6/21/06 BdMtg Item ___
Chlorine Policy
Deadline: June 5, 2006

WATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

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June 5, 2006
File No. 31-370.40.4A

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Via electronic and U.S. mail

Ms. Song Her, Clerk to the Board
State Water Resources Control Board
Executive Office
1001 I Street, 24th Floor
Sacramento, CA 95814

Dear Ms. Her:

Comments on the April 2006 Proposed Draft Total
<u>Residual Chlorine and Chlorine-Produced Oxidants Policy of California</u>

The Sanitation Districts of Los Angeles County (Districts) are pleased to provide comments on the revised draft of the proposed Total Residual Chlorine and Chlorine-Produced Oxidants Policy (the Policy). The Districts are a confederation of special districts, which operate and maintain regional wastewater and solid waste management systems to provide sanitation services for over 5 million people who reside in 78 cities and unincorporated areas in Los Angeles County. The Districts own and operate eight Water Reclamation Plants (WRPs) that discharge to inland surface waters, all of which could potentially be affected by this Policy. The Districts have previously submitted comments on earlier drafts of this Policy in July 2005 and January 2006 and have also submitted additional supplemental data to the State Water Resources Control Board (State Board) in October and November 2005. All of the prior information and comment letters regarding this Policy are attached to this letter as Attachment 2. In addition, representatives from the Districts attended both stakeholder meetings regarding the draft Policy in September 2005.

To begin, the Districts would like to support the State Board's desire to protect aquatic life by adopting the chlorine criteria established by USEPA in 1984 in the *Ambient Water Quality Criteria for Chlorine*. Whereas it is commendable to adopt these standards (0.019 mg/L for a one-hour objective and 0.011 mg/L for a four-day average), there has not yet been technology developed that can measure chlorine at these levels instantaneously in a wastewater matrix. Whereas several other states in the U.S. have adopted these same criteria, they recognize the limitations of current technology and most do not require continuous monitoring AND most do not require that permit limits be set at the levels of the criteria (because there is no way to measure chlorine levels that low).[1] Despite several submittals and testimony from the Districts and other parties, the State Board is forging ahead and specifying the use of

[1] Refer to the Districts' January 4, 2006 submittal (also contained in Attachment 2) that included a memo summarizing the approach to chlorine residual regulation outside the State of California.

Recycled Paper

technology that cannot measure chlorine reliably below 0.05 mg/L under controlled laboratory conditions.[2] Not only is there significant disparity between manufacturer claims and actual performance with regard to the detection limit of the instrument but also with its detection response time. For instance, the same on-line analyzer's rate of stabilization was evaluated in the Districts' laboratory and it took between 15 and 30 minutes for the analyzer to stabilize to a change in concentration; the manufacturer claims that the instrument takes 1.5 to 2 minutes for a 90% response. In this regard, the Districts believe the State Board's proposed Policy, despite being born of good intentions, is inherently flawed due to misrepresented manufacturer instrument claims.

There are three components of the Policy that especially concern the Districts. They are all related to the fact that the currently available continuous on-line analyzers cannot reliably, precisely, and accurately measure chlorine residual at levels of the chlorine criteria. The Districts request the State Board review these three areas and make the requested changes to the Policy.

Quantification/Reporting Limit

The proposed Policy requires that facilities have a quantification/reporting limit (QRL) that does not exceed the facility's effluent limit (p. 7). At the same time, the effluent limits must be set at the criteria levels: 0.019 mg/L for a one-hour objective and 0.011 mg/L for a four-day average. Given that continuous on-line analyzers cannot measure chlorine at those low levels, every discharger will need to pursue an alternate QRL with their Regional Water Quality Control Board (as provided in the Policy). However, the Policy specifies alternate QRLs cannot be pursued by dischargers if they can otherwise show compliance by proving the presence of excess dechlorination agent. The Policy requires that each facility measure dechlorinating agent or otherwise be able to prove there is excess dechlorinating agent (see Compliance Determination section, p. 8). Thus, in effect, the draft Policy establishes a QRL that no discharger can meet and allows no opportunity for dischargers to petition for an alternate QRL. Consequently, all dischargers will need to operate without QRLs. At the same time, the Policy implies that a QRL is needed.[3] The State Board should recognize this shortcoming of the draft Policy and allow dischargers to pursue an alternate QRL as needed. Alternatively, the Policy can be modified to specifically state that a facility may operate without a QRL if the discharger can demonstrate the presence of residual dechlorinating agent. The Districts suggest the following language be added to the Policy on page 7 (the first paragraph already is in the Policy but is shown here to provide context):

> "The *quantification/reporting limit* (QRL) shall not exceed the facility's effluent limitation. However, if the Regional Water Board determines on a case-by-case basis that the discharger cannot meet the QRL set at the effluent limit and that it is infeasible for the discharger to show compliance via the presence of residual dechlorination agent or by other means (see Compliance Determination section of this Policy), the Regional Water Board may establish a QRL, provided that the discharger completes and submits a QRL study.
>
> If a discharger CAN demonstrate on a continuous basis the presence of residual dechlorinating agent via stoichiometric records (based on the same recording interval as the on-line chlorine

[2] Please refer to the Districts' October 20, 2005 submittal in which the Districts' laboratory tested an on-line analyzer (Capital Controls 1870E), whose manufacturer claims can measure chlorine down to 0.001 mg/L. After rigorous testing, the Districts established the meter could (with 84% recovery) measure down to a level of 0.05 mg/L (50 times higher than claimed by the manufacturer) in deionized water spiked with chlorine. The Districts also tested the same continuous analyzer in a wastewater matrix, and discovered the lowest measurable level was even higher – consistent, though not accurate, readings were obtained when the chlorine concentration in the sample was at least 0.15 mg/L (with a 50% recovery). (Refer to the Districts' October 27, 2005 submittal to the State Board, which is also included in Attachment 2.)

[3] It is likely that the vast majority of the California wastewater treatment facilities subject to the new Policy WILL NOT be able to comply with a QRL that is equal to or below the chlorine requirements but they WILL BE able to show compliance with the residual chlorine limitations via demonstrating the presence of residual dechlorination agent and thus will not be able to qualify for establishing a QRL. The way the Policy QRL requirements are stated, the facilities that CAN demonstrate the presence of residual dechlorinating agent would also have to operate with a QRL that does not exceed their effluent limitation. As currently written, the Policy guarantees that most if not all wastewater facilities within the state WILL NOT be able to comply with the proposed requirements.

analyzer) or with an on-line dechlorinating agent analyzer, then compliance with the QRL provisions in this Policy is not required." (Underlined text has been added.)

(This section of the Policy has been edited in redline/strikeout format according to this request, including proposed language for allowing the use of stoichiometric checks for compliance determinations; these edits are shown in Attachment 3.) In addition, to allow the use of new monitoring methods that may be developed in the future, the Districts request the policy be revised to allow the discharger to submit data on proposed alternative monitoring methods to their local regional board and to grant regional boards the authority to review and approve such methods for use to comply with this Policy.

Back-up monitoring to show compliance

Continuous on-line analyzers are required by the Policy to determine if chlorine criteria are being met in a discharger's effluent. In the "Compliance Determination" section (p. 8), the Policy indicates that continuous monitoring of dechlorinating agent is the preferred method to provide back-up confirmation to results from continuous chlorine residual analyzers. It was our understanding that representatives from the State Board indicated that use of stoichiometric calculations would be acceptable in lieu of continuous monitors for dechlorinating agents, not just for use as a back-up method when continuous monitoring systems are off-line for calibration and maintenance (as implied in the Policy). Stoichiometry can be used to show if any exceedances indicated by the on-line chlorine analyzers are valid exceedances or false positives readings. Similar to on-line analyzers, volumetric flow rate of dechlorinating agent can be monitored continuously, therefore a stoichiometric check to demonstrate sufficient dechlorinating agent could also be continuously calculated and recorded. However, unlike dechlorinating agent analyzers, the use of stoichiometry does not require calibration and maintenance of an additional analyzer (which is subject to the same limitations in terms of reliability and accuracy as the chlorine residual analyzers). Therefore, we request that the draft Policy be revised to clarify that stoichiometric calculations can be used to confirm non detect results from a continuous on-line chlorine analyzer. Please modify the Policy on p. 8 to read:

"When continuous monitoring systems are off-line, such as for calibration and maintenance, a back-up system must be in place to show compliance." (Underlined text has been added.)

(This section of the Policy has been edited according to this request and is shown in Attachment 3.)

Compliance schedule

Presently, in addition to using continuous chlorine analyzers to indicate when Districts' facilities are complying with their current effluent residual chlorine limitation of 0.1 mg/L, the Districts measure chlorine residual in daily confirmatory grab samples using Standard Method 4500 CLC at a reporting level of 0.05 mg/L. So, the Districts' compliance history with a chlorine residual level of 0.05 mg/L to 0.1 mg/L is well documented. As affirmed repeatedly by the Districts, the best currently available continuous on-line analyzer cannot measure the levels of chlorine residual specified by the U.S. EPA criteria or this Policy. In the future (after the proposed 5-year compliance schedule provisions sunset), when the analyzer technology is advanced/improved and on-line analyzers can detect chlorine at these low levels, it is conceivable that the Districts may experience low-level exceedances of the criteria that were undetectable until this point (i.e., concentrations above the criteria levels and below 0.05 mg/L). Since there is no visibility at this very low concentration range and since there is a documented time lag response of the continuous analyzers, it is possible that future disinfection dosing and control optimization may be necessary.

Furthermore, as the performance of wastewater treatment facilities is pushed to meet ever increasingly more restrictive requirements, with each modification of the wastewater treatment plant, there is a potential for unforeseen changes in treated effluent characteristics. Some of the Districts' facilities recently experienced such a change in the generation of disinfection-by-products as a result of converting its facilities to operate in a denitrification/nitrification (NDN) mode at a cost of approximately

$80 million to meet USEPA ammonia criteria. Planning, design and construction of the NDN facilities took approximately 8 years to implement at 7 of the Districts' facilities. The reason the change in treated effluent quality was not detected in the early years of research development was because the detection limit of the constituent of concern was above the notification limit. The analytical methods improved near the time the construction of the facilities was being completed. Consequently, the Districts are in the process of evaluating additional changes to disinfection processes to minimize the generation of disinfection-by-products. So, in the case where there are required process changes that may affect effluent quality, and/or when analytical techniques improve, dischargers should be afforded a compliance schedule to make the necessary process/control modifications without being subject to mandatory minimum penalties. Imposing hourly effluent limitations significantly increases the potential liability of wastewater treatment facilities where a facility could under the new Policy face up to $72,000 per day in penalties for a situation where the only change that occurred was either the advancement of analyzer technology and/or a process change required by other regulations. Under the Policy as currently drafted (p. 5-6), obtaining a compliance schedule would not be possible; the draft Policy specifies that the need for a compliance schedule only be considered at permit issuance, reissuance or modification. The Districts request that the issuance of a compliance schedule also be allowed if deemed appropriate by the individual Regional Water Quality Control Board (Regional Board) if a discharger can show good cause. The Districts suggest the following language for the Policy:

> "A compliance schedule may be issued at permit issuance, reissuance or modification, or if otherwise deemed appropriate by the individual Regional Water Quality Control Board (Regional Board) in the case of a discharger showing good cause."

(This section of the Policy has been edited according to this request and is shown in Attachment 3.)

Other Comments

In addition to the aforementioned comments on the Policy, the Districts have additional comments on the Policy as well as comments on the Draft Substitute Environmental Document and the Economic Considerations for the Policy. These comments are included for your review and response in Attachment 1.

In conclusion, we thank the State Board for this opportunity to provide comments on this draft Policy and urge the Board and staff to revisit the Policy and make our requested changes. The Districts are available to work with you on refining this Policy. We request that our comments, in this letter and Attachments 1 and 2, be considered and that the State Board provide responses. If you have any questions about our comments, please contact the undersigned at (562) 699-7411, extension 2502 or Beth Bax at extension 2835.

Very truly yours,

James F. Stahl

Victoria O. Conway
Assistant Department Head
Technical Services Department

VOC:BCB:drs
Attachments

Attachment 1: Additional Comments on the Policy and Comments on the Draft Substitute Environmental Document and the Economic Considerations for the Policy

Attachment 1: Additional Comments on the Policy and Comments on the Draft Substitute Environmental Document and the Economic Considerations for the Policy

In addition to the concerns detailed in our main comment letter, the Districts request that the State Board review and respond to the following comments.

Additional Comments on the Policy

Throughout this past year, the Districts have provided the State Board with key information for consideration in crafting the Policy. A copy of these letters and data submittals is included in Attachment 2 and will be referred to in these comments. For the most part, the changes requested in these comments and in the main letter are reflected in Attachment 3 (Suggested Edits to the Policy). If these changes are made (shown in redline/strikeout), the Districts' major concerns with the Policy will have been addressed.

Under the Calculation section, the draft Policy states: "Because chlorine residual can be acutely toxic to fish and other aquatic life within minutes of exposure, weekly and monthly limits are not protective and are, therefore, impracticable." The Districts would like the State Board staff to consider the study submitted in January 2006 by the Districts in which facilities in 9 states besides California were surveyed, and while the acute and chronic USEPA chlorine criteria had been adopted into their respective statewide guidances, the permits for these facilities had either daily and/or longer-term discharge limits in most cases. The Districts request that the State Board consider these approaches before deciding limits of one hour and four days are necessary to determine compliance.

Some of the WRPs operated by the Districts discharge intermittently (for 120 minutes or less within a 24-hour period as defined by the Policy) at certain times of the year when the treated effluent is not discharged because it is diverted for reuse purposes. The same WRPs discharge continuously in other parts of the year (normally in winter when reuse demand is much lower). Because we operate facilities that meet the definitions for both continuous discharge and intermittent discharge under this Policy, the Districts request that the Policy be modified to allow permits to include chlorine residual limits for both continuous and intermittent discharges where appropriate. Therefore, we request the following language be added to the Policy: "For discharges that can be either continuous or intermittent (e.g., in the situation where the water is discharged continuously at some times and intermittently at others due to circumstances such as water reuse demands, the NPDES permit for that discharge shall include both the continuous and intermittent chlorine residual objectives. The intermittent chlorine residual objectives shall apply when the discharge time is less than two hours in a 24-hour period, and the continuous objective shall apply at all other times." This would allow dischargers such as the Districts more flexibility in meeting the limitations while maximizing reuse of treated effluent.

Although later in the Policy mixing zones are discussed, the calculation section in the Policy does not address calculating limits for areas with approved mixing zones. The language in this section should be revised to accommodate calculation of limits for discharges with approved mixing zones.

The Districts support the inclusion of a provision allowing 5-year compliance schedules for dischargers to meet the residual chlorine discharge limitations. Whereas the Policy allows for a compliance schedule and states that justification must be provided before one is approved, the Districts request that the words "planned or" be added to the second item listed under justification (on p. 6), so it reads "2. Documentation that facility upgrades are planned or underway, if applicable;". In many cases an agency may decide to upgrade facilities in order to comply, but may not have had sufficient time to begin such changes yet at the time of permit issuance.

The Districts also request that the issuance of a compliance schedule, in addition to being considered at permit issuance, reissuance or modification, also be allowed if deemed appropriate by the individual Regional Water Quality Control Board (Regional Board) if a discharger can show good cause. Furthermore, the Districts suggest that the Policy specify that interim residual chlorine limits be based on past performance at the specific discharge.

We also recommend that the language referring to "new or modified effluent limit" be removed in two places (one on page 5 and one on page 6 of the Policy) within this section. The Regional Boards should be afforded more discretion for providing dischargers with compliance schedules, other than just when new or more restrictive effluent limits are applied or other provisions of this Policy are applied in a permit. Again, if a discharger can show good cause, the Policy should allow the Regional Board to grant or extend a compliance schedule.

The monitoring requirements section of the Draft Policy states that: "Continuous monitoring of chlorine residual or dechlorination residual concentrations shall be required in all facilities." The monitoring frequency is specified as "one or more data points, every minute." The equipment sensitivity level specified under the Quantification/Reporting Requirements is 1 μg/L. As previously discussed at the workshops, the sensitivity and monitoring frequency requirements presented in the draft Policy do not reflect the actual limitations of the instruments currently available on the market or the realities of layers of variables (errors) in a continuous on-line field environment. We are unaware of any current on-line analytical technology that is capable of accurately or reliably measuring chlorine at 1 μg/L or with sufficient response time to take discrete measurements at one-minute intervals under continuous monitoring conditions in the field. Information we submitted in our October 2005 data submittals provides evidence of the sensitivity issues for continuous analyzers. Therefore, the Districts continue to have significant concerns about the proposed approach because of these issues/problems.

Additionally, the Districts request that continuous monitoring be allowed for intermittent discharges (as well grab samples) to characterize the discharge. This request can be accommodated by adding the following text to the sentence that begins "Grab samples shall be collected..." (p. 6): "If continuous chlorine monitoring is not used for intermittent discharges,".

As detailed in previous submittals and discussed further below, the Districts have performed toxicity testing recently that suggests that our receiving water may have a buffering capacity to partially protect aquatic life from residual chlorine. The Districts are committed to operate all our facilities to comply with every effluent limitation, but there have been times (infrequent and unavoidable) when chlorine has been discharged in amounts higher than our current discharge limitation of 0.10 mg/L. (A detailed exceedance summary was sent to the State Board in October 2005.) Our recent testing suggests that aquatic life may be able to tolerate short-term exceedances of residual chlorine discharge limits in some receiving waters without experiencing adverse impacts. Therefore, we request that the State Board pursue the development of an approved methodology for site-specific objectives for short-term exposures as expeditiously as possible so that both the Regional Boards and dischargers will have sufficient guidance to pursue the successful and timely development of site-specific objectives, as allowed under the draft Policy.

Comments on the Draft Substitute Environmental Document

Table 1 (p. 13-14), which lists the current chlorine criteria applied by each California Regional Water Quality Control Board and is also included in the economic analysis for the Policy, is incorrect, with regards to the range of existing permit limits in the Lahontan Region. Whereas the table correctly reports that Lahontan's Basin Plan includes chlorine criteria of 0.002 and 0.003 mg/L (for a median and maximum, respectively), the Region has also established a method detection limit of 0.05 mg/L (which becomes the effective limit) for some permits, so the listed range of 0.011 to 0.019 mg/L in Table 1 is incorrect.

Comments on the Analyses of Issues and Alternatives

Chapter 1 – Water Quality Objectives

The Draft Substitute Environmental Document lists 7 alternatives in this section and recommends adopting portions of two of them. For continuous, freshwater discharges, this analysis concludes adopting the USEPA developed chlorine criteria is the right choice. The document states: "the proposed criteria show a solid scientific foundation and are a logical choice for protecting aquatic life from TRC and CPO toxicity," (p.38) primarily because these criteria have been adopted in other states, such as "Virginia, Illinois, Delaware and Connecticut" and is proposed to be adopted in Arizona. That is true; these states have or are about to adopt the criteria. However, the results of a study performed by the Districts indicate that these other states do not implement the criteria in the same manner as what is being proposed in the Policy. (See Attachment 2.) For instance, whereas Virginia has adopted the USEPA chlorine criteria of 0.011 mg/L for a four-day average and 0.019 mg/L for a one-hour maximum concentration, the Hampton Roads Sanitary District operates 9 POTWs that have to maintain effluent with less than 0.1 mg/L of chlorine (the defined reporting limit). They ensure compliance by taking one effluent grab sample per day. So, while the Districts do support the State Board's decision to adopt these criteria, the Districts urge the State Board to review and consider the implementation methods undertaken by the states listed in the environmental document as justification for adopting these criteria.

Chapter 2 - Mixing Zones

The State Board analyzed three alternatives for mixing zones: 1) Prohibit mixing zones, 2) Allow mixing zones in a small area near an outfall and 3) Policy should remain silent with regards to mixing zones (and leave the decision to the individual Regional Boards). The recommendation is to adopt Alternative 1 or 3. The Districts support Alternative 2 and think that in the event that a mixing zone can be proven to still be protective of aquatic life near an outfall, a mixing zone should be considered. Therefore, the Districts support Alternative 2, or at the least, Alternative 3. The Regional Boards currently need to determine if mixing zones are appropriate for dischargers, so this Policy should be implemented in the same manner to ensure consistency (otherwise an individual discharge may have mixing zones for some constituents, but none for chlorine, despite providing scientific justification for one).

In an earlier submittal (see Attachment 2), the Districts submitted the results of a study investigating the sensitivity of aquatic life to a short-term exposure of a relatively high concentration of chlorine. Test organisms were exposed to concentrations of chlorine between 0 and 4 mg/L for a total of five minutes and then their survival 48 hours after the exposure was recorded. The results of the study clearly showed that the test organism used was more sensitive to chlorine in a synthetic control dilution water environment than in receiving water. This finding would suggest that the receiving water might provide some buffering ability for aquatic life to tolerate levels of chlorine residual higher than the proposed objectives for very short durations. We believe that this type of study could be done to develop a site-specific objective, and we request that the State Board work with the Districts and other interested parties to develop an approved scientific methodology referenced in the Policy for such work so that those parties and Regional Boards wishing to pursue site-specific objectives can do so efficiently.

Chapter 3 - Calculation of Effluent Limitations

The State Board recommendation is to apply the chlorine objectives as end-of-pipe limits and to apply them as a one-hour maximum (0.019 mg/L) and a four-day average (0.011 mg/L). Again, while the Districts support the adoption of the chlorine criteria, the Districts think the State Board should reconsider the implementation of the criteria. The study of 31 POTWs in other states (see Attachment 2) indicates that only two facilities have one-hour average limits in their permits in addition to daily or longer-term limits. (These POTWs are located in eleven different states, nine of which have adopted the USEPA chlorine criteria.) All of the 31 POTWs have either daily or some combination of daily, weekly and monthly limits. Thus, although most of the states in which these facilities operate have adopted EPA's chlorine criteria into their water quality standards, they have implementation practices that don't include translating the acute and chronic criteria into one-hour and four-day averages for permit limits. The Districts urge the State Board to reconsider the frequencies of these limits and to instead adopt longer-term averages.

Chapter 4 - Compliance Schedules

The State Board recommendation for compliance schedules is to adopt either 2 years (with the ability for each Regional Board to extend the compliance schedule to five years) or five years. The Districts support a five-year compliance schedule and request the State Board follow suit in this regard. Adopting two-year compliance schedules would not give dischargers enough time to upgrade their facilities (to implement continuous monitoring and refine a facility's process control and/or to upgrade the facility with better chlorination/dechlorination capabilities or to change from chlorination practices to other types of disinfection processes such as UV disinfection), and thus, the individual Regional Boards would be flooded with requests for extended compliance schedules.

Chapter 5-Monitoring and Reporting Frequency

The State Board recommendation for monitoring and reporting frequency is to use continuous analyzers for chlorine monitoring and reporting. As we have mentioned previously in our comments, there has not yet been technology developed that can measure chlorine at the levels of the criteria instantaneously. The Districts do currently utilize continuous monitors for process control; when the analyzers record high levels of residual chlorine, the dosage of dechlorination agent is increased. The lag time between detecting a residual at the final chlorine analyzer and the actual increase in dechlorinating agent dose can range from approximately <1 to 5 minutes depending on the WRP configuration. (This lag time includes the time it takes for the controller to change the chemical flow rate, which is estimated to be less than 10 seconds, as well as the distance between the location of the chemical storage and chemical dosing point and is also a function of the physical layout and concomitant restrictions at each plant.)

The State Board's reasoning for the need for continuous monitoring is to prevent 'catastrophic failures' that could occur if the process is not being carefully monitored. The Districts agree that continuous monitors are an important tool for refining a chlorination/dechlorination system but contend that these measurements should be used with caution to demonstrate compliance with the proposed criteria because they do not accurately measure the chlorine concentration in the treated effluent. The Districts submitted the results of a study in which a continuous analyzer was used to measure the chlorine in a sample of secondary- effluent wastewater from a Districts' facility in October 2005 (see Attachment

2). Collected samples were spiked with concentrations ranging from 0.04 mg/L to 1.12 mg/L. The lowest concentration at which 50% recovery was observed (the concentration at which the meter even estimated half the actual concentration) was 0.15 mg/L in wastewater. That is ten times the concentrations specified in the criteria. Thus, the Districts suggest that while continuous monitors can indicate a gross exceedance of the criteria that the State Board instead put more emphasis on the analysis of daily grab samples taken from the final effluent and operational parameters such as sufficient and continuous dosing of dechlorinating agent to demonstrate compliance with the proposed effluent limits.

The State Board's recommendations in this chapter also address the quantification/reporting limit and the appropriate back up to continuous monitoring for continuous chlorine residual analyzers. The Districts have strongly recommended changes on both of these topics; please see the main letter for these comments.

Chapter 6 – Compliance Determination

The State Board's recommendations in this chapter include having each facility maintain a chlorinating and dechlorinating analyzer to show compliance. It was our understanding that representatives from the State Board indicated that use of stoichiometric calculations would be acceptable in lieu of continuous monitors for dechlorinating agents, not just for use as a back-up method when continuous monitoring systems are off-line for calibration and maintenance (as implied in the Policy). Since chemical dosing measurements are continuously monitored, stoichiometry can be reliably used to demonstrate the there is a presence of residual dechlorinating agent present in the effluent prior to discharge in addition to showing if any exceedance indicated by the on-line chlorine analyzers are valid exceedances or false positives readings. We request, therefore, that this chapter of the Substitute Environmental Document be revised to clarify that stoichiometric calculations can be used to confirm the presence of dechlorinating agent in conjunction with the use of a continuous chlorine residual analyzer.

Comments on the Economic Considerations for the Policy

The compliance costs for a number of case studies are used in the Economic Considerations report to estimate the economic impact of this Policy. Unfortunately, many of the facilities examined (p. 5-2 of the report), are listed as having chlorine effluent concentrations that are non-detectable. Even the averages that are listed for other agencies are most likely averages of detected and non-detected concentrations. This report assumes a non-detected value is equivalent to a zero chlorine residual and assumes that the facilities that have non-detected levels of chlorine can comply with this Policy. However, the lowest detected level of chlorine residual is not identified for most facilities (p. A-2 through A-35). Thus, facilities may have detection limits of 0.1 mg/L and a chlorine residual of 0.95 mg/L is reported as a non-detect. The Economic Considerations report assumes that facilities that report non-detects have no residual chlorine and can meet the proposed Policy. Given that the individual limits for facilities in California are currently much higher than the proposed objectives and that the proposed Policy will require monitoring at much lower levels, this report should not make this assumption. In doing so, it grossly underestimates the potential expense of all facilities statewide to come into compliance with the proposed Policy.

Under Section 4 of the Economic Considerations, the use of alternate disinfection systems is explored (i.e., non-chlorination systems). The Districts have had some recent experience with a UV disinfection system that suggests that dosing with a small amount of chlorine will remain necessary even with a UV system. The Districts recently converted the Whittier Narrows Water Reclamation Plant to UV disinfection. However, when a validation test was conducted, we discovered that UV disinfection does not adequately destroy adenovirus. This means that facilities that switch to UV disinfection to avoid chlorination (and thus the chlorine residual objectives in the Policy) will likely still have to use some chlorine in their disinfection process and thus will still have to dechlorinate and to comply with the objectives in the Policy. Two recent letters from the Los Angeles County Department of Health Services regarding this specific problem are included with this submittal in Attachment 4. Both letters state that whereas the poliovirus is typically used as the target organism by UV disinfection guidelines, recent research indicates that double-stranded DNA viruses may be capable of UV repair and much more resistant to UV disinfection than poliovirus. This means that chlorination may be a necessary component to a UV disinfection system.

Attachment 2: Previous Submittals on the Policy (Comment letters and additional information)

Attachment 2.A: Comments on April 2005 Proposed Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California (Submitted on July 7, 2005)

WATER RECLAMATION
SOLID WASTE MANAGEMENT

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JAMES F. STAHL
Chief Engineer and General Manager

July 7, 2005
File No. 31-370.40.4A

Ms. Dena McCann
Division of Water Quality
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Dear Ms. McCann:

Comments on April 2005 Proposed Total Residual Chlorine and
<u>Chlorine-Produced Oxidants Policy of California</u>

The County Sanitation Districts of Los Angeles County (Districts) are pleased to provide comments on the scoping document for the proposed Total Residual Chlorine and Chlorine-Produced Oxidants Policy. By way of background, the Districts are a confederation of special districts, which operate and maintain regional wastewater and solid waste management systems to provide sanitation services for approximately 5.1 million people who reside in 78 cities and unincorporated areas in Los Angeles County.

As an agency that is currently required to comply with final effluent chlorine residual limitations and conduct continuous monitoring at many of our wastewater treatment plants, we request that the State Board's CEQA document consider the potential environmental impact of increased usage of chemicals for dechlorination which may be implemented by wastewater agencies to ensure that the final effluent chlorine residual requirements are met essentially 100% of the time. Although the State Board believes that the <u>relocation</u> of dechlorination facilities is not expected to have any adverse impacts on the environment as stated on page 21 of the informational document, we believe that the potential use of excess chemicals for dechlorination also needs to be considered in the environmental documentation for this policy. The types of environmental impacts that should be considered in the draft FED include transportation and associated air quality emissions for transport and delivery of greater amounts of dechlorination agents, environmental risks associated with the delivery/transfer of extra shipments of these chemicals (e.g., risk of spills), and potential water quality impacts associated with dosing at higher levels of dechlorination agents.

In addition, we have the following comments that we request the State Board consider.

We have concerns regarding the limitations of the equipment used for continuous chlorine monitoring. In order to assess compliance with the proposed freshwater objectives of 13 and 19 ppb, respectively, the continuous monitoring system must be capable of measuring chlorine residual down to 10 ppb accurately so that compliance can be based on reliable data. The proposed policy mandates that the system be calibrated at a concentration of no more than 500 ppb. For a system that is routinely calibrated at 500 ppb, as is proposed by the State Board on page 5 of the proposed policy, any results produced below 500 ppb would have to be extrapolated assuming that the calibration curve is always linear to the origin. These extrapolated results are not reliable or reproducible and it is not scientifically valid to use them for the purpose of compliance determination. Indeed, requirements currently contained in the monitoring and reporting programs for the Districts' water reclamation plants that discharge to inland surface waters within the Los Angeles Region do not even allow the reporting of results extrapolated below the calibration curve.

In addition, there are manufacturers that claim that their on-line continuous monitoring systems are capable of detecting chlorine down to 1 to 10 ppb, but the accuracy of the systems at these levels has never been validated. Some of the manufacturers also specify that the repeatability and stability are approximately 100 ppb. This would mean that a measured concentration of 50 ppb could be 150 ppb or it could be zero. The current available systems do not provide reliable measurements at the proposed compliance levels. Unlike other toxic pollutants that have compliance requirements, chlorine residual continuous monitoring equipment do not have established method detection limits (MDLs) or reporting limits (RLs). It is essential that the draft proposed policy provide guidance on how on-line system MDLs and RLs in wastewater matrix can and should be derived, what are the acceptance criteria for system performance and how the resultant values are to be used in compliance reporting.[1]

Lastly, compliance schedules of longer than 2 years may be necessary as 2 years may not allow for sufficient time to develop site-specific objectives or to design and construct an alternate disinfection process should that be necessary. In the State Board's "Policy for Implementing the State Revolving Fund for Construction of Wastewater Treatment Facilities," as amended June 18, 1998, the State Board estimated that a *minimum* of 3.3 years is required to take a project from design to the initiation of operation, and that *some projects may take as long as 12 years to complete.* Additionally, the State Board has issued a "SRF Loan Program Flow Chart" that chronicles the process of obtaining State loan funding for facility upgrades. In this chart, the State Board recognizes that it could take 11.8 years to complete the funding process. The State Board should allow the Regional Boards to consider granting longer compliance schedules (up to 5 years) in cases where a discharger provides supporting information in regards to efforts and studies required to achieve compliance. In addition, the compliance schedule timeline should not begin until a discharger becomes aware that their facility cannot comply with the objectives and applicable effluent limitations.

In conclusion, we request that the State Board address the comments included above, as well as the comments contained in the comment letter dated July 7, 2005 submitted by the Bay Area Clean Water Agencies, Tri-TAC, California Association of Sanitation Agencies, and Central Valley Clean Water Agencies, which is incorporated herein by reference. If you have any questions about our comments, please contact the undersigned at (562) 699-7411, extension 2801 or Sharon Green at extension 2503.

Very truly yours,

James F. Stahl

Raymond Tremblay for
Section Head
Monitoring Section

RLT:MR:drs

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[1] Even if these are established, chlorination/dechlorination processes are sophisticated pieces of equipment that may be momentarily interrupted due to transient conditions and may take time to respond to changes in chemical dosing rates or to be able to switch over to the back-up system. Even the most highly sensitive and responsive equipment require a finite time to measure and respond to changing conditions, thus short duration excursions in chlorine residual are likely unless significant excess dechlorination agent is present. The State Board should acknowledge the possibility of equipment failure and provide for an "upset defense" in the proposed policy, similar to that provided under the Clean Water Act for technology-based limitations.

Attachment 2.B: Information Submittal by the Los Angeles County Sanitation Districts For the State Water Resources Control Board's Chlorine Residual Policy (Submitted on October 20, 2005)

DRAFT

Information Submittal by the Los Angeles County Sanitation Districts For the State Water Resources Control Board's Chlorine Residual Policy

This document provides information for consideration by the State Water Resources Control Board (SWRCB) as it develops the draft Total Residual Chlorine and Chlorine-Produced Oxidants Policy (Chlorine Residual Policy). This material includes background information on seven of the Los Angeles County Sanitation Districts' (Districts') water reclamations plants (WRPs) located within the San Gabriel River and Santa Clara River watersheds and their chlorination/dechlorination practices; an overview of final effluent limitations for residual chlorine and the Districts' history of compliance with those limits; in-house performance evaluations of continuous chlorine residual analyzers; studies that have been be conducted to assess chlorine residual and chlorine demand in receiving waters and recommendations for future studies; and proposed regulatory compliance alternatives/options for the draft Policy. This information has been compiled as a result of discussions with the SWRCB staff at two stakeholder workshops held in late September 2005.

1) Districts' WRP Background

The Districts own and operate the Long Beach, Los Coyotes, Pomona, San Jose Creek and Whittier Narrows WRPs, which are located within the lower portion of the San Gabriel River Watershed. These facilities are part of an integrated collection and treatment system known as the Joint Outfall System. The Districts also own and operate two WRPs that are located in the upper Santa Clara River Watershed (the Saugus and Valencia WRPs). These facilities are part of the Santa Clarita Valley Joint Sewerage System. All seven WRPs provide tertiary treatment consisting of activated sludge secondary treatment with nitrification/denitrification, followed by inert media filtration, chlorination and dechlorination. Treatment capacity ranges from 6.5 million gallons per day (MGD) at the Saugus WRP to 100 MGD at the San Jose Creek WRP. Collectively, these facilities produce approximately 170 MGD of recycled water that meets California drinking water standards for chemical constituents. Approximately 70 MGD of water is actively reused (not discharged) for applications such as landscape irrigation, industrial processing, and groundwater recharge[1].

2) Chlorine Residual Permit Limitations

All seven of the WRPs have final effluent limits for chlorine residual in their NPDES permits and all of the permits have been revised in the past three years: the Long Beach, Los Coyotes and Whittier Narrows WRPs permits were adopted in 2002; the Saugus and Valencia WRPs permits in 2003; and the Pomona and San Jose Creek WRP permits in 2004. All of the permits require continuous monitoring of final effluents to determine compliance with residual chlorine limits. To understand the evolution of the new requirements and compliance monitoring, it is critical to look at the previous NPDES permits for these plants.

Prior to the adoption of these new NPDES permits, the plants did not have effluent residual chlorine limits, but instead had receiving water limits. The 1995 NPDES permits for the Long Beach and San Jose Creek WRPs contained the following receiving water limitation:

[1] At the present time, recycled water is not actively used from the Saugus WRP.

> "The discharge of wastes to lined watercourses or flood control channels shall not result in residual chlorine in concentrations greater than 0.1 mg/L at the points of transition from a lined structure to an unlined structure or at the point of upstream beginning of the tidal prism of San Gabriel River."

At the remaining WRPs, the following requirement applied:

> "The residual chlorine in the receiving water shall not exceed 0.1 mg/L as a result of the wastes discharged."

The receiving water limit of 0.1 mg/L was based on the residual chlorine objective in the Water Quality Control Plan, Los Angeles Region (Basin Plan). The Long Beach, Los Coyotes, Pomona and San Jose Creek WRPs[2] discharge final effluent into concrete-lined flood control channels; the Saugus, Valencia, Whittier Narrows and San Jose Creek WRPs[3] discharge final effluent to unlined (soft bottom) water bodies. As previously mentioned, prior to the most recent permits, the residual chlorine requirement was never applied as an end of pipe limit. Compliance monitoring for the receiving water limits was based on the collection of grab samples. The Districts were required to monitor final effluent using continuous monitors that had previously been installed for process control.

The new NPDES permits for the WRPs now require that the final effluents comply with an end-of-pipe daily maximum chlorine residual limitation of 0.1 mg/L. The permits also contain the following exceptions, which allow some operational flexibility for uncontrollable events/excursions:

> "For the determination of compliance with total residual chlorine limit, one of the following applies:
>
> - Total residual chlorine concentration excursions of up to 0.3 mg/L, at the point in treatment train immediately following dechlorination, shall not be considered violations of this requirement provided the total duration of such excursions do not exceed 15 minutes during any calendar day. Peaks in excess of 0.3 mg/L lasting less than one minute shall not be considered a violation of this requirement; or
> - For continuous total residual chlorine recording devices that require greater than one minute to level off after the detection of a spike: if it can be demonstrated that a stoichiometrically appropriate amount of dechlorination chemical has been added to effectively dechlorinate the effluent to 0.1 mg/L or less, then the exceedance over one minute, but not for more than five minutes, will not be considered to be a violation."[4]

These exceptions, granted by the Regional Board acknowledge, the limitations of continuous monitoring devices with regard to reliability and accuracy, and the likelihood that sporadic excursions above the effluent limitations will not impact beneficial uses in the receiving waters. Table 1 lists the discharge point(s) for each WRP, the receiving water for the discharge and the existing beneficial use for each waterbody as defined in the Basin Plan.

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[2] Discharge Point 001 only.

[3] Discharge Points 002 and 003.

[4] Only the San Jose Creek and Pomona NPDES permits, which were the last permits to be adopted, include the stochiometric demonstration provision; this is an artifact of the time the permits were adopted by the Regional Board (e.g., this provision was put in a permit before these permits were adopted) and was not specifically related to the operations of the plants themselves.

Table 1 – WRP Discharges and Receiving Water Existing Beneficial Uses

Watershed	WRP	Discharge	Receiving water	Defined existing surface water beneficial uses
Santa Clara River Watershed	Saugus	001 (unlined)	Reach 6 of SCR	MUN, IND, PROC, GWR, FRSH, REC –1, REC-2, WARM, WILD, RARE, MIGR, WET
	Valencia	001 (unlined)	Reach 5 of SCR	MUN, IND, PROC, GWR, FRSH, REC –1, REC-2, WARM, WILD, RARE, MIGR, WET
San Gabriel River Watershed	Whittier Narrows	Discharge 001 (unlined)	Reach 3 of SGR	WILD
		Discharge 002 (unlined)	Zone 1 Ditch	GWR, REC-1, REC-2, WILD, RARE
		Discharge 003 (unlined)	Test Basin	Not Applicable/No longer used
		Discharge 004 (unlined)	Reach 3 of Rio Hondo	REC-1, REC-2, WILD, RARE
	Long Beach	001 (concrete lined)	Coyote Creek	RARE
	Los Coyotes	001 (concrete lined)	Reach 1 of SGR	REC –1, REC-2
	Pomona	001 (concrete lined)	A tributary to Reach 1 of SJC	WILD
	San Jose Creek	Discharge 001 (concrete lined)	Reach 1 of SGR	REC-1, REC-2,
		Discharge 002 (unlined)	Reach 1 of SJC	WILD
		Discharge 003 (unlined)	Reach 3 of SGR	REC-1, REC-2, WILD, RARE
		Discharges 001A and 001B(unlined, not yet used)	Reach 2 of SGR	REC-1, REC-2, WILD, RARE

SCR – Santa Clara River, SGR – San Gabriel River, SJC – San Jose Creek
Uses are defined in pages 2-1 through 2-3 of the Basin Plan (which are presented in Appendix H).
San Gabriel Watershed receiving waters identified in this table also have WARM as a potential or intermittent beneficial use.
NA – not applicable

As previously mentioned, some of the recycled water from the Districts' WRPs is diverted for beneficial reuse rather than being discharged. The reuse permits do not require a specific effluent chlorine residual, but do require that the final effluent be disinfected to comply with total coliform requirements based on the specific use of the recycled water. Currently, the most restrictive use is for landscape irrigation at sites with unrestricted access such as schools, where no more than one sample can have a total coliform result exceeding 23 organisms/100 mL and a 7-day median of 2.2 organisms/100mL must be met. As a result, the Districts optimize the operation of the plants' chlorination/ dechlorination systems to ensure compliance with both NPDES and reuse requirements. In addition, under the recycled water criteria established in California Code of Regulations, Title 22, recycled water to be used for unrestricted uses must also comply with a 450 mg/L-min chlorine contact time (CT). This CT is the product of total residual chlorine and modal contact time measured at the same point. This value must be met at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow. This therefore requires the continual dosing of chlorine at WRPs at levels that can not necessarily be lowered and is another operational factor that WRPs must consider.

