February 27, 2017

Jessica Watkins
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

VIA EMAIL: jwatkins@waterboards.ca.gov

Subject: Comments on Tentative Order: NPDES Permit No. CA0038776, Regional Water Quality Control Board Order No. R2-2017-00XX for City of Pacifica Calera Creek Water Recycling Plant and its wastewater collection system

Dear Ms. Watkins:

The Bay Area Clean Water Agencies (BACWA) appreciates the opportunity to comment on the Tentative Order (TO) issued to the City of Pacifica Calera Creek Water Recycling Plant and its wastewater collection system (Pacifica). BACWA is a joint powers agency whose members own and operate publicly-owned treatment works (POTWs) and sanitary sewer systems that collectively provide sanitary services to over 7.1 million people in the nine-county San Francisco Bay Area. BACWA members are public agencies, governed by elected officials and managed by professionals who protect the environment and public health.

BACWA's comments pertain to the new numeric chronic whole effluent toxicity (WET) limits in Pacifica's Tentative Order. Pacifica's current permit contains narrative toxicity limits, and numeric triggers that if exceeded lead to accelerated monitoring as well as a toxicity investigation/reduction evaluation (TIE/TRE). BACWA is extremely concerned about the imposition of chronic toxicity limits in this TO, particularly since at 1.0 TUc as an average monthly effluent limit (AMEL), and 1.8 TUc as a maximum daily effluent limit (MDEL), these limits are within the natural variability of the test. Toxicity testing is best deployed as a monitoring tool to observe if there is toxicity due to an unknown contaminant that is not being monitored, rather than a metric that leads to a violation if exceeded, even before any investigations have been conducted.

Toxicity testing measures a biological response, rather than directly measuring the presence of a toxicant. While biological inhibition may occur in response to a toxicant, it can also occur due to problems with the organisms' food, or with the health of the organisms themselves. It is particularly difficult to investigate the cause of a toxicity result below approximately 2 TUc,

because the results are typically intermittent and can't be associated with any particular activity or discharge.

Because of the lower validity of WET data when measured at low levels, over the past seven years, several dischargers in the San Francisco Bay Region have exceeded their triggers and were required to conduct TREs (see Attachment 1). Of the six shallow water dischargers with low toxicity triggers who have conducted TREs in the past five years, only one has identified a probable toxicant. The other TREs were either inconclusive or showed pathogen interference was the cause of the observed toxic effect. Pacifica's test species, *Ceriodaphnia dubia*, in particular, has been problematic, as it is vulnerable to epibiont[1] pathogenicity for dischargers such as the San Jose/Santa Clara Regional Wastewater Facility, and the City of Palo Alto. The total cost of these TRE efforts has been upwards of $1.3 million for this seven-year period.

Besides problems with interference, there has been significant variability observed between laboratories measuring toxicity in the same effluent sample. Between August 2009 and May 2010, San Jose sent fifteen split samples to different labs for chronic toxicity testing using *Ceriodaphnia* (see Attachment 2). In four of these fifteen occasions, the results from the two labs were sufficiently different that one of the results would have contributed to a trigger exceedance and the other would not. In two cases, one lab showed relatively high levels of toxic effect (>5 TUc) while the other showed none.

This laboratory variability, particularly with *Ceriodaphnia*, was also observed by the Southern California Coastal Water Research Program in their recent interlaboratory study[2]. Results from this study are provided in Figure 1, below, where the *Ceriodaphnia* reproduction test reproducibility was poor, often showing high toxicity (high percent effect) in the blank samples, and low toxicity (low percent effect) in the copper spiked samples.

[1] See San Jose/Santa Clara RWF's Annual Report, pg. 21, see https://bacwa.org/document/san-jose-annual-report-2016/

[2] Stormwater Monitoring Coalition: Toxicity Testing Laboratory Guidance Document, Southern California Coastal Water Research Program.
http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/956_StrmWtrMonitCoalitToxTestingLabGuid.pdf

