerson
Executive Officer
Regional Water Quality Control Board-
Los Angeles Region
320 West Fourth Street, Suite 200
Los Angeles, California 90012

Attention: Mr. David Hung

Dear Mr. Dickerson

Subject: Los Angeles Department of Water and Power (LADWP) Comments on the Tentative Revision of Waste Discharge Requirements for the Haynes Generating Station

LADWP has reviewed the Tentative Revised Waste Discharge Requirements (WDRs) dated April 19, 2004 that were prepared to accommodate the test and start up discharge for the repowered units at Haynes Generating Station (HnGS). LADWP has one overriding comment and a few specific comments.

Discharge Location Nomenclature

In numerous locations, the WDRs make reference to the power plant discharge being into the San Gabriel River Estuary. LADWP disputes the proposed reclassification of this segment of the San Gabriel River as being an estuary and has submitted its objections in several pieces of correspondence, namely LADWP letters dated April 17, 2003 and November 19, 2003. LADWP incorporates those letters by reference, including all references and attachments associated with the letters, into the administrative record as part of the comments on this Tentative Revised WDR.

On January 15, 2003, LADWP received its first written notice from the Los Angeles Regional Board Water Quality Control Board (Regional Board) that it had, via discussions with the State Water Resources Control Board (State Board), reclassified the HnGS discharge from its longstanding (over four decades) classification as an ocean discharge to being an estuarine discharge. The January 15th letter and its attached memoranda provided LADWP no factual

basis or record of consideration for the reclassification proposal other than regulatory definitions and discharge location. This proposed reclassification represents an abrupt and unsupported change from three decades of settled regulatory interpretation by all state and federal agencies with jurisdiction over the permit. LADWP believes that reclassifying these facilities based solely on the regulatory definition and the location of the discharge ignores nearly three decades of settled regulatory history, is inconsistent with the facts relative to HnGS, and disputes historical and scientific environmental findings.

The Regional Board's June 4, 2001 memorandum to the State Board requesting a water body classification provided no facts or scientific information upon which such a decision could be made. In turn, the State Board, in deliberating on the request, did not request any supporting information. Furthermore, LADWP was not provided an opportunity to provide input with either scientific evidence or historical information that had a bearing on this proposed reclassification. Thus, the resultant reclassification was based solely on the State Implementation Plan (SIP) definition of an estuary and the location of the HnGS discharges. However, as LADWP presented in the two above referenced letters, historical and scientific information exists to suggest that this water body segment is unique and, as a result, its classification does not conform to the use of mere definitional and locational criteria.

LADWP contends that the discharge from HnGS is not into an estuary. EPA, in the Proposed 316(b) Rule, defines an estuary as "a semi-enclosed body of water that has a free connection with open seas and within which the seawater is measurably diluted with fresh water derived from land drainage. The salinity of an estuary exceeds 0.5 part per thousand (by mass) but is typically less than 30 parts per thousand (by mass)." The area surrounding the HnGS outfalls is not measurably diluted with fresh water and certainly not fresh water from land drainage. The salinity of the water in the vicinity of the outfalls ranges between 31.48 and 34.04 parts per thousand (ppt). The salinity of the water upstream of the Alamitos Generating Station, at the 7th Street Bridge, ranges from 2.33 ppt at the surface to 31.64 ppt at the bottom. (Reference LADWPs November 19, 2003 letter.) The 7th Street Bridge location provides the first evidence of any fresh and salt water mixing.

As presented in LADWP's April 17, 2003 letter, the regulatory definitions of an estuary found in the Thermal Plan, Enclosed Bays and Estuaries Policy (EBEP), Ocean Plan, and the SIP/CTR hinge predominantly on the existence of a mixing zone of fresh and ocean water where the fresh water encounter with the ocean water occurs at the mouth of the river. It is presumed that the mixing zone exists somewhere between the mouth of the river and a point upstream where the tidal influence from the sea water ceases to influence or mix with the fresh water. The EBEP further qualifies the mixing zone as one that exists during a major portion of the year. These conditions do not occur in the lower San Gabriel River. What does occur at the mouth of the river is the mixing of an ocean discharge with ocean water from San Pedro Bay. All of the water within the lower San Gabriel River is essentially thermal ocean water from power plant effluent that extends upstream from the river mouth to a location somewhere below the 7th Street Bridge.

For purposes of NPDES permitting, the ideal question to help determine how this area of the river should be appropriately classified would be, "What was this area like before the power plants were sited and began discharging". Ordinarily the answer to a question like this would be based on conjecture and speculation; however, the Regional Board and the dischargers are fortunate to have credible, tangible, and verifiable information to answer this question. Historical information on the river can be found dating back to 1858 and discussions of manmade alterations to control flooding can be traced to as early as the 1920's. During the 1940's and 1950's, aerial photographs and eyewitness accounts note that a sand bar existed at the mouth of the river because there was insufficient water input to the lower San Gabriel River to breach the berm except for instances of intense storms during the rainy season. During the majority of the year, water in the lower San Gabriel River tended to pond and then percolate into the ground. The first documented studies of the lower San Gabriel River were conducted by the California Department of Fish and Game prior to the river being dredged in 1952 and provide accounts of the water levels and the polluted state of the river. (A full discussion of this information can be found in Attachment 12 to LADWP's April 17, 2003 letter.) A present day likely characterization of the river, if the two power plants did not exist, has been postured and the area equated to the Santa Ana River with tidal action in the lower 0.5 miles and small ponds with no connection to each other for about another 1.0 mile upstream.

If the fresh water/salt water interface exists at or above the 7th Street Bridge and the salinity of the water in the vicinity of the outfalls does not meet the definition of an estuary (nor the biological definition of an estuary) then what should the lower San Gabriel River be considered? Information presented in LADWPs April 17th and November 19th letters discuss this question and conclude that the lower San Gabriel River contains **coastal water** that is also thermally enhanced power plant effluent, it is not an estuary.

In summary, reclassification of the water body to an estuary is inappropriate for the following reasons:

- No changes in plant discharge location from 1959 to the present and no change in regulatory history (except adoption of the SIP, which did not change the 1974 definition of an estuary) exist to support the change in permitting approach.
- To LADWPs knowledge, at no time during regulatory proceedings involving permit reissuance (1959-1995), the approval of the Thermal Study under Provision 3 (water quality objectives for existing coastal water discharges) of the Thermal Plan, the approval of a mixing zone and dilution factor, and the approval of an Ocean Plan exception and federal 301(g) variance for chlorine, did the Regional Board, State Board, EPA, or any stakeholder question the appropriateness of conducting these efforts as an ocean discharger.
- In a March 23, 1982 Regional Board memorandum to the State Board, the Regional Board characterized the San Gabriel Flood Control Channel in the vicinity of the power plant discharges as a large surface channel discharge.
- Via issuance of the 1984/1985 NPDES permits under the Ocean Plan, the Regional Board affirmatively responded to LADWPs request to regulate the discharge as an ocean discharge.
- Actual historical information exists which suggests the water body segment before existence of the power plant discharges was a dry channel bed with isolated puddles after a storm event, clearly not an estuary.
- Due to the characteristics of the channel bottom and the presence of the power plant discharge, ocean water never interfaces with fresh water to create an estuary situation.
- The salt water power plant discharge meets ocean water at the mouth of the river and the salt water/fresh water (power plant salt water discharge and publically owned treatment works fresh water effluent) interface is upstream of the power plant discharge.

Future Actions and Recommendations

LADWP issued a task assignment on April 6, 2004 to its consultants to fully study the hydraulic nature of the Lower San Gabriel River to determine where the estuary exists and does not exist, as well as other scientific undertakings. LADWP hopes to have a complete scope of work to submit to Regional Board staff for their review and approval in the first half of June. LADWP has committed the funds to carry out the study once an approved approach has been agreed to.

LADWP recommends that until a thorough and complete study can be conducted and the findings reviewed, that the water body segment into which LADWP discharges be referred to as the San Gabriel River Flood Control Channel and that all references to this area as an estuary be deleted from the Tentative WDR modifications.

Specific WDR Comments

Order Page 2, Finding 6

Update the facility address to read: 6801 ~~Westminster Avenue~~ Second Street

The reverse osmosis process at HnGS exists to provide purified water for boiler make up water and has no connection to the proposed desalination facility to be constructed on the facility property. LADWP suggest the following rewrite: "...reverse osmosis membrane reject ~~of the desalination system~~, metal..."

Order Page 2, Finding 11

To reduce confusion regarding the requirements of the finalized Clean Water Act 316(b) Rule, LADWP recommends that the compliance performance standard as stated in the Rule be utilized. LADWP suggest the following rewrite: " ....reduce impingement of fish and other aquatic organisms by 80-95% ~~up to 90%~~ and reduce entrainment of said organisms by 60-90% ~~up to 85%~~."

Implementation of, and compliance with, the 316(b) Rule will be a lengthy process transpiring over the next 4 and one-half years from the date of Federal Register publication. Because of this lengthy process, LADWP suggests that the last sentence regarding implementation be reworded to reflect that it is not a definitive snap shot in time but a process that will commence during the NPDES permit renewal. LADWP suggest the following wording: "The implementation of these rules shall commence ~~occur~~ during the NPDES permit renewal."

Order Page 3, Finding 14

For the reasons outlined above, LADWP requests that this finding be deleted until studies can be completed, reviewed and a scientific determination as to the proper classification of the discharge area can be made. As previously noted, this State Board determination was made without input from the discharger, thus denying LADWP input and due process.

Order Page 5, Amendment No. 2

LADWP requests the deletion of the parenthetical "(end of pipe)". LADWP believes this again reflects a premature decision on the part of the Regional Board staff that a mixing zone, dilution factors, and intake credits are not applicable to the discharge. The previously referenced study proposed by LADWP should be able to address the appropriateness of a mixing zone and therefore dilution factors. Several other factors, including the ultimate water body classification, also enter in to whether mixing zones, dilution factors, and intake

credits are appropriate and these should all be reviewed and addressed by the Regional Board and LADWP before a decision that end of pipe compliance is necessary.

LADWP appreciates the opportunity to comment on this permit. If you have any questions or require additional information, please feel free to contact me at (213) 367-0279.

Sincerely,

"Original Signed By"

Susan M. Damron
Manager of Wastewater Quality Compliance

SMD: bdc

Attachment 9

Flow Science Incorporated
723 E. Green St., Pasadena, CA 91101
(626) 304-1134 • FAX (626) 304-9427

FLOW SCIENCE

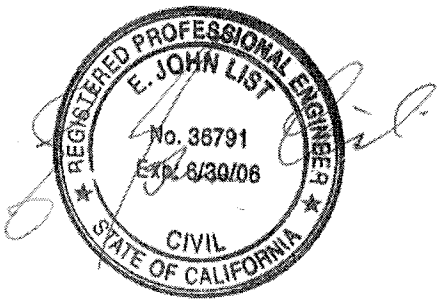
TECHNICAL MEMORANDUM

THE SAN GABRIEL RIVER FLOOD CONTROL CHANNEL:

EMBAYMENT OR ESTUARY?

Prepared
for
Los Angeles Department of Water and Power
Los Angeles, California

Prepared by:



E. John List, Ph.D., P.E.
Principal Cosultant

FSI 044015-4
June 12, 2006

FLOW SCIENCE

SUMMARY

Early coastal charts from ca. 1860, and aerial photographs of Alamitos Bay from 1927 and 1938, suggest that, typical of meandering rivers, the natural course of the San Gabriel River involved at least two discharge locations within Alamitos Bay. Furthermore, there is some evidence that both river mouths were simultaneously active, at least during flood events. A photograph from 1927 shows clearly that about the time of the construction of the Long Beach Marine Stadium, a lower section of the river had been channelized, which had the effect of closing off the northern river mouth that discharged into the stadium, bypassing several river meanders and redirecting the entire river into the Bay at the southern river mouth. Subsequently, and prior to1938, an additional new channel was excavated that extended the channelized section of stream, cut off flow to the southern rivermouth, and further redirected the river to discharge into the Alamitos Bay entrance. Between 1938 and 1947 the river discharge was entirely separated from Alamitos Bay by the construction of a separate jettied entrance to Alamitos Bay. The three jetties that define the entrance to the Bay and the mouth of the channel were later extended into San Pedro Bay during the construction of the Alamitos Bay Marina, which is at the approximate location of the original southern mouth of the San Gabriel River. In summary, the San Gabriel River estuary that was present prior to 1925 no longer exists, and the river flow, once discharged to Alamitos Bay, has been completely redirected into the San Gabriel River Flood Control Channel.

This brief technical memorandum therefore addresses the issue of whether the lower reaches of the San Gabriel River Flood Control Channel constitute an estuary or an embayment. A number of definitions of estuary, embayment and tidal prism are available (see Appendix A). The following technical definitions embody the essential element of each water body:

Estuary:
A coastal body of water that is semi-enclosed, openly connected with the ocean, and mixes with freshwater drainage from land. It is an environment where terrestrial, freshwater, and seawater (saline) habitats overlap as a result of the tidally-driven inflow of salt water.

Embayment:
Portions of open water or marsh defined by natural topographical features such as points or islands, or by human structures such as dikes or channels.

Tidal Prism:
A volume of water exchanged between an estuary or a lagoon and the open sea during one tidal period.

In other words, the essential element of an estuary is the tidally-driven mixing of seawater from the ocean with freshwater from the land, while an embayment is an open body of saline ocean water separated from the open ocean by distinct topographical features.

Available salinity and temperature data in the lower reaches of the San Gabriel Flood Control Channel indicate that the lowest reach of the San Gabriel River Flood Control Channel, which includes that section of channel containing the power plant discharges, is actually an embayment. While salinity data indicate the presence of a freshwater-salt water wedge within the lower San Gabriel River upstream of this embayment, there is no tidally-driven water exchange between the river and the open ocean. In fact, even during a rising tide, the flow of water continues from the channel to the bay, so that a key element of an estuary is not present. Furthermore, the presence of the saltwater wedge in the channel is an artifact of (a) the diversion of the river from Alamitos Bay by the construction of the flood control channel, (b) the presence of a significant flow of treated wastewater discharged into the channel, and (c) the discharge of a large volume flow rate of Alamitos Bay water from the power plants into the channel. The San Gabriel River estuary actually ceased to exist as a result of construction of the Long Beach Marine Stadium and the Alamitos Bay Marina.

A review of the Los Angeles Regional Water Quality Control Board Administrative Record and Basin Plan for specific definitions of the San Gabriel River Estuary indicates that the lower reaches of the San Gabriel River Flood Control Channel fall clearly within the definition of a "Bay", as defined by the Regional Board. Whether or not there is an "Estuary", as defined by the Regional Board, within the flood control channel, is dependent upon the interpretation of "tidal prism." The Regional Board states that the tidal prism in an engineered channel is functionally equivalent to an estuary. However, since there is no tidally-induced exchange flow of ocean water into the San Gabriel River Flood Control Channel, there is no "tidal prism" in the generally accepted sense of the words, and it would appear that there can be no functionally equivalent estuary.

HISTORICAL BACKGROUND

Historically, the San Gabriel River entered San Pedro Bay at a number of locations, primarily because both it and the Los Angeles River meandered over the flood plain that is now the location of much of metropolitan Los Angeles. As one historical source states:

> "Two of the larger rivers flowed in much different channels than they do now. The Los Angeles River emerged from the San Fernando Valley where it does today, but turned west to reach the sea at Santa Monica Bay. The San Gabriel came down from its canyon, through the hills at Whittier Narrows, and angled southwest and south to end near San Pedro. A smaller stream, the San Jose Creek, flowed south where the San Gabriel River flows today. None of the rivers had a clear channel to the ocean, but tended to spread out into wide marshy areas from which rivulets would drain.
>
> "During the dry season, the rivers would all but disappear from the surface though their waters ran underground. When it rained, vast amounts of water poured down the mountain canyons and spread across the flatlands making the whole basin into an enormous lake that slowly disappeared into marshes."
> (Source: http://www.ci.cerritos.ca.us/library/history/chapter1.html)

This description is illustrated by two charts of San Pedro Bay that map the area essentially before any development. **Figure 1** is from an 1859 survey (U.S. Coast Survey Chart that is available in the Thomas Building at the California Institute of Technology), showing most of the area between what is now Long Beach and the San Gabriel River as marshlands. In 1859, the San Gabriel River joined San Pedro Creek forming what was then known as Rattlesnake Island (now Terminal Island).

An 1857 navigational chart (see **Figure 2**) of the approach to San Pedro Bay shows additional offshore islands (sand bars) and detail within the San Pedro Creek Estuary. This chart apparently ends where the San Gabriel River entered San Pedro Bay.

Steady reclamation of the marshland to the west of the San Gabriel River (now the City of Long Beach) accompanied the dredging of San Pedro Creek to form the Los Angeles and Long Beach Harbors. This, in turn, led to the clear separation of Alamitos Bay from the remainder of San Pedro Harbor. In further reclamation work, some 7 million cubic yards of sediment was dredged out to construct the Marine Stadium for the 1932 Los Angeles Olympic Games[1]. Prior to this construction a northern channel of the San Gabriel River had entered Alamitos Bay approximately where the Cerritos Channel is now located. A southern channel of the San Gabriel River entered Alamitos Bay at the approximate site of the existing marina. Photographs, referenced below, make it clear that at least during flood events both channels were active. An aerial photograph taken in 1927, included here as **Figure 3,** shows the old north and south San Gabriel River channels and the diversion that removed the river from the marine stadium and channelized a section of the river, bypassing some river meanders.

[1] http://www.longbeachrowing.org/history/history_home_page.htm

In the past, severe flooding frequently occurred across the broad Los Angeles flood plain as a result of high winter runoff in both the Los Angeles and San Gabriel Rivers. In particular, major floods occurred in 1861-62, 1867, and 1891. In response to these events, the San Gabriel and Los Angeles Rivers were channelized. **Figure 4** is a photograph (March 4, 1938) of Alamitos Bay showing how the initial channelization of the river was extended to discharge the San Gabriel River into the mouth of Alamitos Bay. The photograph shows flood waters discharging to San Pedro Bay during an extreme flood event (March 2, 1938 was the wettest day in Los Angeles history with 5.88 inches of rain). An original northern path of the San Gabriel River prior to the Marine Stadium diversion (now the Cerritos Channel), is clearly visible in the left center of the photograph, and in this photograph the flooding river has broken through the channelization to discharge into the stadium.

The photograph makes it clear that sometime prior to March 1938 the San Gabriel River Flood Control Channel was redirected from two possible entries into Alamitos Bay to discharge through the entrance to Alamitos Bay.

By 1947 the San Gabriel River had been separated from Alamitos Bay by the construction of a separation wall, which is visible in a 1947 photograph that is not reproduced here. A January 15, 1951 photograph (**Figure 5**) clearly shows this separate channel and a high degree of sediment accumulation within the San Gabriel River Flood Control Channel and also within Alamitos Bay. The development of the Alamitos Bay Marina, which started in 1953, is not apparent in the photograph. A later photograph taken on July 13, 1956 (not included), shows that the marina was still under construction, although the jetty on the north side of Alamitos Bay entrance and the jetty separating the San Gabriel River flows from the bay had both been extended. A photograph taken in August 1959 (**Figure 6**) shows the completed marina and jetties. **Figure 7,** a photograph taken on October 11, 1962, shows the Haynes Generating Station cooling water channel and the completed marina. The Haynes and Alamitos Generating Stations were constructed, together with their respective cooling water inlet channels, in the mid to late 1950s. These cooling water channels take water directly from the Alamitos Bay Marina and the Los Cerritos Channel , respectively, and discharge it into the Flood Control Channel (see figures below).

Thus, in the period ca. 1926-1956 the San Gabriel River estuary was removed and the river was channelized into its current configuration. The river outlets were moved from Alamitos Bay to San Pedro Bay at a location immediately south of the Bay entrance, thereby eliminating any direct connection with Alamitos Bay, except through the power plant cooling water systems. The redirection of the San Gabriel River from Alamitos Bay protected the Marine Stadium and the marina from large flood events and the accompanying sediment carried by these floods. In fact, the San Gabriel River historically deposited enough sediment at its outlet that a sand berm would form and flow would be diverted through San Pedro Creek, as shown in **Figure 1**. According to

historical records, the floods of 1861-62 deposited so much sediment that the harbor was effectively closed.[2]

A recent satellite photograph of Los Angeles- Long Beach Harbor (see **Figure 8**) shows that extensive development has occurred in the past 140 years, although a comparison of **Figure 7, Figure 8, and Figure 9** shows that very little has changed in Alamitos Bay since about 1959. **Figure 9** shows an enlarged plan view of Alamitos Bay and the San Gabriel Flood Control Channel, including the Alamitos and Haynes Generating Stations at the top of the photograph adjacent to the Flood Control Channel. **Figure 10** provides details of the location of the cooling water discharges to the flood control channel.

Current Situation

As shown in **Figure 8** and **Figure 9**, the San Gabriel River now discharges directly to San Pedro Bay through the San Gabriel River Flood Control Channel. There are three primary sources of water in the channel. First, approximately 100 mgd of tertiary-treated reclaimed wastewater is now discharged to the river by the San Jose Creek and Los Coyotes treatment plants, which are operated by the County Sanitation Districts of Los Angeles County (LACSD). Because reclaimed water has been discharged to the channel year round since the treatment plants were constructed,[3] during dry weather flow conditions the channel upstream of the cooling water flows is effluent-dominated. Some urban runoff also enters the channel. Second, during winter storms the channel flow can increase sharply in response to rainfall and storm runoff, which can be substantial, especially during El Niño years. For example, in 1967/68 the peak flow was 47,000 mgd (72,000 cfs, 2,060 m^3/sec). Third, flow in the lower reaches of the channel consists primarily of warm seawater effluent from the Alamitos and Haynes Generating Station cooling water discharges, the locations of which are indicated in **Figure 10**.

