Los Trancos Creek WKS 8-74

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July 11, 2001

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Mrs. Hope M. Smythe
Environmental Specialist IV
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Dear Mrs. Smythe:

Enclosed are four bound copies and one unbound copy of the document entitled Water Quality and Marine Ecological Monitoring Studies for the Crystal Cove Development Project: Third Quarterly Report for the Period July 1 – September 30, 2000. One of the bound copies, for your agency file, contains the complete laboratory QA/QC documentation in Appendices A and B.

If you should have questions about this report, I will be happy to discuss them with you. I appreciate the continuing opportunity to assist the Regional Board in this project.

Sincerely,

Richard F. Ford, Ph.D.
Consultant and
Professor Emeritus of Biology
San Diego State University

c Gerard Thibeault, SARWQCB
Joanne Schneider, SARWQCB
Roberta Marshall, ICDC
Sat Tamaribuchi, TIC

WATER QUALITY AND MARINE ECOLOGICAL MONITORING STUDIES FOR THE CRYSTAL COVE DEVELOPMENT PROJECT:

THIRD QUARTERLY REPORT FOR THE PERIOD JULY 1 – SEPTEMBER 30, 2000

BY

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June 18, 2001

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EXECUTIVE SUMMARY

During the period July - September 2000, this monitoring study involved sampling of freshwater runoff at one point upstream and near the downstream end of three watersheds (Los Trancos, Muddy, and Emerald Canyons) and concurrent sampling of seawater at surf zone sites where these watersheds flow into the ocean. Monitoring was conducted at five of the nine station sites during dry-weather flows. No dry-weather runoff was observed in the Muddy Canyon or Emerald Canyon watersheds during July-September, 2000. The primary objectives during this period were to:

- Sample dry-weather runoff from Los Trancos Canyon (and in Muddy and Emerald Canyons if there is flow), with sampling times determined by upstream irrigation schedules, in order to evaluate water quality during such runoff.
- Measure and evaluate data for suspended and dissolved solids, water hardness, oil and grease, concentrations of important inorganic and organic chemical constituents, and pathogen indicator bacteria in the existing freshwater runoff from the three major watersheds.
- Measure and evaluate corresponding levels of these same constituents and ocean salinities where dry-weather runoff enters surf zone.
- Evaluate the above data to compare levels of constituents among station sites .
- Evaluate data for indicator bacteria taken by Orange County (OCEHP) at their coastal station series.
- Obtain and evaluate additional indicator bacteria data from sampling of dry-weather runoff at the monitoring stations of the Crystal Cove Project.
- Conduct laboratory toxicity determinations employing *Ceriodaphnia dubia* exposed to water samples obtained during dry-weather runoff from the lower watershed stations in Los Trancos and Muddy Canyons.
- Evaluate these water quality data and their potential effects on aquatic organisms.
- Continue laboratory work and data analysis associated with quantitative marine ecological studies of benthic invertebrates, algae, and surfgrass epiphytes in rocky intertidal and rocky subtidal habitats adjacent to the control site (Emerald Canyon) and adjacent to Muddy and Los Trancos Canyons.

The major results of this study for the period July - September 2000 were:

- Trace metals in dissolved form did not exceed CTR water quality criteria at any station sampled in the dry-weather runoff on July 31, September 12 and September 29, 2000.
- In the surf zone, total recoverable concentrations of trace metals either were below laboratory detection and reporting units (ND) or were present at levels below appropriate water quality objectives of the California Ocean Plan.
- Comparisons indicated that the concentrations of the physical and chemical constituents of dry-weather runoff in the watershed of Los Trancos Canyon for the July - September samples were within the ranges typical of other, similar southern California watersheds. The only exception was a relatively high concentration of the organophosphorus pesticide diazinon at Station LT on September 12, 2000.
- Dry-weather runoff flow had no evident or measurable effects on the concentrations of these constituents in the surf zone.
- In combination, and with the exception of the value for diazinon, these results indicate that the dry-weather runoff on July 31, September 12 and September 29, 2000, had no adverse effects on the water quality of Los Trancos Canyon. They also indicate that this runoff caused no adverse changes in the water quality characteristics of the adjacent surf

zone. Given these conditions, the dry-weather runoff would be expected to have no adverse effects on marine organisms of the Irvine Coast ASBS. Analyses of the continuing monthly sampling series during the period October 2000 – January 2001, will help to determine if these dry-weather runoff conditions remain the same or change over the course of the year.

- Dry-weather samples taken in Los Trancos Canyon contained indicator bacteria in concentrations that were sometimes above the single sample limits for fecal coliforms and enterococci. However, the entry of this runoff into the ocean rapidly dilutes or kills the bacteria to the extent that their numbers fall below the detection limit of the methods used and do not represent a problem.
- Dry weather diversion of these low flows into the Orange County sewer system will help to eliminate potential problems with indicator bacteria.
- Emerald Canyon and Muddy Canyon had no flow or no standing water for most of the period July – September 2000. Because of this, the indicator bacteria present in water collected from these creeks did not enter the ocean, and the surf zone samples contained very low numbers of indicator bacteria.
- The results of the toxicity testing of *Ceriodaphnia dubia* exposed to a dry-weather runoff sample taken at Station LT on September 12, 2000, showed significant acute (48 hour) toxic effects on survival and chronic (7 day) toxic effects on survival and reproduction of this test species. Concentrations of all constituents in this runoff sample, except diazinon, were lower than those expected to produce toxic effects on *C. dubia* The relatively high concentration of diazinon was most likely responsible for these toxic effects.
- Because the USEPA is phasing out the use of the insecticide compounds diazinon and chlorpyrifos, potential problems of their toxicity in runoff water will be reduced over time.
- Planned diversion to the sanitary sewer of dry-weather runoff and its constituents in Los Trancos and Muddy Canyons also will help to eliminate potential problems with pesticides there.

WATER QUALITY AND MARINE ECOLOGICAL MONITORING STUDIES FOR THE CRYSTAL COVE DEVELOPMENT PROJECT:

THIRD QUARTERLY REPORT ON WATER QUALITY DATA FOR THE PERIOD JULY 1- SEPTEMBER 30, 2000

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June 18, 2001

INTRODUCTION

This document represents the third quarterly report for 2000 concerning the water quality and marine ecological monitoring studies for the Crystal Cove Development Project conducted during 2000. The purposes and specific approaches employed in the monitoring effort are described in the study plan for the work (Ford 2000), in the first quarterly report dated May 12, 2000 (Ford et al 2000a), and in the analytical report dated June 2, 2000 (Ford et al 2000b).

During July – September 2000, monitoring studies of dry-weather runoff were conducted within and just offshore of the watersheds for the Crystal Cove Development Project, Phases IV-3 and IV-4, and for an adjacent control study area in and just offshore of Emerald Canyon. All subsequent references in this document to the Crystal Cove Project concern those two phases of the Crystal Cove Development Project. The approaches used in the monitoring studies as a whole are intended to provide accurate and pertinent quantitative evidence about the potential effects of storm water runoff and dry-weather flows from these watersheds on freshwater and ocean water quality and on inshore marine habitats and organisms of the Irvine Coast Marine Life Refuge Area of Special Biological Significance.

This third quarterly report includes information on the results of dry-weather sampling for water quality constituents and pathogen indicator bacteria conducted on July 31, September 12, and September 29, 2000. In addition, it describes the related results of toxicity bioassays employing the freshwater crustacean *Ceriodaphnia dubia* exposed to

dry-weather runoff water sampled at Los Trancos Canyon Station LT on September 12, 2000.

Project Personnel and Supporting Laboratories

Dr. Richard F. Ford had overall responsibility for coordination and management of the water quality and marine ecological studies during the reporting period. In addition, he had responsibility for sampling and analyses of water quality constituents and marine ecological data. Dr. Barbara B. Hemmingsen had responsibility for analysis and interpretation of the data for pathogen indicator bacteria. Michael A. Shane and his staff of the Hubbs-Sea World Research Institute in San Diego, CA, were responsible for coordination of ecological field studies, water quality and ecological sampling, sampling at the subtidal stations, data management, and computer-assisted summarization and analyses of the data.

Water quality samples were taken in the watershed and at the surf zone stations during dry-weather runoff by the staff of the Maintenance Department at the Pelican Hill Golf Course, Newport Coast, CA. Richard Swinhart of that Department coordinated this effort. He also planned dry-weather sampling in relation to irrigation schedules. Paul Simpson, a doctoral candidate at the Institute of Marine Science, University of Alaska Fairbanks, was responsible for the studies of algal epiphytes on surfgrass. His continuing work involved laboratory analyses of the samples.

Del Mar Analytical of Irvine and Colton, CA, conducted a majority of the analyses for constituents of runoff and ocean water. James Hatfield of Del Mar Analytical, Irvine, coordinated this effort. Laboratory sub-contractors also conducted some analyses. Sierra Analytical, Inc. of Laguna Hills, CA, did the analyses of nitrate + nitrite and of the indicator bacteria. Sequoia Analytical of Morgan Hill, CA, conducted the analyses of organophosphorus pesticide compounds, as well as some supplementary analyses of trace metals. High accuracy Enzyme-linked Immunosorbant Assay (ELISA) determinations of chlorpyrifos and diazinon were conducted for selected water samples by Aqua-Science of Davis, CA. In addition, the Bioassay Laboratory of Ogden Environmental and Energy Services Company, Inc. in San Diego, CA, conducted acute and chronic toxicity testing under the direction of Chris Stransky. The complete, original data sets and QA/QC documentation provided by these State-certified laboratories form part of the third quarterly report as Exhibit 1 and Appendices A and B. Complete sets of these laboratory documents were provided to the SARWQCB and the Irvine Community Development Company in hard copy form and in Excel computer format with the third quarterly report of June 18, 2000. These data sets are available from the SARWQCB.

STUDY DESIGN AND STATION PLACEMENT

Basic Design Features

The study design employs a modified version of the Before and After Control Impact (BACI) approach (Schmitt and Osenberg 1996). Station placement (figure 1) was planned to sample representative conditions in upper and lower portions of the freshwater watershed, in the surf zone and intertidal area, and at subtidal locations sufficiently close to the shore so that the influences of watershed runoff, if any, might be detected. It is important to recognize that sampling at these stations is intended to provide representative information about conditions existing at the sites where and at the times the samples were taken.

It was not possible to establish stations in the upper reaches of the three canyon watersheds, because of access constraints. However, in Muddy and Emerald Canyons it was possible to place these upper watershed stations far enough upstream so that they received no runoff flow from developed areas of the watershed. Therefore, they are representative of those undeveloped, upstream watershed areas. In Los Trancos Canyon, it was possible to place the upper watershed station far enough upstream so that it received no runoff from the developed portions of the Newport Coast Planned Community Phases IV-1 and IV-2, but not upstream of all other development. Therefore, this station reflects the combined effects of the undeveloped portion of the canyon and of existing development within the watershed.

Standard randomization procedures were employed in both the ecological sampling and toxicity testing to help reduce variability, to assure that the assumptions for use of statistical testing are met, and to obtain ecological data that are representative of the populations and species associations sampled.

Sampling Stations

Three sampling station series (study areas) were established. The locations of these study areas and stations are shown in Figure 1. They were employed in the combined water quality and marine ecological field studies within and just offshore from the watersheds of Emerald Canyon (Control Station Series EC), Muddy Creek/Muddy Canyon (MC Series), and Crystal Cove Creek/Los Trancos Canyon (LT Series). For each, one freshwater watershed station was placed downstream near the point where freshwater storm and dry-weather runoff flows to the ocean (Stations EC, MC, and LT). These stations were established just upstream and adjacent to the arch culverts that carry water under Pacific Coast Highway (PCH) and receive runoff from PCH as well as other sources. Station MC receives runoff from PCH, El Morro School, the Crystal Cove State Park Headquarters, and Laguna Beach County Water District facilities. Station LC receives runoff from PCH, the Pelican Hill Golf Course, existing development, and Los Trancos parking lot. One additional freshwater sampling station was established at an appropriate location farther upstream in each watershed that did not receive runoff from developed areas in Muddy and Emerald Canyons and from the developed portion of

Phase IV in Los Trancos Canyon. Those upstream locations, designated Stations ECU. MCU and LTU, were as follows:

Station	Location
ECU	Emerald Canyon, just upstream of the Swanson Park swimming pool area and all Emerald Bay residences.
MCU	Muddy Canyon, just north of the Crystal Cove State Park Headquarters and upstream of all grading activity.
LTU	Los Trancos Canyon, adjacent to most upstream golf cart bridge of the Pelican Hill Golf Course. This station is affected by existing development within the upstream watershed

Data from the above sites were used to evaluate water quality in upstream segments of these watersheds and to consider possible effects of runoff constituents on freshwater organisms present there.

Water quality and ecological sampling stations were established in the surf zone directly opposite the mouths of these three canyon watersheds (Stations EC-1, MC-1, and LT-1), and in directly adjacent rocky intertidal habitats (Figure 1). Subtidal stations (EC-2, MC-2, and LT-2) were established directly offshore from these intertidal/surf zone sites, at a depth of 20 ft MLLW. These subtidal stations (Figure 1) were situated in rocky subtidal habitats that were ecologically similar among the three station locations, so that direct comparisons of data could be made between them.

The positions of all stations were determined and recorded by using global positioning system receivers. These positions are provided in Ford et al (2000a-b; Table 1). The GPS receiver and underwater markers were used to relocate subtidal stations during subsequent sampling.

SAMPLING PROCEDURES

Procedures and Timing for Water Quality Sampling During Non-Storm Periods in the Watershed and Surf Zone

Over the first year of monitoring, the study plan specified that water quality samples were to be taken once per month during non-storm (dry-weather) runoff conditions at three stations associated with each of the three watersheds, when there was flow at those stations. The nine stations are:

Los Trancos Canyon
- LTU
- LT
- LT-1

Muddy Canyon
- MCU

MC
MC-1
Emerald Canyon
ECU
EC
EC-1

Three such sample sets were taken during the third quarter on July 31, September 12, and September 29, 2000, and data from those samples are considered in this report. Timing of the dry-weather flow sampling was coordinated directly with the irrigation schedule for the portion of the Pelican Hill Golf Course that contributes runoff to Los Trancos Canyon. In addition, and to the extent possible, this sampling was coordinated with known watering schedules for residential and roadside landscape areas upstream, that are not part of the Crystal Cove Project, from which substantial amounts of runoff enter Los Trancos Canyon between Stations LTU and LT. The approach was to take dry-weather flow samples early in the morning, following irrigation during the previous night and early morning hours. In this way, the possible effects of irrigation on dry-weather runoff could be evaluated.

Samples for analysis of water quality constituents and salinity were taken once in the early morning on a given dry-weather sampling day at each station where there was flow. The same methods used in the storm water sampling were employed, as described by Ford et al (2000a-b). Measurements of water and air temperatures and observations of cloud cover, color and turbidity of the water, and wave height also were obtained (Ford et al 2000a-c).

At locations where there was flowing water of sufficient depth in the runoff channel, the velocity of runoff water movement was determined. This was done by marking off an exact distance of 10 ft along the axis of runoff flow, using small metal stakes with flags on them. A ping-pong ball was released at the upstream stake and a stopwatch started simultaneously. The number of seconds required for the ping-pong ball to reach the stake 10 ft downstream was recorded. It was not possible to use a current meter, because the depth of the flowing water during dry-weather flow generally was too shallow. These measurements were then converted to current velocity in feet per second. The Pelican Hill staff made three replicate measurements at each station during dry-weather flow sampling. Initial trials involving 10-20 replicate measurements showed that this method is accurate to within about 0.1 second. The only conditions under which this might not be the case would be during strong winds.

In addition, those making the velocity measurements always selected a runoff path of fairly uniform water width and depth. They measured and recorded this mean width and mean depth, as a basis for making approximate estimates of flow rate. These data are provided in this report, but flow rates were not calculated based upon them.

If there was no flowing water at a station site, no samples were taken there. Full sets of samples, plus those for salinity, also were taken during each monthly sampling at the three surf zone stations (LT-1, MC-1, and EC-1), whether or not there was flow

upstream in that watershed. This was done to provide comparative data for surf zone sites receiving dry-weather runoff and those not receiving it.

The Environmental Health Division of the Orange County Health Care Agency takes samples frequently at six of the nine watershed and surf zone monitoring stations employed in the Crystal Cove Project as part of their Bacteriological Monitoring Program (OCEHP). Data on pathogen indicator bacteria from this program are used directly in the Crystal Cove monitoring study. The watershed and surf zone (beach) stations employed in this ongoing bacteriological sampling program that are located in closest proximity to the Crystal Cove Development sites are shown in Figure 2. In addition, sampling for indicator bacteria was conducted by the Pelican Hill staff at all dry-weather flow sites where there was runoff. Dr. Barbara Hemmingsen evaluated the data from these stations, together with pertinent sets of data obtained by the Orange County Health Care Agency.

Procedures and Timing for Water Quality Sampling During Non-Storm Periods at the Subtidal Stations

Quarterly sampling is carried out at the three subtidal stations (LT-2, MC-2, and EC-2) to obtain water quality data, including data for indicator bacteria. This work, conducted by staff of the Hubbs-Sea World Research Institute, is done from the "Doctor J," a 25 ft work boat, using the same methods described for the storm event sampling at the subtidal stations (Ford et al 2000a-b). Data on water quality constituents and bacteriological indicators are obtained from both surface and near-bottom water at each of these three stations. Measurements are made of air temperature, surface and bottom water temperatures, Secchi disk depth (water clarity), cloud cover, wave height, and turbidity. Data for the subtidal stations are used to establish levels of chemical constituents present there during non-storm conditions. This information is employed as part of the basis for evaluating potential effects of dry-weather runoff. Quarterly sampling was conducted at the three subtidal stations during dry-weather periods on June 26 - 27, 2000, (data previously evaluated in Ford et al 2000b) and again on October 12, 2000 (data to be evaluated in final report for 2000). Because both these sets of subtidal samples were taken just outside of the July – September third quarter period, the results are not reported in this document.

Processing and Documentation of Water Quality Samples

Water quality samples were taken and held in polyethylene or amber glass bottles, using the standard treatment and refrigeration methods specified by Del Mar Analytical of Irvine, CA. Water samples for analysis of indicator bacteria were taken using sterile plastic containers provided by the laboratory. The field technicians completed chain of custody forms for all samples. A courier from Del Mar Analytical, Irvine then transported these samples and records to that laboratory as soon as possible after sampling and within the established time limits set by the analytical laboratories involved.

The constituents of runoff water and ocean water analyzed in the study are shown in Table 1, together with the specific analytical methods that were used and the reporting

limits attained. Del Mar Analytical and three affiliated laboratories analyzed all but one of the constituents of storm water samples taken at all freshwater watershed and ocean stations. These laboratories are all State-certified. James Zimmer analyzed the salinity samples at San Diego State University. These were measured to the nearest 0.01 ppt, using a Plessey Model 6230N oceanographic laboratory salinometer accurate to ±0.001 ppt, which compares the sample to standard seawater. This instrument was calibrated prior to each series of sample runs. Standard Quality Assurance/Quality Control (QA/QC) procedures were employed in all of this laboratory work, as documented in Appendices A and B.

Detection limits employed by Del Mar Analytical and affiliated laboratories for analyses of all the chemical constituents were selected to be lower than the chronic toxicity criteria specified in the California Ocean Plan (CSWRCB 1997) and for freshwater in the EPA California Toxics Rule (USEPA 2000a), where reasonably feasible. Selection of the constituents for the baseline study was based in part on information provided in U.S. Environmental Protection Agency guidelines (USEPA 1992, 1996, 2000a-b) and from recommendations by Frank T. Melbourne and others of the Storm Water Group at the San Diego Regional Water Quality Control Board, water quality specialist Bruce Moore of the Orange County Public Facilities and Resources Department (pers. comm.), and Hope Smythe, Joanne Schneider and other staff members of the Santa Ana Regional Water Quality Control Board.

WATER QUALITY CRITERIA FOR RUNOFF CONSTITUENTS

Shown in Tables 2 - 4 are the primary water quality criteria that are used in the monitoring study for the Crystal Cove Development Project. These criteria were specified by the staff of the Santa Ana Regional Water Quality Control Board (SARWQCB) for use as guidance in evaluating dissolved and total recoverable concentrations of trace metals present in freshwater runoff and ocean water.

Criteria for Trace Metals

Two different sets of criteria for trace (heavy) metals were specified by the SARWQCB. For the freshwater watershed, the water quality criteria contained in the recently promulgated EPA California Toxics Rule (USEPA 2000a) are used for guidance.

In this regard, it is essential for the reader to note an important change in the way freshwater quality criteria for trace metals are applied by the EPA California Toxics Rule, effective May 18, 2000 (USEPA 2000a). As indicated on page 31690 of that document, the EPA states:

> The Agency received extensive public comment during the development of the NTR regarding the most appropriate approach for expressing the aquatic life metals criteria. The principal issue was the correlation between metals that are measured and metals that are bio-available and toxic to aquatic life. It is now the Agency's policy that the use of dissolved metals to set and measure compliance with aquatic life water quality standards is the recommended approach, because

dissolved metal more closely approximates the bio-available fraction of the metal in the water column than does total recoverable metal.

In addition, the pertinent tables provided in this final version of the California Toxics Rule (CTR) no longer contain acute or chronic water quality criteria based on trace metals in total recoverable form. Only criteria based on dissolved trace metals are included.

Measurements of freshwater hardness are essential in calculating the specific water quality criteria values for protection of aquatic organisms that apply to most trace metals (USEPA 2000a). The primary sources of calcium and magnesium in freshwater are their mineral forms that contain carbonate. Because of this, as water hardness increases there is a corresponding increase in the concentration of carbonate ions (Drever 1997, Moore and Ramamoorthy 1984). These and the resulting bicarbonate and hydroxide ions can form weakly bound molecules, called complexes, with copper, zinc, lead and other trace metal ions. This reduces the concentration of potentially toxic trace metal ions in the water. As a result, the concentrations of these metal ions that are biologically available are reduced, with a corresponding reduction in their potential toxic effects on aquatic organisms. For this reason it is important to know the hardness of a freshwater sample in order to evaluate the possible toxic effects of trace metals it contains (USEPA 2000a).

Concentrations of the seven trace metals cadmium, chromium, copper, lead, nickel, silver, and zinc evaluated in this study are dependent on the hardness of the water in which they occur. Because of this, the CTR (USEPA 2000a) requires the water quality criteria for these trace metals to be adjusted as a function of water hardness. The adjusted criteria for the dissolved fraction of these six trace metals are shown in Tables 2 and 3 for the specific hardness values of the monitoring study samples. These values were calculated by using the standard equations and the constants described in USEPA (2000a). These corrected criteria values were applied to data for the seven hardness-dependent trace metals in this study. The sample measurements for chromium were compared with the CTR criteria for Chromium III (Tables 2B and 3B), as it is the form that makes up all or nearly all of the total chromium measured. There is no evidence that the toxic chromium VI (hexavalent chromium) is present in relatively natural canyon watersheds of this kind. Note that for water with a hardness value of 400 mg/L or greater, the CTR specifies that the criteria be adjusted using 400mg/L as the ceiling value. Therefore, the water quality criteria values for the category > 400 mg/L in Tables 2 and 3 apply to all samples with freshwater hardness values > 400 mg/L. All hardness-corrected values shown in these tables are expressed in mg/L, to allow direct comparison with the water quality data tables in this report. For those data tables, Del Mar Analytical reported all trace metal concentrations in mg/L.

Importance of Employing Only the Most Applicable and Realistic Criteria

In addition, separate freshwater criteria are shown based on acute (Table 2) and chronic (Table 3) levels of toxicity. The almost universally accepted approach is to apply only the acute toxicity criteria (CMC) as guidance in evaluating constituents from storm

water runoff samples taken in southern California. This is because the exposures to chemical constituents during typical storms are of short duration, generally comparable to those of acute toxicity tests. There is no scientific or logical basis for applying chronic toxicity criteria (CCC) to the chemical constituent data obtained from samples of storm water runoff. The reason for this is that these chronic water quality criteria are based on long-term toxicity tests involving exposure of aquatic organisms to the same levels of potentially toxic chemicals for a period of seven days. Because storm runoff from coastal canyons in southern California lasts no more than 2-24 hours at most, the results of such multi-day chronic exposures are a very poor model and have no validity in this case. Using them for evaluations of storm water runoff is, in fact, misleading. For this reason major groups involved, such as URS Corporation and GeoSyntec Consultants, use only acute toxicity criteria in evaluating the constituents of storm water runoff in southern California (Peter Mangarella, URS Corporation, Oakland, CA, pers. comm., April 2000). This same logical convention is being applied in the monitoring studies for the Crystal Cove Development Project. Because the results described in this third quarterly report concern only dry-weather runoff, the acute criteria shown in Table 2 are provided primarily for comparison.

Based on this same reasoning, the chronic toxicity criteria (CCC) are used as guidance in evaluating concentrations of constituents in relatively continuous, dry-weather (non-storm) runoff. Acute toxicity criteria are often used in addition for comparative purposes. This convention also is being used in the monitoring study for the Crystal Cove Development Project.

Shown in Table 4 are the water quality criteria or objectives that are being used for guidance in this monitoring study to evaluate trace metals in coastal ocean water at the surf zone and subtidal stations, as specified by the SARWQCB. They are the objectives established by the California Ocean Plan (CSWRCB 1997; Table B). These standard objectives, which require no correction for water hardness, apply only to the total recoverable concentrations of trace metals. Both the instantaneous maximum and daily maximum water quality objectives provided in the California Ocean Plan are being used to evaluate the data for the Crystal Cove Project, as specified by the staff of the Santa Ana Regional Water Quality Control Board.

It is important for the reader to note that values exceeding the above criteria and guidelines do not necessarily indicate that a water quality problem exists, as they are employed only for guidance in the evaluation process (Lee and Jones-Lee 1995). This is particularly true of values for trace metals in un-dissolved form, because in most cases they are not biologically available and exist in non-toxic form (Makepeace et al 1995, Drever 1997, Eisler 1998, Lee et al 1999). Dr. Edward Goldberg, an internationally recognized geochemist specializing in trace metals, stated that water quality criteria for trace metals, other than those in dissolved form, must be applied with great caution, because most such trace metals are not toxic to aquatic organisms (pers. comm., 2000). In addition, he has concluded that, with the exception of mercury, the concern about the toxicity of trace metals in general has been over-emphasized.

Criteria for Nitrate + Nitrite

The California Toxics Rule and the California Ocean Plan do not include criteria for any of the other chemical constituents evaluated in this water quality monitoring study. For purposes of general guidance, criteria established and employed by other agencies have been used to evaluate these other data. Application of these criteria is not specified or required by the SARWQCB.

Nitrogen in the form of nitrate + nitrite is not considered as a toxic pollutant, but rather as a nuisance substance if present in runoff or receiving water at excessive concentrations. The Santa Ana Region (8) Basin Plan (SARWQCB 1995) has established a water quality guidance objective for nitrate + nitrite (as N) of 10 mg/L in freshwater. There is no such guidance objective for ocean water.

Criteria for Organophosphorus Pesticides

Water quality criteria for two of the three organophosphorus pesticide compounds of greatest concern (Table 1), diazinon and chlorpyrifos, were established by the USEPA (1986, 1998). The acute water quality criterion (CMC) established by EPA (1998) for diazinon in freshwater is 0.09 µg/L; a chronic water quality criterion (CCC) for diazinon in freshwater has not been established by that agency. The acute water quality criterion (CMC) for chlorpyrifos in freshwater established by USEPA (1986) is 0.083 µg/L, while the chronic criterion value (CCC) is 0.041 µg/L.

Chlorpyrifos is the compound widely used in the pesticide products Dursban and Lorsban. It is used extensively in products employed to exterminate termites, ants, roaches, fleas and other home and garden pests. In addition, it is employed to control pests on apple trees, grape vines and other agricultural crops.

The USEPA has instituted a phase-out of chlorpyrifos for household and garden use, as well as in schools and other facilities frequented by children. This is because exposure to its residue is considered hazardous to the health of children. Professional exterminators will be prohibited from using these pesticides in all other types of buildings by the end of 2001. The six manufacturers of chloropyrifos-based pesticides have agreed to stop their production for residential use by January 2001. The agency also has instituted a phase-out of diazinon. However, use of both these compounds probably will continue for some time at a lower level until existing supplies are exhausted.

The chronic water quality criterion (CCC) for Demeton in freshwater is 0.10 µg/L (USEPA 1998). No acute water quality criterion has been established for this compound. Similarly, USEPA (1998) reported acute (CMC) and chronic (CCC) water quality criteria for the organophosphorus pesticide parathion in freshwater of 0.065 µg/L and 0.013 µg/L, respectively.

The following is a summary of these criteria for organophosphorus pesticide compounds (µg/L), as used for guidance in evaluations:

Water Quality Criteria for Freshwater Organisms

Constituent (µg/L)	Acute (CMC)	Chronic (CCC)
Chlorpyrifos	0.083	0.041
Demeton	-	0.10
Diazinon	0.09	-
Malathion	-	0.10
Parathion	0.065	0.013

These are discussed in subsequent sections of this report.

RESULTS AND DISCUSSION OF WATER QUALITY STUDIES FOR DRY-WEATHER RUNOFF

Basic Water Quality Data for Dry-Weather Conditions

The basic water quality constituent data obtained during dry-weather sampling are summarized in Tables 5-15. These include the summaries of field observations made when this sampling was conducted (Tables 5-7) and surf zone salinity data (Table 8). Water quality constituent data obtained from dry-weather sampling are shown for July 31 (Table 10), September 12 (Tables 9 and 11) and September 29, 2000 (Table 12). These same data sets are shown in Tables 13-15 for all five stations on a given date, allowing direct comparisons among stations. Data concerning indicator pathogen bacteria provided by the Orange County program (OCEHP), and taken primarily during dry-weather conditions, are summarized in Table 16. Basic data for indicator bacteria from dry-weather sampling in the Crystal Cove monitoring study are shown in Tables 17-19.

Evaluation of Water Quality Data for Dry-Weather Runoff

The concentrations of trace metals in dry-weather samples taken in the freshwater watershed and at the surf zone stations were evaluated by comparison with the appropriate water quality objectives shown in Tables 2 - 4. Those objectives were: 1) the chronic (CCC) criterion for the trace metal in **dissolved form**, present in **freshwater** (California Toxics Rule, USEPA 2000a); 2) the instantaneous maximum criterion for the trace metal in **total recoverable form**, present in **seawater** (Table 4; Calif. Ocean Plan, CSWRCB 1997); and 3) the daily maximum criterion for the trace metal in **total recoverable form**, present in **seawater** (Table 4 and CSWRCB 1997).

The water quality criteria for nitrate + nitrite (as N) and those for the organophosphorus pesticides, as described in the previous section, also were used in these evaluations for guidance. It is important to note that use of these criteria is not required for the Project by the SARWQCB.