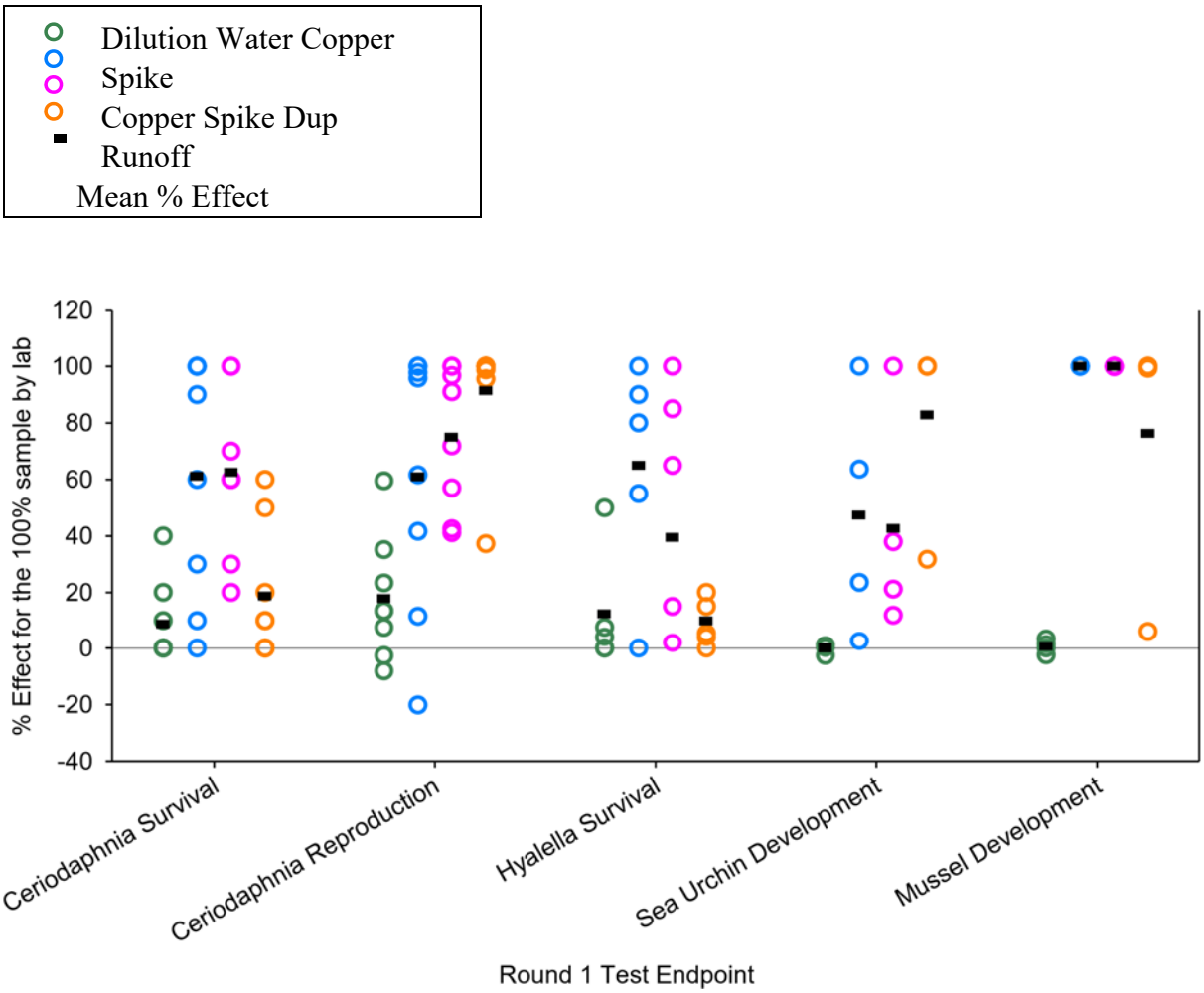

Figure 1. Toxicity test response (% effect) of the various endpoints to full strength (no dilution or 100%) samples during Round 1 of the SMC intercalibration study. Each symbol represents the result from a single laboratory[2]

In light of these known issues with the chronic WET test, and with the *Ceriodaphnia dubia* test species specifically, BACWA's recommendations for implementing toxicity limits in Pacifica's TO are below.