Haynes Generating Station draws its cooling water directly from the NE corner of Alamitos Bay. From the bulkhead of the marina, water is passed through seven 96-inch diameter conduits, under the Pacific Coast Highway and the San Gabriel River Flood Control Channel, and into another channel, roughly parallel to the Flood Control Channel, that leads to the generating station cooling water intake pumps. Alamitos Generating Station draws its cooling water from Alamitos Bay via the Los Cerritos Channel. The inflow canals are visible in **Figure 9** and **Figure 10**. After passing through the generating stations, the cooling waters are discharged directly to the San Gabriel River Flood Control Channel at the locations indicated on **Figure 10**.

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[2] This is a common feature of ephemeral streams in California and would probably still be the situation at the San Gabriel Flood Control Channel terminus in San Pedro Bay , as is evident in **Figure 5,** if (a) the power plant cooling water were not in the channel and (b) most of the river sediment were not retained in the Santa Fe Flood Control Basin upstream.

[3] Water reclamation plants operated by LACSD and their dates of construction are as follows: Pomona (1926, and originally known as the Tri-cities plant), Los Coyotes (1970), San Jose Creek East (1971) and West (1993), Long Beach (1973), and Whittier Narrows (1962). Flow rates and levels of treatment have changed over time.

Because the power plants draw their cooling water from Alamitos Bay, there is a hydrologic connection between the lower San Gabriel River Channel and Alamitos Bay that (in the current, channelized configuration) would otherwise not exist. In fact, the volume of water circulated from Alamitos Bay to the lower San Gabriel River channel is far larger than the dry weather freshwater flows in the river channel upstream of the generating stations.

The comprehensive field studies performed as part of the 1972 studies of thermal effects from the generating stations provide a significant amount of detail regarding the operation of the power plants and their effects on the lower channel.[4] The combined power plant design discharge is 2,200 mgd, or about 12 million cubic feet per hour, of which 1014 mgd is from the Haynes plant. During the outgoing tide the maximum flow rate from the channel to San Pedro Bay, which includes the power plant flow, is approximately 20-22 million cubic feet per hour. Even during a rising tide the flow of water is from the channel to the bay. The minimum channel flow occurs at high tide and is about 4 million cubic feet per hour. Because the net discharge is always from the channel to the ocean when the power plants are operating at capacity there is no tidally-driven flow into the channel. The effect of the tide is simply to reduce the volume rate of outflow within the channel and to cause variations in the water surface elevation in the channel. Because the channel downstream of the power plant discharges does not experience any tidally-driven inflow of ocean water, it does not meet this basic definition of an estuary.

While both San Pedro Bay water and the power plant discharges have essentially the same salinity levels, San Pedro Bay water is significantly cooler than the power plant discharges, as is evident in the vertical profiles of temperature taken in the lower channel during the 1972 field studies. These data show that even during high tide the cooler ocean water barely penetrates into the bottom of the lower reaches of the channel, as illustrated in **Figure 11** and **Figure 12**, which show typical examples of the thermal pattern during winter and summer, respectively. Station RW-6 is located at the intersection of the flood control channel and San Pedro Bay.

An important effect of the cooling water circulation through Alamitos Bay is the near-continual flushing of the Bay, which would, despite the existence of a tidal prism in Alamitos Bay, experience poor water quality without the flushing induced by the power plant flows. This was clearly demonstrated by hydraulic model studies performed prior to the construction of the marina[5], which showed (in the absence of the power plant

[4] Alamitos Generating Station Haynes Generating Station, Thermal Effect Study. Report prepared for Southern California Edison Company and Los Angeles Department of Water and Power by Environmental Quality Analysts, Inc and Marine Biological Consultants, 1972.

[5] Moffat and Nichol, Inc., George F. Nicholson and J.W.B. Blackman, 1954. Alamitos Bay Marina, Long Beach, California. Report of Comprehensive Study and Model Study for Alamitos Bay Marina prepared for the Honorable City Council, The City Manager and the City Engineer of Long Beach, California, 126 pp.

flows) near-zero fluid speeds were found in the easternmost corner of the Alamitos Bay and along the northeast bulkhead (see Moffatt and Nichol studies). The 316(b) studies performed by Intersea Research Corporation in 1981 found a drastically different situation with the power plant in operation[6].

Except for the highest storm flows, the interaction within the flood control channel of the fresh water[7] channel flow and the saline power plant cooling waters occurs upstream of the power plant discharges, as demonstrated by the recent field studies performed by MBC, the results of which are presented in **Figure 13** through **Figure 16**. Power plant cooling water flow rates range up to 2,200 mgd and are much larger than dry weather freshwater flows in the river (about 100 mgd), and the mixing of the cooling water with other water in the channel is fairly rapid and complete. However, there is a clearly defined saline wedge that exists in the flood control channel upstream of the power plant discharges. Although such saline wedges are a typical physical feature of estuaries, saline wedges can occur in non-estuarine environments as well (e.g., the Straits of Gibraltar have a clearly defined saline wedge). For the San Gabriel River the salt water wedge is simply an artifact created by (a) construction of the engineered river channel, (b) the addition of a substantial fresh water component from treated wastewater flow to what would normally be an ephemeral stream, and (c) the diversion of a very large flow of seawater originally from Alamitos Bay but discharged as a saltwater effluent into the river. As can be seen in the 1927 (**Figure 3**) and 1951 (**Figure 5**) aerial photographs, the normal stream flow in the river is so small and the sediment encroachment so large that any saltwater wedge in the absence of the power plants and the wastewater flow would be tiny.

The field data in **Figures 13, 14, 15, and 16** demonstrate clearly that when the power plants are operating, the interface between fresh and saltwater is actually an interface between freshwater effluent (from the upstream channel) and saltwater effluent from the power plant discharges (i.e., ocean water from Alamitos Bay). There is no interface between freshwater from the upstream channel and ocean water that directly enters the channel from San Pedro Bay with the tides. As shown in **Figures 11 and 12**, this San Pedro Bay water is held very close to the channel terminus by the strong cooling water outflows, while the saline wedge of saltwater effluent extends upstream in the San Gabriel River Flood Control Channel from the AES Power Plant discharge. At low tide this wedge extends to the 405 Freeway Bridge. At high tide, this wedge is located significantly farther upstream. This region of the San Gabriel River Flood Control Channel shows one of the physical attributes of an estuary, that is to say an area where salt water and fresh water meet; however, another defining criterion, tidally-induced transfer between the river channel and the open ocean, is missing. The position of this wedge moves in response to the change in tidal elevation in the ocean, but no tidally-

[6] Haynes Generating Station Cooling Water Intake Study 316(b) Demonstration Program. Report prepared for Los Angeles Department of Water and Power by Intersea Research Corporation, November, 1981.
[7] The "fresh water" during most of the year is primarily treated wastewater released from four upstream wastewater treatment plants. At times of intense rainfall it can also include significant stormwater runoff.

driven ocean water enters the flood control channel when the power plants are in operation, and the net flow of water is always seaward.

BAY OR ESTUARY ?

Historically, the San Gabriel River may have had a short-lived natural estuary when river flow rates were high enough to result in freshwater discharge directly to the Pacific Ocean (i.e., in response to storm events, such as illustrated in Figure 4). During these events, San Pedro Bay water would be driven toward the river mouth by tidal action, and a tidal prism and saline wedge would have been present at the river mouth during times when the river mouth was open. Subsequently, at the time the river outlet was directed into Alamitos Bay, between about 1868 and 1946, the estuary would have occurred at the intersection of the river mouth with the shoreline within Alamitos Bay, but again, only during the limited times when river flow rates were high enough to allow water to reach the Bay. After 1946, the river was separated from Alamitos Bay and the very lower reaches of the channel were filled with San Pedro Bay water by the tide until the power plant cooling water pumps were started sometime after 1956. Between about 1946 and 1956, there were no power plant discharges, but there was also little dry weather freshwater flow in the river because the wastewater treatment plants were discharging very low flows of secondary effluent to the river at this time. As shown in **Figure 5**, this led to heavy sediment accumulation within the channel.

Normally, in any coastal configuration the geographic area within the bay entrance that is continuously filled with bay water is designated as part of the bay. Freshwater bodies that connect to the bay and that are intermittently filled with tidally-driven bay water and a significant flow of fresh water are designated as estuaries. Because the lower San Gabriel River Channel is continuously filled with power plant saltwater effluent that originated from Alamitos Bay, it has the same salinity and essentially the same water quality characteristics as Alamitos Bay water. The state defines saltwater as water in which the salinity is equal to or greater than 10 parts per thousand (ppt) 95 percent or more of the time (Draft Chlorine Policy), and the salinity of seawater (from an oceanographic perspective) is generally viewed as ranging from 25 to 38 ppt. Thus, the lower channel is continuously filled with seawater from the power plants and the upstream fresh water mixes with the saltwater effluent creating a saline wedge. Although the position of this wedge within the channel is a function of downstream tidal conditions, there is no tidal prism that exchanges with the open ocean, so that an essential feature of a true estuary is not present. Similarly, measurements have demonstrated that the salinity of the water both at the interface between the warm power plant effluent and cold San Pedro Bay water and just downstream of the interface between the power plant effluent and the freshwater from upstream is equivalent to ocean water salinity, this water should more appropriately be considered water enclosed within an embayment.

The primary purpose of the concrete structures that separate the river channel and the generating station outfalls from the rest of Alamitos Bay is to prevent the high storm

water river discharges from creating problems in the Bay (high flows and sedimentation). Incidentally, this separation minimizes recirculation of warmed Bay water through the power plant intakes.

Thus, water in the lower reaches of the San Gabriel River Flood Control Channel during the vast majority of the year predominantly originates (about 95%) from Alamitos Bay water and has salinity values approximately equivalent to Alamitos Bay. Because an estuary is defined as the interface of tidally-driven ocean water with a sizeable upstream river flow, the lower section of the San Gabriel River Flood Control Channel cannot be considered as an estuary when the power plants are operating, as is evident in **Figures 11 through 16** presented above. The natural San Gabriel River estuary was in fact obliterated by the construction of the Long Beach Marine Stadium and the Alamitos Bay Marina. Although the region of the flood control channel located upstream of the power plant discharges does contain a wedge of freshwater effluent overlying saltwater effluent, which originated in Alamitos Bay, this wedge is simply an artifact of the construction of the Flood Control Channel, the two operating power plants, and the release of treated wastewater to the San Gabriel River. As the historical photographs so vividly demonstrate, in the absence of these factors, the San Gabriel River existed only as an ephemeral meandering stream, subject to periodic flood discharges. The present configuration does not contain the primary feature of an estuary, which is the interchange of fresh water with tidally-driven water from the ocean, and is therefore not an estuary.

BASIN PLAN AND ADMINISTRATIVE RECORD

In addition to the technical discussion and definitions provided in the foregoing analysis, the administrative record for the Water Quality Control Plan (Basin Plan) for the Los Angeles Region was reviewed in order to determine the definitions that were used in establishing beneficial uses for the San Gabriel River and Alamitos Bay. In January 1973, the Regional Water Quality Control Board (Regional Board) and State Water Resources Control Board (State Board) provided supplemental definitions to clarify definitions contained in Section 13050 of the California Water Code. These definitions were provided as part of a workshop on Beneficial Uses and Water Quality Objectives, and were as follows:

"**Bays** – Indentations along the coast which enclose an area of oceanic water within distinct headlands or harbor works."

"**Estuaries** – Waters at the mouths of streams which serve as mixing zones for fresh and ocean waters. Estuaries will generally be considered to extend from a bay or the open ocean to the inland limit of tidal action, but they may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters."

"**Enclosed Bays** – Indentations along the coast which enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays will include all bays where the narrowest distance between headlands or outermost harbor works is less than 75% of the

greatest dimension of the enclosed portion of the bay. This definition includes, but is not limited to, Los Angeles Harbor."

"**Estuaries and Coastal Lagoons** – waters at the mouths of streams which serve as mixing zones for fresh and ocean water during a major portion of the year. Mouths of streams which are temporarily separated from the ocean by sandbars shall be considered as estuaries. Estuarine waters will generally be considered to extend from a bay or the open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters."

In the 1975 Basin Plan, the following beneficial uses were assigned to the "San Gabriel River Tidal Prism": IND (industrial), REC1 (contact recreation), REC2 (non-contact recreation), COMM (commercial and sportfishing), RARE (rare, threatened, or endangered species), MAR (marine habitat), and SAL (inland saline water habitat).

No subsequent updates of the regulatory definitions from 1973 have been located in the administrative record, but in 1994, updates to the Basin Plan included the addition of three new beneficial uses: aquaculture, estuarine habitat, and wetlands habitat. The estuarine habitat (EST) beneficial use was defined as "uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds)." The EST beneficial use was added to the "San Gabriel River Estuary."

The 1994 Basin Plan assigned the following beneficial uses to the "San Gabriel River Estuary": IND, NAV (navigation), REC1, REC2, COMM, EST, MAR, WILD (wildlife habitat), RARE, MIGR (migration of aquatic organisms), and SPWN (spawning, reproduction, and/or early development). The 1994 Basin Plan also contained the following footnote for the San Gabriel River Estuary: "These areas are engineered channels. All References to Tidal Prisms in Regional Board documents are functionally equivalent to estuaries."

Review and Comment

The actions taken and statements made by the Regional Board can be reviewed in the context of the foregoing description of the history and hydrodynamics of Alamitos Bay and the San Gabriel River Flood Control Channel.

First, it is clear that the definition of a "Bay" and "Enclosed Bay" within the Basin Plan and Administrative Record is entirely congruent with the concept that the lower reaches of the San Gabriel River Flood Control Channel are an embayment. The key element is:

> *"Indentations along the coast which enclose an area of oceanic water within distinct headlands or harbor works."*

Unquestionably, the lower reaches of the San Gabriel River Flood Control Channel enclose an area of oceanic water (as defined by its salinity) within distinct headlands or harbor works.

The second issue is whether any part of the San Gabriel River Flood Control Channel is an estuary. The key element of the Regional Board definition is:

> *"Waters at the mouths of streams which serve as mixing zones for fresh and ocean waters. Estuaries will generally be considered to extend from a bay or the open ocean to the inland limit of tidal action, but they may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters."*

The definition refers to the mixing zone for fresh and ocean waters. The results of the field studies previously referenced indicate quite clearly that such a zone does not exist in the San Gabriel River Flood Control Channel. Rather, the interface is between fresh water effluent from upstream and seawater effluent discharged by the generating stations. The actual ocean water of the San Pedro Bay is held to the mouth of the channel by the constant outflow of power plant seawater effluent. As to the term, "the inland limit of tidal action," as previously noted there is no tidally-induced mixing in the flood control channel and there is no tidal exchange of water from the ocean to the flood control channel while the power plants are operating. However, the tide does control the water surface elevation in the flood control channel.

The 1994 Basin Plan also contains the following footnote for the San Gabriel River Estuary:

> *"These areas are engineered channels. All References to Tidal Prisms in Regional Board documents are functionally equivalent to estuaries."*

As previously noted, in fact there is no tidal prism, in the generally accepted sense of the words, within the San Gabriel River Flood Control Channel, because there is no tidal flow into the flood control channel. Thus, in this sense, there is no functionally equivalent estuary.

APPENDIX - Definitions of Estuary, Embayment and Tidal Prism on the Web:

Estuary

- the wide part of a river where it nears the sea; fresh and salt water mix
  wordnet.princeton.edu/perl/webwn

- An estuary is a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water mixes with fresh water. The key feature of an estuary is that it is a mixing place for sea water and a significantly-sized river to supply fresh water. A tide is a necessary component to maintain a dynamic relationship between the two waters. ...
  en.wikipedia.org/wiki/Estuary

- the wide lower course of a river where its current is met by the tides of the ocean.
  www.sbwater.org/Terms.htm

- a semi-enclosed body of water where fresh water and salt water meet.
  museum.nhm.uga.edu/gawildlife/glossary/gawwglossary.html

- The thin zone along a coastline where freshwater systems and rivers meet and mix with a salty ocean (such as a bay, mouth of a river, salt marsh, lagoon).
  www.srh.weather.gov/srh/jetstream/append/glossary_e.htm

- A semi-enclosed body of water which has a free connection to the open sea and within which seawater is measurably diluted by fresh water derived from land drainage.
  www.estuaries.gov/glossary.html

- Regions of interaction between rivers and nearshore ocean waters, where tidal action and river flow create a mixing of fresh water and saltwater. These areas may include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife.
  www.ec.gc.ca/water/en/info/gloss/e_gloss.htm

- Mouth of a river where its fresh water mixes with salt water and is affected by tides.
  sites.state.pa.us/PA_Exec/Fish_Boat/pafish/fishhtms/glossar.htm

- The broad lower course of a river that is encroached on by the sea and affected by the tides.
  usinfo.state.gov/products/pubs/geography/glossary.htm

- A complex ecosystem between a river and near-shore ocean waters where fresh and salt water mix. These brackish areas include bays, mouths of rivers, salt marshes, wetlands, and lagoons and are influenced by tides and currents. Estuaries provide valuable habitat for marine animals, birds, and other wildlife.
  www.nsc.org/ehc/glossary.htm

- A bay or inlet, often at the mouth of a river, in which large quantities of freshwater and seawater mix together. These unique habitats are necessary nursery grounds for many marine fishes and shellfishes
  antron.dupont.com/content/resources/green_glossary/ant06_04_05.shtml

- A coastal water resource where fresh water from rivers mixes with salt water from the ocean. www.soil.ncsu.edu/publications/BMPs/glossary.html

- an environment where terrestrial, freshwater, and seawater (saline) habitats overlap www.nwrc.usgs.gov/fringe/glossary.html

- An estuary is where a river meets the sea. www.enchantedlearning.com/subjects/sharks/glossary/indexe.shtml

- A water passage where salt water meets fresh water. Estuaries often contain salt marshes and other wetlands, which are important habitat for many species. Wide, brackish mouth of a river where tide meets current; transitional environments between fresh water and salt water. 2) An embayment along a coastline where rivers meet the sea. An estuary often contains waters of different salinities. ... response.restoration.noaa.gov/cpr/watershed/calcasieu/calc_html/resources/glossary.html

- A body of water that is partially enclosed by land but is still connected to the open ocean. Also, within the estuary, salt water from the ocean mixes with fresh water from the land, usually from a river. 159.121.112.22/coast/glossary.html

- A bay at the mouth of a river formed by subsidence of the land and/or a rise in sea level. Fresh water from the river mixes with the salt water of the sea, giving brackish or low salinity conditions. museum.gov.ns.ca/mnh/nature/nhns2/glossary.htm

- Where fresh water meets salt water. www.mwdoc.com/glossary.htm

- a place where fresh and salt water mix, such as a bay, salt marsh, or where a river enters an ocean. mvhs1.mbhs.edu/riverweb/glossary.html

- (Fishing) Sheltered water, often with grass bottom or grassy shorelines, where juvenile fish have shelter, food and a chance to grow. outdoorstore.espn.com/servlet/catalog.CFPage

- the open mouth of a river, where fresh water and sea water mix. www.artistwd.com/joyzine/australia/strine/e-2.php

- Estuary - A water passage, such as the mouth of a river, where the tide meets the current of a stream. csd.unl.edu/general/glossary-letter.asp

- The mouth or lower course of a river where it meets the sea and is affected by ocean tides. www.ergon.com.au/energyed/glossary.asp

- An area where salt and fresh water mix, typically at the mouth of a river. www.twingroves.district96.k12.il.us/Wetlands/General/Terms.html

- A coastal body of water that is semi-enclosed, openly connected with the ocean, and mixes with freshwater drainage from land. www.streamnet.org/pub-ed/ff/Glossary/glossaryhabitat.html

- The mouth of a river where its currents meet the ocean's tides.
  www.dfo-mpo.gc.ca/canwaters-eauxcan/bbb-lgb/library-bibliotheque/glossary-glossaire/index_e.asp

- Where river currents meet and are influenced by oceanic tides
  bonita.mbnms.nos.noaa.gov/Educate/teachercurriculum/glossary.html

Embayment

- An indentation in a shoreline forming an open bay.
  www.ripcurrents.noaa.gov/glossary.shtml

- An area of water protected by land forming a bay such as Saginaw Bay.
  www.great-lakes.net/humanhealth/about/words_e.html

- A small bay or any small semi-enclosed coastal water body whose opening to a larger body of water is restricted. In Buzzards Bay there are over 30 major embayments in the form of harbors, coves, coastal lagoons (or salt pond), and river mouths.
  www.buzzardsbay.org/citz96-g.htm

- A coastal indentation (or bedrock valley) which has been submerged by rising sea-level, and has not been significantly infilled by sediment. Also: Drowned River Valley
  www.ozestuaries.org/oracle/ozestuaries/conceptual_mods/cm_glossary.htm

- Portions of open water or marsh defined by natural topographical features such as points or islands, or by human structures such as dikes or channels.
  www.wetmaap.org/References/glossary.html

- A low area of coastal land.
  www.wwnorton.com/college/geo/earth2/glossary/e.htm

- bay: an indentation of a shoreline larger than a cove but smaller than a gulf
  wordnet.princeton.edu/perl/webwn

Tidal prism

- The volume of water stored in an estuary or tidal lake between the high and low tide levels; the volume of water that moves into and out of the estuary over a tidal cycle.
  www.deh.gov.au/coasts/publications/nswmanual/glossary.html

- The difference in the volume of water in a waterbody between low and high tides.
  www.epa.gov/owow/nps/MMGI/Chapter5/ch5-3.html

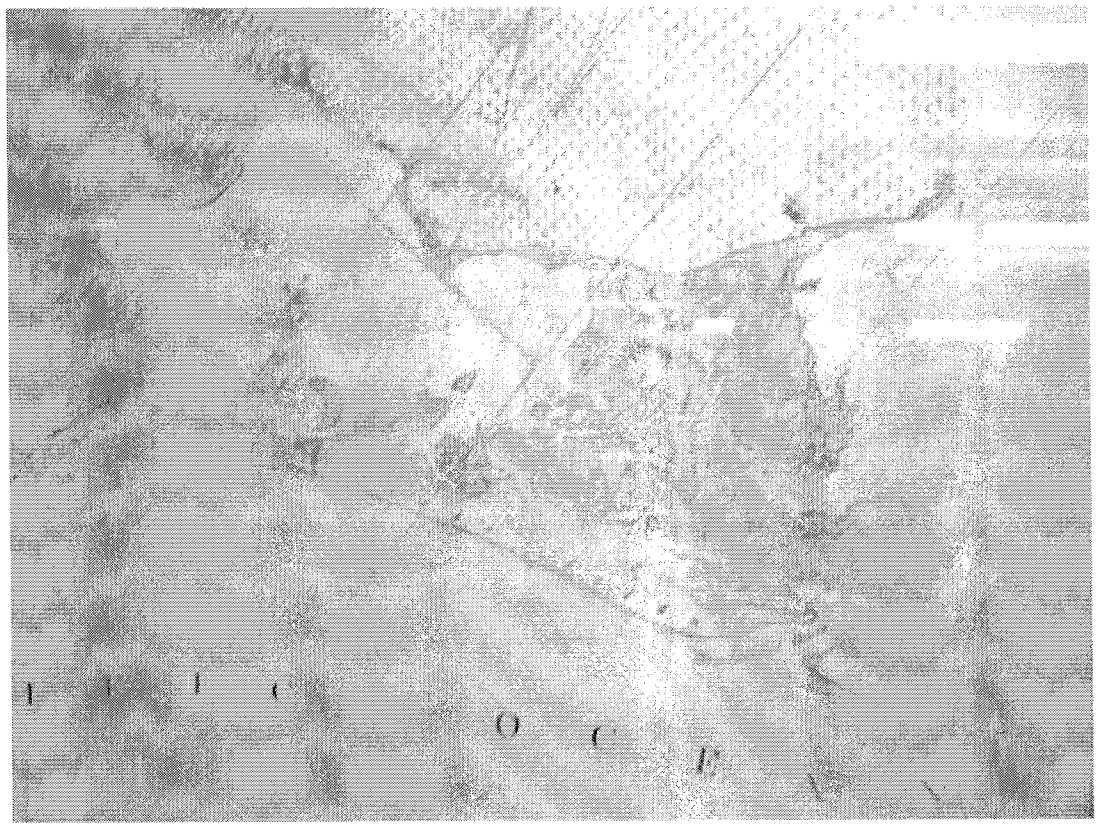


Figure 1 – U.S. Coast Survey (1859) Point Fermin to San Gabriel River.

