CHAPTER 1. INTRODUCTION

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The Hyperion Treatment Plant (HTP) is mandated to conduct a comprehensive monitoring program of influent, effluent, and receiving waters of Santa Monica Bay by directive of the National Pollutant Discharge Elimination System (NPDES) Permit No. CA0109991, Order No. 94-021. This permit, which became effective May 11, 1994 was adopted by the California Regional Water Quality Control Board, Los Angeles Region (RWQCB 1994).

As stated in the HTP NPDES permit, the receiving water monitoring program "must document water quality at the 5-Mile Outfall, at reference stations, and at areas beyond the zone of initial dilution where discharge impacts might reasonably be expected". Each year, staff from the Bureau of Sanitation's Environmental Monitoring Division (EMD) collect and assess vast amounts of oceanographic, bacteriological, chemical, physical, and biological data from shoreline, receiving waters, and sediments of Santa Monica Bay. These data are collected under the extensive marine monitoring program for the Hyperion Treatment Plant (HTP). This biennial assessment report presents summarized data collected from January 2001 through December 2002 and is submitted to the U.S. Environmental Protection Agency, Region IX, (USEPA) and the California Regional Water Quality Control Board, Los Angeles Region, (RWQCB) in compliance with the HTP NPDES permit.

Throughout the year, all raw data are tabulated and submitted to the RWQCB and USEPA on a monthly, quarterly, semiannual and annual basis as mandated in the HTP NPDES permit (RWQCB 1994). After submission, these data are available to interested parties either through requests to these regulatory agencies or the City of Los Angeles. The data collected include bacteriological information from nearshore and shoreline waters, extensive measurements of water column physical parameters, sediment and tissue chemistry, and community composition and species abundance of benthic infauna and demersal fish and invertebrates. These data were collected, analyzed, and reported by the EMD staff of the City of Los Angeles (Appendix A).

A. HISTORICAL BACKDROP

Wastewater from the City of Los Angeles has been discharged into the waters of Santa Monica Bay since 1894 from the site of the Hyperion Treatment Plant. As the population of Los Angeles grew, so did the flow of sewage to this site. Treatment practices at Hyperion changed to cope with population growth and the resultant increased sewage flows to the plant. In the early 1950's HTP was a full secondary treatment plant. By 1957, HTP was discharging partial secondary effluent into Santa Monica Bay through the 5-Mile Outfall. At the same time, associated marine monitoring programs have been conducted to assess environmental effects of effluent disposal into the receiving waters of Santa Monica Bay from Hyperion. Revision and modification of the monitoring program continued through 1997 and 1998 to improve the quality of information, reduce effort leading to non-informative data, and move toward a regional concept of monitoring.

Since 1941, the monitoring program at Hyperion has evolved dramatically with changing treatment and disposal practices at the plant coupled with a changing regulatory environment and public concerns. The scope of this program has grown over the years as flows from Hyperion increased, new facilities were constructed, methods of treatment and disposal changed, and environmental laws promulgated.

The existing NPDES monitoring program became effective in 1994 and represents one of the largest in the country in terms of area covered, frequency and numbers of samples collected, and the numbers of analyses performed (Table 1-1). As detailed in Hyperion's NPDES permit, the monitoring program was designed to ensure that discharges from Hyperion were in conformity with goals and objectives of the California Ocean Plan (SWRCB 1990). The Ocean Plan contained water quality objectives for the coastal waters of California. Assessments of the data generated by this program and the previous program conducted under the 1987 permit have answered questions regarding the quality of Hyperion effluent, the environmental impact of Hyperion's 5-Mile and 7-Mile outfalls on Santa Monica Bay, recovery of sea-bottom communities in response to the abatement of sludge discharge from the 7-Mile Outfall and diminished solids in the 5-Mile effluent, and information on the safety of swimming in the Bay and consumption of its sportfish.

As a combined result of the information generated during the 1987 and 1994 NPDES programs and the development of regionally-based monitoring in Southern California (SCBPP 1994), the NPDES ocean monitoring program was substantially modified in 1997 and 1998 to incorporate participation in several special projects. By coordinating efforts with other agencies and organizations, the scope of effort was increased to address new issues or old ones in greater detail than previously possible. These modifications included:

(1) 1997 regional monitoring interlaboratory calibration exercises and special studies,
(2) 1997 Retrospective Evaluation of Sediments of Santa Monica Bay with the United States Geological Survey (USGS) and the Southern California Coastal Water Research Project (SCCWRP),
(3) 1998 Cooperative Water Quality Program with Los Angeles County Sanitation Districts and the Orange County Sanitation Districts
(4) 1998 Santa Monica Bay Restoration Project's Seafood Consumption Study, and
(5) Southern California Bight'98 Regional Monitoring Survey.

In order to offset the extra effort required to conduct the above five special studies, the USEPA and RWQCB agreed to suspend some of Hyperion’s normal NPDES monitoring program in 1997 and 1998. The details of these resource exchanges along with the goals and objectives of each special study were discussed in the City of Los Angeles, Environmental Monitoring Division Biennial Assessment Report (CLA, EMD 1999).

Table 1-1. Summary of the City of Los Angeles' current ocean monitoring program for Santa Monica Bay, with 1998-99 modifications.