1. **BACWA recommends that the Regional Water Board consider alternatives to effluent limits for investigating low levels of toxicity**

The Central Valley Regional Water Board has allowed dischargers under its jurisdiction to initiate a study of low level toxicity. Dischargers may participate in this study in lieu of pursuing a TRE after observing such low-level toxicity. From the Central Valley Regional Water Board's 2017/18 Priorities:

> *Over the past five years staff has noticed an overall decrease in the magnitude of toxicity reported and a potential increase in reoccurring but intermittent low level toxicity. As a result of the toxicity being intermittent and occurring at low levels, several Dischargers have conducted multiple year studies, accruing heavy costs and in many cases not identifying the cause. In FY 17/18 staff would continue working with stakeholders to better understand chronic toxicity with a focus on low level chronic toxicity. In addition, staff will work with industry experts and the State Water Board to develop a chronic toxicity guidance document.*

Rather than imposing low toxicity limits, BACWA recommends that the San Francisco Bay Regional Water Board consider working with its counterpart in the Central Valley to develop guidance for investigating low level toxicity.

2. **If effluent limits are necessary, the Regional Water Board should establish a minimum level for chronic toxicity. Results below laboratory reporting levels should not be deemed as violations.**

The AMEL of 1.0 TUc is equal to the Method Detection Limit (MDL) of the WET test, since lower toxicity cannot be measured. The variability in WET test results increases as the toxicity approaches the MDL. In contrast to chemical effluent limits, there are no Minimum Levels (MLs) that have been established for chronic toxicity. If there were, results in the 1.0 to 1.8 TUc range would probably be below a likely ML/Reporting Level (RL), making them Detected Not Quantified (DNQ) values, and not suitable for compliance evaluation purposes. The Regional Water Board or EPA should establish chronic toxicity MLs before imposing numeric chronic toxicity effluent limits, particularly a limit set equal to the MDL. Additionally, laboratories should be given guidance for establishing RLs for the WET test.

Once these analytical measures are in place, compliance determination for chronic toxicity limits should be consistent with that for other permitted constituents. Specifically, reporting and enforcement requirements for toxicity should be equivalent with those listed in Attachment E, Section VIII.B.6:

> *For purposes of reporting and administrative enforcement by the Regional Water Board and State Water Board, the Discharger shall be deemed out of compliance with effluent*

> *limitations if the concentration in the monitoring sample is greater than the effluent limitation and greater than or equal to the RL.*

3. BACWA recommends that the maximum daily effluent limit of 1.8 TUc be removed

Due to the variability inherent in toxicity testing, declaring a violation based on a single test result without confirmation sampling is unwarranted. Single sample exceedances that are not part of a pattern of toxicity should be viewed with suspicion, as they may be due to transient causes unrelated to chronic toxicity, especially when they are below 2 TUc. The appropriate response to a WET test indicating the presence of toxicity is to investigate the cause, starting with follow up testing to confirm the initial result.

Exceedance of the effects level identified in the proposed MDEL will trigger accelerated monitoring whether or not it is an enforceable limit. This response is the result that the Regional Water Board and EPA want to encourage, so there is no additional benefit from making it a violation, while Pacifica would potentially suffer an enforcement action or a citizen lawsuit for an event over which it has no control.

4. BACWA recommends that Pacifica be given a choice of test species

On page F-26, the TO states:

> *The Discharger's August 2016 chronic toxicity screening report found green algae (Selenastrum capricornutum) to be the most sensitive species (2 TUc); however, tests conducted in May and June 2015 using the water flea (Ceriodaphnia dubia) exhibited more chronic toxicity (10.6 and 4.3 TUc). Thus, this Order retains the requirement to use the water flea (Ceriodaphnia dubia) for chronic toxicity tests because it is the most sensitive species.*

This reasoning does not make sense. It is unknown whether *Selenastrum* would have exhibited toxicity during the May and June toxicity events, since this alternative test was not run at that time. Furthermore, Pacifica did a TIE which concluded that biological contamination in the UV channel was the likely cause of the observed toxic effect, which may not have impacted *Selenastrum* as it did *Ceriodaphnia*. If Pacifica were given a choice of test species between *Selenastrum* and *Ceriodaphnia*, it could determine which test had less variability in its effluent, yielded consistent, actionable results, and avoid spurious violations.