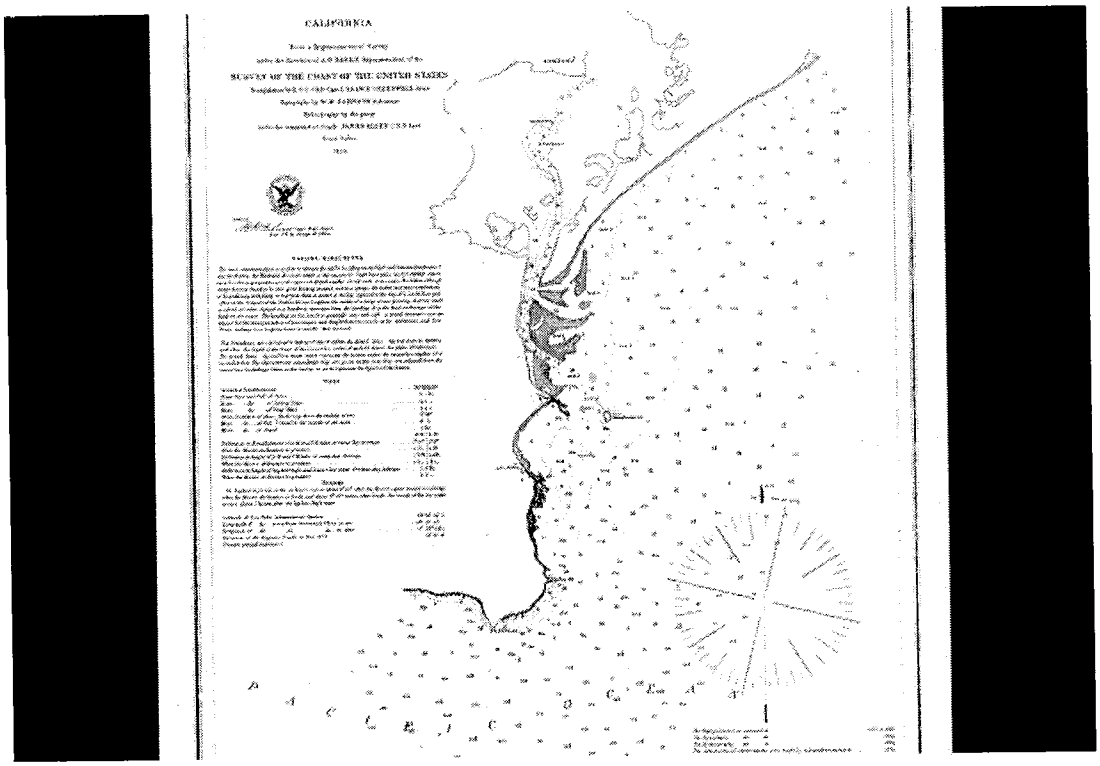


Figure 2 – Navigational chart of the approach to San Pedro (ca. 1857) (NOAA)

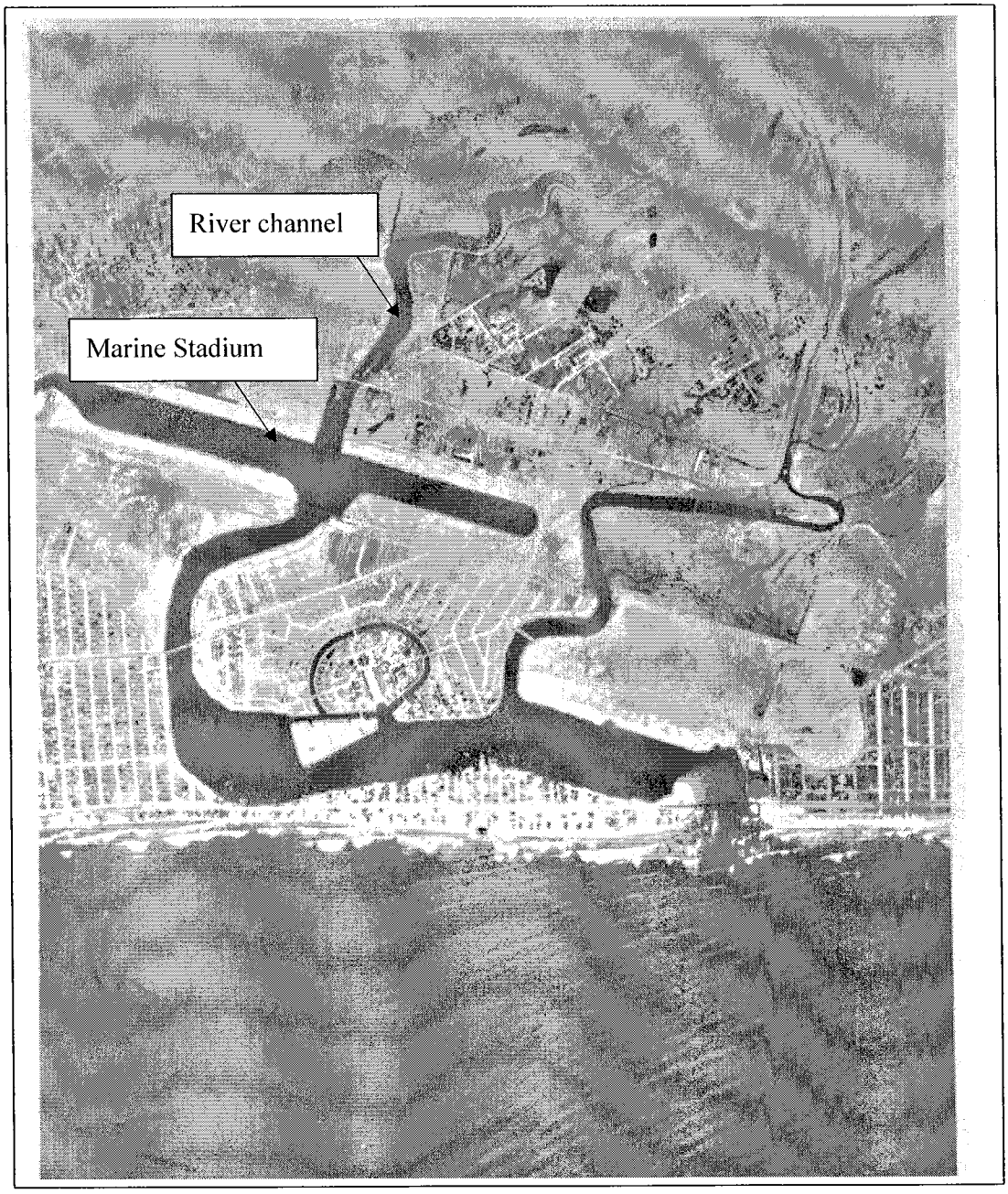


Figure 3 – Photograph of Alamitos Bay in 1927, showing recent diversion of the San Gabriel River from the Marine Stadium area. (Source: Fairchild Collection)

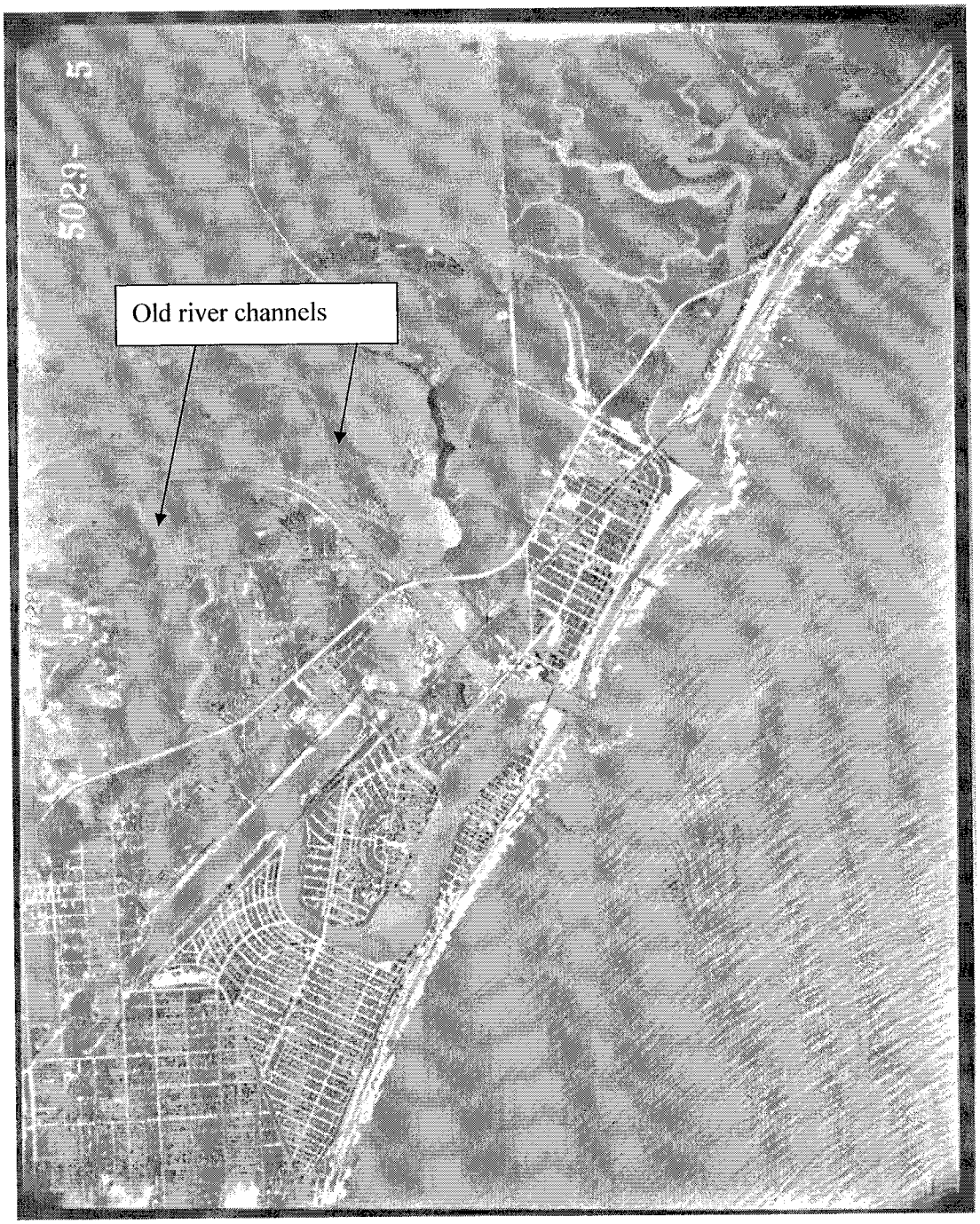


Figure 4 – Aerial photograph taken on March 4, 1938, showing channelized San Gabriel River discharging at the entrance of Alamitos Bay (Source: Fairchild Collection).

Figure 5 – January 15, 1951, aerial photograph of Alamitos Bay and San Gabriel River Flood Control Channel showing a high level of sand deposition in the flood control channel (Source: Fairchild Collection).

Figure 6 – August 11, 1959, aerial photograph of Alamitos Bay showing completed marina and jetties (Source: Fairchild Collection).

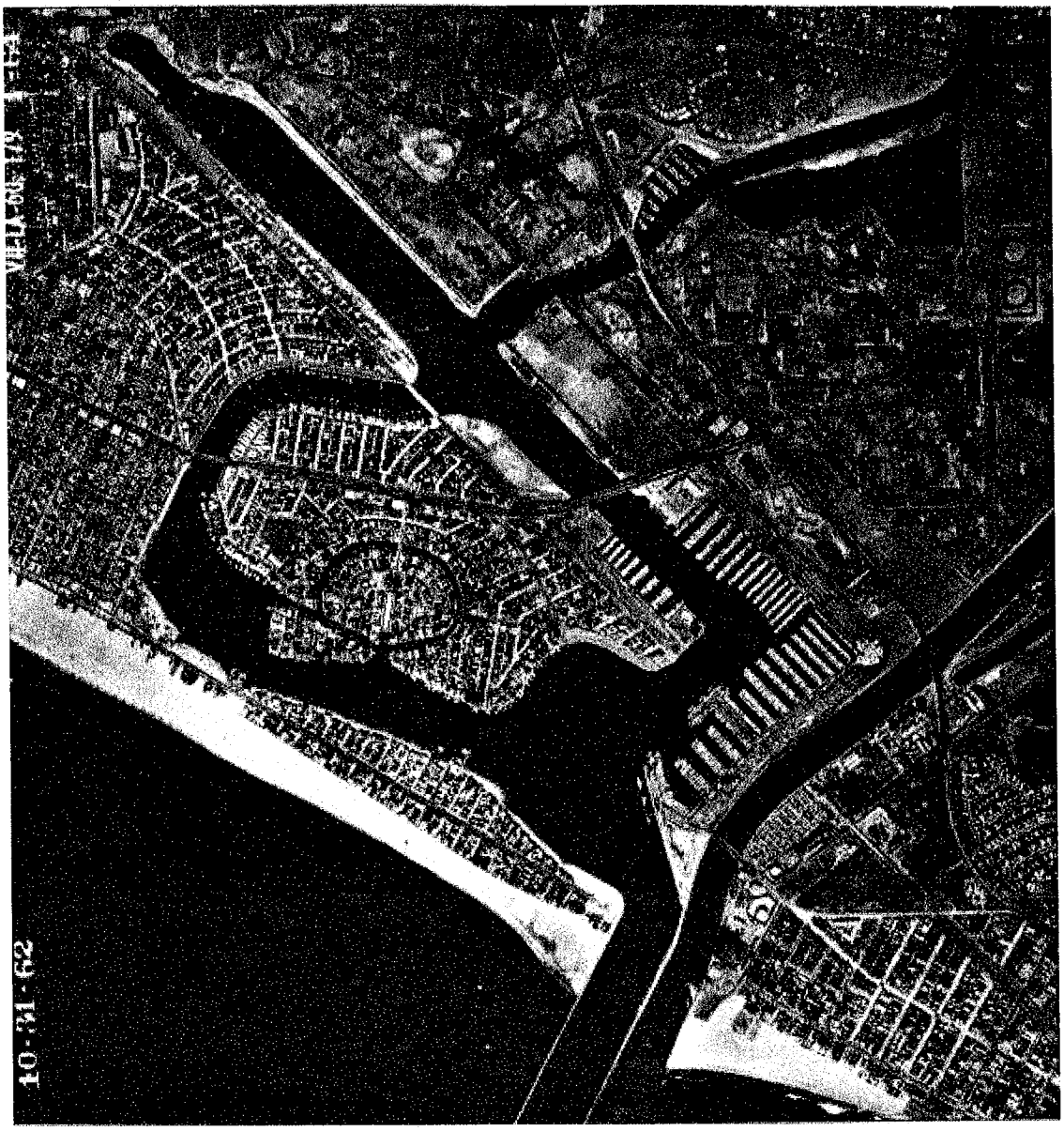


Figure 7 – October 31, 1962 photograph showing completed marina and Haynes cooling water channel.

Figure 8 – Los Angeles Long Beach Harbors 2005 (From Google Earth).

Figure 9 – Enlarged plan view of Alamitos Bay and the San Gabriel Flood Control Channel showing Alamitos and Haynes Generating Stations.

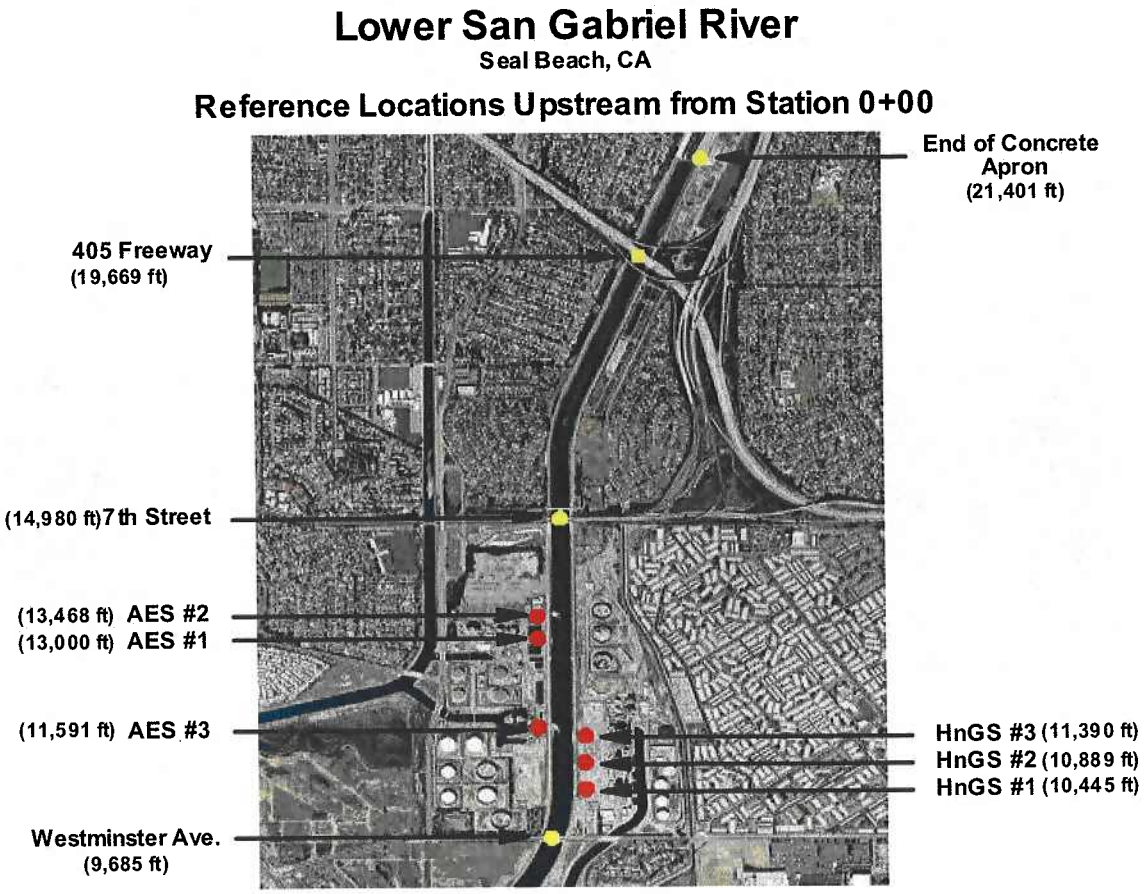


Figure 10 – Location of the generating station cooling water discharges.