MONITORING PROGRAM	# of stations/ Replicates	Sample Frequency	Samples/ Year (2001-02)	Analyses
Microbiology Shoreline	18/1	Daily	6,570	Total and fecal coliforms; Enterococcus 5x's/month
Inshore	11/2 depths	5x's/month	1,296	Total and fecal coliforms, and Enterococcus bacteria
Water Quality: Sample Locations	54	Quarterly	216	CTD profiles
Discrete Water Samples Offshore microbiology	21/4 depths	Quarterly	336 336	Fecal coliforms Ammonia-N
Benthic Infauna Replicate Sampling	5/3 summer	Annual	15	ID, biomass, community analysis
Sample Locations	44 winter 39 summer	Semiannual	83	ID, biomass, community analysis
Sediment Chemistry	44summer	Annual	44	TOC, dissolved sulfide, grain size, metals, BNA's, chlorinated hydrocarbons, volatile organics
Trawling	9 stations 5/2 4/1	Quarterly	56	Count, measure and weigh all fish and invertebrates, community analysis
Tissue Analysis Trawl-Caught Fish	5/3 muscle and liver	Semiannual	60	Metals, chlorinated hydrocarbons, BNA's, % lipids
Trawl-Caught Invertebrates	3/3 cancer crabs, muscle and *hepato	Semiannual	18	Metals, chlorinated hydrocarbons, BNA's, % lipids (hepatopancreas dissection protocol not available)
Rig-Caught Fish ZID	2 stations 3/3 muscle only	3x's/yr	27	Metals, chlorinated hydrocarbons, BNA's, % lipids
Shortbank	3/6 muscle only	3x's/yr	54	Metals, chlorinated hydrocarbons, BNA's, % lipids

* In the absence of an accepted protocol for crab hepatopancreas dissection, this tissue was not dissected and analyzed.

B. PROGRAM CHANGES TO MONITOR EFFECTS OF FULL SECONDARY TREATMENT

On November 23, 1998, the Hyperion Treatment Plant began discharging full secondary treated effluent into Santa Monica Bay. In order to assess the subtle changes in the benthic community as a result of the changes from partial to full secondary treatment and to determine the geographic area around the outfall ("footprint") that is impacted by the discharge, a new benthic sampling program was submitted and approved by the RWQCB. This new program shifted the sampling array from the previous equidistant, depth contour-based grid to a combination fixed station/random station array (see Chapters 5 and 6). The implementation of this new benthic sampling program began in winter 1999. The benefits of this new program include the following:

(1) Increased sensitivity to any changes resulting from implementation of full secondary treatment;
(2) Ability to provide statistical estimates of areal characteristics of the macrofaunal community and for sediment chemistry within the outfall area;
(3) Elimination of scientifically unnecessary replication (reduction from 5 replicates to 3);
(4) Elimination of artificially imposed depth effects;
(5) Elimination of stations that do not provide meaningful information to the monitoring program (i.e., reduction of redundant information);
(6) Implementation of a biannual sampling regimen with the present assessment report; and
(7) A 3% reduction in sampling and analytical effort with this program improvement while obtaining additional information and reducing duplications.

It is expected that the data resulting from this new benthic program will provide information necessary to significantly reduce the Hyperion Treatment Plant's benthic program in Santa Monica Bay in the near future. Furthermore, due to the improved quality of effluent at the Hyperion Treatment Plant as a result of full secondary treatment, reductions in the other ocean monitoring programs are expected (CLA, EMD 2001 and this report). This "reduced" effort is being redirected toward more environmentally significant and higher priority issues such as the total maximum daily load (TMDL), stormwater programs, regional monitoring, Ballona Lagoon, and Ballona Wetlands monitoring programs.

LITERATURE CITED

California State Water Resources Control Board. 1990. Water Quality Control Plan: Ocean waters of California. California State Water Resources Control Board, CA 23 pp.

City of Los Angeles, Environmental Monitoring Division. 1999. Marine Monitoring in Santa Monica Bay: Biennial Assessment Report for the Period January, 1997 through December, 1998. Report submitted to EPA and RWQCB (Los Angeles). Department of Public Works, Bureau of Sanitation, Hyperion Treatment Plant, Playa del Rey, California, pp. 1-1 to 8-34 + appendices.

City of Los Angeles, Environmental Monitoring Division. 2001. Marine Monitoring in Santa Monica Bay: Biennial Assessment Report for the Period January, 1999 through December, 2000. Report submitted to EPA and RWQCB (Los Angeles). Department of Public Works, Bureau of Sanitation, Hyperion Treatment Plant, Playa del Rey, California, pp. 1-1 to 8-38 + appendices.

CLA, EMD. See City of Los Angeles, Environmental Monitoring Division.

Regional Water Quality Control Board, Los Angeles. 1994. Waste Discharge Requirements for the City of Los Angeles (Hyperion Treatment Plant), Order No. 94-021, NPDES No. CA0109991.

RWQCB. See Regional Water Quality Control Board, Los Angeles Region.

SCBPP. See Southern California Bight Pilot Project.

Southern California Bight Pilot Project Steering Committee. 1994. I. Executive summary. Southern California Coastal Water Research Project, Westminster, California, 20 pp.

SWRCB. See California State Water Resources Control Board.