5. Violations should not continue to accrue during Toxicity Identification Evaluations/Toxicity Reduction Evaluations

If Pacifica can demonstrate to the Regional Water Board that it is engaged in a good-faith effort to investigate the cause of any apparent toxicity, the permit should protect them from accruing any additional violations that would result from exceedance of permit limits during accelerated monitoring. Not providing this protection leaves the discharger vulnerable to citizen lawsuits, even as it is doing all that it can to address the cause of the violation.

6. Language about episodic toxicity and enforcement should be reinstated.

The current permit includes the following requirement (Attachment E, Section V.B.3.h.i):

> *The Regional Water Board recognizes that chronic toxicity may be episodic and identification of causes of and reduction of sources of chronic toxicity may not be successful in all cases. Consideration of enforcement by the Regional Water Board will be based in part on the Discharger's actions and efforts to identify and control or reduce sources of consistent toxicity.*

This section is no less applicable with effluent limits than with triggers, and should be restored.

BACWA appreciates the opportunity to comment on this Tentative Order and thanks you for considering our concerns.

Respectfully Submitted,

David R. Williams

David R. Williams
Executive Director
Bay Area Clean Water Agencies

cc: BACWA Board
Pedro Mendoza, City of Pacifica
Denise Conners, Larry Walker and Associates
Eric Dunlavey, BACWA Permits Committee Chair

Summary of Chronic TREs by Region 2 Dischargers

Shallow Dischargers

Discharger	Timeframe	Number of Samples	Number between 1 and 2 Tuc	Percentage between 1 and 2 Tuc	Number ≥ 2 Tuc	Percentage ≥ 2 Tuc	TRE Notes
Palo Alto	June 2009 - December 2014	72	5	7%	10	14%	TRE Feb-Jul 2012, concluded cause was pathogen interference. Cost approximately **$100K**.
San Jose	July 2009 - December 2016	127	15	12%	12	9%	TRE/TIEs Oct 2009 - June 2010, and June 2013- August 2014, both inconclusive. Investigations in 2016 confirmed presence of epibionts. Total cost above **$260K**.
Sunnyvale	January 2010 - December 2014	85	4 (survival) 14 (Growth)	5% (survival) 16% (growth)	2 (survival) 12 (Growth)	2% (survival) 14% (growth)	Three successive TREs, all inconclusive - ammonia, unidentified organic and polymer, respectively, were suspected. Total cost approximately **$750K**.
Novato	October 2010 - October 2014	25	2	8%	13	52%	TRE Feb 2011 - May 2012, found pathogen interference. Total cost approximately **$100K.**
Sonoma	March 2006 - January 2015	53	6	11%	9	17%	Ongoing TIE indicates that zinc may be toxicant. Total cost **$73K.**
Las Gallinas	April 2009 - December 2014	32	19 (survival) 20 (Growth)	59% (survival) 62% (growth)	1 (survival) 2 (Growth)	3% (survival) 6% (growth)	TIE work since 2011 is inconclusive, but pyrethroids are suspected. Total cost approximately **$50K**.

Deep Water Discharger

Discharger	Timeframe	Number of Samples	Number between 10 and 20 Tuc	Percentage between 10 and 20 Tuc	Number ≥ 20 Tuc	Percentage ≥ 20 Tuc	TRE Notes
Vallejo	January 2016-June 2016	7	3	43%	0	0%	Addition of zeolite showed toxicity caused by ammonia. District received permission to conduct toxicity testing with zeolite in future. Total cost approximately **$60K**.

San Jose-Santa Clara Regional Wastewater Facility

Chronic Toxicity Test Results 2009-Dec 2014 **Test Species: *Ceriodaphnia dubia (May 2009- October 2014 Permit)***