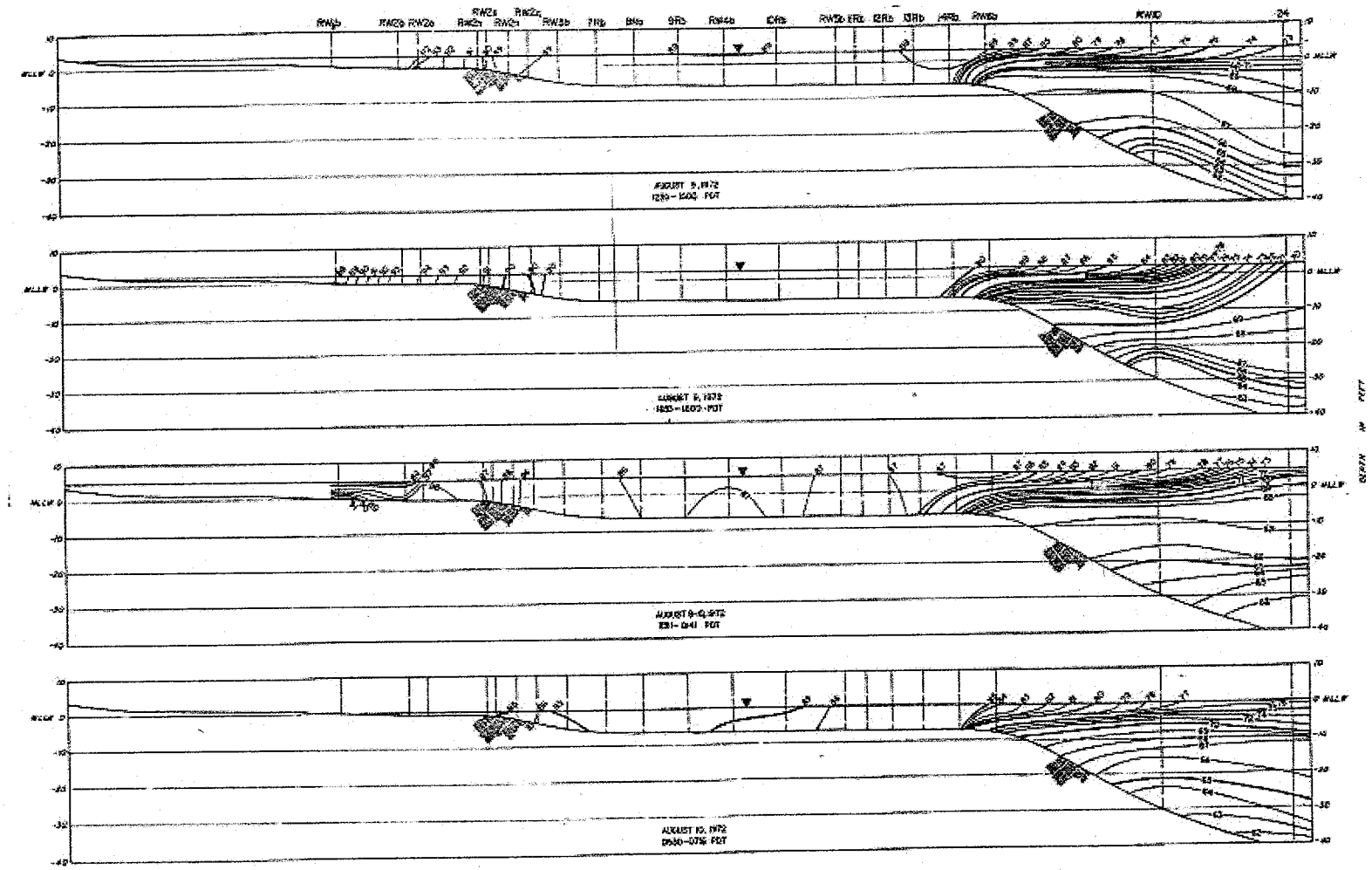


Fig. 2-30. Temperature Cross Sections in San Gabriel River and Offshore, August 9-10, 1972

Figure 11– Isothermal patterns in lower San Gabriel Flood Control Channel in August, 1972 over range of tides- 3rd panel high tide, 4th panel low tide.

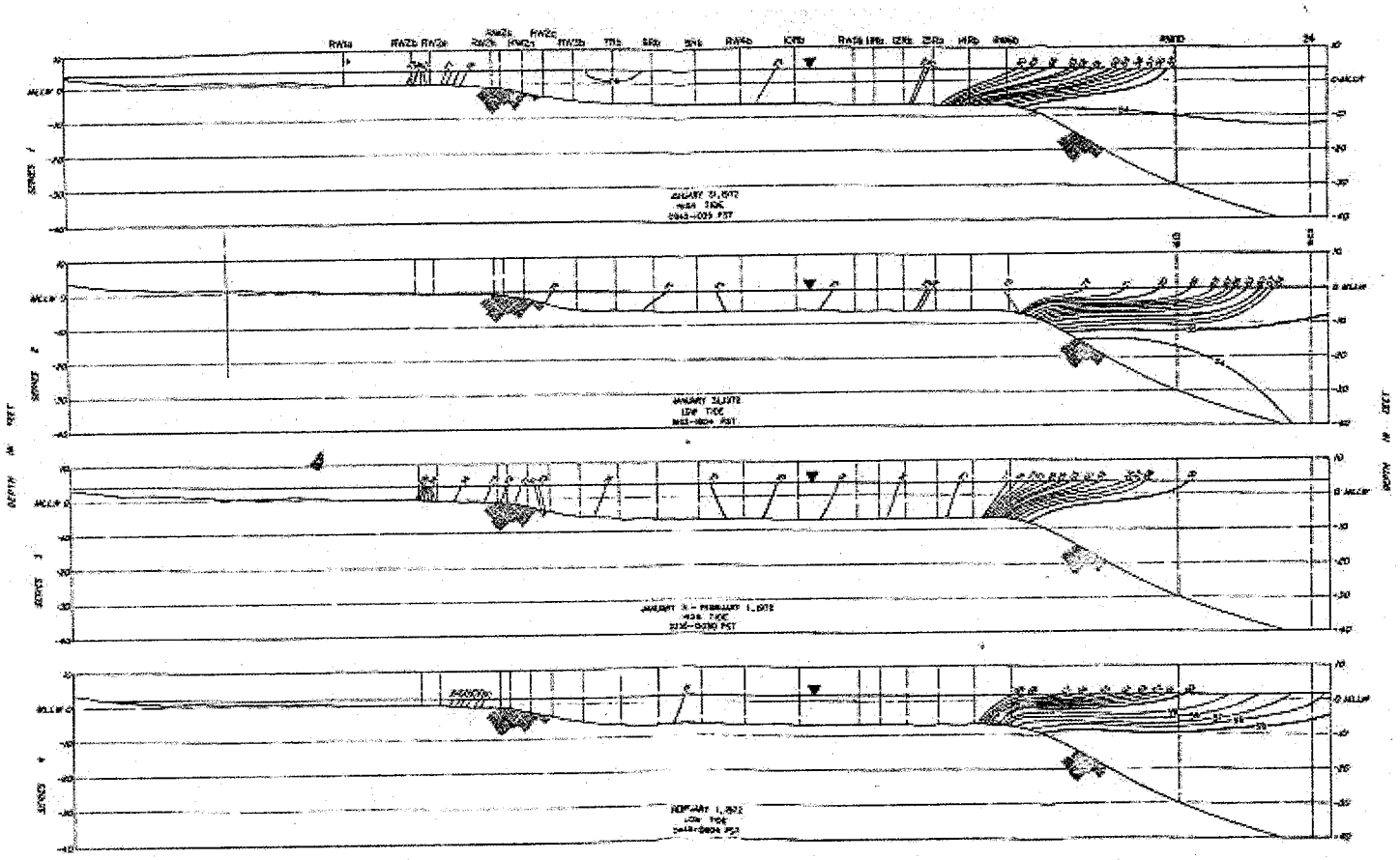


Fig. 2-31. Temperature Cross Sections in San Gabriel River and Offshore, January 31-February 1 1972

Figure 12 – Thermal patterns in lower San Gabriel River Flood Control Channel in Winter over a range of tides as indicated.

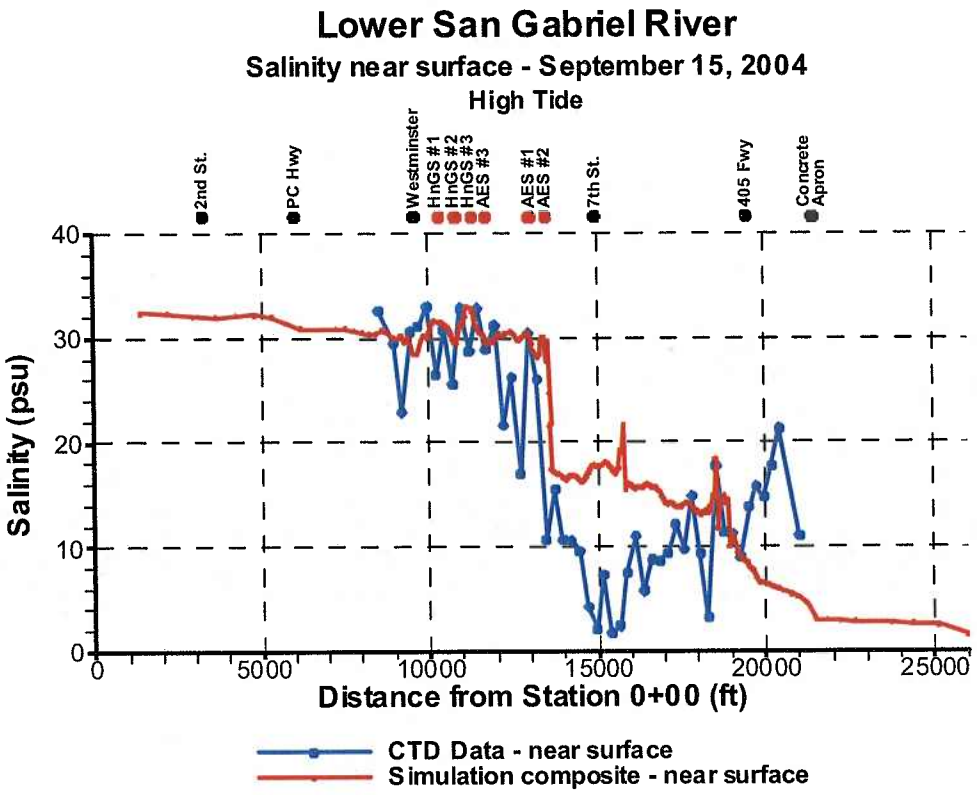


Figure 13 – Near surface salinity in the San Gabriel River Flood Control Channel.

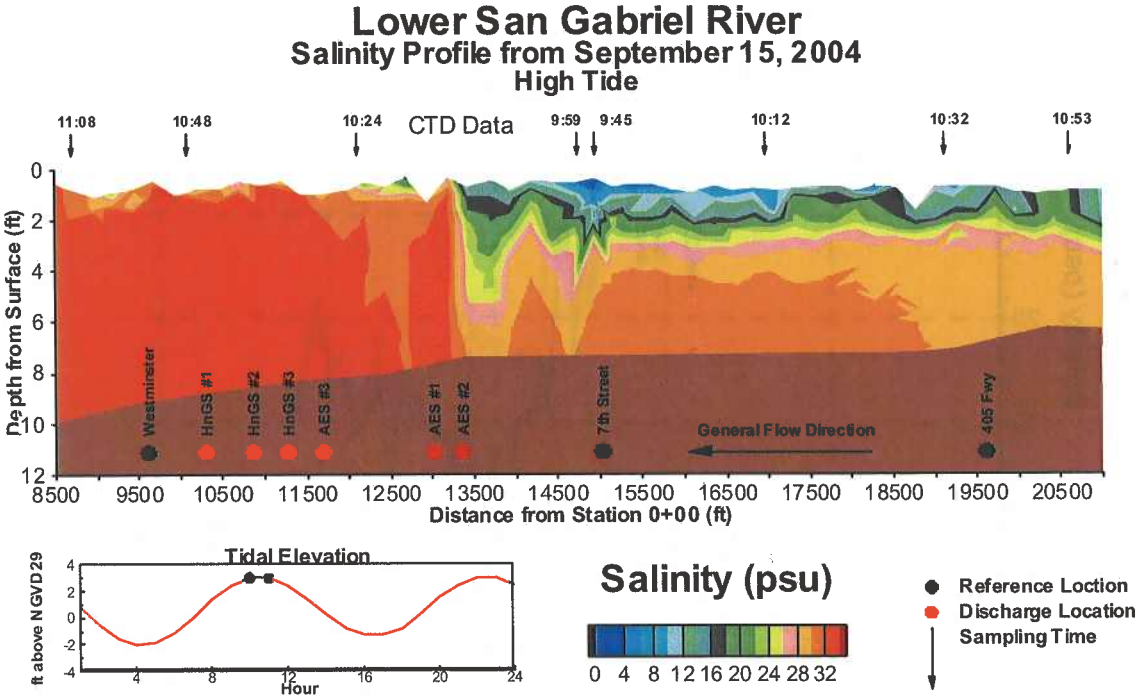
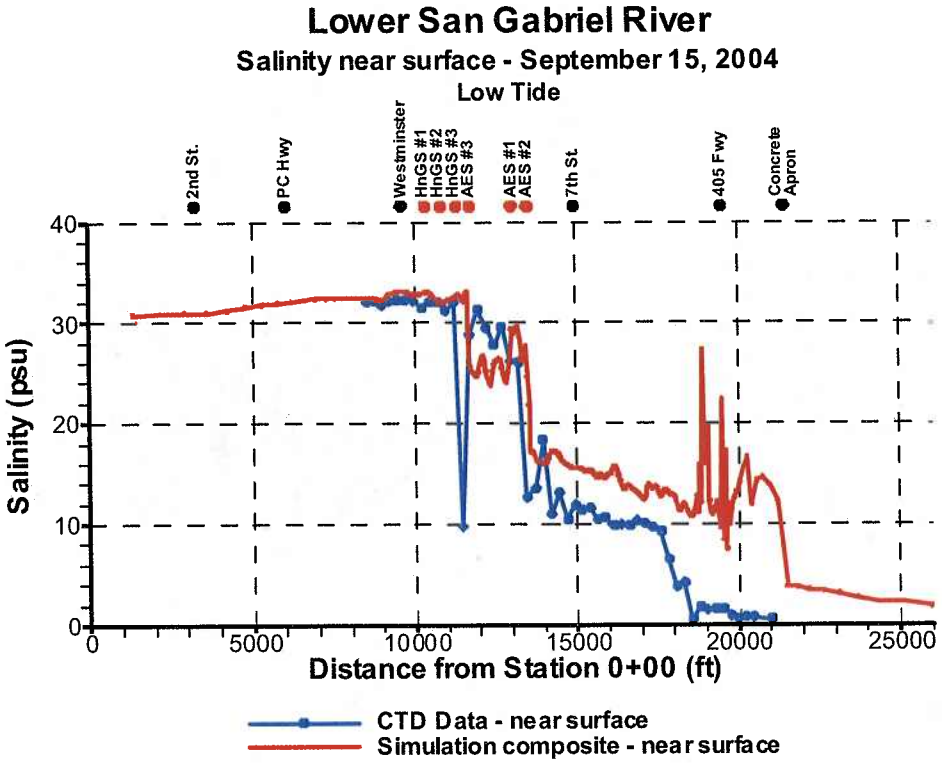


Figure 14 – Salinity profile data in the San Gabriel River Flood Control Channel at high tide near the cooling water discharges.



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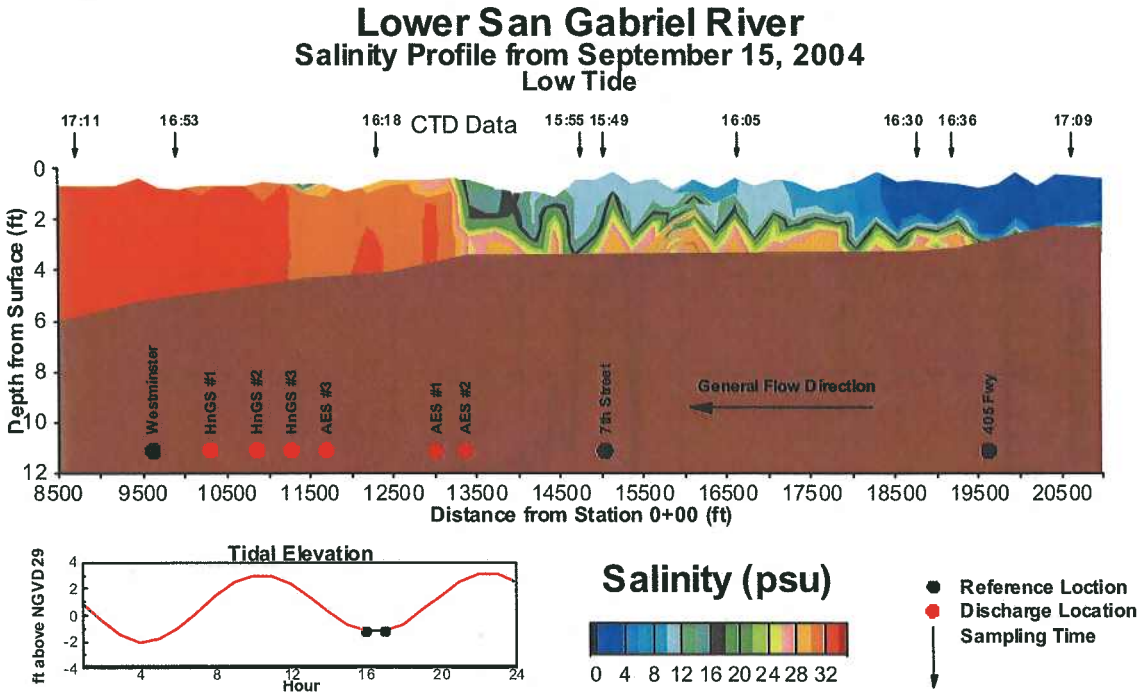

Figure 16- Salinity profile in the San Gabriel River Flood Control Channel near the cooling water discharges at low tide.

Attachment 10

LOWER SAN GABRIEL RIVER ENVIRONMENTAL ASSESSMENT

Prepared for:

Los Angeles Dept. of Water and Power
111 North Hope Street
Los Angeles, CA 90012

Prepared by:

MBC *Applied Environmental Sciences*
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Costa Mesa, CA 92626

MBC

April 2003

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We wish to thank Dr. D. J. Reish for his assistance and for the aerial photographs used herein.

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EXECUTIVE SUMMARY

At the request of Los Angeles Department of Water and Power (LADWP), MBC Applied Environmental Sciences (MBC) has conducted a literature review to determine the physical and biological characteristics of the lower San Gabriel River. Historic accounts of the river from old documents and scientific studies were used to characterize the river before and after man's influence began altering the natural river. Beneficial and adverse effects of the discharges into the San Gabriel River were determined and discussed. The report also theorizes what the characteristics of the San Gabriel River would be today in the absence of the generating station discharges using historic data, characteristics of other Southern California rivers, and old aerial photographs of the river.

Ancient. Studies indicate an estuarine environment last existed near the mouth of the San Gabriel River several thousand years ago when the climate was much wetter and the river flowed from the mountains to join with Alamitos Bay. That period came to an end with the advent of a drier Mediterranean climate. With only 13 inches of rainfall per year in the new climate, the river was dry most of the time. The basin lacked sufficient rainfall and the resultant salinity gradients that characterize an estuary.

Historic. Historically, the river flowed from the San Gabriel Mountains as a small stream that periodically disappeared and reappeared over the shallow river course. Most of the flow was underground due to the porous nature of the large and deep depositional sediments (to 20,000 ft) in the Los Angeles Basin. Farther along, the river was noted to be narrow and flowing until it disappeared on a broad, flat alluvial plain. Over the next century there were repeated attempts to dam, channelize, and dredge the river to control catastrophic floods. During this period, most of the flow percolated into the substrate to recharge groundwater stopping even minor flows in the lower portion of the river so that significant amounts of freshwater occurred in the lower reaches of the rivers only during periods of heavy rainfall. In the early part of the 20th Century, the San Gabriel River was separated from its common exit with Alamitos Bay by a rock jetty, moving the river mouth to empty directly into San Pedro Bay.

Post Generating Station Discharges. Based on temperatures from the 316(b), thermal effects and subsequent NPDES monitoring studies, the downstream extent of the river freshwater influence is at or above the 7th Street Bridge about 0.25 miles upstream of the generating stations' discharge. These temperature studies further indicate that oceanic water does not penetrate the San Gabriel River more than about 800 ft upstream of the river mouth on extreme high tide (less than 25% of the distance upstream to the PCH Bridge) and not at all during normal tides. Net flow is out of the river except on extreme high tides.

Infauna. Infaunal studies suggested that the infauna was depressed compared to those of the nearby Alamitos Bay because of the stress related to elevated temperature causing the loss of cooler water species and the ravages of stormwater flushing every few years. Still, over 140 marine associated infaunal species have been found in the river since Dr. Reish's early studies in 1952 and 1954. Studies conducted prior to the operation of the generating stations recorded a depauperate biological community behind berms with little or no flow to the ocean. The existing infaunal assemblage in the 2.4 miles to the upward incursion of tidal flux is due to the passage through the plant of cooling water taken from Alamitos Bay.

Fish. It is probable that the nekton is depauperate compared to those of the nearby Alamitos Bay because it is unlikely that many cold water preferring fish are found in the river. However, no studies have been conducted in the river except in the upstream fresh water portion in the area above the 7th Street Bridge and at the discharge of the river into San Pedro Bay. Although little is known of the fish that inhabit the area from the discharges of the generating stations to the mouth of the San Gabriel River, it is clear that the fauna noted are either warm or temperate water tolerant species. Incidental to other dive studies in the river, two flatfish, speckled sanddab and spotted turbot as well as striped mullet, topsmelt, and yellowfin croaker have all been noted during the surveys in the area of the lower San Gabriel River.