Water quality of dry-weather runoff was sampled in the freshwater watershed and surf zone on three dates during this quarter, July 31, September 12, and September 29, 2000. The sampling originally planned for late August 2000, was postponed to September 12th because of changes in the irrigation schedule at the Pelican Hill Golf Course. On all three dates, there was dry-weather flow at the three stations (LTU, LT and LT-1) in the watershed of Los Trancos Canyon, but none at any station in the Muddy Canyon and Emerald Canyon watersheds. Because of this, dry-weather runoff data were obtained at Stations LTU, LT and LT-1; for comparative purposes, these data also were taken at Surf Zone Stations MC-1 and EC-1.

Runoff Flow Velocity

Field observations and velocity measurements of runoff flow made during water quality sampling are shown in Tables 5 - 7. For all three dates, these observations indicate that the runoff water was relatively clear and there was no evidence of turbidity. The flow velocities of this runoff water also were relatively uniform, ranging from a mean of 0.6 ft/sec at Station LTU on September 12 (Table 6B) to a mean of 3.0 ft/sec at Station LTU on September 29, 2000 (Table 7B).

Effects on Ocean Salinity and Water Clarity

The salinities measured in the surf zone at Station LT-1 during this runoff sampling on all three dates were uniformly high (Tables 8 A – 8 C) and showed no evidence of being affected by the dry-weather runoff flow of freshwater. As shown in these three tables, the salinity levels at Station LT-1 were essentially the same as those measured for the same dates and time periods at Stations MC-1 and EC-1, which received no freshwater runoff. In addition, these salinities at Station LT-1 and at the other two stations were determined to be 100% of normal for the project study areas, based on measurements made under dry-weather (non-storm) conditions during the time periods from May - September, 2000, specified in Tables 8 A – 8 C. This indicates that the relatively low flow of freshwater in dry-weather runoff from Los Trancos Canyon had no effect on the salinity of seawater at Surf Zone Station LT-1 on the dates samples were taken.

Trace Metals

As shown in Tables 3 and 10-15, there were no instances for samples of July 31, September 12, and September 29, 2000, in which the concentrations of dissolved trace metals in dry-weather runoff at freshwater watershed Stations LTU and LT exceeded the chronic water quality standards to project aquatic life established by the CTR (USEPA 2000a). This is a significant result, and confirms the findings of earlier dry-weather runoff sampling conducted on during the period February – June 2000 (Ford et al 2000a-c), which also showed no values exceeding these CTR standards.

There were several instances in which low concentrations of dissolved nickel and zinc were present in runoff water at Station LTU and Station LT on July 31; similarly, low concentrations of nickel or zinc were present in the runoff water at Station LTU and Station LT on September 12. On September 29, low concentrations of dissolved nickel were present at Stations LTU and LT, and low levels of dissolved copper and zinc were present at Station LT (Tables 12 and 15). However, all of these concentrations were well below the chronic water quality criteria specified by the CTR (Table 3 and USEPA 2000a).

As shown in Tables 10-15, almost all of the samples taken at Surf Zone Stations LT-1, MC-1 and EC-1 had concentrations of trace metals in total recoverable form and dissolved form that were below laboratory reporting limits (ND). Concentrations of total copper observed at Surf Zone Stations MC-1 and EC-1 on September 29, 2000, were near the daily maximum water quality objective of the California Ocean Plan (Table 4). However, given that there was no dry-weather runoff to those sites, the concentrations of total copper were not from that source. This indicates that there would be no adverse effects on marine habitats and organisms of the Irvine Coast ASBS caused by trace metals entering the ocean in dry-weather runoff from Los Trancos Canyon.

Nutrient Chemicals

The nutrient chemicals in runoff water containing phosphorus and nitrogen are considered as biostimulatory or "nuisance" constituents in storm runoff, rather than toxic constituents (CRWQCB 1995). Excess nutrient biostimulation can degrade water quality when resulting algal blooms depress the dissolved oxygen concentration of the water; the death of fishes and other aquatic life can occur as a result. Algal blooms also can cause changes in the water such as coloration, increased turbidity, and floating algal mats and scum. This general condition produced by excess nutrients is called eutrophication. It normally occurs in standing or gently flowing bodies of freshwater and in poorly circulated, enclosed bays and estuaries receiving excess nutrient concentrations from runoff water.

It is a commonly held misconception that these effects also occur or are likely to occur in open coastal ocean areas of southern California. While natural phytoplankton (plant plankton) blooms are a regular phenomenon in the coastal ocean, there is no evidence at all in the scientific literature indicating that biostimulatory nutrients in storm runoff produce such blooms or other eutrophication effects on the open coast. Natural nutrient chemical concentrations are relatively low in coastal ocean areas during the winter period of storm runoff; as a result, phytoplankton and bottom-living algae rapidly use any additional nutrients entering coastal ocean water.

As shown in Tables 10-15, concentrations of total and dissolved phosphorus, total Kjeldahl nitrogen and nitrate + nitrite as N were present either at typical, low concentrations or below laboratory reporting limits (ND) in the freshwater watershed and at all surf zone stations for which dry-weather runoff sampling was conducted during the period July 31 – September 29, 2000. The results obtained were very similar to those for

previous dry-weather runoff sampling conducted during the period February - June 2000 (Ford et al 2000a-c). Values of nitrate + nitrite in the freshwater watershed ranged from 1.5 - 8.5 mg/L on July 31, September 12, and September 29, 2000, all below the water quality guidance objective of 10 mg/L employed in the Santa Ana Region (8) Basin Plan (CRWQCB 1995). Nitrate+ nitrite concentrations were highest on September 29, 2000 (Table 15).

The levels of these nutrient chemical constituents at the surf zone stations all were within typical levels for inshore coastal ocean waters. This indicates that nutrient chemicals entering the ocean in dry-weather runoff through Los Trancos Canyon would have no adverse effects on marine habitats and organisms of the Irvine Coast ASBS.

Organophosphorus Pesticide Compounds

Based on the results of analyses using EPA Method 8141, none of the dry-weather samples taken at the freshwater watershed stations and the adjacent ocean stations had concentrations of the 26 organophosphorus pesticide compounds (Table 1) that were above the laboratory reporting limits (all ND), as shown in Tables 10 - 15. These results are the same as the results reported for dry-weather sampling conducted during the period February – June 2000 (Ford et al 2000a-c). They indicate that dry-weather runoff through Los Trancos Canyon was relatively free of potentially toxic organophosphorus pesticides, at least in concentrations above the laboratory reporting limits used. It further indicates that these pesticides would not be introduced into the Irvine Coast ASBS at levels harmful to marine organisms.

Additional ELISA determinations of higher accuracy (Miller et al 1997) were conducted to measure the concentrations of chlorpyrifos and diazinon in the dry-weather runoff sample taken at Station LT on September 12, 2000. This was done in part to help evaluate the results of toxicity testing in which the daphniid cladoceran crustacean *Ceriodaphnia dubia* was exposed to that water sample. Their relationship to the results of these ELISA determinations also are considered in the section of this report entitled Freshwater Toxicity Testing for Dry-Weather Runoff.

The results of the ELISA determinations are shown in Table 9. The measured value for chlorpyrifos 0.0171µg/L) is lower than the chronic and acute freshwater quality criteria reported by the USEPA (1986, 1998), which are 0.041 µg/L and 0.083 µg/L, respectively. Concentrations of chlorpyrifos similar to that observed for Station LT are commonly reported in both storm water runoff and dry-weather flows elsewhere in southern California watersheds (Ogden Environmental 1999, 2000; URS Greiner Woodward Clyde 1999; Chris Stransky, Ogden Environmental, pers. comm., May 2000). The result for diazinon (0.6534 µg/L) is much higher than the established acute freshwater criterion of 0.09 µg/L reported by the USEPA (1998). The value also is much higher than the chronic freshwater criterion for diazinon of 0.05 µg/L proposed in an unpublished study by Siepmann and Finlayson (2000). This diazinon concentration of 0.6534 was not detected by EPA method 8141 (Table 11 B). There are no indications that

either chlorpyrifos or diazinon derived from discharges of the Crystal Cove Development Project.

Oil and Grease

As shown in Tables 10 - 15, oil and grease were not present above the laboratoryreporting limit (ND) at any of the freshwater and surf zone stations sampled during the period July 31 – September 29, 2000. This indicates that these constituents were not a major component of the dry-weather runoff and would not affect aquatic life either in the watershed or in the adjacent Irvine Coast ASBS.

Total Suspended Solids

Levels of total suspended solids (TSS) in the freshwater watershed and the surf zone during dry-weather runoff are shown in Tables 10-15. These TSS measurements, taken on July 31, September 12 , and September 29, 2000, had the following means and ranges:

Station	Mean (mg/L)	Range (mg/L)
LTU	219	18-400
LT	230	20-430-
LT-1	104	80-140
MC-1	119	88-120
EC-1	115	98-150

Levels of TSS observed in the surf zone were relatively uniform at all three stations. These levels of TSS were generally similar to those measured for dry-weather runoff sampled during the period February - June 2000 (Ford et al 2000a-c).

Freshwater Hardness

Values for freshwater hardness (as calcium carbonate) at Stations LTU and LT ranged from 490 - 2200 mg/L in dry-weather runoff sampled on July 31, September 12, and September 29, 2000 (Tables 10-15). The results are generally similar to those for dry-weather flows sampled in February - June 2000 (Ford et al 2000a-c). Relatively high water hardness values are characteristic of Los Trancos Canyon watershed.

Comparisons with Other Areas of Southern California

Comparisons were made of these physical and inorganic chemical constituent concentrations with data from other similar sites in southern California. The comparative data included dry-water measurements for Orange County coastal watersheds provided

by water quality specialist Bruce Moore of the Orange County PFRD, data obtained and evaluated by Ford (2001) for Dana Point Headlands, information for Orange and San Diego Counties in the files of the San Diego Regional Water Quality Control Board, and data reported by Bay and Schiff (1997), Bay et al (1998, 1999), SCCWRP (1999), Ogden Environmental (1999, 2000), and URS Greiner Woodward Clyde (1999). Data for nutrient chemicals also were compared with those reported for Del Mar Inshore Station 93.26 by CalCOFI (Internet web site data for 1997, 1998, 1999).

These comparisons indicated that the concentrations of all physical and chemical constituents of dry-weather runoff in the watershed of Los Trancos Canyon for the July 31, September 12, and September 29 samples were within normal ranges typical of those other, similar southern California watersheds. The comparisons, as well as the data shown in Tables 10-15, also indicate that dry-weather runoff flow had no measurable effects on the concentrations of these constituents in the surf zone. The levels of all constituents at these locations were within typical or normal ranges for inshore ocean waters of southern California.

General Conclusions

With the exception of the diazinon concentration at Station LT on September 12, these results indicate that the dry-weather runoff on July 31, September 12, and September 29, 2000, had no evident detrimental effects on the water quality of Los Trancos Canyon. They also indicate that this runoff caused no adverse changes in the water quality characteristics of the adjacent ocean. Given these conditions, the dry-weather runoff would be expected to have no adverse effects on marine organisms of the Irvine Coast ASBS. Analyses of the continuing monthly sampling series will help to determine if these dry-weather runoff conditions remain the same or change over the course of the year.

INDICATOR BACTERIA

Basic station data employed in this section for total coliforms, fecal coliforms and enterococci obtained in runoff and seawater samples during dry-weather runoff are summarized in Tables 17-19. Shown in Table 16 are data from the Orange County Environmental Health Monitoring Program (OCEHP), which conducts sampling for pathogen indicator bacteria at a large series of stations along the Orange County Coast. These station locations in closest proximity to the three study areas of the Crystal Cove Project are shown in Figure 2. Summary and analytical data are shown in Figures 3-14, as presented and discussed in the following sections.

Emerald Canyon

During the third quarter of 2000 (July – September), no sampling was conducted at freshwater watershed Stations ECU and EC, because there was no dry-weather runoff. No water was present in the Emerald Bay Drain (Figure 2). A primary reason for this is that the Emerald Bay Community diverted runoff water into the sanitary sewer system

during the period May – October 2000. Because no flowing or standing water was present at the Emerald Bay Drain, located on the upper beach, OCEHP collected no samples there during the third quarter (Figure 34). However, samples were taken at Station EC-1 in the Emerald Cove surf zone by OCEHP (Table 16) and as part of the Crystal Cove water quality monitoring study (Tables 17 – 19).

The results of this sampling, summarized in Figure 4, show that very low numbers of fecal coliforms were present at Station EC-1 during July – September 2000. With two exceptions, similar low values of enterococci were present in these same water samples (Figure 5). The increased numbers of enterococci on days 208 and 213 (July 26 and 31) were not reflected in the fecal coliform counts. Whatever the reason for these two instances of higher counts, the numbers of enterococci had decreased to <10 MPN/100ml by the next OCEHP sampling the following day on August 1, 2000.

Muddy Canyon

In the third quarter, standing, not flowing water from Muddy Creek was sampled 12 times by OCEHP only. Several times indicator bacteria were present in numbers above the single sample standard (Figures 6 and 7). This is not surprising for a stagnant water body. The lack of dry-weather flow from Muddy Creek into the surf was reflected in the uniformly low numbers of both fecal coliforms and enterococci found in 13 samples collected by OCEHP from the surf zone and the three samples collected at Station MC-1 by the monitoring program for the Crystal Cove Project (Figures 8 and 9).

Los Trancos Canyon

The water quality monitoring program for the Crystal Cove Project takes samples upstream in Los Trancos Canyon (Station LTU), and where the OCEHP does not sample. Indicator bacteria were detected in each of the three samples taken by that monitoring program on March 31, September 12, and September 29, 2000 (Figure 10 and Tables 17 - 19). Fecal coliforms were present at or above the standard for single samples, and enterococci exceeded this limit in all three samples. This result is similar to what was observed in the second quarter of 2000.

Downstream data are available from Station LT (Crystal Cove Development Project) and the Crystal Creek upstream site (OCEHP). Counts for most of these samples were above the single sample limit for fecal coliforms, and nearly all were above that limit for enterococci (Figures 11 and 12). Thus, dry-weather flow in Crystal Cove Creek contained bacteria that are viewed as indicators of contamination by feces of warm blooded animals.

It is clear from comparisons with the Crystal Cove surf zone samples that the bacteria in the freshwater runoff are markedly reduced in number when they enter into the surf zone. Both the OCEHP samples and the Crystal Cove Project samples (Station LT-1) in the surf zone showed fecal coliforms and enterococci present, but their number were quite low and almost always below the single sample limit (Figures 13 and 14 and Tables 16 - 19).

General Conclusions

No storms occurred during the third quarter. Because of this, only dry-weather flow would carry bacteria into the ocean. At Emerald Bay, runoff water was diverted into the sanitary sewer, so none flowed into the ocean. There was no flow of water in Muddy Creek, so the bacteria did not enter the ocean from that source. Only Los Trancos Canyon had dry-weather flow. This runoff contained substantial numbers of indicator bacteria. Despite this, the surf zone at Station LT-1was not unduly contaminated with indicator bacteria, although their numbers there were occasionally higher than in the surf zones of Emerald and Muddy Canyons.

FRESHWATER TOXICITY TESTING FOR DRY-WEATHER RUNOFF

Procedures

Acute and chronic toxicity testing of the daphniid cladoceran crustacean *Ceridaphnia dubia* is conducted by exposing test animals to dry-weather runoff samples taken at Watershed Station LT and, if there is runoff flow, also at Watershed Station MC. The monitoring study plan specifies that this testing be conducted at three or more representative times during a one- year period.

Ford et al (2000b) described the specific procedures employed in the field sampling of the runoff water used in these tests. The full descriptions of laboratory bioassay testing and QA/QC procedures employed by the Bioassay Laboratory of Ogden Environmental and Energy Services are included in this report as Exhibit 1.

Separate acute (48 hr survival) and chronic tests (7 day survival and reproduction) were conducted using replicate groups of *C. dubia*. Those animals were exposed to an undiluted (100%) dry-weather runoff sample taken at Station LT in Los Trancos Canyon on September 12, 2000. In addition, the tests employed a dilution series in order to further evaluate the combined effects of potentially toxic runoff constituents at different levels of dilution or concentration. Pure freshwater was used for these dilutions and for the laboratory controls, as described in Exhibit 1.

Results and Discussion of Toxicity Testing

The complete results of the toxicity test employing the September 12, 2000 sample are included as Exhibit 1 (Bioassay Report dated October 9, 2000). The following table summarizes these test results:

Toxicity Testing Results Summary – *C. dubia*

Sample: LT 9/12/00				
Endpoint	Control (% surv.)	100% Sample (% surv.)	NOEC (% sample)	EC/LC50 (% sample)
Acute Survival	100	0*	50*	70.7
Chronic Survival	100	0*	25*	33.0
	Mean # of Neonates			
	Control	100% Sample		
Chronic Reproduction	34.6	0.0*	25*	34.7

* statistically significantly difference observed

Results for both acute and chronic reference toxicant tests were within internal laboratory control chart limits (± 2 sd)

Acute Test Results

Complete mortality of *C. dubia* (0 % survival) was observed at the highest concentration tested, the full-strength water sample taken at Station LT. Mean survival in the controls (100 percent) exceeded the USEPA acceptability criterion of 90 percent. Therefore, this test was declared valid.

The results of the dilution series indicated that the no observed effect concentration (NOEC) for this acute 48 hr test was 50% of the undiluted runoff sample. The LC_{50} and EC_{50} for the acute survival endpoint was 70.7% of the undiluted sample.

Chronic Test Results

For the seven-day chronic test, survival of *C. dubia* exposed to the full strength dry-weather sample from Station LT also was 0 %. Survival of the control animals was 90%, exceeding the minimum acceptability criterion (> 80%) established in the USEPA protocol. Therefore, the test was considered valid.

The results of Fisher's Exact Tests indicated statistically significant differences ($p<0.05$) in survival data between the control and the treatment groups exposed to both the 50 and 100 % sample concentrations. A comparison of reproduction data similarly indicated statistically significant differences between the control and the treatment groups for these 50 and 100 % sample concentrations. The chronic no observed effect concentration (NOEC) value for both survival and reproduction was 25% of the undiluted sample. The LC_{50} and EC_{50} values for survival and reproduction endpoints were 33.0% and 34.7%, respectively, of the undiluted sample. Reproduction in the controls exceeded 15 young per original female and control survival was >80%, as required by the USEPA protocol. Therefore, these tests were declared valid.

Relationship to Concentrations of Runoff Constituents

These bioassay results indicated clearly that there were adverse acute and chronic effects on survival of *C. dubia* exposed to dry-weather runoff water sampled at Station LT on September 12, 2000. Similarly, there was an adverse chronic effect on reproduction.

As shown in Tables 11 B and 14 (Station LT, 07:30 hrs), the trace metals detected in this September 12, 2000, dry-weather flow sample were total cadmium (0.09 mg/L), total copper (0.069 mg/L), total lead (0.012 mg/L), total nickel (0.024 mg/L), dissolved nickel (0.011 mg/L), total zinc (0.043 mg/L), and dissolved zinc (0.089mg/L). These concentrations are relatively low and the values for dissolved nickel and zinc do not exceed CTR chronic toxicity criteria (Table 3). Similarly, the value for total recoverable copper is below that expected to produce toxicity to this species, given that no dissolved

the toxic effects observed. There are no indications that this concentration of diazinon derived from discharges of the Crystal Cove Development Project. Because the USEPA is phasing out the use of the insecticide diazinon, as well as chlorpyrifos, potential problems of their toxicity in runoff water will be reduced over time. In addition, diversion of dry-weather runoff to the sanitary sewer from Los Trancos and Muddy Canyons will help to eliminate potential problems there.

copper was detected (Schuabaur-Berigan 1993, Kim et al 1999, USEPA 2000b). Therefore, it is very unlikely that these trace metals contributed to the toxicity effects observed.

Shown in Table 9 are the ELISA measurements (Miller et al 1997) of the organophosphorus pesticide compounds diazinon and chlorpyrifos from analyses of this runoff sample taken at Station LT on September 12, 2000. The concentration of diazinon is relatively high (0.6534 µg/L), and is greater than the 48 hr LC_{50} value of 0.44µg/L reported for *C. dubia* by Bailey et al (1996,1997). It is also well above the maximum acceptable toxicant concentration (MATC) of 0.34 µg/L derived for *C. dubia* by Norberg-King (1987). For diazinon, the acute (CMC) and chronic (CCC) water quality criteria to protect aquatic life in freshwater systems are 0.08 and 0.05 µg/L, respectively (Siepmann and Finlayson 2000). USEPA (1998) established a similar acute criterion for diazinon of 0.09 µg/L. The diazinon concentration measured for Station LT on September 12, 2000, is also well above all of those criteria values.

The concentration of chlorpyrifos measured in this dry-weather runoff sample from Station LT was 0.0171 µg/L (Table 9). This concentration is substantially lower than the 48-hour LC_{50} value of 0.06 µg/L for *C. dubia* exposed to chlorpyrifos (Bailey et al 1996). It is also well below the maximum acceptable concentration (MATC) value of chlorpyrifos (0.083µg/L) derived for *C. dubia*. The acute (CMC) water quality criterion value to protect aquatic life for chlorpyrifos in freshwater systems is 0.083 µg/L; that for chronic (CCC) toxicity is 0.041 µg/L (USEPA 1986, 1998). The concentration of chlorpyrifos in the dry-weather runoff sample taken at Station LT on September 12, 2000, (0.0171µg/L) is lower than these acute and chronic water quality criteria values.

These results indicate that the relatively high level of diazinon in the September 12 sample from Station LT was responsible for the significant toxic effects on *C dubia* described above. There is no indication that this diazinon concentration came from runoff of the Crystal Cove Development Project. The low concentration of chlorpyrifos and those of dissolved nickel and zinc in the sample suggest that they did not contribute to the toxicity effects observed.

As indicated above, the USEPA is phasing out the use of diazinon, as well as chlorpyrifos. Once the use of these two insecticides ends, the problem of their toxic effects in freshwater watersheds also will be eliminated. In addition, the planned diversion to the sanitary sewer of dry-weather runoff in Los Trancos and Muddy Canyons will serve to eliminate this potential problem in those watersheds.

General Conclusions

The results of the toxicity testing for *Ceriodaphnia dubia* exposed to a dry-weather runoff sample taken at Station LT on September 12, 2000, showed acute (48 hour) toxic effects on survival and chronic (7 day) toxic effects on both survival and reproduction of this test species. Concentrations of constituents in this runoff sample, except diazinon, were lower than those expected to produce toxic effects on *C. dubia*. The results indicate that the relatively high concentration of diazinon was responsible for

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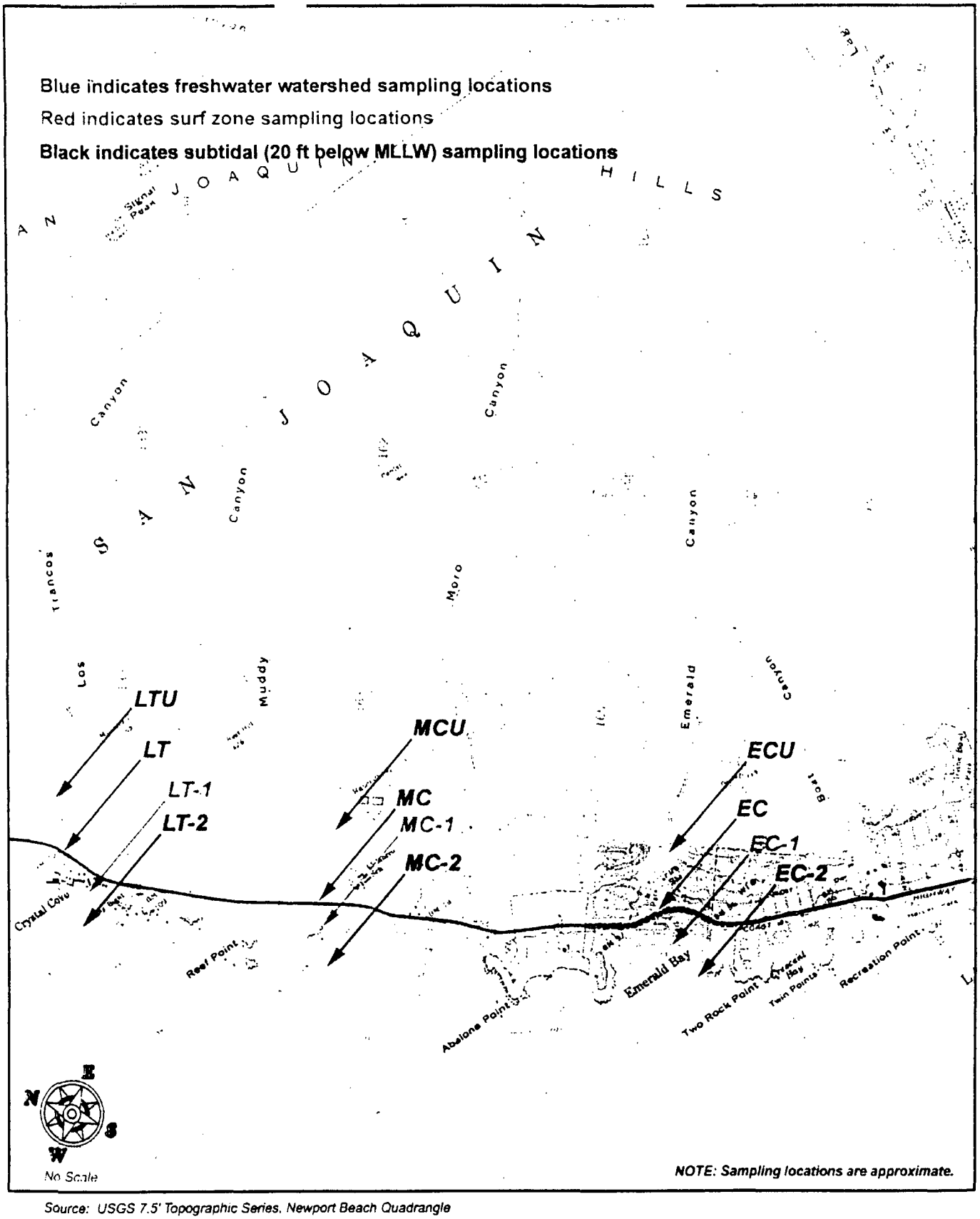
U.S. Environmental Protection Agency. 2000. Water Quality Standards; Establishment of Numerical Criteria for Priority Toxic Pollutants for the State of California; Rule. Environmental Protection Agency 40 FRL Part 131 (FRL-6587-97), pp 31682-31719, May 18, 2000.

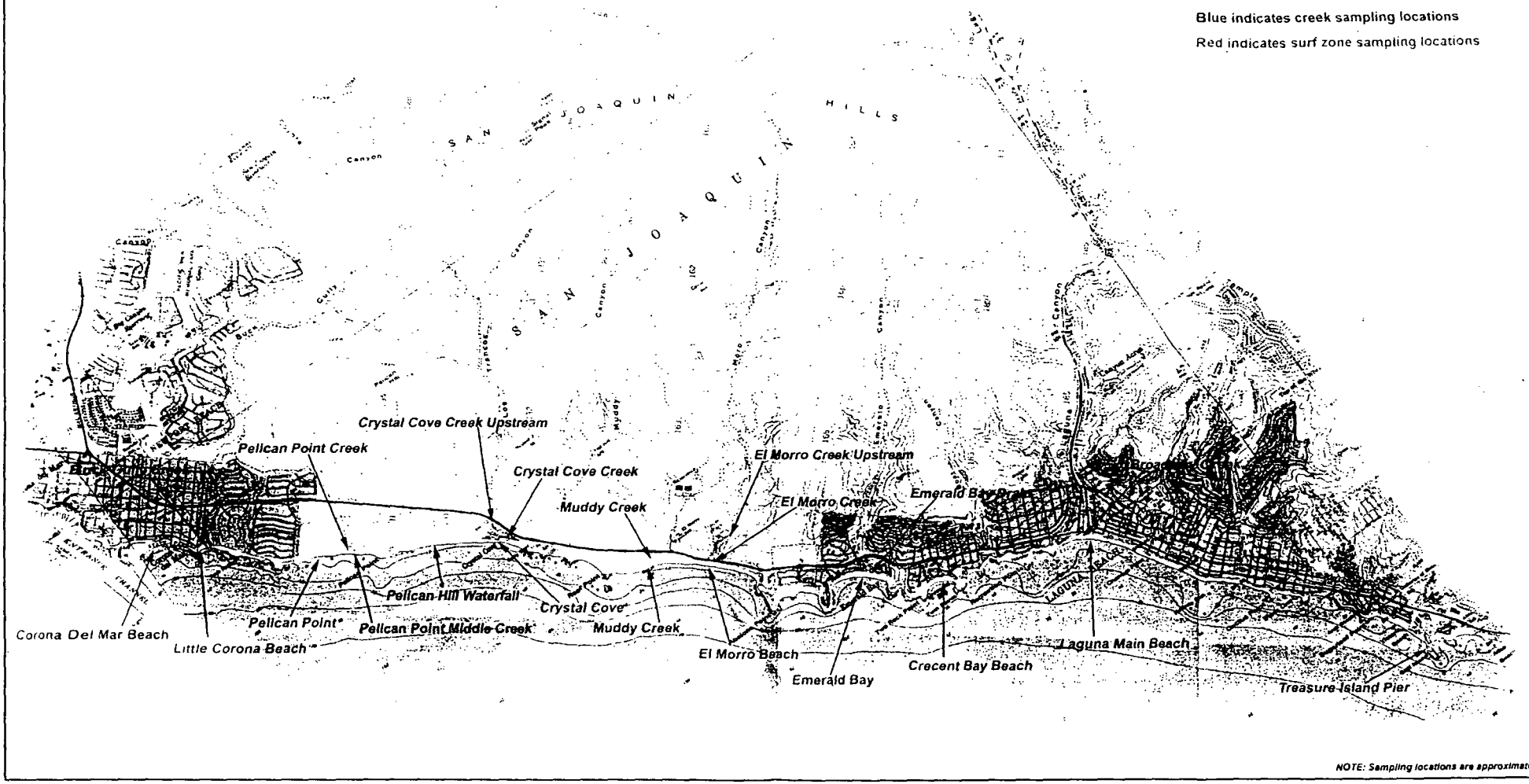
U.S. Environmental Protection Agency. 2000b. ECOTOX online database. http://www.epa.gov/ecotox/



Source: USGS 7.5' Topographic Series, Newport Beach Quadrangle

FIGURE 1

STATION LOCATIONS FOR WATER QUALITY AND MARINE ECOLOGICAL MONITORING FOR THE CRYSTAL COVE DEVELOPMENT PROJECT



Source: USGS 7.5' Topographic Series, Newport Beach Quadrangle

FIGURE 2 COUNTY OF ORANGE SAMPLING STATIONS FOR BACTERIOLOGICAL INDICATORS

No Scale

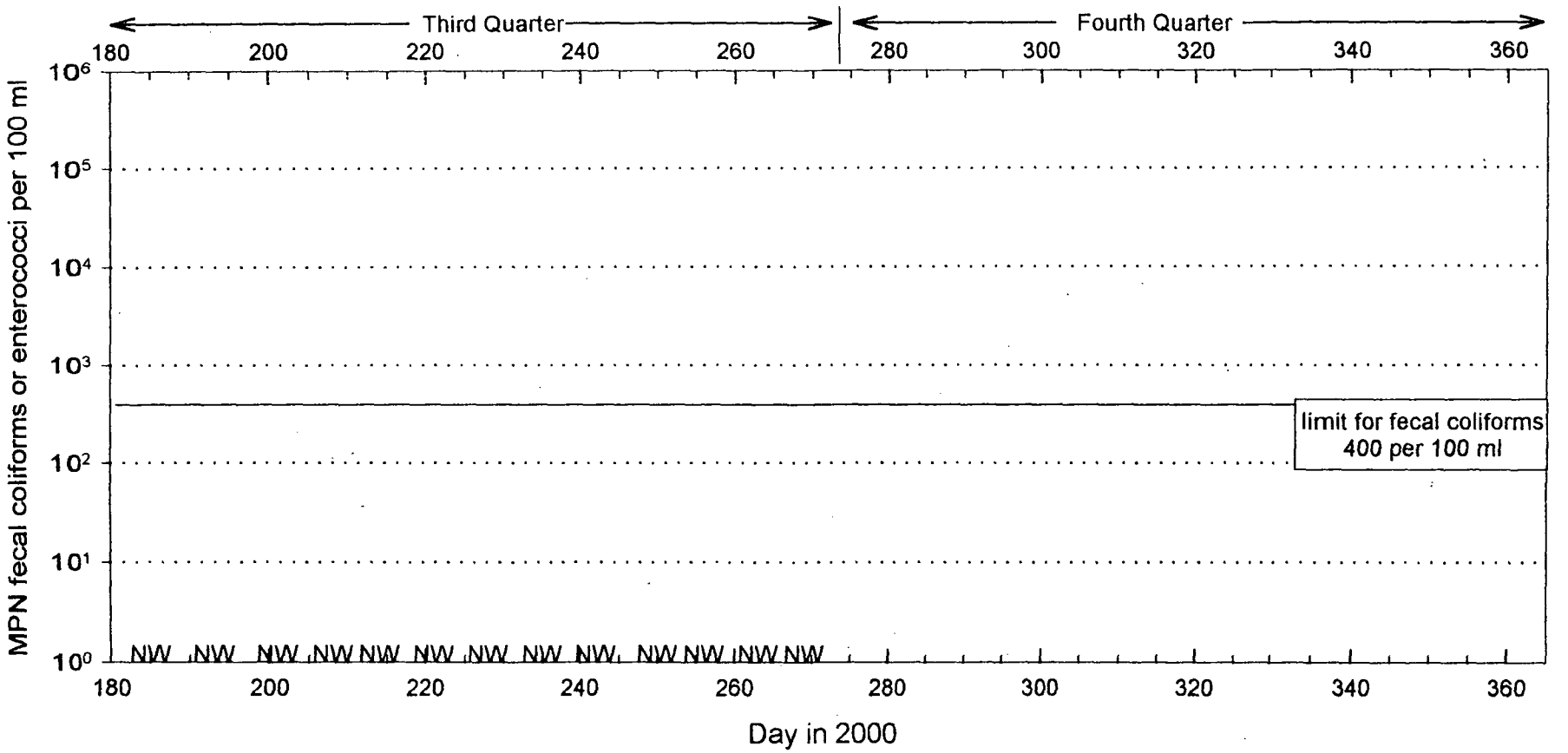


Figure 3. Fecal coliforms and enterococci in water draining from Emerald Canyon during the 3rd quarter of 2000. NW = no water reported by OCEHP. No samples taken by the Crystal Cove Development Project.