Start Date	NOEC (Survival)	TUc (Reproduction)	NOEC % (Reproduction)	EC or IC 25 (Reproduction)	TST (Reproduction)
7/18/09	100%	33.5	<32% effluent	2.99% effluent	Fail 67.7%
8/1/09	100%	<1	100% effluent	>100% effluent	Pass
8/17/2009 (TSI)	100%	1.17	100% effluent	85.4% effluent	Fail 25%
8/19/2009 (PERL)	100%	2.49	56% effluent	40.2% effluent	Fail 36%
9/14/2009 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
9/15/2009 (ESD)	100%	<1	100% effluent	>100% effluent	Pass
10/4/2009 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
10/4/2009 (ESD)	100%	<1	100% effluent	>100% effluent	Pass
11/7/2009 (ESD)	100%	<1	100% effluent	>100% effluent	Pass
11/28/2009 (TSI)	100%	<1	100% effluent	>100% effluent	Pass
11/29/2009 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
12/18/2009 (ESD)	100%	5.78	<32% effluent	17.3% effluent	Fail 41.9%
12/20/2009 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
1/9/2010 (TSI)	100%	<1	100% effluent	>100% effluent	Pass
1/10/2010 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
1/20/2010 (TSI)	100%	<1	100% effluent	>100% effluent	Pass
1/21/2010 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
1/30/2010 (ESD)	100%	<1	100% effluent	>100% effluent	Pass
1/31/2010 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
2/8/2010 (AS)	75%	5.2	<32% effluent	19.1% effluent	Fail 75.5%
2/8/2010 (ESD)	100%	8.5	<32% effluent	11.8% effluent	Fail 40.3%
2/26/2010 (AS)	100%	<1*	100% effluent	>100% effluent	Pass
2/27/2010 (ESD)	100%	7.5	<32% effluent	13.3% effluent	Fail 70.7%
3/13/2010 (AS)	100%	<1	100% effluent	>100% effluent	Pass
3/13/2010 (ESD)	100%	<1	100% effluent	>100% effluent	Pass
3/27/2010 (ESD)	100%	<1	100% effluent	>100% effluent	Pass
3/28/2010 (AS)	100%	<1	100% effluent	>100% effluent	Pass
4/17/2010 (ESD)	100%	<1	100% effluent	>100% effluent	Fail 16.9%
4/17/2010 (AS)	100%	No Result**	NA	NA	NA
5/1/2010 (ESD)	100%	<1	100% effluent	>100% effluent	Pass

October 2009-June 2010: SJSC conducted TRE/TIE investigations. TIE costs estimated ~ $200,000 - 250,000. Toxicity Identification Evaluation (TIE) manipulations were performed on samples from two confirmed toxic events in February with support from Aqua-Science Laboratories in Davis, CA. The TIE studies could only confirm that toxicity was present, was only slightly ameliorated by EDTA (not a metal or only slight effect from a metal), was more ameliorated by Solid Phase Extraction (SPE) columns (likely organic), was substantially ameliorated by Organophosphate (OP) enzyme and piperonyl butoxide (PBO) (indicating possibility of an OP pesticide or some organic compound that behaves similarly), was exacerbated by filtration (not particle-bound) and was exacerbated by sodium thiosulfate (STS) (not an oxidizer). Unfortunately, attempts to elute and recover the toxicity captured on SPE columns were unsuccessful. For this reason, the TIE investigations were of limited value.

5/2/2010 (AS)	100%	1.8	42% effluent	55.6% effluent	Fail 24%
5/2/2010 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
5/21/2010 (ESD)	100%	<1	100% effluent	>100% effluent	Pass
5/21/2010 (PERL)	100%	<1	100% effluent	>100% effluent	Pass
6/14/10	100%	<1	100% effluent	>100% effluent	Pass
6/26/10	100%	<1	100% effluent	>100% effluent	Pass
7/17/10	100%	<1	100% effluent	>100% effluent	Pass
8/13/10	100%	<1	100% effluent	>100% effluent	Pass
9/19/10	100%	10.4	6.25% effluent	9.63% effluent	Fail 84.8%
10/4/10	100%	<1	100% effluent	>100% effluent	Pass
10/24/10	100%	<1	100% effluent	>100% effluent	Pass
11/13/10	100%	<1	100% effluent	>100% effluent	Pass
12/11/10	100%	No Result**	100% effluent	>100% effluent	Pass
12/19/2010 (TSI)	100%	<1	100% effluent	>100% effluent	Pass
1/10/11	100%	<1	100% effluent	>100% effluent	Pass
2/21/11	100%	<1	100% effluent	>100% effluent	Pass
3/7/11	100%	<1	100% effluent	>100% effluent	Pass
4/21/11	100%	<1	100% effluent	>100% effluent	Pass
5/10/11	100%	5.46	25% effluent	18.3% effluent	Fail 51.8%
6/9/11	100%	<1	100% effluent	>100% effluent	Pass
6/21/11	100%	1.4	50% effluent	71% effluent	Fail 34.6%
7/23/11	100%	<1	100% effluent	>100% effluent	Pass
8/8/11	100%	<1	100% effluent	>100% effluent	Pass
8/22/11	100%	1.7	25% effluent	58.9% effluent	Fail 62.9%
9/13/11	100%	<1	100% effluent	>100% effluent	Pass
10/3/11	100%	<1	100% effluent	>100% effluent	Pass
11/2/11	100%	<1	100% effluent	>100% effluent	Pass
12/5/11	100%	<1	100% effluent	>100% effluent	Pass
1/10/12	100%	1.6	50% effluent	61.7% effluent	Fail 40.8%
2/6/12	100%	<1	100% effluent	>100% effluent	Pass
3/5/12	100%	<1	100% effluent	>100% effluent	Pass
4/16/12	100%	<1	100% effluent	>100% effluent	Pass
5/7/12	100%	<1	100% effluent	>100% effluent	Pass

