ATTACHMENT C

ORANGE COUNTY ENVIRONMENTAL MONITORING COMMENTS ON CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN DIEGO REGION TENTATIVE ORDER No. R9-2007-0002 NPDES NO. CAS0108740

INTRODUCTION

Attachment C contains the principal technical comments of the County of Orange (the "County") regarding the monitoring and reporting requirements of Tentative Order No. R9-2007-0002 dated February 9, 2007 ("Tentative Order").

These comments are divided into two sections: (1) General Comments, and (2) Specific Comments. The first section discusses the County's strategic concern with the Tentative Order's requirement, whereas the latter section addresses issues relating to specific requirements.

The County has endeavored to provide a complete set of comments on the Tentative Order. However, the County reserves the right to submit additional comments relating to Tentative Order No. R9-2007-0002 and the supporting Fact Sheet/Technical Report to the Regional Board in the future.

GENERAL COMMENTS

The principal goal of the Copermittees' environmental monitoring program is to support the Drainage Area Management Plan. This goal is entirely consistent with other observations on the role of monitoring. For example, "monitoring is most useful when it results in more effective management decisions, specifically management decisions that protect or rehabilitate the environment." (NAS, 1991[1]). A number of the proposed modifications to the monitoring program do not appear to be supportive of this goal. Further, as changes in protocols and procedures are mandated there is a significant risk that they start to compromise the integrity and value of what is increasingly being recognized as one of the most comprehensive urban stormwater quality data sets in the United States. Finally, while the Board's interest in moving toward greater regional consistency is recognized, the Permittees are concerned that requirements are being prescribed without due consideration of the needs of south Orange County.

SPECIFIC COMMENTS

E.II.A.1.c. Timing of Mass Loading Station (MLS) Monitoring

The requirement to sample the first wet weather event of the year at each MLS needs to be considered in the context of the entire Orange County effort. Including the six MLSs

[1] Managing Troubled Waters, National Academy of Sciences, 1991

in the tentative order, there would in future be eighteen MLSs in Orange County requiring “first flush” sampling.

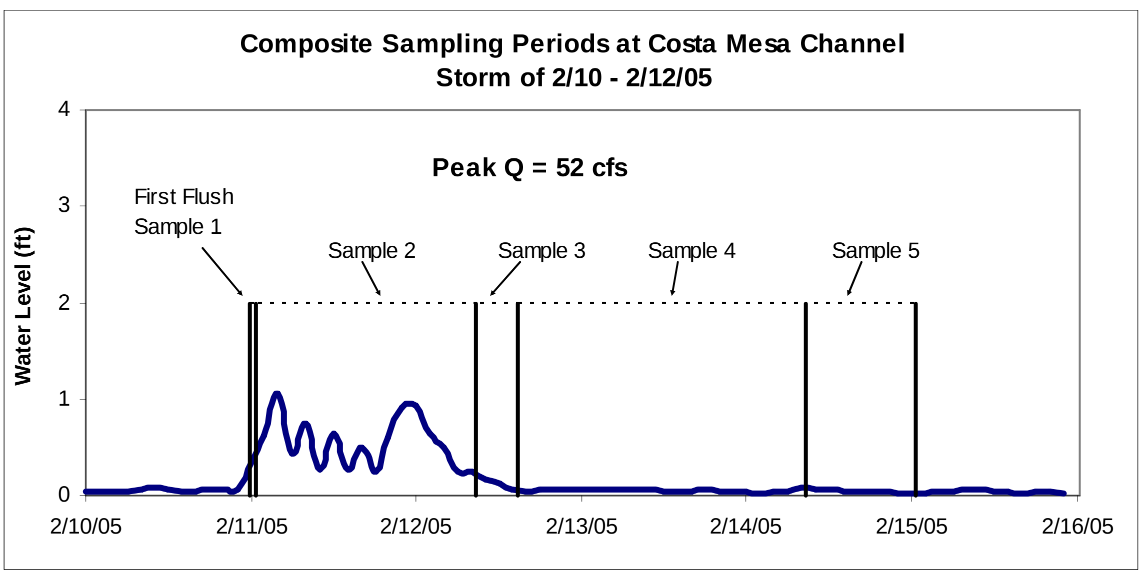
Proposed modification:

The requirement to increase the “first flush” sampling effort needs to be predicated on an assessment and finding of need.