Adverse Effects. The discharge of warm water from the generating station affects the flow of the river, the temperature of the waters of the lower river, and it is possible that some of the low volume waste streams from the generating station may alter chemical characteristics of the local receiving waters. The elimination of a diverse and abundant intertidal community due to warm water may be an adverse impact. However, it is unclear what the community would look like in the absence of the cooling water flows from the generating stations. Assuming no warm cooling water flow from the generating stations, the intertidal community would likely extend as far as the tidal prism which has been shown in historical documents to extend no further upstream than a short distance past PCH Bridge during extreme high tides. However, other factors such as the well-documented closures at the mouth of the river for most of the year would have limited tidal flow and periodic large storms would have deposited sufficient sediment in the river course to limit the upstream incursion of tidal waters.

Beneficial Effects. The beneficial effects to Alamitos Bay from the cooling water systems include increased circulation facilitating the withdrawal of organic and inorganic wastes, and the reduction of residence time of the water mass within the harbor. This provides circulation in what would otherwise be dead end channels. The result is that dissolved oxygen increases and contaminants are flushed from the harbor area. An additional beneficial effect from the operation of the Haynes and Alamitos generating stations is the increased water flow in the lower San Gabriel River. This flow keeps the river open and provides a habitat that would not exist without the generating station discharges. Previous to operation of the generating stations, tidal influence in the river was limited to the area slightly upstream of the PCH overcrossing, a distance of about 1 km from the river mouth. The generating station discharges have allowed a marine-like environment to develop for almost 6.5 km upstream of the river mouth.

Natural Condition. It is no longer possible to have a natural river in southern California. Due to the urbanization of southern California, the potential loss from floods in an uncontrolled river course would be disastrous. The natural condition without human influence would be a river flowing to the ocean across a broad alluvial plain. Frequent diversions and channel breakthroughs, particularly during storms would cause the rivers to mingle and the river to meander across the alluvial plain with its mouth constantly changing from flood to flood.

It is possible, however, to determine what the likely characterization of the San Gabriel River would be without the flow of the two generating stations. The San Gabriel River would likely take on more of the characteristics of the Santa Ana River rather than that of the Los Angeles River. The Santa Ana River has tidal action in the lower 0.5 miles and then is composed of small ponds with no connection to each other for about another 1.0 mile upstream. Because of this the fauna and fish biota are restricted to the relatively small area of tidal action. There is no net flow of freshwater down the Santa Ana River during most of the year, so there is no estuarine environment that exists in the Santa Ana River. The Santa Ana River mouth builds up a berm at the entrance which is normally breached during the winter months when substantial rainfall occurs. In contrast, the mouth of the Los Angeles River is kept open by dredging and more than three-quarters of its 51 mile length is covered by concrete allowing no percolation into the substratum. Based on a series of aerial photographs from 1951 through the late-1960s, the San Gabriel River had a berm restricting tidal flow except during exceptional rains. This berm existed even though there was 30 to 50 mgd of discharges upstream from publicly owned treatment works (POTWs) as their discharge flow percolated into the substrate as it flowed along the river course. Sedimentation from winter storms would have filled the channel causing ponding and would have allowed tidal actions to go no further than the PCH bridge. Biologically, the infaunal and fish communities would have been depauperate in the river compared to the status of the river now.

Ocean to Ocean Discharge. After the construction of the two generating stations, up to 2.3 billion gallons per day of seawater circulated through the generating stations and into the river. This is in effect an ocean to ocean discharge with the fresh water interface being restricted to a very small area upstream of the 7th Street Bridge. It is clear from the biological and oceanographic definition that the San Gabriel River does not function as an estuary nor does it have the characteristics of an estuary. An estuary will generally have a quiet backwater area that is tidally influenced with a strong freshwater input. Only in a relatively protected

shallow area can an estuarine community develop as it allows primary productivity (the basis of the estuarine food web) to be high. None of these factors are present in the San Gabriel River. There is little to no freshwater influence, there are no quiet areas, and primary productivity is not high, all factors which preclude the establishment or development of an estuarine community. Even the marine community of the San Gabriel River is not a stable system as every two to three years it is flushed away due to storm waters. The lower San Gabriel River is not a habitat where an estuarine community with all of its diversity and productivity could or would ever develop.

LOWER SAN GABRIEL RIVER ENVIRONMENTAL ASSESSMENT

LOWER SAN GABRIEL RIVER CONDITIONS PRIOR TO THE CONSTRUCTION OF THE HAYNES AND ALAMITOS GENERATING STATIONS

HISTORICAL CONDITIONS

Many thousands of years ago, the San Gabriel River emptied into Alamitos Bay in several unstable channels which meandered east and west from one large storm to another (IRC 1981). During this period the area received considerably more rain than today and an estuarine environment existed in the San Pedro Bay. The change to a drier Mediterranean-type climate several thousand years ago ended that phase of the river's existence. With the climate change and subsequent reduction of average rainfall to about 13 inches per year, the basin lacked sufficient rainfall and the resultant salinity gradients that characterize a true estuary (Abbott et al. 1973). Records of the area date back to 1858 when it was first surveyed, at which time the San Gabriel and Los Angeles rivers shared a single stream course for about 8 km upstream of the current Los Angeles river mouth (Gumprecht 2001).

A large storm in 1868 caused the San Gabriel River to break over a river bank north of Long Beach, separating it from the Los Angeles River and forming a new course, essentially the same channel the river follows today (Gumprecht 2001). After the course change, the San Gabriel River emptied into Alamitos Bay, a natural bay surrounded by tidal saltwater marshes separated from the ocean by tidal spits (IRC 1981). Repeated attempts during this period to channelize and control the river generally ended in the loss of dams and destructive floods which occurred about every five years.

The catastrophic floods of 1914 provided motivation to coordinate flood protection on a basin-wide scale. During the 1920s and 1930s rivers in the Los Angeles Basin, including the San Gabriel River, were substantially dammed and channelized to prevent flooding over the basin and also to recharge water bearing substrata (HEP 1976, Gumprecht 2001). As most of the flow percolated into the substrate to recharge grouhdwater this essentially stopped even minor flows in the lower portion of the river. Construction of flood control dams in the San Gabriel Mountains further reduced the freshwater flow to the river, so that significant amounts of freshwater occurred in the lower reaches of the rivers only during periods of rainfall (Anderson et al. 1993). In the 1920s, the San Gabriel River was separated from its common exit with Alamitos Bay by a rock jetty, moving the river mouth to empty directly into San Pedro Bay (Reish and Winter 1954).

The lower San Gabriel River was initially dredged in the 1940s for the purpose of controlling floods, but tidal waters did not enter the San Gabriel River because of a sand bar berm built up in front of the river mouth (Reish and Winter 1954). Most of the natural rivers in central and southern California exhibit the same characteristic, with berms that block tidal flow into and freshwater flow out of the river except during periods of heavy rain when the berms are typically breached by the combined effects of increased river flow and wave action. A typical berm is observed in the aerial photo from the San Gabriel River on 15 January 195, demonstrating that the berm is not broken through every winter (Figure 1). Because of sedimentation, the Los Angeles County Flood Control District again dredged the lower river late in 1952, and enlarging the San Gabriel River for about 6.5 km upstream of the river mouth.

During the period of the 1940s and 1950s, the only water input into the lower San Gabriel River during most of the year (other than during rainy periods) came from discharges from Santa Fe Springs Waste Disposal (mostly brine from oil well drilling), and the Los Alamitos Naval Station, City of Seal Beach, and Dow Chemical sewer discharges (Reish 1956) which were all less than primary treated effluents. As there was not enough water volume to keep the river's berm open except during the rainy season, these discharge waters (about 30 to 50 mgd) tended to pond along the streambed and to percolate into the ground along the lower San Gabriel River.

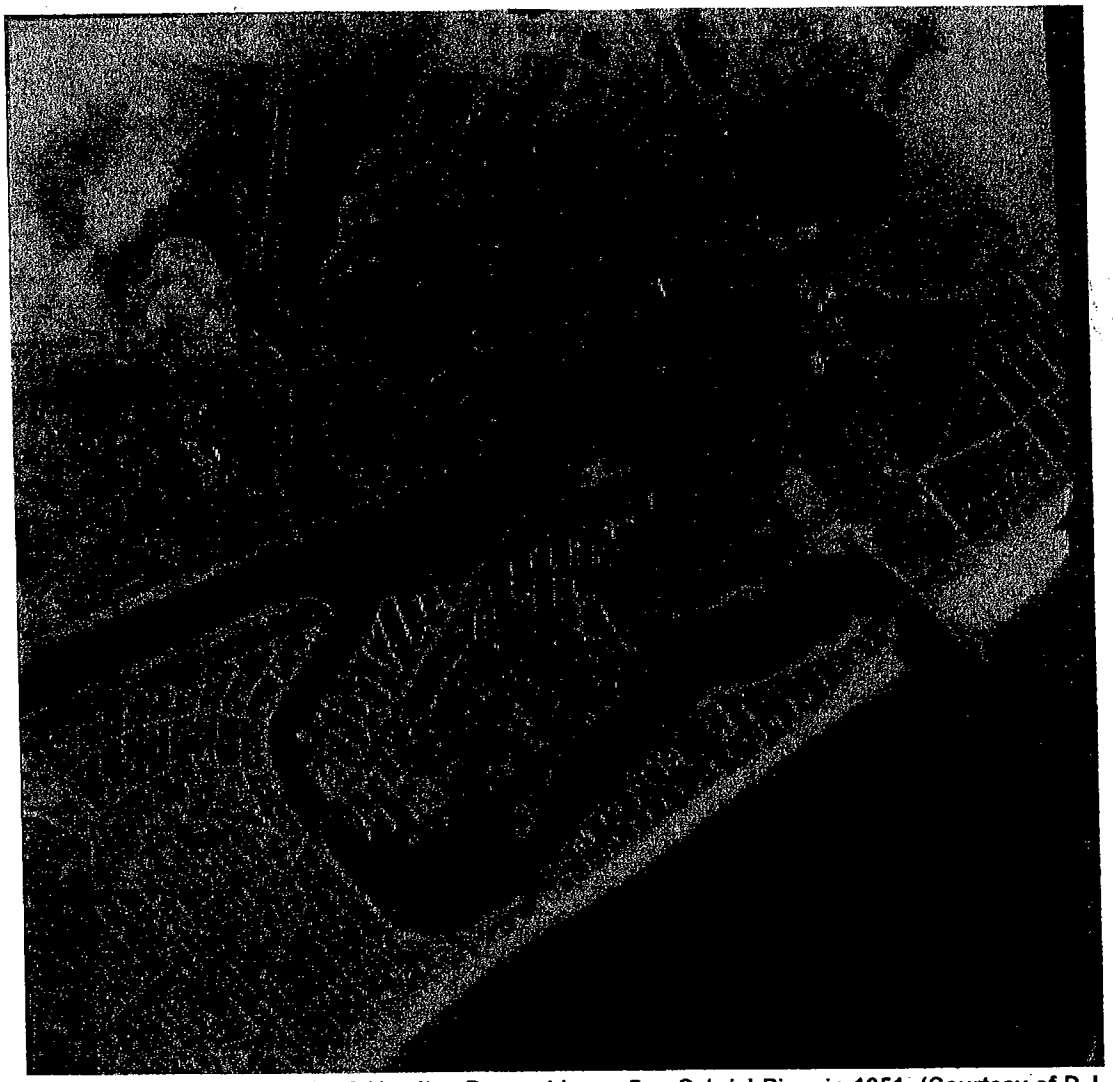

Figure 1. Aerial photograph of Alamitos Bay and lower San Gabriel River in 1951. (Courtesy of D.J. Reish).

FIRST STUDIES

The first studies of the San Gabriel River were conducted by the California Department of Fish and Game prior to it being dredged in 1952 (Reish and Winter 1954). The lower San Gabriel River was found to be polluted with black bottom sediments which had a sulfide or petroleum odor. Benthic samples collected at 14 stations between the 7th Street overcrossing and the mouth of the river and were completely devoid of macroinvertebrate species (Reish 1956). Following the 1954 dredging, tidal waters still did not proceed upriver much past the Pacific Coast Highway (PCH) overcrossing. Dr. Reish noted that in order to reoccupy stations in 1954 upstream of PCH that had been sampled in 1952, he was forced to tow the boat upriver by walking in six inches of water (D. Reish, pers. comm. 2003). In the two years following dredging the sediments had not improved, but the study found 12 infaunal species in the lower river, downstream of PCH. These species presumably colonized the area as larvae from Alamitos Bay, where nine of the 12 species were known to occur (Reish 1956). The 1954 studies concluded that the lower portion of the river (below

PCH), although still highly polluted, was beginning to exhibit benthic characteristics similar to those of Alamitos Bay as a tidally influenced embayment (Reish 1956).

LOWER SAN GABRIEL RIVER CONDITIONS AFTER CONSTRUCTION OF THE HAYNES AND ALAMITOS GENERATING STATIONS

Channelization of the lower San Gabriel River was complete in 1960. Construction for the Haynes Generating Station was begun in the late 1950s and the first Unit went into commercial operation in 1962; Alamitos Generating Station was already operating in late 1956 with its first Unit completed in September. Following that, Unit 2 went into operation in Feb 1957, Unit 3 in Dec 1961, Unit 4 in Jun 1962, and Units 5 and 6 in Mar and Sept 1966, respectively (S. Maghy 2003 pers. comm.). After the completion of the Haynes and Alamitos generating stations, up to 2.3 billion gallons per day (2,296.8 MGD) of seawater were taken from Alamitos Bay, circulated once though the power plants as condenser cooling water, and then discharged into the San Gabriel River. Because of this continuous, high volume flow, the San Gabriel River mouth no longer closed during any portion of the year. The flow, however, was seawater and not freshwater. The constant seawater flow resulted in improved environmental conditions and contributed to increased demersal and benthic species diversity in the lower San Gabriel River. In 1966, Turner and Strachan (1969) found 19 infaunal species living in the sediments of in the lower river, an increase from the 12 species Reish found in 1954 and the abiotic conditions found in 1952. In 1970 and 1971, Reish again reoccupied river benthic stations first sampled in 1952. These surveys recorded 25 species in 1970 and 34 species in 1971, indicating that the sediment conditions had improved since the onset of the discharge from the generating stations in the late 1960s (Anderson et al. 1993). Benthic studies conducted in 2001 by MBC at three locations in the lower San Gabriel River resulted in the observation of 65 species and more than 22,000 individuals indicating that the river has continued to improve (MBC 2001).

PHYSICAL CHARACTERISTICS OF THE LOWER SAN GABRIEL RIVER

The San Gabriel River is a major flood control channel that is maintained by the Los Angeles County Flood Control District. The U.S. Army Corps of Engineers completed the concrete lining of the channel in May 1964 to accommodate a maximum flow of approximately 13 billion gallons per day (EQA/MBC 1973). Coyote Creek, which enters the San Gabriel River approximately 6.4 km upstream from the river mouth, is an important tributary to the San Gabriel River, but is only active during the rainy season. The San Gabriel River drains southeastern Los Angeles County from the San Gabriel Mountains through the San Gabriel Valley to Long Beach, an area of approximately 598 km^2. The river empties into the eastern end of San Pedro Bay, between Alamitos Bay to the west and Anaheim Bay to the east.

The lower portion of the San Gabriel River is a man-made trapezoidal channel which extends from the seaward end of the channel entrance to a point approximately 7.9 km upstream, the maximum extent of tidal influence (EQA/MBC 1973). From the entrance to approximately 6.5 km upstream, the channel bottom is composed of natural sediments with sides formed from riprap laid on a slope of approximately 2:1. Beyond this point to upstream of the tidal influence, the channel is concrete lined with side slopes of 2:1. Channel width varies from about 600 feet at the entrance to about 240 feet at the beginning of the concrete section.

River Flow and Tidal Influence

Water flow dynamics in the river are influenced by channel geometry and location and magnitude of water inputs into the channel. These inputs include seawater intrusion from the river mouth, cooling water discharges from the Haynes and Alamitos generating stations, treated wastewater discharges, and storm water runoff. The extent of tidal incursion, total water volume,

and residence time of waters in the river is a function of channel geometry and tidal stage. The maximum travel of tidal water in the channel is a function of tidal height (EQA/MBC 1973). Due to slope differences above the confluence of the San Gabriel River and Coyote Creek, a given tide will extend farther up Coyote Creek (Figure 2).

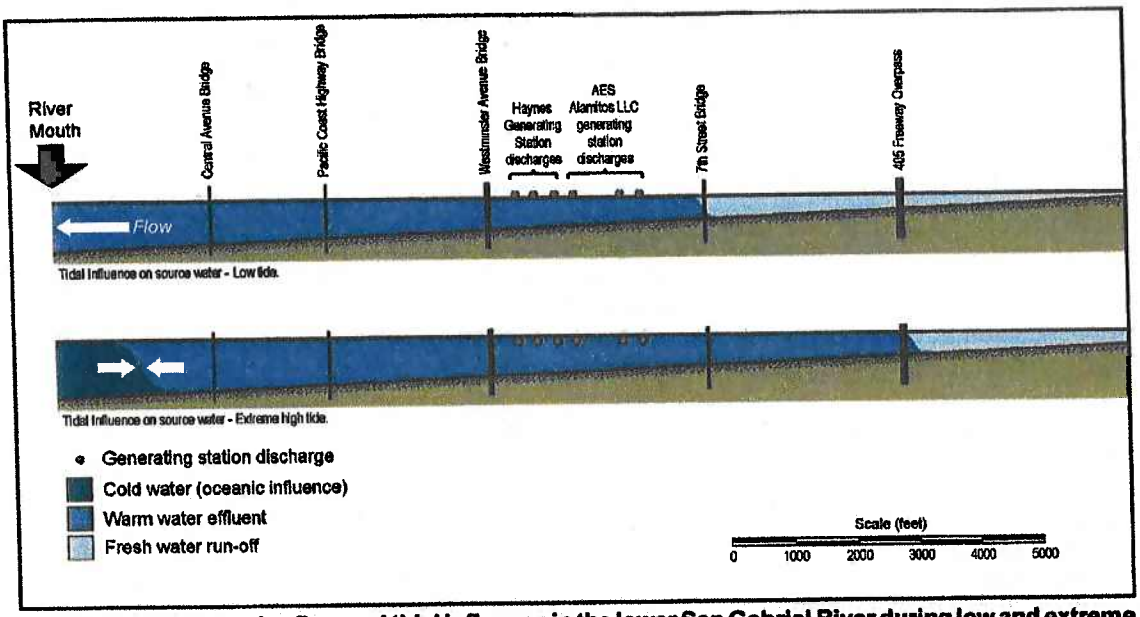

Figure 2. Representative flow and tidal influence in the lower San Gabriel River during low and extreme high tides. Horizontal axis to scale, vertical exaggerated. Source EQA/MBC 1973, MBC 2002, LACOSAN 2003 unpublished.

Flow patterns in the lower San Gabriel River are complicated by cooling water discharges from the Haynes and Alamitos generating stations. Ocean water for cooling purposes is supplied to Haynes Generating Station from the northwest corner of Long Beach Marina through conduits and earthen channels. Ocean water for cooling purposes at the Alamitos Generating Station is supplied via canals off Los Cerritos Channel, which is connected to San Pedro Bay through the Long Beach Marina-Alamitos Bay Complex. After passing through condensers, both generating stations discharge heated effluent into the San Gabriel River from opposite banks approximately 3 km upstream of the river mouth. Each plant has three discharge structures in the San Gabriel River, and the discharges from each plant are offset by about 0.2 km. Maximum permitted combined discharges into the lower San Gabriel River from these plants is about 2.3 billion gallons per day (bgd) of seawater. However, combined cooling water discharges recorded during winter and summer NPDES sampling periods since 1997 have ranged from 473 mgd to 2.18 bgd, and are typically lower in winter than in summer (MBC 1997-2003a). Discharges from the generating stations are typically zero to 15°C higher than ambient intake water temperatures

Other flows into the lower San Gabriel River, such as effluent flows from the Los Angeles County Sanitation District Water Renovation plants and daily runoff into the San Gabriel River and Coyote Creek, are negligible in comparison with the maximum potential cooling water discharges. The cooling water discharges usually supply enough volume to raise the water level of the river in response to the changing tide and to maintain a net outflow to the ocean except in the case of extreme high tides (Figure 2). Rainfall and subsequent runoff exert a profound, but temporary, effect on water flow.

Using extent of tidal incursion and channel geometry it is possible to determine total water volumes upstream of the entrance as a function of tidal height (EQA/MBC 1973). These results can be used to determine the rate of inflow or outflow through the channel entrance due to tidal changes for any tide cycle. For example, if the tide changes elevation from +1ft to +2ft Mean Lower Low Water (MLLW) in one hour, the corresponding change in total water volume in the channel is from 157 to 193 million gallons in that same period. It is important to note here, that the change in tide would not be the normal change caused by a tidal wedge moving upstream as the tide increases in height. In the San Gabriel River, a net outflow is characteristic at the river mouth; however, the magnitude of that outflow varies considerably depending on tidal stage. The height of the tide acts as a dam that retards the flow of the channel as shown in Figure 2. Heated discharge water is essentially stored in the channel on flood tide and then released on the following ebb tide. EQA/MBC (1973) found a six-fold variation in outflow rate at the mouth of the San Gabriel River between ebb and flood tides within one 24-hr period.