3) Residual Chlorine Compliance History at Districts' WRPs

To determine compliance with permit effluent and receiving water limitations, the Districts continuously monitor final effluents for chlorine residual and collect weekly grab samples at the closest downstream receiving water station. Data from January 2002 through September 2005for the receiving water are presented in Appendix A as well as daily maximum final effluent analyzer data for a typical treatment plant (San Jose Creek East WRP).[5] These data show levels typically below detection levels. Periodic excursions of final effluent residual chlorine levels have been observed under the new NPDES permits, but have not resulted in observable impacts to receiving waters (i.e., mortality) based on field observations. During the subject period, there were approximately 70 excursions above a level of 0.1 mg/L from the 7 WRPs collectively. Of these only 23 events resulted in exceedances of NPDES permit requirements as summarized in Table2[6].

Table 2 – Residual Chlorine: Number of Final Effluent Excursions Above 0.1 mg/L (Number of NPDES Exceedances Shown in Parentheses)[7]

WRP	2002	2003	2004	Jan 2005 to Oct 2005	Total
Long Beach	0	0	0	1 (1)	1(1)
Los Coyotes	2 (2)	3(2)	7	0	12 (4)
Pomona	0	0	17 (1)	3	20 (1)
San Jose Creek	2(1)	6(1)	6(3)	6 (4)	20 (9)
Saugus	0	0	2 (2)	0	2 (2)
Valencia	0	1	1	0	2 (0)
Whittier Narrows	0	7 (4)	4 (1)	2 (1)	13 (6)
Total	4 (3)	17 (7)	37 (7)	12 (6)	70 (23)

Each of the events listed in the table were attributed to four categories: 1) equipment malfunction, 2) equipment delayed response lag time, 3) human error and 4) unknown causes. Accordingly, the following observations can be made based on these data:

[5] The Districts have typically reported non-detected analyzer data at "<0.05 mg/L or <0.1 mg/L" since the Districts' laboratory staff calibrate equipment using a standard with a reporting level of 0.05 mg/L. These reporting levels for analyzer equipment have not been verified as no methods/procedures exist to do so.

[6] This summary does not reflect final effluent residual chlorine exceedances observed at the Los Coyotes WRP from August 31, 2002 through October 2, 2002. These exceedances occurred during the transition phase of the implementation of the new NPDES permit for the Los Coyotes WRP.

[7] The Districts are aware that the SWRCB has questioned whether or not averaging periods would improve the overall compliance picture for discharges. Unfortunately, the Districts are unable to perform averaging assessments on historical data since the discrete data older than two-weeks are currently not archived.

- Excursions above 0.1 mg/L due to unknown causes ranged from 20 seconds to less than 15 minutes.
- Excursions above 0.1 mg/L related to lag times associated with chlorination/dechlorination equipment ranged from 15 seconds to less than 7 minutes.
- Excursions above 0.1 mg/L due to human error ranged from less than one minute to approximately 2.5 hours.
- Excursions above 0.1 mg/L due to equipment malfunctions ranged from 15 seconds to almost 2 hours.

Specific information regarding the 70 individual incidents is presented in Appendix B.

4) Chlorination and Dechlorination Operations at Districts' WRPs

Chlorination at the Long Beach, Pomona, Saugus, Valencia and Whittier Narrows WRPs is achieved using liquid sodium hypochlorite and dechlorination with sodium bisulfite. At the Los Coyotes and San Jose Creek WRPs, chlorination is achieved using gaseous chlorine and dechlorination with sulfur dioxide. At each WRP, the Districts can add chlorinating agents in several places in the treatment process to ensure that adequate chlorination of the effluent occurs. Figure1 presents the typical location in the treatment process train of the chlorination and dechlorination equipment at the Districts' WRPs. In addition, Appendix C provides photographs of the equipment shown in the schematic in Figure 1.

All seven WRP biological treatment systems are operating in a nitrification/denitrification mode to comply with ammonia limits placed in the NPDES permits for these facilities in 1995. After nitrification/denitrification treatment, a small amount of ammonia is added to the secondary effluent prior to chlorination so that the primary mechanism for disinfection is chloramination to prevent the formation of trihalomethanes. The ammonia concentration for process control in the secondary effluent is validated with an on-line analyzer; ammonia compliance is determined using 24-hour composite final effluent samples.

The Districts dose chlorine before the inert media filters in the treatment process to prevent excess biological growth in the filters (a schematic showing the location of dosing points and analyzers is shown in Figure 1). An analyzer[8] downstream of the chlorine dosing point and just before the filters (Pre-Cl_2 Analyzer) validates the chlorine addition. The WRPs have the ability to dose additional chlorine after the filters (Post-Cl_2); however, this dosing point is used only when the chlorine analyzer just before the chlorine contact tanks (Post-CL_2 Analyzer), measures a low concentration of chlorine. The filtered effluent then flows to the chlorine contact tanks. The analyzer located at the end of the chlorine contact tanks (Out-Cl_2 Analyzer), controls the dosing of the dechlorinating agent, which is sulfur dioxide or sodium bisulfite. At this point in the process, stoichiometric equations are used to determine what amount of dechlorinating agent is required to reduce the chlorine concentration to an appropriate residual level and is adjusted to provide a margin of safety, which can range from a factor of 1.2 to 2. A description of the stoichiometric equations used in the dechlorinating process is presented in Appendix D.

After the dechlorinating agent is dosed, the amount of chlorine residual in the dechlorinated effluent is measured by another on-line analyzer prior to effluent being discharged to the surface water (shown as Final-Cl_2 Analyzer in Figure 1). This final analyzer provides verification that the proper dose of dechlorinating agent was used. If this analyzer detects a chlorine residual, controls override the automatic stoichiometric dosage of the dechlorinating system. The

[8] The Districts use the Capital Controls 1870E online residual chlorine analyzer, manufactured by Severn Trent.

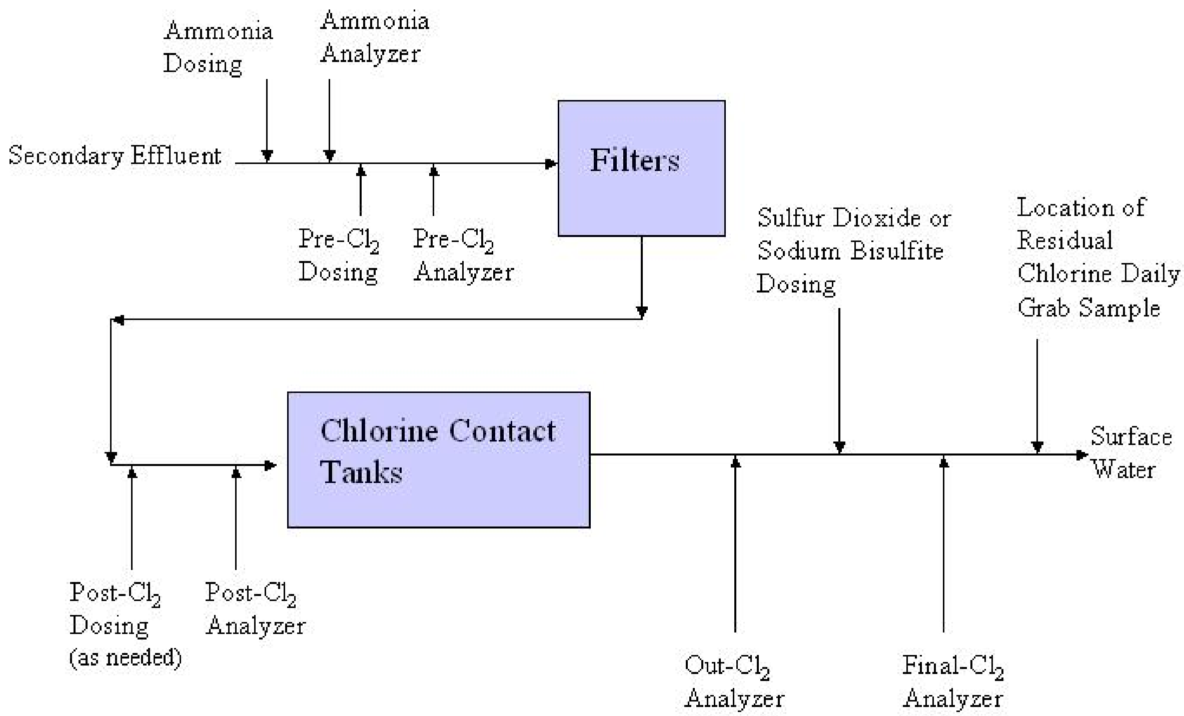
dechlorination system then provides a dose that is based on the stoichiometric dosage plus an additional safety factor of 1.5 to 1.75. The lag time between detecting a residual at the Final-Cl_2 analyzer and the actual increase in dechlorinating agent dose can range from approximately < 1 to 5 minutes depending on the WRP configuration. This lag time includes the time it takes for the controller to change the chemical flow rate, which is estimated to be less than 10 seconds. The wide range of potential lag times reflects the physical differences between the WRPs - the lag time depends on the distance between the location of the chemical storage and chemical dosing point and is a function of the physical layout and concomitant restrictions at each plant. For example, the dechlorinating chemical storage tanks are located directly above the dosing point at the Whittier Narrows WRP and there is relatively little travel time from the tank to the point of use compared to Long Beach WRP. In addition, treatment processes are subject to transient conditions, such as those that occur when valves or gates are operated, pumps come on line, chemical dosing rates are varied, etc. In addition, the demand for chlorine can vary from minute to minute for a number of reasons, including varying ammonia and nitrite conditions. Even the most highly sensitive and responsive instrument/control systems require a finite time to measure and respond to changing conditions and the response itself may generate a transient condition.

All continuous analyzers used to monitor the chlorination/dechlorination process are calibrated using standards with a reporting level of 50 ug/L. As previously mentioned, the analyzers are calibrated using the standards with a 50 ug/L reporting level, which are obtained from the laboratory, but this reporting level has not been verified or validated for the continuous monitoring analyzers. Appendix E presents sample Final-Cl_2 analyzer output data (tabular for two hours and graphical for a 24-hour period) collected by the Districts' distributive control system at 30 second intervals. As can be observed from the Appendix E data, residual chlorine levels within the treatment process are inherently variable due to many factors such as changing flow conditions or changing dosing rates and others previously mentioned, however, the Final-Cl_2 analyzer output consistently provides no residual in the final effluent. However, as previously mentioned although a reporting level of 0.05 ug/L or 0.1 mg/L has been used in the reporting of District's analyzer data to the Regional Board, this has not been verified or validated as there is currently no such practice for this equipment. The Districts currently only report to the Regional Board the daily maximum concentration measured by the Final-Cl_2 analyzer. Based on limited laboratory final effluent monitoring (using grab samples and the amperometric tritration method), we have observed that our dechlorinated effluent appears to be in compliance with the criteria proposed in the SWRCB proposed residual chlorine policy. However, it is not possible to make that determination from the analyzer data.

In addition to the data provided by the continuous analyzers, grab samples are collected on a daily basis at immediately downstream from the analyzer for verification purposes to ensure that there is no chlorine residual present and to ensure proper operation of the analyzers. This is not required by the permit but is performed as a process check. The grab samples are analyzed using Standard Method4500 CLC, at a reporting level of 50 ug/L.

As previously noted, the Districts' WRPs provide final effluent for reuse. The recycled water for reuse purposes is typically not fully dechlorinated. This recycled water is diverted to separate distribution systems for reuse activities (i.e., not discharged to surface water) and is not fully dechlorinated to maintain an adequate level of residual chlorine to prevent or minimize the growth of bacteria during distribution.

Figure 1 WRP Chlorination and Dechlorination Schematic



In response to the adoption of the new NPDES permits with residual chlorine effluent limitations, the Districts have implemented improvements within the alarm systems and location of chemicals to optimize of the chlorination/dechlorination systems. Audible alarm set points at the Final- Cl_2 analyzer have been established to alert Operations staff if the residual chlorine in the dechlorinated effluent measures 0.05 mg/L. When this alarm is triggered, staff respond by increasing the dose of dechlorination agent and verifying that the chlorination and dechlorination equipment is operating properly. Modifications to increase the reliability of the dosing of dechlorinating agent have also been implemented at some of the WRPs. For example, at the Los Coyotes WRP, a supplemental dechlorination system has been installed to respond to residual chlorine detections in the dechlorinated effluent in less then five minutes, which is the lag time associated with the location of the chemical storage tank of the primary system. The supplemental system provides a level of redundancy and is designed to rapidly release sodium bisulfite in the effluent discharge channel to eliminate any remaining residual chlorine before the effluent is discharged to the San Gabriel River, if necessary. At the Saugus WRP, it is also possible to dose the dechlorinated effluent with a highly concentrated sodium bisulfite rather than the typical solution of sodium bisulfite and water[9].

Nevertheless, based on the complexities of these systems, it would be difficult to achieve 100% compliance at all times unless the exceptions provided in the permits were preserved.

[9] Sodium bisulfite is typically blended with water before dosing to improve dosage control efficiency at the Saugus WRP.

5) Analytical Measurements of Residual Chlorine

The May 2005 draft SWRCB Residual Chlorine Policy establishes two objectives for freshwater: a one-hour objective of 19 ug/L and a four-day objective of 11 ug/L. The draft Policy further specifies that continuous monitoring shall be required in all facilities and defines continuous monitoring as taking one or more readings each minute, and that the monitoring devices must have a manufacturer's stated detection limit, scale range, or sensitivity of 1 part per billion

As you are aware, at the September 26, 2005 meeting, Tony Palmer, the Executive Director of the Instrumentation Testing Association (ITA), provided comments on the Policy and summarized technical issues with the use of continuous monitors. Mr. Palmer specifically pointed out that: "The instrument manufacturers of analytical online water and wastewater instruments do not provide purchasers of their instruments with verification or validation of their respective instrument accuracy and performance using NIST traceable standards. This means that the instrument's published specifications are not proved to the end user that the instrument they purchased actually meets published specifications. Published instrument performance specifications are marketing materials and are not government regulated. The requirement of continuous monitoring of one data point per minute (60 data points per hour) cannot be met for real changes in total chlorine residual."

After reviewing the Policy, information provided by ITA and others in the industry, we had serious concerns as to whether currently available monitoring equipment can accurately and reliably detect and quantify chlorine residual at the proposed objective levels or the proposed detection limit of 1 ppb. The Districts are not aware of any such devices, nor are we aware that any such devices have been approved under 40 CFR 136[10]. Given this data gap, the Districts elected to conduct some informal performance evaluations of an on-site continuous analyzer **in the laboratory under controlled conditions (not conditions experienced in plant operations)** using **deionized water (not wastewater)** to determine its capability of detecting chlorine residual at the proposed criteria levels. A summary of the results are presented in Appendix F.[11] These studies indicate that although many manufacturers of chlorine residual analyzers claim to be able to collect measurements that would match the technical specifications in the proposed Policy, these claims could not be confirmed. The lowest concentration the online chlorine analyzer could detect with acceptable precision and accuracy was 0.05 mg/L or 50 ug/L[12] (compared to the objectives of 11 ug/L and 19 ug/L). It is important to reiterate that these results were obtained in the laboratory and not the field, and in deionized water and not final effluent. The Districts expect that the presence of other constituents in the wastewater matrix will further affect the precision and accuracy of the readings, and that field conditions will have other impacts as well (e.g., reading unsteadiness, design limitations, inability to achieve reliable standard curves.) Due to

[10] Per US EPA, no on-line analyzers have been approved for compliance monitoring under 40 CFR 136 (personal communication with Bill Telliard). In fact, US EPA does not approve the analyzer, but approves the method the analyzer uses based on data from the analyzer that shows its results are equivalent to those that could be achieved using the wet chemistry methods in the laboratory, and those comparable results would have to be provided to EPA for review. At this point, no such demonstration has been made. This is highlighted by the fact that all the other states that have adopted the 1984 EPA chlorine residual criteria require that compliance be determined using grab samples and approved analytical methods. Wisconsin and Ohio allow for use of continuous analyzers if they can duplicate the accuracy of approved methods, including the method detection limit. At this point, we are not aware of a device that can meet these requirements.

[11] These summary results were previously provided to SWRCB staff in September 2005 in a slightly different format, and is included here for completeness.

[12] Concentrations below 0.04 mg/L (0.03 and 0.01 mg/L) gave the same reading.

time constraints, the Districts were unable to test instruments made by other manufacturers, but expect their performance to be similar. The Districts did, however, contact a number of manufacturers[13] of on-line chlorine analyzers, but none could validate the detection limit capabilities of 0.001 mg/L (1 ug/L) they claimed in the instruments' specifications, which is consistent with the testimony provided by ITA.

The Districts also investigated the use of an amperometric titrator in the laboratory for the quantification of residual chlorine at a 10 ug/L reporting level, since an amperometric titration method is required by Standard Methods (Standard Method 4500-Cl E) for quantifying chlorine concentrations below 0.2 mg/L.[14] The Districts' laboratory recently purchased an amperometric titrator (model AutoACT 9000 by Hach Company). An instrument evaluation was performed using quality control check standards. The reporting limit was determined to be 0.01 mg/L, with a Method Detection Limit of 0.004 mg/L. Results of the performance evaluation are also presented in Appendix F. Through this testing, the Districts have determined that by using an amperometric titrator in the laboratory it is possible to provide results down to the levels required to determine compliance with the policy in a laboratory setting using grab samples. However, given that the titration method is more labor intensive than taking an analyzer reading, analysis of grab samples every 30 minutes as allowed for back-up system purposes in the draft Policy[15] would not be practical.

Additional Laboratory Work

The Districts are in the process of conducting additional studies to provide further information regarding low-level chlorine measurements using final effluent. The results of this work will be forwarded to the SWRCB when completed. These analytical studies as described below are scheduled to be completed by early November 2005 and include the following:

> <u>Performance Evaluation of an Online Chlorine Analyzer in Wastewater Matrix.</u> From the testing described previously, it has been concluded that the lowest measurable concentration an online chlorine analyzer can detect (based on laboratory testing) with reasonable precision and accuracy (measurements are repeatable and meet percent recoveries acceptable to Districts' laboratory practices) is 0.05 mg/L in **deionized water**. It is anticipated that the lowest measurable concentration will be greater than 0.05 mg/L when testing actual effluent from a WRP, since the effluent provides a different matrix that is more complex than that of deionized water and can contain materials that interfere the analysis. The objective of this study is to determine the lowest measurable concentration that an online chlorine analyzer can detect in the laboratory in an effluent matrix (i.e., given the more complex effluent matrix). Secondary effluent from the San Jose Creek WRP will be used and each sample will be dosed to a specified concentration of chlorine. Then, the concentration in each sample will be measured by manually analyzing a sample with an amperometric titrator and with a continuous analyzer. The duration of continuous monitoring for each tested concentration will be one hour.
>
> <u>Performance Evaluation of an Online Chlorine Analyzer – Response Time</u>. In addition, the response time of the continuous analyzer will also be tested in a deionized water matrix. From previous studies, it has been shown that concentrations of total residual

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[13] Severn Trent, Wallace & Tiernan and GLI were contacted.

[14] Method may yield positive interference due to the presence of organics in wastewater.

[15] The draft Policy requires the collection of grab samples every 30 minutes both at the end of pipe and in the receiving water when continuous monitoring systems are off-line for calibration and maintenance; *see* page 5 of the draft Policy.

chlorine decline quickly (within 5 minutes of dosing) in secondary effluent. The response time of the online analyzer will be tested on the following concentration ranges: a) 0 to 0.05 mg/L; b) 0.05 mg/L to 0.1 mg/L, and c) 0 to 0.1 mg/L. A response curve of the online analyzer [readings (mg/L) versus time (seconds)] will be constructed.

6) Chlorine Decay Studies/ Assessments

Receiving Waters

Chlorine is not a stable chemical. Once discharged in wastewater, it usually dissipates rapidly in a receiving water due to natural organic matter, temperature, light, agitation, etc. The level of decay will be site specific depending on the concentration in the wastewater and the conditions of the receiving water, as will potential impacts on wildlife. This ability for chlorine to expend or assimilate was acknowledged in the draft Policy.[16]

This condition has been examined by the Districts during episodes when residual chlorine excursions have occurred. It is the Districts' practice to make observations in the receiving water if the excursions occur during normal working hours when staff is available to quickly respond in light of the non-conservative nature of chlorine. As previously noted, Districts staff observed no fish mortality during these events. Historical measurements in receiving waters during some of these excursions indicate that there is a residual chlorine demand in the receiving waters at the point of discharge. Recent incidents at the San Jose Creek WRP, caused by an equipment malfunction, allowed the collection of residual chlorine samples at downstream locations from the final effluent discharge point immediately following the excursion event as shown below in Table 3.

Table 3 – Receiving Water Residual Chlorine

	Final Effluent Chlorine Residual (mg/L)	200 Feet Downstream (mg/L)	300 Feet Downstream (mg/L)	400 Feet Downstream (mg/L)	Approximate Loss of chlorine (mg/L/1000 feet)
Incident 1	0.47	<0.05	<0.05	Not measured	4
Incident 2	3.7	1.5	Not measured	0.05	10

Outfalls

Effluent from the Districts' San Jose Creek WRP is discharged through two outfalls: the San Gabriel River Outfall (also known as Discharge 001) and the San Jose Creek Outfall (also known as Discharge 002). The San Gabriel River Outfall is a 9.5 mile enclosed pipeline that coveys chlorinated effluent from the plant to the lined San Gabriel River. The effluent is not dechlorinated to prevent the build-up of biological growth in the pipeline. Specific field studies conducted by the Districts in the San Gabriel River Outfall have evaluated chlorine demand of final effluent within this pipeline. This study found that there was a residual chlorine loss within this enclosed pipeline of approximately 0.05 mg/L/1000 feet due to chlorine demand within the pipeline. Appendix G presents additional information regarding this work.

[16] *See* page 6 of the draft Policy.

This kind of evaluation suggests that chlorine decay is likely to occur either in discharge distribution pipelines and/or once the effluent commingles with the receiving water, and should be factored into possible compliance options for the Policy as discussed later.

7) Planned Additional Studies Regarding Residual Chlorine Toxicity

Per the discussion above regarding chlorine decay in receiving waters, it is likely that the residual chlorine may not pose a toxicity threat to aquatic life given the rapid decay associated with the oxidation of organic material within the receiving water. The Districts propose to conduct a study that builds on the agency's earlier work looking at chlorine demand in receiving waters by adding in a toxicity assessment associated with residual chlorine and short-term exposures to mimic the kinds of incidents observed by the Districts and other POTWs.

Residual Chlorine Demand Determination

This study is designed to determine the chlorine demand at and around the discharge of San Jose Creek WRP effluent to the unlined portion of San Jose Creek. An "upstream" sample will be collected in San Jose Creek above the discharge at San Jose Creek receiving water location C1 (approximately 100 yards above the #002 outfall) and a "downstream" sample will be collected from San Jose Creek receiving water location C2 (approximately 200 yards below the treatment plant discharge point). In addition to these receiving waters, a synthetic, reconstituted deionized, very hard dilution water sample will also be prepared. The chlorine demand will be empirically determined on each of these samples. Samples will be treated with increasing amounts of chlorine. After a 30-minute contact period, chlorine residuals will be determined by the amperometric titration method. The chlorine demand will then be read directly from a constructed calibration curve (a plot of the amount of chlorine consumed versus dosage). Once the demand has been chemically determined, acute toxicity tests will be conducted using *Ceriodaphnia dubia.*

Short-term Chlorine Residual Toxicity Testing

As a separate part of this study, receiving water and laboratory water samples will be dosed with a low dose(s) of chlorine (approximately 0.5 mg/L) for a short duration. This study is intended to evaluate the short-term residual chlorine sensitivity of *Ceriodaphnia dubia* at a residual chlorine concentration of less than 1 mg/L in receiving water samples and laboratory dilution water. Less than 24-hour old *Ceriodaphnia dubia* neonates will be exposed to control (non-dosed) and chlorine-dosed water samples for 5 minutes and 10 minutes. Organisms will then be transferred to clean water samples after exposure and their survival will be monitored for 48 hours.[17] This will provide an indication of impact or lack of impact associated with the short-term chlorine exposures.

8) Survey of Residual Chlorine Requirements and Compliance Methods in Other States

The Districts are in the process of completing a survey of chlorine residual requirements and compliance methods at POTWs outside of California. At this point, a total of 24 facilities from nine different states have been contacted. Most of these states have adopted US EPA's 1984 residual chlorine objectives for waters in their respective states[18]. However, only a handful of these plants have limits as low as the criteria objectives. For the most part, their discharge limits

[17] Adverse toxicological effects will be defined as 50% or greater mortality occurring in a treatment.
[18] We are aware that at least 25 states have adopted the recommended criteria.

are at least twice as high possibly due to the consideration of dilution and mixing zones when determining compliance. Whereas some of these facilities do monitor their chlorine concentrations within their facility with an on-line analyzer, these results are used to control operational processes; none of the plants surveyed to date use chlorine analyzers for compliance reporting. Many of the states officially recognize the limits of chlorine measurement from laboratory procedures as well and require that daily grab samples be collected, such as Colorado, Texas[19] and Washington[20]. For example, Ohio has adopted a quantification limit of 50 ug/L, below which they consider all reported values to essentially be non-detect values[21].

The majority of the facilities surveyed monitor for residual chlorine using the DPD (Diethyl-P-Phenylene Diamine) colorimetric method or amperometric titration on grab samples from the effluent. Reported method detection limits range from 10 to 100 ug/L. Many of the facilities have language in their permits stating that a measurement below a specific detection level will be treated as a non-detect. Once this survey has been completed, the Districts will forward a copy to the SWRCB for their consideration.

9) Proposed Compliance Options

Based on the information we have provided herein, the Districts believe that there are significant issues with the Policy as previously drafted with respect to the use of continuous monitors for determining compliance, but also believe that there are other options that the SWRCB should consider. The draft Policy requires that continuous monitoring must be done at all facilities except where it is inappropriate, such as facilities with very small, short-term, intermittent flows. Moreover, the draft Policy specified that these on-line monitoring devices must have a manufacturer's stated detection limit, scale range, or sensitivity of 1 ppb. As illustrated by the Districts' preliminary investigations, and discussions with US EPA, other state agencies, and POTWs, grab samples, which represent more or less "instantaneous" conditions, are used for constituents, such as chlorine residual, that are unstable. To our knowledge, other states only have approved continuous monitoring for a limited number of parameters such as temperature, pH, conductivity, and dissolved oxygen – not chlorine residual. Moreover, despite what a manufacturer's stated detection limit might be, we are not currently aware of a continuous monitor that has demonstrated that it can reliably and accurately meet sensitivity of 1 ppb in a wastewater matrix and in the field, nor are we aware that any continuous monitoring device meets the conditions of 40 CFR 136 for NPDES compliance monitoring. We agree that it is very important that data collected for compliance be representative of the monitored activity; however, at this time, we cannot agree that continuous monitoring is appropriate for chlorine residual compliance. We do, however, believe as illustrated by the Districts' chlorination and dechlorination operations, that continuous monitors can play an important role in process control to prevent situations where effluent limitations are likely to be exceeded. We also believe that in lieu of continuous meters or complimentary to that function, the use of stoichiometric process control for dechlorination is another method to prevent permit violations, particularly when modified to account for a margin of safety. Consequently, we recommend that the SWRCB consider the following alternatives for determining compliance in lieu of continuous monitoring

[19] *See* http://www.tceq.state.tx.us/compliance/complaints/protocols/wqsamp_proto.html.

[20] *See* http://www.ecy.wa.gov/programs/wq/wastewater/index.html#permit_manual. Washington State regulations state that "Each effluent flow or pollutant required to be monitored pursuant to (a) of this subsection shall be monitored at intervals sufficiently frequent to yield data which reasonably characterizes the nature of the discharge of the monitored effluent flow or pollutant. Variable effluent flows and pollutant levels may be monitored at more frequent intervals than relatively constant effluent flows and pollutant levels which may be monitored at less frequent intervals." Yet, Washington only requires daily grab sampling for chlorine residual.

[21] *See* http://www.epa.state.oh.us/dsw/guidance/permit9.pdf.

as part of the proposed Policy. This suggestion assumes that some agencies already use continuous monitors for process control or may elect to do so voluntarily.

Require daily effluent grab sampling coupled with either:

- Continuous monitors for process control with set points/alarms established for actions to adjust chemical dosages and weekly grab sampling in downstream receiving water with provisions to collect supplemental grab samples of effluent and receiving water when process monitoring indicates potential violations may occur;[22] or
- Stoichiometric process control with a margin of safety factor included in the calculations and daily grab sampling in downstream receiving water.[23]

In addition to the above suggested alternatives, the State Board could consider that when excursions above permit limits occur, it may be warranted to initiate follow-up investigations in the receiving water to evaluate impacts on beneficial uses, and to determine the need for process and/or operations modifications to avoid future violations.

If continuous monitors are to be required for compliance monitoring, then a study will likely be necessary that can lead to approval under 40 CFR 136, that can develop a reporting level for the monitor pursuant to 40 CFR 136, Appendix B that is lower than effluent limits in permits, and that results in an adequate QA/QC and maintenance program that ensures proper operation of the monitor. The other option would be to conduct performance evaluations of currently available monitoring devices similar to the work being undertaken by the Districts. This would be a different kind of study with the goal of identifying one or more analyzers that are capable of meeting a suitable detection level in a wastewater matrix. Both kinds of studies will require the cooperation of the ITA, SWRCB, US EPA, POTWs, and others to develop the studies intended to answer these questions and develop the studies' protocols. The Districts would be willing to set up a kick-off meeting with stakeholders to begin these discussions (or participate as a stakeholder in related meetings), if the SWRCB is interested in pursuing this topic further.

10) Site Specific Options/Attenuation Zones

In recognition that some water bodies may have assimilative capacity or may naturally expend chlorine residual, the draft Policy allows for the consideration of developing site-specific objectives by Regional Boards. In doing so, the Regional Boards have been instructed to consider all aspects of the receiving water that bear on appropriate objectives such as *chlorine demand*, chlorine decay, formation of chlorinated compounds that may be harmful in the environment, differences between resident species sensitivity verses those used to develop the statewide objectives, differences in biological availability and toxicity of chlorine due to physical and chemical characteristics of the site water. This option will be important for POTWs inasmuch as there may be short periods of time when residual chlorine concentrations above the objectives will occur, but decay of chlorine occurs in discharge outfalls and/or the prevailing water body conditions in the localized area of the outfall discharge, thus, will not lead to adverse impacts. However, the reality of pursuing site-specific objectives is resource intensive, often politically infeasible, and not likely to offer a practicable remedy for occasional excursions.

[22] The State Board may not have the legal authority to require the use of continuous monitors for process control and thus we recommend that a legal evaluation be done to determine whether this option is within the State's authority in the context of Cal. Water Code Section 13360.

[23] We have also heard some proposals to utilize on-line continuous dechlorinating agent monitors as an alternative compliance measure, Unfortunately, the Districts have no experience with this type instrumentation and thus cannot provide any additional insight into this option.

As can be seen from the Districts' data, there have been occasions when short-term, low level excursions have occurred. These events are not believed to have adversely impacted beneficial uses based on Districts' field observations. Rather than requiring each POTW to develop a site-specific objective for a short-term/low level excursion, it would be desirable for the Policy to include some type of guidance for these kinds of events. It is our understanding that the SWRCB is proposing to not address SSOs or provide requirements for SSOs in the policy, so that these could be addressed at the Regional Board level. Although, this may be consistent with the current practice of having Regional Boards primarily involved in the adoption of SSOs, due to the nature of residual chlorine in that it is not a conservative compound and is impacted by environmental factors such as demand in receiving waters, we recommend that the SWRCB provide the Regional Boards guidelines for the development of SSOs/Attenuation Zones. SSO/Attenuation Zone guidance could consist of narrative provisions that establish the kinds of information a POTW must have to qualify for short-term exceptions. This could include information on the typical kind of chlorine demand in the discharge outfall and/or water body and responses to varying levels of chlorine exposure, or the kinds of toxicity studies currently being undertaken by the Districts. In some cases, agencies may have sophisticated models available, such as the Sacramento Regional Wastewater Treatment Plant Dilution Model, which can predict the impacts of occasional excursions on wildlife thresholds[24]. Satisfactory provision of this information would be a permit condition to quality for the SSO/Attenuation Zone.[25]

Another option could be the development of guidance and standardized decay factors similar to the work done by the New York State Department of Environmental Conservation, which conducted a field study evaluating the fate and impact of chlorine disinfection on aquatic life from treated wastewater discharges to freshwater streams. Coupled with a literature review, the key findings of the study were:

1. A rapid decay of residual chlorine upon discharge to a water body takes place during warm weather periods. Based on available information, a five-fold across the-board reduction was assumed.
2. The decay factor diminished with temperature as did chlorine toxicity. A reasonable presumption was thus been made that these two factors would effectively offset each other, with the result that an 80:1 dilution would protect aquatic life under the proposed chlorine standard at as high as 2.0 mg/l effluent TRC. [80 x 5 ug/l x 5 (decay factor) = 2000 ug/l = 2.0 mg/l]
3. Discharges to streams with dilution ratios of 30:1 or less would be allowed no more than 0.5 mg/l considering the factors noted above. At this maximum concentration, the Department recommended alternative disinfection or dechlorination to meet the conflicting needs of adequate disinfection and aquatic life protection.
4. Dischargers were also allowed to provide site-specific information regarding the impact of chlorine disinfection upon the protection of aquatic life to demonstrate reasonable variance from the guidance.

The Districts believe that this type of flexibility will be critical to dischargers and would like to continue this dialogue with the SWRCB to look at these at other potential regulatory alternative.

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[24] The model indicated that the proposed hourly chlorine effluent limitation resulted in a number of violations that were not reflective of impacts while the current daily limitation was adequate to protect aquatic resources and captured a majority of the events that would impact fish resources. Based on historical plant data, the proposed hourly limitation would have resulted in a total of 39 violations with 32 of the events resulting in no impact (false positive violations) to fish species. The model showed that when a discharge event occurred, the duration was short, and zones of passage were always maintained for passing organisms.

[25] Another variation of this concept may be an exception provision.

APPENDIX A

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
1/1/2002	< .05
1/2/2002	< .05
1/3/2002	< .05
1/4/2002	< .05
1/5/2002	< .05
1/6/2002	< .05
1/7/2002	< .05
1/8/2002	< .05
1/9/2002	< .05
1/10/2002	< .05
1/11/2002	< .05
1/12/2002	< .05
1/13/2002	< .05
1/14/2002	< .05
1/15/2002	< .05
1/16/2002	< .05
1/17/2002	< .05
1/18/2002	< .05
1/19/2002	< .05
1/20/2002	< .05
1/21/2002	< .05
1/22/2002	< .05
1/23/2002	< .05
1/24/2002	< .05
1/25/2002	< .05
1/26/2002	< .05
1/27/2002	< .05
1/28/2002	< .05
1/29/2002	< .05
1/30/2002	< .05
1/31/2002	< .05
2/1/2002	< .05
2/2/2002	< .05
2/3/2002	< .05
2/4/2002	< .05
2/5/2002	< .05
2/6/2002	< .05
2/7/2002	< .05
2/8/2002	< .05
2/9/2002	< .05
2/10/2002	< .05
2/11/2002	< .05
2/12/2002	< .05
2/13/2002	< .05
2/14/2002	< .05
2/15/2002	< .05
2/16/2002	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
2/17/2002	< .05
2/18/2002	< .05
2/19/2002	< .05
2/20/2002	< .05
2/21/2002	< .05
2/22/2002	< .05
2/23/2002	< .05
2/24/2002	< .05
2/25/2002	< .05
2/26/2002	< .05
2/27/2002	< .05
2/28/2002	< .05
3/1/2002	< .05
3/2/2002	< .05
3/3/2002	< .05
3/4/2002	< .05
3/5/2002	< .05
3/6/2002	< .05
3/7/2002	< .05
3/8/2002	< .05
3/9/2002	< .05
3/10/2002	< .05
3/11/2002	< .05
3/12/2002	< .05
3/13/2002	< .05
3/14/2002	< .05
3/15/2002	< .05
3/16/2002	< .05
3/17/2002	< .05
3/18/2002	< .05
3/19/2002	< .05
3/20/2002	< .05
3/21/2002	< .05
3/22/2002	< .05
3/23/2002	< .05
3/24/2002	< .05
3/25/2002	< .05
3/26/2002	< .05
3/27/2002	< .05
3/28/2002	< .05
3/29/2002	< .05
3/30/2002	< .05
3/31/2002	< .05
4/1/2002	< .05
4/2/2002	< .05
4/3/2002	< .05
4/4/2002	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
4/5/2002	< .05
4/6/2002	< .05
4/7/2002	< .05
4/8/2002	< .05
4/9/2002	< .05
4/10/2002	< .05
4/11/2002	< .05
4/12/2002	< .05
4/13/2002	< .05
4/14/2002	< .05
4/15/2002	< .05
4/16/2002	< .05
4/17/2002	< .05
4/18/2002	< .05
4/19/2002	< .05
4/20/2002	< .05
4/21/2002	< .05
4/22/2002	< .05
4/23/2002	< .05
4/24/2002	< .05
4/25/2002	< .05
4/26/2002	< .05
4/27/2002	< .05
4/28/2002	< .05
4/29/2002	< .05
4/30/2002	< .05
5/1/2002	< .05
5/2/2002	< .05
5/3/2002	< .05
5/4/2002	< .05
5/5/2002	< .05
5/6/2002	< .05
5/7/2002	< .05
5/8/2002	< .05
5/9/2002	< .05
5/10/2002	< .05
5/11/2002	< .05
5/12/2002	< .05
5/13/2002	< .05
5/14/2002	< .05
5/15/2002	< .05
5/16/2002	< .05
5/17/2002	< .05
5/18/2002	< .05
5/19/2002	< .05
5/20/2002	< .05
5/21/2002	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
5/22/2002	< .05
5/23/2002	< .05
5/24/2002	< .05
5/25/2002	< .05
5/26/2002	< .05
5/27/2002	< .05
5/28/2002	< .05
5/29/2002	< .05
5/30/2002	< .05
5/31/2002	< .05
6/1/2002	< .05
6/2/2002	< .05
6/3/2002	< .05
6/4/2002	< .05
6/5/2002	< .05
6/6/2002	< .05
6/7/2002	< .05
6/8/2002	< .05
6/9/2002	< .05
6/10/2002	< .05
6/11/2002	< .05
6/12/2002	< .05
6/13/2002	< .05
6/14/2002	< .05
6/15/2002	< .05
6/16/2002	< .05
6/17/2002	< .05
6/18/2002	< .05
6/19/2002	< .05
6/20/2002	< .05
6/21/2002	< .05
6/22/2002	< .05
6/23/2002	< .05
6/24/2002	< .05
6/25/2002	< .05
6/26/2002	< .05
6/27/2002	< .05
6/28/2002	< .05
6/29/2002	< .05
6/30/2002	< .05
7/1/2002	< .05
7/2/2002	< .05
7/3/2002	< .05
7/4/2002	< .05
7/5/2002	< .05
7/6/2002	< .05
7/7/2002	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
7/8/2002	< .05
7/9/2002	< .05
7/10/2002	< .05
7/11/2002	< .05
7/12/2002	< .05
7/13/2002	< .05
7/14/2002	< .05
7/15/2002	< .05
7/16/2002	< .05
7/17/2002	< .05
7/18/2002	< .05
7/19/2002	< .05
7/20/2002	< .05
7/21/2002	< .05
7/22/2002	< .05
7/23/2002	< .05
7/24/2002	< .05
7/25/2002	< .05
7/26/2002	< .05
7/27/2002	< .05
7/28/2002	< .05
7/29/2002	< .05
7/30/2002	< .05
7/31/2002	< .05
8/1/2002	< .05
8/2/2002	< .05
8/3/2002	< .05
8/4/2002	< .05
8/5/2002	< .05
8/6/2002	< .05
8/7/2002	< .05
8/8/2002	< .05
8/9/2002	< .05
8/10/2002	< .05
8/11/2002	< .05
8/12/2002	< .05
8/13/2002	< .05
8/14/2002	< .05
8/15/2002	< .05
8/16/2002	< .05
8/17/2002	< .05
8/18/2002	< .05
8/19/2002	< .05
8/20/2002	< .05
8/21/2002	< .05
8/22/2002	< .05
8/23/2002	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
8/24/2002	< .05
8/25/2002	< .05
8/26/2002	< .05
8/27/2002	< .05
8/28/2002	< .05
8/29/2002	< .05
8/30/2002	< .05
8/31/2002	< .05
9/1/2002	< .05
9/2/2002	< .05
9/3/2002	< .05
9/4/2002	< .05
9/5/2002	< .05
9/6/2002	< .05
9/7/2002	< .05
9/8/2002	< .05
9/9/2002	< .05
9/10/2002	< .05
9/11/2002	< .05
9/12/2002	< .05
9/13/2002	< .05
9/14/2002	< .05
9/15/2002	< .05
9/16/2002	< .05
9/17/2002	< .05
9/18/2002	< .05
9/19/2002	< .05
9/20/2002	< .05
9/21/2002	< .05
9/22/2002	< .05
9/23/2002	< .05
9/24/2002	< .05
9/25/2002	< .05
9/26/2002	< .05
9/27/2002	< .05
9/28/2002	< .05
9/29/2002	< .05
9/30/2002	< .05
10/1/2002	< .05
10/2/2002	< .05
10/3/2002	< .05
10/4/2002	< .05
10/5/2002	< .05
10/6/2002	< .05
10/7/2002	< .05
10/8/2002	< .05
10/9/2002	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
10/10/2002	< .05
10/11/2002	< .05
10/12/2002	< .05
10/13/2002	< .05
10/14/2002	< .05
10/15/2002	< .05
10/16/2002	< .05
10/17/2002	< .05
10/18/2002	< .05
10/19/2002	< .05
10/20/2002	< .05
10/21/2002	< .05
10/22/2002	< .05
10/23/2002	< .05
10/24/2002	< .05
10/25/2002	< .05
10/26/2002	< .05
10/27/2002	< .05
10/28/2002	< .05
10/29/2002	< .05
10/30/2002	< .05
10/31/2002	< .05
11/1/2002	< .05
11/2/2002	< .05
11/3/2002	< .05
11/4/2002	< .05
11/5/2002	< .05
11/6/2002	< .05
11/7/2002	< .05
11/8/2002	< .05
11/9/2002	< .05
11/10/2002	< .05
11/11/2002	< .05
11/12/2002	< .05
11/13/2002	< .05
11/14/2002	< .05
11/15/2002	< .05
11/16/2002	< .05
11/17/2002	< .05
11/18/2002	< .05
11/19/2002	< .05
11/20/2002	< .05
11/21/2002	< .05
11/22/2002	< .05
11/23/2002	< .05
11/24/2002	< .05
11/25/2002	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
11/26/2002	< .05
11/27/2002	< .05
11/28/2002	< .05
11/29/2002	< .05
11/30/2002	< .05
12/1/2002	< .05
12/2/2002	< .05
12/3/2002	< .05
12/4/2002	< .05
12/5/2002	< .05
12/6/2002	< .05
12/7/2002	< .05
12/8/2002	< .05
12/9/2002	< .05
12/10/2002	< .05
12/11/2002	< .05
12/12/2002	< .05
12/13/2002	< .05
12/14/2002	< .05
12/15/2002	< .05
12/16/2002	< .05
12/17/2002	< .05
12/18/2002	< .05
12/19/2002	< .05
12/20/2002	< .05
12/21/2002	< .05
12/22/2002	< .05
12/23/2002	< .05
12/24/2002	< .05
12/25/2002	< .05
12/26/2002	< .05
12/27/2002	< .05
12/28/2002	< .05
12/29/2002	< .05
12/30/2002	< .05
12/31/2002	< .05
1/1/2003	< .05
1/2/2003	< .05
1/3/2003	< .05
1/4/2003	< .05
1/5/2003	< .05
1/6/2003	< .05
1/7/2003	< .05
1/8/2003	< .05
1/9/2003	< .05
1/10/2003	< .05
1/11/2003	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
1/12/2003	< .05
1/13/2003	< .05
1/14/2003	< .05
1/15/2003	< .05
1/16/2003	< .05
1/17/2003	< .05
1/18/2003	< .05
1/19/2003	< .05
1/20/2003	< .05
1/21/2003	< .05
1/22/2003	< .05
1/23/2003	< .05
1/24/2003	< .05
1/25/2003	< .05
1/26/2003	< .05
1/27/2003	< .05
1/28/2003	< .05
1/29/2003	< .05
1/30/2003	< .05
1/31/2003	4.1
2/1/2003	< .05
2/2/2003	< .05
2/3/2003	< .05
2/4/2003	< .05
2/5/2003	< .05
2/6/2003	< .05
2/7/2003	< .05
2/8/2003	< .05
2/9/2003	< .05
2/10/2003	< .05
2/11/2003	< .05
2/13/2003	< .05
2/14/2003	< .05
2/15/2003	< .05
2/16/2003	< .05
2/17/2003	< .05
2/18/2003	< .05
2/19/2003	< .05
2/20/2003	< .05
2/21/2003	< .05
2/22/2003	< .05
2/23/2003	< .05
2/24/2003	< .05
2/25/2003	< .05
2/26/2003	< .05
2/27/2003	< .05
2/28/2003	< .05