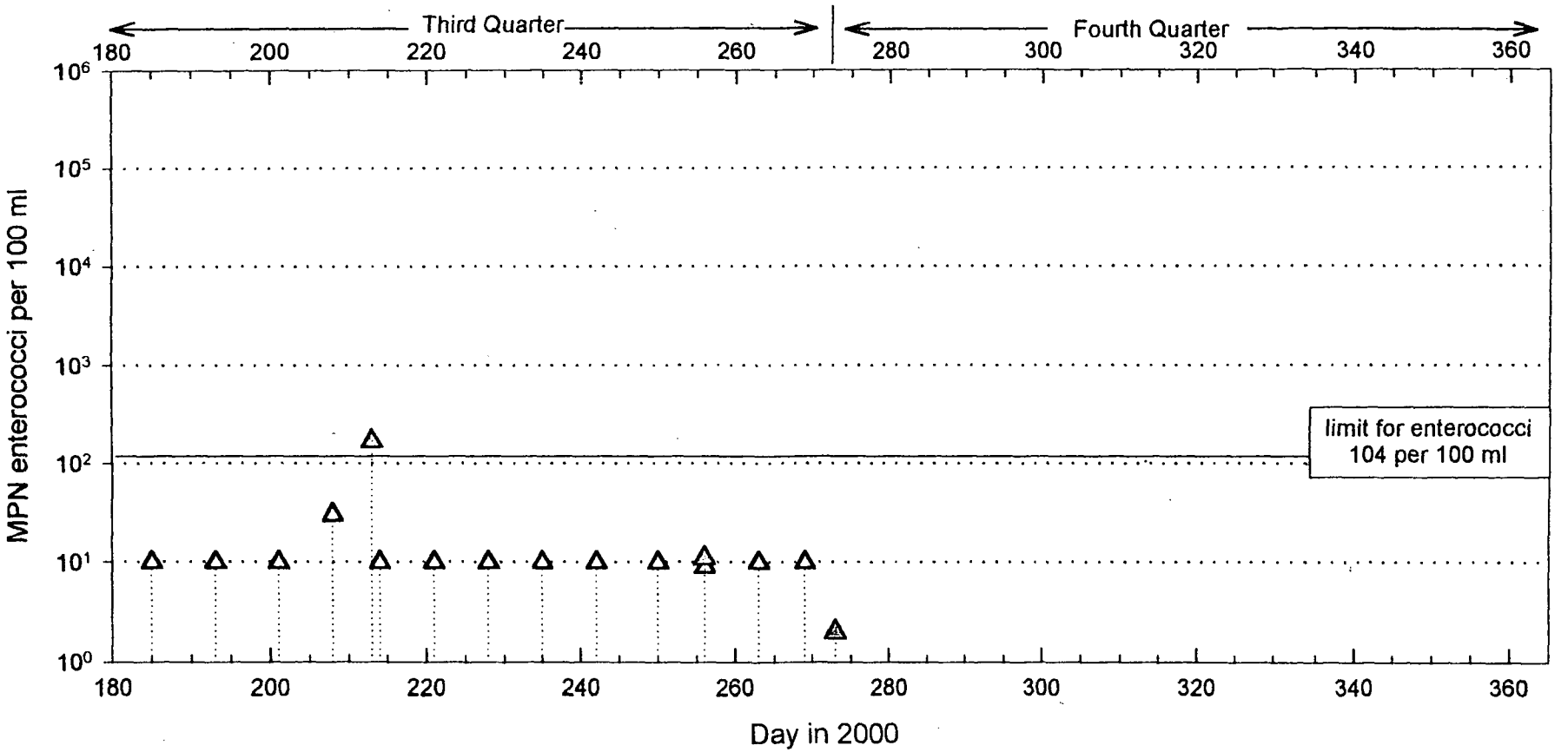


Figure 5. Enterococci in Emerald Canyon surf zone during the third quarter of 2000. Open triangles: OCEHP data from the Emerald Bay surf zone (with one exception, all values less than 10). Closed triangles: values obtained for the Crystal Cove Development Project at station EC-1 (surf zone).

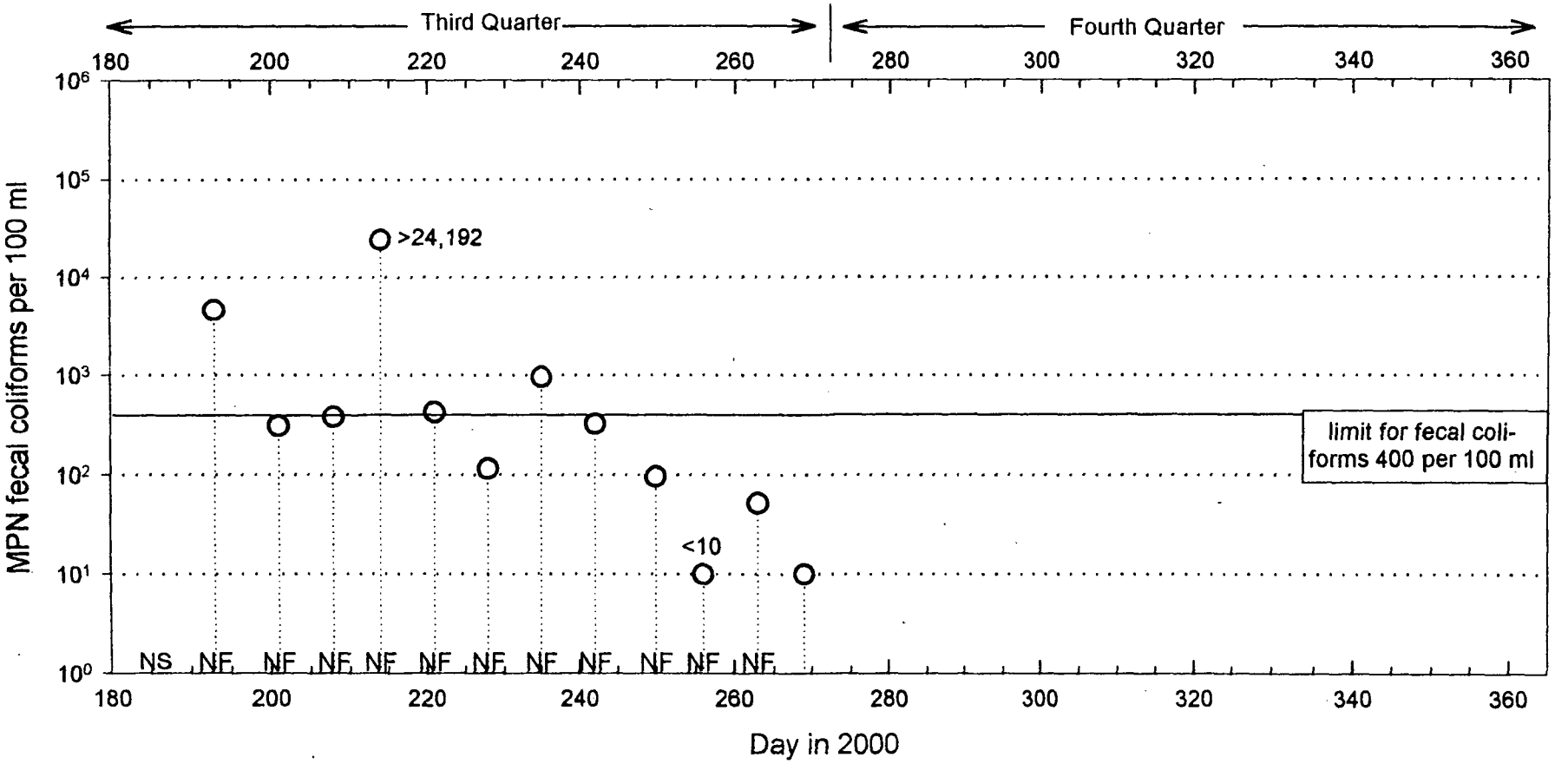


Figure 6. Fecal coliforms in water in Muddy Creek during the third quarter of 2000. Open circles: OCEHP data from Muddy Creek. No samples were taken for the Crystal Cove Development Project at station MC. NF = no flow. NS = no sample taken.

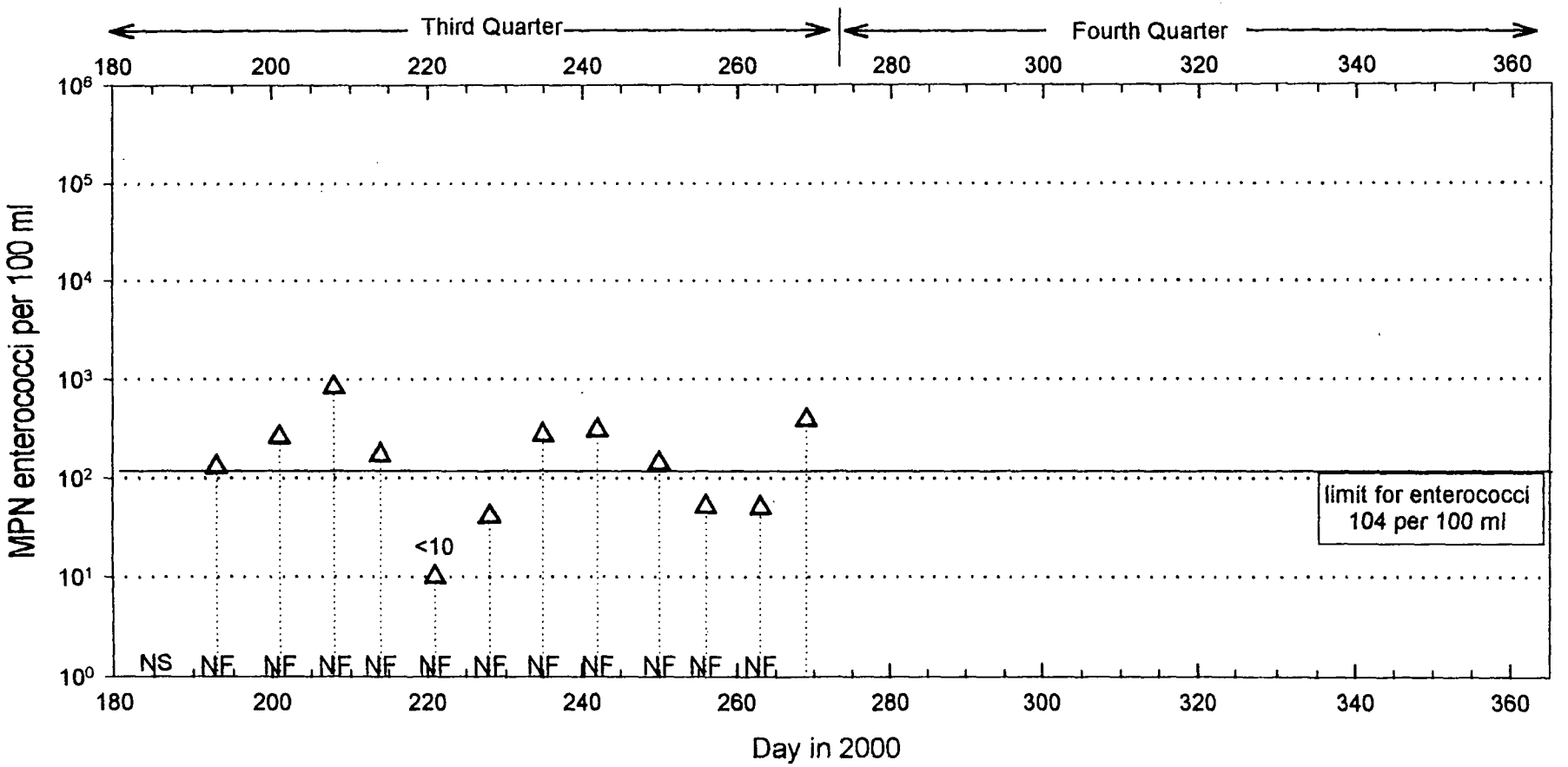


Figure 7. Enterococci in Muddy Creek during the third quarter of 2000. Open triangles: OCEHP data from Muddy Creek. No samples were taken for the Crystal Cove Development Project at station MC. NF = no flow; NS = no sample taken.

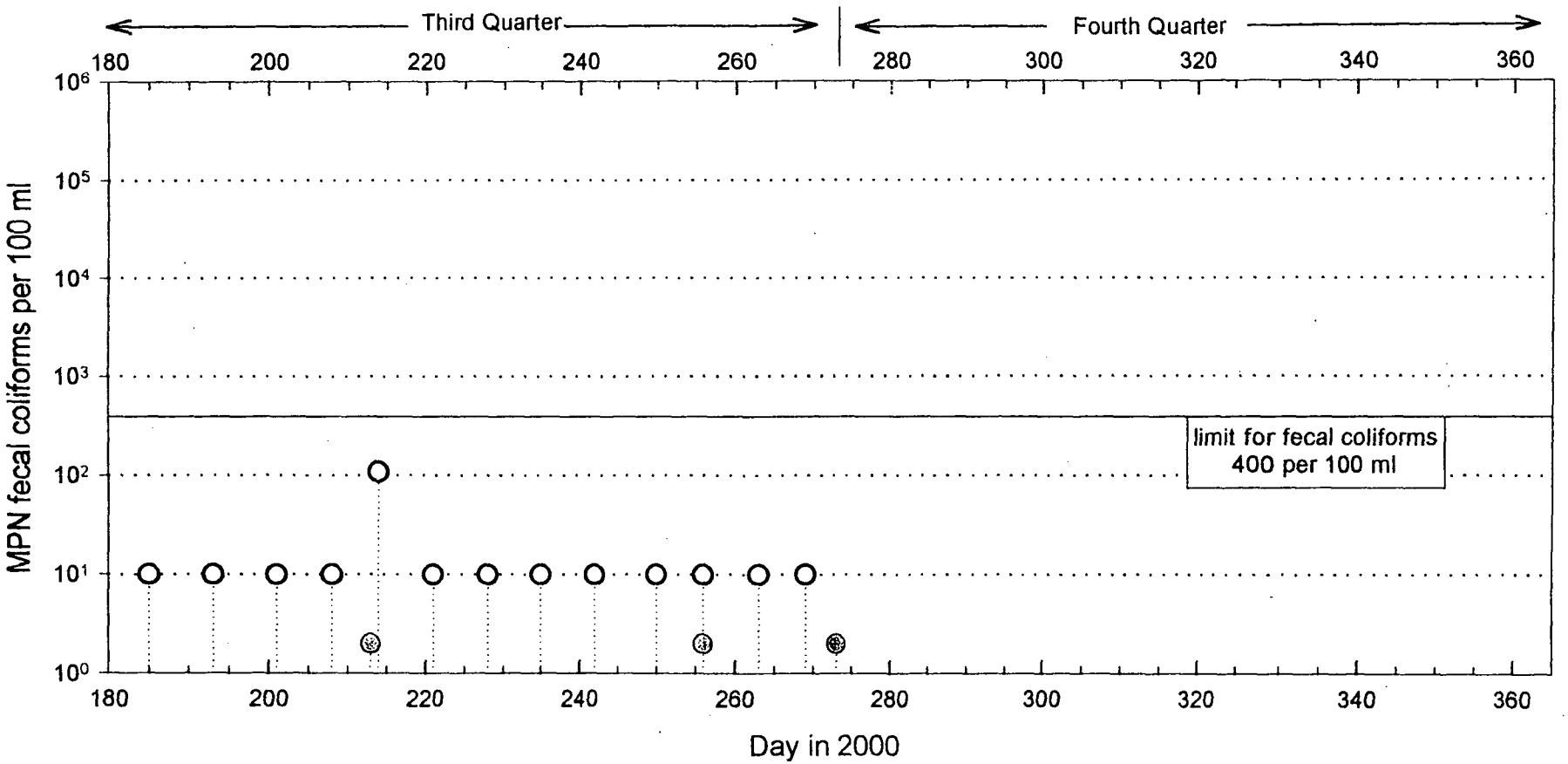


Figure 8. Fecal coliforms in Muddy Creek surf zone during the third quarter of 2000. Open circles: OCEHP data from the Muddy Creek surf zone (most values <10). Closed circles: values (<2) obtained for the Crystal Cove Development Project at station MC-1 (surf zone).

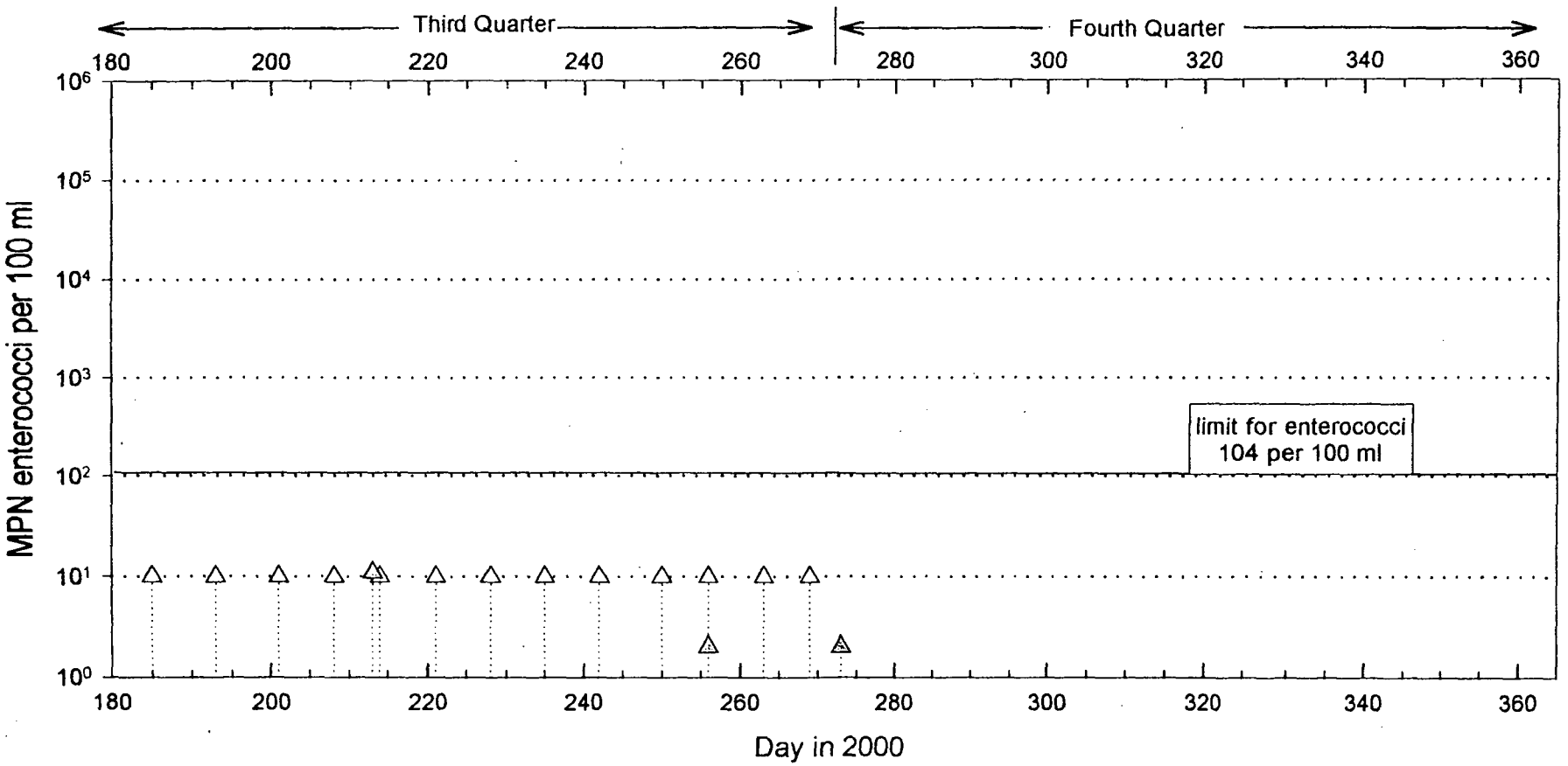


Figure 9. Enterococci in Muddy Creek surf zone during the third quarter of 2000. Open triangles: OCEHP data from the Muddy Creek surf zone (most values <10). Closed triangles: values obtained for the Crystal Cove Development Project at station MC-1 (surf zone).

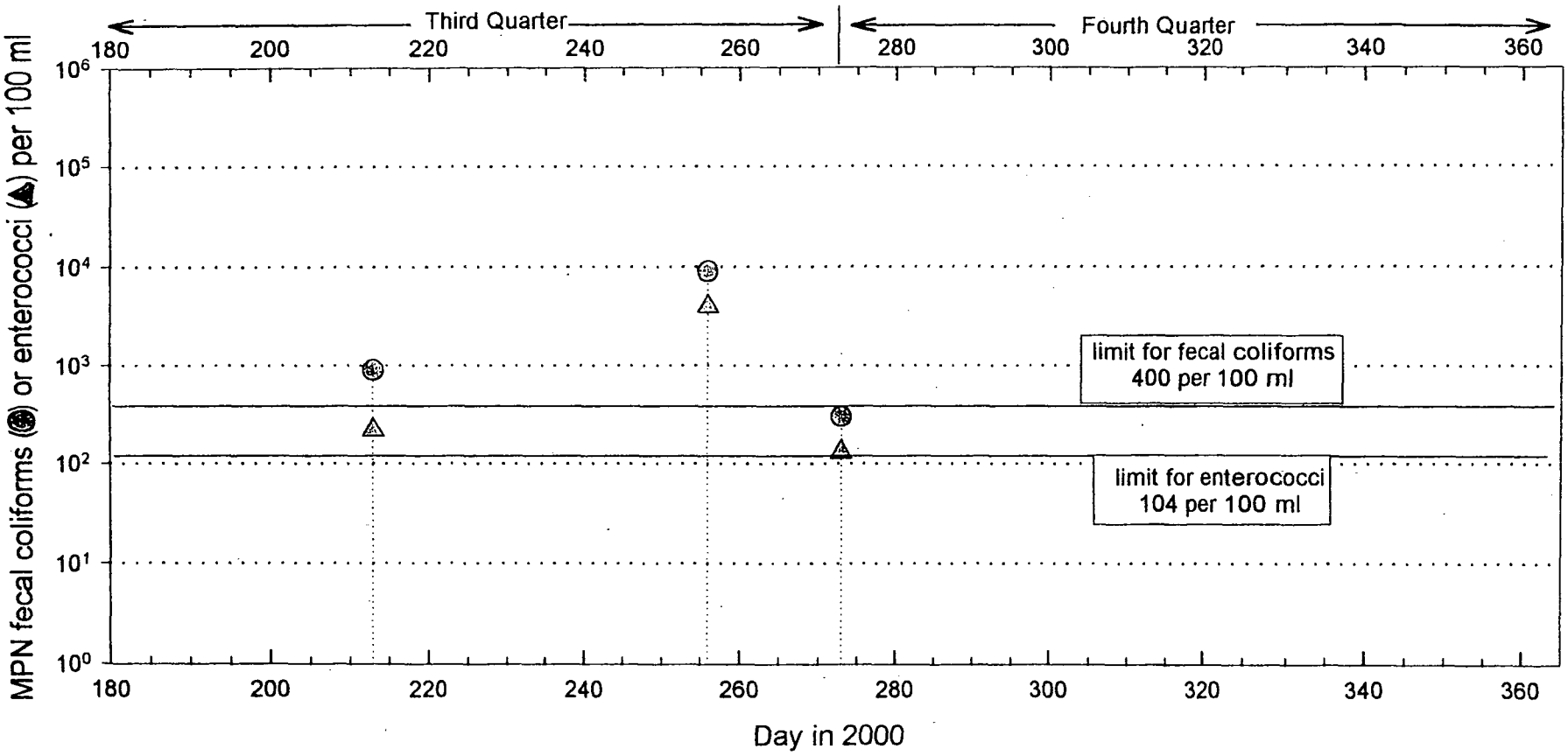


Figure 10. Enterococci and fecal coliforms per 100 ml of Crystal Cove Creek water (Los Trancos Canyon upstream) station LTU of the Crystal Cove Development Project during the third quarter of 2000. No OCEHP samples. Closed circles: fecal coliforms. Closed triangles: enterococci.

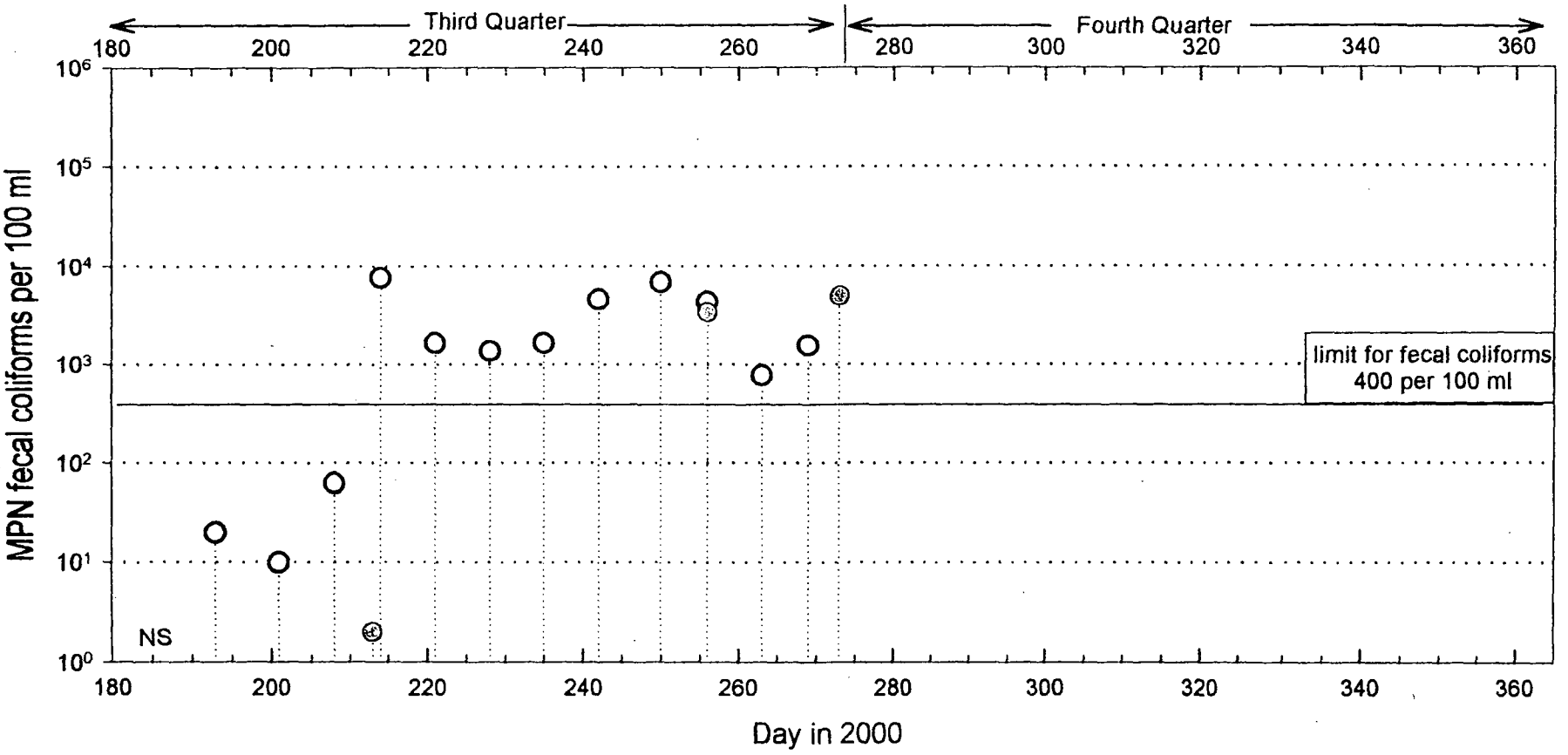


Figure 11. Fecal coliforms in Crystal Cove Creek (Los Trancos Canyon) during the third quarter of 2000. Open circles: OCEHP data from Crystal Cove Creek upstream. Closed circles: values obtained for the Crystal Cove Development Project at station LT. NS = no sample taken by OCEHP.