Because of this channel geometry, any discharged ocean water /freshwater interface takes place above 7th Street. This interface was recognized in the early 1970s and monitoring studies were conducted at the mouth of the river where the seawater discharge from the two generating stations encountered ambient ocean conditions.

Temperature and Salinity

During the three thermal effects studies that displayed the warmest temperatures conducted in May, August, and November 1972, surface temperature at the San Gabriel River mouth ranged from 23.3° to 32.2°C (EQA/MBC 1973). From 1978 through 2001, water temperatures in the upper two meters downstream of the generating stations at Westminster Avenue and PCH averaged 21°C in winter and 27° to 28°C in summer. Maximum temperatures at those stations reached 26°C in winter and 34°C in summer (MBC 1979, 1981, 1986, 1988, 1990-1992a, 1993-1999, 2000a, 2001).

Results from the Thermal Effect Study (EQA/MBC 1973) indicated that surface water temperatures of the lower San Gabriel River were generally 5 to 10°C warmer than natural oceanic surface temperatures, and that colder bottom waters carried into the channel by tidal action do not penetrate very far past the channel entrance (Figure 2). Also, waters of the lower San Gabriel River were well-mixed vertically, and as the thermal field from the generating station discharges progressed downstream, it extended no further than depths of five to ten feet after passing the channel entrance. During winter months, water temperature in the lower river may decrease from the generating stations discharges to the channel entrance due to atmospheric cooling, while during summer months, the temperature may increase due to absorption of solar radiation. The effect of a seasonal thermocline in spring and summer, which acts as a barrier to vertical mixing of the thermal effluent, is evidenced by shallow vertical extensions of the elevated temperature field during these months. In winter, when thermoclines are generally absent, thermal fields are generally deeper and less extensive.

Effects from the warmer waters of the San Gabriel River are usually apparent as a warm water lens directly off the river mouth (MBC 1979, 1981, 1986, 1988, 1990-1992a, 1993-1999, 2000a, 2000b, 2001, 2002). Offshore, the warmer waters are subjected to tidal action; in southern California, the tide wave rotates in a counterclockwise direction. As a result, flood tide currents flow upcoast and ebb tide currents flow downcoast. At the mouth of the San Gabriel River during high tides, river flow is retarded at the channel entrance, and the thermal field tends to spread upcoast ((Figure 2)). During ebbing tides, the outward volume of river flow increases, and the thermal field moves offshore and/or downcoast. Exceptions occur during periods where high winds or strong currents oppose the tidal effect.

Downstream of 7th Street, near the generating stations, salinity is essentially that of salt water (30 to 34 parts per thousand [ppt]) (MBC 1979, 1981, 1986, 1988, 1990-1992a, 1993-1999,

2000a, 2000b, 2001, 2002). However, upstream of the generating stations, salinity is generally lower and more stratified; a lens of fresh water often overlies denser salt water, representing a tidal wedge. At 7th Street bridge, difference between salinity values at the water surface and a depth of one meter vary greatly, especially in winter. Plants typical of freshwater habitats, such as cattail, are common along the shore upstream from 7th Street.

Sediments

Because of the discharges from the generating stations, the tidally influenced section of the lower San Gabriel River extends approximately 8 km upstream of the river mouth (Figure 2). The river is concrete lined upriver of the confluence of the San Gabriel River and Coyote Creek, about 6.5 km from the river mouth. South of this point the river bottom is unprotected natural sediment with channel sides covered with riprap to protect the earthen banks.

Substrate type and sediment characteristics are among the most important environmental characteristics associated with biological distribution. Because of this, sediment characteristics and grain sizes are generally determined when infaunal samples are collected. Sediments along the concrete lined section of the lower San Gabriel River and Coyote Creek can accumulate through the dry season when water flow is low, but are usually washed out of the channel by winter runoff. Immediately downstream of the concrete lining, river sediments are composed of concrete rubble and hard-packed clay (D. Montagne 2000, pers. comm.).

Sediments of the lower San Gabriel River bottom are characterized by fine sand with a low percentage of silt and clay (MBC 2001, 2002). Samples collected in 2001 and 2002 between the river mouth and the 7th Street Bridge consisted of 72-97% sand. Silt and clay (fines) are undoubtedly eroded and transported downstream by river currents. Outside of the mouth of the San Gabriel River, in San Pedro Bay, grain size and depth are strongly correlated. Shallow sediments are characterized by larger median grain sizes and smaller silt and clay fractions than offshore sediments (MBC 2001, 2002). The bottom materials in the nearshore areas are constantly suspended by waves, sorted by wave velocity and transported offshore. Only the larger materials are left behind. Percentage of fine materials in the sediments increases with depth as influence from surface waves and currents decreases.

BIOLOGICAL CHARACTERISTICS OF THE LOWER SAN GABRIEL RIVER

Intertidal Community

The intertidal community of the lower San Gabriel River is restricted in both diversity and abundance. In the upper, concrete-lined section tidal influence is limited to the highest of high tides, which occur too infrequently to support an intertidal community. Downstream of the concrete lining, reduced river flow and tidal action allow the seasonal accumulation of sediments at the base of the riprap sides, forming mudflats. These intertidal mudflats (above 7th Street) support plants tolerant of brackish waters, such as cattails (D. Vilas 2000, pers. obs.), and are likely to support populations of opportunistic species such as oligochaetes and the polychaete annelid *Capitella* sp.

South of the 7th Street Bridge, the San Gabriel River environment becomes increasingly marine. Still, the intertidal riprap community is periodically subjected to low salinity and siltation during large winter rains and to elevated temperatures throughout the year (EQA/MBC 1973). At the mouth of the river, the intertidal community was found to be depauperate, composed of patches of the brown acorn barnacle *Chthamalus fissus* and the purple-lined acorn barnacle *Balanus amphitrite*, the alga *Gracilariopsis sjoestedtii*, and the rock louse *Ligia occidentalis* (EQA/MBC 1973). In 1992, the only intertidal organisms that were observed on the riprap near the Alamitos Generating Station discharges were *Chthamalus fissus* and a thin green algae between the barnacles (MBC 1992b).

Rocky intertidal communities outside of the river in nearby San Pedro Bay were much more diverse than those inside the river (EQA/MBC 1973). Still, these communities were found to have a high percentage of species tolerant of warmer waters. This indicates that the thermal field from the San Gabriel River was influencing nearby intertidal communities. Wave exposure also appeared to affect intertidal species composition in San Pedro Bay.

At a wave-protected station in the Alamitos Bay entrance channel, adjacent to the San Gabriel River, 17 intertidal species were found on the riprap (EQA/MBC 1973). Barnacles, primarily *C. fissus* and the white acorn barnacle *Balanus glandulus*, dominated the upper intertidal. The predatory rock snail *Roperia poulsoni* was also common. The low intertidal zone was covered by a mat of algae and encrusting bryozoans interspersed with patches of the tubiculus snail *Serpulorbis squamigerus*. *Roperia poulsoni* and the small keyhole limpet *Fissurella volcano* were common.

Eleven species were observed at a second San Pedro Bay intertidal station, located on the riprap on the west side of Anaheim Bay jetty (EQA/MBC 1973). Although more than a mile from the mouth of the San Gabriel River, this area is more exposed to river outflow than the Alamitos Channel station, and is subject to more wave action. Here, the upper intertidal was dominated by barnacles, primarily *C. fissus*, and limpets, primarily the rough limpet *Collisella scabra*. The upper part of the lower intertidal was dominated by the colonial sea anemone *Anthopleura elegantissima*, while the lower part was dominated by algae and bryozoans. The lined shore crab *Pachygrapsus crassipes* and the ochre sea star *Pisaster ochraceus* were common. *Anthopleura elegantissima* and *P. ochraceus* are indicative of rocky intertidal areas with moderate wave action (Dayton 1971).

Only a few intertidal species survived directly within the influence of the San Gabriel River. Periodic storm runoff characterized by low salinity and high turbidity may eliminate some species. However, elevated water temperatures in the river, which may exceed the thermal tolerance of many intertidal species, was the likely cause of impoverishment in the area (EQA/MBC 1973). Recent data collected on temperature from monitoring surveys indicates the average temperature in the river in summer is approximately 27° to 28°C, at or near the lethal temperature limit for bay mussel (*Mytilus galloprovincialis*) (MBC 2003b).

Benthic Infauna

Benthic infauna--those animals found living in the sediments of soft bottoms--are an important food source for fish and birds. The sedentary nature of the species that comprise the infauna render them susceptible to, and are reflective of, local environmental conditions.

The benthic infauna of the lower San Gabriel River are subjected to variations in water quality, including daily tidal fluctuations and elevated temperatures, as well as periodic storm runoff characterized by low salinity, high turbidity, and bottom scouring by river flow. Although there is no tidal exchange of ocean water more than 800 ft upstream of the San Gabriel River mouth, once through cooling water from Alamitos Bay allows the introduction of larva of many infaunal species into the upper portion of the lower San Gabriel River (Figure 2). However, local conditions in the river, particularly winter flushing events, limit successful recruitment of most species and reoccurring infaunal species tend to be well-adapted to conditions in the San Gabriel River. These adaptations include the ability to tolerate warmer water and salinity fluctuations as well as reproducing rapidly when conditions are favorable. The result is an infaunal community with low species diversity, although densities of opportunistic or particularly well-adapted species can be quite high. Multi-year analysis indicates that although abundance and species richness may vary markedly from year to year (LACOSAN 2000, unpubl. data), it is possible to characterize the infaunal communities of different regions of the lower San Gabriel River.

Along the concrete-lined section of Coyote Creek (above 7th Street), sediments can accumulate through the dry season when water flow is low, although sediment deposition and water

flow are variable. Tidal influence (discharge water backing up the river) in this area is limited to the highest of tides. The infaunal community is dominated by midge larvae (Chironomidae) and oligochaetes, typical freshwater species (LACOSAN 2000, unpubl. data). Yearly sampling results vary widely, ranging from zero specimens to several thousand of each taxa collected, probably related to the presence or absence of sediment and whether freshwater flow is consistent in the creek. Similarly, year-to-year variability and a freshwater-dominated infaunal community structure was found at the junction of the San Gabriel River and Coyote Creek, although numbers of individuals collected was considerably lower than in Coyote Creek. The occurrence of a brackish-water-tolerant marine annelid *Streblospio bendicti* in low numbers, however, indicates some tidal influence of the infaunal community at the river junction.

Further south, at the San Diego Freeway (I-405) Bridge, the infaunal community was composed primarily of brackish-water tolerant marine species such as the annelids *S. benedicti*, *Capitella* sp. and *Neanthes arenacaeodentata*, and the amphipods *Corophium insidiosum* and *Grandidierella japonica*, with some freshwater-associated insect taxa (LACOSAN 2000 unpubl. data). Although the infaunal community was mostly marine, salinity levels could vary widely from seawater to freshwater depending on tidal height. Only highly tolerant species could survive, and even those species would be highly stressed. As a likely result of this, yearly abundance at this site was consistently lower than abundances found in other regions of the lower San Gabriel River.

South of the 7th Street Bridge, the San Gabriel River benthic environment is essentially marine. However, this region of the river is still subject to varying salinity during seasonal freshwater flushing. The importance of seasonal runoff to infaunal communities was demonstrated by the May 1991 sampling following the heavy rainfall during an El Niño year. Infaunal communities were eliminated from many regions of the river, probably as a result of low salinity, high turbidity and scouring and redistribution of sediments.

The infaunal environment in the region of the river between the 7th Street and PCH Bridges is hospitable to infaunal species when freshwater runoff is absent, during all but a few days during the winter months. As a result, samples collected in October in this region of the river tend, to varying degrees, to show infaunal communities with high abundances and occasionally high species richness. The core species of these infaunal communities, however, are those tolerant of disturbance, such as fluctuations in temperature and salinity, and many are the same species as found upriver. The most prevalent of these species include the annelids *N. arenacaeodentata*, *S. benedicti*, and *Capitella* sp, and the amphipod *G. japonica* (LACOSAN 2000 unpubl. data). These species are occasionally highly abundant in samples. In general, high species richness in the river is a result of rare occurrences of a variety of species. For example, at the Westminster Avenue Bridge infaunal stations, 140 different species were found during seven sampling periods; however, all but 33 species occurred in less than one third of the samples, while 55 species occurred only once. The species most frequently encountered at this site, *N. arenacaeodentata*, was found 20 out of 21 times. In 2002, infaunal abundance in the lower river was more than twice that offshore the river mouth, but species richness was less than half that offshore (MBC 2002). Community dominants in the lower river included the annelid *S. benedicti*, and the arthropods *Monocorophium insidiosum* and *G. japonica*, which are common in estuarine and disturbed environments. Because of the inherent variability in the river environment (fluctuating temperature, salinity, nutrient loads, and the potential for contaminants) the community is more likely to change from year to year compared with the offshore community.

At the mouth of the San Gabriel River, wave action and the resulting sediment coarseness, appear to define the infaunal community. Abundance and species richness are typically low in sandy areas compared with siltier sands offshore (Barnard 1963). Species that reoccur in this nearshore area, such as the annelid *Paraonella platybranchia* and the bean clam *Donax gouldii* (LACOSAN 2000, unpubl. data), tend to favor shallow, coarse sediments.

Offshore of the San Gabriel River, in San Pedro Bay, the infaunal community is characterized by wave action. The infaunal community is dominated by a comparatively large number of reoccurring species, including the annelids *Apoprionospio pygmaea* and *Mediomastus* spp., and the amphipod *Amphideutopus oculatus* (MBC 2002). Species richness and diversity tend to increase with depth and in areas protected from wave action. The infaunal community offshore of the San Gabriel River is typical of a sandy, shallow subtidal of the nearshore shelf of southern California (Barnard 1963).

Fish

The fish community of the lower San Gabriel River is subject to the same environmental variations and gradients as the benthic infauna. Upstream from the 7th Street Bridge, the fish fauna is generally representative of freshwater and brackish communities, with dominant species such as mosquitofish (*Gambusia affinis*), California killifish (*Fundulus parvipinnis*), and tilapia (*Tilapia* sp.). Tilapia was introduced from Africa, and was first discovered in California in 1964, and is capable of withstanding a wide range of physical conditions (Dill and Cordone 1997). Tilapia are occasionally caught by anglers from the Seal Beach Pier, demonstrating this species' tolerance for saltwater. It was first discovered in Coyote Creek in 1972, and later in the San Gabriel River in 1974 (Knaggs 1977). This species has been distributed world-wide as an aquarium fish and as part of the aquaculture industry. A decline in the diversity of the benthic community in the river since 1971 has been attributed to the presence of *Tilapia mossambica* (Anderson et al. 1993).

Upstream of the mouth, to the 7th Street Bridge, very little information is available on the demersal fish population. During dives to collect sediment and place mussel moorings, several species have been noted including speckled sanddab, spotted turbot, yellowfin croaker, mullet, and top smelt (Curtis et al. 2000, pers. comm.). Undoubtedly many more warm water tolerant species such as sargo, opaleye, and staghorn sculpin exist in the river; however, it is likely that the population is depauperate compared to that noted in Alamitos Bay because of the lack of cold water fauna.

Near the mouth of the San Gabriel River, the fish community is more representative of the marine environment. The warmer than ambient waters in the lower river attract a variety of fishes that are considered tropical or subtropical. The area directly offshore of the river is also a major breeding ground for round stingray (*Urolophus halleri*). Between these two areas are fish species adapted to survival within the tidal wedge, such as topsmelt (*Atherinops affinis*), anchovies (*Engraulis mordax* and *Anchoa* spp.), and tilapia. Numerous trophic levels are represented in the fish fauna of the lower San Gabriel River. For example, tilapia and mosquitofish are omnivores, feeding on a variety of prey items. Topsmelt are planktivores, and feed on algae and planktonic crustaceans. Barred sand bass and California halibut eat invertebrates, crabs, octopus, and other fishes.

As part of comprehensive monitoring programs for the Haynes and Alamitos generating stations, demersal fish trawls have been conducted offshore of the river for decades (EQA/MBC 1973; MBC 1979, 1981, 1986, 1988, 1990-1992a, 1993-1999, 2000a, 2000b, 2001, 2002). Monitoring is conducted at six stations located on the 20-ft and 40-ft isobaths upcoast and downcoast of the river mouth. The fish community offshore of the river is typical for southern California embayments and nearshore waters. Among the most common fish sampled off the river are nearshore schooling species, such as white croaker (*Genyonemus lineatus*), queenfish (*Seriphus politus*), and northern anchovy (*Engraulis mordax*). Also common are bottom-dwellers such as California halibut (*Paralichthys californicus*), spotted turbot (*Pleuronichthys ritteri*), speckled sanddab (*Citharichthys stigmaeus*), California tonguefish (*Symphurus atricauda*), and fantail sole (*Xystreurys liolepis*). Other species present in the area but not captured in large numbers are those that utilize nearby structures for foraging and habitat (such as the Alamitos Bay jetties, the Seal Beach Pier, oil islands, artificial reefs, and bait receivers), and include barred sand bass (*Paralabrax*

nebulifer), black perch (*Embiotoca jacksoni*), kelp bass (*Paralabrax clathratus*), and pile perch (*Rhacochilus vacca*).

The fish community just offshore the river mouth is relatively homogenous both spatially and temporally. Compared with other trawl studies off Ventura County, Redondo Beach, and Huntington Beach, the abundance and diversity of the fish community offshore the river mouth is more diverse and abundant (EQA/MBC 1973). It was surmised that the discharge of warm water from the generating stations ameliorated colder winter conditions, a period when productivity and growth rates are normally at their lowest. Therefore, the thermal effects from the generating station were deemed beneficial.

Birds

Field observations recorded during annual NPDES surveys since 1990 in the river and offshore of the river mouth have noted a variety of seabird and shorebird species. In the San Gabriel River, the armored shoreline provides habitat, resting areas, and feeding areas for both seabirds and shorebirds. More commonly observed birds at San Gabriel River stations include cormorants (*Phalacrocorax* spp.), mallard ducks (*Anas platyrhynchos*), California brown pelicans (*Pelecanus occidentalis californicus*), gulls (*Larus* spp.), great blue herons (*Ardea herodias*), and snowy egrets (*Egretta thula*). Less frequently observed in the river are western grebes (*Aechmophorus occidentalis*), black skimmers (*Rynchops niger*), American coots (*Fulica americana*), and black-crowned night herons (*Nycticorax nycticorax*).

Offshore of the river mouth, seabirds prevail, with commonly observed species including California brown pelicans, western grebes, California least terns (*Sterna antillarum browni*), Forster's terns (*Sterna forsteri*), Caspian terns (*Sterna caspia*), elegant terns (*Sterna elegans*), cormorants, Western gulls (*Larus occidentalis*), and Heermann's gulls (*Larus heermanni*). Less common offshore are ring-billed gulls (*Larus delawarensis*), Bonaparte's gulls (*Larus philadelphia*), shearwaters (*Puffinus* sp.), surf scoters (*Melanitta perspicillata*), willets (*Catoptrophorus semipalmatus*), Pacific loons (*Gavia pacifica*), and black skimmers.

Marine Mammals

California sea lions (*Zalophus californianus*) have been observed in most surveys offshore of the San Gabriel River. These animals are most abundant in the Southern California Bight during the May-July breeding period. Their food consists of squid, octopus, and a variety of fishes. In August 1992, biologists surveying the area in response to an accidental chlorine spill observed a California sea lion in the San Gabriel River just downstream from the Alamitos Generating Station discharges (MBC 1992b) (the Alamitos Generating Station is approximately 3 km upstream from the mouth of the San Gabriel River).

In March 1994, three gray whales (*Eschrichtius robustus*) were observed near Station T4, offshore and upcoast of the San Gabriel River. Gray whales pass by the San Gabriel River during their north-bound (spring) and south-bound (fall) migrations between Mexico and Alaska, though most gray whales follow an offshore route instead of an inshore route in southern California. This species is no longer listed as endangered or threatened under the federal Endangered Species Act. Gray whales use their baleen to sift out crustaceans, mollusks, and other invertebrates which they suck from the bottom sediments. In August 1990, two bottlenose dolphins (*Tursiops truncatus*) were spotted directly off the river mouth. Bottlenose dolphin feed on a broad spectrum of marine fish and invertebrates.

Marine Reptiles

Green sea turtles (*Chelonia mydas*) have been observed in the lower river on occasion, including several times during summer 2001 at the Westminster Avenue bridge (MBC 2001). Green sea turtles are listed as threatened throughout their world-wide range, while the Mexican nesting population is listed as endangered by the U.S. Government. This tropical species likely prefers warm waters such as those of the lower river. A population of green sea turtles has resided in the discharge canal of the South Bay Power Plant in San Diego Bay for many years.

EFFECTS OF THE OPERATION OF THE HAYNES AND ALAMITOS GENERATING STATIONS

ENVIRONMENTAL EFFECTS

The discharge of warm water from the generating station affects the hydrodynamics of the river (flow), the physical characteristics of the waters of the lower river (higher temperature), and the chemical characteristics of the waters of the lower river (permitted waste streams).

Long-term or cumulative impacts due to operation of the generating stations

The discharge of relatively large volumes of warm water from the generating stations represent "cumulative impacts." This discharge has led to the aforementioned changes in river flow, and fish, infaunal, and intertidal community alterations.