APPENDIX A

San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
3/1/2003	< .05
3/2/2003	< .05
3/3/2003	< .05
3/4/2003	< .05
3/5/2003	< .05
3/6/2003	< .05
3/7/2003	< .05
3/8/2003	< .05
3/9/2003	< .05
3/10/2003	< .05
3/11/2003	< .05
3/12/2003	< .05
3/13/2003	< .05
3/14/2003	< .05
3/15/2003	< .05
3/16/2003	< .05
3/17/2003	< .05
3/18/2003	< .05
3/19/2003	< .05
3/20/2003	< .05
3/21/2003	< .05
3/22/2003	< .05
3/23/2003	< .05
3/24/2003	< .05
3/25/2003	< .05
3/26/2003	< .05
3/27/2003	< .05
3/28/2003	< .05
3/29/2003	< .05
3/30/2003	< .05
3/31/2003	< .05
4/1/2003	< .05
4/2/2003	< .05
4/3/2003	< .05
4/4/2003	< .05
4/5/2003	< .05
4/6/2003	< .05
4/7/2003	< .05
4/8/2003	< .05
4/9/2003	< .05
4/10/2003	< .05
4/11/2003	< .05
4/12/2003	< .05
4/13/2003	< .05
4/14/2003	< .05
4/15/2003	< .05
4/16/2003	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
4/17/2003	> .5
4/18/2003	< .05
4/19/2003	< .05
4/20/2003	< .05
4/21/2003	< .05
4/22/2003	< .05
4/23/2003	< .05
4/24/2003	< .05
4/25/2003	< .05
4/26/2003	< .05
4/27/2003	< .05
4/28/2003	< .05
4/29/2003	< .05
4/30/2003	< .05
5/1/2003	< .05
5/2/2003	< .05
5/3/2003	< .05
5/4/2003	< .05
5/5/2003	< .05
5/6/2003	< .05
5/7/2003	< .05
5/8/2003	< .05
5/9/2003	< .05
5/10/2003	< .05
5/11/2003	< .05
5/12/2003	0.22
5/13/2003	< .05
5/14/2003	< .05
5/15/2003	< .05
5/16/2003	< .05
5/17/2003	< .05
5/18/2003	< .05
5/19/2003	< .05
5/20/2003	0.53
5/21/2003	< .05
5/22/2003	< .05
5/23/2003	< .05
5/24/2003	< .05
5/25/2003	< .05
5/26/2003	< .05
5/27/2003	< .05
5/28/2003	< .05
5/29/2003	< .05
5/30/2003	< .05
5/31/2003	< .05
6/1/2003	< .05
6/2/2003	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
6/3/2003	< .05
6/4/2003	< .05
6/5/2003	< .05
6/6/2003	< .05
6/7/2003	< .05
6/8/2003	< .05
6/9/2003	< .05
6/10/2003	< .05
6/11/2003	< .05
6/12/2003	< .05
6/13/2003	< .05
6/14/2003	< .05
6/15/2003	< .05
6/16/2003	< .05
6/17/2003	< .05
6/18/2003	< .05
6/19/2003	< .05
6/20/2003	< .05
6/21/2003	< .05
6/22/2003	< .05
6/23/2003	< .05
6/24/2003	< .05
6/25/2003	< .05
6/26/2003	< .05
6/27/2003	< .05
6/28/2003	< .05
6/29/2003	< .05
6/30/2003	< .05
7/1/2003	< .05
7/2/2003	> .5
7/3/2003	< .05
7/4/2003	< .05
7/5/2003	< .05
7/6/2003	< .05
7/7/2003	< .05
7/8/2003	< .05
7/9/2003	< .05
7/10/2003	< .05
7/11/2003	< .05
7/12/2003	< .05
7/14/2003	< .05
7/15/2003	< .05
7/16/2003	< .05
7/17/2003	< .05
7/18/2003	> .5
7/19/2003	< .05
7/20/2003	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
7/21/2003	< .05
7/22/2003	< .05
7/23/2003	< .05
7/24/2003	< .05
7/25/2003	< .05
7/26/2003	< .05
7/27/2003	< .05
7/28/2003	< .05
7/29/2003	< .05
7/30/2003	< .05
7/31/2003	< .05
8/1/2003	< .05
8/2/2003	< .05
8/3/2003	< .05
8/4/2003	< .05
8/5/2003	< .05
8/6/2003	< .05
8/7/2003	< .05
8/8/2003	< .05
8/9/2003	< .05
8/10/2003	< .05
8/11/2003	< .05
8/12/2003	< .05
8/13/2003	< .05
8/14/2003	< .05
8/15/2003	< .05
8/16/2003	< .05
8/18/2003	< .05
8/19/2003	< .05
8/20/2003	< .05
8/21/2003	< .05
8/22/2003	< .05
8/23/2003	< .05
8/24/2003	< .05
8/25/2003	< .05
8/26/2003	< .05
8/27/2003	< .05
8/28/2003	< .05
8/29/2003	< .05
8/30/2003	< .05
8/31/2003	< .05
9/1/2003	< .05
9/2/2003	< .05
9/3/2003	< .05
9/4/2003	< .05
9/5/2003	< .05
9/6/2003	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP Final Effluent Residual Chlorine mg/L
Date	Column 247
9/7/2003	< .05
9/8/2003	< .05
9/9/2003	< .05
9/10/2003	< .05
9/11/2003	< .05
9/12/2003	< .05
9/13/2003	< .05
9/14/2003	< .05
9/15/2003	< .05
9/16/2003	< .05
9/17/2003	< .05
9/18/2003	< .05
9/19/2003	< .05
9/20/2003	< .05
9/21/2003	< .05
9/22/2003	< .05
9/23/2003	< .05
9/24/2003	< .05
9/25/2003	< .05
9/26/2003	< .05
9/27/2003	< .05
9/28/2003	< .05
9/29/2003	< .05
9/30/2003	< .05
10/1/2003	< .05
10/2/2003	< .05
10/3/2003	< .05
10/4/2003	< .05
10/5/2003	< .05
10/6/2003	< .05
10/7/2003	< .05
10/8/2003	< .05
10/9/2003	< .05
10/10/2003	< .05
10/11/2003	< .05
10/12/2003	< .05
10/13/2003	< .05
10/14/2003	< .05
10/15/2003	< .05
10/16/2003	< .05
10/17/2003	< .05
10/18/2003	< .05
10/19/2003	< .05
10/20/2003	< .05
10/21/2003	< .05
10/22/2003	< .05
10/23/2003	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP Final Effluent Residual Chlorine mg/L
Date	Column 247
10/24/2003	< .05
10/25/2003	< .05
10/26/2003	< .05
10/27/2003	< .05
10/28/2003	< .05
10/29/2003	< .05
10/30/2003	< .05
10/31/2003	< .05
11/1/2003	< .05
11/2/2003	< .05
11/3/2003	< .05
11/4/2003	< .05
11/5/2003	< .05
11/6/2003	< .05
11/7/2003	< .05
11/8/2003	< .05
11/9/2003	< .05
11/10/2003	< .05
11/11/2003	< .05
11/12/2003	< .05
11/13/2003	< .05
11/14/2003	< .05
11/15/2003	< .05
11/16/2003	< .05
11/17/2003	< .05
11/18/2003	< .05
11/19/2003	< .05
11/20/2003	< .05
11/21/2003	< .05
11/22/2003	< .05
11/23/2003	< .05
11/24/2003	< .05
11/25/2003	< .05
11/26/2003	< .05
11/27/2003	< .05
11/28/2003	< .05
11/29/2003	< .05
11/30/2003	< .05
12/1/2003	< .05
12/2/2003	< .05
12/3/2003	< .05
12/4/2003	< .05
12/5/2003	< .05
12/6/2003	< .05
12/7/2003	< .05
12/8/2003	< .05
12/9/2003	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
12/10/2003	< .05
12/11/2003	< .05
12/12/2003	< .05
12/13/2003	< .05
12/14/2003	< .05
12/15/2003	< .05
12/16/2003	< .05
12/17/2003	< .05
12/18/2003	< .05
12/19/2003	< .05
12/20/2003	< .05
12/21/2003	< .05
12/22/2003	< .05
12/23/2003	< .05
12/24/2003	< .05
12/25/2003	< .05
12/26/2003	< .05
12/27/2003	< .05
12/28/2003	< .05
12/29/2003	< .05
12/30/2003	< .05
12/31/2003	< .05
1/1/2004	< .05
1/2/2004	< .05
1/3/2004	< .05
1/4/2004	< .05
1/5/2004	< .05
1/6/2004	< .05
1/7/2004	< .05
1/8/2004	< .05
1/9/2004	< .05
1/10/2004	< .05
1/11/2004	< .05
1/12/2004	< .05
1/13/2004	< .05
1/14/2004	< .05
1/15/2004	< .05
1/16/2004	< .05
1/17/2004	< .05
1/18/2004	< .05
1/19/2004	< .05
1/20/2004	< .05
1/21/2004	< .05
1/22/2004	< .05
1/23/2004	< .05
1/24/2004	< .05
1/25/2004	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
1/26/2004	< .05
1/27/2004	< .05
1/28/2004	< .05
1/29/2004	< .05
1/30/2004	> .05
1/31/2004	< .05
2/1/2004	< .05
2/2/2004	< .05
2/3/2004	< .05
2/4/2004	< .05
2/5/2004	< .05
2/6/2004	< .05
2/7/2004	< .05
2/8/2004	< .05
2/9/2004	< .05
2/10/2004	< .05
2/11/2004	< .05
2/13/2004	< .05
2/14/2004	< .05
2/15/2004	< .05
2/16/2004	< .05
2/17/2004	< .05
2/18/2004	< .05
2/19/2004	< .05
2/20/2004	< .05
2/21/2004	< .05
2/22/2004	< .05
2/23/2004	< .05
2/24/2004	< .05
2/25/2004	< .05
2/26/2004	< .05
2/27/2004	< .05
2/28/2004	< .05
2/29/2004	< .05
3/1/2004	< .05
3/2/2004	< .05
3/3/2004	< .05
3/4/2004	< .05
3/5/2004	< .05
3/6/2004	< .05
3/7/2004	< .05
3/8/2004	< .05
3/9/2004	< .05
3/10/2004	< .05
3/11/2004	< .05
3/12/2004	< .05
3/13/2004	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
3/14/2004	< .05
3/15/2004	< .05
3/16/2004	< .05
3/17/2004	< .05
3/18/2004	< .05
3/19/2004	< .05
3/20/2004	< .05
3/21/2004	< .05
3/22/2004	< .05
3/23/2004	< .05
3/24/2004	< .05
3/25/2004	< .05
3/26/2004	< .05
3/27/2004	< .05
3/28/2004	< .05
3/29/2004	< .05
3/30/2004	< .05
3/31/2004	< .05
4/1/2004	< .05
4/2/2004	< .05
4/3/2004	< .05
4/4/2004	< .05
4/5/2004	< .05
4/6/2004	< .05
4/7/2004	< .05
4/8/2004	< .05
4/9/2004	< .05
4/10/2004	< .05
4/11/2004	< .05
4/12/2004	< .05
4/13/2004	< .05
4/14/2004	< .05
4/15/2004	< .05
4/16/2004	< .05
4/17/2004	< .05
4/18/2004	< .05
4/23/2004	< .05
4/24/2004	< .05
4/25/2004	< .05
4/26/2004	< .05
4/27/2004	< .05
4/28/2004	< .05
4/29/2004	< .05
4/30/2004	< .05
5/1/2004	< .05
5/2/2004	< .05
5/3/2004	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
5/4/2004	< .05
5/5/2004	< .05
5/6/2004	< .05
5/7/2004	< .05
5/8/2004	< .05
5/9/2004	< .05
5/10/2004	< .05
5/11/2004	< .05
5/12/2004	< .05
5/13/2004	< .05
5/14/2004	< .05
5/15/2004	< .05
5/16/2004	< .05
5/17/2004	< .05
5/18/2004	< .05
5/19/2004	< .05
5/20/2004	< .05
5/21/2004	< .05
5/22/2004	< .05
5/23/2004	< .05
5/24/2004	< .05
5/25/2004	< .05
5/26/2004	< .05
5/27/2004	< .05
5/28/2004	< .05
5/29/2004	< .05
5/30/2004	< .05
5/31/2004	< .05
6/1/2004	< .05
6/2/2004	< .05
6/3/2004	< .05
6/4/2004	< .05
6/5/2004	< .05
6/6/2004	< .05
6/7/2004	< .05
6/8/2004	< .05
6/9/2004	< .05
6/10/2004	< .05
6/11/2004	< .05
6/12/2004	< .05
6/13/2004	< .05
6/14/2004	< .05
6/15/2004	< .05
6/16/2004	< .05
6/17/2004	< .05
6/18/2004	< .05
6/19/2004	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

Date	San Jose Creek East WRP Final Effluent Residual Chlorine mg/L Column 247	
6/20/2004	< .05	
6/21/2004	< .05	
6/22/2004	< .05	
6/23/2004	< .05	
6/24/2004	< .05	
6/25/2004	< .05	
6/26/2004	< .05	
6/27/2004	< .05	
6/28/2004	< .05	
7/2/2004	< .05	
7/3/2004	< .05	
7/4/2004	< .05	
7/5/2004	< .05	
7/6/2004	< .05	
7/7/2004	< .05	
7/8/2004	< .05	
7/9/2004	< .05	
7/10/2004	< .05	
7/11/2004	< .05	
7/12/2004	< .05	
7/13/2004	< .05	
7/14/2004	< .05	
7/15/2004	< .05	
7/16/2004	< .05	
7/17/2004	< .05	
7/18/2004	< .05	
7/19/2004	< .05	
7/20/2004	< .05	
7/21/2004	< .05	
7/22/2004	< .05	
7/23/2004	< .05	
7/24/2004	< .05	
7/25/2004	< .05	
7/26/2004	< .05	
7/27/2004	< .05	
7/28/2004	< .05	
7/29/2004	< .05	
7/30/2004	< .05	Effective date of current NPDES permit
7/31/2004	< .05	
8/1/2004	< .05	
8/2/2004	< .05	
8/3/2004	< .05	
8/4/2004	< .05	
8/5/2004	< .05	
8/6/2004	< .05	
8/7/2004	< .05	
8/8/2004	< .05	

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
8/9/2004	< .05
8/10/2004	< .05
8/11/2004	< .05
8/12/2004	< .05
8/13/2004	< .05
8/14/2004	< .05
8/15/2004	< .05
8/16/2004	< .05
8/17/2004	< .05
8/18/2004	< .05
8/19/2004	< .05
8/20/2004	< .05
8/21/2004	< .05
8/22/2004	< .05
8/23/2004	< .05
8/24/2004	< .05
8/25/2004	< .05
8/26/2004	< .05
8/27/2004	< .05
8/28/2004	< .05
8/29/2004	< .05
8/30/2004	< .05
8/31/2004	< .05
9/1/2004	< .05
9/2/2004	< .05
9/3/2004	< .05
9/4/2004	< .05
9/5/2004	< .05
9/6/2004	< .05
9/7/2004	< .05
9/8/2004	< .05
9/9/2004	< .05
9/10/2004	< .05
9/11/2004	< .05
9/12/2004	< .05
9/13/2004	< .05
9/14/2004	< .05
9/15/2004	< .05
9/16/2004	< .05
9/17/2004	< .05
9/18/2004	< .05
9/19/2004	< .05
9/20/2004	< .05
9/21/2004	< .05
9/22/2004	< .05
9/23/2004	< .05
9/24/2004	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
9/25/2004	< .05
9/26/2004	< .05
9/27/2004	< .05
9/28/2004	< .05
9/29/2004	< .05
9/30/2004	< .05
10/1/2004	< .05
10/2/2004	< .05
10/3/2004	< .05
10/4/2004	< .05
10/5/2004	< .05
10/6/2004	< .05
10/7/2004	< .05
10/8/2004	< .05
10/9/2004	< .05
10/10/2004	< .05
10/11/2004	< .05
10/12/2004	< .05
10/13/2004	< .05
10/14/2004	< .05
10/15/2004	< .05
10/16/2004	< .05
10/17/2004	< .05
10/18/2004	< .05
10/19/2004	< .05
10/20/2004	< .05
10/21/2004	< .05
10/22/2004	< .05
10/23/2004	< .05
10/24/2004	< .05
10/25/2004	< .05
10/26/2004	< .05
10/27/2004	< .05
10/28/2004	< .05
10/29/2004	< .05
10/30/2004	< .05
10/31/2004	< .05
11/1/2004	< .05
11/2/2004	< .05
11/3/2004	< .05
11/4/2004	< .05
11/5/2004	< .05
11/6/2004	< .05
11/7/2004	< .05
11/8/2004	< .05
11/9/2004	< .05
11/10/2004	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
11/11/2004	< .05
11/12/2004	< .05
11/13/2004	< .05
11/14/2004	< .05
11/15/2004	< .05
11/16/2004	< .05
11/17/2004	< .05
11/18/2004	< .05
11/19/2004	< .05
11/20/2004	< .05
11/21/2004	< .05
11/22/2004	< .05
11/23/2004	< .05
11/24/2004	< .05
11/25/2004	< .05
11/26/2004	< .05
11/27/2004	< .05
11/28/2004	< .05
11/29/2004	< .05
11/30/2004	< .05
12/1/2004	< .05
12/2/2004	< .05
12/3/2004	< .05
12/4/2004	< .05
12/5/2004	< .05
12/6/2004	< .05
12/7/2004	< .05
12/8/2004	< .05
12/9/2004	< .05
12/10/2004	< .05
12/11/2004	< .05
12/12/2004	< .05
12/13/2004	< .05
12/14/2004	< .05
12/15/2004	< .05
12/16/2004	< .05
12/17/2004	< .05
12/18/2004	< .05
12/19/2004	< .05
12/20/2004	< .05
12/21/2004	< .05
12/22/2004	< .05
12/23/2004	< .05
12/24/2004	< .05
12/25/2004	< .05
12/26/2004	< .05
12/27/2004	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
12/28/2004	< .05
12/29/2004	< .05
12/30/2004	< .05
12/31/2004	< .05
1/1/2005	< .05
1/2/2005	< .05
1/3/2005	< .05
1/4/2005	< .05
1/5/2005	< .05
1/6/2005	< .05
1/7/2005	< .05
1/8/2005	< .05
1/9/2005	< .05
1/10/2005	< .05
1/11/2005	< .05
1/12/2005	< .05
1/13/2005	< .05
1/14/2005	< .05
1/15/2005	< .05
1/16/2005	< .05
1/17/2005	< .05
1/18/2005	< .05
1/19/2005	< .05
1/20/2005	< .05
1/21/2005	< .05
1/22/2005	< .05
1/23/2005	0.53
1/24/2005	< .05
1/25/2005	< .05
1/26/2005	< .05
1/27/2005	< .05
1/28/2005	< .05
1/29/2005	< .05
1/30/2005	< .05
1/31/2005	< .05
2/1/2005	< .05
2/2/2005	< .05
2/3/2005	< .05
2/4/2005	< .05
2/5/2005	< .05
2/6/2005	< .05
2/7/2005	< .05
2/8/2005	< .05
2/9/2005	< .05
2/10/2005	< .05
2/11/2005	< .05
2/12/2005	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
2/13/2005	< .05
2/14/2005	< .05
2/15/2005	< .05
2/16/2005	< .05
2/17/2005	< .05
2/18/2005	< .05
2/19/2005	< .05
2/20/2005	< .05
2/21/2005	< .05
2/22/2005	< .05
2/23/2005	< .05
2/24/2005	< .05
2/25/2005	< .05
2/26/2005	< .05
2/27/2005	< .05
2/28/2005	< .05
3/1/2005	< .05
3/2/2005	< .05
3/3/2005	< .05
3/4/2005	< .05
3/5/2005	< .05
3/6/2005	< .05
3/7/2005	< .05
3/8/2005	< .05
3/9/2005	< .05
3/10/2005	< .05
3/11/2005	< .05
3/12/2005	< .05
3/13/2005	< .05
3/14/2005	< .05
3/15/2005	< .05
3/16/2005	< .05
3/17/2005	< .05
3/18/2005	< .05
3/19/2005	< .05
3/20/2005	< .05
3/21/2005	< .05
3/22/2005	< .05
3/23/2005	< .05
3/24/2005	< .05
3/25/2005	< .05
3/26/2005	< .05
3/27/2005	< .05
3/28/2005	< .05
3/29/2005	< .05
3/30/2005	< .05
3/31/2005	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
4/1/2005	< .05
4/2/2005	< .05
4/3/2005	< .05
4/4/2005	< .05
4/5/2005	< .05
4/6/2005	< .05
4/7/2005	< .05
4/8/2005	< .05
4/9/2005	< .05
4/10/2005	< .05
4/11/2005	< .05
4/12/2005	< .05
4/13/2005	< .05
4/14/2005	< .05
4/15/2005	< .05
4/16/2005	< .05
4/17/2005	< .05
4/18/2005	< .05
4/19/2005	< .05
4/20/2005	< .05
4/21/2005	< .05
4/22/2005	< .05
4/23/2005	< .05
4/24/2005	< .05
4/25/2005	< .05
4/26/2005	< .05
4/27/2005	< .05
4/28/2005	< .05
4/29/2005	< .05
4/30/2005	< .05
5/1/2005	< .05
5/2/2005	< .05
5/3/2005	< .05
5/4/2005	< .05
5/5/2005	< .05
5/6/2005	< .05
5/7/2005	< .05
5/8/2005	< .05
5/9/2005	< .05
5/10/2005	< .05
5/11/2005	< .05
5/12/2005	< .05
5/13/2005	< .05
5/14/2005	< .05
5/15/2005	< .05
5/16/2005	< .05
5/17/2005	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
5/18/2005	< .05
5/19/2005	< .05
5/20/2005	< .05
5/21/2005	< .05
5/22/2005	< .05
5/23/2005	< .05
5/24/2005	< .05
5/25/2005	< .05
5/26/2005	< .05
5/27/2005	< .05
5/28/2005	< .05
5/29/2005	< .05
5/30/2005	< .05
5/31/2005	< .05
6/1/2005	< .05
6/2/2005	< .05
6/3/2005	< .05
6/4/2005	< .05
6/5/2005	< .05
6/6/2005	< .05
6/7/2005	< .05
6/8/2005	< .05
6/9/2005	< .05
6/10/2005	< .05
6/11/2005	< .05
6/12/2005	< .05
6/13/2005	< .05
6/14/2005	< .05
6/15/2005	< .05
6/16/2005	< .05
6/17/2005	< .05
6/18/2005	< .05
6/19/2005	< .05
6/20/2005	< .05
6/21/2005	< .05
6/22/2005	< .05
6/23/2005	< .05
6/24/2005	< .05
6/25/2005	< .05
6/26/2005	< .05
6/27/2005	< .05
6/28/2005	< .05
6/29/2005	< .05
6/30/2005	< .05
7/1/2005	< .05
7/2/2005	< .05
7/3/2005	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
7/4/2005	< .05
7/5/2005	< .05
7/6/2005	< .05
7/7/2005	< .05
7/8/2005	< .05
7/9/2005	< .05
7/10/2005	< .05
7/11/2005	< .05
7/12/2005	< .05
7/13/2005	< .05
7/14/2005	< .05
7/15/2005	< .05
7/16/2005	< .05
7/17/2005	< .05
7/18/2005	< .05
7/19/2005	< .05
7/20/2005	< .05
7/21/2005	< .05
7/22/2005	< .05
7/23/2005	< .05
7/24/2005	< .05
7/25/2005	< .05
7/26/2005	< .05
7/27/2005	< .05
7/28/2005	< .05
7/29/2005	< .05
7/30/2005	< .05
7/31/2005	< .05
8/1/2005	< .05
8/2/2005	< .05
8/3/2005	< .05
8/4/2005	< .05
8/5/2005	< .05
8/6/2005	< .05
8/7/2005	< .05
8/8/2005	0.31
8/9/2005	< .05
8/10/2005	< .05
8/11/2005	< .05
8/12/2005	< .05
8/13/2005	< .05
8/14/2005	< .05
8/15/2005	< .05
8/16/2005	< .05
8/17/2005	< .05
8/18/2005	< .05
8/19/2005	< .05

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San Jose Creek East Final Effluent Residual Chlorine for Discharge No. 002 to San Jose Creek

	San Jose Creek East WRP
	Final Effluent Residual Chlorine
	mg/L
Date	Column 247
8/20/2005	< .05
8/21/2005	< .05
8/22/2005	< .05
8/23/2005	< .05
8/24/2005	< .05
8/25/2005	< .05
8/26/2005	< .05
8/27/2005	< .05
8/28/2005	< .05
8/29/2005	< .05
8/30/2005	< .05
8/31/2005	< .05
9/1/2005	< .05
9/2/2005	< .05
9/3/2005	< .05
9/4/2005	< .05
9/5/2005	< .05
9/6/2005	< .05
9/7/2005	< .05
9/8/2005	< .05
9/9/2005	< .05
9/10/2005	< .05
9/11/2005	< .05
9/12/2005	< .05
9/13/2005	< .05
9/14/2005	< .05
9/15/2005	< .05
9/16/2005	< .05
9/17/2005	< .05
9/18/2005	< .05
9/19/2005	< .05
9/20/2005	< .05
9/21/2005	< .05
9/22/2005	< .05
9/23/2005	< .05
9/24/2005	< .05
9/25/2005	< .05
9/26/2005	< .05
9/27/2005	< .05
9/28/2005	< .05
9/29/2005	< .05
9/30/2005	< .05