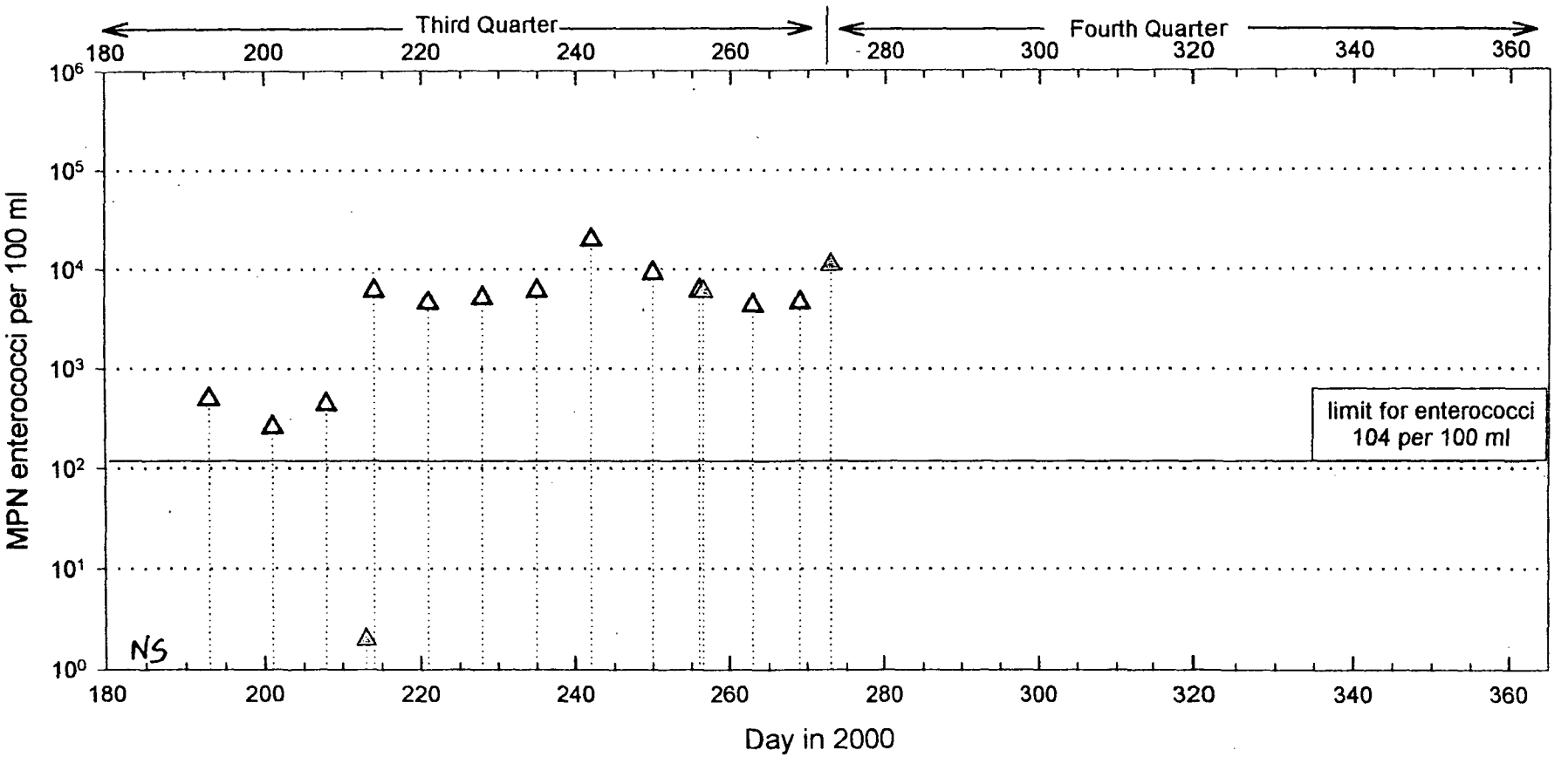


Figure 12. Enterococci in Crystal Cove Creek (Los Trancos Canyon) during the third quarter of 2000. Open triangles: OCEHP data from Crystal Cove Creek upstream. Closed triangles: values obtained for the Crystal Cove Development Project at station LT. NS = no sample taken by OCEHP.

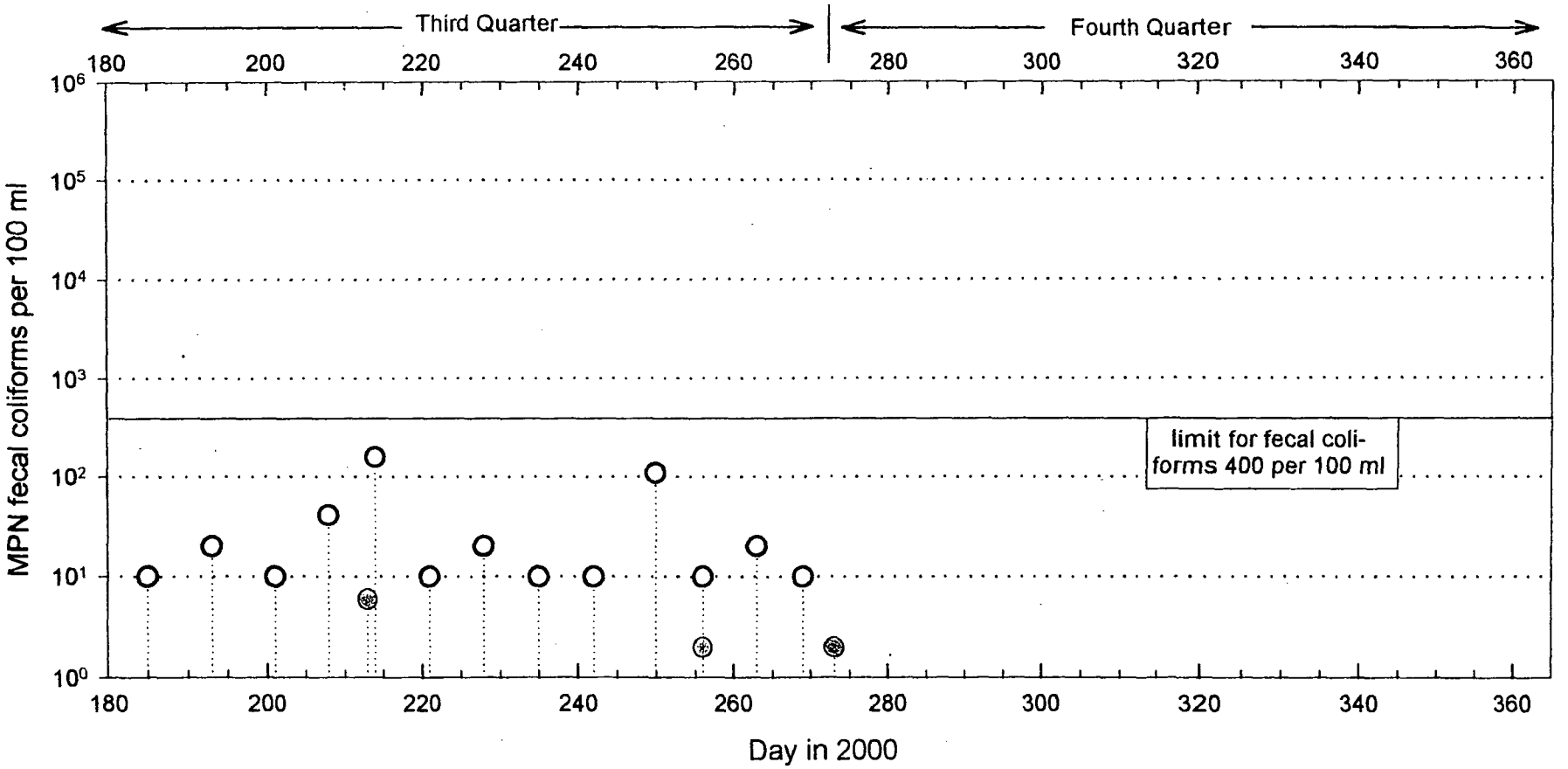


Figure 13. Fecal coliforms in Crystal Cove surf zone water during the third quarter of 2000. Open circles: OCEHP data from the Crystal Cove surf zone; 5 samples had <10 fecal coliforms per 100 ml. Closed circles: values obtained for the Crystal Cove Development Project at Station LT-1 (surf zone).

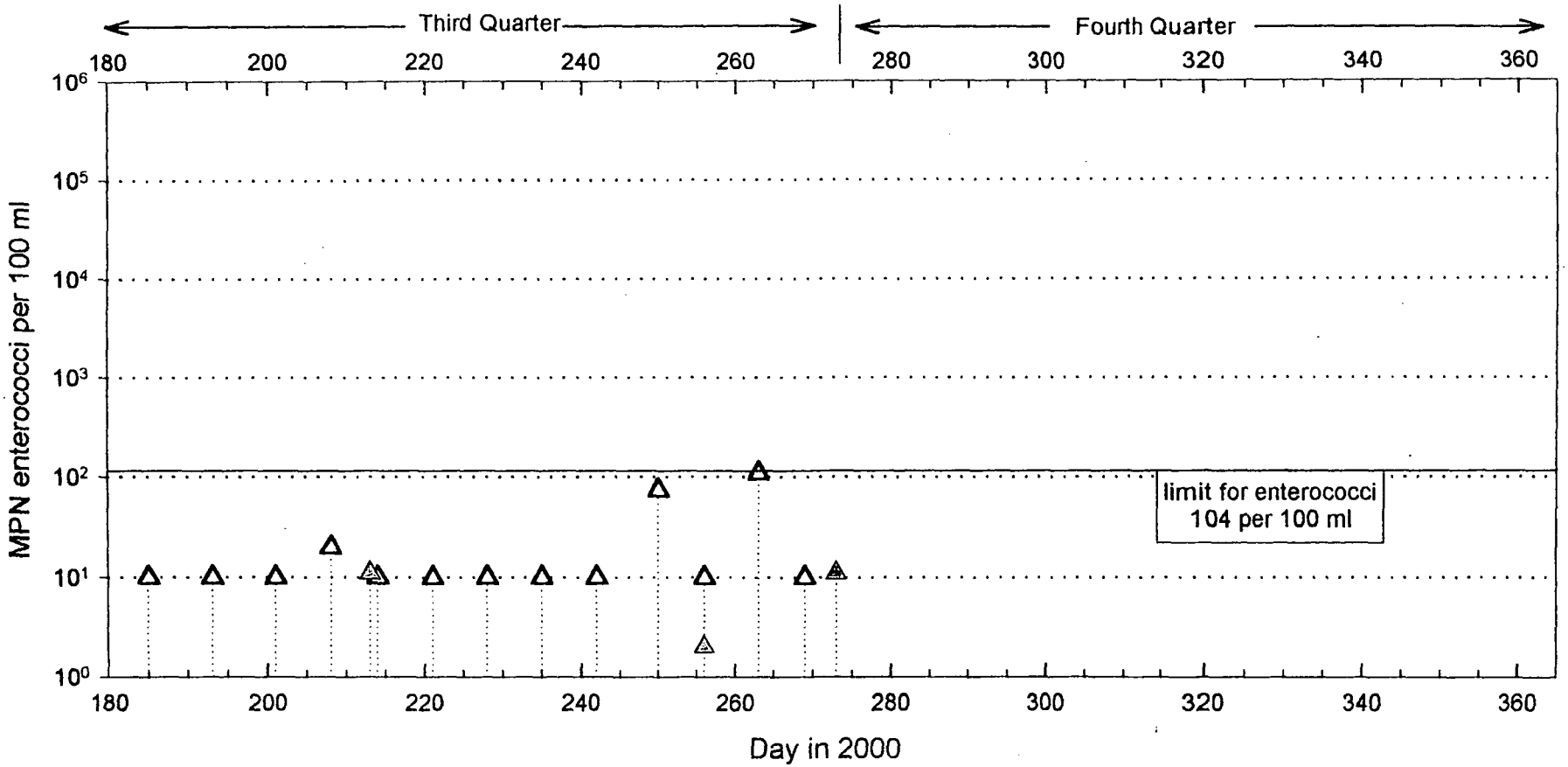


Figure 14. Enterococci in Crystal Cove surf zone during the third quarter of 2000. Open triangles: OCEHP data from Crystal Cove surf zone; 5 samples had <10 enterococci per 100 ml. Closed triangles: values obtained for the Crystal Cove Development Project at stations LT-1 (surf zone).

TABLE 1

Constituents analyzed for freshwater runoff and seawater in the water quality monitoring studies for the Crystal Cove Development Project during 2000. Analytical methods used and laboratory reporting limits for those methods are shown.

PHYSICAL CONSTITUENTS

CONSTITUENT	REPORTING LIMIT	METHOD
Total Dissolved Solids (TDS)	10.0 mg/L	EPA 160.1
Total Suspended Solids (TSS)	10.0 mg/L	EPA 160.2
Freshwater Hardness	4.0 mg/L	EPA 130.2

CHEMICAL CONSTITUENTS

CONSTITUENT	REPORTING LIMIT	METHOD
Salinity (Seawater)	0.01 ppt	Comparison with Standard Seawater
Oil and Grease	1.0 mg/L	EPA 413.2
Total Phosphorus	0.050 mg/L	EPA 365.3
Dissolved Phosphorus	0.050 mg/L	EPA 365.3
Total Kjeldahl Nitrogen (TKN)	0.5 mg/L	SM 4500
Nitrate + Nitrite (as N)	0.01 mg/l	EPA 353.3
DISSOLVED TRACE METALS		ALL EPA 6010B
Cadimum (Cd)	0.005 mg/L	
Chromium, Total (Cr)	0.005 mg/L	
Copper (Cu)	0.010 mg/L	
Lead (Pb)	0.005 mg/L	
Nickel (Ni)	0.010 mg/L	
Silver (Ag)	0.010 mg/L	
Zinc (Zn)	0.020 mg/L	
TOTAL RECOVERABLE TRACE METALS		ALL EPA 6010B
Cadimum (Cd)	0.005 mg/L	
Chromium, Total (Cr)	0.005 mg/L	
Copper (Cu)	0.010 mg/L	
Lead (Pb)	0.005 mg/L	
Nickel (Ni)	0.010 mg/L	
Silver (Ag)	0.010 mg/L	
Zinc (Zn)	0.020 mg/L	

TABLE 1 (Cont'd)

CHEMICAL CONSTITUENTS

CONSTITUENT	REPORTING LIMIT	METHOD
ORGANOPHOSPHORUS PESTICIDES		ALL EPA 8141A
Azinphos methyl	1.0 µg/L	
Bolstar	0.500 µg/L	
Chlorpyrifos	0.500 µg/L	
Coumaphos	1.0 µg/L	
Demeton	0.500 µg/L	
Diazinon	0.500 µg/L	
Dichlorvos	0.500 µg/L	
Disulfoton	0.500 µg/L	
Ethion	0.500 µg/L	
Ethoprop	0.500 µg/L	
EPN	0.500 µg/L	
Fensulfothion	0.500 µg/L	
Fenthion	0.500 µg/L	
Malathion	0.500 µg/L	
Merphos	0.500 µg/L	
Mevinphos	0.500 µg/L	
Monocrotophos	0.500 µg/L	
Naled	1.00 µg/L	
Parathion-ethyl	0.500 µg/L	
Parathion-Methyl	0.50 µg/L	
Phorate	0.500 µg/L	
Ronnel	0.500 µg/L	
Stirophos	1.00 µg/L	
Sulfotep	0.500 µg/L	
Tokuthion (Prothiofos)	0.500 µg/L	
Trichloronate	0.500 µg/L	
Chlorpyrifos	0.01 µg/L	ELISA*
Diazinon	0.01 µg/L	ELISA*

PATHOGEN INDICATOR BACTERIA

CONSTITUENT	REPORTING LIMIT	METHOD
Total Coliforms (MPN/100ml)	2/100 ml	SM 9221B
Fecal Coliforms (MPN/100ml)	2/100 ml	SM 9221E
Enterococci (MPN/100ml)	2/100 ml	SM 9230B

* Enzyme-Linked Immunosorbant Assay (Miller et al 1997)

TABLE 2

Acute (CMC) freshwater aquatic life criteria applied in the monitoring study for the Crystal Cove Development Project, as specified by the California Regional Water Quality Control Board, Santa Ana Region. Shown are calculated values of acute freshwater quality criteria for the hardness-dependent dissolved trace metals cadmium, chromium III, copper, lead, nickel, silver and zinc, expressed in mg/L. Based on the EPA California Toxics Rule (USEPA, May 18, 2000). Criteria values are shown for each 1 mg/L increment of freshwater hardness in the table columns. Calculations provided by PBS&J, San Diego, December 8, 2000.

FRESHWATER AQUATIC LIFE CRITERION MAXIMUM CONCENTRATIONS (ACUTE CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

CADMIUM

Hardness (mg/L)	Criterion Maximum Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.00074	0.00078	0.00082	0.00087	0.00091	0.00095	0.00099	0.00100	0.00110	0.00110
30	0.00120	0.00120	0.00120	0.00130	0.00130	0.00140	0.00140	0.00150	0.00150	0.00150
40	0.00160	0.00160	0.00170	0.00170	0.00180	0.00180	0.00180	0.00190	0.00190	0.00200
50	0.00200	0.00210	0.00210	0.00210	0.00220	0.00220	0.00230	0.00230	0.00240	0.00240
60	0.00250	0.00250	0.00250	0.00260	0.00260	0.00270	0.00270	0.00280	0.00280	0.00290
70	0.00290	0.00290	0.00300	0.00300	0.00310	0.00310	0.00320	0.00320	0.00330	0.00330
80	0.00330	0.00340	0.00340	0.00350	0.00350	0.00360	0.00360	0.00370	0.00370	0.00380
90	0.00380	0.00390	0.00390	0.00390	0.00400	0.00400	0.00410	0.00410	0.00420	0.00420
100	0.00430	0.00430	0.00440	0.00440	0.00440	0.00450	0.00450	0.00460	0.00460	0.00470
110	0.00470	0.00480	0.00480	0.00490	0.00490	0.00500	0.00500	0.00510	0.00510	0.00510
120	0.00520	0.00520	0.00530	0.00530	0.00540	0.00540	0.00550	0.00550	0.00560	0.00560
130	0.00570	0.00570	0.00580	0.00580	0.00590	0.00590	0.00600	0.00600	0.00600	0.00610
140	0.00610	0.00620	0.00620	0.00630	0.00630	0.00640	0.00640	0.00650	0.00650	0.00660
150	0.00660	0.00670	0.00670	0.00680	0.00680	0.00690	0.00690	0.00700	0.00700	0.00700
160	0.00710	0.00710	0.00720	0.00720	0.00730	0.00730	0.00740	0.00740	0.00750	0.00750
170	0.00760	0.00760	0.00770	0.00770	0.00780	0.00780	0.00790	0.00790	0.00800	0.00800
180	0.00810	0.00810	0.00820	0.00820	0.00830	0.00830	0.00840	0.00840	0.00840	0.00850
190	0.00850	0.00860	0.00860	0.00870	0.00870	0.00880	0.00880	0.00890	0.00890	0.00900
200	0.00900	0.00910	0.00910	0.00920	0.00920	0.00930	0.00930	0.00940	0.00940	0.00950
210	0.00950	0.00960	0.00960	0.00970	0.00970	0.00980	0.00980	0.00990	0.00990	0.01000
220	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
230	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100
240	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100
250	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200
260	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200
270	0.01200	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300
280	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300
290	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400
300	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400
310	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500
320	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500
330	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600
340	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600
350	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700
360	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01800
370	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800
380	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01900
390	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900
400	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900	0.01900	0.02000	0.02000

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.
3. Criteria do not apply to Sacramento River (and tributaries) above Hamilton City. (CFR131.38(b)(1) Footnote (x) to Table)

FRESHWATER AQUATIC LIFE CRITERION MAXIMUM CONCENTRATIONS (ACUTE CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

CHROMIUM (III)

Hardness (mg/L)	Criterion Maximum Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.15	0.15	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.20
30	0.20	0.21	0.22	0.22	0.23	0.23	0.24	0.24	0.25	0.25
40	0.26	0.26	0.27	0.27	0.28	0.29	0.29	0.30	0.30	0.31
50	0.31	0.32	0.32	0.33	0.33	0.34	0.34	0.35	0.35	0.36
60	0.36	0.37	0.37	0.38	0.38	0.39	0.39	0.40	0.40	0.40
70	0.41	0.41	0.42	0.42	0.43	0.43	0.44	0.44	0.45	0.45
80	0.46	0.46	0.47	0.47	0.48	0.48	0.48	0.49	0.49	0.50
90	0.50	0.51	0.51	0.52	0.52	0.53	0.53	0.54	0.54	0.54
100	0.55	0.55	0.56	0.56	0.57	0.57	0.58	0.58	0.58	0.59
110	0.59	0.60	0.60	0.61	0.61	0.62	0.62	0.62	0.63	0.63
120	0.64	0.64	0.65	0.65	0.65	0.66	0.66	0.67	0.67	0.68
130	0.68	0.68	0.69	0.69	0.70	0.70	0.71	0.71	0.71	0.72
140	0.72	0.73	0.73	0.74	0.74	0.74	0.75	0.75	0.76	0.76
150	0.76	0.77	0.77	0.78	0.78	0.79	0.79	0.79	0.80	0.80
160	0.81	0.81	0.81	0.82	0.82	0.83	0.83	0.84	0.84	0.84
170	0.85	0.85	0.86	0.86	0.86	0.87	0.87	0.88	0.88	0.88
180	0.89	0.89	0.90	0.90	0.90	0.91	0.91	0.92	0.92	0.92
190	0.93	0.93	0.94	0.94	0.94	0.95	0.95	0.96	0.96	0.96
200	0.97	0.97	0.98	0.98	0.98	0.99	0.99	1.00	1.00	1.00
210	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
220	1.00	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
230	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
240	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.20	1.20	1.20
250	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
260	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
270	1.20	1.20	1.20	1.20	1.30	1.30	1.30	1.30	1.30	1.30
280	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
290	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
300	1.30	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
310	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
320	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.50
330	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
340	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
350	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.60	1.60	1.60
360	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
370	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
380	1.60	1.60	1.60	1.60	1.70	1.70	1.70	1.70	1.70	1.70
390	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
400	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION MAXIMUM CONCENTRATIONS (ACUTE CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

COPPER

Hardness (mg/L)	Criterion Maximum Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.0029	0.0031	0.0032	0.0034	0.0035	0.0036	0.0038	0.0039	0.0041	0.0042
30	0.0043	0.0045	0.0046	0.0047	0.0049	0.0050	0.0051	0.0053	0.0054	0.0055
40	0.0057	0.0058	0.0059	0.0061	0.0062	0.0063	0.0065	0.0066	0.0067	0.0069
50	0.0070	0.0071	0.0073	0.0074	0.0075	0.0077	0.0078	0.0079	0.0080	0.0082
60	0.0083	0.0084	0.0086	0.0087	0.0088	0.0090	0.0091	0.0092	0.0093	0.0095
70	0.0096	0.0097	0.0099	0.0100	0.0100	0.0100	0.0100	0.0110	0.0110	0.0110
80	0.0110	0.0110	0.0110	0.0110	0.0110	0.0120	0.0120	0.0120	0.0120	0.0120
90	0.0120	0.0120	0.0120	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130
100	0.0130	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140	0.0150
110	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0160	0.0160	0.0160
120	0.0160	0.0160	0.0160	0.0160	0.0160	0.0170	0.0170	0.0170	0.0170	0.0170
130	0.0170	0.0170	0.0170	0.0180	0.0180	0.0180	0.0180	0.0180	0.0180	0.0180
140	0.0180	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190	0.0200
150	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0210	0.0210	0.0210
160	0.0210	0.0210	0.0210	0.0210	0.0210	0.0220	0.0220	0.0220	0.0220	0.0220
170	0.0220	0.0220	0.0220	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
180	0.0230	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240
190	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0260	0.0260
200	0.0260	0.0260	0.0260	0.0260	0.0260	0.0260	0.0270	0.0270	0.0270	0.0270
210	0.0270	0.0270	0.0270	0.0270	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280
220	0.0280	0.0280	0.0280	0.0290	0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
230	0.0290	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0310
240	0.0310	0.0310	0.0310	0.0310	0.0310	0.0310	0.0310	0.0320	0.0320	0.0320
250	0.0320	0.0320	0.0320	0.0320	0.0320	0.0320	0.0330	0.0330	0.0330	0.0330
260	0.0330	0.0330	0.0330	0.0330	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340
270	0.0340	0.0340	0.0350	0.0350	0.0350	0.0350	0.0350	0.0350	0.0350	0.0350
280	0.0350	0.0360	0.0360	0.0360	0.0360	0.0360	0.0360	0.0360	0.0360	0.0370
290	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0370	0.0380	0.0380
300	0.0380	0.0380	0.0380	0.0380	0.0380	0.0380	0.0390	0.0390	0.0390	0.0390
310	0.0390	0.0390	0.0390	0.0390	0.0390	0.0400	0.0400	0.0400	0.0400	0.0400
320	0.0400	0.0400	0.0400	0.0410	0.0410	0.0410	0.0410	0.0410	0.0410	0.0410
330	0.0410	0.0420	0.0420	0.0420	0.0420	0.0420	0.0420	0.0420	0.0420	0.0420
340	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0430	0.0440	0.0440
350	0.0440	0.0440	0.0440	0.0440	0.0440	0.0440	0.0440	0.0450	0.0450	0.0450
360	0.0450	0.0450	0.0450	0.0450	0.0450	0.0460	0.0460	0.0460	0.0460	0.0460
370	0.0460	0.0460	0.0460	0.0460	0.0470	0.0470	0.0470	0.0470	0.0470	0.0470
380	0.0470	0.0470	0.0480	0.0480	0.0480	0.0480	0.0480	0.0480	0.0480	0.0480
390	0.0480	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0500
400	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0510	0.0510

Note:

1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.
3. Criteria do not apply to Sacramento River (and tributaries) above Hamilton City. (CFR131.38(b)(1) Footnote (x) to Table)

FRESHWATER AQUATIC LIFE CRITERION MAXIMUM CONCENTRATIONS (ACUTE CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

LEAD

Hardness (mg/L)	Criterion Maximum Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.011	0.011	0.012	0.013	0.013	0.014	0.015	0.015	0.016	0.016
30	0.017	0.018	0.018	0.019	0.020	0.020	0.021	0.022	0.022	0.023
40	0.024	0.024	0.025	0.025	0.026	0.027	0.027	0.028	0.029	0.029
50	0.030	0.031	0.031	0.032	0.033	0.033	0.034	0.035	0.036	0.036
60	0.037	0.038	0.038	0.039	0.040	0.040	0.041	0.042	0.042	0.043
70	0.044	0.044	0.045	0.046	0.046	0.047	0.048	0.049	0.049	0.050
80	0.051	0.051	0.052	0.053	0.053	0.054	0.055	0.055	0.056	0.057
90	0.058	0.058	0.059	0.060	0.060	0.061	0.062	0.062	0.063	0.064
100	0.065	0.065	0.066	0.067	0.067	0.068	0.069	0.070	0.070	0.071
110	0.072	0.072	0.073	0.074	0.074	0.075	0.076	0.077	0.077	0.078
120	0.079	0.079	0.080	0.081	0.082	0.082	0.083	0.084	0.084	0.085
130	0.086	0.087	0.087	0.088	0.089	0.089	0.090	0.091	0.092	0.092
140	0.093	0.094	0.094	0.095	0.096	0.097	0.097	0.098	0.099	0.099
150	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.110	0.110	0.110
160	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
170	0.110	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
180	0.120	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.130	0.130
190	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.140
200	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
210	0.140	0.140	0.140	0.150	0.150	0.150	0.150	0.150	0.150	0.150
220	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.160	0.160	0.160
230	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
240	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
250	0.170	0.170	0.170	0.170	0.180	0.180	0.180	0.180	0.180	0.180
260	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.190	0.190
270	0.190	0.190	0.190	0.190	0.190	0.190	0.190	0.190	0.190	0.190
280	0.190	0.190	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
290	0.200	0.200	0.200	0.200	0.200	0.200	0.210	0.210	0.210	0.210
300	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.220
310	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220
320	0.220	0.220	0.220	0.230	0.230	0.230	0.230	0.230	0.230	0.230
330	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.240	0.240	0.240
340	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
350	0.240	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
360	0.250	0.250	0.250	0.250	0.250	0.260	0.260	0.260	0.260	0.260
370	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.270
380	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270
390	0.270	0.270	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280
400	0.280	0.280	0.280	0.280	0.280	0.280	0.290	0.290	0.290	0.290

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION MAXIMUM CONCENTRATIONS (ACUTE CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

NICKEL

Hardness (mg/L)	Criterion Maximum Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16
30	0.17	0.17	0.18	0.18	0.19	0.19	0.20	0.20	0.21	0.21
40	0.22	0.22	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.26
50	0.26	0.26	0.27	0.27	0.28	0.28	0.29	0.29	0.30	0.30
60	0.30	0.31	0.31	0.32	0.32	0.33	0.33	0.33	0.34	0.34
70	0.35	0.35	0.35	0.36	0.36	0.37	0.37	0.38	0.38	0.38
80	0.39	0.39	0.40	0.40	0.40	0.41	0.41	0.42	0.42	0.42
90	0.43	0.43	0.44	0.44	0.44	0.45	0.45	0.46	0.46	0.46
100	0.47	0.47	0.48	0.48	0.48	0.49	0.49	0.50	0.50	0.50
110	0.51	0.51	0.52	0.52	0.52	0.53	0.53	0.53	0.54	0.54
120	0.55	0.55	0.55	0.56	0.56	0.57	0.57	0.57	0.58	0.58
130	0.58	0.59	0.59	0.60	0.60	0.60	0.61	0.61	0.61	0.62
140	0.62	0.63	0.63	0.63	0.64	0.64	0.64	0.65	0.65	0.66
150	0.66	0.66	0.67	0.67	0.67	0.68	0.68	0.69	0.69	0.69
160	0.70	0.70	0.70	0.71	0.71	0.72	0.72	0.72	0.73	0.73
170	0.73	0.74	0.74	0.74	0.75	0.75	0.76	0.76	0.76	0.77
180	0.77	0.77	0.78	0.78	0.78	0.79	0.79	0.80	0.80	0.80
190	0.81	0.81	0.81	0.82	0.82	0.82	0.83	0.83	0.83	0.84
200	0.84	0.85	0.85	0.85	0.86	0.86	0.86	0.87	0.87	0.87
210	0.88	0.88	0.88	0.89	0.89	0.89	0.90	0.90	0.91	0.91
220	0.91	0.92	0.92	0.92	0.93	0.93	0.93	0.94	0.94	0.94
230	0.95	0.95	0.95	0.96	0.96	0.96	0.97	0.97	0.98	0.98
240	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
250	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
260	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
270	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
280	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
290	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
300	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
310	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
320	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
330	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
340	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
350	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
360	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
370	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
380	1.40	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
390	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
400	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION MAXIMUM CONCENTRATIONS (ACUTE CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