E.II.A1.d. Flow-weighting of Wet Weather Samples

The requirement to collect flow-weighted composite stormwater samples will not allow accurate comparisons to CTR criteria for chronic toxicity due to dissolved metals. The County’s present method provides a more thorough and reliable characterization of a storm with respect to comparison to water quality standards. 3-5 time-weighted composite samples are collected during a 4-day period to characterize a storm and its subsequent effects (see example below). The first flush sample is collected over an hour period and is comprised of six discrete samplings 12 minutes apart. The subsequent composite samples are prepared from bi-hourly samples.

The analyte concentrations from each of the composite samples are combined with the respective discharge volumes during the composite samplings to calculate the individual and total stormwater loads. The dissolved metals concentrations from each of the samples are compared to the CTR acute criteria. The time-weighted average dissolved metals concentrations for the 4-day sampling period are compared to the CTR chronic criteria.



Flow-weighted compositing by field instrumentation (automatic sampler linked to portable flowmeter) has many disadvantages including:

- Since the components are linked, if one component fails the system fails.

- When programming the autosampler the operator must have a fairly accurate prediction of the size of the storm. If the magnitude is over predicted the sampler will not collect enough volume for all of the required analyses. If the magnitude is under predicted the autosampler will collect too frequently and the latter part of the storm will be missed unless the autosampler is serviced before or immediately after the time of the last sampling. Since the County will be required to monitor 18 MLSs during the first measurable rain event of the season this type of maintenance is not possible.
- The channel rating must be accurate at the time of sampling. Flow rates are calculated from the water level records using the channel rating (stage-discharge relationship). Presently, water level records are processed at the end of monitoring year (quarterly for Santa Ana Region TMDL programs). The water level records are adjusted (with shifts) to reflect changes in the stage-discharge relationship arising from sediment deposition/scouring or new instantaneous discharge measurements. These adjustments can result in significant differences in the calculated discharge rates.

If the County were required to modify its current automatic sampling procedure for stormwater, manpower limitations would dictate that the process be conducted by flow-weighted compositing in the laboratory as described in EPA 833-B-92-001 Exhibit 3-20 (constant time – volume proportional to flow rate). Aliquots from each bottle, proportional to flow rate at the time of collection would be composited into a single large container. Aliquots from the container would be submitted for the required analyses.

Advantages:

- The autosampler and the flowmeter are not linked, reducing the likelihood of sampling failure.
- Unscheduled autosampler servicing (to reprogram the collection frequency due to changes in storm magnitude) would not be required.

Disadvantages:

- The volume of a composite sample may not be great enough to accommodate all of the chemical and toxicity testing analyses. For short duration storms the volume of the composite sample would be much smaller. Presently Orange County analyzes chronic toxicity in mass emissions samples with multiple dilution tests. Some of these tests require substantial volume. Approximately 4 gallons of sample are required for toxicity tests currently conducted on stormwater samples under the third term permit.
- The space limitations of the County's laboratory would severely hinder expeditious processing of all of the samples from the first measurable event of each year.