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RECEIVING WATER DATA

DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
9/4/2002	LOS COYOTES	SG-R4	0913	<	0.05	MG/L	CHLORINE RESIDUAL
9/11/2002	LOS COYOTES	SG-R4	1050	<	0.05	MG/L	CHLORINE RESIDUAL
9/16/2002	LOS COYOTES	SG-R4	1027	<	0.05	MG/L	CHLORINE RESIDUAL
9/25/2002	LOS COYOTES	SG-R4	1110	<	0.05	MG/L	CHLORINE RESIDUAL
10/2/2002	LOS COYOTES	SG-R4	0855		0.5	MG/L	CHLORINE RESIDUAL
10/9/2002	LOS COYOTES	SG-R4	0925	<	0.05	MG/L	CHLORINE RESIDUAL
10/15/2002	LOS COYOTES	SG-R4	0931	<	0.05	MG/L	CHLORINE RESIDUAL
10/21/2002	LOS COYOTES	SG-R4	1054	<	0.05	MG/L	CHLORINE RESIDUAL
10/29/2002	LOS COYOTES	SG-R4	0910	<	0.05	MG/L	CHLORINE RESIDUAL
11/5/2002	LOS COYOTES	SG-R4	0845	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2002	LOS COYOTES	SG-R4	0855	<	0.05	MG/L	CHLORINE RESIDUAL
11/19/2002	LOS COYOTES	SG-R4	0756	<	0.05	MG/L	CHLORINE RESIDUAL
11/25/2002	LOS COYOTES	SG-R4	1320	<	0.05	MG/L	CHLORINE RESIDUAL
12/3/2002	LOS COYOTES	SG-R4	0845	<	0.05	MG/L	CHLORINE RESIDUAL
12/10/2002	LOS COYOTES	SG-R4	1410	<	0.05	MG/L	CHLORINE RESIDUAL
12/26/2002	LOS COYOTES	SG-R4	0815	<	0.05	MG/L	CHLORINE RESIDUAL
1/2/2003	LOS COYOTES	SG-R4	0925	<	0.05	MG/L	CHLORINE RESIDUAL
1/7/2003	LOS COYOTES	SG-R4	0900	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2003	LOS COYOTES	SG-R4	0917	<	0.05	MG/L	CHLORINE RESIDUAL
1/21/2003	LOS COYOTES	SG-R4	0750	<	0.05	MG/L	CHLORINE RESIDUAL
1/28/2003	LOS COYOTES	SG-R4	1220	<	0.05	MG/L	CHLORINE RESIDUAL
2/4/2003	LOS COYOTES	SG-R4	1100	<	0.05	MG/L	CHLORINE RESIDUAL
2/18/2003	LOS COYOTES	SG-R4	1147	<	0.05	MG/L	CHLORINE RESIDUAL
3/12/2003	LOS COYOTES	SG-R4	1207	<	0.05	MG/L	CHLORINE RESIDUAL
3/18/2003	LOS COYOTES	SG-R4	0850	<	0.05	MG/L	CHLORINE RESIDUAL
3/26/2003	LOS COYOTES	SG-R4	1057	<	0.05	MG/L	CHLORINE RESIDUAL
4/1/2003	LOS COYOTES	SG-R4	0800	<	0.05	MG/L	CHLORINE RESIDUAL
4/9/2003	LOS COYOTES	SG-R4	1002	<	0.05	MG/L	CHLORINE RESIDUAL
4/17/2003	LOS COYOTES	SG-R4	1147	<	0.05	MG/L	CHLORINE RESIDUAL
4/23/2003	LOS COYOTES	SG-R4	1029	<	0.05	MG/L	CHLORINE RESIDUAL
4/29/2003	LOS COYOTES	SG-R4	0920	<	0.05	MG/L	CHLORINE RESIDUAL
5/6/2003	LOS COYOTES	SG-R4	0835	<	0.05	MG/L	CHLORINE RESIDUAL
5/13/2003	LOS COYOTES	SG-R4	0850	<	0.05	MG/L	CHLORINE RESIDUAL
5/20/2003	LOS COYOTES	SG-R4	1035	<	0.05	MG/L	CHLORINE RESIDUAL
5/27/2003	LOS COYOTES	SG-R4	1335	<	0.05	MG/L	CHLORINE RESIDUAL
6/3/2003	LOS COYOTES	SG-R4	0850	<	0.05	MG/L	CHLORINE RESIDUAL
6/10/2003	LOS COYOTES	SG-R4	1115	<	0.05	MG/L	CHLORINE RESIDUAL
6/17/2003	LOS COYOTES	SG-R4	0911	<	0.05	MG/L	CHLORINE RESIDUAL
6/24/2003	LOS COYOTES	SG-R4	1347	<	0.05	MG/L	CHLORINE RESIDUAL
7/1/2003	LOS COYOTES	SG-R4	1335	<	0.05	MG/L	CHLORINE RESIDUAL
7/8/2003	LOS COYOTES	SG-R4	0955	<	0.05	MG/L	CHLORINE RESIDUAL
7/15/2003	LOS COYOTES	SG-R4	1230	<	0.05	MG/L	CHLORINE RESIDUAL
7/22/2003	LOS COYOTES	SG-R4	0905	<	0.05	MG/L	CHLORINE RESIDUAL
7/31/2003	LOS COYOTES	SG-R4	1355	<	0.05	MG/L	CHLORINE RESIDUAL
8/5/2003	LOS COYOTES	SG-R4	0857	<	0.05	MG/L	CHLORINE RESIDUAL
8/12/2003	LOS COYOTES	SG-R4	1325	<	0.05	MG/L	CHLORINE RESIDUAL
8/19/2003	LOS COYOTES	SG-R4	0855	<	0.05	MG/L	CHLORINE RESIDUAL
8/26/2003	LOS COYOTES	SG-R4	1055	<	0.05	MG/L	CHLORINE RESIDUAL
9/2/2003	LOS COYOTES	SG-R4	1340	<	0.05	MG/L	CHLORINE RESIDUAL
9/9/2003	LOS COYOTES	SG-R4	0850	<	0.05	MG/L	CHLORINE RESIDUAL
9/16/2003	LOS COYOTES	SG-R4	1028	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2003	LOS COYOTES	SG-R4	0856	<	0.05	MG/L	CHLORINE RESIDUAL
9/30/2003	LOS COYOTES	SG-R4	1055	<	0.05	MG/L	CHLORINE RESIDUAL
10/7/2003	LOS COYOTES	SG-R4	0945	<	0.05	MG/L	CHLORINE RESIDUAL
10/14/2003	LOS COYOTES	SG-R4	1032	<	0.05	MG/L	CHLORINE RESIDUAL
10/21/2003	LOS COYOTES	SG-R4	0930	<	0.05	MG/L	CHLORINE RESIDUAL
10/28/2003	LOS COYOTES	SG-R4	1000	<	0.05	MG/L	CHLORINE RESIDUAL
11/5/2003	LOS COYOTES	SG-R4	1300	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2003	LOS COYOTES	SG-R4	0915	<	0.05	MG/L	CHLORINE RESIDUAL
11/18/2003	LOS COYOTES	SG-R4	1325	<	0.05	MG/L	CHLORINE RESIDUAL
11/24/2003	LOS COYOTES	SG-R4	1000	<	0.05	MG/L	CHLORINE RESIDUAL
12/2/2003	LOS COYOTES	SG-R4	1100	<	0.05	MG/L	CHLORINE RESIDUAL
12/9/2003	LOS COYOTES	SG-R4	955	<	0.05	MG/L	CHLORINE RESIDUAL
1/6/2004	LOS COYOTES	SG-R4	955	<	0.05	MG/L	CHLORINE RESIDUAL
1/13/2004	LOS COYOTES	SG-R4	1130	<	0.05	MG/L	CHLORINE RESIDUAL
1/20/2004	LOS COYOTES	SG-R4	920	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
1/27/2004	LOS COYOTES	SG-R4	1336	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2004	LOS COYOTES	SG-R4	1300	<	0.05	MG/L	CHLORINE RESIDUAL
2/10/2004	LOS COYOTES	SG-R4	1315	<	0.05	MG/L	CHLORINE RESIDUAL
2/17/2004	LOS COYOTES	SG-R4	1345	<	0.05	MG/L	CHLORINE RESIDUAL
2/25/2004	LOS COYOTES	SG-R4	1320	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2004	LOS COYOTES	SG-R4	1340	<	0.05	MG/L	CHLORINE RESIDUAL
3/9/2004	LOS COYOTES	SG-R4	1115	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2004	LOS COYOTES	SG-R4	1105	<	0.05	MG/L	CHLORINE RESIDUAL
3/23/2004	LOS COYOTES	SG-R4	1025	<	0.05	MG/L	CHLORINE RESIDUAL
3/29/2004	LOS COYOTES	SG-R4	1020	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2004	LOS COYOTES	SG-R4	1230	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2004	LOS COYOTES	SG-R4	1235	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2004	LOS COYOTES	SG-R4	1230	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	LOS COYOTES	SG-R4	1215	<	0.05	MG/L	CHLORINE RESIDUAL
5/5/2004	LOS COYOTES	SG-R4	1255	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2004	LOS COYOTES	SG-R4	1023	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2004	LOS COYOTES	SG-R4	840	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2004	LOS COYOTES	SG-R4	1010	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2004	LOS COYOTES	SG-R4	927	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2004	LOS COYOTES	SG-R4	1130	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2004	LOS COYOTES	SG-R4	1354	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2004	LOS COYOTES	SG-R4	1330	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2004	LOS COYOTES	SG-R4	1155	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2004	LOS COYOTES	SG-R4	912	<	0.05	MG/L	CHLORINE RESIDUAL
7/14/2004	LOS COYOTES	SG-R4	1345	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2004	LOS COYOTES	SG-R4	1025	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2004	LOS COYOTES	SG-R4	1155	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2004	LOS COYOTES	SG-R4	1127	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2004	LOS COYOTES	SG-R4	1200	<	0.05	MG/L	CHLORINE RESIDUAL
8/17/2004	LOS COYOTES	SG-R4	1245	<	0.05	MG/L	CHLORINE RESIDUAL
8/24/2004	LOS COYOTES	SG-R4	855	<	0.05	MG/L	CHLORINE RESIDUAL
8/31/2004	LOS COYOTES	SG-R4	1100	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2004	LOS COYOTES	SG-R4	1126	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2004	LOS COYOTES	SG-R4	1103	<	0.05	MG/L	CHLORINE RESIDUAL
9/20/2004	LOS COYOTES	SG-R4	1148	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2004	LOS COYOTES	SG-R4	1007	<	0.05	MG/L	CHLORINE RESIDUAL
10/4/2004	LOS COYOTES	SG-R4	1030	<	0.05	MG/L	CHLORINE RESIDUAL
10/13/2004	LOS COYOTES	SG-R4	930	<	0.05	MG/L	CHLORINE RESIDUAL
10/26/2004	LOS COYOTES	SG-R4	1138	<	0.05	MG/L	CHLORINE RESIDUAL
11/1/2004	LOS COYOTES	SG-R4	1206	<	0.05	MG/L	CHLORINE RESIDUAL
11/8/2004	LOS COYOTES	SG-R4	1246	<	0.05	MG/L	CHLORINE RESIDUAL
11/15/2004	LOS COYOTES	SG-R4	1153	<	0.05	MG/L	CHLORINE RESIDUAL
11/22/2004	LOS COYOTES	SG-R4	1126	<	0.05	MG/L	CHLORINE RESIDUAL
11/30/2004	LOS COYOTES	SG-R4	1109	<	0.05	MG/L	CHLORINE RESIDUAL
12/7/2004	LOS COYOTES	SG-R4	835	<	0.05	MG/L	CHLORINE RESIDUAL
12/13/2004	LOS COYOTES	SG-R4	1102	<	0.05	MG/L	CHLORINE RESIDUAL
12/21/2004	LOS COYOTES	SG-R4	1311	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	LOS COYOTES	SG-R4	845	<	0.05	MG/L	CHLORINE RESIDUAL
1/25/2005	LOS COYOTES	SG-R4	928	<	0.05	MG/L	CHLORINE RESIDUAL
1/31/2005	LOS COYOTES	SG-R4	1250	<	0.05	MG/L	CHLORINE RESIDUAL
2/8/2005	LOS COYOTES	SG-R4	940	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2005	LOS COYOTES	SG-R4	1310	<	0.05	MG/L	CHLORINE RESIDUAL
3/8/2005	LOS COYOTES	SG-R4	1305	<	0.05	MG/L	CHLORINE RESIDUAL
3/15/2005	LOS COYOTES	SG-R4	1135	<	0.05	MG/L	CHLORINE RESIDUAL
3/22/2005	LOS COYOTES	SG-R4	1252	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	LOS COYOTES	SG-R4	905	<	0.05	MG/L	CHLORINE RESIDUAL
4/5/2005	LOS COYOTES	SG-R4	1230	<	0.05	MG/L	CHLORINE RESIDUAL
4/12/2005	LOS COYOTES	SG-R4	916	<	0.05	MG/L	CHLORINE RESIDUAL
4/19/2005	LOS COYOTES	SG-R4	1211	<	0.05	MG/L	CHLORINE RESIDUAL
4/26/2005	LOS COYOTES	SG-R4	1216	<	0.05	MG/L	CHLORINE RESIDUAL
5/3/2005	LOS COYOTES	SG-R4	1139	<	0.05	MG/L	CHLORINE RESIDUAL
5/9/2005	LOS COYOTES	SG-R4	1131	<	0.05	MG/L	CHLORINE RESIDUAL
5/17/2005	LOS COYOTES	SG-R4	1122	<	0.05	MG/L	CHLORINE RESIDUAL
5/24/2005	LOS COYOTES	SG-R4	1130	<	0.05	MG/L	CHLORINE RESIDUAL
5/31/2005	LOS COYOTES	SG-R4	1030	<	0.05	MG/L	CHLORINE RESIDUAL
6/7/2005	LOS COYOTES	SG-R4	1236	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
6/14/2005	LOS COYOTES	SG-R4	1030	<	0.05	MG/L	CHLORINE RESIDUAL
6/21/2005	LOS COYOTES	SG-R4	1205	<	0.05	MG/L	CHLORINE RESIDUAL
6/28/2005	LOS COYOTES	SG-R4	1005	<	0.05	MG/L	CHLORINE RESIDUAL
7/5/2005	LOS COYOTES	SG-R4	1209	<	0.05	MG/L	CHLORINE RESIDUAL
7/12/2005	LOS COYOTES	SG-R4	1257	<	0.05	MG/L	CHLORINE RESIDUAL
7/19/2005	LOS COYOTES	SG-R4	910	<	0.05	MG/L	CHLORINE RESIDUAL
7/26/2005	LOS COYOTES	SG-R4	857	<	0.05	MG/L	CHLORINE RESIDUAL
8/2/2005	LOS COYOTES	SG-R4	855	<	0.05	MG/L	CHLORINE RESIDUAL
8/9/2005	LOS COYOTES	SG-R4	1300	<	0.05	MG/L	CHLORINE RESIDUAL
9/6/2005	LOS COYOTES	SG-R4	1126	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2005	LOS COYOTES	SG-R4	1329	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	LOS COYOTES	SG-R4	1023	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	LOS COYOTES	SG-R4	938	<	0.05	MG/L	CHLORINE RESIDUAL
8/4/2004	SJCWRP	SG-R2	1025	<	0.05	MG/L	CHLORINE RESIDUAL
8/18/2004	SJCWRP	SG-R2	1140	<	0.05	MG/L	CHLORINE RESIDUAL
8/25/2004	SJCWRP	SG-R2	1245	<	0.05	MG/L	CHLORINE RESIDUAL
9/1/2004	SJCWRP	SG-R2	1150	<	0.05	MG/L	CHLORINE RESIDUAL
9/8/2004	SJCWRP	SG-R2	1133	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2004	SJCWRP	SG-R2	1215	<	0.05	MG/L	CHLORINE RESIDUAL
9/22/2004	SJCWRP	SG-R2	1200	<	0.05	MG/L	CHLORINE RESIDUAL
9/29/2004	SJCWRP	SG-R2	1050	<	0.05	MG/L	CHLORINE RESIDUAL
10/6/2004	SJCWRP	SG-R2	1232	<	0.05	MG/L	CHLORINE RESIDUAL
10/12/2004	SJCWRP	SG-R2	1205	<	0.05	MG/L	CHLORINE RESIDUAL
10/25/2004	SJCWRP	SG-R2	1219	<	0.05	MG/L	CHLORINE RESIDUAL
11/3/2004	SJCWRP	SG-R2	1050	<	0.05	MG/L	CHLORINE RESIDUAL
11/8/2004	SJCWRP	SG-R2	1235	<	0.05	MG/L	CHLORINE RESIDUAL
11/17/2004	SJCWRP	SG-R2	1126	<	0.05	MG/L	CHLORINE RESIDUAL
11/23/2004	SJCWRP	SG-R2	1133	<	0.05	MG/L	CHLORINE RESIDUAL
12/1/2004	SJCWRP	SG-R2	912	<	0.05	MG/L	CHLORINE RESIDUAL
12/15/2004	SJCWRP	SG-R2	1310	<	0.05	MG/L	CHLORINE RESIDUAL
12/20/2004	SJCWRP	SG-R2	1220	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	SJCWRP	SG-R2	1232	<	0.05	MG/L	CHLORINE RESIDUAL
1/25/2005	SJCWRP	SG-R2	1110	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2005	SJCWRP	SG-R2	1229	<	0.05	MG/L	CHLORINE RESIDUAL
2/9/2005	SJCWRP	SG-R2	1207	<	0.05	MG/L	CHLORINE RESIDUAL
3/2/2005	SJCWRP	SG-R2	1206	<	0.05	MG/L	CHLORINE RESIDUAL
3/9/2005	SJCWRP	SG-R2	1200	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2005	SJCWRP	SG-R2	1355	<	0.05	MG/L	CHLORINE RESIDUAL
3/21/2005	SJCWRP	SG-R2	1310	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	SJCWRP	SG-R2	1425	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2005	SJCWRP	SG-R2	1340	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2005	SJCWRP	SG-R2	1140	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2005	SJCWRP	SG-R2	1140	<	0.05	MG/L	CHLORINE RESIDUAL
4/27/2005	SJCWRP	SG-R2	1220	<	0.05	MG/L	CHLORINE RESIDUAL
5/4/2005	SJCWRP	SG-R2	1243	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2005	SJCWRP	SG-R2	1355	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2005	SJCWRP	SG-R2	1130	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2005	SJCWRP	SG-R2	1157	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2005	SJCWRP	SG-R2	1002	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2005	SJCWRP	SG-R2	1215	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2005	SJCWRP	SG-R2	1245	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2005	SJCWRP	SG-R2	905	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2005	SJCWRP	SG-R2	1100	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2005	SJCWRP	SG-R2	1145	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2005	SJCWRP	SG-R2	1220	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2005	SJCWRP	SG-R2	1335	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2005	SJCWRP	SG-R2	1200	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2005	SJCWRP	SG-R2	1106	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2005	SJCWRP	SG-R2	1100	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2005	SJCWRP	SG-R2	1355	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2005	SJCWRP	SG-R2	1245	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	SJCWRP	SG-R2	835	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	SJCWRP	SG-R2	817	<	0.05	MG/L	CHLORINE RESIDUAL
11/6/2002	SJCWRP	SG-R11	1330	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2002	SJCWRP	SG-R11	1505	<	0.05	MG/L	CHLORINE RESIDUAL
11/20/2002	SJCWRP	SG-R11	0820	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
11/25/2002	SJCWRP	SG-R11	1130	<	0.05	MG/L	CHLORINE RESIDUAL
12/4/2002	SJCWRP	SG-R11	1205	<	0.05	MG/L	CHLORINE RESIDUAL
12/11/2002	SJCWRP	SG-R11	0930	<	0.05	MG/L	CHLORINE RESIDUAL
12/26/2002	SJCWRP	SG-R11	0940	<	0.05	MG/L	CHLORINE RESIDUAL
1/2/2003	SJCWRP	SG-R11	1230	<	0.05	MG/L	CHLORINE RESIDUAL
1/8/2003	SJCWRP	SG-R11	1415	<	0.05	MG/L	CHLORINE RESIDUAL
1/15/2003	SJCWRP	SG-R11	1425	<	0.05	MG/L	CHLORINE RESIDUAL
1/22/2003	SJCWRP	SG-R11	1320	<	0.05	MG/L	CHLORINE RESIDUAL
1/29/2003	SJCWRP	SG-R11	1125	<	0.05	MG/L	CHLORINE RESIDUAL
2/5/2003	SJCWRP	SG-R11	1135	<	0.05	MG/L	CHLORINE RESIDUAL
2/19/2003	SJCWRP	SG-R11	1120	<	0.05	MG/L	CHLORINE RESIDUAL
2/24/2003	SJCWRP	SG-R11	1145	<	0.05	MG/L	CHLORINE RESIDUAL
3/3/2003	SJCWRP	SG-R11	1125	<	0.05	MG/L	CHLORINE RESIDUAL
3/11/2003	SJCWRP	SG-R11	0835	<	0.05	MG/L	CHLORINE RESIDUAL
3/19/2003	SJCWRP	SG-R11	1118	<	0.05	MG/L	CHLORINE RESIDUAL
3/25/2003	SJCWRP	SG-R11	1136	<	0.05	MG/L	CHLORINE RESIDUAL
4/1/2003	SJCWRP	SG-R11	1050	<	0.05	MG/L	CHLORINE RESIDUAL
4/8/2003	SJCWRP	SG-R11	0835	<	0.05	MG/L	CHLORINE RESIDUAL
4/17/2003	SJCWRP	SG-R11	1152	<	0.05	MG/L	CHLORINE RESIDUAL
4/22/2003	SJCWRP	SG-R11	1051	<	0.05	MG/L	CHLORINE RESIDUAL
4/30/2003	SJCWRP	SG-R11	1148	<	0.05	MG/L	CHLORINE RESIDUAL
5/7/2003	SJCWRP	SG-R11	0950	<	0.05	MG/L	CHLORINE RESIDUAL
5/14/2003	SJCWRP	SG-R11	1023	<	0.05	MG/L	CHLORINE RESIDUAL
5/21/2003	SJCWRP	SG-R11	1250	<	0.05	MG/L	CHLORINE RESIDUAL
5/28/2003	SJCWRP	SG-R11	0952	<	0.05	MG/L	CHLORINE RESIDUAL
6/4/2003	SJCWRP	SG-R11	0900	<	0.05	MG/L	CHLORINE RESIDUAL
6/11/2003	SJCWRP	SG-R11	1055	<	0.05	MG/L	CHLORINE RESIDUAL
6/18/2003	SJCWRP	SG-R11	1038	<	0.05	MG/L	CHLORINE RESIDUAL
6/25/2003	SJCWRP	SG-R11	0959	<	0.05	MG/L	CHLORINE RESIDUAL
7/2/2003	SJCWRP	SG-R11	1347	<	0.05	MG/L	CHLORINE RESIDUAL
7/9/2003	SJCWRP	SG-R11	0924	<	0.05	MG/L	CHLORINE RESIDUAL
7/16/2003	SJCWRP	SG-R11	1415	<	0.05	MG/L	CHLORINE RESIDUAL
7/23/2003	SJCWRP	SG-R11	1140	<	0.05	MG/L	CHLORINE RESIDUAL
7/31/2003	SJCWRP	SG-R11	1025	<	0.05	MG/L	CHLORINE RESIDUAL
8/7/2003	SJCWRP	SG-R11	1105	<	0.05	MG/L	CHLORINE RESIDUAL
8/13/2003	SJCWRP	SG-R11	1230	<	0.05	MG/L	CHLORINE RESIDUAL
8/20/2003	SJCWRP	SG-R11	0940	<	0.05	MG/L	CHLORINE RESIDUAL
8/27/2003	SJCWRP	SG-R11	0935	<	0.05	MG/L	CHLORINE RESIDUAL
9/3/2003	SJCWRP	SG-R11	0900	<	0.05	MG/L	CHLORINE RESIDUAL
9/10/2003	SJCWRP	SG-R11	0840	<	0.05	MG/L	CHLORINE RESIDUAL
9/17/2003	SJCWRP	SG-R11	0925	<	0.05	MG/L	CHLORINE RESIDUAL
9/24/2003	SJCWRP	SG-R11	0930	<	0.05	MG/L	CHLORINE RESIDUAL
10/1/2003	SJCWRP	SG-R11	1145	<	0.05	MG/L	CHLORINE RESIDUAL
10/8/2003	SJCWRP	SG-R11	1030	<	0.05	MG/L	CHLORINE RESIDUAL
10/15/2003	SJCWRP	SG-R11	1110	<	0.05	MG/L	CHLORINE RESIDUAL
10/21/2003	SJCWRP	SG-R11	0955	<	0.05	MG/L	CHLORINE RESIDUAL
10/29/2003	SJCWRP	SG-R11	1025	<	0.05	MG/L	CHLORINE RESIDUAL
11/5/2003	SJCWRP	SG-R11	0920	<	0.05	MG/L	CHLORINE RESIDUAL
11/19/2003	SJCWRP	SG-R11	1030	<	0.05	MG/L	CHLORINE RESIDUAL
11/24/2003	SJCWRP	SG-R11	1335	<	0.05	MG/L	CHLORINE RESIDUAL
12/3/2003	SJCWRP	SG-R11	1105	<	0.05	MG/L	CHLORINE RESIDUAL
1/7/2004	SJCWRP	SG-R11	1000	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2004	SJCWRP	SG-R11	1030	<	0.05	MG/L	CHLORINE RESIDUAL
1/21/2004	SJCWRP	SG-R11	1240	<	0.05	MG/L	CHLORINE RESIDUAL
1/28/2004	SJCWRP	SG-R11	930	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2004	SJCWRP	SG-R11	1035	<	0.05	MG/L	CHLORINE RESIDUAL
2/11/2004	SJCWRP	SG-R11	1240	<	0.05	MG/L	CHLORINE RESIDUAL
2/17/2004	SJCWRP	SG-R11	1050	<	0.05	MG/L	CHLORINE RESIDUAL
2/25/2004	SJCWRP	SG-R11	1005	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2004	SJCWRP	SG-R11	1425	<	0.05	MG/L	CHLORINE RESIDUAL
3/10/2004	SJCWRP	SG-R11	1050	<	0.05	MG/L	CHLORINE RESIDUAL
3/17/2004	SJCWRP	SG-R11	950	<	0.05	MG/L	CHLORINE RESIDUAL
3/24/2004	SJCWRP	SG-R11	1215	<	0.05	MG/L	CHLORINE RESIDUAL
3/29/2004	SJCWRP	SG-R11	1015	<	0.05	MG/L	CHLORINE RESIDUAL
4/7/2004	SJCWRP	SG-R11	930	<	0.05	MG/L	CHLORINE RESIDUAL
4/14/2004	SJCWRP	SG-R11	1440	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
4/21/2004	SJCWRP	SG-R11	1034	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	SJCWRP	SG-R11	1125	<	0.05	MG/L	CHLORINE RESIDUAL
5/5/2004	SJCWRP	SG-R11	957	<	0.05	MG/L	CHLORINE RESIDUAL
5/12/2004	SJCWRP	SG-R11	1110	<	0.05	MG/L	CHLORINE RESIDUAL
5/19/2004	SJCWRP	SG-R11	1020	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2004	SJCWRP	SG-R11	1254	<	0.05	MG/L	CHLORINE RESIDUAL
5/26/2004	SJCWRP	SG-R11	1222	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2004	SJCWRP	SG-R11	1505	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2004	SJCWRP	SG-R11	1505	<	0.05	MG/L	CHLORINE RESIDUAL
6/2/2004	SJCWRP	SG-R11	955	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2004	SJCWRP	SG-R11	815	<	0.05	MG/L	CHLORINE RESIDUAL
6/9/2004	SJCWRP	SG-R11	955	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2004	SJCWRP	SG-R11	810	<	0.05	MG/L	CHLORINE RESIDUAL
6/16/2004	SJCWRP	SG-R11	1400	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2004	SJCWRP	SG-R11	900	<	0.05	MG/L	CHLORINE RESIDUAL
6/23/2004	SJCWRP	SG-R11	920	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2004	SJCWRP	SG-R11	820	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2004	SJCWRP	SG-R11	820	<	0.05	MG/L	CHLORINE RESIDUAL
6/30/2004	SJCWRP	SG-R11	1005	<	0.05	MG/L	CHLORINE RESIDUAL
7/7/2004	SJCWRP	SG-R11	1020	<	0.05	MG/L	CHLORINE RESIDUAL
7/14/2004	SJCWRP	SG-R11	1045	<	0.05	MG/L	CHLORINE RESIDUAL
7/21/2004	SJCWRP	SG-R11	1045	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2004	SJCWRP	SG-R11	840	<	0.05	MG/L	CHLORINE RESIDUAL
7/28/2004	SJCWRP	SG-R11	947	<	0.05	MG/L	CHLORINE RESIDUAL
8/4/2004	SJCWRP	SG-R11	1010	<	0.05	MG/L	CHLORINE RESIDUAL
8/11/2004	SJCWRP	SG-R11	1150	<	0.05	MG/L	CHLORINE RESIDUAL
8/18/2004	SJCWRP	SG-R11	1330	<	0.05	MG/L	CHLORINE RESIDUAL
8/24/2004	SJCWRP	SG-R11	1110	<	0.05	MG/L	CHLORINE RESIDUAL
8/25/2004	SJCWRP	SG-R11	1050	<	0.05	MG/L	CHLORINE RESIDUAL
9/1/2004	SJCWRP	SG-R11	927	<	0.05	MG/L	CHLORINE RESIDUAL
9/8/2004	SJCWRP	SG-R11	919	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2004	SJCWRP	SG-R11	1015	<	0.05	MG/L	CHLORINE RESIDUAL
9/22/2004	SJCWRP	SG-R11	1000	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2004	SJCWRP	SG-R11	945	<	0.05	MG/L	CHLORINE RESIDUAL
9/29/2004	SJCWRP	SG-R11	810	<	0.05	MG/L	CHLORINE RESIDUAL
10/6/2004	SJCWRP	SG-R11	1010	<	0.05	MG/L	CHLORINE RESIDUAL
10/12/2004	SJCWRP	SG-R11	905	<	0.05	MG/L	CHLORINE RESIDUAL
10/25/2004	SJCWRP	SG-R11	935	<	0.05	MG/L	CHLORINE RESIDUAL
10/26/2004	SJCWRP	SG-R11	845	<	0.05	MG/L	CHLORINE RESIDUAL
10/26/2004	SJCWRP	SG-R11	845	<	0.05	MG/L	CHLORINE RESIDUAL
11/3/2004	SJCWRP	SG-R11	1150	<	0.05	MG/L	CHLORINE RESIDUAL
11/8/2004	SJCWRP	SG-R11	950	<	0.05	MG/L	CHLORINE RESIDUAL
11/17/2004	SJCWRP	SG-R11	905	<	0.05	MG/L	CHLORINE RESIDUAL
11/22/2004	SJCWRP	SG-R11	1230	<	0.05	MG/L	CHLORINE RESIDUAL
11/23/2004	SJCWRP	SG-R11	953	<	0.05	MG/L	CHLORINE RESIDUAL
12/1/2004	SJCWRP	SG-R11	856	<	0.05	MG/L	CHLORINE RESIDUAL
12/15/2004	SJCWRP	SG-R11	915	<	0.05	MG/L	CHLORINE RESIDUAL
12/20/2004	SJCWRP	SG-R11	1028	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	SJCWRP	SG-R11	1002	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	SJCWRP	SG-R11	955	<	0.05	MG/L	CHLORINE RESIDUAL
1/19/2005	SJCWRP	SG-R11	1005	<	0.05	MG/L	CHLORINE RESIDUAL
1/25/2005	SJCWRP	SG-R11	855	<	0.05	MG/L	CHLORINE RESIDUAL
1/31/2005	SJCWRP	SG-R11	810	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2005	SJCWRP	SG-R11	855	<	0.05	MG/L	CHLORINE RESIDUAL
2/9/2005	SJCWRP	SG-R11	850	<	0.05	MG/L	CHLORINE RESIDUAL
2/28/2005	SJCWRP	SG-R11	900	<	0.05	MG/L	CHLORINE RESIDUAL
2/28/2005	SJCWRP	SG-R11	1345	<	0.05	MG/L	CHLORINE RESIDUAL
2/28/2005	SJCWRP	SG-R11	1345	<	0.05	MG/L	CHLORINE RESIDUAL
3/2/2005	SJCWRP	SG-R11	855	<	0.05	MG/L	CHLORINE RESIDUAL
3/9/2005	SJCWRP	SG-R11	908	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2005	SJCWRP	SG-R11	1050	<	0.05	MG/L	CHLORINE RESIDUAL
3/21/2005	SJCWRP	SG-R11	1225	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	SJCWRP	SG-R11	1000	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	SJCWRP	SG-R11	1059	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2005	SJCWRP	SG-R11	1120	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2005	SJCWRP	SG-R11	915	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
4/20/2005	SJCWRP	SG-R11	850	<	0.05	MG/L	CHLORINE RESIDUAL
4/27/2005	SJCWRP	SG-R11	925	<	0.05	MG/L	CHLORINE RESIDUAL
5/4/2005	SJCWRP	SG-R11	855	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2005	SJCWRP	SG-R11	1125	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2005	SJCWRP	SG-R11	850	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2005	SJCWRP	SG-R11	1052	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2005	SJCWRP	SG-R11	1352	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2005	SJCWRP	SG-R11	948	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2005	SJCWRP	SG-R11	1125	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2005	SJCWRP	SG-R11	1030	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2005	SJCWRP	SG-R11	917	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2005	SJCWRP	SG-R11	836	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2005	SJCWRP	SG-R11	1120	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2005	SJCWRP	SG-R11	1250	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2005	SJCWRP	SG-R11	838	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2005	SJCWRP	SG-R11	952	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2005	SJCWRP	SG-R11	919	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2005	SJCWRP	SG-R11	1150	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	SJCWRP	SG-R11	1130	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	SJCWRP	SG-R11	0	<	0.05	MG/L	CHLORINE RESIDUAL
8/4/2004	SJCWRP	SG-C2	1300	<	0.05	MG/L	CHLORINE RESIDUAL
8/18/2004	SJCWRP	SG-C2	1350	<	0.05	MG/L	CHLORINE RESIDUAL
8/25/2004	SJCWRP	SG-C2	1130	<	0.05	MG/L	CHLORINE RESIDUAL
9/1/2004	SJCWRP	SG-C2	850	<	0.05	MG/L	CHLORINE RESIDUAL
9/8/2004	SJCWRP	SG-C2	814	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2004	SJCWRP	SG-C2	1005	<	0.05	MG/L	CHLORINE RESIDUAL
9/22/2004	SJCWRP	SG-C2	945	<	0.05	MG/L	CHLORINE RESIDUAL
9/29/2004	SJCWRP	SG-C2	745	<	0.05	MG/L	CHLORINE RESIDUAL
10/6/2004	SJCWRP	SG-C2	945	<	0.05	MG/L	CHLORINE RESIDUAL
10/12/2004	SJCWRP	SG-C2	831	<	0.05	MG/L	CHLORINE RESIDUAL
10/25/2004	SJCWRP	SG-C2	925	<	0.05	MG/L	CHLORINE RESIDUAL
11/3/2004	SJCWRP	SG-C2	1140	<	0.05	MG/L	CHLORINE RESIDUAL
11/8/2004	SJCWRP	SG-C2	930	<	0.05	MG/L	CHLORINE RESIDUAL
11/17/2004	SJCWRP	SG-C2	840	<	0.05	MG/L	CHLORINE RESIDUAL
11/23/2004	SJCWRP	SG-C2	1005	<	0.05	MG/L	CHLORINE RESIDUAL
12/1/2004	SJCWRP	SG-C2	846	<	0.05	MG/L	CHLORINE RESIDUAL
12/15/2004	SJCWRP	SG-C2	900	<	0.05	MG/L	CHLORINE RESIDUAL
12/20/2004	SJCWRP	SG-C2	1040	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	SJCWRP	SG-C2	953	<	0.05	MG/L	CHLORINE RESIDUAL
1/19/2005	SJCWRP	SG-C2	945	<	0.05	MG/L	CHLORINE RESIDUAL
1/25/2005	SJCWRP	SG-C2	845	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2005	SJCWRP	SG-C2	845	<	0.05	MG/L	CHLORINE RESIDUAL
2/9/2005	SJCWRP	SG-C2	833	<	0.05	MG/L	CHLORINE RESIDUAL
2/15/2005	SJCWRP	SG-C2	1303	<	0.05	MG/L	CHLORINE RESIDUAL
3/2/2005	SJCWRP	SG-C2	833	<	0.05	MG/L	CHLORINE RESIDUAL
3/9/2005	SJCWRP	SG-C2	848	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2005	SJCWRP	SG-C2	1035	<	0.05	MG/L	CHLORINE RESIDUAL
3/21/2005	SJCWRP	SG-C2	1515	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	SJCWRP	SG-C2	1040	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2005	SJCWRP	SG-C2	1109	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2005	SJCWRP	SG-C2	900	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2005	SJCWRP	SG-C2	832	<	0.05	MG/L	CHLORINE RESIDUAL
4/27/2005	SJCWRP	SG-C2	908	<	0.05	MG/L	CHLORINE RESIDUAL
5/4/2005	SJCWRP	SG-C2	1100	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2005	SJCWRP	SG-C2	1100	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2005	SJCWRP	SG-C2	910	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2005	SJCWRP	SG-C2	1102	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2005	SJCWRP	SG-C2	1403	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2005	SJCWRP	SG-C2	931	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2005	SJCWRP	SG-C2	1105	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2005	SJCWRP	SG-C2	1015	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2005	SJCWRP	SG-C2	816	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2005	SJCWRP	SG-C2	820	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2005	SJCWRP	SG-C2	1100	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2005	SJCWRP	SG-C2	1003	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2005	SJCWRP	SG-C2	820	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
8/3/2005	SJCWRP	SG-C2	812	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2005	SJCWRP	SG-C2	925	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2005	SJCWRP	SG-C2	903	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2005	SJCWRP	SG-C2	1130	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	SJCWRP	SG-C2	1115	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	SJCWRP	SG-C2	759	<	0.05	MG/L	CHLORINE RESIDUAL
1/9/2002	SAUGUS	Saugus-RB	1035	<	0.05	mg/L	CHLORINE RESIDUAL
1/14/2002	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
1/22/2002	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
1/30/2002	SAUGUS	Saugus-RB	1120	<	0.05	mg/L	CHLORINE RESIDUAL
2/7/2002	SAUGUS	Saugus-RB	1145	<	0.05	mg/L	CHLORINE RESIDUAL
2/16/2002	SAUGUS	Saugus-RB	1055	<	0.05	mg/L	CHLORINE RESIDUAL
2/21/2002	SAUGUS	Saugus-RB	1125	<	0.05	mg/L	CHLORINE RESIDUAL
2/25/2002	SAUGUS	Saugus-RB	1125	<	0.05	mg/L	CHLORINE RESIDUAL
3/6/2002	SAUGUS	Saugus-RB	1130	<	0.05	mg/L	CHLORINE RESIDUAL
3/16/2002	SAUGUS	Saugus-RB	1145	<	0.05	mg/L	CHLORINE RESIDUAL
3/19/2002	SAUGUS	Saugus-RB	1200	<	0.05	mg/L	CHLORINE RESIDUAL
3/28/2002	SAUGUS	Saugus-RB	1210	<	0.05	mg/L	CHLORINE RESIDUAL
5/1/2002	SAUGUS	Saugus-RB	1150	<	0.05	mg/L	CHLORINE RESIDUAL
5/10/2002	SAUGUS	Saugus-RB	1200	<	0.05	mg/L	CHLORINE RESIDUAL
5/16/2002	SAUGUS	Saugus-RB	1200	<	0.05	mg/L	CHLORINE RESIDUAL
5/23/2002	SAUGUS	Saugus-RB	1210	<	0.05	mg/L	CHLORINE RESIDUAL
5/30/2002	SAUGUS	Saugus-RB	1200	<	0.05	mg/L	CHLORINE RESIDUAL
6/7/2002	SAUGUS	Saugus-RB	1045	<	0.05	mg/L	CHLORINE RESIDUAL
6/10/2002	SAUGUS	Saugus-RB	1205	<	0.05	mg/L	CHLORINE RESIDUAL
6/19/2002	SAUGUS	Saugus-RB	1106	<	0.05	mg/L	CHLORINE RESIDUAL
6/27/2002	SAUGUS	Saugus-RB	1135	<	0.05	mg/L	CHLORINE RESIDUAL
7/3/2002	SAUGUS	Saugus-RB	1157	<	0.05	mg/L	CHLORINE RESIDUAL
7/11/2002	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
7/15/2002	SAUGUS	Saugus-RB	1105	<	0.05	mg/L	CHLORINE RESIDUAL
7/23/2002	SAUGUS	Saugus-RB	1120	<	0.05	mg/L	CHLORINE RESIDUAL
7/31/2002	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
8/8/2002	SAUGUS	Saugus-RB	1045	<	0.05	mg/L	CHLORINE RESIDUAL
8/16/2002	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
8/19/2002	SAUGUS	Saugus-RB	1045	<	0.05	mg/L	CHLORINE RESIDUAL
8/27/2002	SAUGUS	Saugus-RB	1130	<	0.05	mg/L	CHLORINE RESIDUAL
9/4/2002	SAUGUS	Saugus-RB	1102	<	0.05	mg/L	CHLORINE RESIDUAL
9/13/2002	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
9/19/2002	SAUGUS	Saugus-RB	1140	<	0.05	mg/L	CHLORINE RESIDUAL
9/27/2002	SAUGUS	Saugus-RB	1020	<	0.05	mg/L	CHLORINE RESIDUAL
9/30/2002	SAUGUS	Saugus-RB	1020	<	0.05	mg/L	CHLORINE RESIDUAL
10/11/2002	SAUGUS	Saugus-RB	1030	<	0.05	mg/L	CHLORINE RESIDUAL
10/16/2002	SAUGUS	Saugus-RB	1105	<	0.05	mg/L	CHLORINE RESIDUAL
10/24/2002	SAUGUS	Saugus-RB	1030	<	0.05	mg/L	CHLORINE RESIDUAL
10/29/2002	SAUGUS	Saugus-RB	1115	<	0.05	mg/L	CHLORINE RESIDUAL
11/14/2002	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
11/19/2002	SAUGUS	Saugus-RB	1105	<	0.05	mg/L	CHLORINE RESIDUAL
11/26/2002	SAUGUS	Saugus-RB	1140	<	0.05	mg/L	CHLORINE RESIDUAL
12/5/2002	SAUGUS	Saugus-RB	1040	<	0.05	mg/L	CHLORINE RESIDUAL
12/13/2002	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
12/26/2002	SAUGUS	Saugus-RB	1135	<	0.05	mg/L	CHLORINE RESIDUAL
1/3/2003	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
1/14/2003	SAUGUS	Saugus-RB	1140	<	0.05	mg/L	CHLORINE RESIDUAL
1/21/2003	SAUGUS	Saugus-RB	1115	<	0.05	mg/L	CHLORINE RESIDUAL
1/30/2003	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
2/18/2003	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
2/21/2003	SAUGUS	Saugus-RB	1050	<	0.05	mg/L	CHLORINE RESIDUAL
3/3/2003	SAUGUS	Saugus-RB	1156	<	0.05	mg/L	CHLORINE RESIDUAL
3/14/2003	SAUGUS	Saugus-RB	1105	<	0.05	mg/L	CHLORINE RESIDUAL
3/20/2003	SAUGUS	Saugus-RB	1025	<	0.05	mg/L	CHLORINE RESIDUAL
3/27/2003	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
3/31/2003	SAUGUS	Saugus-RB	1145	<	0.05	mg/L	CHLORINE RESIDUAL
4/11/2003	SAUGUS	Saugus-RB	1050	<	0.05	mg/L	CHLORINE RESIDUAL
4/17/2003	SAUGUS	Saugus-RB	1010	<	0.05	mg/L	CHLORINE RESIDUAL
4/24/2003	SAUGUS	Saugus-RB	1130	<	0.05	mg/L	CHLORINE RESIDUAL
4/29/2003	SAUGUS	Saugus-RB	1145	<	0.05	mg/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
5/15/2003	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
5/20/2003	SAUGUS	Saugus-RB	1135	<	0.05	mg/L	CHLORINE RESIDUAL
5/30/2003	SAUGUS	Saugus-RB	1020	<	0.05	mg/L	CHLORINE RESIDUAL
6/4/2003	SAUGUS	Saugus-RB	1055	<	0.05	mg/L	CHLORINE RESIDUAL
6/9/2003	SAUGUS	Saugus-RB	1110	<	0.05	mg/L	CHLORINE RESIDUAL
6/16/2003	SAUGUS	Saugus-RB	1045	<	0.05	mg/L	CHLORINE RESIDUAL
6/25/2003	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
7/3/2003	SAUGUS	Saugus-RB	1025	<	0.05	mg/L	CHLORINE RESIDUAL
7/11/2003	SAUGUS	Saugus-RB	1035	<	0.05	mg/L	CHLORINE RESIDUAL
7/17/2003	SAUGUS	Saugus-RB	1031	<	0.05	mg/L	CHLORINE RESIDUAL
7/23/2003	SAUGUS	Saugus-RB	1105	<	0.05	mg/L	CHLORINE RESIDUAL
7/28/2003	SAUGUS	Saugus-RB	1015	<	0.05	mg/L	CHLORINE RESIDUAL
8/8/2003	SAUGUS	Saugus-RB	1050	<	0.05	mg/L	CHLORINE RESIDUAL
8/13/2003	SAUGUS	Saugus-RB	1030	<	0.05	mg/L	CHLORINE RESIDUAL
8/19/2003	SAUGUS	Saugus-RB	1130	<	0.05	mg/L	CHLORINE RESIDUAL
8/25/2003	SAUGUS	Saugus-RB	1050	<	0.05	mg/L	CHLORINE RESIDUAL
9/5/2003	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
9/10/2003	SAUGUS	Saugus-RB	1130	<	0.05	mg/L	CHLORINE RESIDUAL
9/18/2003	SAUGUS	Saugus-RB	1115	<	0.05	mg/L	CHLORINE RESIDUAL
9/23/2003	SAUGUS	Saugus-RB	1055	<	0.05	mg/L	CHLORINE RESIDUAL
9/29/2003	SAUGUS	Saugus-RB	1100	<	0.05	mg/L	CHLORINE RESIDUAL
10/10/2003	SAUGUS	Saugus-RB	1125	<	0.05	mg/L	CHLORINE RESIDUAL
10/16/2003	SAUGUS	Saugus-RB	1150	<	0.05	mg/L	CHLORINE RESIDUAL
10/23/2003	SAUGUS	Saugus-RB	1155	<	0.05	mg/L	CHLORINE RESIDUAL
10/28/2003	SAUGUS	Saugus-RB	1140	<	0.05	mg/L	CHLORINE RESIDUAL
1/7/2004	SAUGUS	Saugus-RB	1255	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2004	SAUGUS	Saugus-RB	1230	<	0.05	MG/L	CHLORINE RESIDUAL
1/21/2004	SAUGUS	Saugus-RB	1200	<	0.05	MG/L	CHLORINE RESIDUAL
1/28/2004	SAUGUS	Saugus-RB	1205	<	0.05	MG/L	CHLORINE RESIDUAL
2/11/2004	SAUGUS	Saugus-RB	1230	<	0.05	MG/L	CHLORINE RESIDUAL
3/10/2004	SAUGUS	Saugus-RB	1300	<	0.05	MG/L	CHLORINE RESIDUAL
3/17/2004	SAUGUS	Saugus-RB	1245	<	0.05	MG/L	CHLORINE RESIDUAL
3/24/2004	SAUGUS	Saugus-RB	1200	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2004	SAUGUS	Saugus-RB	1230	<	0.05	MG/L	CHLORINE RESIDUAL
4/7/2004	SAUGUS	Saugus-RB	1300	<	0.05	MG/L	CHLORINE RESIDUAL
4/14/2004	SAUGUS	Saugus-RB	1225	<	0.05	MG/L	CHLORINE RESIDUAL
4/21/2004	SAUGUS	Saugus-RB	1345	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	SAUGUS	Saugus-RB	1230	<	0.05	MG/L	CHLORINE RESIDUAL
5/5/2004	SAUGUS	Saugus-RB	1220	<	0.05	MG/L	CHLORINE RESIDUAL
5/12/2004	SAUGUS	Saugus-RB	1348	<	0.05	MG/L	CHLORINE RESIDUAL
5/19/2004	SAUGUS	Saugus-RB	1215	<	0.05	MG/L	CHLORINE RESIDUAL
5/26/2004	SAUGUS	Saugus-RB	1150	<	0.05	MG/L	CHLORINE RESIDUAL
6/2/2004	SAUGUS	Saugus-RB	1310	<	0.05	MG/L	CHLORINE RESIDUAL
6/9/2004	SAUGUS	Saugus-RB	1343	<	0.05	MG/L	CHLORINE RESIDUAL
6/16/2004	SAUGUS	Saugus-RB	1207	<	0.05	MG/L	CHLORINE RESIDUAL
6/23/2004	SAUGUS	Saugus-RB	1315	<	0.05	MG/L	CHLORINE RESIDUAL
6/30/2004	SAUGUS	Saugus-RB	1217	<	0.05	MG/L	CHLORINE RESIDUAL
7/7/2004	SAUGUS	Saugus-RB	1320	<	0.05	MG/L	CHLORINE RESIDUAL
7/14/2004	SAUGUS	Saugus-RB	1400	<	0.05	MG/L	CHLORINE RESIDUAL
7/21/2004	SAUGUS	Saugus-RB	1300	<	0.05	MG/L	CHLORINE RESIDUAL
7/28/2004	SAUGUS	Saugus-RB	1220	<	0.05	MG/L	CHLORINE RESIDUAL
8/4/2004	SAUGUS	Saugus-RB	1240	<	0.05	MG/L	CHLORINE RESIDUAL
8/11/2004	SAUGUS	Saugus-RB	1345	<	0.05	MG/L	CHLORINE RESIDUAL
8/18/2004	SAUGUS	Saugus-RB	1140	<	0.05	MG/L	CHLORINE RESIDUAL
8/25/2004	SAUGUS	Saugus-RB	1100	<	0.05	MG/L	CHLORINE RESIDUAL
9/1/2004	SAUGUS	Saugus-RB	1200	<	0.05	MG/L	CHLORINE RESIDUAL
9/8/2004	SAUGUS	Saugus-RB	1130	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2004	SAUGUS	Saugus-RB	1345	<	0.05	MG/L	CHLORINE RESIDUAL
9/22/2004	SAUGUS	Saugus-RB	1100	<	0.05	MG/L	CHLORINE RESIDUAL
9/29/2004	SAUGUS	Saugus-RB	1103	<	0.05	MG/L	CHLORINE RESIDUAL
10/6/2004	SAUGUS	Saugus-RB	1205	<	0.05	MG/L	CHLORINE RESIDUAL
10/13/2004	SAUGUS	Saugus-RB	1240	<	0.05	MG/L	CHLORINE RESIDUAL
11/3/2004	SAUGUS	Saugus-RB	1345	<	0.05	MG/L	CHLORINE RESIDUAL
11/10/2004	SAUGUS	Saugus-RB	1235	<	0.05	MG/L	CHLORINE RESIDUAL
11/17/2004	SAUGUS	Saugus-RB	1235	<	0.05	MG/L	CHLORINE RESIDUAL
11/24/2004	SAUGUS	Saugus-RB	1145	<	0.05	MG/L	CHLORINE RESIDUAL