SILVER

Hardness (mg/L)	Criterion Maximum Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.00022	0.00024	0.00026	0.00028	0.00030	0.00032	0.00034	0.00036	0.00039	0.00041
30	0.00043	0.00046	0.00049	0.00051	0.00054	0.00057	0.00060	0.00062	0.00065	0.00068
40	0.00071	0.00074	0.00078	0.00081	0.00084	0.00087	0.00091	0.00094	0.00098	0.00100
50	0.00100	0.00110	0.00110	0.00120	0.00120	0.00120	0.00130	0.00130	0.00140	0.00140
60	0.00140	0.00150	0.00150	0.00160	0.00160	0.00160	0.00170	0.00170	0.00180	0.00180
70	0.00190	0.00190	0.00200	0.00200	0.00210	0.00210	0.00220	0.00220	0.00230	0.00230
80	0.00240	0.00240	0.00250	0.00250	0.00260	0.00260	0.00270	0.00270	0.00280	0.00280
90	0.00290	0.00290	0.00300	0.00300	0.00310	0.00320	0.00320	0.00330	0.00330	0.00340
100	0.00340	0.00350	0.00360	0.00360	0.00370	0.00380	0.00380	0.00390	0.00390	0.00400
110	0.00410	0.00410	0.00420	0.00430	0.00430	0.00440	0.00450	0.00450	0.00460	0.00470
120	0.00470	0.00480	0.00490	0.00490	0.00500	0.00510	0.00510	0.00520	0.00530	0.00530
130	0.00540	0.00550	0.00560	0.00560	0.00570	0.00580	0.00590	0.00590	0.00600	0.00610
140	0.00620	0.00620	0.00630	0.00640	0.00650	0.00650	0.00660	0.00670	0.00680	0.00690
150	0.00690	0.00700	0.00710	0.00720	0.00730	0.00730	0.00740	0.00750	0.00760	0.00770
160	0.00770	0.00780	0.00790	0.00800	0.00810	0.00820	0.00820	0.00830	0.00840	0.00850
170	0.00860	0.00870	0.00880	0.00890	0.00890	0.00900	0.00910	0.00920	0.00930	0.00940
180	0.00950	0.00960	0.00970	0.00980	0.00980	0.00990	0.01000	0.01000	0.01000	0.01000
190	0.01000	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100
200	0.01100	0.01100	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200	0.01200
210	0.01200	0.01200	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300	0.01300
220	0.01300	0.01300	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400	0.01400
230	0.01400	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500
240	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01600	0.01700
250	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01700	0.01800	0.01800
260	0.01800	0.01800	0.01800	0.01800	0.01800	0.01800	0.01900	0.01900	0.01900	0.01900
270	0.01900	0.01900	0.01900	0.01900	0.02000	0.02000	0.02000	0.02000	0.02000	0.02000
280	0.02000	0.02000	0.02100	0.02100	0.02100	0.02100	0.02100	0.02100	0.02100	0.02100
290	0.02200	0.02200	0.02200	0.02200	0.02200	0.02200	0.02200	0.02200	0.02300	0.02300
300	0.02300	0.02300	0.02300	0.02300	0.02300	0.02300	0.02400	0.02400	0.02400	0.02400
310	0.02400	0.02400	0.02400	0.02500	0.02500	0.02500	0.02500	0.02500	0.02500	0.02500
320	0.02600	0.02600	0.02600	0.02600	0.02600	0.02600	0.02600	0.02600	0.02700	0.02700
330	0.02700	0.02700	0.02700	0.02700	0.02700	0.02800	0.02800	0.02800	0.02800	0.02800
340	0.02800	0.02800	0.02900	0.02900	0.02900	0.02900	0.02900	0.02900	0.02900	0.03000
350	0.03000	0.03000	0.03000	0.03000	0.03000	0.03000	0.03100	0.03100	0.03100	0.03100
360	0.03100	0.03100	0.03200	0.03200	0.03200	0.03200	0.03200	0.03200	0.03200	0.03300
370	0.03300	0.03300	0.03300	0.03300	0.03300	0.03400	0.03400	0.03400	0.03400	0.03400
380	0.03400	0.03400	0.03500	0.03500	0.03500	0.03500	0.03500	0.03500	0.03600	0.03600
390	0.03600	0.03600	0.03600	0.03600	0.03600	0.03700	0.03700	0.03700	0.03700	0.03700
400	0.03700	0.03800	0.03800	0.03800	0.03800	0.03800	0.03800	0.03900	0.03900	0.03900

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION MAXIMUM CONCENTRATIONS (ACUTE CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

ZINC

Hardness (mg/L)	Criterion Maximum Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.030	0.031	0.032	0.034	0.035	0.036	0.037	0.039	0.040	0.041
30	0.042	0.043	0.045	0.046	0.047	0.048	0.049	0.050	0.052	0.053
40	0.054	0.055	0.056	0.057	0.058	0.060	0.061	0.062	0.063	0.064
50	0.065	0.066	0.067	0.068	0.070	0.071	0.072	0.073	0.074	0.075
60	0.076	0.077	0.078	0.079	0.080	0.081	0.082	0.083	0.085	0.086
70	0.087	0.088	0.089	0.090	0.091	0.092	0.093	0.094	0.095	0.096
80	0.097	0.098	0.099	0.100	0.100	0.100	0.100	0.100	0.110	0.110
90	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.120	0.120
100	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.130	0.130
110	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.140
120	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.150
130	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
140	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
150	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
160	0.170	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
170	0.180	0.180	0.190	0.190	0.190	0.190	0.190	0.190	0.190	0.190
180	0.190	0.190	0.190	0.200	0.200	0.200	0.200	0.200	0.200	0.200
190	0.200	0.200	0.200	0.200	0.210	0.210	0.210	0.210	0.210	0.210
200	0.210	0.210	0.210	0.210	0.210	0.220	0.220	0.220	0.220	0.220
210	0.220	0.220	0.220	0.220	0.220	0.220	0.230	0.230	0.230	0.230
220	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.240	0.240
230	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.250
240	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
250	0.250	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260
260	0.260	0.260	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270
270	0.270	0.270	0.270	0.270	0.280	0.280	0.280	0.280	0.280	0.280
280	0.280	0.280	0.280	0.280	0.280	0.280	0.290	0.290	0.290	0.290
290	0.290	0.290	0.290	0.290	0.290	0.290	0.290	0.290	0.300	0.300
300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310
320	0.310	0.310	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320
330	0.320	0.320	0.320	0.320	0.330	0.330	0.330	0.330	0.330	0.330
340	0.330	0.330	0.330	0.330	0.330	0.330	0.340	0.340	0.340	0.340
350	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.340	0.350	0.350
360	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
370	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360
380	0.360	0.360	0.360	0.370	0.370	0.370	0.370	0.370	0.370	0.370
390	0.370	0.370	0.370	0.370	0.370	0.380	0.380	0.380	0.380	0.380
400	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.390	0.390

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.
3. Criteria do not apply to Sacramento River (and tributaries) above Hamilton City. (CFR131.38(b)(1) Footnote (x) to Table)

	m_A	b_A	CF(1)	CF(2)
Cadmium	1.128	-3.6867	1.136672	0.041838
Copper	0.9422	-1.700	0.960	0
Chromium (III)	0.8190	3.688	0.316	0
Lead	1.273	-1.460	1.46203	0.145712
Nickel	0.8460	2.255	0.998	0
Silver	1.72	-6.52	0.85	0
Zinc	0.8473	0.884	0.978	0

TABLE 3

Chronic (CCC) freshwater aquatic life criteria applied in the monitoring study for the Crystal Cove Development Project, as specified by the California Regional Water Quality Control Board, Santa Ana Region. Shown are calculated values of chronic freshwater quality criteria for the hardness-dependent dissolved trace metals cadmium, chromium III, copper, lead, nickel, silver and zinc, expressed in mg/L. Based on the EPA California Toxics Rule (USEPA, May 18, 2000). Criteria values are shown for each 1 mg/L increment of freshwater hardness in the table columns. Calculations provided by PBS&J, San Diego, December 8, 2000.

FRESHWATER AQUATIC LIFE CRITERION CONTINUOUS CONCENTRATIONS (CHRONIC CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

CADMIUM

Hardness (mg/L)	Criterion Continuous Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.00068	0.00070	0.00073	0.00075	0.00078	0.00080	0.00083	0.00085	0.00087	0.00089
30	0.00092	0.00094	0.00096	0.00098	0.00100	0.00100	0.00110	0.00110	0.00110	0.00110
40	0.00110	0.00120	0.00120	0.00120	0.00120	0.00120	0.00130	0.00130	0.00130	0.00130
50	0.00130	0.00140	0.00140	0.00140	0.00140	0.00140	0.00150	0.00150	0.00150	0.00150
60	0.00150	0.00160	0.00160	0.00160	0.00160	0.00160	0.00160	0.00170	0.00170	0.00170
70	0.00170	0.00170	0.00180	0.00180	0.00180	0.00180	0.00180	0.00180	0.00190	0.00190
80	0.00190	0.00190	0.00190	0.00190	0.00200	0.00200	0.00200	0.00200	0.00200	0.00210
90	0.00210	0.00210	0.00210	0.00210	0.00210	0.00220	0.00220	0.00220	0.00220	0.00220
100	0.00220	0.00230	0.00230	0.00230	0.00230	0.00230	0.00230	0.00240	0.00240	0.00240
110	0.00240	0.00240	0.00240	0.00240	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
120	0.00260	0.00260	0.00260	0.00260	0.00260	0.00260	0.00270	0.00270	0.00270	0.00270
130	0.00270	0.00270	0.00270	0.00280	0.00280	0.00280	0.00280	0.00280	0.00280	0.00290
140	0.00290	0.00290	0.00290	0.00290	0.00290	0.00290	0.00300	0.00300	0.00300	0.00300
150	0.00300	0.00300	0.00300	0.00310	0.00310	0.00310	0.00310	0.00310	0.00310	0.00320
160	0.00320	0.00320	0.00320	0.00320	0.00320	0.00320	0.00330	0.00330	0.00330	0.00330
170	0.00330	0.00330	0.00330	0.00340	0.00340	0.00340	0.00340	0.00340	0.00340	0.00340
180	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350	0.00350	0.00360	0.00360	0.00360
190	0.00360	0.00360	0.00360	0.00360	0.00370	0.00370	0.00370	0.00370	0.00370	0.00370
200	0.00370	0.00370	0.00380	0.00380	0.00380	0.00380	0.00380	0.00380	0.00380	0.00390
210	0.00390	0.00390	0.00390	0.00390	0.00390	0.00390	0.00400	0.00400	0.00400	0.00400
220	0.00400	0.00400	0.00400	0.00400	0.00410	0.00410	0.00410	0.00410	0.00410	0.00410
230	0.00410	0.00420	0.00420	0.00420	0.00420	0.00420	0.00420	0.00420	0.00420	0.00430
240	0.00430	0.00430	0.00430	0.00430	0.00430	0.00430	0.00430	0.00440	0.00440	0.00440
250	0.00440	0.00440	0.00440	0.00440	0.00450	0.00450	0.00450	0.00450	0.00450	0.00450
260	0.00450	0.00450	0.00460	0.00460	0.00460	0.00460	0.00460	0.00460	0.00460	0.00460
270	0.00470	0.00470	0.00470	0.00470	0.00470	0.00470	0.00470	0.00470	0.00480	0.00480
280	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00490	0.00490	0.00490	0.00490
290	0.00490	0.00490	0.00490	0.00490	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500
300	0.00500	0.00500	0.00510	0.00510	0.00510	0.00510	0.00510	0.00510	0.00510	0.00510
310	0.00520	0.00520	0.00520	0.00520	0.00520	0.00520	0.00520	0.00520	0.00530	0.00530
320	0.00530	0.00530	0.00530	0.00530	0.00530	0.00530	0.00540	0.00540	0.00540	0.00540
330	0.00540	0.00540	0.00540	0.00540	0.00540	0.00550	0.00550	0.00550	0.00550	0.00550
340	0.00550	0.00550	0.00550	0.00560	0.00560	0.00560	0.00560	0.00560	0.00560	0.00560
350	0.00560	0.00570	0.00570	0.00570	0.00570	0.00570	0.00570	0.00570	0.00570	0.00570
360	0.00580	0.00580	0.00580	0.00580	0.00580	0.00580	0.00580	0.00580	0.00590	0.00590
370	0.00590	0.00590	0.00590	0.00590	0.00590	0.00590	0.00590	0.00600	0.00600	0.00600
380	0.00600	0.00600	0.00600	0.00600	0.00600	0.00600	0.00610	0.00610	0.00610	0.00610
390	0.00610	0.00610	0.00610	0.00610	0.00620	0.00620	0.00620	0.00620	0.00620	0.00620
400	0.00620	0.00620	0.00620	0.00630	0.00630	0.00630	0.00630	0.00630	0.00630	0.00630

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION CONTINUOUS CONCENTRATIONS (CHRONIC CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

CHROMIUM (III)

Hardness (mg/L)	Criterion Continuous Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.048	0.050	0.052	0.053	0.055	0.057	0.059	0.061	0.063	0.065
30	0.066	0.068	0.070	0.072	0.074	0.075	0.077	0.079	0.081	0.082
40	0.084	0.086	0.087	0.089	0.091	0.093	0.094	0.096	0.098	0.099
50	0.100	0.100	0.100	0.110	0.110	0.110	0.110	0.110	0.110	0.120
60	0.120	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.130	0.130
70	0.130	0.130	0.140	0.140	0.140	0.140	0.140	0.140	0.150	0.150
80	0.150	0.150	0.150	0.150	0.150	0.160	0.160	0.160	0.160	0.160
90	0.160	0.160	0.170	0.170	0.170	0.170	0.170	0.170	0.180	0.180
100	0.180	0.180	0.180	0.180	0.180	0.190	0.190	0.190	0.190	0.190
110	0.190	0.190	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.210
120	0.210	0.210	0.210	0.210	0.210	0.210	0.220	0.220	0.220	0.220
130	0.220	0.220	0.220	0.220	0.230	0.230	0.230	0.230	0.230	0.230
140	0.230	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.250	0.250
150	0.250	0.250	0.250	0.250	0.250	0.250	0.260	0.260	0.260	0.260
160	0.260	0.260	0.260	0.270	0.270	0.270	0.270	0.270	0.270	0.270
170	0.270	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.290	0.290
180	0.290	0.290	0.290	0.290	0.290	0.290	0.300	0.300	0.300	0.300
190	0.300	0.300	0.300	0.310	0.310	0.310	0.310	0.310	0.310	0.310
200	0.310	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.330
210	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.340	0.340	0.340
220	0.340	0.340	0.340	0.340	0.340	0.350	0.350	0.350	0.350	0.350
230	0.350	0.350	0.350	0.360	0.360	0.360	0.360	0.360	0.360	0.360
240	0.360	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.380
250	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.390	0.390	0.390
260	0.390	0.390	0.390	0.390	0.390	0.400	0.400	0.400	0.400	0.400
270	0.400	0.400	0.400	0.410	0.410	0.410	0.410	0.410	0.410	0.410
280	0.410	0.410	0.420	0.420	0.420	0.420	0.420	0.420	0.420	0.420
290	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.440	0.440
300	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.450	0.450	0.450
310	0.450	0.450	0.450	0.450	0.450	0.460	0.460	0.460	0.460	0.460
320	0.460	0.460	0.460	0.470	0.470	0.470	0.470	0.470	0.470	0.470
330	0.470	0.470	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480
340	0.480	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.500
350	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.510	0.510
360	0.510	0.510	0.510	0.510	0.510	0.510	0.520	0.520	0.520	0.520
370	0.520	0.520	0.520	0.520	0.520	0.530	0.530	0.530	0.530	0.530
380	0.530	0.530	0.530	0.530	0.540	0.540	0.540	0.540	0.540	0.540
390	0.540	0.540	0.540	0.550	0.550	0.550	0.550	0.550	0.550	0.550
400	0.550	0.560	0.560	0.560	0.560	0.560	0.560	0.560	0.560	0.560

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION CONTINUOUS CONCENTRATIONS (CHRONIC CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

COPPER

Hardness (mg/L)	Criterion Continuous Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.0023	0.0024	0.0025	0.0026	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031
30	0.0032	0.0033	0.0034	0.0035	0.0036	0.0037	0.0037	0.0038	0.0039	0.0040
40	0.0041	0.0042	0.0043	0.0044	0.0044	0.0045	0.0046	0.0047	0.0048	0.0049
50	0.0050	0.0050	0.0051	0.0052	0.0053	0.0054	0.0055	0.0055	0.0056	0.0057
60	0.0058	0.0059	0.0060	0.0060	0.0061	0.0062	0.0063	0.0064	0.0064	0.0065
70	0.0066	0.0067	0.0068	0.0068	0.0069	0.0070	0.0071	0.0072	0.0072	0.0073
80	0.0074	0.0075	0.0076	0.0076	0.0077	0.0078	0.0079	0.0080	0.0080	0.0081
90	0.0082	0.0083	0.0083	0.0084	0.0085	0.0086	0.0086	0.0087	0.0088	0.0089
100	0.0090	0.0090	0.0091	0.0092	0.0093	0.0093	0.0094	0.0095	0.0096	0.0096
110	0.0097	0.0098	0.0099	0.0099	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
120	0.0100	0.0110	0.0110	0.0110	0.0110	0.0110	0.0110	0.0110	0.0110	0.0110
130	0.0110	0.0110	0.0110	0.0110	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120
140	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120	0.0130	0.0130
150	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130	0.0130
160	0.0130	0.0130	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140
170	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140	0.0150	0.0150	0.0150	0.0150
180	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
190	0.0150	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160	0.0160
200	0.0160	0.0160	0.0160	0.0160	0.0160	0.0170	0.0170	0.0170	0.0170	0.0170
210	0.0170	0.0170	0.0170	0.0170	0.0170	0.0170	0.0170	0.0170	0.0170	0.0170
220	0.0180	0.0180	0.0180	0.0180	0.0180	0.0180	0.0180	0.0180	0.0180	0.0180
230	0.0180	0.0180	0.0180	0.0180	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190
240	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190	0.0190	0.0200
250	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
260	0.0200	0.0200	0.0200	0.0200	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210
270	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0210	0.0220
280	0.0220	0.0220	0.0220	0.0220	0.0220	0.0220	0.0220	0.0220	0.0220	0.0220
290	0.0220	0.0220	0.0220	0.0220	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
300	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
310	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240
320	0.0240	0.0240	0.0240	0.0240	0.0240	0.0250	0.0250	0.0250	0.0250	0.0250
330	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
340	0.0250	0.0260	0.0260	0.0260	0.0260	0.0260	0.0260	0.0260	0.0260	0.0260
350	0.0260	0.0260	0.0260	0.0260	0.0260	0.0260	0.0270	0.0270	0.0270	0.0270
360	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270
370	0.0270	0.0270	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280
380	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.0290	0.0290
390	0.0290	0.0290	0.0290	0.0290	0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
400	0.0290	0.0290	0.0290	0.0290	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION CONTINUOUS CONCENTRATIONS (CHRONIC CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

LEAD

Hardness (mg/L)	Criterion Continuous Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.00042	0.00044	0.00047	0.00049	0.00052	0.00054	0.00057	0.00059	0.00061	0.00064
30	0.00066	0.00069	0.00071	0.00074	0.00076	0.00079	0.00081	0.00084	0.00087	0.00089
40	0.00092	0.00094	0.00097	0.00099	0.00100	0.00100	0.00110	0.00110	0.00110	0.00110
50	0.00120	0.00120	0.00120	0.00130	0.00130	0.00130	0.00130	0.00140	0.00140	0.00140
60	0.00140	0.00150	0.00150	0.00150	0.00150	0.00160	0.00160	0.00160	0.00160	0.00170
70	0.00170	0.00170	0.00180	0.00180	0.00180	0.00180	0.00190	0.00190	0.00190	0.00190
80	0.00200	0.00200	0.00200	0.00210	0.00210	0.00210	0.00210	0.00220	0.00220	0.00220
90	0.00220	0.00230	0.00230	0.00230	0.00240	0.00240	0.00240	0.00240	0.00250	0.00250
100	0.00250	0.00250	0.00260	0.00260	0.00260	0.00270	0.00270	0.00270	0.00270	0.00280
110	0.00280	0.00280	0.00280	0.00290	0.00290	0.00290	0.00300	0.00300	0.00300	0.00300
120	0.00310	0.00310	0.00310	0.00320	0.00320	0.00320	0.00320	0.00330	0.00330	0.00330
130	0.00330	0.00340	0.00340	0.00340	0.00350	0.00350	0.00350	0.00350	0.00360	0.00360
140	0.00360	0.00370	0.00370	0.00370	0.00370	0.00380	0.00380	0.00380	0.00380	0.00390
150	0.00390	0.00390	0.00400	0.00400	0.00400	0.00400	0.00410	0.00410	0.00410	0.00420
160	0.00420	0.00420	0.00420	0.00430	0.00430	0.00430	0.00430	0.00440	0.00440	0.00440
170	0.00450	0.00450	0.00450	0.00450	0.00460	0.00460	0.00460	0.00470	0.00470	0.00470
180	0.00470	0.00480	0.00480	0.00480	0.00490	0.00490	0.00490	0.00490	0.00500	0.00500
190	0.00500	0.00510	0.00510	0.00510	0.00510	0.00520	0.00520	0.00520	0.00520	0.00530
200	0.00530	0.00530	0.00540	0.00540	0.00540	0.00540	0.00550	0.00550	0.00550	0.00560
210	0.00560	0.00560	0.00560	0.00570	0.00570	0.00570	0.00580	0.00580	0.00580	0.00580
220	0.00590	0.00590	0.00590	0.00600	0.00600	0.00600	0.00600	0.00610	0.00610	0.00610
230	0.00620	0.00620	0.00620	0.00620	0.00630	0.00630	0.00630	0.00630	0.00640	0.00640
240	0.00640	0.00650	0.00650	0.00650	0.00650	0.00660	0.00660	0.00660	0.00670	0.00670
250	0.00670	0.00670	0.00680	0.00680	0.00680	0.00690	0.00690	0.00690	0.00690	0.00700
260	0.00700	0.00700	0.00710	0.00710	0.00710	0.00710	0.00720	0.00720	0.00720	0.00730
270	0.00730	0.00730	0.00730	0.00740	0.00740	0.00740	0.00750	0.00750	0.00750	0.00750
280	0.00760	0.00760	0.00760	0.00760	0.00770	0.00770	0.00770	0.00780	0.00780	0.00780
290	0.00780	0.00790	0.00790	0.00790	0.00800	0.00800	0.00800	0.00800	0.00810	0.00810
300	0.00810	0.00820	0.00820	0.00820	0.00820	0.00830	0.00830	0.00830	0.00840	0.00840
310	0.00840	0.00840	0.00850	0.00850	0.00850	0.00860	0.00860	0.00860	0.00860	0.00870
320	0.00870	0.00870	0.00870	0.00880	0.00880	0.00880	0.00890	0.00890	0.00890	0.00890
330	0.00900	0.00900	0.00900	0.00910	0.00910	0.00910	0.00910	0.00920	0.00920	0.00920
340	0.00930	0.00930	0.00930	0.00930	0.00940	0.00940	0.00940	0.00950	0.00950	0.00950
350	0.00950	0.00960	0.00960	0.00960	0.00970	0.00970	0.00970	0.00970	0.00980	0.00980
360	0.00980	0.00980	0.00990	0.00990	0.00990	0.01000	0.01000	0.01000	0.01000	0.01000
370	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
380	0.01000	0.01000	0.01000	0.01000	0.01000	0.01100	0.01100	0.01100	0.01100	0.01100
390	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100
400	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100	0.01100

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION CONTINUOUS CONCENTRATIONS (CHRONIC CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

NICKEL

Hardness (mg/L)	Criterion Continuous Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.013	0.014	0.014	0.015	0.016	0.016	0.017	0.017	0.018	0.018
30	0.019	0.019	0.020	0.020	0.021	0.021	0.022	0.022	0.023	0.023
40	0.024	0.024	0.025	0.025	0.026	0.026	0.027	0.027	0.028	0.028
50	0.029	0.029	0.030	0.030	0.031	0.031	0.032	0.032	0.033	0.033
60	0.034	0.034	0.035	0.035	0.036	0.036	0.037	0.037	0.038	0.038
70	0.038	0.039	0.039	0.040	0.040	0.041	0.041	0.042	0.042	0.043
80	0.043	0.044	0.044	0.044	0.045	0.045	0.046	0.046	0.047	0.047
90	0.048	0.048	0.048	0.049	0.049	0.050	0.050	0.051	0.051	0.052
100	0.052	0.052	0.053	0.053	0.054	0.054	0.055	0.055	0.056	0.056
110	0.056	0.057	0.057	0.058	0.058	0.059	0.059	0.059	0.060	0.060
120	0.061	0.061	0.062	0.062	0.062	0.063	0.063	0.064	0.064	0.065
130	0.065	0.065	0.066	0.066	0.067	0.067	0.067	0.068	0.068	0.069
140	0.069	0.070	0.070	0.070	0.071	0.071	0.072	0.072	0.072	0.073
150	0.073	0.074	0.074	0.075	0.075	0.075	0.076	0.076	0.077	0.077
160	0.077	0.078	0.078	0.079	0.079	0.079	0.080	0.080	0.081	0.081
170	0.081	0.082	0.082	0.083	0.083	0.083	0.084	0.084	0.085	0.085
180	0.086	0.086	0.086	0.087	0.087	0.088	0.088	0.088	0.089	0.089
190	0.090	0.090	0.090	0.091	0.091	0.092	0.092	0.092	0.093	0.093
200	0.093	0.094	0.094	0.095	0.095	0.095	0.096	0.096	0.097	0.097
210	0.097	0.098	0.098	0.099	0.099	0.099	0.100	0.100	0.100	0.100
220	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
230	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
240	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
250	0.110	0.110	0.110	0.110	0.110	0.110	0.120	0.120	0.120	0.120
260	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
270	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
280	0.120	0.120	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
290	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
300	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.140
310	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
320	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
330	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.150	0.150	0.150
340	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
350	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
360	0.150	0.150	0.150	0.150	0.160	0.160	0.160	0.160	0.160	0.160
370	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
380	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
390	0.160	0.160	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
400	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

FRESHWATER AQUATIC LIFE CRITERION CONTINUOUS CONCENTRATIONS (CHRONIC CRITERIA)
STATE OF CALIFORNIA (40 CFR 131.38)

ZINC

Hardness (mg/L)	Criterion Continuous Concentration (mg/L)									
	0	1	2	3	4	5	6	7	8	9
20	0.030	0.031	0.033	0.034	0.035	0.036	0.038	0.039	0.040	0.041
30	0.043	0.044	0.045	0.046	0.047	0.049	0.050	0.051	0.052	0.053
40	0.054	0.056	0.057	0.058	0.059	0.060	0.061	0.062	0.063	0.065
50	0.066	0.067	0.068	0.069	0.070	0.071	0.072	0.073	0.074	0.076
60	0.077	0.078	0.079	0.080	0.081	0.082	0.083	0.084	0.085	0.086
70	0.087	0.088	0.089	0.090	0.092	0.093	0.094	0.095	0.096	0.097
80	0.098	0.099	0.100	0.100	0.100	0.100	0.100	0.100	0.110	0.110
90	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.120	0.120	0.120
100	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.130	0.130	0.130
110	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.140	0.140
120	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.150	0.150
130	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.160	0.160
140	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.170
150	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
160	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
170	0.190	0.190	0.190	0.190	0.190	0.190	0.190	0.190	0.190	0.190
180	0.190	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
190	0.200	0.200	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
200	0.210	0.210	0.210	0.220	0.220	0.220	0.220	0.220	0.220	0.220
210	0.220	0.220	0.220	0.220	0.230	0.230	0.230	0.230	0.230	0.230
220	0.230	0.230	0.230	0.230	0.230	0.230	0.240	0.240	0.240	0.240
230	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.250	0.250	0.250
240	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.260	0.260
250	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260	0.260
260	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270	0.270
270	0.270	0.270	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280
280	0.280	0.280	0.280	0.290	0.290	0.290	0.290	0.290	0.290	0.290
290	0.290	0.290	0.290	0.290	0.290	0.300	0.300	0.300	0.300	0.300
300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.310	0.310	0.310
310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.320
320	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320
330	0.320	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330
340	0.330	0.330	0.330	0.340	0.340	0.340	0.340	0.340	0.340	0.340
350	0.340	0.340	0.340	0.340	0.340	0.350	0.350	0.350	0.350	0.350
360	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.360	0.360	0.360
370	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.370
380	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370
390	0.370	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.380
400	0.380	0.380	0.380	0.380	0.390	0.390	0.390	0.390	0.390	0.390

Note:
1. Water-effect ratio is assumed to be 1.
2. Criteria are expressed in terms of the dissolved fraction of the metal in the water column.

	m_C	b_C	CF(1)	CF(2)
Cadmium	0.7852	-2.715	1.101672	0.041838
Copper	0.8545	-1.702	0.960	0
Chromium (III)	0.8190	1.561	0.860	0
Lead	1.273	-4.705	1.46203	0.145712
Nickel	0.8460	0.0584	0.997	0
Silver	EPA has not published an aquatic life criterion value			
Zinc	0.8473	0.884	0.986	0

TABLE 4

Water quality objectives applied in the monitoring study for the Crystal Cove Development Project, as required by the California Regional Water Quality Control Board, Santa Ana Region. Shown are the objectives for ocean waters (expressed in µg/L and mg/L), specified by the California Ocean Plan (CSWRCB 1997). See footnote for details.

Parameter	Units	California Ocean Plan Water Quality Objectives [1]		
		6-month Median	Daily Maximum	Instantaneous Maximum
Arsenic	µg/L	8 (2)	32 (2)	80 (2)
Cadmium	µg/L	1 (2)	4 (2)	10 (2)
Hexavalent Chromium	µg/L	2 (2)	8 (2)	20 (2)
Copper	µg/L	3 (2)	12 (2)	30 (2)
Lead	µg/L	2 (2)	8 (2)	20 (2)
Mercury	µg/L	0.04 (2)	0.16 (2)	0.4 (2)
Nickel	µg/L	5 (2)	20 (2)	50 (2)
Selenium	µg/L	15 (2)	60 (2)	150 (2)
Silver	µg/L	0.7 (2)	2.8 (2)	7 (2)
Zinc	µg/L	20 (2)	80 (2)	200 (2)
Chlorine (Total residual)	µg/L	2	8	60
Ammonia (expressed as N)	µg/L	600	2400	6000
Total Nitrate-Nitrite (expressed as N)	µg/L	-	-	-
Chronic Toxicity	Tuc	-	-	-
Phenolic Compounds (non-chlorinated)	µg/L	30	120	300
Chlorinated phenolics	µg/L	1	4	10
Endosulfan	µg/L	0.009	0.018	0.027
Endrin	µg/L	0.002	0.004	0.006
Phosphorus (Total)	mg/L	-	-	-
pH	su	-	-	6 - 9

California Ocean Plan Criteria for total recoverable concentrations of trace metal expressed in mg/L

Parameter (2)	Daily Maximum	Instantaneous Maximum
Cadmium	0.004	0.010
Chromium	0.008	0.020
Copper	0.012	0.030
Lead	0.008	0.020
Nickel	0.020	0.050
Silver	0.0028	0.007
Zinc	0.080	0.200

(2) Expressed as total recoverable concentrations.