Two automatic samplers, operating simultaneously, would be used to collect bi-hourly samples. Each sampler contains eight 1.8-liter glass bottles and the site would have to be serviced at least every 16 hours to change bottles and power supplies. The maximum volume collected in each bi-hourly sampling is 2 x 1.8 = 3.6 liters. The volume from each bi-hourly sampling used in the composite sample is calculated as:

$V_i = V_L[(V_{imax}Q_i/Q_{max}) / \quad (V_{imax}Q_i/Q_{max})]$ where

V_i = volume from each bi-hourly sampling
V_L= volume required for all analyses
V_{imax} = volume of the bi-hourly sample corresponding to the greatest discharge rate
Q_i = flow rate for sample i
Q_{imax} = maximum flow rate recorded for any bi-hourly sampling

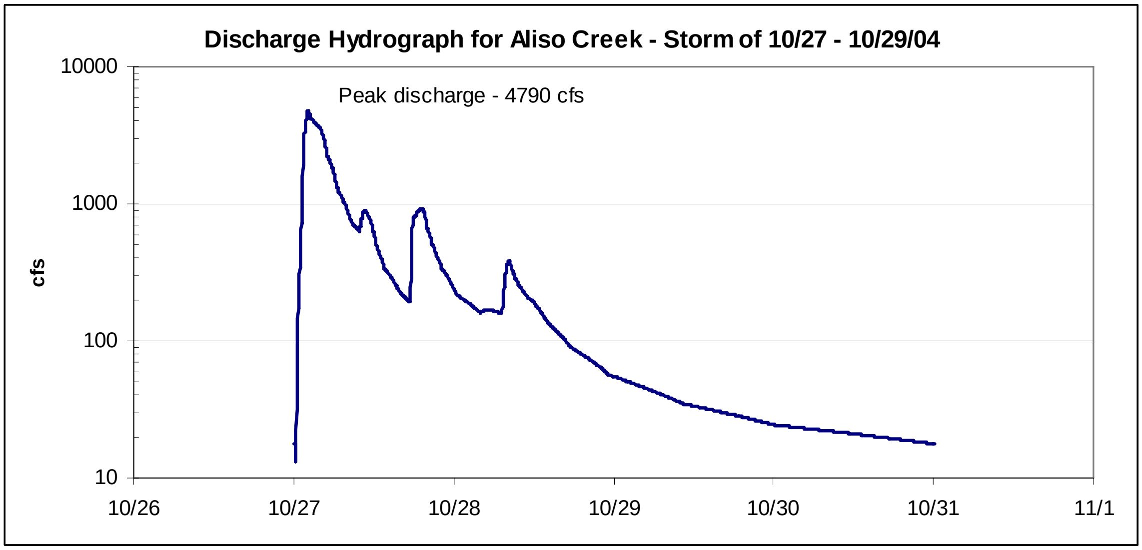
$(V_{imax}Q_i/Q_{imax})$ must first be calculated to ensure that it is greater than V_L. If it is not, the equation becomes:

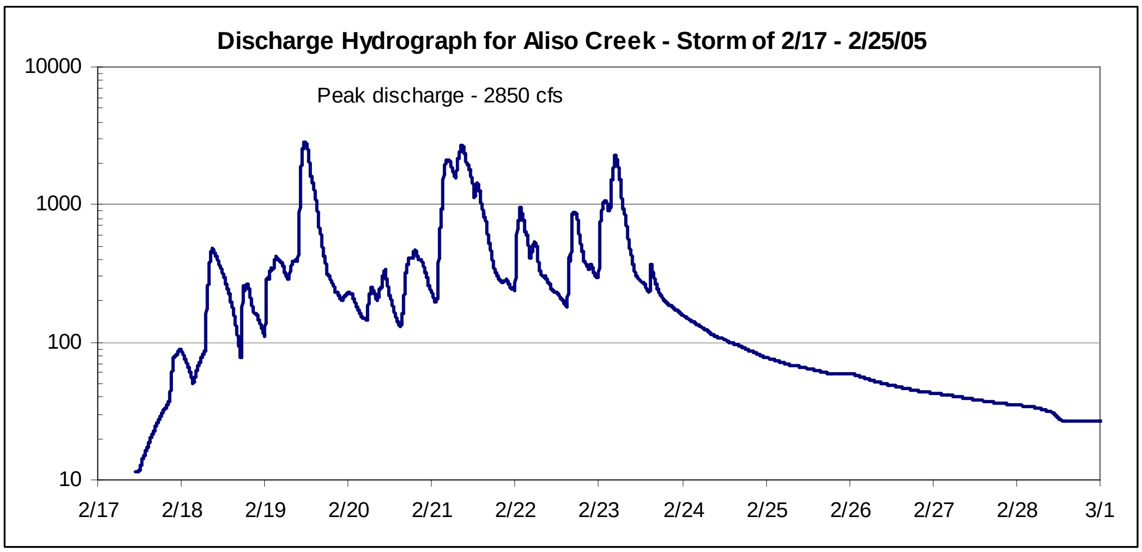
$V_i = V_{imax}Q_i/Q_{imax}$

The following two discharge hydrographs illustrate the disadvantages of flow-composite sampling using automatic sampling and laboratory compositing. The first storm spans approximately two days and has a significant peak discharge. Assuming a maximum sample bi-hourly sample volume of 3.6 liters, the total volume of the composite sample would be just 12.9 liters. The sample volumes required for chemical and toxicity tests used in the program are tabulated below.

	Analysis	**Req. Vol. (L)**	
	Nutrients incl. TSS	1.5	
	Trace Metals (total)	0.25	
	Trace Metals (diss)	0.25	
	OP + Pyrethroid Pesticides	2.0	
	Carbamate Pesticides	1.0	
	DOC	0.25	
	TOC	0.25	
	TDS	0.25	
	Toxicity Tests	0-1 dilutions	5 dilutions
1	Ceriodaphnia survival/reproduction	6	10
2	Hyalella survival	1.5	3
3	Selenastrum growth	1.5	3
	Total Chem + Tox 1-3	**14.75**	**21.75**
4	Mysid survival/growth	10	14
5	Sea Urchin fertilization	1	1
6	Fathead Minnow survival	10	14
	Total Chem + Tox 1,5,6	**22.75**	**30.75**
	Total Chem + Tox 1,4,5,6	**32.75**	**44.75**

Storm 2 spans more than seven days and would generate enough volume in the composite to accommodate all analyses. However, these seven days of sampling would yield approximately 90 bi-hourly samples (90 1.8-liter bottles) which would have be stored and refrigerated until the sampling was completed and the maximum discharge rate determined.





Proposed Modification:

Clearly the choice of automatic sampling options is not an easy one. The present method and the constant time – volume proportional to flow rate method each have advantages and disadvantages. The choice should not be solely based on costs or logistics. The County recommends that a pilot study be conducted to determine the differences between the two methods rather than making such a significant change to the direction of the monitoring program through the permit process.

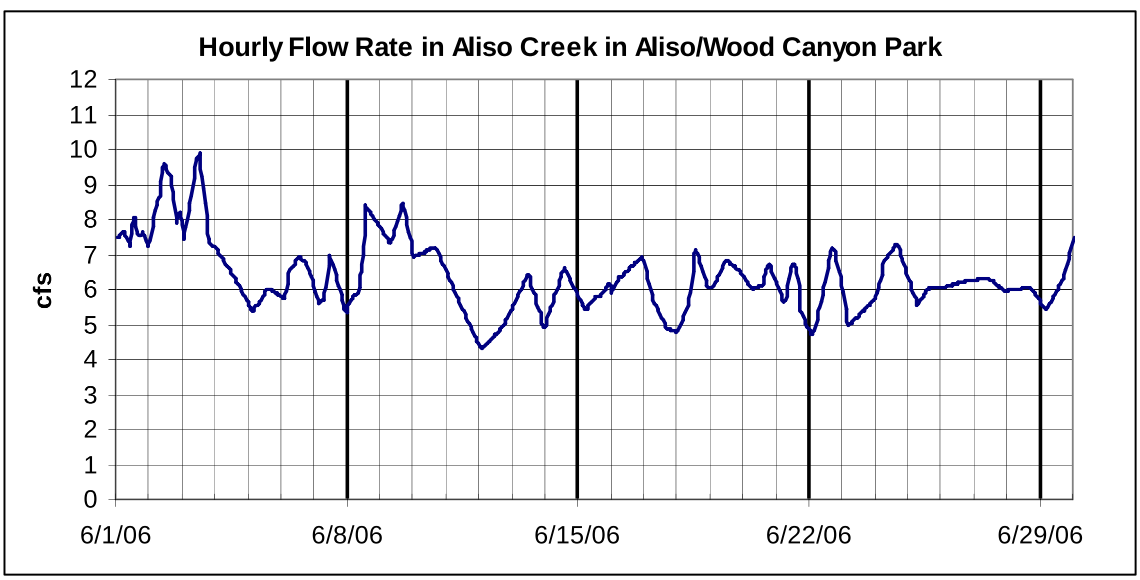
Until the study is completed, the monitoring protocols would remain the same as in the third permit.