APPENDIX A
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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
12/1/2004	SAUGUS	Saugus-RB	1100	<	0.05	MG/L	CHLORINE RESIDUAL
12/16/2004	SAUGUS	Saugus-RB	1230	<	0.05	MG/L	CHLORINE RESIDUAL
12/22/2004	SAUGUS	Saugus-RB	1015	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2005	SAUGUS	Saugus-RB	1315	<	0.05	MG/L	CHLORINE RESIDUAL
2/9/2005	SAUGUS	Saugus-RB	1255	<	0.05	MG/L	CHLORINE RESIDUAL
2/16/2005	SAUGUS	Saugus-RB	1244	<	0.05	MG/L	CHLORINE RESIDUAL
3/2/2005	SAUGUS	Saugus-RB	1305	<	0.05	MG/L	CHLORINE RESIDUAL
3/10/2005	SAUGUS	Saugus-RB	1200	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2005	SAUGUS	Saugus-RB	1335	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	SAUGUS	Saugus-RB	1212	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2005	SAUGUS	Saugus-RB	1115	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2005	SAUGUS	Saugus-RB	1100	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2005	SAUGUS	Saugus-RB	1215	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2005	SAUGUS	Saugus-RB	1230	<	0.05	MG/L	CHLORINE RESIDUAL
5/4/2005	SAUGUS	Saugus-RB	1045	<	0.05	MG/L	CHLORINE RESIDUAL
4/27/2005	SAUGUS	Saugus-RB	1147	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2005	SAUGUS	Saugus-RB	1020	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2005	SAUGUS	Saugus-RB	1305	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2005	SAUGUS	Saugus-RB	1020	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2005	SAUGUS	Saugus-RB	1015	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2005	SAUGUS	Saugus-RB	1045	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2005	SAUGUS	Saugus-RB	1305	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2005	SAUGUS	Saugus-RB	1010	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2005	SAUGUS	Saugus-RB	1100	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2005	SAUGUS	Saugus-RB	945	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2005	SAUGUS	Saugus-RB	1000	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2005	SAUGUS	Saugus-RB	1222	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2005	SAUGUS	Saugus-RB	1020	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2005	SAUGUS	Saugus-RB	1045	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2005	SAUGUS	Saugus-RB	1030	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2005	SAUGUS	Saugus-RB	1305	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2005	SAUGUS	Saugus-RB	1315	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	SAUGUS	Saugus-RB	1211	<	0.05	MG/L	CHLORINE RESIDUAL
1/9/2002	VALENCIA	VA-RD	945	<	0.05	mg/L	CHLORINE RESIDUAL
1/14/2002	VALENCIA	VA-RD	1045	<	0.05	mg/L	CHLORINE RESIDUAL
1/22/2002	VALENCIA	VA-RD	1020	<	0.05	mg/L	CHLORINE RESIDUAL
1/30/2002	VALENCIA	VA-RD	1035	<	0.05	mg/L	CHLORINE RESIDUAL
2/7/2002	VALENCIA	VA-RD	1105	<	0.05	mg/L	CHLORINE RESIDUAL
2/16/2002	VALENCIA	VA-RD	1020	<	0.05	mg/L	CHLORINE RESIDUAL
2/21/2002	VALENCIA	VA-RD	1022	<	0.05	mg/L	CHLORINE RESIDUAL
2/25/2002	VALENCIA	VA-RD	1040	<	0.05	mg/L	CHLORINE RESIDUAL
3/6/2002	VALENCIA	VA-RD	1105	<	0.05	mg/L	CHLORINE RESIDUAL
3/16/2002	VALENCIA	VA-RD	1110	<	0.05	mg/L	CHLORINE RESIDUAL
3/19/2002	VALENCIA	VA-RD	1035	<	0.05	mg/L	CHLORINE RESIDUAL
3/28/2002	VALENCIA	VA-RD	1045	<	0.05	mg/L	CHLORINE RESIDUAL
5/1/2002	VALENCIA	VA-RD	1100	<	0.05	mg/L	CHLORINE RESIDUAL
5/10/2002	VALENCIA	VA-RD	1120	<	0.05	mg/L	CHLORINE RESIDUAL
5/16/2002	VALENCIA	VA-RD	1120	<	0.05	mg/L	CHLORINE RESIDUAL
5/23/2002	VALENCIA	VA-RD	1115	<	0.05	mg/L	CHLORINE RESIDUAL
5/30/2002	VALENCIA	VA-RD	1105	<	0.05	mg/L	CHLORINE RESIDUAL
6/7/2002	VALENCIA	VA-RD	950	<	0.05	mg/L	CHLORINE RESIDUAL
6/10/2002	VALENCIA	VA-RD	1100	<	0.05	mg/L	CHLORINE RESIDUAL
6/19/2002	VALENCIA	VA-RD	1020	<	0.05	mg/L	CHLORINE RESIDUAL
6/27/2002	VALENCIA	VA-RD	1045	<	0.05	mg/L	CHLORINE RESIDUAL
7/3/2002	VALENCIA	VA-RD	1109	<	0.05	mg/L	CHLORINE RESIDUAL
7/11/2002	VALENCIA	VA-RD	1015	<	0.05	mg/L	CHLORINE RESIDUAL
7/15/2002	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
7/23/2002	VALENCIA	VA-RD	1025	<	0.05	mg/L	CHLORINE RESIDUAL
7/31/2002	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
8/8/2002	VALENCIA	VA-RD	1000	<	0.05	mg/L	CHLORINE RESIDUAL
8/16/2002	VALENCIA	VA-RD	945	<	0.05	mg/L	CHLORINE RESIDUAL
8/19/2002	VALENCIA	VA-RD	950	<	0.05	mg/L	CHLORINE RESIDUAL
8/27/2002	VALENCIA	VA-RD	1035	<	0.05	mg/L	CHLORINE RESIDUAL
9/4/2002	VALENCIA	VA-RD	1005	<	0.05	mg/L	CHLORINE RESIDUAL
9/13/2002	VALENCIA	VA-RD	1000	<	0.05	mg/L	CHLORINE RESIDUAL
9/19/2002	VALENCIA	VA-RD	1030	<	0.05	mg/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
9/27/2002	VALENCIA	VA-RD	925	<	0.05	mg/L	CHLORINE RESIDUAL
9/30/2002	VALENCIA	VA-RD	925	<	0.05	mg/L	CHLORINE RESIDUAL
10/11/2002	VALENCIA	VA-RD	930	<	0.05	mg/L	CHLORINE RESIDUAL
10/16/2002	VALENCIA	VA-RD	1015	<	0.05	mg/L	CHLORINE RESIDUAL
10/24/2002	VALENCIA	VA-RD	950	<	0.05	mg/L	CHLORINE RESIDUAL
10/29/2002	VALENCIA	VA-RD	1035	<	0.05	mg/L	CHLORINE RESIDUAL
11/14/2002	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
11/19/2002	VALENCIA	VA-RD	1020	<	0.05	mg/L	CHLORINE RESIDUAL
11/26/2002	VALENCIA	VA-RD	1100	<	0.05	mg/L	CHLORINE RESIDUAL
12/5/2002	VALENCIA	VA-RD	1000	<	0.05	mg/L	CHLORINE RESIDUAL
12/13/2002	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
12/26/2002	VALENCIA	VA-RD	1030	<	0.05	mg/L	CHLORINE RESIDUAL
1/3/2003	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
1/14/2003	VALENCIA	VA-RD	1035	<	0.05	mg/L	CHLORINE RESIDUAL
1/21/2003	VALENCIA	VA-RD	1020	<	0.05	mg/L	CHLORINE RESIDUAL
1/30/2003	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
2/18/2003	VALENCIA	VA-RD	1003	<	0.05	mg/L	CHLORINE RESIDUAL
2/21/2003	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
3/3/2003	VALENCIA	VA-RD	1040	<	0.05	mg/L	CHLORINE RESIDUAL
3/14/2003	VALENCIA	VA-RD	1030	<	0.05	mg/L	CHLORINE RESIDUAL
3/20/2003	VALENCIA	VA-RD	950	<	0.05	mg/L	CHLORINE RESIDUAL
3/27/2003	VALENCIA	VA-RD	1000	<	0.05	mg/L	CHLORINE RESIDUAL
3/31/2003	VALENCIA	VA-RD	1040	<	0.05	mg/L	CHLORINE RESIDUAL
4/11/2003	VALENCIA	VA-RD	945	<	0.05	mg/L	CHLORINE RESIDUAL
4/17/2003	VALENCIA	VA-RD	925	<	0.05	mg/L	CHLORINE RESIDUAL
4/24/2003	VALENCIA	VA-RD	1046	<	0.05	mg/L	CHLORINE RESIDUAL
4/29/2003	VALENCIA	VA-RD	1045	<	0.05	mg/L	CHLORINE RESIDUAL
5/15/2003	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
5/20/2003	VALENCIA	VA-RD	1025	<	0.05	mg/L	CHLORINE RESIDUAL
5/30/2003	VALENCIA	VA-RD	935	<	0.05	mg/L	CHLORINE RESIDUAL
6/4/2003	VALENCIA	VA-RD	1000	<	0.05	mg/L	CHLORINE RESIDUAL
6/9/2003	VALENCIA	VA-RD	1030	<	0.05	mg/L	CHLORINE RESIDUAL
6/16/2003	VALENCIA	VA-RD	1015	<	0.05	mg/L	CHLORINE RESIDUAL
6/25/2003	VALENCIA	VA-RD	1020	<	0.05	mg/L	CHLORINE RESIDUAL
7/3/2003	VALENCIA	VA-RD	940	<	0.05	mg/L	CHLORINE RESIDUAL
7/11/2003	VALENCIA	VA-RD	935	<	0.05	mg/L	CHLORINE RESIDUAL
7/17/2003	VALENCIA	VA-RD	935	<	0.05	mg/L	CHLORINE RESIDUAL
7/23/2003	VALENCIA	VA-RD	1005	<	0.05	mg/L	CHLORINE RESIDUAL
7/28/2003	VALENCIA	VA-RD	940	<	0.05	mg/L	CHLORINE RESIDUAL
8/8/2003	VALENCIA	VA-RD	937	<	0.05	mg/L	CHLORINE RESIDUAL
8/13/2003	VALENCIA	VA-RD	945	<	0.05	mg/L	CHLORINE RESIDUAL
8/19/2003	VALENCIA	VA-RD	1045	<	0.05	mg/L	CHLORINE RESIDUAL
8/25/2003	VALENCIA	VA-RD	1005	<	0.05	mg/L	CHLORINE RESIDUAL
9/5/2003	VALENCIA	VA-RD	1000	<	0.05	mg/L	CHLORINE RESIDUAL
9/10/2003	VALENCIA	VA-RD	1030	<	0.05	mg/L	CHLORINE RESIDUAL
9/18/2003	VALENCIA	VA-RD	1025	<	0.05	mg/L	CHLORINE RESIDUAL
9/23/2003	VALENCIA	VA-RD	1010	<	0.05	mg/L	CHLORINE RESIDUAL
9/29/2003	VALENCIA	VA-RD	1005	<	0.05	mg/L	CHLORINE RESIDUAL
10/10/2003	VALENCIA	VA-RD	1035	<	0.05	mg/L	CHLORINE RESIDUAL
10/16/2003	VALENCIA	VA-RD	1045	<	0.05	mg/L	CHLORINE RESIDUAL
10/23/2003	VALENCIA	VA-RD	1105	<	0.05	mg/L	CHLORINE RESIDUAL
10/28/2003	VALENCIA	VA-RD	1110	<	0.05	mg/L	CHLORINE RESIDUAL
1/7/2004	VALENCIA	VA-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2004	VALENCIA	VA-RD	1120	<	0.05	MG/L	CHLORINE RESIDUAL
1/15/2004	VALENCIA	VA-RD	1220	<	0.05	MG/L	CHLORINE RESIDUAL
1/21/2004	VALENCIA	VA-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
1/28/2004	VALENCIA	VA-RD	1130	<	0.05	MG/L	CHLORINE RESIDUAL
2/11/2004	VALENCIA	VA-RD	1040	<	0.05	MG/L	CHLORINE RESIDUAL
3/10/2004	VALENCIA	VA-RD	1125	<	0.05	MG/L	CHLORINE RESIDUAL
3/17/2004	VALENCIA	VA-RD	1130	<	0.05	MG/L	CHLORINE RESIDUAL
3/24/2004	VALENCIA	VA-RD	1050	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2004	VALENCIA	VA-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
4/7/2004	VALENCIA	VA-RD	1145	<	0.05	MG/L	CHLORINE RESIDUAL
4/14/2004	VALENCIA	VA-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL
4/21/2004	VALENCIA	VA-RD	1150	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	VALENCIA	VA-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
5/5/2004	VALENCIA	VA-RD	1105	<	0.05	MG/L	CHLORINE RESIDUAL
5/12/2004	VALENCIA	VA-RD	1138	<	0.05	MG/L	CHLORINE RESIDUAL
5/19/2004	VALENCIA	VA-RD	1056	<	0.05	MG/L	CHLORINE RESIDUAL
5/26/2004	VALENCIA	VA-RD	1020	<	0.05	MG/L	CHLORINE RESIDUAL
6/2/2004	VALENCIA	VA-RD	1120	<	0.05	MG/L	CHLORINE RESIDUAL
6/9/2004	VALENCIA	VA-RD	1135	<	0.05	MG/L	CHLORINE RESIDUAL
6/16/2004	VALENCIA	VA-RD	1048	<	0.05	MG/L	CHLORINE RESIDUAL
6/23/2004	VALENCIA	VA-RD	1123	<	0.05	MG/L	CHLORINE RESIDUAL
6/30/2004	VALENCIA	VA-RD	1054	<	0.05	MG/L	CHLORINE RESIDUAL
7/7/2004	VALENCIA	VA-RD	1213	<	0.05	MG/L	CHLORINE RESIDUAL
7/14/2004	VALENCIA	VA-RD	1200	<	0.05	MG/L	CHLORINE RESIDUAL
7/21/2004	VALENCIA	VA-RD	1141	<	0.05	MG/L	CHLORINE RESIDUAL
7/28/2004	VALENCIA	VA-RD	1115	<	0.05	MG/L	CHLORINE RESIDUAL
8/4/2004	VALENCIA	VA-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
8/11/2004	VALENCIA	VA-RD	1120	<	0.05	MG/L	CHLORINE RESIDUAL
8/18/2004	VALENCIA	VA-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL
8/25/2004	VALENCIA	VA-RD	1010	<	0.05	MG/L	CHLORINE RESIDUAL
9/1/2004	VALENCIA	VA-RD	1050	<	0.05	MG/L	CHLORINE RESIDUAL
9/8/2004	VALENCIA	VA-RD	1036	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2004	VALENCIA	VA-RD	1200	<	0.05	MG/L	CHLORINE RESIDUAL
9/22/2004	VALENCIA	VA-RD	1015	<	0.05	MG/L	CHLORINE RESIDUAL
9/29/2004	VALENCIA	VA-RD	1010	<	0.05	MG/L	CHLORINE RESIDUAL
10/6/2004	VALENCIA	VA-RD	1115	<	0.05	MG/L	CHLORINE RESIDUAL
10/13/2004	VALENCIA	VA-RD	1120	<	0.05	MG/L	CHLORINE RESIDUAL
11/3/2004	VALENCIA	VA-RD	1300	<	0.05	MG/L	CHLORINE RESIDUAL
11/10/2004	VALENCIA	VA-RD	1125	<	0.05	MG/L	CHLORINE RESIDUAL
11/17/2004	VALENCIA	VA-RD	1125	<	0.05	MG/L	CHLORINE RESIDUAL
11/24/2004	VALENCIA	VA-RD	1050	<	0.05	MG/L	CHLORINE RESIDUAL
12/1/2004	VALENCIA	VA-RD	1008	<	0.05	MG/L	CHLORINE RESIDUAL
12/16/2004	VALENCIA	VA-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
12/22/2004	VALENCIA	VA-RD	1010	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2005	VALENCIA	VA-RD	1140	<	0.05	MG/L	CHLORINE RESIDUAL
2/9/2005	VALENCIA	VA-RD	1130	<	0.05	MG/L	CHLORINE RESIDUAL
2/16/2005	VALENCIA	VA-RD	1120	<	0.05	MG/L	CHLORINE RESIDUAL
3/2/2005	VALENCIA	VA-RD	1125	<	0.05	MG/L	CHLORINE RESIDUAL
3/10/2005	VALENCIA	VA-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2005	VALENCIA	VA-RD	1205	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	VALENCIA	VA-RD	1055	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2005	VALENCIA	VA-RD	1020	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2005	VALENCIA	VA-RD	1040	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2005	VALENCIA	VA-RD	1111	<	0.05	MG/L	CHLORINE RESIDUAL
5/4/2005	VALENCIA	VA-RD	940	<	0.05	MG/L	CHLORINE RESIDUAL
4/27/2005	VALENCIA	VA-RD	1058	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2005	VALENCIA	VA-RD	932	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2005	VALENCIA	VA-RD	1140	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2005	VALENCIA	VA-RD	920	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2005	VALENCIA	VA-RD	910	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2005	VALENCIA	VA-RD	950	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2005	VALENCIA	VA-RD	1155	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2005	VALENCIA	VA-RD	920	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2005	VALENCIA	VA-RD	1010	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2005	VALENCIA	VA-RD	900	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2005	VALENCIA	VA-RD	845	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2005	VALENCIA	VA-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2005	VALENCIA	VA-RD	925	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2005	VALENCIA	VA-RD	1010	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2005	VALENCIA	VA-RD	950	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2005	VALENCIA	VA-RD	1210	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2005	VALENCIA	VA-RD	1130	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	VALENCIA	VA-RD	1116	<	0.05	MG/L	CHLORINE RESIDUAL
1/10/2002	POMONA	POM-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
1/24/2002	POMONA	POM-RA	1025	<	0.05	MG/L	CHLORINE RESIDUAL
2/1/2002	POMONA	POM-RA	900	<	0.05	MG/L	CHLORINE RESIDUAL
2/8/2002	POMONA	POM-RA	1125	<	0.05	MG/L	CHLORINE RESIDUAL
2/20/2002	POMONA	POM-RA	825	<	0.05	MG/L	CHLORINE RESIDUAL
3/4/2002	POMONA	POM-RA	1020	<	0.05	MG/L	CHLORINE RESIDUAL

DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
3/26/2002	POMONA	POM-RA	1235	<	0.05	MG/L	CHLORINE RESIDUAL
4/1/2002	POMONA	POM-RA	1205	<	0.05	MG/L	CHLORINE RESIDUAL
6/12/2002	POMONA	POM-RA	1150	<	0.05	MG/L	CHLORINE RESIDUAL
6/26/2002	POMONA	POM-RA	1215	<	0.05	MG/L	CHLORINE RESIDUAL
8/2/2002	POMONA	POM-RA	830	<	0.05	MG/L	CHLORINE RESIDUAL
8/23/2002	POMONA	POM-RA	1225	<	0.05	MG/L	CHLORINE RESIDUAL
9/5/2002	POMONA	POM-RA	910	<	0.05	MG/L	CHLORINE RESIDUAL
9/12/2002	POMONA	POM-RA	720	<	0.05	MG/L	CHLORINE RESIDUAL
9/19/2002	POMONA	POM-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
10/1/2002	POMONA	POM-RA	820	<	0.05	MG/L	CHLORINE RESIDUAL
10/22/2002	POMONA	POM-RA	905	<	0.05	MG/L	CHLORINE RESIDUAL
10/30/2002	POMONA	POM-RA	855	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2002	POMONA	POM-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
11/26/2002	POMONA	POM-RA	1135	<	0.05	MG/L	CHLORINE RESIDUAL
12/3/2002	POMONA	POM-RA	915	<	0.05	MG/L	CHLORINE RESIDUAL
12/12/2002	POMONA	POM-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
12/23/2002	POMONA	POM-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
1/2/2003	POMONA	POM-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
1/8/2003	POMONA	POM-RA	1045	<	0.05	MG/L	CHLORINE RESIDUAL
1/15/2003	POMONA	POM-RA	1135		0.55	MG/L	CHLORINE RESIDUAL
1/23/2003	POMONA	POM-RA	1015		0.95	MG/L	CHLORINE RESIDUAL
2/6/2003	POMONA	POM-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
2/20/2003	POMONA	POM-RA	810	<	0.05	MG/L	CHLORINE RESIDUAL
3/7/2003	POMONA	POM-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
3/12/2003	POMONA	POM-RA	1055	<	0.05	MG/L	CHLORINE RESIDUAL
3/20/2003	POMONA	POM-RA	1025	<	0.05	MG/L	CHLORINE RESIDUAL
3/26/2003	POMONA	POM-RA	1040	<	0.05	MG/L	CHLORINE RESIDUAL
4/2/2003	POMONA	POM-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
4/9/2003	POMONA	POM-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
4/30/2003	POMONA	POM-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
5/9/2003	POMONA	POM-RA	1140	<	0.05	MG/L	CHLORINE RESIDUAL
5/28/2003	POMONA	POM-RA	815	<	0.05	MG/L	CHLORINE RESIDUAL
11/3/2003	POMONA	POM-RA	930	<	0.05	MG/L	CHLORINE RESIDUAL
11/19/2003	POMONA	POM-RA	745	<	0.05	MG/L	CHLORINE RESIDUAL
11/26/2003	POMONA	POM-RA	910	<	0.05	MG/L	CHLORINE RESIDUAL
12/3/2003	POMONA	POM-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
12/9/2003	POMONA	POM-RA	1035	<	0.05	MG/L	CHLORINE RESIDUAL
12/15/2003	POMONA	POM-RA	815	<	0.05	MG/L	CHLORINE RESIDUAL
12/22/2003	POMONA	POM-RA	1045	<	0.05	MG/L	CHLORINE RESIDUAL
12/29/2003	POMONA	POM-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
2/5/2004	POMONA	POM-RA	900	<	0.05	MG/L	CHLORINE RESIDUAL
2/11/2004	POMONA	POM-RA	815	<	0.05	MG/L	CHLORINE RESIDUAL
3/4/2004	POMONA	POM-RA	900	<	0.05	MG/L	CHLORINE RESIDUAL
3/11/2004	POMONA	POM-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL
3/17/2004	POMONA	POM-RA	940	<	0.05	MG/L	CHLORINE RESIDUAL
3/24/2004	POMONA	POM-RA	915	<	0.05	MG/L	CHLORINE RESIDUAL
4/1/2004	POMONA	POM-RA	930	<	0.05	MG/L	CHLORINE RESIDUAL
4/7/2004	POMONA	POM-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
4/14/2004	POMONA	POM-RA	950	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2004	POMONA	POM-RA	925	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	POMONA	POM-RA	925	<	0.05	MG/L	CHLORINE RESIDUAL
5/5/2004	POMONA	POM-RA	955	<	0.05	MG/L	CHLORINE RESIDUAL
5/12/2004	POMONA	POM-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
5/19/2004	POMONA	POM-RA	830	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2004	POMONA	POM-RA	918	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2004	POMONA	POM-RA	950	<	0.05	MG/L	CHLORINE RESIDUAL
8/17/2004	POMONA	POM-RA	945	<	0.05	MG/L	CHLORINE RESIDUAL
8/24/2004	POMONA	POM-RA	955	<	0.05	MG/L	CHLORINE RESIDUAL
8/31/2004	POMONA	POM-RA	920	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2004	POMONA	POM-RA	840	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2004	POMONA	POM-RA	925	<	0.05	MG/L	CHLORINE RESIDUAL
9/21/2004	POMONA	POM-RA	1106	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2004	POMONA	POM-RA	842	<	0.05	MG/L	CHLORINE RESIDUAL
10/5/2004	POMONA	POM-RA	805	<	0.05	MG/L	CHLORINE RESIDUAL
10/12/2004	POMONA	POM-RA	1125	<	0.05	MG/L	CHLORINE RESIDUAL
10/26/2004	POMONA	POM-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
11/2/2004	POMONA	POM-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
11/9/2004	POMONA	POM-RA	1300	<	0.05	MG/L	CHLORINE RESIDUAL
11/16/2004	POMONA	POM-RA	905	<	0.05	MG/L	CHLORINE RESIDUAL
11/23/2004	POMONA	POM-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
11/30/2004	POMONA	POM-RA	820	<	0.05	MG/L	CHLORINE RESIDUAL
12/7/2004	POMONA	POM-RA	1020	<	0.05	MG/L	CHLORINE RESIDUAL
12/16/2004	POMONA	POM-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	POMONA	POM-RA	851	<	0.05	MG/L	CHLORINE RESIDUAL
1/13/2005	POMONA	POM-RA	850	<	0.05	MG/L	CHLORINE RESIDUAL
1/18/2005	POMONA	POM-RA	1258	<	0.05	MG/L	CHLORINE RESIDUAL
1/25/2005	POMONA	POM-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
2/1/2005	POMONA	POM-RA	1048	<	0.05	MG/L	CHLORINE RESIDUAL
2/8/2005	POMONA	POM-RA	805	<	0.05	MG/L	CHLORINE RESIDUAL
2/15/2005	POMONA	POM-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
2/25/2005	POMONA	POM-RA	841	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2005	POMONA	POM-RA	815	<	0.05	MG/L	CHLORINE RESIDUAL
3/8/2005	POMONA	POM-RA	800	<	0.05	MG/L	CHLORINE RESIDUAL
3/15/2005	POMONA	POM-RA	945	<	0.05	MG/L	CHLORINE RESIDUAL
3/22/2005	POMONA	POM-RA	800	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	POMONA	POM-RA	835	<	0.05	MG/L	CHLORINE RESIDUAL
4/5/2005	POMONA	POM-RA	1225	<	0.05	MG/L	CHLORINE RESIDUAL
4/12/2005	POMONA	POM-RA	918	<	0.05	MG/L	CHLORINE RESIDUAL
4/19/2005	POMONA	POM-RA	925	<	0.05	MG/L	CHLORINE RESIDUAL
4/26/2005	POMONA	POM-RA	937	<	0.05	MG/L	CHLORINE RESIDUAL
5/3/2005	POMONA	POM-RA	1150	<	0.05	MG/L	CHLORINE RESIDUAL
5/9/2005	POMONA	POM-RA	936	<	0.05	MG/L	CHLORINE RESIDUAL
5/17/2005	POMONA	POM-RA	1015	<	0.05	MG/L	CHLORINE RESIDUAL
5/24/2005	POMONA	POM-RA	830	<	0.05	MG/L	CHLORINE RESIDUAL
5/31/2005	POMONA	POM-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
6/7/2005	POMONA	POM-RA	850	<	0.05	MG/L	CHLORINE RESIDUAL
6/14/2005	POMONA	POM-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
6/21/2005	POMONA	POM-RA	1140	<	0.05	MG/L	CHLORINE RESIDUAL
6/28/2005	POMONA	POM-RA	940	<	0.05	MG/L	CHLORINE RESIDUAL
7/5/2005	POMONA	POM-RA	1123	<	0.05	MG/L	CHLORINE RESIDUAL
7/12/2005	POMONA	POM-RA	832	<	0.05	MG/L	CHLORINE RESIDUAL
7/19/2005	POMONA	POM-RA	910	<	0.05	MG/L	CHLORINE RESIDUAL
7/26/2005	POMONA	POM-RA	905	<	0.05	MG/L	CHLORINE RESIDUAL
8/2/2005	POMONA	POM-RA	903	<	0.05	MG/L	CHLORINE RESIDUAL
8/9/2005	POMONA	POM-RA	905	<	0.05	MG/L	CHLORINE RESIDUAL
9/6/2005	POMONA	POM-RA	855	<	0.05	MG/L	CHLORINE RESIDUAL
9/6/2005	POMONA	POM-RA	955	<	0.05	MG/L	CHLORINE RESIDUAL
9/13/2005	POMONA	POM-RA	840	<	0.05	MG/L	CHLORINE RESIDUAL
9/13/2005	POMONA	POM-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	POMONA	POM-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	POMONA	POM-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	POMONA	POM-RA	1101	<	0.05	MG/L	CHLORINE RESIDUAL
9/27/2005	POMONA	POM-RA	905	<	0.05	MG/L	CHLORINE RESIDUAL
9/27/2005	POMONA	POM-RA	945	<	0.05	MG/L	CHLORINE RESIDUAL
9/27/2005	POMONA	POM-RA	1040	<	0.05	MG/L	CHLORINE RESIDUAL
1/2/2002	LONG BEACH	LB-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
1/7/2002	LONG BEACH	LB-RA	1240	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2002	LONG BEACH	LB-RA	1250	<	0.05	MG/L	CHLORINE RESIDUAL
1/21/2002	LONG BEACH	LB-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
1/31/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
2/4/2002	LONG BEACH	LB-RA	1215	<	0.05	MG/L	CHLORINE RESIDUAL
2/13/2002	LONG BEACH	LB-RA	1220	<	0.05	MG/L	CHLORINE RESIDUAL
2/19/2002	LONG BEACH	LB-RA	1240	<	0.05	MG/L	CHLORINE RESIDUAL
2/25/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
3/4/2002	LONG BEACH	LB-RA	1300	<	0.05	MG/L	CHLORINE RESIDUAL
3/11/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
3/20/2002	LONG BEACH	LB-RA	1230	<	0.05	MG/L	CHLORINE RESIDUAL
3/25/2002	LONG BEACH	LB-RA	1240	<	0.05	MG/L	CHLORINE RESIDUAL
4/1/2002	LONG BEACH	LB-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
4/10/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
4/17/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
4/23/2002	LONG BEACH	LB-RA	925	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
5/6/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
5/13/2002	LONG BEACH	LB-RA	1225	<	0.05	MG/L	CHLORINE RESIDUAL
5/23/2002	LONG BEACH	LB-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
5/31/2002	LONG BEACH	LB-RA	1225	<	0.05	MG/L	CHLORINE RESIDUAL
6/4/2002	LONG BEACH	LB-RA	1150	<	0.05	MG/L	CHLORINE RESIDUAL
6/10/2002	LONG BEACH	LB-RA	1230	<	0.05	MG/L	CHLORINE RESIDUAL
6/18/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
6/24/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
7/1/2002	LONG BEACH	LB-RA	1205	<	0.05	MG/L	CHLORINE RESIDUAL
7/8/2002	LONG BEACH	LB-RA	1215	<	0.05	MG/L	CHLORINE RESIDUAL
7/15/2002	LONG BEACH	LB-RA	1220	<	0.05	MG/L	CHLORINE RESIDUAL
7/24/2002	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
7/31/2002	LONG BEACH	LB-RA	1230	<	0.05	MG/L	CHLORINE RESIDUAL
8/6/2002	LONG BEACH	LB-RA	1215	<	0.05	MG/L	CHLORINE RESIDUAL
8/14/2002	LONG BEACH	LB-RA	1215	<	0.05	MG/L	CHLORINE RESIDUAL
8/21/2002	LONG BEACH	LB-RA	1230	<	0.05	MG/L	CHLORINE RESIDUAL
8/26/2002	LONG BEACH	LB-RA	1225	<	0.05	MG/L	CHLORINE RESIDUAL
9/4/2002	LONG BEACH	LB-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
9/11/2002	LONG BEACH	LB-RA	1300	<	0.05	MG/L	CHLORINE RESIDUAL
9/16/2002	LONG BEACH	LB-RA	1045	<	0.05	MG/L	CHLORINE RESIDUAL
9/25/2002	LONG BEACH	LB-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL
10/2/2002	LONG BEACH	LB-RA	1040	<	0.05	MG/L	CHLORINE RESIDUAL
10/9/2002	LONG BEACH	LB-RA	0845	<	0.05	MG/L	CHLORINE RESIDUAL
10/15/2002	LONG BEACH	LB-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
10/21/2002	LONG BEACH	LB-RA	1155	<	0.05	MG/L	CHLORINE RESIDUAL
10/29/2002	LONG BEACH	LB-RA	1225	<	0.05	MG/L	CHLORINE RESIDUAL
11/5/2002	LONG BEACH	LB-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2002	LONG BEACH	LB-RA	0940	<	0.05	MG/L	CHLORINE RESIDUAL
11/19/2002	LONG BEACH	LB-RA	0910	<	0.05	MG/L	CHLORINE RESIDUAL
11/25/2002	LONG BEACH	LB-RA	1015	<	0.05	MG/L	CHLORINE RESIDUAL
12/3/2002	LONG BEACH	LB-RA	0920	<	0.05	MG/L	CHLORINE RESIDUAL
12/10/2002	LONG BEACH	LB-RA	1320	<	0.05	MG/L	CHLORINE RESIDUAL
12/26/2002	LONG BEACH	LB-RA	0900	<	0.05	MG/L	CHLORINE RESIDUAL
1/2/2003	LONG BEACH	LB-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
1/7/2003	LONG BEACH	LB-RA	1055	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2003	LONG BEACH	LB-RA	0955	<	0.05	MG/L	CHLORINE RESIDUAL
1/21/2003	LONG BEACH	LB-RA	0835	<	0.05	MG/L	CHLORINE RESIDUAL
1/28/2003	LONG BEACH	LB-RA	1123	<	0.05	MG/L	CHLORINE RESIDUAL
2/4/2003	LONG BEACH	LB-RA	0900	<	0.05	MG/L	CHLORINE RESIDUAL
2/18/2003	LONG BEACH	LB-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL
3/12/2003	LONG BEACH	LB-RA	1037	<	0.05	MG/L	CHLORINE RESIDUAL
3/18/2003	LONG BEACH	LB-RA	0955	<	0.05	MG/L	CHLORINE RESIDUAL
3/26/2003	LONG BEACH	LB-RA	0940	<	0.05	MG/L	CHLORINE RESIDUAL
4/1/2003	LONG BEACH	LB-RA	0000	<	0.05	MG/L	CHLORINE RESIDUAL
4/9/2003	LONG BEACH	LB-RA	0751	<	0.05	MG/L	CHLORINE RESIDUAL
4/17/2003	LONG BEACH	LB-RA	1045	<	0.05	MG/L	CHLORINE RESIDUAL
4/23/2003	LONG BEACH	LB-RA	0921	<	0.05	MG/L	CHLORINE RESIDUAL
4/29/2003	LONG BEACH	LB-RA	1240	<	0.05	MG/L	CHLORINE RESIDUAL
5/6/2003	LONG BEACH	LB-RA	0920	<	0.05	MG/L	CHLORINE RESIDUAL
5/13/2003	LONG BEACH	LB-RA	1240	<	0.05	MG/L	CHLORINE RESIDUAL
5/20/2003	LONG BEACH	LB-RA	1057	<	0.05	MG/L	CHLORINE RESIDUAL
5/27/2003	LONG BEACH	LB-RA	1154	<	0.05	MG/L	CHLORINE RESIDUAL
6/3/2003	LONG BEACH	LB-RA	1255	<	0.05	MG/L	CHLORINE RESIDUAL
6/10/2003	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
6/17/2003	LONG BEACH	LB-RA	1104	<	0.05	MG/L	CHLORINE RESIDUAL
6/24/2003	LONG BEACH	LB-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
7/1/2003	LONG BEACH	LB-RA	1233	<	0.05	MG/L	CHLORINE RESIDUAL
7/8/2003	LONG BEACH	LB-RA	1131	<	0.05	MG/L	CHLORINE RESIDUAL
7/15/2003	LONG BEACH	LB-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
7/22/2003	LONG BEACH	LB-RA	0953	<	0.05	MG/L	CHLORINE RESIDUAL
7/31/2003	LONG BEACH	LB-RA	1218	<	0.05	MG/L	CHLORINE RESIDUAL
8/5/2003	LONG BEACH	LB-RA	1250	<	0.05	MG/L	CHLORINE RESIDUAL
8/12/2003	LONG BEACH	LB-RA	1136	<	0.05	MG/L	CHLORINE RESIDUAL
8/19/2003	LONG BEACH	LB-RA	1145	<	0.05	MG/L	CHLORINE RESIDUAL
8/26/2003	LONG BEACH	LB-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
9/2/2003	LONG BEACH	LB-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
9/9/2003	LONG BEACH	LB-RA	0935	<	0.05	MG/L	CHLORINE RESIDUAL
9/16/2003	LONG BEACH	LB-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
9/16/2003	LONG BEACH	LB-RA	1126	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2003	LONG BEACH	LB-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
9/30/2003	LONG BEACH	LB-RA	1150	<	0.05	MG/L	CHLORINE RESIDUAL
10/7/2003	LONG BEACH	LB-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
10/14/2003	LONG BEACH	LB-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
10/21/2003	LONG BEACH	LB-RA	1252	<	0.05	MG/L	CHLORINE RESIDUAL
10/28/2003	LONG BEACH	LB-RA	1320	<	0.05	MG/L	CHLORINE RESIDUAL
11/5/2003	LONG BEACH	LB-RA	0915	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2003	LONG BEACH	LB-RA	0910	<	0.05	MG/L	CHLORINE RESIDUAL
11/18/2003	LONG BEACH	LB-RA	1140	<	0.05	MG/L	CHLORINE RESIDUAL
11/24/2003	LONG BEACH	LB-RA	1057	<	0.05	MG/L	CHLORINE RESIDUAL
12/2/2003	LONG BEACH	LB-RA	1310	<	0.05	MG/L	CHLORINE RESIDUAL
12/9/2003	LONG BEACH	LB-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
1/6/2004	LONG BEACH	LB-RA	1320	<	0.05	MG/L	CHLORINE RESIDUAL
1/13/2004	LONG BEACH	LB-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
1/20/2004	LONG BEACH	LB-RA	1240	<	0.05	MG/L	CHLORINE RESIDUAL
1/27/2004	LONG BEACH	LB-RA	1055	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2004	LONG BEACH	LB-RA	1125	<	0.05	MG/L	CHLORINE RESIDUAL
2/10/2004	LONG BEACH	LB-RA	1100	<	0.05	MG/L	CHLORINE RESIDUAL
2/17/2004	LONG BEACH	LB-RA	1150	<	0.05	MG/L	CHLORINE RESIDUAL
2/25/2004	LONG BEACH	LB-RA	1126	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2004	LONG BEACH	LB-RA	1135	<	0.05	MG/L	CHLORINE RESIDUAL
3/9/2004	LONG BEACH	LB-RA	1023	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2004	LONG BEACH	LB-RA	1022	<	0.05	MG/L	CHLORINE RESIDUAL
3/23/2004	LONG BEACH	LB-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
3/29/2004	LONG BEACH	LB-RA	920	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2004	LONG BEACH	LB-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2004	LONG BEACH	LB-RA	1105	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2004	LONG BEACH	LB-RA	1105	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	LONG BEACH	LB-RA	1025	<	0.05	MG/L	CHLORINE RESIDUAL
5/5/2004	LONG BEACH	LB-RA	1143	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2004	LONG BEACH	LB-RA	1123	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2004	LONG BEACH	LB-RA	1100	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2004	LONG BEACH	LB-RA	1155	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2004	LONG BEACH	LB-RA	955	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2004	LONG BEACH	LB-RA	1025	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2004	LONG BEACH	LB-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2004	LONG BEACH	LB-RA	902	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2004	LONG BEACH	LB-RA	1405	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2004	LONG BEACH	LB-RA	945	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2004	LONG BEACH	LB-RA	946	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2004	LONG BEACH	LB-RA	910	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2004	LONG BEACH	LB-RA	1110	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2004	LONG BEACH	LB-RA	1148	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2004	LONG BEACH	LB-RA	933	<	0.05	MG/L	CHLORINE RESIDUAL
8/17/2004	LONG BEACH	LB-RA	1106	<	0.05	MG/L	CHLORINE RESIDUAL
8/24/2004	LONG BEACH	LB-RA	1251	<	0.05	MG/L	CHLORINE RESIDUAL
8/31/2004	LONG BEACH	LB-RA	1106	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2004	LONG BEACH	LB-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2004	LONG BEACH	LB-RA	1020	<	0.05	MG/L	CHLORINE RESIDUAL
9/20/2004	LONG BEACH	LB-RA	1251	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2004	LONG BEACH	LB-RA	905	<	0.05	MG/L	CHLORINE RESIDUAL
10/4/2004	LONG BEACH	LB-RA	930	<	0.05	MG/L	CHLORINE RESIDUAL
10/13/2004	LONG BEACH	LB-RA	1038	<	0.05	MG/L	CHLORINE RESIDUAL
10/26/2004	LONG BEACH	LB-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL
11/1/2004	LONG BEACH	LB-RA	1127	<	0.05	MG/L	CHLORINE RESIDUAL
11/8/2004	LONG BEACH	LB-RA	1155	<	0.05	MG/L	CHLORINE RESIDUAL
11/15/2004	LONG BEACH	LB-RA	1110	<	0.05	MG/L	CHLORINE RESIDUAL
11/22/2004	LONG BEACH	LB-RA	1211	<	0.05	MG/L	CHLORINE RESIDUAL
11/30/2004	LONG BEACH	LB-RA	1013	<	0.05	MG/L	CHLORINE RESIDUAL
12/7/2004	LONG BEACH	LB-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
12/13/2004	LONG BEACH	LB-RA	1140	<	0.05	MG/L	CHLORINE RESIDUAL
12/21/2004	LONG BEACH	LB-RA	1212	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	LONG BEACH	LB-RA	1040	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
1/18/2005	LONG BEACH	LB-RA	1148	<	0.05	MG/L	CHLORINE RESIDUAL
1/25/2005	LONG BEACH	LB-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
1/31/2005	LONG BEACH	LB-RA	1045	<	0.05	MG/L	CHLORINE RESIDUAL
2/8/2005	LONG BEACH	LB-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
2/14/2005	LONG BEACH	LB-RA	1055	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2005	LONG BEACH	LB-RA	1202	<	0.05	MG/L	CHLORINE RESIDUAL
3/8/2005	LONG BEACH	LB-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
3/15/2005	LONG BEACH	LB-RA	1033	<	0.05	MG/L	CHLORINE RESIDUAL
3/22/2005	LONG BEACH	LB-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	LONG BEACH	LB-RA	940	<	0.05	MG/L	CHLORINE RESIDUAL
4/5/2005	LONG BEACH	LB-RA	843	<	0.05	MG/L	CHLORINE RESIDUAL
4/12/2005	LONG BEACH	LB-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
4/19/2005	LONG BEACH	LB-RA	1134	<	0.05	MG/L	CHLORINE RESIDUAL
4/26/2005	LONG BEACH	LB-RA	1122	<	0.05	MG/L	CHLORINE RESIDUAL
5/3/2005	LONG BEACH	LB-RA	1100	<	0.05	MG/L	CHLORINE RESIDUAL
5/9/2005	LONG BEACH	LB-RA	1101	<	0.05	MG/L	CHLORINE RESIDUAL
5/17/2005	LONG BEACH	LB-RA	930	<	0.05	MG/L	CHLORINE RESIDUAL
5/24/2005	LONG BEACH	LB-RA	1055	<	0.05	MG/L	CHLORINE RESIDUAL
5/31/2005	LONG BEACH	LB-RA	953	<	0.05	MG/L	CHLORINE RESIDUAL
6/7/2005	LONG BEACH	LB-RA	1056	<	0.05	MG/L	CHLORINE RESIDUAL
6/14/2005	LONG BEACH	LB-RA	1109	<	0.05	MG/L	CHLORINE RESIDUAL
6/21/2005	LONG BEACH	LB-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
6/28/2005	LONG BEACH	LB-RA	914	<	0.05	MG/L	CHLORINE RESIDUAL
7/5/2005	LONG BEACH	LB-RA	1115	<	0.05	MG/L	CHLORINE RESIDUAL
7/12/2005	LONG BEACH	LB-RA	1223	<	0.05	MG/L	CHLORINE RESIDUAL
7/19/2005	LONG BEACH	LB-RA	1010	<	0.05	MG/L	CHLORINE RESIDUAL
7/26/2005	LONG BEACH	LB-RA	1318	<	0.05	MG/L	CHLORINE RESIDUAL
8/2/2005	LONG BEACH	LB-RA	959	<	0.05	MG/L	CHLORINE RESIDUAL
8/9/2005	LONG BEACH	LB-RA	1207	<	0.05	MG/L	CHLORINE RESIDUAL
9/6/2005	LONG BEACH	LB-RA	1100	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2005	LONG BEACH	LB-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	LONG BEACH	LB-RA	915	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	LONG BEACH	LB-RA	1012	<	0.05	MG/L	CHLORINE RESIDUAL
1/2/2002	WHITTIER NARROWS	WN-RD	1300	<	0.05	MG/L	CHLORINE RESIDUAL
1/7/2002	WHITTIER NARROWS	WN-RD	1245	<	0.05	MG/L	CHLORINE RESIDUAL
2/26/2002	WHITTIER NARROWS	WN-RD	1340	<	0.05	MG/L	CHLORINE RESIDUAL
3/6/2002	WHITTIER NARROWS	WN-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
3/15/2002	WHITTIER NARROWS	WN-RD	1300	<	0.05	MG/L	CHLORINE RESIDUAL
3/20/2002	WHITTIER NARROWS	WN-RD	1340	<	0.05	MG/L	CHLORINE RESIDUAL
3/25/2002	WHITTIER NARROWS	WN-RD	1050	<	0.05	MG/L	CHLORINE RESIDUAL
4/4/2002	WHITTIER NARROWS	WN-RD	1340	<	0.05	MG/L	CHLORINE RESIDUAL
4/11/2002	WHITTIER NARROWS	WN-RD	1340	<	0.05	MG/L	CHLORINE RESIDUAL
4/18/2002	WHITTIER NARROWS	WN-RD	1330	<	0.05	MG/L	CHLORINE RESIDUAL
4/30/2002	WHITTIER NARROWS	WN-RD	1340	<	0.05	MG/L	CHLORINE RESIDUAL
5/10/2002	WHITTIER NARROWS	WN-RD	1345	<	0.05	MG/L	CHLORINE RESIDUAL
5/16/2002	WHITTIER NARROWS	WN-RD	1345	<	0.05	MG/L	CHLORINE RESIDUAL
5/23/2002	WHITTIER NARROWS	WN-RD	1330	<	0.05	MG/L	CHLORINE RESIDUAL
5/31/2002	WHITTIER NARROWS	WN-RD	1335	<	0.05	MG/L	CHLORINE RESIDUAL
6/6/2002	WHITTIER NARROWS	WN-RD	915	<	0.05	MG/L	CHLORINE RESIDUAL
6/13/2002	WHITTIER NARROWS	WN-RD	930	<	0.05	MG/L	CHLORINE RESIDUAL
6/20/2002	WHITTIER NARROWS	WN-RD	1320	<	0.05	MG/L	CHLORINE RESIDUAL
6/26/2002	WHITTIER NARROWS	WN-RD	1310	<	0.05	MG/L	CHLORINE RESIDUAL
7/5/2002	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
7/10/2002	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
7/18/2002	WHITTIER NARROWS	WN-RD	915	<	0.05	MG/L	CHLORINE RESIDUAL
7/25/2002	WHITTIER NARROWS	WN-RD	1310	<	0.05	MG/L	CHLORINE RESIDUAL
8/14/2002	WHITTIER NARROWS	WN-RD	1355	<	0.05	MG/L	CHLORINE RESIDUAL
8/22/2002	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
8/29/2002	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
9/5/2002	WHITTIER NARROWS	WN-RD	920	<	0.05	MG/L	CHLORINE RESIDUAL
9/12/2002	WHITTIER NARROWS	WN-RD	940	<	0.05	MG/L	CHLORINE RESIDUAL
9/18/2002	WHITTIER NARROWS	WN-RD	930	<	0.05	MG/L	CHLORINE RESIDUAL
9/26/2002	WHITTIER NARROWS	WN-RD	935	<	0.05	MG/L	CHLORINE RESIDUAL
10/3/2002	WHITTIER NARROWS	WN-RD	1340	<	0.05	MG/L	CHLORINE RESIDUAL
10/10/2002	WHITTIER NARROWS	WN-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL
10/17/2002	WHITTIER NARROWS	WN-RD	915	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
10/24/2002	WHITTIER NARROWS	WN-RD	1340	<	0.05	MG/L	CHLORINE RESIDUAL
10/31/2002	WHITTIER NARROWS	WN-RD	1320	<	0.05	MG/L	CHLORINE RESIDUAL
11/6/2002	WHITTIER NARROWS	WN-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2002	WHITTIER NARROWS	WN-RD	1050	<	0.05	MG/L	CHLORINE RESIDUAL
11/20/2002	WHITTIER NARROWS	WN-RD	0955	<	0.05	MG/L	CHLORINE RESIDUAL
11/25/2002	WHITTIER NARROWS	WN-RD	1020	<	0.05	MG/L	CHLORINE RESIDUAL
12/4/2002	WHITTIER NARROWS	WN-RD	0925	<	0.05	MG/L	CHLORINE RESIDUAL
12/11/2002	WHITTIER NARROWS	WN-RD	1124	<	0.05	MG/L	CHLORINE RESIDUAL
12/26/2002	WHITTIER NARROWS	WN-RD	0805	<	0.05	MG/L	CHLORINE RESIDUAL
1/2/2003	WHITTIER NARROWS	WN-RD	1200	<	0.05	MG/L	CHLORINE RESIDUAL
1/8/2003	WHITTIER NARROWS	WN-RD	1310	<	0.05	MG/L	CHLORINE RESIDUAL
1/15/2003	WHITTIER NARROWS	WN-RD	1310	<	0.05	MG/L	CHLORINE RESIDUAL
1/22/2003	WHITTIER NARROWS	WN-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL
1/29/2003	WHITTIER NARROWS	WN-RD	0915	<	0.05	MG/L	CHLORINE RESIDUAL
2/5/2003	WHITTIER NARROWS	WN-RD	1000	<	0.05	MG/L	CHLORINE RESIDUAL
2/19/2003	WHITTIER NARROWS	WN-RD	0950	<	0.05	MG/L	CHLORINE RESIDUAL
2/24/2003	WHITTIER NARROWS	WN-RD	1030	<	0.05	MG/L	CHLORINE RESIDUAL
3/3/2003	WHITTIER NARROWS	WN-RD	1005	<	0.05	MG/L	CHLORINE RESIDUAL
3/11/2003	WHITTIER NARROWS	WN-RD	0926	<	0.05	MG/L	CHLORINE RESIDUAL
3/19/2003	WHITTIER NARROWS	WN-RD	0930	<	0.05	MG/L	CHLORINE RESIDUAL
3/25/2003	WHITTIER NARROWS	WN-RD	0932	<	0.05	MG/L	CHLORINE RESIDUAL
4/1/2003	WHITTIER NARROWS	WN-RD	0910	<	0.05	MG/L	CHLORINE RESIDUAL
4/8/2003	WHITTIER NARROWS	WN-RD	0922	<	0.05	MG/L	CHLORINE RESIDUAL
4/17/2003	WHITTIER NARROWS	WN-RD	1034	<	0.05	MG/L	CHLORINE RESIDUAL
4/22/2003	WHITTIER NARROWS	WN-RD	1140	<	0.05	MG/L	CHLORINE RESIDUAL
4/30/2003	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
5/7/2003	WHITTIER NARROWS	WN-RD	1215	<	0.05	MG/L	CHLORINE RESIDUAL
5/14/2003	WHITTIER NARROWS	WN-RD	0855	<	0.05	MG/L	CHLORINE RESIDUAL
5/21/2003	WHITTIER NARROWS	WN-RD	0934	<	0.05	MG/L	CHLORINE RESIDUAL
5/28/2003	WHITTIER NARROWS	WN-RD	0840	<	0.05	MG/L	CHLORINE RESIDUAL
6/4/2003	WHITTIER NARROWS	WN-RD	0948	<	0.05	MG/L	CHLORINE RESIDUAL
6/11/2003	WHITTIER NARROWS	WN-RD	0935	<	0.05	MG/L	CHLORINE RESIDUAL
7/16/2003	WHITTIER NARROWS	WN-RD	1252	<	0.05	MG/L	CHLORINE RESIDUAL
7/23/2003	WHITTIER NARROWS	WN-RD	0955	<	0.05	MG/L	CHLORINE RESIDUAL
7/31/2003	WHITTIER NARROWS	WN-RD	0930	<	0.05	MG/L	CHLORINE RESIDUAL
8/7/2003	WHITTIER NARROWS	WN-RD	1143	<	0.05	MG/L	CHLORINE RESIDUAL
8/13/2003	WHITTIER NARROWS	WN-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL
8/20/2003	WHITTIER NARROWS	WN-RD	1030	<	0.05	MG/L	CHLORINE RESIDUAL
8/27/2003	WHITTIER NARROWS	WN-RD	0835	<	0.05	MG/L	CHLORINE RESIDUAL
1/7/2004	WHITTIER NARROWS	WN-RD	845	<	0.05	MG/L	CHLORINE RESIDUAL
1/14/2004	WHITTIER NARROWS	WN-RD	1115	<	0.05	MG/L	CHLORINE RESIDUAL
1/21/2004	WHITTIER NARROWS	WN-RD	1035	<	0.05	MG/L	CHLORINE RESIDUAL
1/28/2004	WHITTIER NARROWS	WN-RD	1015	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2004	WHITTIER NARROWS	WN-RD	940	<	0.05	MG/L	CHLORINE RESIDUAL
2/11/2004	WHITTIER NARROWS	WN-RD	1125	<	0.05	MG/L	CHLORINE RESIDUAL
2/17/2004	WHITTIER NARROWS	WN-RD	925	<	0.05	MG/L	CHLORINE RESIDUAL
2/25/2004	WHITTIER NARROWS	WN-RD	820	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2004	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
3/10/2004	WHITTIER NARROWS	WN-RD	915	<	0.05	MG/L	CHLORINE RESIDUAL
3/17/2004	WHITTIER NARROWS	WN-RD	840	<	0.05	MG/L	CHLORINE RESIDUAL
3/24/2004	WHITTIER NARROWS	WN-RD	1100	<	0.05	MG/L	CHLORINE RESIDUAL
3/29/2004	WHITTIER NARROWS	WN-RD	850	<	0.05	MG/L	CHLORINE RESIDUAL
4/7/2004	WHITTIER NARROWS	WN-RD	827	<	0.05	MG/L	CHLORINE RESIDUAL
4/14/2004	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
4/21/2004	WHITTIER NARROWS	WN-RD	845	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	WHITTIER NARROWS	WN-RD	940	<	0.05	MG/L	CHLORINE RESIDUAL
5/5/2004	WHITTIER NARROWS	WN-RD	853	<	0.05	MG/L	CHLORINE RESIDUAL
5/12/2004	WHITTIER NARROWS	WN-RD	1000	<	0.05	MG/L	CHLORINE RESIDUAL
5/19/2004	WHITTIER NARROWS	WN-RD	825	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2004	WHITTIER NARROWS	WN-RD	1320	<	0.05	MG/L	CHLORINE RESIDUAL
5/26/2004	WHITTIER NARROWS	WN-RD	1000	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2004	WHITTIER NARROWS	WN-RD	1420	<	0.05	MG/L	CHLORINE RESIDUAL
6/2/2004	WHITTIER NARROWS	WN-RD	825	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2004	WHITTIER NARROWS	WN-RD	855	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2004	WHITTIER NARROWS	WN-RD	855	<	0.05	MG/L	CHLORINE RESIDUAL
6/9/2004	WHITTIER NARROWS	WN-RD	835	<	0.05	MG/L	CHLORINE RESIDUAL