TABLE 5 A

Field data for dry-weather flow sampling on July 31, 2000, at Watershed and Surf Zone Stations, following irrigation during the night and early morning of July 30-31, 2000, in upstream areas of Los Trancos Canyon watershed. There was no dry-weather flow in Muddy canyon or Emerald Canyon.

DATE	TIME (hrs)	STATION	WATER TEMP (°C)	AIR TEMP (°C)	CLOUD COVER (%)	RUNOFF COLOR	WATER TURBIDITY	SURF Ht (ft)
7/31/00	0730	LTU	20	20	100	Lt Brown	None	
7/31/00	0800	LT	20	20	100	Clear	None	
7/31/00	0830	LT-1	18	19	100	Clear	None	2
7/31/00	0915	MCU	NO	RUNOFF	FLOW	AT	STATION	
7/31/00	0920	MC	NO	RUNOFF	FLOW	AT	STATION	
7/31/00	0930	MC-1	20	232	100		None	2
7/31/00	0950	ECU	NO	RUNOFF	FLOW	AT	STATION	
7/31/00	0955	EC	NO	RUNOFF	FLOW	AT	STATION	
7/31/00	1000	EC-1	20	23	100		None	2

TABLE 5 B

Current velocities of dry-weather flow measured during sampling in Los Trancos Canyon watershed on July 31, 2000. Mean velocity (ft/sec) is based on three replicate measurements, with range shown. Cross sectional dimensions of water flow path are indicated. For description of methods, see text.

Station LTU 0730 hrs

Mean flow velocity at Station = 0.94 ft/sec
Range: 0.8 – 1.0 ft/sec
Dimensions: Mean flow width = 30"
Maximum flow depth = 3"

Station LT 0910 hrs

Mean flow velocity at Station = 1.1 ft/sec
Range: 0.9 – 1.2 ft/sec
Dimensions: Mean flow width = 24"
Maximum flow depth = 3"

Station LT-1 0830 hrs

Flow over upper beach to surf zone
Mean flow velocity = 2.17 ft/sec
Range: 2.0 – 2.5 ft/sec
Dimensions: Mean flow width = 26"
Maximum flow depth = 2"

TABLE 6 A

Field data for dry-weather flow sampling on September 12, 2000, at Watershed and Surf Zone Stations, following irrigation during the night and early morning of September 11 - 12, 2000, in upstream areas of Los Trancos Canyon watershed. There was no dry-weather flow in Muddy canyon or Emerald Canyon.

DATE	TIME (hrs)	STATION	WATER TEMP (°C)	AIR TEMP (°C)	CLOUD COVER (%)	RUNOFF COLOR	WATER TURBIDITY	SURF Ht (ft)
9/12/00	0630	LTU	15	16	0	Clear	None	
9/12/00	0730	LT	16	13	0	Clear	None	
9/12/00	0745	LT-1	18	19	0	Clear	None	2
9/12/00	0810	MCU	NO	RUNOFF	FLOW	AT	STATION	
9/12/00	0815	MC	NO	RUNOFF	FLOW	AT	STATION	
9/12/00	0830	MC-1	18	26	0		None	2
9/12/00	0920	ECU	NO	RUNOFF	FLOW	AT	STATION	
9/12/00	0935	EC	NO	RUNOFF	FLOW	AT	STATION	
9/12/00	900	EC-1	18	22	0		None	2

TABLE 6 B

Current velocities of dry-weather flow measured during sampling in Los Trancos Canyon watershed on September 12, 2000. Mean velocity (ft/sec) is based on three replicate measurements, with range shown. Cross sectional dimensions of water flow path are indicated. For description of methods, see text.

Station LTU 0630 hrs
Mean flow velocity at Station = 0.61 ft/sec
Range: 0.8 – 1.0 ft/sec
Dimensions: Mean flow width = 48"
Maximum flow depth = 3"

Station LT 0730 hrs
Mean flow velocity at Station = 1.17 ft/sec
Range: 1.0 – 1.2 ft/sec
Dimensions: Mean flow width = 60"
Maximum flow depth = 2"

Station LT-1 0800 hrs
Flow over upper beach to surf zone
Mean flow velocity = 1.17 ft/sec
Range: 1.0 – 1.2 ft/sec
Dimensions: Mean flow width = 24"
Maximum flow depth = 2"

TABLE 7 A

Field data for dry-weather flow sampling on September 29, 2000, at Watershed and Surf Zone Stations, following irrigation during the night and early morning of September 28 - 29, 2000, in upstream areas of Los Trancos Canyon watershed. There was no dry-weather flow in Muddy canyon or Emerald Canyon.

DATE	TIME (hrs)	STATION	WATER TEMP (°C)	AIR TEMP (°C)	CLOUD COVER (%)	RUNOFF COLOR	WATER TURBIDITY	SURF Ht (ft)
9/29/00	0610	LTU	19	17	50	Clear	None	
9/29/00	0645	LT	20	19	50	Clear	None	
9/29/00	0715	LT-1	20	18	50	Clear	None	2
9/29/00	0750	MCU	NO	RUNOFF	FLOW	AT	STATION	
9/29/00	0755	MC	NO	RUNOFF	FLOW	AT	STATION	
9/29/00	0800	MC-1	19	21	50		None	2
9/29/00	0920	ECU	NO	RUNOFF	FLOW	AT	STATION	
9/29/00	0850	EC	NO	RUNOFF	FLOW	AT	STATION	
9/29/00	0820	EC-1	20	20	50		None	2

TABLE 7 B

Current velocities of dry-weather flow measured during sampling in Los Trancos Canyon watershed on September 29, 2000. Mean velocity (ft/sec) is based on three replicate measurements, with range shown. Cross sectional dimensions of water flow path are indicated. For description of methods, see text.

Station LTU 0610 hrs

Mean flow velocity at Station = 3.0 ft/sec
Range: 2.5 – 3.3 ft/sec
Dimensions: Mean flow width = 14"
Maximum flow depth = 5"

Station LT 0645 hrs

Mean flow velocity at Station = 1.2 ft/sec
Range: 1.1 – 1.2 ft/sec
Dimensions: Mean flow width = 6"
Maximum flow depth = 3"

Station LT-1 0715 hrs

Flow over upper beach to surf zone
Mean flow velocity = 1.0 ft/sec
Range: 1.0 – 1.1 ft/sec
Dimensions: Mean flow width = 5"
Maximum flow depth = 3"

TABLE 8 A

Salinities (ppt) measured at Surf Zone Stations LT-1, MC-1 and EC-1 during dry-weather sampling on July 31, 2000. Sampling followed irrigation of upstream locations in Los Trancos Canyon watershed during the preceding night and early morning hours of July 30-31, 2000. There was no dry-weather runoff flow in the Muddy Canyon and Emerald Canyon watersheds. Station locations are shown in Figure 1. Also shown is the percentage of mean normal, dry-weather salinity (33.3ppt) each value represents, based on non-storm data for the period May - June, 2000.

STATION	TIME (hrs)	SALINITY (ppt)	PERCENT OF NORMAL	SAMPLE DATE
LT-1	0830	33.27	100.0	7/31/00
MC-1	0845	33.26	100.0	7/31/00
EC-1	0900	33.25	100.0	7/31/00

TABLE 8 B

Salinities (ppt) measured at Surf Zone Stations LT-1, MC-1 and EC-1 during dry-weather sampling on September 12, 2000. Sampling followed irrigation of upstream locations in Los Trancos Canyon watershed during the preceding night and early morning hours of September 11-12, 2000. There was no dry-weather runoff flow in the Muddy Canyon and Emerald Canyon watersheds. Station locations are shown in Figure 1. Also shown is the percentage of mean normal, dry-weather salinity (33.4ppt) each value represents, based on non-storm data for the period June - July, 2000.

STATION	TIME (hrs)	SALINITY (ppt)	PERCENT OF NORMAL	SAMPLE DATE
LT-1	0800	33.35	100.0	9/12/00
MC-1	0830	33.37	100.0	9/12/00
EC-1	0900	33.38	100.0	9/12/00

TABLE 8 C

Salinities (ppt) measured at Surf Zone Stations LT-1, MC-1 and EC-1 during dry-weather sampling on September 29, 2000. Sampling followed irrigation of upstream locations in Los Trancos Canyon watershed during the preceding night and early morning hours of September 28- 29, 2000. There was no dry-weather runoff flow in the Muddy Canyon and Emerald Canyon watersheds. Station locations are shown in Figure 1. Also shown is the percentage of mean normal, dry-weather salinity (33.5ppt) each value represents, based on non-storm data for the period June - September, 2000.

STATION	TIME (hrs)	SALINITY (ppt)	PERCENT OF NORMAL	SAMPLE DATE
LT-1	0715	33.46	100.0	9/29/00
MC-1	0845	33.57	100.0	9/29/00
EC-1	0900	33.56	100.0	9/29/00

TABLE 9

Values of the Organophosphorus pesticides chlorpyrifos and diazinon determined by the high accuracy Enzyme-linked Immunosorbant Assay (ELISA) method for dry-weather runoff sampled at Station LT on September 12, 2000. Water sample was employed in acute and chronic toxicity testing of the daphniid crustacean *Ceriodaphnia dubia*

	Station LT	Units	Date	Time (hrs)
Chlorpyrifos	0.0171.	µg/L	9/12/00	0800
Diazinon	0.6534	µg/L	9/12/00	0800

TABLES 10 – 12

Water quality constituent data for dry-weather runoff on July 13, September 12, and September 29, 2000, shown separately for each watershed and surf zone station sampled. Laboratory reporting limits (RL) and detection limits (DL) are indicated. ND indicates that the constituent was not present at a concentration above the laboratory detection limit.

TABLE 10 A WATER QUALITY DATA FOR DRY WEATHER SAMPLING ON JULY 31, 2000

SAMPLE SITE	DATE	TIME	LAB SAMPLE ID
LTU	7/31/00	7:30 AM	IJG0910-01

ANALYTE	RESULT	RL	DL	UNITS
Total Dissolved Solids	4500	10	10	mg/l
Total Suspended Solids	400	10	10	mg/l
Hardness (as CaCO3)	2000	4.0	4.0	mg/l
Cadmium, Total	0.012	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	0.010	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	ND	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	0.023	0.010	0.0015	mg/l
Nickel, Dissolved	0.012	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	0.034	0.020	0.0042	mg/l
Zinc, Dissolved	ND	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	0.91	0.050	0.0074	mg/l
Phosphorus, Dissolved	NR	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	3.04	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 10 E WATER QUALITY DATA FOR DR. WEATHER SAMPLING ON JULY 31, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
LT	7/31/00	8:00 AM	IJG0910-02

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	1400	10	10	mg/l
Total Suspended Solids	430	10	10	mg/l
Hardness (as CaCO3)	490	4.0	4.0	mg/l
Cadmium, Total	0.0053	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper,Total	0.025	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	ND	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	0.017	0.010	0.0015	mg/l
Nickel, Dissolved	ND	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	0.10	0.020	0.0042	mg/l
Zinc, Dissolved	0.031	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	0.78	0.050	0.0074	mg/l
Phosphorus, Dissolved	NR	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	22	0.50	0.089	mg/l
Nitrate/Nitrite	3.1	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 10 C WATER QUALITY DATA FOR DRY WEATHER SAMPLING ON JULY 31, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
LT-1	7/31/00	8:30 AM	IJG0910-03

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	35000	10	10	mg/l
Total Suspended Solids	140	10	10	mg/l
Cadmium, Total	ND	0.010	0.0020	mg/l
Cadmium, Dissolved	ND	0.010	0.0020	mg/l
Chromium, Total	ND	0.010	0.0020	mg/l
Chromium, Dissolved	ND	0.010	0.0020	mg/l
Copper,Total	ND	0.020	0.0044	mg/l
Copper, Dissolved	ND	0.020	0.0044	mg/l
Lead, Total	ND	0.010	0.0026	mg/l
Lead, Dissolved	ND	0.010	0.0026	mg/l
Nickel, Total	ND	0.020	0.0030	mg/l
Nickel, Dissolved	ND	0.020	0.0030	mg/l
Silver, Total	ND	0.020	0.0020	mg/l
Silver, Dissolved	ND	0.020	0.0020	mg/l
Zinc, Total	ND	0.040	0.0084	mg/l
Zinc, Dissolved	ND	0.040	0.0084	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	ND	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	0.67	0.50	0.089	mg/l
Nitrate/Nitrite	2.02	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 10 D WATER QUALITY DATA FOR DRY WEATHER SAMPLING ON JULY 31, 2000

SAMPLE SITE	DATE	TIME	LAB SAMPLE ID
MC-1	7/31/00	9:30 AM	IJG0910-04

ANALYTE	RESULT	RL	DL	UNITS
Total Dissolved Solids	36000	10	10	mg/l
Total Suspended Solids	150	10	10	mg/l
Cadmium, Total	ND	0.010	0.0020	mg/l
Cadmium, Dissolved	ND	0.015	0.0030	mg/l
Chromium, Total	ND	0.010	0.0020	mg/l
Chromium,Dissolved	ND	0.015	0.0030	mg/l
Copper, Total	ND	0.020	0.0044	mg/l
Copper, Dissolved	ND	0.030	0.0066	mg/l
Lead, Total	ND	0.010	0.0026	mg/l
Lead, Dissolved	ND	0.015	0.0039	mg/l
Nickel, Total	ND	0.020	0.0030	mg/l
Nickel, Dissolved	ND	0.030	0.0045	mg/l
Silver, Total	ND	0.020	0.0020	mg/l
Silver, Dissolved	ND	0.030	0.0030	mg/l
Zinc, Total	ND	0.040	0.0084	mg/l
Zinc, Dissolved	ND	0.060	0.013	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	ND	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	0.84	0.50	0.089	mg/l
Nitrate/Nitrite	1.65	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 10 E WATER QUALITY DATA FOR DRY EATHER SAMPLING ON JULY 31, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
EC-1	7/31/00	10:00 AM	IJG0910-05

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	35000	10	10	mg/l
Total Suspended Solids	150	10	10	mg/l
Cadmium, Total	ND	0.010	0.0020	mg/l
Cadmium, Dissolved	ND	0.015	0.0030	mg/l
Chromium, Total	ND	0.010	0.0020	mg/l
Chromium, Dissolved	ND	0.015	0.0030	mg/l
Copper, Total	ND	0.020	0.0044	mg/l
Copper, Dissolved	ND	0.030	0.0066	mg/l
Lead, Total	ND	0.010	0.0026	mg/l
Lead, Dissolved	ND	0.015	0.0039	mg/l
Nickel, Total	ND	0.020	0.0030	mg/l
Nickel, Dissolved	ND	0.030	0.0045	mg/l
Silver, Total	ND	0.020	0.0020	mg/l
Silver, Dissolved	ND	0.030	0.0030	mg/l
Zinc, Total	ND	0.040	0.0084	mg/l
Zinc, Dissolved	ND	0.060	0.013	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	ND	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	0.56	0.50	0.089	mg/l
Nitrate/Nitrite	1.71	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 11 A WATER QUALITY DATA FOR DRY WEATHER SAMPLING ON SEPTEMBER 12, 2000

SAMPLE SITE	DATE	TIME	LAB SAMPLE ID
LTU	9/12/00	6:30 AM	IJI0347-03

ANALYTE	RESULT	RL	DL	UNITS
Total Dissolved Solids	2800	10	10	mg/l
Total Suspended Solids	240	10	10	mg/l
Hardness (as CaCO3)	1400	4.0	4.0	mg/l
Cadmium, Total	ND	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	0.025	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	ND	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	ND	0.010	0.0015	mg/l
Nickel, Dissolved	ND	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	0.043	0.020	0.0042	mg/l
Zinc, Dissolved	0.022	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	1.4	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	2.08	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	1.25	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 11 B WATER QUALITY DATA FOR DR[illegible]/EATHER SAMPLING ON SEPTEMBER 12, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
LT	9/12/00	7:30 AM	IJI0347-01

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	2500	10	10	mg/l
Total Suspended Solids	260	10	10	mg/l
Hardness (as CaCO3)	1300	4.0	4.0	mg/l
Cadmium, Total	0.0090	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	0.0052	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	0.069	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	0.012	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	0.024	0.010	0.0015	mg/l
Nickel, Dissolved	0.011	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	0.15	0.020	0.0042	mg/l
Zinc, Dissolved	0.089	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	1.1	0.050	0.0074	mg/l
Phosphorus, Dissolved	0.48	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	1.7	0.50	0.089	mg/l
Nitrate/Nitrite	4	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop.	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	1.25	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 11 C WATER QUALITY DATA FOR DR WEATHER SAMPLING ON SEPTEMBER 12, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
LT-1	9/12/00	8:00 AM	IJI0347-02

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	35000	10	10	mg/l
Total Suspended Solids	80	10	10	mg/l
Cadmium, Total	ND	0.010	0.0020	mg/l
Cadmium, Dissolved	ND	0.010	0.0020	mg/l
Chromium, Total	ND	0.010	0.0020	mg/l
Chromium, Dissolved	ND	0.010	0.0020	mg/l
Copper, Total	ND	0.020	0.0044	mg/l
Copper, Dissolved	ND	0.020	0.0044	mg/l
Lead, Total	ND	0.010	0.0026	mg/l
Lead, Dissolved	ND	0.010	0.0026	mg/l
Nickel, Total	ND	0.020	0.0030	mg/l
Nickel, Dissolved	ND	0.020	0.0030	mg/l
Silver, Total	ND	0.020	0.0020	mg/l
Silver, Dissolved	ND	0.020	0.0020	mg/l
Zinc, Total	ND	0.040	0.0084	mg/l
Zinc, Dissolved	ND	0.040	0.0084	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	ND	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	1.1	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	1.25	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 11 D WATER QUALITY DATA FOR DRY WEATHER SAMPLING ON SEPTEMBER 12, 2000

SAMPLE SITE	DATE	TIME	LAB SAMPLE ID
MC-1	9/12/00	8:30 AM	IJI0347-04

ANALYTE	RESULT	RL	DL	UNITS
Total Dissolved Solids	35000	10	10	mg/l
Total Suspended Solids	88	10	10	mg/l
Cadmium,Total	ND	0.010	0.0020	mg/l
Cadmium, Dissolved	ND	0.010	0.0020	mg/l
Chromium,Total	ND	0.010	0.0020	mg/l
Chromium, Dissolved	ND	0.010	0.0020	mg/l
Copper, Total	ND	0.020	0.0044	mg/l
Copper, Dissolved	ND	0.020	0.0044	mg/l
Lead, Total	ND	0.010	0.0026	mg/l
Lead, Dissolved	ND	0.010	0.0026	mg/l
Nickel, Total	ND	0.020	0.0030	mg/l
Nickel, Dissolved	ND	0.020	0.0030	mg/l
Silver, Total	ND	0.020	0.0020	mg/l
Silver, Dissolved	ND	0.020	0.0020	mg/l
Zinc, Total	ND	0.040	0.0084	mg/l
Zinc, Dissolved	ND	0.040	0.0084	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	0.055	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	2.43	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	1.25	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0 150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 11 E WATER QUALITY DATA FOR DR VEATHER SAMPLING ON SEPTEMBER 12, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
EC-1	9/12/00	9:00 AM	IJI0347-05

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	35000	10	10	mg/l
Total Suspended Solids	98	10	10	mg/l
Cadmium, Total	ND	0.010	0.0020	mg/l
Cadmium, Dissolved	ND	0.010	0.0020	mg/l
Chromium, Total	ND	0.010	0.0020	mg/l
Chromium, Dissolved	ND	0.010	0.0020	mg/l
Copper, Total	ND	0.020	0.0044	mg/l
Copper, Dissolved	ND	0.020	0.0044	mg/l
Lead, Total	ND	0.010	0.0026	mg/l
Lead, Dissolved	ND	0.010	0.0026	mg/l
Nickel, Total	ND	0.020	0.0030	mg/l
Nickel, Dissolved	ND	0.020	0.0030	mg/l
Silver, Total	ND	0.020	0.0020	mg/l
Silver, Dissolved	ND	0.020	0.0020	mg/l
Zinc, Total	ND	0.040	0.0084	mg/l
Zinc, Dissolved	ND	0.040	0.0084	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	ND	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	1.1	0.50	0.089	mg/l
Nitrate/Nitrite	2.67	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	1.25	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 12 A WATER QUALITY DATA FOR DR' /EATHER SAMPLING ON SEPTEMBER 29, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
LTU	9/29/00	6:10 AM	IJI0989-01

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	4100	10	10	mg/l
Total Suspended Solids	18	10	10	mg/l
Hardness (as CaCO3)	2200	4.0	4.0	mg/l
Cadmium, Total	ND	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	ND	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	ND	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	0.016	0.010	0.0015	mg/l
Nickel, Dissolved	0.014	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	ND	0.020	0.0042	mg/l
Zinc, Dissolved	ND	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	ND	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	5	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 12 B WATER QUALITY DATA FOR DR' 'EATHER SAMPLING ON SEPTEMBER 29, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
LT	9/29/00	6:45 AM	IJ10989-02

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	2600	10	10	mg/l
Total Suspended Solids	20	10	10	mg/l
Hardness (as CaCO3)	1300	4.0	4.0	mg/l
Cadmium, Total	ND	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	0.014	0.010	0.0022	mg/l
Copper, Dissolved	0.013	0.010	0.0022	mg/l
Lead, Total	ND	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	0.014	0.010	0.0015	mg/l
Nickel, Dissolved	0.014	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	0.044	0.020	0.0042	mg/l
Zinc, Dissolved	0.043	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	1.0	0.050	0.0074	mg/l
Phosphorus, Dissolved	1.1	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	8.5	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 12 C WATER QUALITY DATA FOR DRY WEATHER SAMPLING ON SEPTEMBER 29, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
LT-1	9/29/00	7:15 AM	IJI0989-03

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	34000	10	10	mg/l
Total Suspended Solids	93	10	10	mg/l
Hardness (as CaCO3)	6200	4.0	4.0	mg/l
Cadmium, Total	ND	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	ND	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	ND	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	ND	0.010	0.0015	mg/l
Nickel, Dissolved	ND	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	ND	0.020	0.0042	mg/l
Zinc, Dissolved	ND	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	0.77	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	4.5	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 12 D WATER QUALITY DATA FOR DRY WEATHER SAMPLING ON SEPTEMBER 29, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
MC-1	9/29/00	8:00 AM	IJI0989-05

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	35000	10	10	mg/l
Total Suspended Solids	120	10	10	mg/l
Hardness (as CaCO3)	6200	4.0	4.0	mg/l
Cadmium, Total	ND	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	0.011	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	ND	0.005	0.0013	mg/l
Lead, Dissolved	0.0062	0.005	0.0013	mg/l
Nickel, Total	ND	0.010	0.0015	mg/l
Nickel, Dissolved	ND	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	ND	0.020	0.0042	mg/l
Zinc, Dissolved	ND	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus, Total	0.078	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	4.4	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLE 12 E WATER QUALITY DATA FOR DRY EATHER SAMPLING ON SEPTEMBER 29, 2000

SAMPLE SITE	*DATE*	*TIME*	*LAB SAMPLE ID*
EC-1	9/29/00	8:30 AM	IJI0989-04

ANALYTE	*RESULT*	*RL*	*DL*	*UNITS*
Total Dissolved Solids	35000	10	10	mg/l
Total Suspended Solids	98	10	10	mg/l
Hardness (as CaCO3)	6200	4.0	4.0	mg/l
Cadmium, Total	ND	0.005	0.0010	mg/l
Cadmium, Dissolved	ND	0.005	0.0010	mg/l
Chromium, Total	ND	0.005	0.0010	mg/l
Chromium, Dissolved	ND	0.005	0.0010	mg/l
Copper, Total	0.013	0.010	0.0022	mg/l
Copper, Dissolved	ND	0.010	0.0022	mg/l
Lead, Total	0.0058	0.005	0.0013	mg/l
Lead, Dissolved	ND	0.005	0.0013	mg/l
Nickel, Total	ND	0.010	0.0015	mg/l
Nickel, Dissolved	ND	0.010	0.0015	mg/l
Silver, Total	ND	0.010	0.0010	mg/l
Silver, Dissolved	ND	0.010	0.0010	mg/l
Zinc, Total	ND	0.020	0.0042	mg/l
Zinc, Dissolved	ND	0.020	0.0042	mg/l
Oil & Grease	ND	1.0	0.094	mg/l
Phosphorus	ND	0.050	0.0074	mg/l
Phosphorus, Dissolved	ND	0.050	0.0074	mg/l
Total Kjeldahl Nitrogen	ND	0.50	0.089	mg/l
Nitrate/Nitrite	7.5	0.05	0.05	mg/l
Azinphos methyl	ND	1.00	0.330	ug/l
Bolstar	ND	0.500	0.130	ug/l
Chlorpyrifos	ND	0.500	0.280	ug/l
Coumaphos	ND	1.00	0.210	ug/l
Demeton	ND	0.500	0.220	ug/l
Diazinon	ND	0.500	0.160	ug/l
Dichlorvos	ND	0.500	0.110	ug/l
Disulfoton	ND	0.500	0.150	ug/l
EPN	ND	0.500	0.190	ug/l
Ethion	ND	0.500	0.150	ug/l
Ethoprop	ND	0.500	0.130	ug/l
Fensulfothion	ND	0.500	0.320	ug/l
Fenthion	ND	0.500	0.100	ug/l
Malathion	ND	0.500	0.250	ug/l
Merphos	ND	0.500	0.400	ug/l
Mevinphos	ND	0.500	0.330	ug/l
Monocrotophos	ND	0.500	0.0600	ug/l
Naled	ND	1.00	0.220	ug/l
Parathion-ethyl	ND	0.500	0.150	ug/l
Parathion-methyl	ND	0.500	0.130	ug/l
Phorate	ND	0.500	0.140	ug/l
Ronnel	ND	0.500	0.120	ug/l
Stirophos	ND	1.00	0.140	ug/l
Sulfotep	ND	0.500	0.240	ug/l
Tokuthion (Prothiofos)	ND	0.500	0.140	ug/l
Trichloronate	ND	0.500	0.130	ug/l

TABLES 13 – 15

Water quality constituent data for dry-weather runoff on July 31, September 12, and September 29, 2000, shown in comparative format for all stations sampled on a given date. ND indicates that the constituent was not present at a concentration above the laboratory detection limit.