6/11/12	100%	<1	100% effluent	>100% effluent	Pass
7/16/12	100%	<1	100% effluent	>100% effluent	Pass
8/13/12	100%	<1	100% effluent	>100% effluent	Pass
9/11/12	100%	<1	100% effluent	>100% effluent	Pass
10/16/12	100%	4.1	12.5% effluent	24.5% effluent	Fail 24.5%
11/2/12	100%	<1	100% effluent	>100% effluent	Pass
11/8/12	100%	<1	100% effluent	>100% effluent	Pass
12/3/12	100%	<1	100% effluent	>100% effluent	Pass
1/19/13	100%	1.7	25% effluent	58.1% effluent	Fail 63.3%
2/4/13	100%	<1	100% effluent	>100% effluent	Pass
3/4/13	100%	10.1	6.25% effluent	9.88% effluent	Fail 44.2%
4/2/13	100%	<1	100% effluent	>100% effluent	Pass
4/12/13	100%	1.2	100% effluent	84.5% effluent	Fail 27%
5/6/13	100%	2.3	50 % effluent	42.7% effluent	Fail 67.6%
6/10/13	100%	<1	100% effluent	>100% effluent	Pass
7/12/13	100%	<1	100% effluent	>100% effluent	Pass
8/1/13	100%	1.1	50% effluent	90.7% effluent	Fail 27.1%
8/5/13	100%	<1	100% effluent	>100% effluent	Pass
9/12/13	100%	2.9	25% effluent	34.6% effluent	Fail
10/4/13	100%	<1	100% effluent	>100% effluent	Pass
11/19/13	100%	1.2	50% effluent	86.1% effluent	Fail
12/9/13	100%	<1	100% effluent	>100% effluent	Pass
1/10/14	100%	<1	100% effluent	>100% effluent	Pass
2/3/14	100%	1.6	100% effluent	>100% effluent	Fail
3/3/14	100%	<1	100% effluent	>100% effluent	Pass
4/8/14	100%	<1	100% effluent	>100% effluent	Pass
5/5/14	100%	<1	100% effluent	>100% effluent	Pass
6/9/14	100%	<1	100% effluent	>100% effluent	Pass
7/14/14	100%	<1	100% effluent	>100% effluent	Pass
8/11/14	100%	<1	100% effluent	>100% effluent	Pass
9/12/14	100%	<1	100% effluent	>100% effluent	Pass
10/3/14	100%	<1	100% effluent	>100% effluent	Pass
11/3/14	100%	<1	100% effluent	>100% effluent	Pass
12/8/14	100%	<1	100% effluent	>100% effluent	Pass

June 2013-August 2014: TRE/TIE initiated in response to permit triggers being exceeded. TIE studies were unsuccessful in confirming toxicity or identifying potential toxicants. The frequency and magnitude of the observed paralysis (a sub-chronic effect) in RWF effluent have also declined.

Note: SJSC uses a TRE/TIE trigger of 2 TUc calculated as 100/EC50 or IC50 or three sample median of >1 as recommended in the 2009 TRE Workplan submitted to Regional Water Board

* <1 - This result was rejected due to an anomolous dose response inversion.

** Test Failed Quality Control