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DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
6/15/2004	WHITTIER NARROWS	WN-RD	855	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2004	WHITTIER NARROWS	WN-RD	936	<	0.05	MG/L	CHLORINE RESIDUAL
6/23/2004	WHITTIER NARROWS	WN-RD	810	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2004	WHITTIER NARROWS	WN-RD	905	<	0.05	MG/L	CHLORINE RESIDUAL
6/30/2004	WHITTIER NARROWS	WN-RD	830	<	0.05	MG/L	CHLORINE RESIDUAL
7/7/2004	WHITTIER NARROWS	WN-RD	830	<	0.05	MG/L	CHLORINE RESIDUAL
7/14/2004	WHITTIER NARROWS	WN-RD	810	<	0.05	MG/L	CHLORINE RESIDUAL
7/21/2004	WHITTIER NARROWS	WN-RD	848	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2004	WHITTIER NARROWS	WN-RD	920	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2004	WHITTIER NARROWS	WN-RD	920	<	0.05	MG/L	CHLORINE RESIDUAL
7/28/2004	WHITTIER NARROWS	WN-RD	818	<	0.05	MG/L	CHLORINE RESIDUAL
8/4/2004	WHITTIER NARROWS	WN-RD	850	<	0.05	MG/L	CHLORINE RESIDUAL
8/11/2004	WHITTIER NARROWS	WN-RD	945	<	0.05	MG/L	CHLORINE RESIDUAL
8/18/2004	WHITTIER NARROWS	WN-RD	1035	<	0.05	MG/L	CHLORINE RESIDUAL
8/24/2004	WHITTIER NARROWS	WN-RD	1035	<	0.05	MG/L	CHLORINE RESIDUAL
8/25/2004	WHITTIER NARROWS	WN-RD	910	<	0.05	MG/L	CHLORINE RESIDUAL
9/8/2004	WHITTIER NARROWS	WN-RD	956	<	0.05	MG/L	CHLORINE RESIDUAL
9/22/2004	WHITTIER NARROWS	WN-RD	1050	<	0.05	MG/L	CHLORINE RESIDUAL
9/29/2004	WHITTIER NARROWS	WN-RD	910	<	0.05	MG/L	CHLORINE RESIDUAL
10/6/2004	WHITTIER NARROWS	WN-RD	1045	<	0.05	MG/L	CHLORINE RESIDUAL
10/12/2004	WHITTIER NARROWS	WN-RD	1005	<	0.05	MG/L	CHLORINE RESIDUAL
10/25/2004	WHITTIER NARROWS	WN-RD	1050	<	0.05	MG/L	CHLORINE RESIDUAL
10/26/2004	WHITTIER NARROWS	WN-RD	920	<	0.05	MG/L	CHLORINE RESIDUAL
11/3/2004	WHITTIER NARROWS	WN-RD	1315	<	0.05	MG/L	CHLORINE RESIDUAL
11/8/2004	WHITTIER NARROWS	WN-RD	1110	<	0.05	MG/L	CHLORINE RESIDUAL
11/17/2004	WHITTIER NARROWS	WN-RD	1015	<	0.05	MG/L	CHLORINE RESIDUAL
11/22/2004	WHITTIER NARROWS	WN-RD	1155	<	0.05	MG/L	CHLORINE RESIDUAL
11/22/2004	WHITTIER NARROWS	WN-RD	1155	<	0.05	MG/L	CHLORINE RESIDUAL
11/23/2004	WHITTIER NARROWS	WN-RD	825	<	0.05	MG/L	CHLORINE RESIDUAL
12/1/2004	WHITTIER NARROWS	WN-RD	1005	<	0.05	MG/L	CHLORINE RESIDUAL
12/15/2004	WHITTIER NARROWS	WN-RD	1210	<	0.05	MG/L	CHLORINE RESIDUAL
12/20/2004	WHITTIER NARROWS	WN-RD	855	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	WHITTIER NARROWS	WN-RD	1105	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	WHITTIER NARROWS	WN-RD	1105	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2005	WHITTIER NARROWS	WN-RD	1047	<	0.05	MG/L	CHLORINE RESIDUAL
2/9/2005	WHITTIER NARROWS	WN-RD	940	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2005	WHITTIER NARROWS	WN-RD	1040	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2005	WHITTIER NARROWS	WN-RD	924	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2005	WHITTIER NARROWS	WN-RD	1259	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2005	WHITTIER NARROWS	WN-RD	835	<	0.05	MG/L	CHLORINE RESIDUAL
6/22/2005	WHITTIER NARROWS	WN-RD	1200	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2005	WHITTIER NARROWS	WN-RD	945	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2005	WHITTIER NARROWS	WN-RD	1007	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2005	WHITTIER NARROWS	WN-RD	857	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2005	WHITTIER NARROWS	WN-RD	1205	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2005	WHITTIER NARROWS	WN-RD	1024	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2005	WHITTIER NARROWS	WN-RD	920	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2005	WHITTIER NARROWS	WN-RD	1207	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2005	WHITTIER NARROWS	WN-RD	1052	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2005	WHITTIER NARROWS	WN-RD	927	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	WHITTIER NARROWS	WN-RD	1025	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	WHITTIER NARROWS	WN-RD	1025	<	0.05	MG/L	CHLORINE RESIDUAL
1/16/2002	WHITTIER NARROWS	WN-RA	1315	<	0.05	MG/L	CHLORINE RESIDUAL
1/23/2002	WHITTIER NARROWS	WN-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
1/30/2002	WHITTIER NARROWS	WN-RA	1300	<	0.05	MG/L	CHLORINE RESIDUAL
2/6/2002	WHITTIER NARROWS	WN-RA	1330	<	0.05	MG/L	CHLORINE RESIDUAL
2/14/2002	WHITTIER NARROWS	WN-RA	1345	<	0.05	MG/L	CHLORINE RESIDUAL
2/21/2002	WHITTIER NARROWS	WN-RA	1250	<	0.05	MG/L	CHLORINE RESIDUAL
8/1/2002	WHITTIER NARROWS	WN-RA	1310	<	0.05	MG/L	CHLORINE RESIDUAL
8/8/2002	WHITTIER NARROWS	WN-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
11/12/2002	WHITTIER NARROWS	WN-RA	1155	<	0.05	MG/L	CHLORINE RESIDUAL
11/20/2002	WHITTIER NARROWS	WN-RA	0933	<	0.05	MG/L	CHLORINE RESIDUAL
11/25/2002	WHITTIER NARROWS	WN-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
12/4/2002	WHITTIER NARROWS	WN-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
12/26/2002	WHITTIER NARROWS	WN-RA	0908	<	0.05	MG/L	CHLORINE RESIDUAL
3/19/2003	WHITTIER NARROWS	WN-RA	1025	<	0.05	MG/L	CHLORINE RESIDUAL

APPENDIX A
RECEIVING WATER DATA

DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
4/1/2003	WHITTIER NARROWS	WN-RA	0955	<	0.05	MG/L	CHLORINE RESIDUAL
4/8/2003	WHITTIER NARROWS	WN-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
4/17/2003	WHITTIER NARROWS	WN-RA	1100	<	0.05	MG/L	CHLORINE RESIDUAL
4/22/2003	WHITTIER NARROWS	WN-RA	1220	<	0.05	MG/L	CHLORINE RESIDUAL
4/30/2003	WHITTIER NARROWS	WN-RA	1350	<	0.05	MG/L	CHLORINE RESIDUAL
10/15/2003	WHITTIER NARROWS	WN-RA	1020	<	0.05	MG/L	CHLORINE RESIDUAL
10/21/2003	WHITTIER NARROWS	WN-RA	0900	<	0.05	MG/L	CHLORINE RESIDUAL
10/29/2003	WHITTIER NARROWS	WN-RA	0940	<	0.05	MG/L	CHLORINE RESIDUAL
11/5/2003	WHITTIER NARROWS	WN-RA	1135	<	0.05	MG/L	CHLORINE RESIDUAL
11/19/2003	WHITTIER NARROWS	WN-RA	0950	<	0.05	MG/L	CHLORINE RESIDUAL
11/24/2003	WHITTIER NARROWS	WN-RA	1210	<	0.05	MG/L	CHLORINE RESIDUAL
12/3/2003	WHITTIER NARROWS	WN-RA	1015	<	0.05	MG/L	CHLORINE RESIDUAL
2/11/2004	WHITTIER NARROWS	WN-RA	1200	<	0.05	MG/L	CHLORINE RESIDUAL
2/17/2004	WHITTIER NARROWS	WN-RA	945	<	0.05	MG/L	CHLORINE RESIDUAL
2/25/2004	WHITTIER NARROWS	WN-RA	855	<	0.05	MG/L	CHLORINE RESIDUAL
3/1/2004	WHITTIER NARROWS	WN-RA	1350	<	0.05	MG/L	CHLORINE RESIDUAL
3/10/2004	WHITTIER NARROWS	WN-RA	955	<	0.05	MG/L	CHLORINE RESIDUAL
3/17/2004	WHITTIER NARROWS	WN-RA	905	<	0.05	MG/L	CHLORINE RESIDUAL
3/24/2004	WHITTIER NARROWS	WN-RA	1130	<	0.05	MG/L	CHLORINE RESIDUAL
3/29/2004	WHITTIER NARROWS	WN-RA	930	<	0.05	MG/L	CHLORINE RESIDUAL
4/7/2004	WHITTIER NARROWS	WN-RA	857	<	0.05	MG/L	CHLORINE RESIDUAL
4/14/2004	WHITTIER NARROWS	WN-RA	1355	<	0.05	MG/L	CHLORINE RESIDUAL
4/21/2004	WHITTIER NARROWS	WN-RA	945	<	0.05	MG/L	CHLORINE RESIDUAL
4/28/2004	WHITTIER NARROWS	WN-RA	1037	<	0.05	MG/L	CHLORINE RESIDUAL
5/5/2004	WHITTIER NARROWS	WN-RA	918	<	0.05	MG/L	CHLORINE RESIDUAL
5/12/2004	WHITTIER NARROWS	WN-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
5/19/2004	WHITTIER NARROWS	WN-RA	828	<	0.05	MG/L	CHLORINE RESIDUAL
5/26/2004	WHITTIER NARROWS	WN-RA	1100	<	0.05	MG/L	CHLORINE RESIDUAL
6/16/2004	WHITTIER NARROWS	WN-RA	1215	<	0.05	MG/L	CHLORINE RESIDUAL
7/7/2004	WHITTIER NARROWS	WN-RA	925	<	0.05	MG/L	CHLORINE RESIDUAL
7/28/2004	WHITTIER NARROWS	WN-RA	910	<	0.05	MG/L	CHLORINE RESIDUAL
8/4/2004	WHITTIER NARROWS	WN-RA	935	<	0.05	MG/L	CHLORINE RESIDUAL
8/11/2004	WHITTIER NARROWS	WN-RA	1050	<	0.05	MG/L	CHLORINE RESIDUAL
8/18/2004	WHITTIER NARROWS	WN-RA	940	<	0.05	MG/L	CHLORINE RESIDUAL
8/25/2004	WHITTIER NARROWS	WN-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
9/1/2004	WHITTIER NARROWS	WN-RA	1040	<	0.05	MG/L	CHLORINE RESIDUAL
9/8/2004	WHITTIER NARROWS	WN-RA	1040	<	0.05	MG/L	CHLORINE RESIDUAL
9/15/2004	WHITTIER NARROWS	WN-RA	1055	<	0.05	MG/L	CHLORINE RESIDUAL
9/22/2004	WHITTIER NARROWS	WN-RA	1030	<	0.05	MG/L	CHLORINE RESIDUAL
9/29/2004	WHITTIER NARROWS	WN-RA	840	<	0.05	MG/L	CHLORINE RESIDUAL
10/6/2004	WHITTIER NARROWS	WN-RA	1145	<	0.05	MG/L	CHLORINE RESIDUAL
10/12/2004	WHITTIER NARROWS	WN-RA	1100	<	0.05	MG/L	CHLORINE RESIDUAL
10/25/2004	WHITTIER NARROWS	WN-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
12/15/2004	WHITTIER NARROWS	WN-RA	1025	<	0.05	MG/L	CHLORINE RESIDUAL
12/20/2004	WHITTIER NARROWS	WN-RA	941	<	0.05	MG/L	CHLORINE RESIDUAL
12/27/2004	WHITTIER NARROWS	WN-RA	1145	<	0.05	MG/L	CHLORINE RESIDUAL
1/25/2005	WHITTIER NARROWS	WN-RA	935	<	0.05	MG/L	CHLORINE RESIDUAL
2/2/2005	WHITTIER NARROWS	WN-RA	1125	<	0.05	MG/L	CHLORINE RESIDUAL
2/9/2005	WHITTIER NARROWS	WN-RA	1033	<	0.05	MG/L	CHLORINE RESIDUAL
2/28/2005	WHITTIER NARROWS	WN-RA	1105	<	0.05	MG/L	CHLORINE RESIDUAL
3/2/2005	WHITTIER NARROWS	WN-RA	1020	<	0.05	MG/L	CHLORINE RESIDUAL
3/9/2005	WHITTIER NARROWS	WN-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
3/16/2005	WHITTIER NARROWS	WN-RA	1135	<	0.05	MG/L	CHLORINE RESIDUAL
3/21/2005	WHITTIER NARROWS	WN-RA	936	<	0.05	MG/L	CHLORINE RESIDUAL
3/30/2005	WHITTIER NARROWS	WN-RA	1145	<	0.05	MG/L	CHLORINE RESIDUAL
4/6/2005	WHITTIER NARROWS	WN-RA	1230	<	0.05	MG/L	CHLORINE RESIDUAL
4/13/2005	WHITTIER NARROWS	WN-RA	1215	<	0.05	MG/L	CHLORINE RESIDUAL
4/20/2005	WHITTIER NARROWS	WN-RA	932	<	0.05	MG/L	CHLORINE RESIDUAL
4/27/2005	WHITTIER NARROWS	WN-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
5/4/2005	WHITTIER NARROWS	WN-RA	945	<	0.05	MG/L	CHLORINE RESIDUAL
5/11/2005	WHITTIER NARROWS	WN-RA	1208	<	0.05	MG/L	CHLORINE RESIDUAL
5/18/2005	WHITTIER NARROWS	WN-RA	1005	<	0.05	MG/L	CHLORINE RESIDUAL
5/25/2005	WHITTIER NARROWS	WN-RA	1001	<	0.05	MG/L	CHLORINE RESIDUAL
6/1/2005	WHITTIER NARROWS	WN-RA	1147	<	0.05	MG/L	CHLORINE RESIDUAL
6/8/2005	WHITTIER NARROWS	WN-RA	1038	<	0.05	MG/L	CHLORINE RESIDUAL
6/15/2005	WHITTIER NARROWS	WN-RA	835	<	0.05	MG/L	CHLORINE RESIDUAL

APPENDIX A
RECEIVING WATER DATA

DATE	WRP	DOWNSTREAM LOCATION	SAMPLE TIME		VALUE	UNIT	TEST DESCRIPTION
6/22/2005	WHITTIER NARROWS	WN-RA	1235	<	0.05	MG/L	CHLORINE RESIDUAL
6/29/2005	WHITTIER NARROWS	WN-RA	917	<	0.05	MG/L	CHLORINE RESIDUAL
7/6/2005	WHITTIER NARROWS	WN-RA	915	<	0.05	MG/L	CHLORINE RESIDUAL
7/13/2005	WHITTIER NARROWS	WN-RA	830	<	0.05	MG/L	CHLORINE RESIDUAL
7/20/2005	WHITTIER NARROWS	WN-RA	1105	<	0.05	MG/L	CHLORINE RESIDUAL
7/27/2005	WHITTIER NARROWS	WN-RA	922	<	0.05	MG/L	CHLORINE RESIDUAL
8/3/2005	WHITTIER NARROWS	WN-RA	1000	<	0.05	MG/L	CHLORINE RESIDUAL
8/10/2005	WHITTIER NARROWS	WN-RA	1255	<	0.05	MG/L	CHLORINE RESIDUAL
9/7/2005	WHITTIER NARROWS	WN-RA	953	<	0.05	MG/L	CHLORINE RESIDUAL
9/14/2005	WHITTIER NARROWS	WN-RA	1015	<	0.05	MG/L	CHLORINE RESIDUAL
9/23/2005	WHITTIER NARROWS	WN-RA	935	<	0.05	MG/L	CHLORINE RESIDUAL
9/28/2005	WHITTIER NARROWS	WN-RA	955	<	0.05	MG/L	CHLORINE RESIDUAL

APPENDIX B

APPENDIX B

Plant	Date of Incident	Considered an NPDES Exceedance?	Duration of Exceedance	Peak Chlorine Residual Level	Cause
Long Beach WRP	1/20/2005	Yes	95 minutes	2.8 mg/L	Human Error
Los Coyotes WRP	11/11/2002	Yes	45 minutes	0.9 mg/L	Equipment Malfunction
Los Coyotes WRP	11/17/2002	Yes	4 minutes	0.7 mg/L	Equipment Response Delay
Los Coyotes WRP	1/28/2003	Yes	7 minutes	0.5 mg/L	Equipment Response Delay
Los Coyotes WRP	8/22/2003	Yes	6 minutes	3.6 mg/L	Equipment Malfunction
Los Coyotes WRP	12/12/2003	No	20 seconds	0.2 mg/L	Not identified
Los Coyotes WRP	1/6/2004	No	20 seconds	0.31 mg/L	Not identified
Los Coyotes WRP	2/3/2004	No	25 seconds	0.26 mg/L	Not identified
Los Coyotes WRP	6/2/2004	No	45 seconds	0.21 mg/L	Not identified
Los Coyotes WRP	7/27/2004	No	15 seconds	0.13 mg/L	Equipment Response Delay
Los Coyotes WRP	7/29/2004	No	15 seconds	0.21 mg/L	Equipment Malfunction
Los Coyotes WRP	7/29/2004	No	50 seconds	0.26 mg/L	Not identified
Los Coyotes WRP	9/23/2004	No	20 seconds	0.44 mg/L	Equipment Response Delay
Pomona WRP	8/9/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	8/16/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	8/18/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	8/20/2004	No	<15 minutes	0.3 mg/L	Not identified
Pomona WRP	8/21/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	9/6/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	9/7/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	9/16/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	9/18/2004	No	<1 minute	0.4 mg/L	Not identified
Pomona WRP	9/21/2004	Yes	16 minutes	1.9 mg/L	Equipment Malfunction
Pomona WRP	9/22/2004	No	<1 minute	0.4 mg/L	Not identified
Pomona WRP	9/27/2004	No	<15 minutes	0.3 mg/L	Not identified
Pomona WRP	9/29/2004	No	<1 minute	0.7 mg/L	Not identified
Pomona WRP	9/30/2004	No	<15 minutes	0.2 mg/L	Not identified
Pomona WRP	11/22/2004	No	4 minutes	0.2 mg/L	Not identified
Pomona WRP	12/1/2004	No	<15 minutes	0.4 mg/L	Not identified
Pomona WRP	12/25/2004	No	<15 minutes	0.3 mg/L	Not identified
Pomona WRP	1/14/2005	No	<1 minute	0.6 mg/L	Not identified
Pomona WRP	1/14/2005	No	<1 minute	0.6 mg/L	Not identified
Pomona WRP	4/18/2005	No	<1 minute	0.2 mg/L	Human Error
San Jose Creek WRP (Discharge Serial No. 001)	10/21/2004	Yes	1 hour 52 minutes	0.9 mg/L	Equipment Malfunction
San Jose Creek WRP (Discharge Serial No. 001)	10/27/2004	No	unknown	unknown	Equipment Malfunction

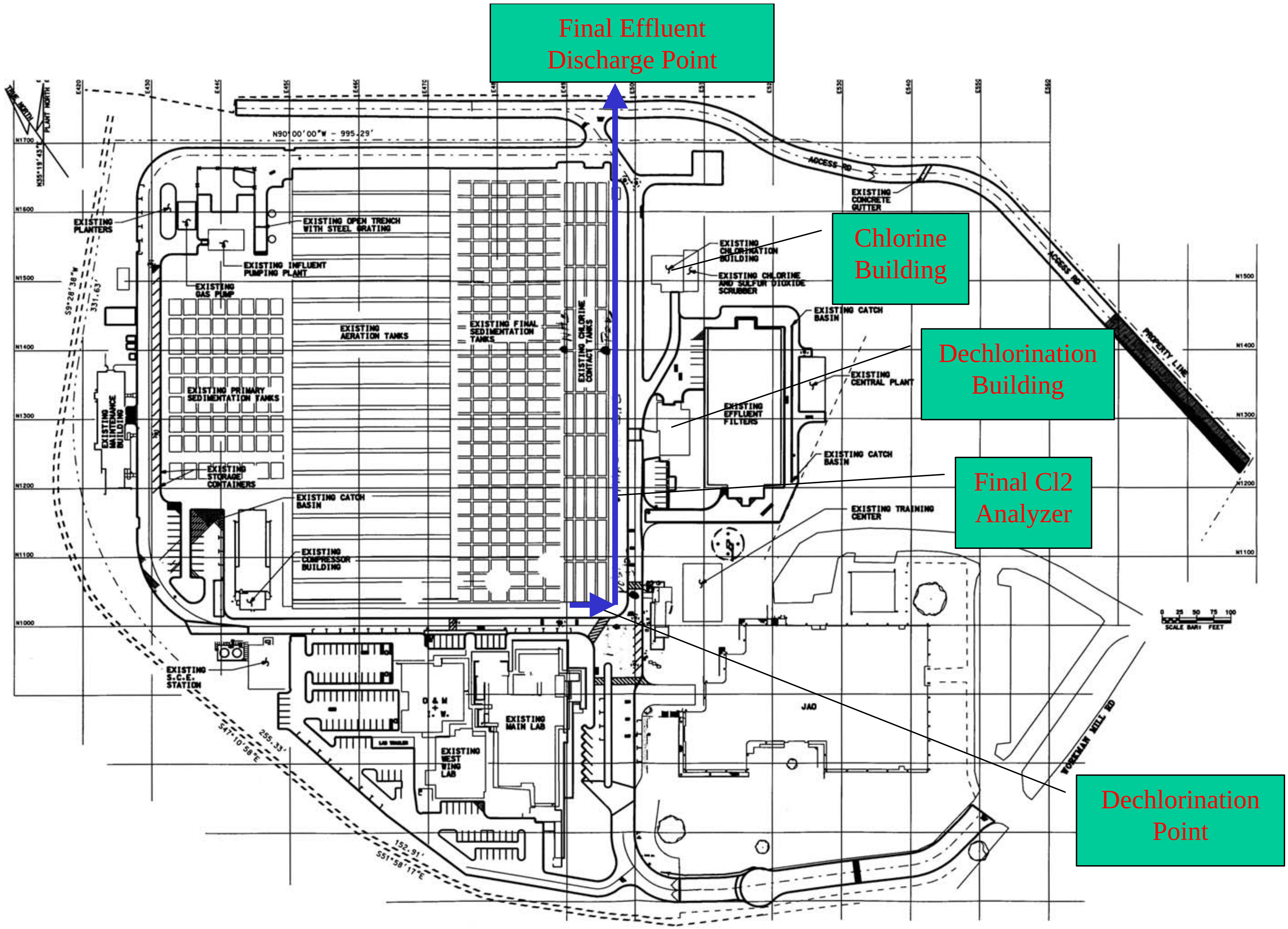
APPENDIX B

Plant	Date of Incident	Considered an NPDES Exceedance?	Duration of Exceedance	Peak Chlorine Residual Level	Cause
San Jose Creek WRP (Discharge Serial No. 001)	4/11/2005	Yes	2 hours 27 minutes	0.25 mg/L	Human Error
San Jose Creek WRP (Discharge Serial No. 002)	1/31/2003	Yes	18 minutes	4 mg/L	Equipment Malfunction
San Jose Creek WRP (Discharge Serial No. 002)	4/17/2003	No	12 minutes	4 mg/L	Human Error
San Jose Creek WRP (Discharge Serial No. 002)	5/12/2003	No	< 2 minutes	0.22 mg/L	Not identified
San Jose Creek WRP (Discharge Serial No. 002)	5/20/2003	No	12 minutes	0.53 mg/L	Equipment Malfunction
San Jose Creek WRP (Discharge Serial No. 002)	7/2/2003	No	14 minutes	3.9 mg/L	Human Error
San Jose Creek WRP (Discharge Serial No. 002)	7/18/2003	No	10 minutes	1.8 mg/L	Human Error
San Jose Creek WRP (Discharge Serial No. 002)	1/30/2004	Yes	3 minutes	0.3 mg/L	Equipment Response Delay
San Jose Creek WRP (Discharge Serial No. 002)	1/23/2005	Yes	3 minutes	0.53 mg/L	Equipment Malfunction
San Jose Creek WRP (Discharge Serial No. 002)	5/17/2005	No	unknown	0.15 mg/L	Not identified
San Jose Creek WRP (Discharge Serial No. 002)	8/9/2005	No	3 minutes	0.308 mg/L	Equipment Response Delay
San Jose Creek WRP (Discharge Serial No. 002)	10/3/2005	Yes	14 minutes	0.47 mg/L	Equipment Malfunction
San Jose Creek WRP (Discharge Serial No. 002)	10/4/2005	Yes	34 minutes	3.7 mg/L	Human Error
San Jose Creek WRP (Discharge Serial No. 003)	8/14/2002	No	90 minutes	0.15 mg/L	Human Error
San Jose Creek WRP (Discharge Serial No. 003)	9/10/2002	Yes	< 1 minute	0.25 mg/L	Not identified
San Jose Creek WRP (Discharge Serial No. 003)	10/1/2004	No	unknown	0.15 mg/L	Not identified

APPENDIX B

Plant	Date of Incident	Considered an NPDES Exceedance?	Duration of Exceedance	Peak Chlorine Residual Level	Cause
San Jose Creek WRP (Discharge Serial No. 003)	10/2/2004	No	unknown	0.20 mg/L	Not identified
San Jose Creek WRP (Discharge Serial No. 003)	10/20/2004	Yes	34 minutes	>0.3 mg/L	Equipment Malfunction
Saugus WRP	6/11/2004	Yes	37 minutes	> 5mg/L	Equipment Malfunction
Saugus WRP	8/26/2004	Yes	22 minutes	1.92 mg/L	Equipment Malfunction
Valencia WRP	12/3/2003	No	2 minutes	0.3 mg/L	Not identified
Valencia WRP	1/8/2004	No	2 minutes	0.2 mg/L	Not identified
Whittier Narrows WRP	2/26/2003	Yes	6 minutes	0.49 mg/L	Equipment Response Delay
Whittier Narrows WRP	8/12/2003	No	< 3 minutes	0.25 mg/L	Not identified
Whittier Narrows WRP	8/22/2003	Yes	6 minutes	0.3 mg/L	Equipment Malfunction
Whittier Narrows WRP	9/3/2003	No	< 2 minutes	0.15 mg/L	Not identified
Whittier Narrows WRP	9/21/2003	Yes	2 minutes	0.48 mg/L	Equipment Malfunction
Whittier Narrows WRP	11/26/2003	Yes	2.25 minutes	0.64 mg/L	Equipment Malfunction
Whittier Narrows WRP	12/16/2003	No	5 minutes	0.43 mg/L	Not identified
Whittier Narrows WRP	2/24/2004	Yes	2 minutes	0.72 mg/L	Not identified
Whittier Narrows WRP	7/20/2004	No	unknown	0.9 mg/L	Not identified
Whittier Narrows WRP	8/1/2004	No	4 minutes	0.2 mg/L	Not identified
Whittier Narrows WRP	12/22/2004	No	4 minutes	0.4 mg/L	Not identified
Whittier Narrows WRP	1/14/2005	Yes	6 minutes	0.69 mg/L	Equipment Malfunction
Whittier Narrows WRP	4/6/2005	No	<1 minute	0.12 mg/L	Not identified

APPENDIX C

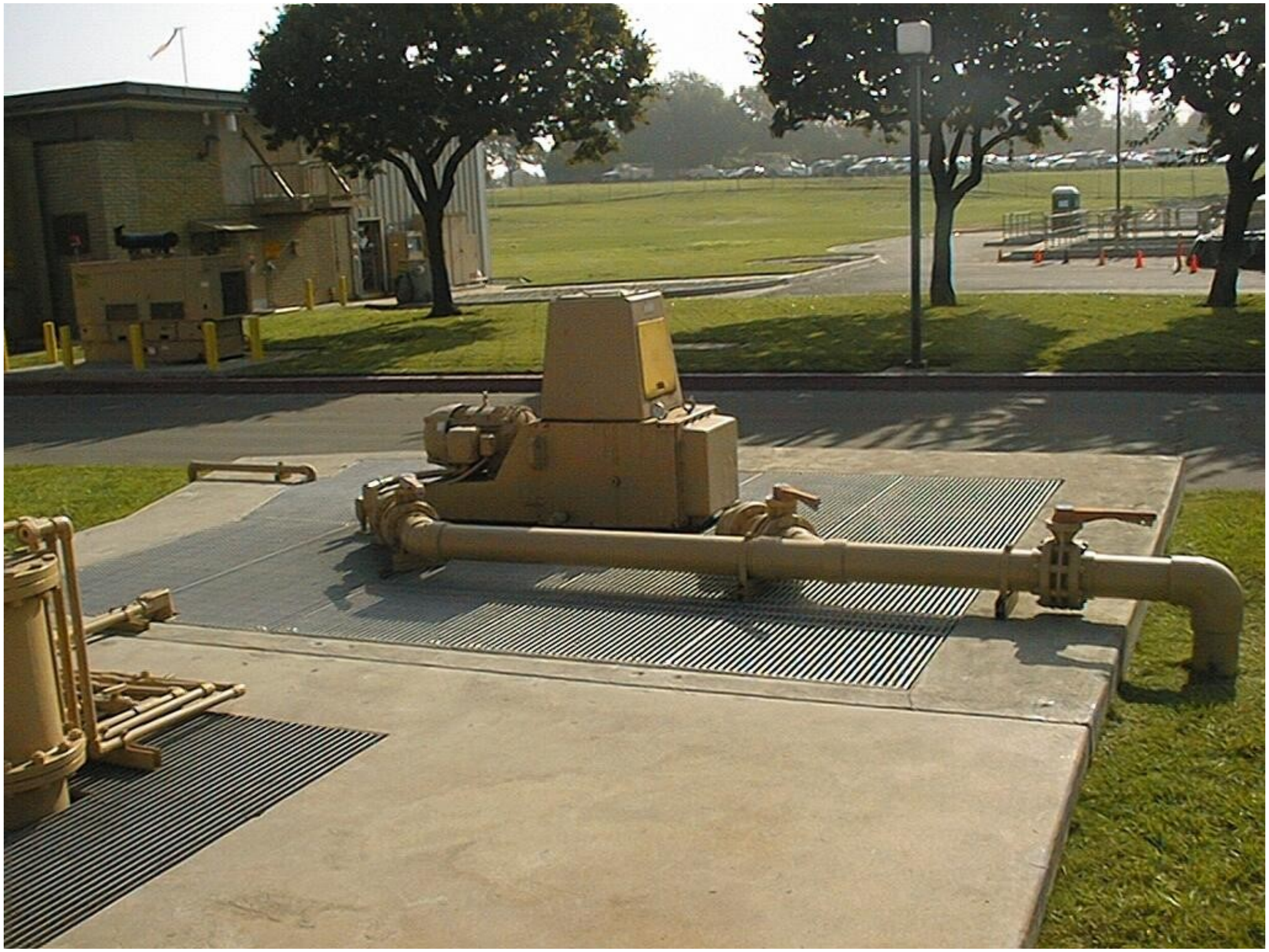


San Jose Creek East WRP Site Layout

SJC East Ammonia Tanks

SJC East Ammonia Addition Station

SJC East Pre-Chlorine Station



SJC East Post-Chlorine Station

SJC East Sodium Bisulfite Tanks

SJC East Final Chlorine Analyzer

APPENDIX D

Appendix D: Stoichiometric Process Control for Dechlorination

A stoichiometric equation is used to determine the amount of sulfur dioxide or sodium bisulfite needed to reduce the chlorine residual to the appropriate level. All parameters for the stoichiometric equations (SO_2 in lbs/day (sulfur dioxide), $NaHSO_3$ in gpm (sodium bisulfite), Cl_2-Out in mg/L (chlorine) and Flow in MGD) can be archived by Operations using the plant Distributed Control System (DCS). The Joint Outfall System plants all use DCS systems except for the Los Coyotes WRP, which uses an analog control system. The Los Coyotes WRP will get a DCS system under a contract to be awarded in Fall 2005. The DCS systems are set to take a reading from the continuous chlorine residual analyzers, chemical flow meters and effluent pumps every 10 seconds, however, the smallest increment of data that can be exported from the archive is once every 30 seconds. Any changes required by the chemical flow meters would take place in approximately 10 seconds. (The Saugus and Valencia WRPs have a different type of DCS. Whereas the WRP Operations staff can display the data used for stoichometric calculations, the data cannot be readily exported from these systems. However, with modifications, these systems would be able to export the necessary data.)