TABLE 13 WATER QUALITY DATA FOR DRY-WEATHER SAMPLING ON JULY 31, 2000

ANALYTE	LTU (7:30 AM)	LT (8:00 AM)	LT-1 (8:30 AM)	MC-1 (9:30 AM)	EC-1 (10:00 AM)
Total Dissolved Solids	4500	1400	35000	36000	35000
Total Suspended Solids	400	430	140	150	150
Hardness (as CaCO3)	2000	490			
Cadmium, Total	0.012	0.0053	ND	ND	ND
Cadmium, Dissolved	ND	ND	ND	ND	ND
Chromium, Total	ND	ND	ND	ND	ND
Chromium,Dissolved	ND	ND	ND	ND	ND
Copper, Total	0.01	0.025	ND	ND	ND
Copper, Dissolved	ND	ND	ND	ND	ND
Lead, Total	ND	ND	ND	ND	ND
Lead, Dissolved	ND	ND	ND	ND	ND
Nickel, Total	0.023	0.017	ND	ND	ND
Nickel, Dissolved	0.012	ND	ND	ND	ND
Silver, Total	ND	ND	ND	ND	ND
Silver, Dissolved	ND	ND	ND	ND	ND
Zinc, Total	0.034	0.1	ND	ND	ND
Zinc, Dissolved	ND	0.031	ND	ND	ND
Oil & Grease	ND	ND	ND	ND	ND
Phosphorus, Total	0.91	0.78	ND	ND	ND
Phosphorus, Dissolved	NR	NR	ND	ND	ND
Total Kjeldahl Nitrogen	ND	22	0.67	0.84	0.56
Nitrate/Nitrite	3.04	3.1	2.02	1.65	1.71
Azinphos methyl	ND	ND	ND	ND	ND
Bolstar	ND	ND	ND	ND	ND
Chlorpyrifos	ND	ND	ND	ND	ND
Coumaphos	ND	ND	ND	ND	ND
Demeton	ND	ND	ND	ND	ND
Diazinon	ND	ND	ND	ND	ND
Dichlorvos	ND	ND	ND	ND	ND
Disulfoton	ND	ND	ND	ND	ND
EPN	ND	ND	ND	ND	ND
Ethion	ND	ND	ND	ND	ND
Ethoprop	ND	ND	ND	ND	ND
Fensulfothion	ND	ND	ND	ND	ND
Fenthion	ND	ND	ND	ND	ND
Malathion	ND	ND	ND	ND	ND
Merphos	ND	ND	ND	ND	ND
Mevinphos	ND	ND	ND	ND	ND
Monocrotophos	ND	ND	ND	ND	ND
Naled	ND	ND	ND	ND	ND
Parathion-ethyl	ND	ND	ND	ND	ND
Parathion-methyl	ND	ND	ND	ND	ND
Phorate	ND	ND	ND	ND	ND
Ronnel	ND	ND	ND	ND	ND
Stirophos	ND	ND	ND	ND	ND
Sulfotep	ND	ND	ND	ND	ND
Tokuthion (Prothiofos)	ND	ND	ND	ND	ND
Trichloronate	ND	ND	ND	ND	ND

TABLE 14 WATER QUALITY DATA FOR DRY-WEATHER SAMPLING ON SEPTEMBER 12, 2000

ANALYTE	LTU (6:30 AM)	LT (7:30 AM)	LT-1 (8:00 AM)	MC-1 (8:30 AM)	EC-1 (9:00 AM)
Total Dissolved Solids	2800	2500	35000	35000	35000
Total Suspended Solids	240	260	80	88	98
Hardness (as CaCO3)	1400	1300			
Cadmium,Total	ND	0.009	ND	ND	ND
Cadmium, Dissolved	ND	ND	ND	ND	ND
Chromium,Total	ND	0.0052	ND	ND	ND
Chromium, Dissolved	ND	ND	ND	ND	ND
Copper, Total	0.025	0.069	ND	ND	ND
Copper, Dissolved	ND	ND	ND	ND	ND
Lead, Total	ND	0.012	ND	ND	ND
Lead, Dissolved	ND	ND	ND	ND	ND
Nickel, Total	ND	0.024	ND	ND	ND
Nickel, Dissolved	ND	0.011	ND	ND	ND
Silver, Total	ND	ND	ND	ND	ND
Silver, Dissolved	ND	ND	ND	ND	ND
Zinc, Total	0.043	0.15	ND	ND	ND
Zinc, Dissolved	0.022	0.089	ND	ND	ND
Oil & Grease	ND	ND	ND	ND	ND
Phosphorus, Total	1.4	1.1	ND	0.055	ND
Phosphorus, Dissolved	ND	0.48	ND	ND	ND
Total Kjeldahl Nitrogen	ND	1.7	ND	ND	1.1
Nitrate/Nitrite	2.08	4	1.1	2.43	2.67
Azinphos methyl	ND	ND	ND	ND	ND
Bolstar	ND	ND	ND	ND	ND
Chlorpyrifos	ND	ND	ND	ND	ND
Coumaphos	ND	ND	ND	ND	ND
Demeton	ND	ND	ND	ND	ND
Diazinon	ND	ND	ND	ND	ND
Dichlorvos	ND	ND	ND	ND	ND
Disulfoton	ND	ND	ND	ND	ND
EPN	ND	ND	ND	ND	ND
Ethion	ND	ND	ND	ND	ND
Ethoprop	ND	ND	ND	ND	ND
Fensulfothion	ND	ND	ND	ND	ND
Fenthion	ND	ND	ND	ND	ND
Malathion	ND	ND	ND	ND	ND
Merphos	ND	ND	ND	ND	ND
Mevinphos	ND	ND	ND	ND	ND
Monocrotophos	ND	ND	ND	ND	ND
Naled	ND	ND	ND	ND	ND
Parathion-ethyl	ND	ND	ND	ND	ND
Parathion-methyl	ND	ND	ND	ND	ND
Phorate	ND	ND	ND	ND	ND
Ronnel	ND	ND	ND	ND	ND
Stirophos	ND	ND	ND	ND	ND
Sulfotep	ND	ND	ND	ND	ND
Tokuthion (Prothiofos)	ND	ND	ND	ND	ND
Trichloronate	ND	ND	ND	ND	ND

TABLE 15 WATER QUALITY DATA FOR DRY-WEATHER SAMPLING ON SEPTEMBER 29, 2000

ANALYTE	LTU (6:10 AM)	LT (6:45 AM)	LT-1 (7:15 AM)	MC-1 (8:00 AM)	EC-1 (8:30 AM)
Total Dissolved Solids	4100	2600	34000	35000	35000
Total Suspended Solids	18	20	93	120	98
Hardness (as CaCO3)	2200	1300	6200	6200	6200
Cadmium, Total	ND	ND	ND	ND	ND
Cadmium, Dissolved	ND	ND	ND	ND	ND
Chromium, Total	ND	ND	ND	ND	ND
Chromium, Dissolved	ND	ND	ND	ND	ND
Copper, Total	ND	0.014	ND	0.011	0.013
Copper, Dissolved	ND	0.013	ND	ND	ND
Lead, Total	ND	ND	ND	ND	0.0058
Lead, Dissolved	ND	ND	ND	0.0062	ND
Nickel, Total	0.016	0.014	ND	ND	ND
Nickel, Dissolved	0.014	0.014	ND	ND	ND
Silver, Total	ND	ND	ND	ND	ND
Silver, Dissolved	ND	ND	ND	ND	ND
Zinc, Total	ND	0.044	ND	ND	ND
Zinc, Dissolved	ND	0.043	ND	ND	ND
Oil & Grease	ND	ND	ND	ND	ND
Phosphorus, Total	ND	1	0.77	0.078	ND
Phosphorus, Dissolved	ND	1.1	ND	ND	ND
Total Kjeldahl Nitrogen	ND	ND	ND	ND	ND
Nitrate/Nitrite	5	8.5	4.5	4.4	7.5
Azinphos methyl	ND	ND	ND	ND	ND
Bolstar	ND	ND	ND	ND	ND
Chlorpyrifos	ND	ND	ND	ND	ND
Coumaphos	ND	ND	ND	ND	ND
Demeton	ND	ND	ND	ND	ND
Diazinon	ND	ND	ND	ND	ND
Dichlorvos	ND	ND	ND	ND	ND
Disulfoton	ND	ND	ND	ND	ND
EPN	ND	ND	ND	ND	ND
Ethion	ND	ND	ND	ND	ND
Ethoprop	ND	ND	ND	ND	ND
Fensulfothion	ND	ND	ND	ND	ND
Fenthion	ND	ND	ND	ND	ND
Malathion	ND	ND	ND	ND	ND
Merphos	ND	ND	ND	ND	ND
Mevinphos	ND	ND	ND	ND	ND
Monocrotophos	ND	ND	ND	ND	ND
Naled	ND	ND	ND	ND	ND
Parathion-ethyl	ND	ND	ND	ND	ND
Parathion-methyl	ND	ND	ND	ND	ND
Phorate	ND	ND	ND	ND	ND
Ronnel	ND	ND	ND	ND	ND
Stirophos	ND	ND	ND	ND	ND
Sulfotep	ND	ND	ND	ND	ND
Tokuthion (Prothiofos)	ND	ND	ND	ND	ND
Trichloronate	ND	ND	ND	ND	ND

TABLE 16

Indicator data for total coliforms, *E. Coli* (fecal coliforms) and enterococci obtained by the Environmental Health Division Bacteriological Monitoring Program of the Orange County Health Care Agency. Data are shown for the period June 20 – October 17, 2000. Sampling station locations in creeks and in the surf zone are shown in Figure 2. Data are expressed as most probable number (MPN) per 100 ml sample.

EXHIBIT 1

Results and interpretation of toxicity testing employing the dry-weather runoff sample of September 12, 2000, taken at Station LT. Report prepared by the Bioassay Laboratory of Ogden Environmental and Energy Services, Inc., San Diego, CA. Complete laboratory QA/QC documentation of these results is included.

Ogden Environmental and Energy Services Company, Inc.

Bioassay Laboratory
5550 Morehouse Drive, Suite B
San Diego, CA 92121
(858) 458-9044

BIOASSAY REPORT

Crystal Cove Monitoring Project

to

Dr. Richard Ford

On behalf of The Irvine Company
4204 Point Loma Avenue
San Diego, CA 92107

September 12, 2000 Dry Weather Monitoring

Prepared: 9 October 2000

Verification of laboratory results: 10 October 2000

INTRODUCTION

Acute and chronic bioassays using the freshwater cladoceran *Ceriodaphnia dubia* (*C. dubia*) were performed using dry weather flow samples collected from Los Trancos Canyon in Newport Coast, California. Testing was undertaken as part of the Crystal Cove Monitoring Study. Sample collection and transport were coordinated under the supervision of Dr. Richard Ford. The test series was conducted between September 13 and 20, 2000 at the Ogden Bioassay Laboratory in San Diego, California. The sample tested during this period was identified as LT.

METHODS AND MATERIALS

Materials and methods used for *C. dubia* acute and chronic testing during this period were identical to those described in the monitoring report dated January 26, 2000. A summary of final results for the samples received September 12, 2000 is outlined in this report. Test specifications and results are listed in Table 1.

RESULTS

Raw test data and statistical summaries for acute survival and chronic survival and reproduction are contained in Appendix A.

Results for both acute and chronic reference toxicant tests were within internal laboratory control chart limits (± 2 sd).

Ceriodaphnia dubia - Acute

Complete mortality was observed at the highest concentration tested. Mean survival in the controls (100 percent) exceeded the EPA acceptability criterion of 90 percent, therefore this test was declared valid. An LC50 value of 70.7 was calculated for these data.

Ceriodaphnia dubia - Chronic

Fisher's Exact Test indicated significant differences in survival data between the control and the 50 and 100 percent concentration data for Sample LT. A comparison of reproduction data similarly indicated statistically significant differences between the control and 50 and 100 percent sample data. The no observed effect concentration

(NOEC) value for both survival and reproduction was 25 percent sample. The LC50 and EC50 values for survival and reproduction endpoints were 33.0 and 34.7, respectively.

Reproduction in the controls exceeded 15 young per original female and control survival was ≥80 percent (as are required by the EPA protocol), therefore, these tests were declared valid.

Summary Table 1. Sample LT Collected September 12, 2000

Sample Information

Sample Date:	September 12, 2000
Sample Time:	0730
Laboratory Receipt Date:	September 12, 2000
Test Material Matrix:	Dry weather runoff
Sampling Method:	Grab
Sample Container Size:	4-liter poly cubitainers

Toxicity Testing Specifications

Ogden Test ID Nos.:	0009-056 (acute); 0009-057 (chronic)
Test Series Initiation Date:	September 13, 2000
Test Series Termination Date:	September 20, 2000
Test Organism:	*Ceriodaphnia dubia*
Test Organism Source:	Odgen in-house culture
Acute Organism Age:	< 24 hrs
Chronic Organism Age:	< 24 hrs
Dilution Water:	EPA 8:2 (DI and Perrier)
Test Concentrations:	100, 50, 25, 12.5, and 6.25% sample
Protocol Used:	EPA 1993 (Acute); EPA 1989 (Chronic)
Statistical Analysis Software:	TOXCALC, version 5.0

Toxicity Testing Results Summary – *C. dubia*

Sample: LT 9/12/00

Endpoint	Control (% surv.)	100% Sample (% surv.)	NOEC (% sample)	EC/LC50 (% sample)
Acute Survival	100	0*	50*	70.7
Chronic Survival	100	0*	25*	33.0
	Mean # of Neonates			
	Control	100% Sample		
Chronic Reproduction	34.6	0.0*	25*	34.7

* statistically significantly difference observed

REFERENCES

EPA. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. EPA/600/4-90/027F, August 1993.

EPA. 1994. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Third Edition; EPA/600/4-91/002, July 1994.

Tidepool Scientific Software, 1992-1994. TOXCALC Comprehensive Toxicity Data Analysis and Database Software, Version 5.0.

Appendix A

Test Data and Statistical Summaries

C. dubia **Acute – Sample LT**

Daphnia Acute Survival Bioassay-48 Hr [illegible]vival

Start Date:	09/13/2000	Test ID:	0009-057	Sample ID:	IRVINE CO - ID:LT
End Date:	09/15/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	09/12/2000	Protocol:	EPAA 91-EPA Acute	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4
L-Lab Control	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000

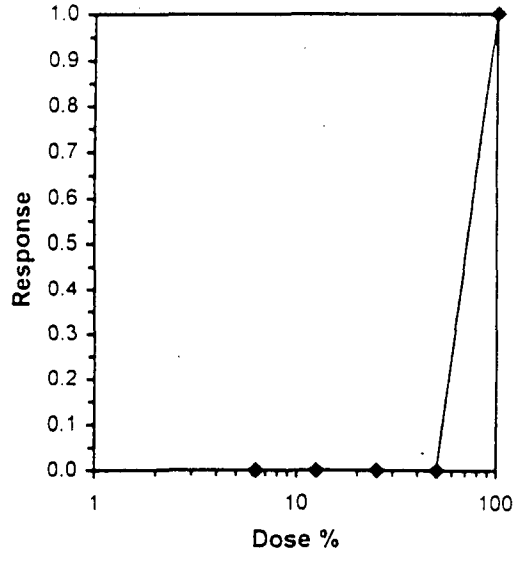
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
L-Lab Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4			0	20
6.25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
12.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
25	1.0000	1.0000	1.3503	1.3453	1.3652	0.739	4	20.00	10.00	0	21
50	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00	0	20
100	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4			20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.5089	0.868	2.79623	11.6732
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	50	100	70.7107	2

Graphical Method

Trim Level	EC50
0.0%	70.711
	70.711



 Reviewed by: BCS 10/04/

Daphnia Acute Survival Bioassay-48 Hr Survival

Start Date:	09/13/2000	Test ID:	0009-057	Sample ID:	IRVINE CO -1D: CT
End Date:	09/15/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	09/12/2000	Protocol:	EPAA 91-EPA Acute	Test Species:	CD-Ceriodaphnia dubia

Comments:

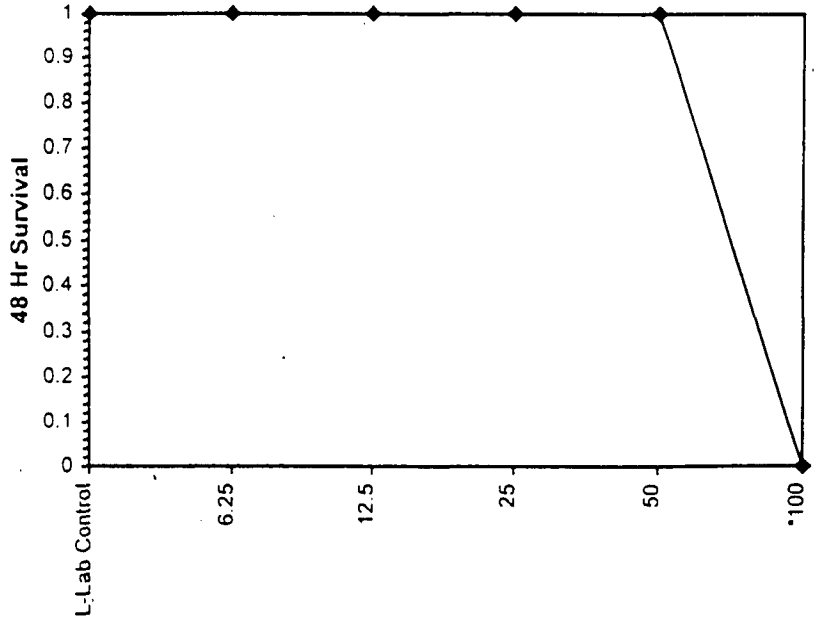
Conc-%	1	2	3	4
L-Lab Control	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
L-Lab Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4		
6.25	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
12.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
25	1.0000	1.0000	1.3503	1.3453	1.3652	0.739	4	20.00	10.00
50	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	18.00	10.00
*100	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.46508	0.884	3.02059	13.9892
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	50	100	70.7107	2

Dose-Response Plot



ToxCalc v5.0

Reviewed by: BCS 10/04/0

Freshwater Acute

48 Hour Toxicity Test Data Sheet - Ogden Bioassay Laboratory

Client: Irvine Co.
Sample ID: LT
Contact: Dr. Ford
Test #: 0009-057

Start Date & Time: 9/13/00 1400
End Date & Time: ~~1400~~ 1400 9/15/00
Test Organisms: Ceriodaphnia dubia
Test Protocol: EPA 91 Acute

Concentration or Percent	Rep	Number of Live Organisms			Dissolved Oxygen (mg/L)			pH (units)			Conductivity (µmhos-cm)			Temperature (°C)			Percent Survival
		0	24	48	0	24	48	0	24	48	0	24	48	0	24	48	
CONTROL	A	5	5	5	7.7	–	8.1	7.92	–	8.35	190 ~~255~~	–	260	24.7	24.3	24.1	100
	B	5	5	5													100
	C	5	5	5													100
	D	5	5	5													100
6.25%	A	5	5	5	7.6	–	8.1	7.71	–	8.45	444	–	443	24.7	24.3	24.1	100
	B	5	5	5													100
	C	5	5	5													100
	D	5	5	5													100
12.5%	A	5	5	5	7.8	–	8.1	7.72	–	8.49	735	–	702	24.7	24.3	24.1	100
	B	5	5	5													100
	C	5	5	5													100
	D	5	5	5													100
Technician Initials		MB	JR	JR													

Conc.	Alkalinity* *(mg/L as $CaCO_3$)	Hardness*	Chlorine Resid. (mg/L)
Control	101	74	ND
Highest conc.	760	1190	0.04

Sample Description: Yellowish tint, cloudy, some debri

Comments: 0 hrs:
24 hrs.
48 hrs.

Reviewed: BCS 10/04/00

QA check: JC 9/27/00

Ogden Bioassay Laboratory
5550 Morehouse Dr., Suite B
San Diego, CA 92121
(858) 458-9044

Freshwater Acute

48 Hour Toxicity Test Data Sheet - Ogden Bioassay Laboratory

Client: IRVINE CO.
Sample ID: LT
Contact: Dr. Ford
Test #: 0009-057

Start Date & Time: 9-13-00 1400
End Date & Time: 9/15/00 1400
Test Organisms: C. dubia
Test Protocol: EPA 91 Acute

Concentration or Percent	Rep	Number of Live Organisms			Dissolved Oxygen (mg/L)			pH (units)			Conductivity (µmhos-cm)			Temperature (°C)			Percent Survival
		0	24	48	0	24	48	0	24	48	0	24	48	0	24	48	
25.1.	A	5	5	5	8.1	–	8.1	7.84	–	8.52	1088	–	1005	24.7	24.3	24.1	100
	B	5	5	5													100
	C	5	5	5													100
	D	5	5	6													100
50.1.	A	5	5	5	8.1	–	8.1	7.69	–	8.62	1884	–	1757	24.5	24.3	24.1	100
	B	5	5	5													100
	C	5	5	5													100
	D	5	5	5													100
100.1.	A	5	4	0	8.9	–	8.1	7.72	–	8.72	3480	–	3200	24.8	24.3	24.1	0
	B	5	5	0													0
	C	5	4	0													0
	D	5	4	0													0
Technician Initials		MB	JR	JR													

Conc.	Alkalinity* *(mg/L as $CaCO_3$)	Hardness* *(mg/L as $CaCO_3$)	Chlorine Resid. (mg/L)
Control	61	74	ND
Highest conc.	260	1190	0.04

Sample Description: yellow tint, cloudy, some debris

Comments:
0 hrs:
24 hrs.
48 hrs.

Reviewed: BCS 10/04/00
QA check: JL 9/27/00

Ogden Bioassay Laboratory
5550 Morehouse Dr., Suite B
San Diego, CA 92121
(858) 458-9044

C. dubia Chronic – Sample LT

C[illegible]odaphnia Survival and Reproduction Test-[illegible]ay Survival

Start Date:	09/13/2000	Te[illegible]D:	0009-056	Sample ID:	IRVINE CO ID: LT
End Date:	09/20/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	09/12/2000	Protocol:	EPAF 89-EPA Freshwater C	Test Species:	CD-Ceriodaphnia dubia

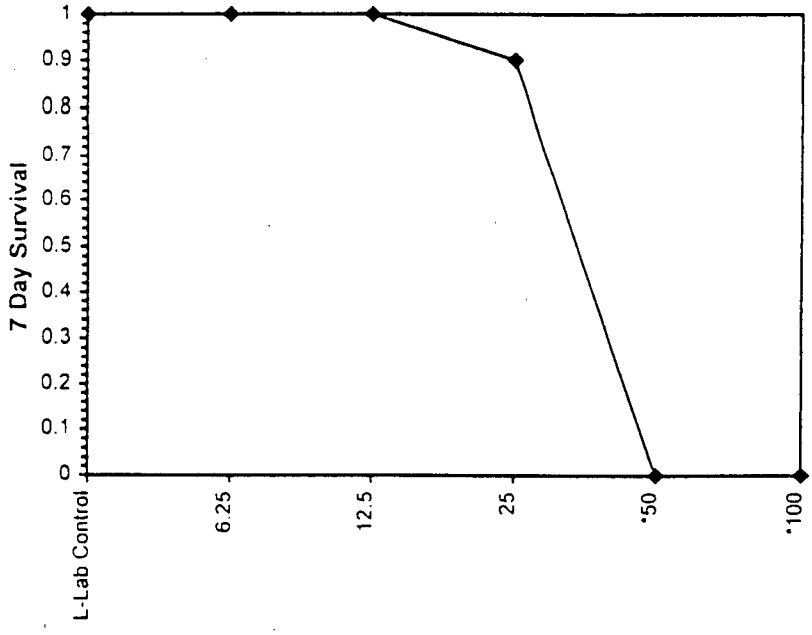
Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
L-Lab Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
L-Lab Control	1.0000	1.0000	0	10	10	10		
6.25	1.0000	1.0000	0	10	10	10	1.0000	0.0500
12.5	1.0000	1.0000	0	10	10	10	1.0000	0.0500
25	0.9000	0.9000	1	9	10	10	0.5000	0.0500
*50	0.0000	0.0000	10	0	10	10	0.0000	0.0500
*100	0.0000	0.0000	10	0	10	10	0.0000	0.0500

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	25	50	35.3553	4

Dose-Response Plot



ToxCalc v5.0

Reviewed by: BCS 10/04/00

C[illegible]daphnia Survival and Reproduction Test-[illegible]ay Survival

Start Date:	09/13/2000	Tes[illegible]D:	0009-056	Sample ID:	IRVINE CO [illegible]D: LT
End Date:	09/20/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	09/12/2000	Protocol:	EPAF 89-EPA Freshwater C	Test Species:	CD-Ceriodaphnia dubia

Comments:

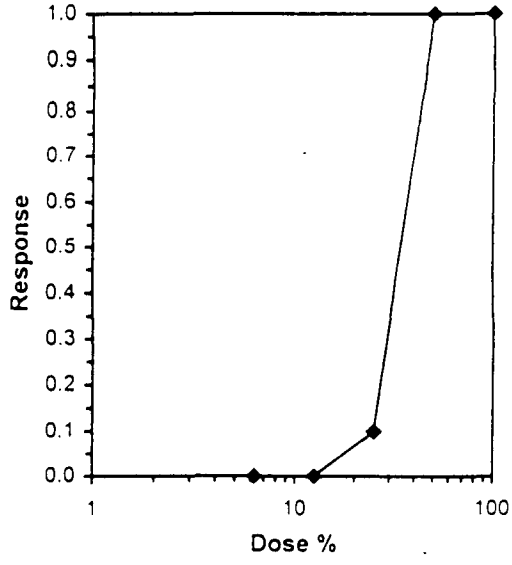
Conc-%	1	2	3	4	5	6	7	8	9	10
L-Lab Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Number Resp	Total Number
L-Lab Control	1.0000	1.0000	0	10	10	10			0	10
6.25	1.0000	1.0000	0	10	10	10	1.0000	0.0500	0	10
12.5	1.0000	1.0000	0	10	10	10	1.0000	0.0500	0	10
25	0.9000	0.9000	1	9	10	10	0.5000	0.0500	1	10
50	0.0000	0.0000	10	0	10	10			10	10
100	0.0000	0.0000	10	0	10	10			10	10

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	25	50	35.3553	4

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	32.988	28.922	37.624
5.0%	33.730	28.623	39.748
10.0%	34.020	31.367	36.897
20.0%	34.020	31.367	36.897
Auto-0.0%	32.988	28.922	37.624



C ɔdaphnia Survival and Reproduction Test- ıroduction

Start Date:	09/13/2000	Tes. .J: 0009-056	Sample ID: IRVINE CO ID : LT
End Date:	09/20/2000	Lab ID: CAOEE-Ogden Bioassay	Sample Type: OTH-Other sample type
Sample Date:	09/12/2000	Protocol: EPAF 89-EPA Freshwater C	Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
L-Lab Control	33.000	33.000	37.000	33.000	36.000	32.000	34.000	38.000	37.000	31.000
6.25	36.000	29.000	33.000	29.000	30.000	35.000	27.000	32.000	25.000	34.000
12.5	31.000	32.000	30.000	32.000	36.000	33.000	33.000	25.000	2.000	35.000
25	35.000	36.000	0.000	30.000	37.000	35.000	35.000	30.000	34.000	17.000
50	6.000	4.000	0.000	6.000	0.000	6.000	0.000	12.000	9.000	6.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

			Transform: Untransformed					Rank	1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
L-Lab Control	34.400	1.0000	34.400	31.000	38.000	7.014	10			34.400	0.0000
6.25	31.000	0.9012	31.000	25.000	36.000	11.581	10	78.00	75.00	31.000	0.0988
12.5	28.900	0.8401	28.900	2.000	36.000	34.311	10	78.00	75.00	28.900	0.1599
25	28.900	0.8401	28.900	0.000	37.000	40.499	10	93.00	75.00	28.900	0.1599
*50	4.900	0.1424	4.900	0.000	12.000	81.887	10	55.00	75.00	4.900	0.8576
*100	0.000	0.0000	0.000	0.000	0.000	0.000	10	55.00	75.00	0.000	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.54568	1.035	-2.8384	10.826
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	25	50	35.3553	4

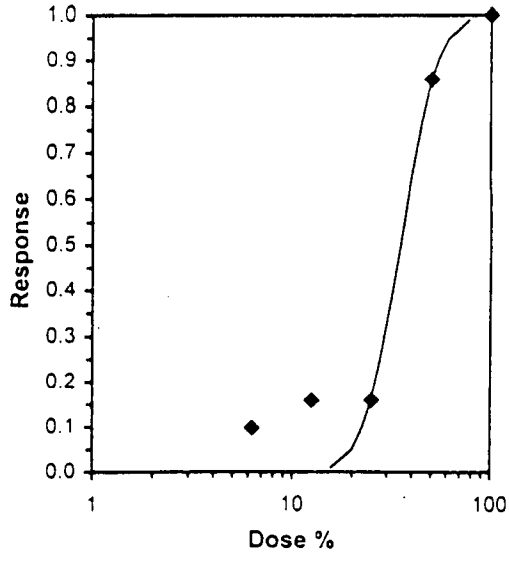
Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	6.73678	2.12804	-0.0356	13.5092	0	18.3737	7.81472	3.7E-04	1.54222	0.14844	9
Intercept	-5.3896	3.28349	-15.839	5.05991							

TSCR

Point	Probits	%	95% Fiducial Limits
EC01	2.674	15.7363	
EC05	3.355	19.8638	
EC10	3.718	22.4901	
EC15	3.964	24.4555	
EC20	4.158	26.1393	
EC25	4.326	27.6759	
EC40	4.747	31.9607	
EC50	5.000	34.8516	
EC60	5.253	38.004	
EC75	5.674	43.8877	
EC80	5.842	46.4678	
EC85	6.036	49.6672	
EC90	6.282	54.0076	
EC95	6.645	61.1481	
EC99	7.326	77.1868	

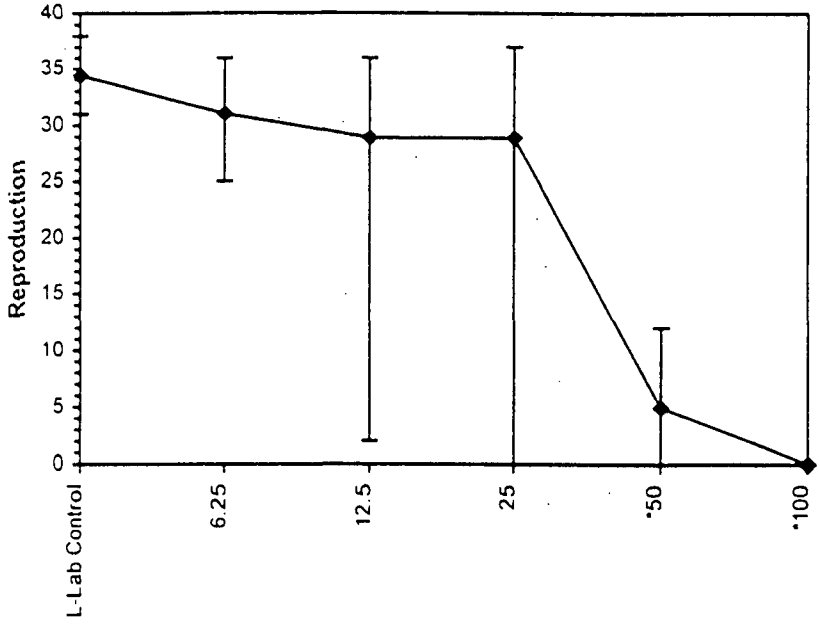
Significant heterogeneity detected (p = 3.68E-04)



Reviewed by: BCS 10/04/16

		C	odaphnia Survival and Reproduction Test		roduction
Start Date:	09/13/2000	Test ID:	0009-056	Sample ID:	IRVINE CO 10 LT
End Date:	09/20/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	OTH-Other sample type
Sample Date:	09/12/2000	Protocol:	EPAF 89-EPA Freshwater C	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Dose-Response Plot



Reviewed by: BCS 10/04/

Ogden Environmental and Energy Services
Bioassay Laboratory
5550 Morehouse Dr. Suite B
San Diego, CA 92121

Raw Data Sheet
Initial and Final Chemistries
Seven Day Chronic Bioassay
Test Species: C. dubia

Client: Irvine Co.

Test Date: 9/13/02

Sample ID. Irvine (LT)

Test No: 0209-056

Concentration Cont	Days 0		1		2		3		4		5		(A) 6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.92	8.22	7.93	8.06	8.13	8.19	8.01	8.08	8.02	8.02	8.23	(A)		8.11
DO (mg/l)	7.7	7.8	7.2	7.9	8.3	5.8	7.8	7.9	8.3	7.9	7.9	↓	↓	7.7
Cond. (µmhos-cm)	2554	267	198	222	192	210	197	208	273	264	246	↓	↓	260
Temperature (°C)	24.7	24.2	24.8	19.4	25.0	24.3	25.1	24.3	24.7	24.2	24.7	↓		24.2

Concentration 25%	Days 0		1		2		3		4		5		(A) 6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.94	8.20	7.97	8.30	8.09	8.26	8.27	8.21	7.93	8.14	8.04	(A)		8.19
DO (mg/l)	8.1	7.6	7.5	8.0	8.6	6.0	8.0	8.0	8.6	7.6	8.6	↓	↓	7.5
Cond. (µmhos-cm)	1088	1073	1274	1270	1202	1185	1085	1076	1484	1379	1305	↓	↓	1247
Temperature (°C)	24.6	24.2	24.7	19.4	25.1	24.3	25.0	24.2	24.8	24.2	25.1	↓		24.2

100% Concentration	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.72	8.61	7.88	8.57	7.96				All clear					
DO (mg/l)	8.9	7.4	8.3	8.1	9.7									
Cond. (µmhos-cm)	3420	3330	3490	3480	3490									
Temperature (°C)	24.7	24.2	24.5	19.4	24.9									

	Control	a	b	c
Alkalinity*	61	260		
Hardness	74	1190		
Initial Chlorine†	ND	0.04		
STS added (g)	—	—		
Final Chlorine †	—	—		

Analysts: WB, DM, BR
DC

* mg/L as CaCO3; † mg/L; ND: no chlorine detected

Sample Description: Yellowish tint, cloudy, some debris

Animal Source: In House

Date Received: N/A

Comments: "A" sample to be used throughout test. (A) No renewal done on day 6 - sample ran out.