E.II.A.1.d. Dry Weather Composite Sampling

The proposed frequency of sample collection (minimum 3 samples / hour) during dry weather monitoring at MLSs does not support the objective of identifying illegal discharges and illicit connections and presents significant technical challenges. During a "typical" 24-hour period, flow rate at an MLS does not vary significantly and the changes in water chemistry at an MLS would be muted because of the large size of the watershed and the number of stormdrain inputs.

In order to comply with this requirement these composite samples would have to be prepared using the constant time – volume proportional to flow increment method (EPA 833-B-92-001 Exhibit 3-19) or constant time – volume proportional to flow rate method (Exhibit 3-20). Either method would require that 72 discrete samples be collected during a 24-hour period and that the samples be flow-composited in the laboratory. Automatic samplers linked to flowmeters will not accommodate both constant time collection and flow-compositing during the same sampling period. To collect 3 samples/hour and produce a flow-composite sample, three automatic samplers would be required at each site for each event.

The flow rate at an MLS, as noted above, does not vary significantly during a typical 24-hour day. Below is a graphic showing the hourly flow rate in Aliso Creek at the streamgauge in Aliso/Wood Canyon Wilderness Park during June of 2006. As can be seen from the graph, the greatest difference between the maximum and minimum hourly flow rates during any 24-hour period is less than 35% of the maximum value (9.9 cfs at 13:00 on 6/3 and 6.5 cfs at 12:00 on 6/4). To produce a flow-composite sample, aliquots from each of the 72 samples collected during the 24-hour period would be combined in a single container. The volume of each of the aliquots would be proportional to the flow rate (q_i/q_t) at the time of sample collection and the volume of the sample collected at the maximum flowrate. Unless the pollutant discharge occurred over several hours or if the concentration of the pollutant was several orders of magnitude above the baseline concentration, it would be difficult to detect intermittent illegal discharges from the composite sample concentration.



Proposed Modification:

Conduct dry-weather monitoring at MLSs with time-weighted composite samples composed of 24 discrete hourly samples. Compute the mass loads of pollutants as the product of the composite sample concentration and the total volume of water discharged past the monitoring point during the time of sample collection.

E.II.A.1.g. Analytical Testing for Mass Loading, Bioassessment, and Ambient Coastal Receiving Waters

Nitrite is readily oxidized to nitrate in the natural aquatic environment. Analysis of this form of nitrogen would not provide any added benefit and would significantly increase program costs. Presently and in prior permit monitoring programs, the concentrations of nitrite + nitrate has been determined and reported as NO_3.

Proposed Modification:

Analyze nitrite + nitrate together as in prior monitoring programs.

Pyrethroid Pesticides

Pyrethroid pesticides are very insoluble and tend to bind to sediment. They would not be detected in an aqueous sample unless the sample had a very high concentration of suspended solids.

Proposed Modification:

Analyze Pyrethroid pesticides in sediments at Bioassessment sites and in Dana Point Harbor.

E.II.A.1.h.(1) DDE Monitoring at the San Juan Creek MLS

Assuming that the requirement to add DDE monitoring was a product of the 303(d) listing of San Juan Creek for DDE, the MLS is not within the water quality limited segment defined by the 303(d) list. The listing was based on samplings conducted at SWAMP station San Juan Creek 9. The 2006 303(d) list states that the estimated size affected is 1 mile. The San Juan Creek MLS is two miles upstream of San Juan Creek 9.