Stoichiometric Calculations

For Sulfur Dioxide the following calculation is used:

$$SO_2 + H_2O \rightarrow H_2SO_3$$

$$NH_2Cl + H_2SO_3 + H_2O \rightarrow NH_4Cl + H_2SO_4$$

Each part of chlorine residual removed requires 0.9-1.05 parts of sulfur dioxide.

SO_2 Dose = Out-Cl_2 x Flow x Mass Loading Conversion Factor x Safety Factor

SO_2 (lbs/day) = Out-Cl_2 (mg/L) x Flow (MGD) x 8.34 (lb/MG)/(mg/L) x R

R is the safety factor ratio applied to ensure sufficient dosing and ranges from 1.2 to 2.0.

Sample Calculation: San Jose Creek East WRP (September 29, 2005 @ 8:33 AM)
Out-Cl_2 = 3.49 mg/L
Flow = 19.07 MGD
R = 1.2
Calculated stoichiometric SO_2 Dose = 667 lbs/day

For Sodium Bisulfite the following calculation is used:

$$NaHSO_3 + Cl_2 + H_2O \rightarrow NaHSO_4 + 2HCl$$

Each part of chlorine residual removed requires 1.46 parts of sodium bisulfite.

$NaHSO_3$ Dose = Out-Cl_2 x Flow x Mass Loading Conversion Factor x GPM Conversion Factor x Safety Factor

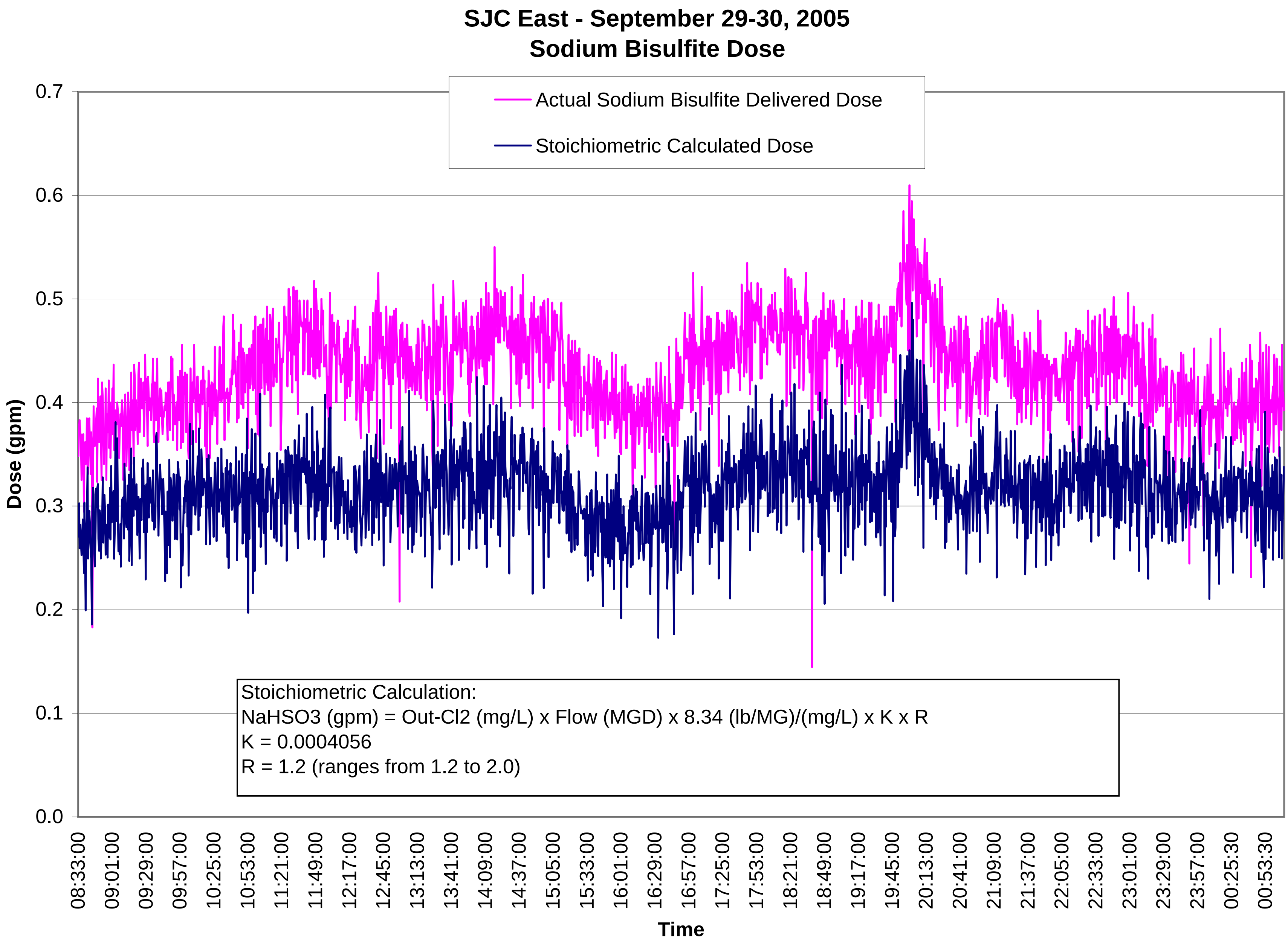
$NaHSO_3$ (gpm) = Out-Cl_2 (mg/L) x Flow (MGD) x 8.34 (lb/MG)/(mg/L) x K x R

K is the combined factor converting $NaHSO_3$(in lbs per Cl_2-lbs) to $NaHSO_3$ (in gpm) and equals 0.0004056.

R is the safety factor ratio applied to ensure sufficient dosing and ranges from 1.2 to 2.0.

Sample Calculation: San Jose Creek East WRP (September 29, 2005 @ 8:33 AM)
Out-Cl_2 = 3.49 mg/L
Flow = 19.07 MGD
K = 0.0004056
R = 1.2
Calculated stoichiometric $NaHSO_3$ Dose = 0.27 gpm
The actual recorded $NaHSO_3$ dose at 8:33 AM was 0.34 gpm. Since the recorded dose is greater than the stoichiometric dose, it can be concluded that no residual chlorine is present in the effluent.

Reference: Handbook of Chlorination and Alternative Disinfectants, Fourth Edition 1999



Data was collected in 30 second intervals from 7:00 AM September 29, 2005 through 7:00 AM September 30, 2005. Data shown above corresponds with the time range when effluent was discharged to the San Jose Creek via Outfall 002.

APPENDIX E

APPENDIX E
San Jose Creek East WRP
Residual Chlorine Analyzer Data (9 AM to 11 AM on 9/29/05)

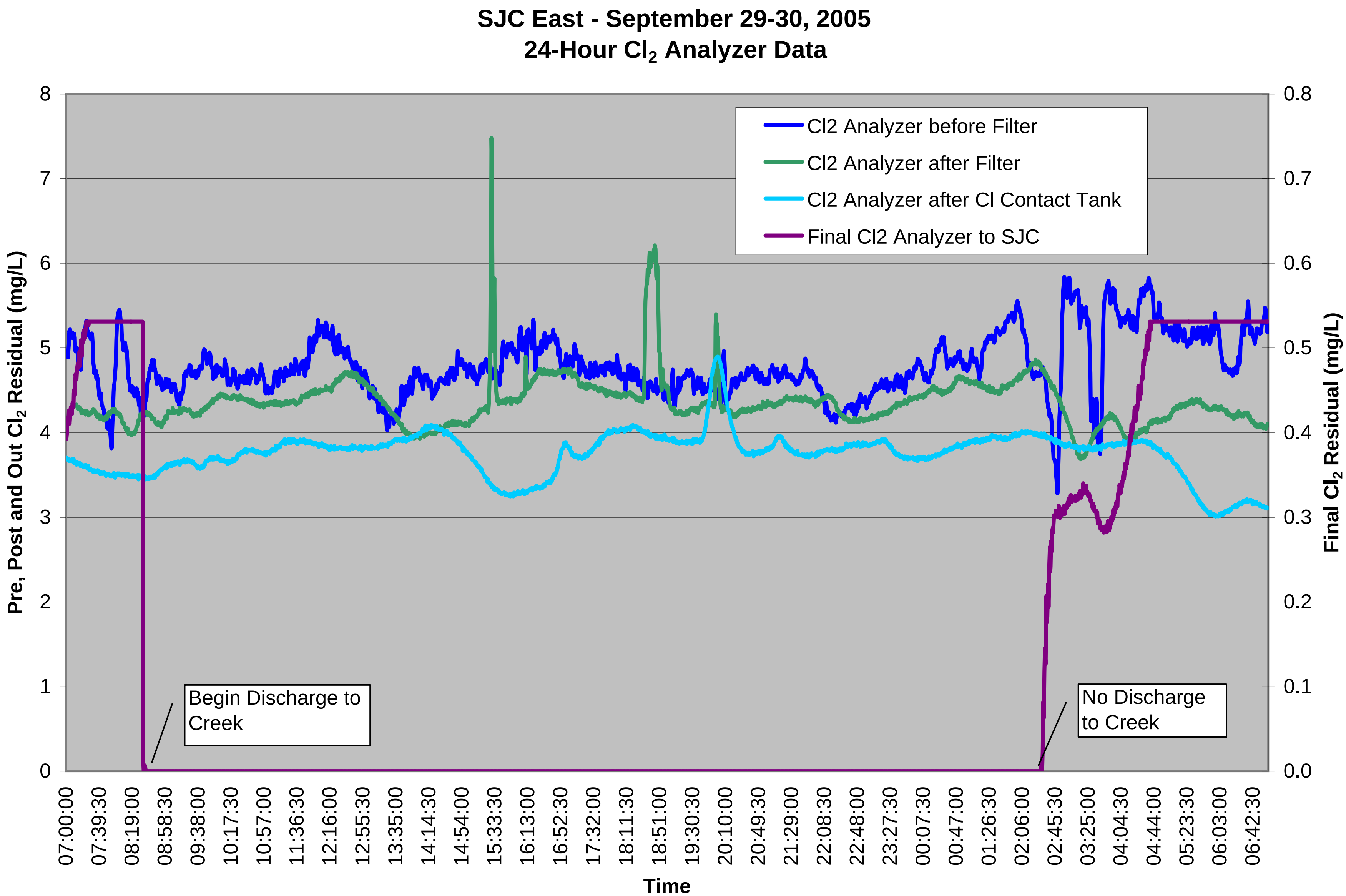
Date	Time	Cl_2 Analyzer before Filter	Cl_2 Analyzer after Filter	Cl_2 Analyzer after Cl Contact Tank	Final Cl_2 Analyzer to SJC
Thu 09/29/2005	09:00:00	4.57911	4.18071	3.57509	0.00000
Thu 09/29/2005	09:00:30	4.56971	4.16606	3.58730	0.00000
Thu 09/29/2005	09:01:00	4.53761	4.20024	3.63126	0.00000
Thu 09/29/2005	09:01:30	4.56971	4.21978	3.63126	0.00000
Thu 09/29/2005	09:02:00	4.61122	4.26129	3.61661	0.00000
Thu 09/29/2005	09:02:30	4.61446	4.23199	3.62637	0.00000
Thu 09/29/2005	09:03:00	4.62710	4.24176	3.63126	0.00000
Thu 09/29/2005	09:03:30	4.58884	4.23932	3.61661	0.00000
Thu 09/29/2005	09:04:00	4.54085	4.24664	3.60928	0.00000
Thu 09/29/2005	09:04:30	4.52464	4.24420	3.63126	0.00000
Thu 09/29/2005	09:05:00	4.52172	4.23687	3.62393	0.00000
Thu 09/29/2005	09:05:30	4.49902	4.23687	3.64103	0.00000
Thu 09/29/2005	09:06:00	4.47665	4.23199	3.60195	0.00000
Thu 09/29/2005	09:06:30	4.54734	4.23687	3.63614	0.00000
Thu 09/29/2005	09:07:00	4.55674	4.25397	3.63858	0.00000
Thu 09/29/2005	09:07:30	4.57587	4.29304	3.62149	0.00000
Thu 09/29/2005	09:08:00	4.57587	4.25641	3.62393	0.00000
Thu 09/29/2005	09:08:30	4.56647	4.25153	3.63126	0.00000
Thu 09/29/2005	09:09:00	4.52172	4.25885	3.62149	0.00000
Thu 09/29/2005	09:09:30	4.49611	4.23199	3.63126	0.00000
Thu 09/29/2005	09:10:00	4.57587	4.24664	3.65324	0.00000
Thu 09/29/2005	09:10:30	4.53113	4.25885	3.62393	0.00000
Thu 09/29/2005	09:11:00	4.47989	4.24176	3.63614	0.00000
Thu 09/29/2005	09:11:30	4.49286	4.24664	3.63614	0.00000
Thu 09/29/2005	09:12:00	4.41893	4.24908	3.64103	0.00000
Thu 09/29/2005	09:12:30	4.39008	4.26129	3.63126	0.00000
Thu 09/29/2005	09:13:00	4.37386	4.25153	3.64103	0.00000
Thu 09/29/2005	09:13:30	4.38683	4.25153	3.64103	0.00000
Thu 09/29/2005	09:14:00	4.40272	4.24176	3.66056	0.00000
Thu 09/29/2005	09:14:30	4.35797	4.21978	3.65812	0.00000
Thu 09/29/2005	09:15:00	4.32587	4.23687	3.63858	0.00000
Thu 09/29/2005	09:15:30	4.31647	4.29060	3.65324	0.00000
Thu 09/29/2005	09:16:00	4.39332	4.23932	3.61905	0.00000
Thu 09/29/2005	09:16:30	4.46692	4.24664	3.64591	0.00000
Thu 09/29/2005	09:17:00	4.39008	4.28083	3.64591	0.00000
Thu 09/29/2005	09:17:30	4.43158	4.23199	3.65812	0.00000
Thu 09/29/2005	09:18:00	4.44455	4.24664	3.67033	0.00000
Thu 09/29/2005	09:18:30	4.45720	4.28571	3.64835	0.00000
Thu 09/29/2005	09:19:00	4.47665	4.28083	3.65812	0.00000
Thu 09/29/2005	09:19:30	4.46692	4.27350	3.65812	0.00000
Thu 09/29/2005	09:20:00	4.48962	4.26129	3.67033	0.00000
Thu 09/29/2005	09:20:30	4.55674	4.29304	3.67277	0.00000
Thu 09/29/2005	09:21:00	4.68158	4.28816	3.68742	0.00000
Thu 09/29/2005	09:21:30	4.67218	4.27106	3.67521	0.00000
Thu 09/29/2005	09:22:00	4.67834	4.27350	3.65812	0.00000
Thu 09/29/2005	09:22:30	4.70395	4.28083	3.64591	0.00000
Thu 09/29/2005	09:23:00	4.72341	4.26862	3.67766	0.00000
Thu 09/29/2005	09:23:30	4.68482	4.27350	3.67033	0.00000
Thu 09/29/2005	09:24:00	4.66569	4.26618	3.68010	0.00000
Thu 09/29/2005	09:24:30	4.71692	4.25397	3.65812	0.00000
Thu 09/29/2005	09:25:00	4.73605	4.26374	3.68498	0.00000
Thu 09/29/2005	09:25:30	4.73605	4.25885	3.65812	0.00000
Thu 09/29/2005	09:26:00	4.72957	4.26129	3.67033	0.00000
Thu 09/29/2005	09:26:30	4.73281	4.25885	3.67277	0.00000
Thu 09/29/2005	09:27:00	4.75227	4.26374	3.67766	0.00000
Thu 09/29/2005	09:27:30	4.79701	4.27350	3.65812	0.00000
Thu 09/29/2005	09:28:00	4.79701	4.27106	3.65812	0.00000
Thu 09/29/2005	09:28:30	4.78080	4.25153	3.66300	0.00000
Thu 09/29/2005	09:29:00	4.79053	4.24176	3.65079	0.00000
Thu 09/29/2005	09:29:30	4.71044	4.22466	3.65568	0.00000
Thu 09/29/2005	09:30:00	4.66569	4.23199	3.66789	0.00000
Thu 09/29/2005	09:30:30	4.67834	4.22955	3.64835	0.00000
Thu 09/29/2005	09:31:00	4.67834	4.21734	3.64103	0.00000
Thu 09/29/2005	09:31:30	4.66569	4.19292	3.65568	0.00000
Thu 09/29/2005	09:32:00	4.68806	4.22711	3.65812	0.00000
Thu 09/29/2005	09:32:30	4.70103	4.18803	3.63614	0.00000
Thu 09/29/2005	09:33:00	4.71044	4.19048	3.63858	0.00000
Thu 09/29/2005	09:33:30	4.71044	4.19536	3.62882	0.00000
Thu 09/29/2005	09:34:00	4.72665	4.21001	3.62393	0.00000
Thu 09/29/2005	09:34:30	4.72957	4.19292	3.62149	0.00000
Thu 09/29/2005	09:35:00	4.70103	4.21978	3.62149	0.00000
Thu 09/29/2005	09:35:30	4.64332	4.22711	3.60684	0.00000
Thu 09/29/2005	09:36:00	4.65272	4.20757	3.60928	0.00000
Thu 09/29/2005	09:36:30	4.67218	4.23443	3.60440	0.00000
Thu 09/29/2005	09:37:00	4.70720	4.20024	3.58730	0.00000
Thu 09/29/2005	09:37:30	4.73605	4.21245	3.57509	0.00000
Thu 09/29/2005	09:38:00	4.67218	4.20757	3.60440	0.00000
Thu 09/29/2005	09:38:30	4.72341	4.20269	3.57998	0.00000
Thu 09/29/2005	09:39:00	4.74578	4.22222	3.58486	0.00000
Thu 09/29/2005	09:39:30	4.76491	4.20269	3.57998	0.00000
Thu 09/29/2005	09:40:00	4.78404	4.20024	3.57265	0.00000
Thu 09/29/2005	09:40:30	4.78404	4.24908	3.58974	0.00000
Thu 09/29/2005	09:41:00	4.77464	4.25641	3.58242	0.00000

APPENDIX E
San Jose Creek East WRP
Residual Chlorine Analyzer Data (9 AM to 11 AM on 9/29/05)

Date	Time	Cl_2 Analyzer before Filter	Cl_2 Analyzer after Filter	Cl_2 Analyzer after Cl Contact Tank	Final Cl_2 Analyzer to SJC
Thu 09/29/2005	09:41:30	4.76816	4.26862	3.57998	0.00000
Thu 09/29/2005	09:42:00	4.77464	4.23932	3.60440	0.00000
Thu 09/29/2005	09:42:30	4.75843	4.23932	3.60928	0.00000
Thu 09/29/2005	09:43:00	4.80350	4.25641	3.58242	0.00000
Thu 09/29/2005	09:43:30	4.91245	4.27106	3.60440	0.00000
Thu 09/29/2005	09:44:00	4.92218	4.27839	3.58974	0.00000
Thu 09/29/2005	09:44:30	4.97017	4.26862	3.59219	0.00000
Thu 09/29/2005	09:45:00	4.98314	4.26374	3.61416	0.00000
Thu 09/29/2005	09:45:30	4.96368	4.26374	3.63858	0.00000
Thu 09/29/2005	09:46:00	4.97665	4.30281	3.61416	0.00000
Thu 09/29/2005	09:46:30	4.92866	4.28083	3.64591	0.00000
Thu 09/29/2005	09:47:00	4.88035	4.29792	3.66300	0.00000
Thu 09/29/2005	09:47:30	4.87386	4.28083	3.66056	0.00000
Thu 09/29/2005	09:48:00	4.88035	4.30281	3.66545	0.00000
Thu 09/29/2005	09:48:30	4.81290	4.30281	3.66056	0.00000
Thu 09/29/2005	09:49:00	4.82263	4.32479	3.67277	0.00000
Thu 09/29/2005	09:49:30	4.87062	4.30769	3.66300	0.00000
Thu 09/29/2005	09:50:00	4.91569	4.32479	3.68498	0.00000
Thu 09/29/2005	09:50:30	4.93806	4.30281	3.68010	0.00000
Thu 09/29/2005	09:51:00	4.93190	4.32479	3.68742	0.00000
Thu 09/29/2005	09:51:30	4.94779	4.31990	3.67766	0.00000
Thu 09/29/2005	09:52:00	4.90921	4.32723	3.70452	0.00000
Thu 09/29/2005	09:52:30	4.92218	4.35653	3.70208	0.00000
Thu 09/29/2005	09:53:00	4.88683	4.34188	3.71673	0.00000
Thu 09/29/2005	09:53:30	4.82587	4.35653	3.69719	0.00000
Thu 09/29/2005	09:54:00	4.78729	4.37363	3.68987	0.00000
Thu 09/29/2005	09:54:30	4.76816	4.36142	3.68254	0.00000
Thu 09/29/2005	09:55:00	4.74578	4.36874	3.68254	0.00000
Thu 09/29/2005	09:55:30	4.72957	4.39805	3.69475	0.00000
Thu 09/29/2005	09:56:00	4.63359	4.34676	3.70696	0.00000
Thu 09/29/2005	09:56:30	4.64656	4.39072	3.70940	0.00000
Thu 09/29/2005	09:57:00	4.65596	4.37607	3.68254	0.00000
Thu 09/29/2005	09:57:30	4.71692	4.39072	3.70208	0.00000
Thu 09/29/2005	09:58:00	4.69455	4.39805	3.70208	0.00000
Thu 09/29/2005	09:58:30	4.66245	4.39560	3.70452	0.00000
Thu 09/29/2005	09:59:00	4.66245	4.40537	3.69231	0.00000
Thu 09/29/2005	09:59:30	4.78404	4.41026	3.69719	0.00000
Thu 09/29/2005	10:00:00	4.80026	4.42002	3.68498	0.00000
Thu 09/29/2005	10:00:30	4.72341	4.39316	3.69475	0.00000
Thu 09/29/2005	10:01:00	4.70103	4.41026	3.69719	0.00000
Thu 09/29/2005	10:01:30	4.72341	4.41758	3.72650	0.00000
Thu 09/29/2005	10:02:00	4.73605	4.44444	3.71184	0.00000
Thu 09/29/2005	10:02:30	4.74254	4.44200	3.69963	0.00000
Thu 09/29/2005	10:03:00	4.74254	4.41758	3.70208	0.00000
Thu 09/29/2005	10:03:30	4.77140	4.42735	3.69231	0.00000
Thu 09/29/2005	10:04:00	4.76816	4.43223	3.68254	0.00000
Thu 09/29/2005	10:04:30	4.75843	4.46398	3.66545	0.00000
Thu 09/29/2005	10:05:00	4.72957	4.45421	3.68742	0.00000
Thu 09/29/2005	10:05:30	4.71044	4.44444	3.66056	0.00000
Thu 09/29/2005	10:06:00	4.69779	4.44200	3.66300	0.00000
Thu 09/29/2005	10:06:30	4.66893	4.43468	3.67521	0.00000
Thu 09/29/2005	10:07:00	4.66569	4.43956	3.67277	0.00000
Thu 09/29/2005	10:07:30	4.66569	4.45177	3.66545	0.00000
Thu 09/29/2005	10:08:00	4.68806	4.42979	3.67766	0.00000
Thu 09/29/2005	10:08:30	4.67834	4.44689	3.66056	0.00000
Thu 09/29/2005	10:09:00	4.70103	4.44933	3.67521	0.00000
Thu 09/29/2005	10:09:30	4.84500	4.44200	3.66545	0.00000
Thu 09/29/2005	10:10:00	4.86413	4.42002	3.65812	0.00000
Thu 09/29/2005	10:10:30	4.77788	4.44689	3.67033	0.00000
Thu 09/29/2005	10:11:00	4.75843	4.41758	3.65812	0.00000
Thu 09/29/2005	10:11:30	4.80642	4.40537	3.65568	0.00000
Thu 09/29/2005	10:12:00	4.78080	4.43223	3.67033	0.00000
Thu 09/29/2005	10:12:30	4.71368	4.42735	3.65812	0.00000
Thu 09/29/2005	10:13:00	4.56647	4.41514	3.62637	0.00000
Thu 09/29/2005	10:13:30	4.56971	4.42491	3.66300	0.00000
Thu 09/29/2005	10:14:00	4.62094	4.41758	3.65568	0.00000
Thu 09/29/2005	10:14:30	4.61770	4.41758	3.65079	0.00000
Thu 09/29/2005	10:15:00	4.63035	4.41270	3.63614	0.00000
Thu 09/29/2005	10:15:30	4.64007	4.41270	3.65812	0.00000
Thu 09/29/2005	10:16:00	4.60797	4.40293	3.67033	0.00000
Thu 09/29/2005	10:16:30	4.55998	4.39560	3.66300	0.00000
Thu 09/29/2005	10:17:00	4.59533	4.40781	3.66300	0.00000
Thu 09/29/2005	10:17:30	4.63035	4.40293	3.67033	0.00000
Thu 09/29/2005	10:18:00	4.60149	4.40293	3.66789	0.00000
Thu 09/29/2005	10:18:30	4.62710	4.42979	3.65079	0.00000
Thu 09/29/2005	10:19:00	4.65272	4.40537	3.67033	0.00000
Thu 09/29/2005	10:19:30	4.72665	4.43956	3.68987	0.00000
Thu 09/29/2005	10:20:00	4.75519	4.43712	3.68254	0.00000
Thu 09/29/2005	10:20:30	4.72665	4.44689	3.68742	0.00000
Thu 09/29/2005	10:21:00	4.69779	4.43712	3.66056	0.00000
Thu 09/29/2005	10:21:30	4.72341	4.41758	3.69475	0.00000
Thu 09/29/2005	10:22:00	4.72665	4.41758	3.68010	0.00000
Thu 09/29/2005	10:22:30	4.64980	4.41514	3.67766	0.00000

APPENDIX E
San Jose Creek East WRP
Residual Chlorine Analyzer Data (9 AM to 11 AM on 9/29/05)

Date	Time	Cl_2 Analyzer before Filter	Cl_2 Analyzer after Filter	Cl_2 Analyzer after Cl Contact Tank	Final Cl_2 Analyzer to SJC
Thu 09/29/2005	10:23:00	4.57295	4.41514	3.68742	0.00000
Thu 09/29/2005	10:23:30	4.62419	4.42979	3.70208	0.00000
Thu 09/29/2005	10:24:00	4.62710	4.42979	3.68498	0.00000
Thu 09/29/2005	10:24:30	4.59533	4.40049	3.72894	0.00000
Thu 09/29/2005	10:25:00	4.52172	4.38828	3.71673	0.00000
Thu 09/29/2005	10:25:30	4.52172	4.42002	3.72405	0.00000
Thu 09/29/2005	10:26:00	4.54410	4.42491	3.75092	0.00000
Thu 09/29/2005	10:26:30	4.59533	4.38828	3.74847	0.00000
Thu 09/29/2005	10:27:00	4.61446	4.41026	3.73138	0.00000
Thu 09/29/2005	10:27:30	4.67542	4.41758	3.75092	0.00000
Thu 09/29/2005	10:28:00	4.65921	4.40781	3.75580	0.00000
Thu 09/29/2005	10:28:30	4.59857	4.44200	3.75580	0.00000
Thu 09/29/2005	10:29:00	4.61770	4.41758	3.74847	0.00000
Thu 09/29/2005	10:29:30	4.64332	4.39805	3.76313	0.00000
Thu 09/29/2005	10:30:00	4.61770	4.41514	3.77534	0.00000
Thu 09/29/2005	10:30:30	4.62710	4.39560	3.77534	0.00000
Thu 09/29/2005	10:31:00	4.62710	4.41514	3.75336	0.00000
Thu 09/29/2005	10:31:30	4.64007	4.41514	3.76557	0.00000
Thu 09/29/2005	10:32:00	4.66569	4.39072	3.78266	0.00000
Thu 09/29/2005	10:32:30	4.63035	4.39316	3.77778	0.00000
Thu 09/29/2005	10:33:00	4.58236	4.39316	3.78022	0.00000
Thu 09/29/2005	10:33:30	4.59533	4.39316	3.80220	0.00000
Thu 09/29/2005	10:34:00	4.61770	4.40049	3.77778	0.00000
Thu 09/29/2005	10:34:30	4.65596	4.40293	3.76801	0.00000
Thu 09/29/2005	10:35:00	4.67218	4.37851	3.80952	0.00000
Thu 09/29/2005	10:35:30	4.60473	4.39560	3.79976	0.00000
Thu 09/29/2005	10:36:00	4.58560	4.39805	3.76313	0.00000
Thu 09/29/2005	10:36:30	4.68806	4.40049	3.77289	0.00000
Thu 09/29/2005	10:37:00	4.73605	4.39805	3.78022	0.00000
Thu 09/29/2005	10:37:30	4.67834	4.37118	3.78266	0.00000
Thu 09/29/2005	10:38:00	4.61446	4.36386	3.79731	0.00000
Thu 09/29/2005	10:38:30	4.59533	4.38828	3.79731	0.00000
Thu 09/29/2005	10:39:00	4.58560	4.38339	3.79731	0.00000
Thu 09/29/2005	10:39:30	4.57911	4.35409	3.78999	0.00000
Thu 09/29/2005	10:40:00	4.64007	4.37118	3.79731	0.00000
Thu 09/29/2005	10:40:30	4.66245	4.34921	3.78510	0.00000
Thu 09/29/2005	10:41:00	4.63359	4.38828	3.79731	0.00000
Thu 09/29/2005	10:41:30	4.69455	4.39072	3.79243	0.00000
Thu 09/29/2005	10:42:00	4.74902	4.38584	3.79731	0.00000
Thu 09/29/2005	10:42:30	4.73605	4.36874	3.78510	0.00000
Thu 09/29/2005	10:43:00	4.74254	4.36142	3.80952	0.00000
Thu 09/29/2005	10:43:30	4.73281	4.33455	3.78510	0.00000
Thu 09/29/2005	10:44:00	4.73281	4.38339	3.77778	0.00000
Thu 09/29/2005	10:44:30	4.72341	4.36630	3.79976	0.00000
Thu 09/29/2005	10:45:00	4.68482	4.34432	3.79487	0.00000
Thu 09/29/2005	10:45:30	4.67834	4.34432	3.78510	0.00000
Thu 09/29/2005	10:46:00	4.69131	4.33455	3.78266	0.00000
Thu 09/29/2005	10:46:30	4.67834	4.35653	3.78999	0.00000
Thu 09/29/2005	10:47:00	4.67834	4.31746	3.76313	0.00000
Thu 09/29/2005	10:47:30	4.58236	4.35409	3.77289	0.00000
Thu 09/29/2005	10:48:00	4.61770	4.33211	3.76313	0.00000
Thu 09/29/2005	10:48:30	4.59857	4.34676	3.78999	0.00000
Thu 09/29/2005	10:49:00	4.59533	4.31258	3.77778	0.00000
Thu 09/29/2005	10:49:30	4.62419	4.31502	3.76557	0.00000
Thu 09/29/2005	10:50:00	4.64980	4.31258	3.76557	0.00000
Thu 09/29/2005	10:50:30	4.62710	4.34188	3.76801	0.00000
Thu 09/29/2005	10:51:00	4.65272	4.31746	3.75824	0.00000
Thu 09/29/2005	10:51:30	4.68158	4.30769	3.76801	0.00000
Thu 09/29/2005	10:52:00	4.70720	4.30281	3.77045	0.00000
Thu 09/29/2005	10:52:30	4.77140	4.32967	3.75824	0.00000
Thu 09/29/2005	10:53:00	4.80642	4.33944	3.75580	0.00000
Thu 09/29/2005	10:53:30	4.78729	4.31502	3.76313	0.00000
Thu 09/29/2005	10:54:00	4.75843	4.31990	3.76313	0.00000
Thu 09/29/2005	10:54:30	4.69455	4.33455	3.75092	0.00000
Thu 09/29/2005	10:55:00	4.69779	4.32479	3.74847	0.00000
Thu 09/29/2005	10:55:30	4.69455	4.34676	3.74847	0.00000
Thu 09/29/2005	10:56:00	4.66569	4.33944	3.76068	0.00000
Thu 09/29/2005	10:56:30	4.64656	4.29548	3.75092	0.00000
Thu 09/29/2005	10:57:00	4.62094	4.34676	3.73871	0.00000
Thu 09/29/2005	10:57:30	4.56971	4.32479	3.76801	0.00000
Thu 09/29/2005	10:58:00	4.49286	4.32723	3.74359	0.00000
Thu 09/29/2005	10:58:30	4.47341	4.32967	3.73871	0.00000
Thu 09/29/2005	10:59:00	4.46368	4.32479	3.72894	0.00000
Thu 09/29/2005	10:59:30	4.49902	4.33455	3.75580	0.00000



Data was collected in 30 second intervals.

APPENDIX F

Report of Performance Evaluations on Online Chlorine Analyzer and Amperometric Titrator for TRC and CPOs Policy

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SWRCB has proposed adoption of the 1984 EPA 304 criteria for chlorine residual of 0.011 mg/L (4-day average) and 0.019 mg/L (1-hour average) for continuous monitoring in fresh water and 0.0075 mg/L (4-day average) and 0.013 mg/L (1-hour average) in saltwater. The LACSD's San Jose Creek Water Quality Laboratory has been conducting performance evaluations using a Districts' continuous chlorine residual analyzer to determine its capability of detecting chlorine residual at the proposed criteria levels. Details on the investigation of both the continuous online analyzer and a laboratory amperometric titrator are listed below as well as conclusions of this work.

1. Online chlorine analyzer – continuous monitoring

The online analyzer the Districts now operates is a Capital Controls 1870E, manufactured by Severn Trent. Bench tests were conducted in the laboratory under carefully controlled conditions. Conformance tests were performed on all standards by manually analyzing a sample and comparing the laboratory results with the analyzer output. The bench scale procedures were carried out as follows:

1. Flushing the analyzer with Deionized (DI) water for 24 hours
2. Zeroing the instrument with DI water
3. Calibrating full span with a 0.2 mg/L standard
4. Continuously flushing with each designated standard to get a stabilized reading, and then recording a reading at 1-minute intervals for one hour.

The discrepancies between actual observed performance and the manufacturer's specifications are listed in Table 1.
Table 2 is a manufacturer survey of chlorine analyzers with their specifications and capabilities.
Figure 1 (actually four graphs) depicts the data, including average percent recovery and percent RSD for the tested concentrations of 0.2 mg/L, 0.1 mg/L, 0.05 mg/L, and 0.04 mg/L.
Results of conformance tests on all tested standards are listed in Table 3.

Conclusions: Online chlorine analyzer

1. The lowest concentration the online chlorine analyzer can detect with acceptable precision and accuracy is 0.05 mg/L.
2. Concentrations below 0.04 mg/L (0.03 and 0.01 mg/L) are giving the same reading as DI water. Low response and great drift (42% recovery, 16% RSD) are observed for a concentration of 0.04 mg/L.
3. No manufacturer could validate the range of detection limit capabilities they claimed in the specifications--that is 0.001 mg/L.
4. It is important to validate the continuous instruments; however, there is no official guideline available at this time.