Reviewed: BR 9/27/02

Ogden Environmental and Energy Services, Inc
Bioassay Laboratory

5550 Morehouse Dr., Suite B
San Diego, CA 92121

Client/Sample ID: IRVINE CO. (LT)
Test Number: 00MRATT 0009-056

Start Date: 9-13-00
Start Time: 1345

End Date: 9-20-00
End Time: 1600

Conc.	Rep	1	2	3	4	5	6	7	8	Total	QA
CONT.	1	0	0	8	0	11	14	✓		33	15
	2	0	0	0	7	12	14	✓		33	
	3	0	0	0	7	13	17	✓		37	
	4	0	0	8	0	13	12	✓		33	
	5	0	0	0	6	13	17	✓		36	
	6	0	0	4	3	11	14	✓		32	
	7	0	0	5	0	13	16	✓		34	
	8	0	0	8	0	13	17	✓		38	
	9	0	0	5	1	13	16	✓		37	
	10	0	0	5	0	12	14	✓		31	
Analyst		MB	JR	BR	JR	MB	MB	SC			

Comments:

Conc.	Rep	1	2	3	4	5	6	7	8	Total	QA
25.1	1	0	0	0	MB 6	11	18	✓		35	17
	2	0	0	0	MB 5	14	17	✓		36	
	3	0	0/d	-	-	-	-	-	-	0/d	
	4	0	0	0	0	9	21	✓		30	
	5	0	0	0	0	14	23	✓		37	
	6	0	0	6	MB 0	11	18	✓		35	
	7	0	0	0	2	14	19	✓		35	
	8	0	0	0	6	2	22	✓		30	
	9	0	0	0	5	12	17	✓		34	
	10	0	0	0	0	11	6	✓		17	
Analyst			BR			MB	MB	SC			

Conc.	Rep	1	2	3	4	5	6	7	8	Total	QA
6.161	1	0	0	4	0	12	20	✓		36	
	2	0	0	0	0	11	18	✓		29	
	3	0	0	1	0	12	20	✓		33	21
	4	0	0	0	1	12	15	✓		29	
	5	0	0	0	1	10	19	✓		30	
	6	0	0	0	0	13	22	✓		35	
	7	0	0	0	5	4	18	✓		27	
	8	0	0	0	0	12	20	✓		32	
	9	0	0	0	0	8	17	✓		25	
	10	0	0	0	0	13	21	✓		34	
Analyst			BR			MB					

Conc.	Rep	1	2	3	4	5	6	7	8	Total	QA
50.1	1	0	0	0	6/d	—	—	—	—	6/d	
	2	0	0	0	4/d	—	—	—	—	4/d	
	3	0	0	0	0/d	—	—	—	—	0/d	
	4	0	0	0	6/d	—	—	—	—	6/d	
	5	0	0	0	0/d	—	—	—	—	0/d	
	6	0	0	0	6/d	—	—	—	—	6/d	
	7	0	0	0	0	0/D	—	—	—	0/D	
	8	0	0	0	0	12/D	—	—	—	12/D	
	9	0	0	5	MB 4/0	4/D	—	—	—	9/D	
	10	0	0	0	6/d	—	—	—	—	6/d	
Analyst			BR								

Conc.	Rep	1	2	3	4	5	6	7	8	Total	QA
12.51	1	0	0	0	0	13	18	✓		31	
	2	0	0	0	0	11	21	✓		32	
	3	0	0	0	0	14	16	✓		30	
	4	0	0	0	0	11	21	✓		32	
	5	0	0	2	MB 0	13	21	✓		36	
	6	0	0	0	3	10	20	✓		33	
	7	0	0	1	0	14	18	✓		33	
	8	0	0	0	0	0	19	✓		25	
	9	0	0	0	0	2	0	✓		2	
	10	0	0	0	0	0	21	✓		35	12
Analyst			JR			MB					

Conc.	Rep	1	2	3	4	5	6	7	8	Total	QA
100.1	1	0	0/d	—	—	—	—	—	—	0/d	
	2	0	0/d	—	—	—	—	—	—	0/d	
	3	0	0/d	—	—	—	—	—	—	0/d	
	4	0	0/d	—	—	—	—	—	—	0/d	
	5	0	0/d	—	—	—	—	—	—	0/d	
	6	0	0/d	—	—	—	—	—	—	0/d	
	7	0	0/d	—	—	—	—	—	—	0/d	
	8	0	0/d	—	—	—	—	—	—	0/d	
	9	0	0/d	—	—	—	—	—	—	0/d	
	10	0	0/d	—	—	—	—	—	—	0/d	
Analyst			BR								

Comments:

Time Fed (day): (0) 1345 (1) 1030 (2) 1200 (3) 0950 (4) 1060 (5) 1315 (6) 1600 (7) _____ (8) _____

Reviewed/Date: BCS 10/04/00

9/27/00

C. dubia Chronic – Reference Toxicant

C[illegible]odaphnia Survival and Reproduction Test-[illegible]ay Survival

Start Date:	09/12/2000	Test ID:	000912cdrt	Sample ID:	REF-Ref Toxicant
End Date:	09/19/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	EPAF 89-EPA Freshwater C	Test Species:	CD-Ceriodaphnia dubia
Comments:					

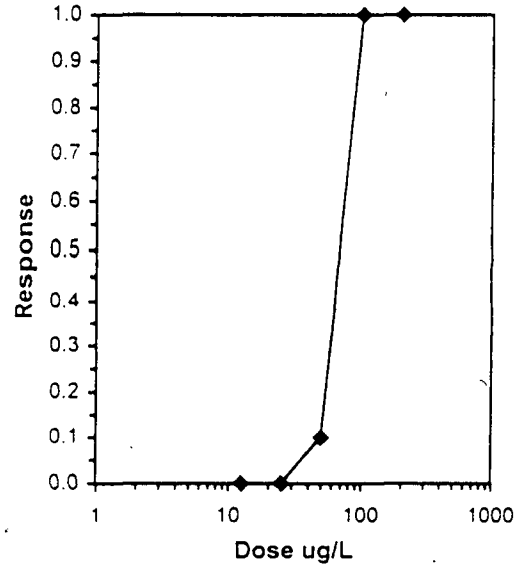
Conc-ug/L	1	2	3	4	5	6	7	8	9	10
L-Lab Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-ug/L	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Number Resp	Total Number
L-Lab Control	1.0000	1.0000	0	10	10	10			0	10
12.5	1.0000	1.0000	0	10	10	10	1.0000	0.0500	0	10
25	1.0000	1.0000	0	10	10	10	1.0000	0.0500	0	10
50	0.9000	0.9000	1	9	10	10	0.5000	0.0500	1	10
100	0.0000	0.0000	10	0	10	10			10	10
200	0.0000	0.0000	10	0	10	10			10	10

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	50	100	70.7107	

Trimmed Spearman-Karber

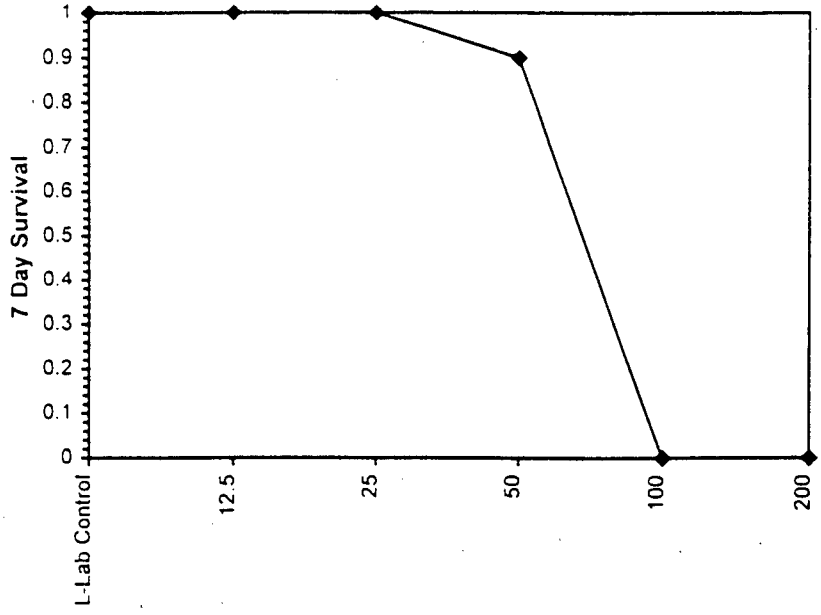
Trim Level	EC50	95% CL	
0.0%	65.975	57.845	75.249
5.0%	67.460	57.246	79.495
10.0%	68.040	62.734	73.794
20.0%	68.040	62.734	73.794
Auto-0.0%	65.975	57.845	75.249



 Reviewed by: [illegible] 10/6/00

Start Date:	09/12/2000	Test ID:	000912cdrt	Sample ID:	REF-Ref Toxicant
End Date:	09/19/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	EPAF 89-EPA Freshwater C	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Dose-Response Plot



Ceriodaphnia Survival and Reproduction Test — production

Start Date:	09/12/2000	Test ID:	000912cdrt	Sample ID:	REF-Ref Toxicant
End Date:	09/19/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	EPAF 89-EPA Freshwater C	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-ug/L	1	2	3	4	5	6	7	8	9	10
L-Lab Control	43.000	34.000	35.000	31.000	37.000	35.000	37.000	39.000	39.000	35.000
12.5	33.000	39.000	0.000	29.000	34.000	38.000	33.000	25.000	32.000	35.000
25	31.000	44.000	34.000	15.000	46.000	36.000	18.000	34.000	12.000	18.000
50	35.000	36.000	4.000	28.000	34.000	0.000	19.000	26.000	0.000	31.000
100	2.000	14.000	0.000	1.000	0.000	2.000	3.000	0.000	5.000	5.000
200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

			Transform: Untransformed					Rank	1-Tailed		
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
L-Lab Control	36.500	1.0000	36.500	31.000	43.000	9.064	10			36.500	0.0000
12.5	29.800	0.8164	29.800	0.000	39.000	37.661	10	78.00	76.00	29.800	0.1836
25	28.800	0.7890	28.800	12.000	46.000	42.425	10	83.50	76.00	28.800	0.2110
*50	21.300	0.5836	21.300	0.000	36.000	68.895	10	65.50	76.00	21.300	0.4164
*100	3.200	0.0877	3.200	0.000	14.000	132.419	10	55.00	76.00	3.200	0.9123
200	0.000	0.0000	0.000	0.000	0.000	0.000	10			0.000	1.0000

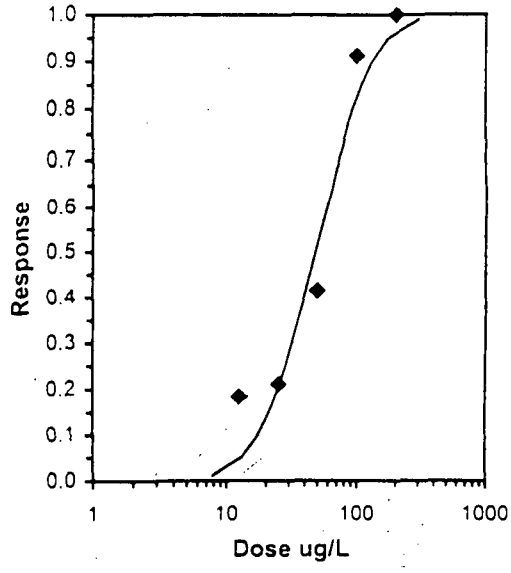
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93588	0.93	-0.9057	1.18466
Bartlett's Test indicates unequal variances (p = 1.03E-04)	23.4577	13.2767		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	25	50	35.3553	

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	2.93258	0.53867	1.87679	3.98838	0	7.40806	7.81472	0.06	1.68261	0.341	10
Intercept	0.0656	0.91562	-1.729	1.86022							
TSCR											

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	7.75063	2.6927	12.9468
EC05	3.355	13.235	6.14241	19.4089
EC10	3.718	17.6039	9.49264	24.1891
EC15	3.964	21.3399	12.6906	28.157
EC20	4.158	24.867	15.9335	31.8715
EC25	4.326	28.354	19.3018	35.5691
EC40	4.747	39.466	30.4897	48.1401
EC50	5.000	48.1519	38.9135	59.576
EC60	5.253	58.7495	48.1637	76.0261
EC75	5.674	81.7734	65.1942	120.078
EC80	5.842	93.2403	72.7596	145.458
EC85	6.036	108.651	82.3598	182.624
EC90	6.282	131.71	95.8716	244.145
EC95	6.645	175.187	119.485	377.302
EC99	7.326	299.151	179.125	860.667

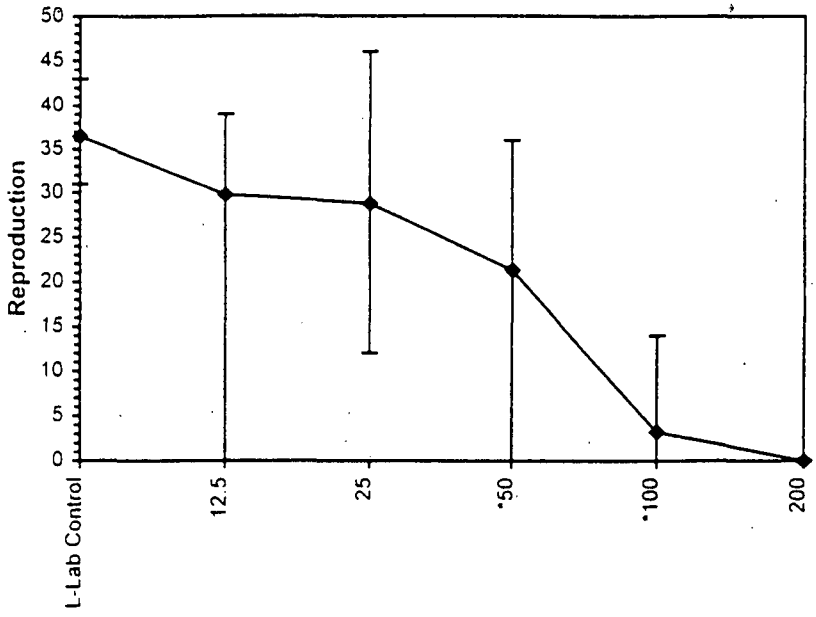


ToxCalc v5.0

Reviewed by: 10/6/00

Start Date:	09/12/2000	Test ID:	000912cdrt	Sample ID:	REF-Ref Toxicant
End Date:	09/19/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	EPAF 89-EPA Freshwater C	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Dose-Response Plot



Reviewed by 10/6/00

Appendix B

Chain-of-Custody Form

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

Ogden Bioassay Laboratory - San Diego
5550 Morehouse Drive, Suite B
San Diego, CA 92121
858-458-9044

Chain of Custody

Date 9.13.00 Page 1 of 1

COMPANY Dr. Ford (Irvine)
ADDRESS
CITY STATE ZIP
PHONE NO.

Chris Stransky (Ogden)
PROJECT MANAGER
SAMPLERS (SIGNATURE)
PHONE NUMBER

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	ANALYSIS REQUIRED: Ceriodaphnia - Acute	ANALYSIS REQUIRED: Ceriodaphnia - Chronic	CONCENTRATIONS/COMMENTS	NUMBER OF CONTAINERS
LT	9.13.00 12 @ 2c	0730	H_2O	Cubitainer 4c	X	X		1

PROJECT INFORMATION

CLIENT
P.O. NO.
SHIPPED VIA: Courier ~~Dr. Ft~~

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS	1
CHAIN OF CUSTODY SEALS	
REC'D. GOOD CONDITION/COLD	
CONFORMS TO RECORD	

SPECIAL INSTRUCTIONS/COMMENTS:

NO COC from Dr. Ford

RELINQUISHED BY

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY

(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)

Bill Robson 1130
(Signature) (Time)
Bill Robson 9.13.00
(Printed Name) (Date)

Ogden Bioassay Lab Log-in No. 00-0764

Additional charges may apply.

DISTRIBUTION: WHITE, CANARY - Ogden Bioassay Lab, PINK - Originator

OEA ENVIRONMENTAL AND ENERGY SERVICES

Ogden Bioassay Laboratory - San Diego
5550 Morehouse Drive, Suite B
San Diego, CA 92121
858 458-9044

Chain of Custody

Date 9.13.00 Page 1 of 1

COMPANY Dr. Ford (Irvine)
ADDRESS
CITY STATE ZIP
PHONE NO.

ANALYSIS REQUIRED: Ceriodaphnia dubia; Ceriodaphnia - chronic

PROJECT MANAGER Chris Stransky (Ogden)
SAMPLERS (SIGNATURE)
PHONE NUMBER

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	Ceriodaphnia dubia	Ceriodaphnia - chronic	CONCENTRATIONS/COMMENTS	NUMBER OF CONTAINERS
LT	9.13.00	0730	H_2O	Cubitainer 4L	X	X		1

PROJECT INFORMATION
CLIENT
P.O. NO.
SHIPPED VIA: Courier - Dr. Ford

SAMPLE RECEIPT
TOTAL NO. OF CONTAINERS
CHAIN OF CUSTODY SEALS
RECD. GOOD CONDITION/COLD
CONFORMS TO RECORD

SPECIAL INSTRUCTIONS/COMMENTS:
NO COC from Dr. Ford

RELINQUISHED BY
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
Bill Robson 1130
(Signature) (Time)
Bill Robson 9.13.00
(Printed Name) (Date)
Ogden Bioassay Lab Logins No. 00-0764

Addtional charges may apply.

DISTRIBUTION: WHITE, CANARY - Ogden Bioassay Lab. PINK - Originator

APPENDIX A

Complete laboratory reports of water quality analyses and associated QA/QC documentation prepared by Del Mar Analytical and subcontracting laboratories for samples taken in the Crystal Cove Monitoring Study during the period July 31 – September 29, 2000.

Copies on file with the Regional Water Quality Control Board, Santa Ana Region and the Irvine Community Development Company.

APPENDIX B

Complete laboratory reports of ELISA pesticide analyses and associated QA/QC documentation prepared by Aqua-Science, Davis, CA, for samples taken on September 12, 2000,at Station LT in the monitoring study for theCrystal Cove Project.

Copies on file with the Regional Water Quality Control Board, Santa Ana Region and the Irvine Community Development Company.

8-74 (TABLE 16)

Health Care Agency / Environmental Health Bacteriological Monitoring Program
Total Coliform (TC), *E.coli* (EC), Enterococcus (ENT) Most Probable Number / 100 ml Sample

STATION	Location Description		6/13/00	6/20/00	6/27/00	7/3/00	7/11/00	7/19/00	7/26/00	8/1/00	8/8/00	8/15/00
NEWPORT COAST (surfzone)												
ONB29	Corona Del Mar State Beach	TC	20	<20	<20	<20	<20	<20	40	70	<20	<20
		EC	<10	<10	20	10	<10	10	10	85	10	10
		ENT	<10	<10	10	20	31	<10	<10	31	<10	<10
ONB31	Little Corona Beach	TC	<20	<20	80	<20	90	20	<20	70	<20	<20
		EC	<10	<10	31	31	63	10	10	257	10	<10
		ENT	<10	<10	41	10	301	<10	<10	10	<10	<10
ONB35	Pelican Point	TC	20	20	40	<20	130	110	110	130	40	40
		EC	<10	10	10	<10	41	109	52	41	31	20
		ENT	<10	<10	<10	10	20	10	85	10	<10	20
ONB39	Crystal Cove	TC	<20	<20	<20	<20	20	<20	<20	20	<20	<20
		EC	<10	<10	<10	10	20	10	41	160	<10	20
		ENT	<10	<10	<10	<10	10	<10	20	<10	<10	10
ONB43	Muddy Creek	TC	<20	<20	<20	<20	20	<20	<20	<20	<20	<20
		EC	<10	<10	<10	<10	<10	10	<10	109	<10	<10
		ENT	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
ONB45	El Morro Beach	TC	<20	<20	<20	20	<20	20	20	<20	<20	<20
		EC	<10	<10	10	10	<10	<10	10	<10	<10	<10
		ENT	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
NEWPORT COAST (creeks) All Creeks Flowing Unless*												
CNBBG	Buck Gully Creek	TC	24192	>24192	>24192	NS	>24192	>24192	>24192	>24192	>24192	>24192
		EC	52	52	419	NS	691	723	906	2723	187	156
		ENT	195	404	683	NS	638	457	613	712	146	488
CNBPP	Pelican Point Creek	TC	>24192	>24192	>24192	NS	>24192	>24192	>24192	>24192	>24192	>24192
		EC	4884	7701	2247	NS	10463	5794	7270	17329	697	11199
		ENT	12033	3654	1935	NS	12997	9208	24192	10463	1607	15531
CNBPM	Pelican Point Middle Creek	TC	*12033	*4106	*459	NS	*3654	*1043	*5794	no water	no water	no water
		EC	368	<10	<10	NS	275	<10	<10	no water	no water	no water
		ENT	62	382	97	NS	63	63	74	no water	no water	no water
CNBPW	Pelican Hill Waterfall	TC	19863	>24192	>24192	NS	>24192	>24192	19863	>24192	17329	12997
		EC	95	122	231	NS	464	185	142	120	20	240
		ENT	41	443	84	NS	278	41	74	160	31	74
CNBCC	Crystal Cove Creek	TC	>24192	>24192	>24192	NS	>24192	>24192	>24192	>24192	>24192	>24192
		EC	6131	1201	1313	NS	2613	1785	314	>24192	4352	6867
		ENT	>24192	738	2282	NS	836	148	2481	3448	933	2909
CNBCU	Crystal Cove Upstream	TC	>24192	>24192	>24192	NS	>24192	>24192	>24192	>24192	>24192	>24192
		EC	663	199	1664	NS	20	10	63	7701	1664	1376
		ENT	>24192	1334	5745	NS	495	256	435	6131	4611	5172
CNBMC	Muddy Creek	TC	*>24192	*>24192	*>24192	NS	*>24192	*>24192	*>24192	>24192	*>24192	*>24192
		EC	246	10	10	NS	4611	309	379	>24192	422	116
		ENT	62	288	2700	NS	131	262	836	173	<10	41
CNB45	El Morro Creek	TC	19863	12033	24192	NS	15531	19663	24192	>24192	>24192	*>24192
		EC	181	122	209	NS	96	689	712	4034	173	336
		ENT	771	1076	1483	NS	594	1106	1785	169	852	512
CNBEU	El Morro Creek Upstream	TC	9208	4611	8664	NS	19863	9804	12997	>24192	>24192	10463
		EC	520	63	121	NS	160	169	41	426	41	31
		ENT	14136	776	1396	NS	776	4034	1294	1785	714	350
Laguna Beach (surfzone)												
OLB10	Emerald Bay	TC	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
		EC	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		ENT	<10	<10	<10	<10	<10	<10	30	<10	<10	<10
OLB05	Crescent Bay Beach	TC	<20	<20	<20	<20	<20	<20	<20	<20	<20	80
		EC	<10	<10	<10	10	<10	20	<10	<10	<10	85
		ENT	<10	<10	<10	10	<10	<10	<10	<10	<10	<10
OLB00	Laguna Main Beach	TC	20	<20	110	70	20	<20	<20	20	<20	80
		EC	<10	<10	41	41	<10	<10	<10	10	<10	<10
		ENT	<10	<10	<10	10	<10	<10	<10	10	<10	41
OSL12	Treasure Island Pier	TC	<20	<20	<20	<20	NS	NS	NS	NS	NS	NS
	(construction on site -	EC	<10	<10	<10	<10	NS	NS	NS	NS	NS	NS
	no access)	ENT	<10	<10	<10	<10	NS	NS	NS	NS	NS	NS
Laguna Beach (creeks) All Creeks Flowing Unless*												
CLBEB	Emerald Bay Drain	TC	no water	no water	no water	no water	no water	no water	no water	no water	no water	no water
		EC	no water	no water	no water	no water	no water	no water	no water	no water	no water	no water
		ENT	no water	no water	no water	no water	no water	no water	no water	no water	no water	no water
CLBBC	Broadway Creek	TC	no water	no water	no water	no water	no water	no water	no water	no water	no water	no water
		EC	no water	no water	no water	no water	no water	no water	no water	no water	no water	no water
		ENT	no water	no water	no water	no water	no water	no water	no water	no water	no water	no water

Health Care Agency / Environmental Health Bacteriological Monitoring Program
Total Coliform (TC), *E.coli* (EC), Enterococcus (ENT) Most Probable Number / 100 ml Sample

STATION	Location Description		8/15/00	8/22/00	8/29/00	9/6/00	9/12/00	9/19/00	9/25/00	10/4/00	10/11/00	10/17/00
NEWPORT COAST (surfzone)											RAIN	
ONB29	Corona Del Mar State Beach	TC	<20	<20	<20	<20	20	20	<20	<20	130	<20
		EC	10	<10	20	<10	10	<10	<10	<10	20	<10
		ENT	<10	<10	<10	41	20	10	10	<10	31	<10
ONB31	Little Corona Beach	TC	<20	<20	20	<20	20	<20	<20	70	300	40
		EC	<10	<10	10	<10	173	<10	<10	10	122	10
		ENT	<10	<10	<10	40	10	<10	<10	10	243	20
ONB35	Pelican Point	TC	40	<20	80	220	230	110	<20	<20	220	<20
		EC	20	<10	121	74	110	52	51	20	74	<10
		ENT	20	20	10	669	41	20	10	10	72	<10
ONB39	Crystal Cove	TC	<20	<20	20	3500	20	<20	<20	<20	80	40
		EC	20	<10	<10	110	10	20	<10	20	41	20
		ENT	10	<10	10	74	<10	110	10	10	107	<10
ONB43	Muddy Creek	TC	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
		EC	<10	<10	<10	<10	10	10	<10	<10	10	<10
		ENT	<10	10	<10	<10	<10	<10	<10	10	10	<10
ONB45	El Morro Beach	TC	<20	<20	<20	130	<20	<20	<20	40	40	<20
		EC	<10	<10	20	122	<10	<10	<10	<10	41	<10
		ENT	<10	10	<10	2014	<10	<10	10	20	52	<10
NEWPORT COAST (creeks) All Creeks Flowing Unless*												
CNBBG	Buck Gully Creek	TC	>24192	>24192	19863	12997	17327	17329	17329	11199	>24192	10462
		EC	156	341	96	161	169	317	336	110	6488	134
		ENT	488	465	472	262	288	231	759	408	24192	171
CNBPP	Pelican Point Creek	TC	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	*>24192
		EC	11199	3448	1012	1333	3873	2187	5172	457	4352	816
		ENT	15531	2909	2359	2613	6131	8664	1597	9208	7701	1222
CNBPM	Pelican Point Middle Creek	TC	no water	no water	*>24192	*>24192	*8664	*8164	*24192	NS	NS	NS
		EC	no water	no water	10	862	328	30	131	NS	NS	NS
		ENT	no water	no water	169	3076	404	703	314	NS	NS	NS
CNBPW	Pelican Hill Waterfall	TC	12997	12997	15531	4884	6867	9804	24192	3873	5172	3130
		EC	240	52	91	199	369	41	206	<10	31	10
		ENT	74	199	158	161	311	733	327	74	121	74
CNBCC	Crystal Cove Creek	TC	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	14136
		EC	6867	341	816	>24192	1445	496	6131	839	15531	203
		ENT	2909	2187	2143	>24192	1918	1334	9804	738	>24192	830
CNBCU	Crystal Cove Upstream	TC	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192
		EC	1376	1669	4611	6867	4352	776	1565	738	9804	408
		ENT	5172	6131	19863	9208	6131	4352	4611	2987	>24192	1789
CNBMC	Muddy Creek	TC	*>24192	>24192	*>24192	*>24192	*>24192	*>24192	*>24192	*>24192	*>24192	*>24192
		EC	116	958	323	96	<10	52	10	<10	14136	10
		ENT	41	275	305	142	52	51	388	3725	14136	571
CNB45	El Morro Creek	TC	*>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	>24192	15531
		EC	336	1054	581	8164	1616	399	175	8164	3448	110
		ENT	512	878	1076	249	1313	1500	763	1455	9208	379
CNBEU	El Morro Creek Upstream	TC	10463	>24192	>24192	>24192	>24192	>24192	>24192	15531	>24192	>24192
		EC	31	1467	985	1071	211	238	213	3076	12997	2105
		ENT	350	6131	2359	2282	323	529	NS	1246	14136	14136
Laguna Beach (surfzone)												
OLB10	Emerald Bay	TC	<20	<20	<20	<20	<20	<20	<20	<20	220	<20
		EC	<10	<10	<10	<10	<10	10	<10	<10	30	20
		ENT	<10	<10	<10	<10	<10	<10	<10	<10	96	<10
OLB05	Crescent Bay Beach	TC	80	<20	<20	<20	<20	20	<20	<20	300	40
		EC	85	<10	<10	<10	<10	20	<10	<10	52	52
		ENT	<10	10	10	<10	<10	10	<10	<10	74	10
OLB00	Laguna Main Beach	TC	80	<20	80	20	20	40	20	40	16000	<20
		EC	<10	20	85	10	213	52	10	10	2851	10
		ENT	41	<10	31	379	20	41	<10	20	1529	31
OSL12	Treasure Island Pier	TC	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	(construction on site -	EC	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	no access)	ENT	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Laguna Beach (creeks) All Creeks Flowing Unless*												
CLBEB	Emerald Bay Drain	TC	no water	no water	no water	no water	no water	no water	no water	*>24192	*>24192	*2755
		EC	no water	no water	no water	no water	no water	no water	no water	1246	24192	52
		ENT	no water	no water	no water	no water	no water	no water	no water	19863	14136	399
CLBBC	Broadway Creek	TC	no water	no water	no water	no water	no water	no water	no water	*>24192	*>24192	*>24192
		EC	no water	no water	no water	no water	no water	no water	no water	816	11199	3654
		ENT	no water	no water	no water	no water	no water	no water	no water	24192	24192	1515

TABLE 17 BACTERIOLOGICAL INDICATOR DATA FOR DRY-WEATHER SAMPLING ON JULY 31, 2000

DATE	TIME	SAMPLE SITE	TOTAL COLIFORM	FECAL COLIFORM	ENTEROCOCCUS	RL	UNITS	LAB SAMPLE ID
7/31/00	7:30 AM	LTU	1,600	900	220	2	mpn	IJG0910-01
7/31/00	8:00 AM	LT	300	<2	2	2	mpn	IJG0910-02
7/31/00	8:30 AM	LT-1	110	6	11	2	mpn	IJG0910-03
7/31/00	9:30 AM	MC-1	30	<2	11	2	mpn	IJG0910-04
7/31/00	10:00 AM	EC-1	11	<2	170	2	mpn	IJG0910-05

TABLE 18 BACTERIOLOGICAL INDICATOR DATA FOR DRY-WEATHER SAMPLING ON SEPTEMBER 12, 2000

DATE	TIME	SAMPLE SITE	TOTAL COLIFORM	FECAL COLIFORM	ENTEROCOCCUS	RL	UNITS	LAB SAMPLE ID
9/12/00	6:30 AM	LTU	17,000	9,000	4,000	2	mpn	IJI0347-03
9/12/00	7:30 AM	LT	13,000	3,400	6,000	2	mpn	IJI0347-01
9/12/00	8:00 AM	LT-1	<2	<2	<2	2	mpn	IJI0347-02
9/12/00	8:30 AM	MC-1	<2	<2	<2	2	mpn	IJI0347-04
9/12/00	9:00 AM	EC-1	4	<2	11	2	mpn	IJI0347-05

TABLE 19 BACTERIOLOGICAL INDICATOR DATA FOR DRY-WEATHER SAMPLING ON SEPTEMBER 29, 2000

DATE	TIME	SAMPLE SITE	TOTAL COLIFORM	FECAL COLIFORM	ENTEROCOCCUS	RL	UNITS	LAB SAMPLE ID
9/29/00	6:10 AM	LTU	1,700	300	130	2	mpn	IJI0989-01
9/29/00	6:45 AM	LT	24,000	5,000	11,000	2	mpn	IJI0989-02
9/29/00	7:15 AM	LT-1	300	<2	11	2	mpn	IJI0989-03
9/29/00	8:00 AM	MC-1	11	<2	<2	2	mpn	IJI0989-05
9/29/00	8:30 AM	EC-1	30	<2	<2	2	mpn	IJI0989-04