Adverse impacts

The discharge of warm water from the generating station affects the flow of the river, the temperature of the waters of the lower river, and it is possible that some of the low volume waste streams from the generating station may alter chemical characteristics of the local receiving waters. However, in plant waste streams are regulated to minimize environmental effects. The elimination of a diverse and abundant intertidal community due to warm water may be an adverse impact. However, it is unclear what the community would look like in the absence of the cooling water flows from the generating stations. Assuming no warm cooling water flow from the generating stations, the intertidal community would likely extend as far as the tidal prism which has been shown in historical documents to extend no further upstream than a short distance past PCH Bridge during extreme high tides. However, other factors such as the well-documented closures at the mouth of the river for most of the year would have limited tidal flow and periodic large storms would have deposited sufficient sediment in the river course to limit the upstream incursion of tidal waters. This coupled with contaminant concentrations and availability of food resources would probably have limited the intertidal community. Studies done prior to the operation of the generating stations recorded a depauperate biological community behind berms with little or no flow to the ocean. However, the river was heavily polluted and gains were noted in subsequent studies conducted before the operation of the generating stations.

Beneficial Effects

Alamitos Bay

The configuration of Alamitos Bay is such that exchanges between bay waters and nearshore ocean waters is limited to a narrow entrance channel. Unlike other embayments where waters furthest from the entrance would experience the poorest flushing and longest retention times (EQA/MBC 1973, IRC 1981), waters near the back of Alamitos Bay are well-mixed due to the intake flows from the generating stations. Without the additional water movement induced by the intake

flow of the generating stations, water exchange would be drastically reduced in Alamitos Bay. While tidal exchange with offshore waters would be expected to occur near the mouth of the bay, near the back reaches of the bay exchange would be extremely limited, possibly taking months or longer for tidal and circulation patterns to exchange back-bay water. This increased circulation resulting from the cooling water systems enhances the water quality of the bay in two ways:

1. It facilitates the withdrawal of substances, such as organic and inorganic wastes, which would otherwise accumulate and degrade water quality, and

2. This extraction of water from Alamitos Bay reduces the residence time of the water mass within the harbor and provides circulation in what would otherwise be dead end channels. The result is that the increased flow into the bay draws in additional dissolved oxygen. In turn, the harbor sediment's dissolved oxygen levels remain high and contaminants are flushed from the harbor area, resulting in beneficial effects on the biological communities of the bay and consequently a more healthy environment.

While Reish and Winter (1954) found the bay to be biologically healthy prior to the construction of the Haynes and Alamitos generating stations, sediments near Colorado Lagoon and in Cerritos Channel emitted a strong sulfide odor, indicating some input of pollutants and/or decomposition.

San Gabriel River

An additional beneficial effect from the operation of the Haynes and Alamitos generating stations is the increased water flow in the lower San Gabriel River. This flow keeps the river open and provides a habitat that would not exist without the generating station discharges. Previous to operation of the generating stations, tidal influence in the river was limited to the area slightly upstream of the PCH overcrossing, a distance of about 1 km from the river mouth. The generating station discharges have allowed a marine-like environment to develop for almost 6.5 km upstream of the river mouth.

Benthic infaunal diversity has increased dramatically in the lower San Gabriel River since 1952, when studies first occurred in the area. River sediments at that time were found to be devoid of macroinvertebrates (Reish 1956). Following dredging and river widening, but prior to operation of the generating stations, 12 infaunal species were found in river sediments. After initiation of operations and circulation of seawater into the river, benthic conditions improved considerably, with 19 species found in the lower river in 1966, 25 species in 1970 and 34 species in 1971 (Turner and Strachan 1967, Anderson et al. 1993). Conditions have continued to improve over time, with at least 140 different infaunal species now known to occur in the lower San Gabriel River (LACOSAN 2000 unpubl. data).

In addition, although little documented, the warm discharge occasionally attracts sea turtles and provides habitat and foraging for green sea turtles, a species listed as threatened (MBC 2001). Similarly, green sea turtles are known to reside in the discharge canal of the South Bay Power Plant in San Diego Bay.

Offshore

The fish communities in southern California, including within Alamitos Bay, are characterized by marked seasonal changes in abundance and diversity (Horn and Allen 1985). It is common for abundance to be lower in winter and higher in summer, when increased day length and warmer water temperatures lead to increased primary production. However, EQA/MBC (1973) found the fish community off the San Gabriel River mouth to be highly abundant when compared

with results from concurrent studies offshore Ormond Beach, Redondo Beach, and Huntington Beach. Additionally, the fish community of the San Gabriel River was relatively homogenous throughout the year. It was hypothesized that the thermal discharge and/or nutrient load from the river, among other things, enhanced productivity and diversity at the river mouth, and the thermal discharge ameliorated cooler water temperatures that would normally occur in winter months.

PROTECTION OF BENEFICIAL USES

Responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs). The SWRCB's Ocean Plan (SWRCB 2001) states: "The beneficial uses of the ocean waters of the State that shall be protected include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting."

Beneficial uses of the lower San Gabriel River include, Industrial service supply; Navigation; Water-contact recreation; Non-water-contact recreation; Commercial and sport fishing; Estuarine habitat; Marine habitat; Wildlife habitat; Rare, threatened, or endangered species; Migration of aquatic organisms; Spawning, reproduction, and/or early development

Additionally, "Shellfish harvesting" is listed as a potential beneficial use. Annual NPDES monitoring performed by LADWP and AES (and SCE) has consistently documented the protection of the beneficial uses of the receiving waters. Shellfish Harvesting is "Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g. clams, oysters, and mussels) for human consumption, commercial, or sport purposes." The high temperatures in the lower river likely contribute to the continued absence of a diverse and abundant intertidal community. The generating stations' discharge contribute to the high temperatures. It is unknown, however, what other factors play a role in intertidal community composition and density.

Prior to the licensing of the two generating stations, flow into the San Gabriel River was limited, with most upstream inputs dammed or used to recharge aquifers. From the 1920s, the river had been channelized and engineered to act primarily as a flood control channel during storm events. Aerial photos dating from the 1950s through the early 1960s (Figures 1, 3-5) show that the San Gabriel River mouth was often closed or restricted by a sandbar berm, similar to other rivers in southern California with limited seasonal flow. The lower river received some municipal and industrial discharges, but not enough to keep the berm open year-round and water and sediment quality in the river behind the berm was poor.

After the construction of the two generating stations, seawater circulated through the generating stations and into the river. Because of the minimal aquatic habitat existing in the lower San Gabriel River, it was determined by Regulators that potential impacts to the existing ecosystem were likely only in the vicinity of the river mouth, recognizing that in the case of the Haynes and Alamitos generating stations, the flood control channel was analogous to the discharge pipes at other coastal generating stations. The amount of seawater being extracted from Alamitos Bay and discharged into the river is approximately 1.5 million gallons per minute, or up to 2.3 billion gallons per day. This input is equivalent to the last 4 km of the lower San Gabriel River being flushed 5 to 14 times a day (depending on the tide), and has kept the river mouth open for the last 30 years. Freshwater inputs upstream of the generating station discharges are minor, amounting to less than 1% of the generating stations' discharges. As a result, during most of the year there is no notable reduction in salinity downstream of the generating station discharges (EQA/MBC 1973).

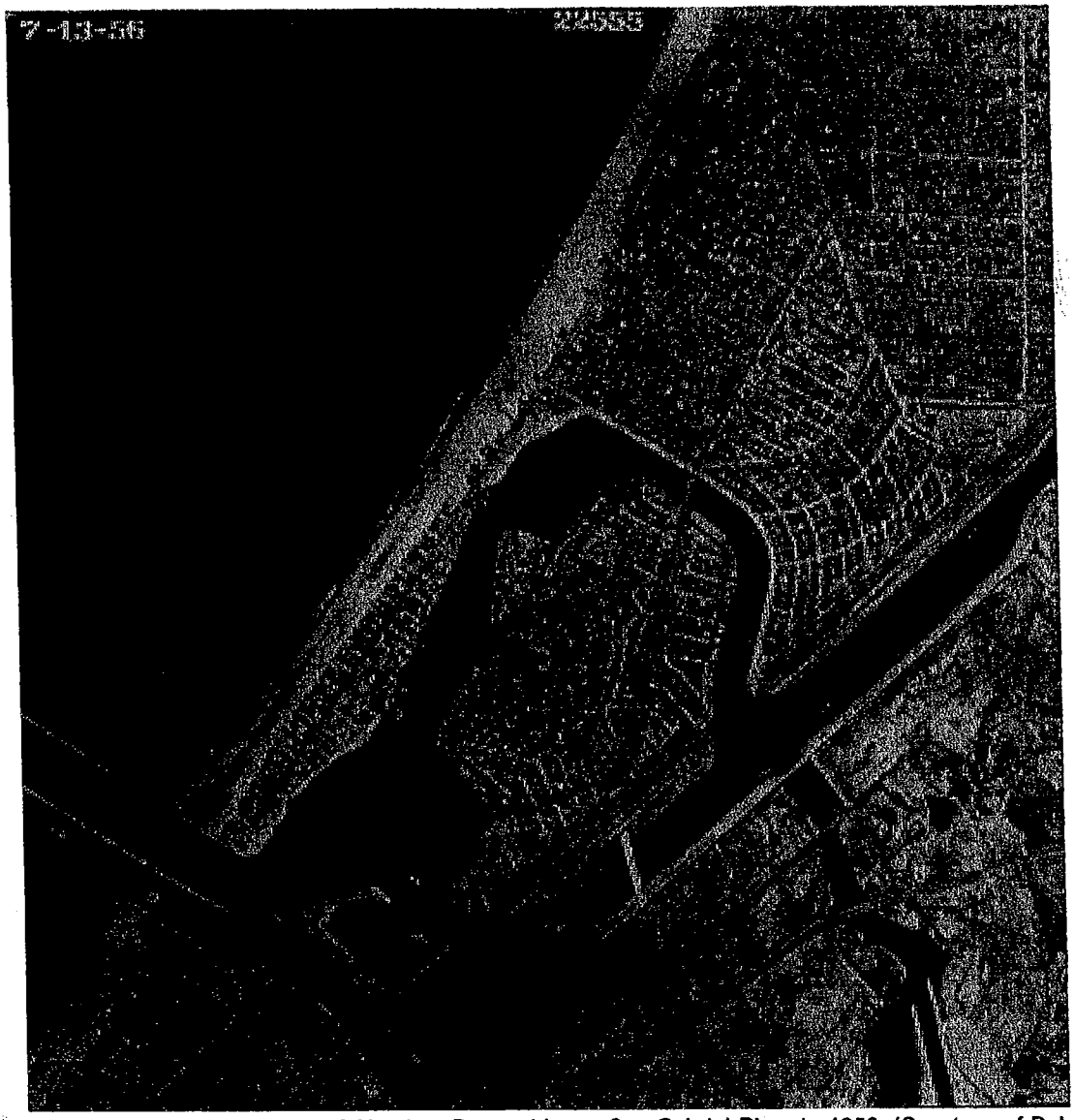

Figure 3. Aerial photograph of Alamitos Bay and lower San Gabriel River in 1956. (Courtesy of D.J. Reish).

EXPECTED CHARACTERISTICS OF THE LOWER SAN GABRIEL RIVER WITHOUT THE GENERATING STATION DISCHARGES

To theorize on what a natural San Gabriel River would look like, it is necessary to go back in time to when three divergent trends had not influenced the river. The first divergence from natural conditions involved the impoundment of the waters to recharge groundwater coming down the mountains (especially during winter) by dams. The second departure from normal conditions would be the channelization of the river by dredging and shoring of the riverbanks to contain the river on one course and safeguard against floods. Finally, we would need to look at the river in the absence of secondary discharges such as sewer and cooling water discharges.

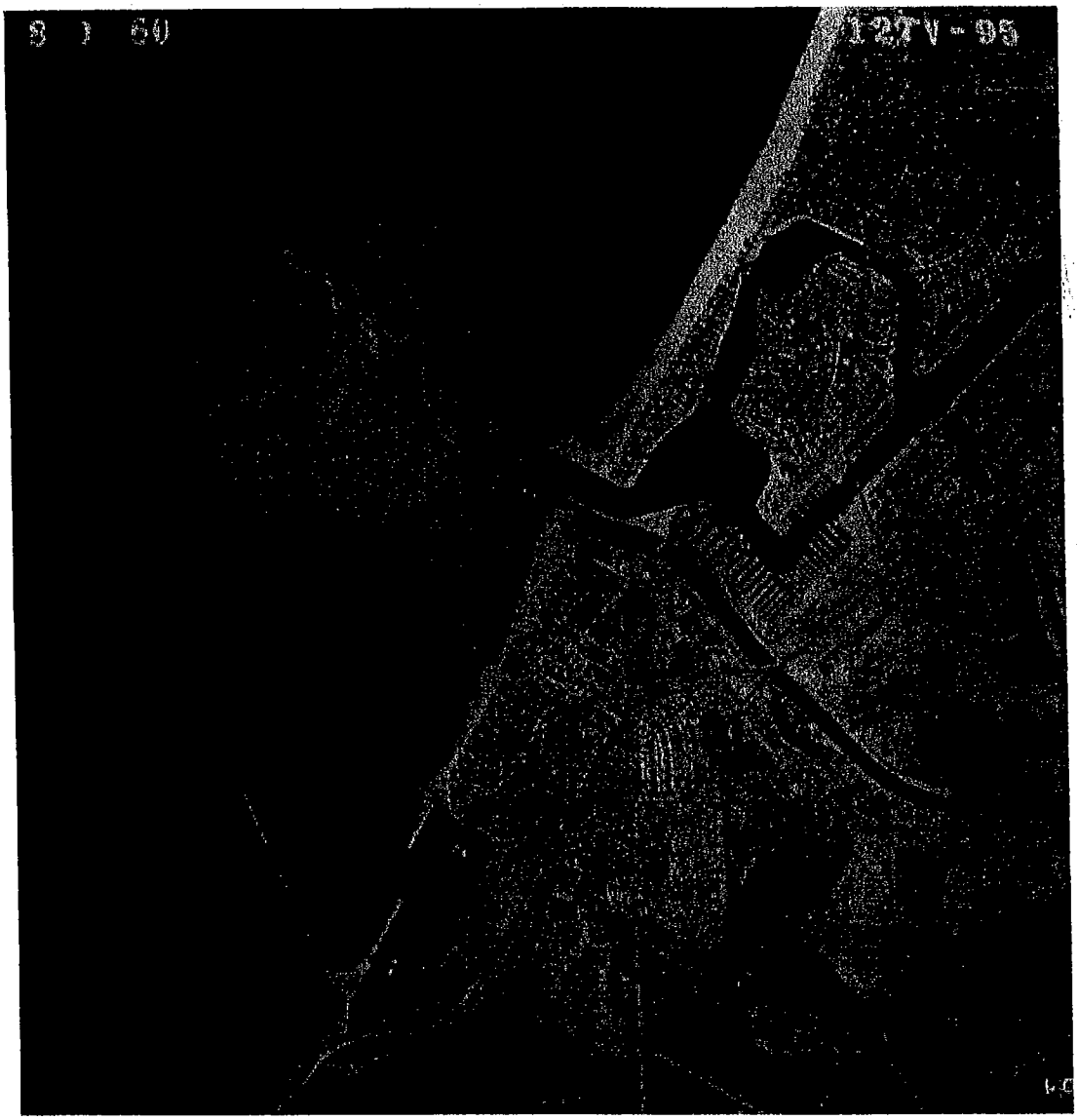

Figure 4. Aerial photograph of Alamitos Bay and lower San Gabriel River in 1960. (Courtesy of D.J. Reish).

NATURAL CONDITION

It is no longer feasible to have a natural river in Southern California due to its urbanization. The potential loss from floods in an uncontrolled river course would be disastrous and would leave large portions of Southern California uninhabitable. However, the natural condition of the lower San Gabriel River without any human influence would be a river flowing towards the ocean across a broad alluvial plain. Frequent diversions and channel breakthroughs, particularly during storms would cause the river mouth to meander across the alluvial plain. Sporadic large winter rains would cause extensive flooding. Previous to human influence, the San Gabriel River flowed by many different paths and often mingled with the Los Angeles and Santa Ana rivers during periods of flooding and once flowed to the ocean in San Pedro by a course now occupied by the Los Angeles River (Gumprecht 2001). Due to the rich alluvial deposits put down in the Los Angeles Basin over

the last one million years (up to 20,000 ft deep), most runoff during rainy seasons sank into the ground, collecting in large underground basins (Gumprecht 2001). Because the river seldom flowed above ground, river courses were shallow and fanned out across a broad alluvial plain (Gumprecht 2001). So dry were some of the rivers of the Los Angeles Basin, that they were referred to as arroyos (dry wash) in a map drawn in the 1830s (Gumprecht 2001). It is probable that willows and cattails and other freshwater vegetation surrounding seasonal ponds would have dominated the lower San Gabriel River as noted in 1958 and would today if conditions were similar.

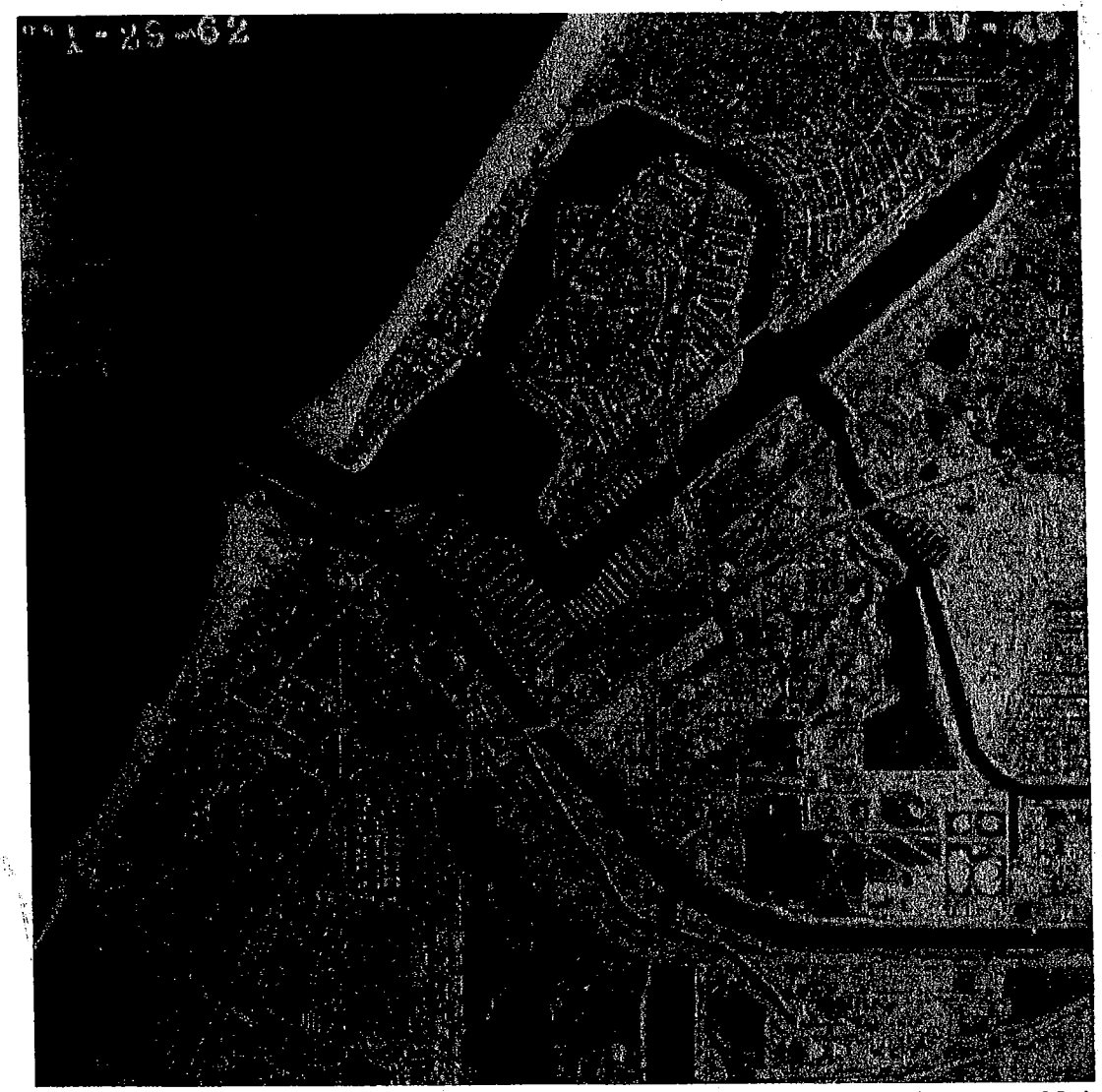

Figure 5. Aerial photograph of Alamitos Bay and lower San Gabriel River in 1962. (Courtesy of D.J. Reish).

DAMMING AND CHANNELIZATION OF THE RIVER FLOW

In order to guard against floods, from the 1860s on dams were placed at various points along the San Gabriel River. Most of these, until the 1920s, worked poorly and were ephemeral at best, disappearing with alarming regularity during large rain storms. Ultimately, the drilling of wells reduced the water flow, while damming of the river further reduced year-round flow. Construction of railroads (with their tracks upon large berms) began the actual channelization of the river flow (Gumprecht 2001). The flood of 1914 was the impetus that brought resources to finally build substantive dams and channelize the rivers. With this phase, flow to the San Gabriel River mouth all but ceased during any but the largest rains.