Proposed Modification:

Do not add DDE monitoring at the San Juan Creek MLS.

E.II.A1.i. Toxicity Testing at MLSs

The proposed requirement would result in a change in toxicity testing organisms at MLSs. Presently toxicity of stormwater discharges is measured using multiple dilution tests with marine organisms to assess the impact of stormwater on the coastal environment. In the Santa Ana Region monitoring program, testing with marine and freshwater organisms is used.

The TDS concentration in at least two (Prima and Segunda Deschecha Channels) of the six MLSs is great enough to negatively affect the toxicity test using *Ceriodaphnia dubia*. The seepage of local saline groundwater into these channels causes these high TDS concentrations.

Proposed Modification:

For dry-weather samples conduct toxicity testing with:

1. Chronic (7-day) survival test with *Ceriodaphnia dubia*. Measure the specific conductance of the sample first. If the conductance exceeds 2500 mhos/cm, substitute *Daphnia magna* and conduct chronic toxicity test (EPA/600/D-87/080, March 1987).
2. Chronic (96-hour) growth test with *Selenastrum capricornutum*
3. Acute survival test with *Hyalella azteca*.

For stormwater samples conduct toxicity testing with:

1. Chronic (7-day) survival test with *Ceriodaphnia dubia*. Measure the specific conductance of the sample first. If the conductance exceeds 2500 mhos/cm, substitute *Daphnia magna* and conduct chronic toxicity test (EPA/600/D-87/080, March 1987).
2. Chronic (96-hr) survival/growth test with *Americamysis bahia*.
3. Chronic (40-min exposure) fertilization test with *Stronglyocentrotus purpuratus.*
4. Chronic (96-hr) survival/growth with larval *Pimphales promelas.*

E.II.A.4.b. Toxicity Testing at ACRW Sites

The Tentative Order proposes the use of freshwater organisms for toxicity testing. Historically, the aqueous toxicity tests have been conducted with marine organisms since the intent of the program is to evaluate the impact of urban runoff on the coastal receiving waters.

Proposed Modification:

Continue to use marine organisms for toxicity testing at the ACRW sites.

E.II.A.5.c.(1) Continue Baseline Monitoring at CSDO Sites

The list of sites to continue baseline monitoring (weekly sampling of indicator bacteria in the stormdrain and the surfzone) includes four stormdrains (MAINBC, LINDAL, BLULGN and PEARL) which are diverted during the AB-411 season. There should be no requirement to sample while drains are being diverted.

E.II.A.5.c.(2) Special Investigations

The Permittees have conducted numerous bacterial source investigations in the Region including:

1. Aliso Creek 13225 Directive Monitoring Plan and J03P02 Cleanup and Abatement Order Monitoring Plan. 2001-2005. Quarterly Progress Reports can be found on the Watershed and Coastal Resources Website at: http://www.ocwatersheds.com/watersheds/Aliso_reports_studies.asp

2. San Juan Creek Microbial Source Tracking Study conducted by the Orange County Health Care Agency and the University of South Florida, 2002. The Report can be found on the Watershed and Coastal Resources Website at: http://www.ocwatersheds.com/watersheds/sanjuan_reports_studies_Qtr1_section1.asp

3. Bacterial Source Tracking Study on Prima Deshecha Channel conducted by MEC/Weston Solutions on behalf of the County and San Clemente, 2006.

These studies need to be explicitly recognized in the Tentative Order and duplicative efforts not required.

Proposed Modification:

Requirements for bacterial source investigations should be stayed pending development of emerging source tracking methodologies.

E.II.B.1 MS4 Outfall Monitoring During Wet Weather

The requirement to monitor MS4 outfalls during wet weather does not support source investigations.

Proposed Modification:

Continue to use the Dry-weather Reconnaissance data as the primary monitoring effort to identify potential sources within the watershed.