LOWER SAN GABRIEL RIVER WITHOUT THE GENERATING STATION DISCHARGES

Without the flow from the two generating stations, the San Gabriel River would look quite different. The San Gabriel River would most likely take on more of the characteristics of the Santa Ana River rather than that of the Los Angeles River. The Santa Ana River has tidal action for the first 0.5 miles and then is composed of small ponds with no connection to each other for about another 1.0 mile. Because of this the fauna and fish biota are restricted to the relatively small area of tidal action. There is no net flow of freshwater down the Santa Ana River during most of the year, so there is no estuarine environment that exists in the Santa Ana River. The Santa Ana River mouth builds up a berm at the entrance which is normally breached during the winter months when substantial rainfall occurs. Unlike the San Gabriel River, a large back channel area called the Newport Slough is kept artificially full of water with a connection via flood gates to the Santa Ana River. Because of this, there remains a small outflow (all saltwater) during low tides. Due to its location in the harbor, the mouth of the Los Angeles River is kept open by dredging at the river mouth and more than three-quarters of its 51 mile length is covered by concrete allowing no percolation into the substratum (Gumpretch 2000). As there is no slough area near the mouth of the San Gabriel, at best there would be only a small flow to the ocean and, most likely, there would be none during most of the year. Although there is about 30 to 50 mgd of flow in the river from sewer and industrial inputs, most of it percolated into the ground previous to the discharges of the generating stations and did not flow to the ocean. Based on a series of aerial photographs from 1951 through the late-1960s, the San Gabriel River always had a berm restricting tidal flow except during exceptional rains. Sedimentation would have filled the channel and ponded fresh water in the upper part of the lower San Gabriel River and allowed tidal actions to go no further than the PCH bridge. Biologically, the infaunal and fish communities would have been severely restricted during most of the year and depauperate even when the river was opened temporarily by large storm runoff. It would have been much less diverse than the status of the river today (MBC 2001, 2002).

BIOLOGICAL DEFINITION OF AN ESTUARY

Pritchard (1967) gives us the definition that "An estuary is a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage".

Fairbridge (1980) gives a more detailed definition as "An estuary is an inlet of the sea reaching into a river valley as far as the upper limit of tidal rise, usually being divisible into three sectors: (a) a marine or lower estuary, in free connection with the open sea; (b) a middle estuary subject to strong salt and fresh water mixing; and (c) an upper or fluvial estuary, characterized by fresh water but subject to daily tidal action. The limits between these sectors are variable. And subject to constant changes in the river discharge."

As these definitions are based more on the physical and geological characteristics, reflecting the bias of the geologists and oceanographers who first categorized them, other salient

features are the rise and fall of the tides, muddy substrates, high turbidity levels, nutrients, high planktonic productivity, and variable salt concentrations (Day et al. 1989, Castro and Huber 2000).

The most important component in the scientific definition is variable salinity. The definition calls for substantial mixing of fresh and salt water in a transitional area between the fresh water and salt water influences during a significant portion of the year and the presence of adequate nutrients to ensure a large phytoplankton population. Here in a relatively protected area, an estuarine community can develop and primary productivity is high because of nutrient runoff into the system. None of these factors are present in the San Gabriel River. As the only mixing of fresh and salt water takes place above the generating stations and there is no transitional area anywhere along the channel from the generating stations to the discharge at the mouth of the river, it would appear that the only area an estuarine environment exists is above the generating stations. Below this area, there are no quiet areas, primary productivity is not high, and there is little to no freshwater influence which would allow a community to develop. In fact, every two to three years the entire community that has developed is lost due to torrential winter rains. It is not a stable system where an estuarine community with all of its diversity and productivity could or would develop.

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Attachment 11

Comments on Environmental Analysis for Regional Water Quality Control Board's Proposed San Gabriel River Metal Total Maximum Daily Load (TMDL)

Introduction

As a state-certified regulatory program, the Regional Water Quality Control Board (RWQCB) is exempt from preparing environmental documents pursuant to the California Environmental Quality Act (CEQA), such as an initial study, negative declaration, or environmental impact report (EIR). Instead, Section 21159 of the Public Resources Code requires the RWQCB to prepare a CEQA-equivalent or substitute document that complies with CEQA goals and policies. Statute further requires that the environmental analysis prepared by the RWQCB include, at a minimum, all of the following: 1) an analysis of the reasonably foreseeable environmental impacts of the methods of compliance; 2) an analysis of reasonably foreseeable feasible mitigation measures; and 3) an analysis of reasonably foreseeable alternative means of compliance.

In the Environmental Analysis prepared for the proposed TMDL for the San Gabriel River, the RWQCB has largely focused on the following two potential compliance measures for power plants that discharge ocean cooling water into the San Gabriel River: relocate the discharge to an ocean outfall or replace the existing copper condensers. Relocating the discharge to an ocean outfall is an unrealistic method of compliance because of the design, construction and tremendous costs associated with this alternative. Specifically, the Environmental Analysis fails to address the engineering constraints and significant adverse impacts associated with the design and construction of the ten, 10- to 12-foot diameter pipes (five each for the Haynes and Alamitos Generating Stations) that would be required to transport 2.2 billion gallons of water per day. The probable significant adverse impacts from the construction alone of an ocean outfall would include, but are not limited to: traffic, air quality, biological resources, and recreation.

Obtaining permitting approval from the required federal, state and local agencies may make such a project infeasible. These agencies include, but are not limited to: the Army Corps of Engineers, the National Marine Fisheries Service, the California Coastal Commission, the State Lands Commission, the California Department of Fish and Game, and the City of Long Beach. Additionally, all proposed new ocean outfall structures over the last decade have been tied up for years in litigation.

Although equally infeasible, the RWQCB failed to include and adequately analyze other potentially "reasonably foreseeable methods of compliance" such as cooling tower technology. While it is LADWP's belief that both a new ocean outfall structure and the installation of cooling towers are infeasible, if the RWQCB intends to consider one as a "reasonably foreseeable method of

compliance," it should consider the other method as well. Either method results in a scenario of zero discharge of wastewater to the San Gabriel River for which the Environmental Analysis is deficient in its consideration of the potentially adverse and significant short-term and long-term environmental impacts. Instead, the RWQCB has chosen to focus its environmental impact assessments primarily on those generated from the construction of structural Best Management Practices (BMP), or on storage, diversion, or treatment facilities for storm water management.

In the Environmental Analysis, the RWQCB minimizes the potential adverse impacts of the proposed TMDL and purports its "positive" impacts. However, the alleged positive effects of the proposed rule do not absolve the public agency from the responsibility of preparing an environmental document that analyzes potentially significant negative environmental effects, because those negative effects might be reduced through the adoption of feasible alternatives or mitigation measures analyzed in an EIR-equivalent document, which is not accomplished through this Environmental Analysis.

Note: For the purposes of effectively commenting on the RWQCB's Environmental Analysis, the comments provided below reflect the short-term and long-term impacts associated with a "zero discharge" scenario that LADWP believes should be properly incorporated into the document and fully considered by the RWQCB. To do otherwise would be the issuance of an incomplete and inadequate substitute CEQA document.

Comments on Discussion of Environmental Evaluation

Air

2.a. The RWQCB, considering only impacts from storm water management activities, has stated that, "...any significant, un-mitigable impacts on air resources would be short-term in duration and/or are outweighed by the necessity of the project." As determined by the South Coast Air Quality Management District, wet cooling towers can contribute to particulate matter emissions, thereby increasing air emissions and/or deterioration of ambient air quality. Furthermore, using closed cycle cooling, either wet or dry cooling towers, creates an energy efficiency penalty which means that more fuel needs to be burned to produce the same amount of energy. This increase in fuel consumption produces an increased level of NOx, CO2, and PM10 emissions. If an impact analysis of cooling towers was included in this section, it may be difficult to establish that imposing this TMDL outweighs the potential long-term air quality impacts.

2.b. Contrary to what is indicated in this section of the Environmental Analysis, the elimination of once-through cooling (i.e., zero discharge into the San Gabriel River) can cause water to become stagnant and create objectionable odors in the Long Beach Marina, and possibly the Naples

canals, San Gabriel River, and other areas of Alamitos Bay. It is a well-known fact that the seawater withdrawal from Los Alamitos Bay created by the two power plants provides a favorable water circulation pattern that promotes the Bay's overall health. There have been many instances where, due to significantly reduced flows in the area from circulating water pump outages for maintenance or repair, restaurant owners and other Long Beach Marina clients have complained to power plant operators about the foul odors emanating from the Marina.

2.c. Contrary to what is indicated in this section of the Environmental Analysis, wet cooling towers can cause drift and fogging, both foreseeable long-term negative impacts, and would result in an alteration of air movement, moisture or temperature, or change in local climate.

Water (3a, 3d, 3e, 3f, and 3g)

Achieving zero discharge in the San Gabriel River via the installation of alternative cooling systems would substantially alter currents, course of direction and water movements in the San Gabriel River, Long Beach Marina, Marine Stadium, Alamitos Bay, and Naples canals. The waters of the Long Beach Marina are isolated from open coast circulation; however, the draw of water for plant cooling purposes increases the influx of ocean water into Alamitos Bay (MBC, 1997a). The process of drawing water into Alamitos Bay and Long Beach Marina contributes to better water circulation, reduces stagnation and improves water quality. Moreover, drawing water from the intake structure in the Marina pulls in trash to this single location for easier removal. In the absence of cooling water draw into the power plants, trash could remain scattered throughout the Marina, and water would become stagnant and likely fetid, as it has in the past during pump outages.

Achieving zero discharge from both power plants via either an ocean outfall or alternative cooling will also significantly alter the amount of water within the river, and quite possibly the distribution of that water across the riverbed. It is conceivable that the amount of available water would not spread from one side of the river bottom to the other, but rather, occur as a shallow stream or creek within the flood control channel bottom. Regardless of the path configuration of any water within the river, based on the available upstream freshwater flows, the water elevation will be very shallow. The RWQCB states that, "This could be considered a positive impact, as it would return the Estuary to more natural flow conditions." However, the RWQCB does not mention the reasonably foreseeable negative impacts from significantly reducing water in the San Gabriel River. The entire ecosystem would completely change, thereby potentially eliminating existing plant and animal species that inhabit the soil, rocks and water. For example, green sea turtles, which are known to

frequent the river, would not be present. Many of the existing beneficial use designations for the river would be altered or eliminated.

Achieving zero discharge in the San Gabriel River would result in an alteration of surface water quality. A shallow water body could lead to increased solar heating contributing to algal blooms. Currently, the power plant effluent, which consists of 99.9% once-through seawater, effectively dilutes the pollutants contained in the upstream freshwater flows (e.g., POTW effluent, storm water flows, and point and non-point non-storm water flows). This would not occur in a zero discharge scenario and the upstream water quality would effectively be the water quality within the "estuary" segment of the river. The discussion in this section focuses on the alleged positive effects and does not include the potentially negative effects from significantly reducing water in the San Gabriel River (3.d.). Explaining that an ocean outfall will be subject to NPDES permitting requirements to mitigate impacts to water quality is not an adequate analysis of the reasonably foreseeable environmental impacts, reasonably foreseeable feasible mitigation measures and reasonably foreseeable alternatives, particularly because an ocean outfall is an infeasible compliance strategy.

A zero discharge scenario could result in alteration of the direction or rate of flow of ground water and/or the change in the quantity or quality of ground water, but not likely for the reason stated here, i.e., "through significant infiltration of storm water." It is more probable that certain construction activities, such as trenching for new pipelines (e.g., reclaimed water and sewer connection pipelines for wet cooling towers), would disrupt soils at depths sufficient to require dewatering, which could result in the aforementioned effects.

Lastly, contrary to what is indicated in this section of the Environmental Analysis, a zero discharge scenario could result in substantial reduction in the amount of water otherwise available for public water supplies. Wet cooling towers, a reasonably foreseeable compliance strategy not addressed here, could require a considerable amount of potable water to be used as makeup water. A review of the amount of available reclaimed water sources indicates that there is an insufficient supply of reclaimed water for the Haynes Generating Station, let alone enough for the Alamitos Generating Station as well.

Plant Life (4 a-c)

Proceeding with achieving zero discharge from both power plants in the San Gabriel River could significantly change the diversity and/or number of planktonic or vascular aquatic plant species and terrestrial plants that currently inhabit the river within the footprint area of the power plant effluent. This impact could affect the animal life that depends on the

existing plant life composition for food or habitat. A zero discharge scenario could also significantly reduce the numbers of unique, rare or endangered plant species, to the extent they exist, that might currently exist within this stretch of the river. Lastly, a zero discharge scenario in the San Gabriel River could result in the introduction of new species of plants into the area and become a barrier to the normal replenishment of existing species.

Animal Life (5 a-d)

As discussed above for plant life, a change in the salinity and volume of water within the "estuary" reach of the San Gabriel River will change significantly with a zero discharge power plant scenario. The fish species, benthos, and hard substrate aquatic life will significantly vary from its current composition without the seawater input to the river from the power plants. For example, an exposed river bottom would permanently impact the sediment infauna. These changes will alter the current ecosystem and could also permanently impact the ability to sustain existing beneficial use classifications (e.g., marine habitat) and deter and/or eliminate the presence of certain existing marine species (e.g., green sea turtles).

Noise (6 a-b)

As stated in this section of the Environmental Analysis, the implementation of alternative cooling technologies as the compliance strategy could result in increased noise levels. The Haynes Generating Station is located adjacent to Leisure World, a large retirement community, and across the street from Island Village, a residential community. It is doubtful that this potential increase in noise could be mitigated to insignificant levels through the use of "standard noise abatement techniques." Assuming the existence of adequate space in which to install alternative cooling technologies, which is questionable, mitigating noise from dry or wet cooling towers by siting these facilities away from receptors is infeasible due to the proximity between these towers and the community. Installing sound barriers and insulation to reduce noise levels may be feasible to a certain extent for wet cooling towers, but would not likely work for dry cooling technology. This is largely due to the fact that dry cooling towers are very tall structures (approximately 110 feet tall), and there are building restrictions and height limits for sound barriers.

Land Use

8. As previously noted, a zero discharge scenario into the San Gabriel River would eliminate the withdrawal of water from the Long Beach Marina thereby causing a reduction in water circulation. The water would become stagnant and fetid, and trash would be dispersed throughout the Long Beach Marina, the Naples canals, and other areas of Alamitos Bay. Objectionable odors and excessive trash could adversely impact these land use areas and associated businesses.

Natural Resources

9. Contrary to what is indicated in this section of the Environmental Analysis, the implementation of cooling towers, as a reasonably foreseeable compliance strategy, would result in an increase in the rate of use of natural resources. Specifically, there would be an increase in the use of natural gas as a result of the energy efficiency penalty. Additional natural gas must be consumed to produce the same amount of electricity because the plant's auxiliary electrical usage increases in order to operate cooling towers. Also, as previously noted, the amount of available reclaimed water is insufficient to supply even one of the two power plants and therefore, potable water resources for use as makeup water for wet cooling towers would be consumed. Thus, contrary to what is indicated in this section of the Environmental Analysis, implementation of alternative cooling, as a reasonably foreseeable compliance strategy, would result in the depletion of nonrenewable natural resources.

Housing

12. Contrary to what is indicated in this section of the Environmental Analysis, the use of sound barriers and insulation may be insufficient mitigation for cooling technologies, particularly with regards to dry cooling. This is largely due to the fact that dry cooling towers are very tall structures (approximately 110 feet tall), and there are building restrictions and height limits for sound barriers. Therefore, noise emanating from cooling towers could adversely affect the Leisure World retirement community to the east, and the Island Village residential community to the south.

Transportation

13.f. Construction of a reclaimed water pipeline to supply a small portion of reclaimed water that would be required for wet cooling towers, a reasonably foreseeable compliance strategy not addressed in this section, could result in an increase in hazards to bicyclists or pedestrians, particularly if that pipeline is constructed in the bike path that runs parallel to the San Gabriel River. While these potential impacts would be "short-term," they could be significant and immitigable. Construction of an ocean outfall would most certainly disrupt traffic for an extended period, including street closures.

Public Service: Parks or Recreational Facilities

14.d. Construction of a reclaimed water pipeline for wet cooling towers, a reasonably foreseeable compliance strategy not included with the other reasons in this section, could result in an alteration of recreational facilities, particularly if that pipeline is constructed in the bike path that runs parallel to the San Gabriel River.

Energy (15 a-b)

Contrary to what is indicated in this section of the Environmental Analysis, the implementation of cooling towers, as a reasonably foreseeable compliance strategy, would result in a substantial increase in electricity demand leading to the consumption of substantial amounts of natural gas.

Utilities and Service Systems (16 a, c, d)

Contrary to what is indicated in this section of the Environmental Analysis, the implementation of cooling towers, as a reasonably foreseeable compliance strategy, could result in a need for new systems and/or substantial alterations to water and power utilities, as electricity and auxiliary equipment would be required to operate cooling units. In addition, the construction of a reclaimed water pipeline and possibly a potable water pipeline would be needed at the plant for wet cooling towers.

Absent a once-through cooling water system, inplant process wastewater, including cooling tower blowdown would likely need to be discharged to a sewer system. No sewer connection currently exists at the Haynes Generating Station and therefore, the need for a new sewer connection and possibly construction of a new sewer line would be required.

Aesthetics (18 a-b)

Contrary to what is indicated in this section of the Environmental Analysis, the implementation of cooling towers, as a reasonably foreseeable compliance strategy, could result in the obstruction of a view open to the public and could result in the creation of an aesthetically offensive site open to public view. Dry cooling towers are very tall structures (approximately 110 feet tall), and could impact public views, as well as be viewed as aesthetically unappealing to the public. In addition, wet cooling towers can create large vapor plumes which can be viewed as aesthetically unappealing.

Recreation

19. State of California-designated beneficial uses of the lower San Gabriel River are: water contact recreation; non-contact water recreation; industrial service supply; protection of rare and endangered species; wildlife habitat; spawning; marine habitat; estuarine habitat; navigation; commercial and sportfishing; and habitat for migratory aquatic organisms. Proceeding with a zero discharge scenario for the San Gabriel River could cause trash to accumulate and water to become stagnant and fetid in the Long Beach Marina, the Naples canals, San Gabriel River, and other areas of Alamitos Bay. Moreover, the lack of water in the river could be aesthetically unappealing. The potential adverse impacts to these recreational and other uses could be significant and immitigable.

Conclusion

In the Environmental Analysis, the RWQCB minimizes the potential adverse impacts of the proposed TMDL and emphasize its "positive" impacts. The primary focus is on alternatives that may in fact be infeasible and/or create numerous significant adverse impacts related to their construction and operation. Proceeding with a zero-discharge scenario may have significant impacts on the beneficial uses of the San Gabriel River that have not been addressed sufficiently in the Environmental Analysis to make adequate determinations. Furthermore, the scenario does not bring the RWQCB any closer to reducing the "impairment." The comments provided herein reflect many of the short-term and long-term impacts associated with a "zero discharge" scenario that LADWP believes should be fully considered and properly incorporated into the RWQCB's Environmental Analysis. Again, to do otherwise would be the issuance of an incomplete and inadequate substitute CEQA document.

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October 27, 2006

Song Her
Division of Water Quality
State Water Resources Control Board
1001 I Street Sacramento, CA 95814

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Sent via e-mail

Dear Ms. Her:

Subject: Comments regarding the San Gabriel River Metals TMDL

The Los Angeles Department of Water and Power (LADWP) appreciates the opportunity to review and submit comments on the proposed Basin Plan amendment and related documents for the metals and selenium TMDL for the San Gabriel River and its tributaries. Enclosed are LADWP's comments for your consideration (Enclosure).

LADWP has found that the Los Angeles Regional Water Quality Control Board (RWQCB) did not adequately assess all the impacts of TMDL implementation in the Lower San Gabriel River (LSGR), nor did the RWQCB either investigate or conduct studies to address the major sources of copper in the LSGR. Such a review should result in a sustainable, holistic view of all waters affecting LSGR. A more complete discussion of this concern is provided in the enclosure. Furthermore, because the 1999 Consent decree did not identify the LSGR segment (estuary) as impaired for copper, there was no need to expedite a copper TMDL without providing a comprehensive environmental impact review.

As also discussed in greater detail in the enclosure, it appears as though the RWQCB has not followed the proper CEQA steps and evaluated all reasonable alternatives such as source control, assigned a copper wasteload allocation (WLA) to a de minimis source rather than the major source, did not allow intake credits given the existing hydrology, and did not estimate and provide a reasonable schedule for implementing the alternatives.

For the above reasons, copper in the LSGR must be removed from the TMDL. However, LADWP also requests that if, despite the above arguments, the TMDL is to be approved with copper WLAs in the LSGR, the TMDL documents *must first be revised* to include the following considerations:

1. A Phased TMDL is needed, which contains a schedule for the development process
2. A TMDL implementation schedule for LSGR after the final WLAs are determined
3. Intake credits must be allowed
4. Source control must be discussed as a viable and essential implementation practice
5. In the Environmental Analysis (CEQA Checklist), the following were not adequately considered by the RWQCB:
    a. Source control measures and their impacts to the region as well as the State
    b. Increased greenhouse gases as a consequence of the zero discharge option
    c. Increased copper in Alamitos Bay as a consequence of the zero discharge option
    d. Impacts of looking for alternative sources of cooling water
6. Also in the revised CEQA Checklist:
    a. The RWQCB needs to consider the negative consequences caused by power plant modifications with sufficient reason before dismissing them.
    b. The RWQCB is incorrect in stating that there would be **no** need for new systems or substantial alterations to power or natural gas utilities. There will most definitely be some remediation measures for HnGS that might cost more than $500 million.
7. All references to estuary must be changed to LSGR.

These and other issues are discussed in greater detail in the enclosure.

Conclusion

LADWP is committed to providing cost effective and sustainable power to the residents of Los Angeles and other cities within the Basin as well as the reducing fossil fuel use, as directed by new legislation. LADWP believes that the TMDL documents as written holds the rate payers unfairly and unjustly responsible for pollution that LADWP did not create.

If you have any questions or require additional information, please contact Clayton Yoshida at (213) 367-4651.

Sincerely,

Original Signed By

Susan M. Damron
Manager of Wastewater Quality Compliance

CL: bdc
Enclosure
c/enc: Clayton Yoshida