Conclusions: Laboratory bench – amperometric titrator

1. RL is 0.01 mg/L, MDL is 0.004 mg/L.
2. RL and MDL were developed based on an EPA-approved method.

Table 1. Comparisons of online analyzer performance with manufacturer specifications

	Laboratory Results	Manufacturer Specifications
Speed Response	15 to 30 minutes	1½ - 2 minutes for 90% full scale response
Sensitivity	0.05 mg/L, unable to differentiate zero and 0.01 mg/L	0.001 mg/L
Accuracy/ Precision	0.2 mg/L 105% recovery, 1% RSD 0.1 mg/L 92% recovery, 2 to 3% RSD (average of two tests) 0.05 mg/L 84% recovery, 3 to 60% RSD (average of six tests) 0.04 mg/L 42% recovery, 16% RSD < 0.04 mg/L 0% recovery	±0.003 mg/L
Start-up	Minimum stabilization time 24 hours Require a back-up system ready a day ahead	Minimum stabilization time 24 hours

Table 2. Manufacturer survey of online chlorine analyzers for continuous monitoring

Model	Manufacturer	Accuracy	Sensitivity	Data Validation by Manufacture
Capital Controls 1870E	Severn Trent	±0.003 mg/L	0.001 mg/L	no
AZTEC CL1000	Severn Trent	±0.001 mg/L	0.001 mg/L	no
MICRO 2000	Wallace & Tiernan	±0.001 mg/L	0.001 mg/L	no
CL 53	GLI	±1% of reading	0.001 mg/L	no

Figure 1. Precision, accuracy, and reproducibility of online analyzer at different concentrations

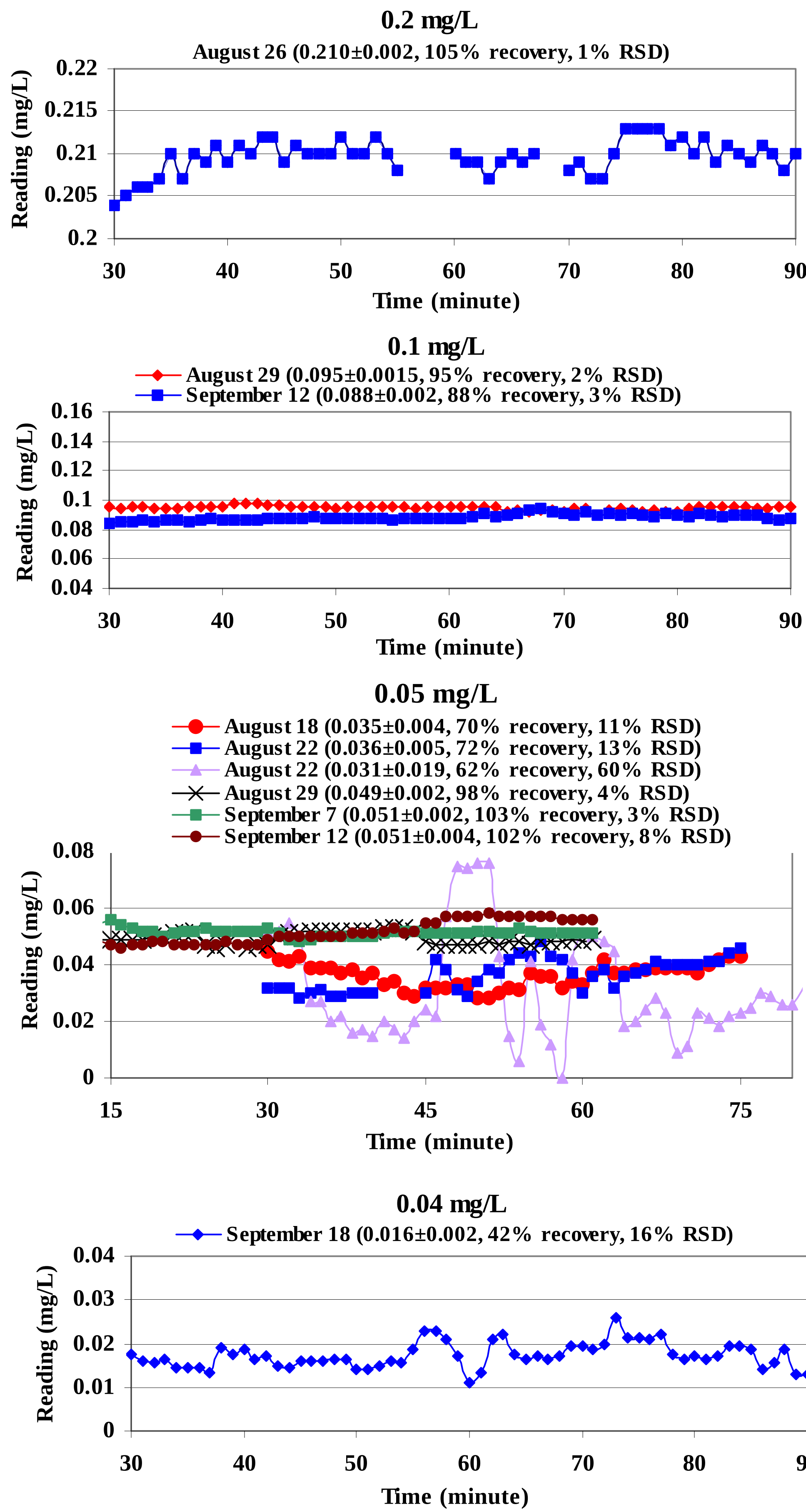


Table 3. Conformance tests on standards using iodometric titration or amperometric titrator

Target value = 0.2 mg/L

8/26/2005	**Iodometric Titration**	**Online Analyzer**
Time	Reading	Reading
starting	0.20 mg/L	
30 min	0.20 mg/L	0.204 mg/L
60 min	0.20 mg/L	0.210 mg/L

Target value = 0.1 mg/L

8/29/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.102 mg/L	
30 min	0.096 mg/L	0.096 mg/L
60 min	0.102 mg/L	0.096 mg/L

9/12/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.097 mg/L	
30 min	0.102 mg/L	0.084 mg/L
60 min	0.095 mg/L	0.088 mg/L

Target value = 0.05 mg/L

8/18/2005	**Iodometric Titration**	**Online Analyzer**
Time	Reading	
starting	0.05 mg/L	
30 min	0.05 mg/L	0.045 mg/L
60 min	0.05 mg/L	0.033 mg/L

8/22/2005	**Iodometric Titration**	**Online Analyzer**
Time	Reading	
starting	0.05 mg/L	
30 min	0.05 mg/L	0.032 mg/L
60 min	0.05 mg/L	0.030 mg/L

8/22/2005	**Iodometric Titration**	**Online Analyzer**
Time	Reading	
starting	0.05 mg/L	
30 min	0.05 mg/L	0.052 mg/L
60 min	0.05 mg/L	0.051 mg/L

8/29/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.051 mg/L	
15 min	0.051 mg/L	0.047 mg/L
60 min	0.050 mg/L	0.047 mg/L

9/7/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.053 mg/L	
15 min	0.053 mg/L	0.047 mg/L
60 min	0.052 mg/L	0.051 mg/L

9/12/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.052 mg/L	
15 min	0.051 mg/L	0.046 mg/L
60 min	0.051 mg/L	0.055 mg/L

Target value = 0.04 mg/L

9/18/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.045 mg/L	
30 min	0.044 mg/L	0.017 mg/L
60 min	0.044 mg/L	0.011 mg/L

Target value = 0.03 mg/L

9/18/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.031 mg/L	0
30 min	0.031 mg/L	0

Target value = 0.01 mg/L

9/18/2005	**Amperometric Titrator**	**Online Analyzer**
Time	Reading	
starting	0.012 mg/L	0
30 min	0.012 mg/L	0

2. Standard Method 4500-Cl E – Amperometric Titration

For chlorine residuals below 0.2 mg/L, an amperometric titration method is required by Standard Methods. The laboratory has purchased an amperometric titrator--model AutoACT 9000 by Hach Company. Instrument evaluation was performed using QC check standards. The Reporting Limit (RL) was determined to be 0.01 mg/L, with an MDL of 0.004 mg/L. Table 4 lists the performance evaluation data for the titrator.

Table 4. Hach AutoACT 9000 performance evaluation

Instrument Readings	**True Value** (diluted from QA check standard from ERA)		
	1.12 mg/L	0.056 mg/L	0.011 mg/L
1	1.118	0.056	0.013
2	1.093	0.055	0.011
3	1.078	0.055	0.011
4			0.011
5			0.01
6			0.009
7			0.01
Average	1.096	0.055	0.011
Std deviation	0.02	0.001	0.001
%RSD	2%	1%	12%
%Recovery	98%	99%	97%

APPENDIX G

APPENDIX G
San Gabriel River Outfall Residual Chlorine Field Study

Residual chlorine sampling was conducted along approximately 9.5 miles of the San Gabriel River Outfall (Outfall) on September 24, 1998. The Outfall conveys final effluent from the San Jose Creek East and West WRPs to Discharge 001 located approximately 9.5 miles from the plant. Samples were collected at 13 maintenance holes to assess the chlorine residual dissipation in the Outfall, which is a reinforced concrete pipeline approximately 5 - 6 feet in diameter. The collected data indicated that there was a 0.24 mg/L/mile loss of residual chlorine in the final effluent conveyed via gravity through the outfall to the San Jose Creek WRP Discharge Point 001 due to microbial activity within the Outfall.

Background

The sampling was conducted on September 24, 1998, from approximately 08:30 AM to 12:20 PM hours. At this time, only effluent from San Jose Creek WRP, West was being discharged to the Outfall since San Jose Creek WRP, East was discharging all of its' flow to the San Jose Creek for groundwater recharge purposes via Discharge Point 002. As a result, flow to the Outfall averaged about 20 MGD during the sampling period. Final effluent chlorine residuals ranged between 0.10 to 1.4 mg/L, with an average of about 1 mg/L. Samples for heterotrophic plate counts were taken at five locations and were delivered to the Microbiology Group. The Laboratories' Biology Group measured dissolved oxygen, chlorine residual, pH and temperature along 13 locations. Sampling data are included in Table 1.

Pipeline Hydraulics/ Reaeration Rates

The total length of the Outfall is approximately 9.5 miles. The pipe diameter ranges between 60 to 72 inches. The elevation head drop between the first maintenance hole location (A-143) sampled and the effluent discharge point (001) was 131 feet. The slope between maintenance holes ranges between -1% to as high as 19% (these extremes are for very short sections). The average slope was found to be 0.5%. Three siphons were identified. The average flow velocity on the day of the sampling was 5 ft/sec at a flow of 20 MGD based on Mannings Equation for flow in circular pipes. Refer to Table 2 for the range of velocities and depths of flow. Based on this analysis, the time of travel on the day of the sampling from maintenance hole A-144 to the end of the Outfall was approximately 213 minutes.

Chlorine Residual Data

Chlorine residual data are plotted on Graph 1. The chlorine residual at the first maintenance hole sampled, A-143, was measured at 1.4 mg/L. Chlorine residual was not detected at maintenance hole A-126, which is located 29,380 feet (5.6 miles) from the first location sampled. An increase in chlorine residual was observed between maintenance holes A-140 and A-138. The exact cause of this increase is unknown, however this may be due to varying chlorine residuals in the San Jose Creek WRP, West final effluent, which as mentioned ranged between 0.10 to 1.4 mg/L or it could reflect an anomaly at maintenance hole A-140. The chlorine residual loss calculated was approximately 0.24 mg/L per mile.

Table 1
San Gabriel River Outfall Sampling Data

Maintenance hole #	Distance from first manhole (A-144) (feet)	Time	Chlorine Residual (mg/L)	Invert Elevation
A-144	0			239.00
A-143	***724***	8:53 AM	1.4	235.94
A-142	***3071***	9:22 AM	0.85	228.05
A-141	4375			222.13
A-140	***7143***	9:37 AM	0.3	213.49
A- 139	8743			207.49
A-138	***10513***	9:55 AM	0.75	200.20
A-137	***11443***	10:12 AM	0.75	194.31
A-136	13522			187.41
A-135	15416			178.52
A-134	15767			177.33
A-133	16212			175.66
A-132	***18022***	10:40 AM	0.3	170.45
A-131	19943			166.09
A-130	***22078***	11:08 AM	0.1	161.86
A-129	22142			161.74
A-128	***24580***	11:15 AM	0.25	156.67
A-127	26730			152.38
A-126	***29380***	11:26 AM	< 0.05	148.20
A-125	31664			142.89
A-124	***34055***	11:41 AM	< 0.05	133.00
A-123	36855			126.62
A-122	39255			124.00
A-121	***40037***	11:54 AM	< 0.05	121.10
A-120	***42457***	12:03 PM	< 0.05	118.26
A-119	44940			117.50
A-118	47355			110.50
Outfall End	***48656***	12:14 PM	< 0.05	104.81

Sampling conducted at manholes shaded.

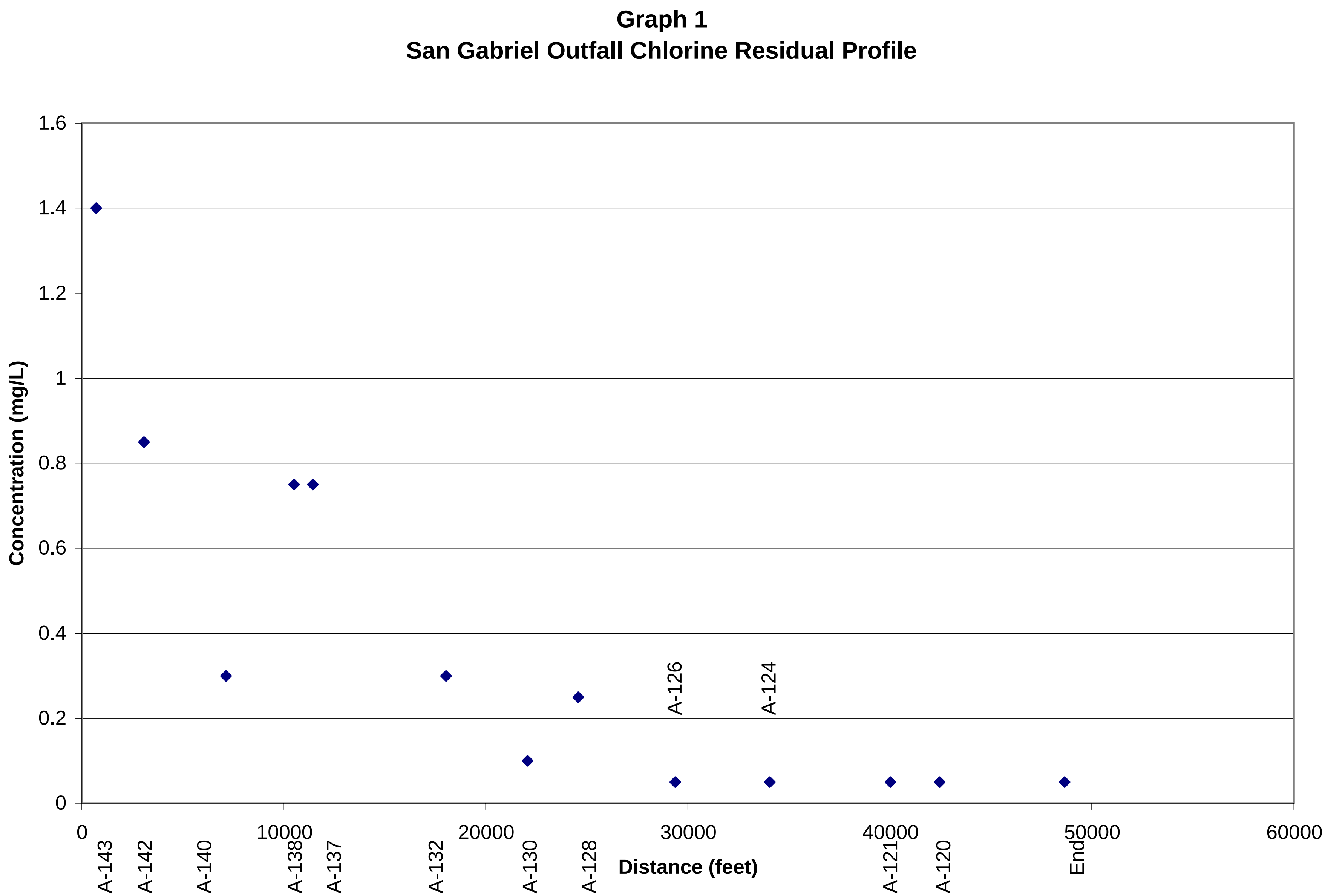
Table 2 -San Gabriel Outfall Flow Velocity
(Only Applies for Q = 20 MGD)

Manhole #	n	Slope (feet/feet)	Pipe Diameter (inches)	Area $(feet)^2$	q (MGD)	Depth of flow (feet)	Flow Velocity (feet/s)	Distance between Manholes (feet)	Total Time from A-144 (minutes)
A-144	0.013	0.0038	60	19.63	20.00	1.49	6.38	0	0
A-143	0.013	0.0038	60	19.63	20.00	1.49	6.38	724.36	2
A-142	0.013	0.00312	63	21.65	20.00	1.55	5.79	2347	9
A-141	0.013	0.00388	60	19.63	20.00	1.47	6.38	1303.2	12
A-140	0.013	0.00312	63	21.65	20.00	1.55	5.79	2768.8	20
A- 139	0.013	0.00338	63	21.65	20.00	1.50	6.10	1600	24
A-138	0.013	0.00584	60	19.63	20.00	1.33	7.46	1770	28
A-137	0.013	0.00392	63	21.65	20.00	1.44	6.40	930	31
A-136	0.013	0.00332	63	21.65	20.00	1.51	6.04	2079	37
A-135	0.013	**0.00001**	60	19.63	20.00	5.00	1.58	1893	57
A-134	0.013	0.0026	66	23.76	20.00	1.57	5.54	351	58
A-133	0.013	0.09	66	23.76	20.00	0.66	19.16	445	58
A-132	0.013	0.0026	66	23.76	20.00	1.57	5.50	1810	63
A-131	0.013	0.00136	69	25.97	20.00	1.84	4.32	1921	71
A-130	0.013	0.0019	69	25.97	20.00	1.70	4.82	2135	78
A-129	0.013	0.0019	69	25.97	20.00	1.70	4.82	64	78
A-128	0.013	0.0019	69	25.97	20.00	1.70	4.82	2438	87
A-127	0.013	0.0019	69	25.97	20.00	1.70	4.82	2150	94
A-126	0.013	0.0016	72	28.27	20.00	1.73	4.60	2650	104
A-125	0.013	0.00136	72	28.27	20.00	1.92	3.97	2284	114
A-124	0.013	0.0028	63	21.65	20.00	1.58	5.66	2391	121
A-123	0.013	0.00216	66	23.76	20.00	1.71	4.93	2800	130
A-122	0.013	0.00136	72	28.27	20.00	1.86	4.14	2400	140
A-121	0.013	0.001	72	28.27	20.00	1.98	3.80	782	143
A-120	0.013	0.00206	72	28.27	20.00	1.65	2.25	2420	161
A-119	0.013	0.0012	72	28.27	20.00	1.89	4.09	2483	171
A-118	0.013	**0.00001**	66	23.76	20.00	4.15	1.12	2415	207
Outfall End	0.013	0.001	66	23.76	20.00	2.04	3.87	1301	213
Average(1)		0.005				1.83	5.38		

(1) The average velocity is 4.9 ft/sec if the velocity at manhole A-133 at 19.16 ft/sec is ignored.

Slopes underlined had negative values, therefore a slope close to zero was assumed.

o:\mrincon\APPENDIX G SGR Outfall Sampling Data100305.xls


Graph 1
San Gabriel Outfall Chlorine Residual Profile
Concentration (mg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10000
20000
30000
40000
50000
60000
Distance (feet)
A-143
A-142
A-140
A-138
A-137
A-132
A-130
A-128
A-126
A-124
A-121
A-120
End

APPENDIX H

2. BENEFICIAL USES

Table of Contents

Introduction

Beneficial uses form the cornerstone of water quality protection under the Basin Plan. Once beneficial uses are designated, appropriate water quality objectives can be established and programs that maintain or enhance water quality can be implemented to ensure the protection of beneficial uses. The designated beneficial uses, together with water quality objectives (referred to as criteria in federal regulations), form water quality standards. Such standards are mandated for all waterbodies within the state under the California Water Code. In addition, the federal Clean Water Act mandates standards for all surface waters, including wetlands.

Twenty-four beneficial uses in the Region are identified in this Chapter. These beneficial uses and their definitions were developed by the State and Regional Boards for use in the Regional Board Basin Plans. Three beneficial uses were added since the original 1975 Basin Plans. These new beneficial uses are Aquaculture, Estuarine Habitat, and Wetlands Habitat.

Beneficial uses can be designated for a waterbody in a number of ways. Those beneficial uses that have been attained for a waterbody on, or after, November 28, 1975, must be designated as "existing" in the Basin Plans. Other uses can be designated, whether or not they have been attained on a waterbody, in order to implement either federal or state mandates and goals (such as fishable and swimmable) for regional waters. Beneficial uses of streams that have intermittent flows, as is typical of many streams in southern California, are designated as intermittent. During dry periods, however, shallow ground water or small pools of water can support some beneficial uses associated with intermittent streams; accordingly, such beneficial uses (e.g., wildlife habitat) must be protected throughout the year and are designated "existing." In addition, beneficial uses can be designated as "potential" for several reasons, including:

- implementation of the State Board's policy entitled "Sources of Drinking Water Policy" (State Board Resolution No. 88-63, described in Chapter 5),
- plans to put the water to such future use,
- potential to put the water to such future use,
- designation of a use by the Regional Board as a regional water quality goal, or
- public desire to put the water to such future use.

Beneficial Use Definitions

Beneficial uses for waterbodies in the Los Angeles Region are listed and defined below. The uses are listed in no preferential order.

Municipal and Domestic Supply (MUN)
Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Agricultural Supply (AGR)
Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

Industrial Process Supply (PROC)
Uses of water for industrial activities that depend primarily on water quality.

Industrial Service Supply (IND)
Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.

Ground Water Recharge (GWR)
Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

Freshwater Replenishment (FRSH)

Uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).

Navigation (NAV)
Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

Hydropower Generation (POW)
Uses of water for hydropower generation.

Water Contact Recreation (REC-1)
Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-contact Water Recreation (REC-2)
Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Commercial and Sport Fishing (COMM)
Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

Aquaculture (AQUA)
Uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.

Warm Freshwater Habitat (WARM)
Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold Freshwater Habitat (COLD)
Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Inland Saline Water Habitat (SAL)
Uses of water that support inland saline water ecosystems including, but not limited to, preservation or enhancement of aquatic saline habitats, vegetation, fish, or wildlife, including invertebrates.

Estuarine Habitat (EST)
Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).

Wetland Habitat (WET)
Uses of water that support wetland ecosystems, including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions which enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants.

Marine Habitat (MAR)
Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

Wildlife Habitat (WILD)
Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Preservation of Biological Habitats (BIOL)
Uses of water that support designated areas or habitats, such as **Areas of Special Biological Significance (ASBS),** established refuges, parks, sanctuaries, ecological reserves, or other areas where the preservation or enhancement of natural resources requires special protection.

The following coastal waters have been designated as ASBS in the Los Angeles Region. For detailed descriptions of their boundaries, see the Ocean Plan discussion in Chapter 5, Plans and Policies:

- San Nicolas Island and Begg Rock
- Santa Barbara Island and Anacapa Island
- San Clemente Island
- Mugu Lagoon to Latigo Point

- Santa Catalina Island, Subarea One, Isthmus Cove to Catalina Head
- Santa Catalina Island, Subarea Two, North End of Little Harbor to Ben Weston Point
- Santa Catalina Island, Subarea Three, Farnsworth Bank Ecological Reserve
- Santa Catalina Island, Subarea Four, Binnacle Rock to Jewfish Point

The following areas are designated Ecological Reserves or Refuges:

- Channel Islands National Marine Sanctuary
- Santa Barbara Island Ecological Reserve
- Anacapa Island Ecological Reserve
- Catalina Marine Science Center Marine Life
- Point Fermin Marine Life Refuge
- Farnsworth Bank Ecological Reserve
- Lowers Cove Reserve
- Abalone Cove Ecological Reserve
- Big Sycamore Canyon Ecological Reserve

Rare, Threatened, or Endangered Species (RARE)
Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

Migration of Aquatic Organisms (MIGR)
Uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.

Spawning, Reproduction, and/or Early Development (SPWN)
Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Shellfish Harvesting (SHELL)
Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sports purposes.

Beneficial Uses for Specific Waterbodies

Tables 2-1 through 2-4 list the major regional waterbodies and their designated beneficial uses. These tables are organized by waterbody type: (i) inland surface waters (rivers, streams, lakes, and inland wetlands), (ii) ground water, (iii) coastal waters (bays, estuaries, lagoons, harbors, beaches, and ocean waters), and (iv) coastal wetlands. Within Table 2-1 waterbodies are organized by major watersheds. Hydrologic unit, area, and subarea numbers are noted in the surface water tables (2-1, 2-3, and 2-4) as a cross reference to the classification system developed by the California Department of Water Resources. For those surface waterbodies that cross into other hydrologic units, such waterbodies appear more than once in a table. Furthermore, certain coastal waterbodies are duplicated in more than one table for completeness (e.g., many lagoons are listed both in inland surface waters and in coastal features tables). Major groundwater basins are classified in Table 2-2 according to the Department of Water Resources Bulletin No. 118 (1980). A series of maps (Figures 2-1 to 2-22) illustrates regional surface waters, ground waters, and major harbors.

The Regional Board contracted with the California Department of Water Resources for a study of beneficial uses and objectives for the upper Santa Clara River (DWR, 1989) and for another study of the beneficial uses and objectives the Piru, Sespe, and Santa Paula Hydrologic areas of the Santa Clara River (DWR, 1993). In addition, the Regional Board contracted with Dr. Prem Saint of California State University at Fullerton to survey and research beneficial uses of all waterbodies throughout the Region (Saint, et al., 1993a and 1993b). Information from these studies was used to update this Basin Plan.

State Board Resolution No. 88-63 (Sources of Drinking Water) followed by Regional Board Resolution No. 89-03 (Incorporation of Sources of Drinking Water Policy into the Water Quality Control Plans (Basin Plans)) states that " All surface and ground waters of the State are considered to be suitable, or potentially suitable, for municipal or domestic waters supply and should be so designated by the Regional Boards ... [with certain exceptions which must be adopted by the Regional Board]." In adherence with these policies, all inland surface and ground waters have been designated as MUN - presuming at least a potential suitability for such a designation.

These policies allow for Regional Boards to consider the allowance of certain exceptions according to criteria set forth in SB Resolution No. 88-63. While supporting the protection of all waters that may be used as a municipal water supply in the future, the

Attachment 2.C: Supplemental Information on October 20, 2005 Information Submittal by the Los Angeles County Sanitation Districts for the State Water Resources Control Board's Chlorine Residual Policy (Submitted on October 27, 2005)

October 27, 2005

Supplemental Information on October 20, 2005 Information Submittal by the Los Angeles County Sanitation Districts for the State Water Resources Control Board's Chlorine Residual Policy:

Performance Evaluation and Response Time Studies of Continuous On-line Total Residual Chlorine Analyzer Using Wastewater Effluent

The goals of the subject studies included 1) determining the lowest measurable concentration that a continuous on-line chlorine analyzer could detect in the laboratory using wastewater effluent[1]; and 2) establishing response times for the on-line analyzer in the laboratory using de-ionized (DI) water. The on-line analyzer used to conduct these laboratory studies was the Capital Controls 1870E analyzer manufactured by Severn Trent. The completion of these two studies meets the Part 5 (Analytical Measurements of Residual Chlorine) commitments of the Sanitation Districts as presented in our October 20, 2005 draft report entitled "*Information Submittal by the Los Angeles County Sanitation Districts for the State Water Resources Control Board's Chlorine Residual Policy*."

Wastewater Effluent Matrix Study

In order to determine the lowest measurable concentration that a Districts' continuous on-line chlorine analyzer could detect in the complex wastewater matrix, a grab sample of post-ammonia secondary effluent was used. Secondary effluent was spiked with chlorine (as sodium hypochlorite) to the desired concentrations prior to the analysis. Testing procedures were carried out as follows:

1. The on-line analyzer was zeroed with DI water.
2. Span calibration was performed with 0.5 mg/L of chlorine in DI water.
3. Continuous flushing was carried out with each designated spiked sample.
4. Conformance tests were performed at 15-minute intervals (or less) by manually analyzing a sample with the laboratory's amperometric titrator and comparing the results to the on-line analyzer's output.

Results of conformance tests performed at different concentrations are listed in Table 1. Figure 1 illustrates the average on-line analyzer response to total residual chlorine (TRC) concentrations ranging from 0.04 mg/L to 1.12 mg/L. Note that the on-line analyzer consistently gave readings that were lower than those obtained from the amperometric titrator. In the wastewater matrix, consistent (though not accurate) results were only possible with the on-line analyzer when the chlorine residual was above 0.15 mg/L (150 ug/L or 150 ppb). Given that the conditions in the laboratory during these experiments were ideal, it would be expected that these results are more consistent than would be expected for the same on-line analyzer in the field.[2]

[1] You may recall as reported in our October 20, 2005 submittal in Section 5 (and as discussed in Appendix F), in chlorine spiked DI water, the lowest measurable concentration (with 84% recovery) is 0.05 mg/L (50ug/L).
[2] Field calibration of the on-line analyzers is conducted on a set maintenance schedule or as necessary and not necessarily daily.

DRAFT

Table 1. Conformance Tests on Spiked Matrix
Online Chlorine Analyzer vs. Amperometric Titrator

10/19/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.040 mg/L**	0	0%

Average % recovery = 0%

10/5/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.051 mg/L**	0	0%

Average % recovery = 0%

10/19/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.076 mg/L**	0.023 mg/L	30%
15 min	0.051 mg/L	0.010 mg/L	20%
20 min	0.049 mg/L	0.002 mg/L	4%

Average % recovery = 18%

10/5/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.106 mg/L**	0	0%

Average % recovery = 0%

10/19/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.126 mg/L**	0.055 mg/L	44%
15 min	0.081 mg/L	0.040 mg/L	49%
30 min	0.066 mg/L	0.019 mg/L	29%
45 min	0.070 mg/L	0.010 mg/L	14%
60 min	0.069 mg/L	0	0%

Average % recovery = 27%

10/5/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.169 mg/L**	0.088 mg/L	52%
6 min	0.141 mg/L	0.086 mg/L	61%
13 min	0.129 mg/L	0.081 mg/L	63%
refill analyzer's feeding reservoir with spiked matrix (conc=0.143 mg/L) at 14 min			
24 min	0.125 mg/L	0.074 mg/L	59%
32 min	0.115 mg/L	0.063 mg/L	55%
38 min	0.106 mg/L	0.056 mg/L	53%
47 min	0.110 mg/L	0.049 mg/L	45%

Average % recovery = 55%

10/18/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.196 mg/L**	0.106 mg/L	54%
15 min	0.153 mg/L	0.089 mg/L	58%
refill analyzer's feeding reservoir with spiked matrix (conc=0.163 mg/L) at 24 min			
30 min	0.163 mg/L	0.091 mg/L	56%
45 min	0.148 mg/L	0.071 mg/L	48%
60 min	0.146 mg/L	0.072 mg/L	49%

Average % recovery = 53%

10/5/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.444 mg/L**	0.296 mg/L	67%
7 min	0.380 mg/L	0.253 mg/L	67%
22 min	0.384 mg/L	0.250 mg/L	65%
refill analyzer's feeding reservoir with spiked matrix (conc=0.432 mg/L) at 26 min			
45 min	0.390 mg/L	0.262 mg/L	67%
60 min	0.359 mg/L	0.235 mg/L	65%

Average % recovery = 66%

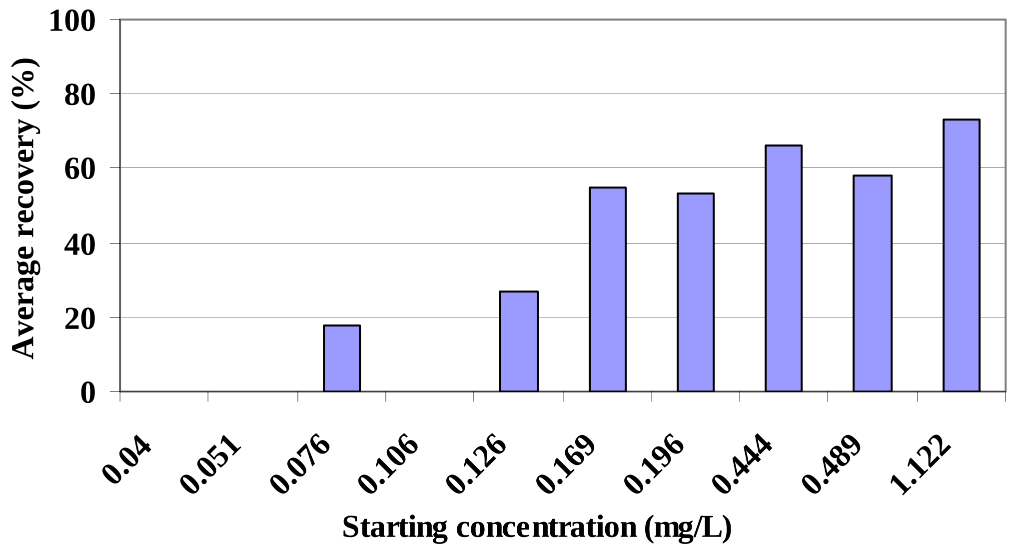
10/18/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**0.489 mg/L**	0.296 mg/L	61%
15 min	0.353 mg/L	0.221 mg/L	63%
30 min	0.326 mg/L	0.185 mg/L	57%
45 min	0.334 mg/L	0.181 mg/L	54%
60 min	0.300 mg/L	0.159 mg/L	53%

Average % recovery = 58%

10/18/2005	**Amperometric Titrator**	**Online Analyzer**	**% Recovery (analyzer/titrator)**
Time	Reading	Reading	
starting	**1.122 mg/L**	0.857 mg/L	76%
15 min	0.931 mg/L	0.682 mg/L	73%
30 min	0.868 mg/L	0.616 mg/L	71%
45 min	0.785 mg/L	0.571 mg/L	73%
60 min	0.797 mg/L	0.568 mg/L	71%

Average % recovery = 73%

Figure 1. Online Analyzer Response at Different Concentrations

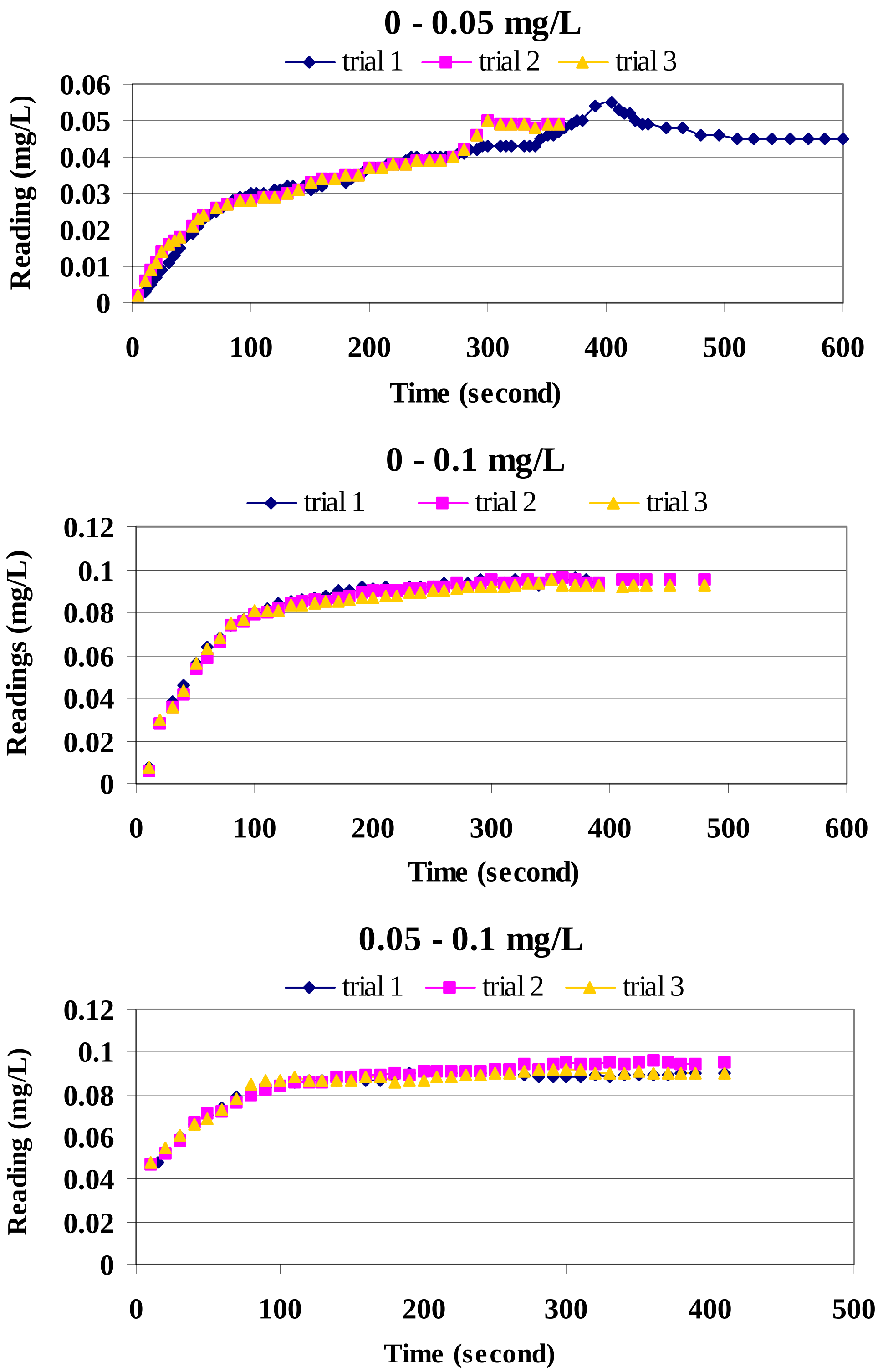


On-line Analyzer Response Times

The time-lag associated with the on-line analyzer's response to changes in chlorine residual levels has also been established for the Capital Controls1870E analyzer manufactured by Severn Trent. Figure 2 shows graphs of the changes in response when the chlorine residual was changed from 0 to 0.05 mg/L, from 0 to 0.10 mg/L, and from 0.05 to 0.10 mg/L.[3] All tests were carried out in DI water. Expectations are that the response in a wastewater matrix would the same as in DI water or worse, due to the high dissolved solids in wastewater and the suspended material that is present in wastewater effluents. Note that there is a definite lag time, and in no case can the on-line analyzer respond within the one-minute time that is proposed in the Total Chlorine Residual Policy.

[3] DI solutions with no chlorine, and solutions containing 0.05 mg/L and 0.1 mg/L of chlorine were used for this experiment.

Figure 2. On-line analyzer response curve when chlorine residual levels change



Conclusions

Wastewater Effluent Matrix Study

1. Low responses are observed at all tested concentrations, i.e., below 80% recovery.
2. At 50% recovery, the lowest measurable concentration of TRC is 0.15 mg/L in wastewater.
3. Zero reading is observed for laboratory measured concentrations at or below 0.05 mg/L.
4. 0 to 27% recovery is observed for concentrations ranging from 0.05 to 0.15 mg/L.
5. A better recovery (> 70%) is obtained when the TRC concentration is above 1 mg/L.

*On-line Analyzer Response Times (test conducted using **DI** water)*

1. For concentrations from 0 to 0.05 mg/L, it requires 4 minutes to achieve 90% response (i.e., 0.04 mg/L).
2. For concentrations from 0 to 0.1 mg/L, it requires 3 minutes to achieve 90% response (i.e., 0.09 mg/L).
3. For concentrations from 0.05 to 0.1 mg/L, the analyzer requires about 2 minutes to reach 90% response.
4. The manufacturer’s specifications state that the analyzer requires 1½ to 2 minutes for a 90% full-scale response.

Attachment 2.D: Comments on December 2005 Revised Draft of the Proposed Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California
(Submitted on January 4, 2006)

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

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JAMES F. STAHL
Chief Engineer and General Manager

January 4, 2006
File No. 31-370.40.4A

Via electronic and U.S. mail

Ms. Dena McCann
Division of Water Quality
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Dear Ms. McCann:

Comments on December 2005 Revised Draft of the Proposed Total
Residual Chlorine and Chlorine-Produced Oxidants Policy of California

The Sanitation Districts of Los Angeles County (Districts) are pleased to provide comments on the revised draft, "test-drive" version, of the proposed Total Residual Chlorine and Chlorine-Produced Oxidants Policy (the Policy). The Districts are a confederation of special districts, which operate and maintain regional wastewater and solid waste management systems to provide sanitation services for over 5 million people who reside in 78 cities and unincorporated areas in Los Angeles County. The Districts own and operate 8 Water Reclamation Plants (WRPs) that discharge to inland surface waters, all of which could potentially be affected by this Policy. The Districts previously submitted comments on the earlier draft of this Policy in July 2005 and have subsequently submitted additional supplemental data to the State Water Resources Control Board (State Board) in October and November 2005. In addition, representatives from the Districts attended both stakeholder meetings regarding the draft Policy in September 2005.

We greatly appreciate the State Board's efforts to solicit comments on this Policy (both the draft and the revised draft) and the Districts have, in turn, tried to provide the State Board with key information for consideration in crafting the Policy. Enclosed with this letter are two submittals we have prepared over the past several months as follow-up to issues raised in previous discussions on the proposed Policy. The first submittal presented, in Appendix A, contains results from a Districts' study regarding the sensitivity of aquatic life to a short-term exposure of a relatively high concentration of chlorine. Test organisms were exposed to concentrations of chlorine between 0 and 4 mg/L for a total of five minutes and then their survival 48 hours after the exposure was recorded. The results of the study clearly showed that the test organism used was more sensitive to chlorine in a synthetic control dilution water environment than in receiving water. This finding would suggest that the receiving water might provide some buffering ability for aquatic life to tolerate levels of chlorine residual higher than the proposed objectives for very short durations. We believe that this type of study could be done to develop a site-specific objective (SSO), and we request that the SWRCB work with us and other interested parties to develop an approved scientific methodology referenced in the Policy for such work so that those parties and RWQCBs wishing to pursue SSOs can do so efficiently.

The second submittal, presented in Appendix B, is a memo summarizing the approach to chlorine residual regulation of publicly owned treatment works (POTWs) outside the State of California. Approximately 30 POTWs from states other than California were surveyed with regards to their chlorine residual limits, measuring methods and compliance measures. Of the 31 POTWs surveyed, only two (both owned by the same agency) are required by permit to monitor with continuous on-line equipment. In this case, the agency is in Oregon and preferred continuous monitoring to frequent grab samples; three other agencies in Oregon with standard NPDES permits are not required to use continuous monitoring for compliance. In addition, all of the 31 POTWs have either daily or some combination of daily, weekly and monthly limits. Only two facilities have one-hour average limits in their permits in addition to daily or longer-term limits. Thus, although most of the states in which these facilities operate have adopted EPA's chlorine residual criteria into their water quality standards, they have implementation practices that don't include continuous monitoring requirements, nor do they routinely translate the acute and chronic criteria into one-hour and four-day averages for permit limits.

In terms of the new revised draft of the Policy that the State Board released in December 2005, the Districts appreciate the opportunity to 'test-drive' the Policy as suggested by the State Board, and are providing you with the following comments/concerns/questions. We also support the comments that were submitted separately in a January 4, 2006, letter to you from Mr. Chuck Weir, Chair of Tri-TAC.

Comments on Part II

"Calculation" – The revised draft Policy contains separate objectives for continuous and intermittent discharges. Some of the WRPs operated by the Districts discharge intermittently (for 120 minutes or less each day as defined by the Policy) at certain times of the year when the treated effluent is not discharged because it is diverted for reuse purposes. The same WRPs discharge continuously in other parts of the year (normally in winter when reuse demand is much lower). Because we operate facilities that meet the definitions for both continuous discharge and intermittent discharge under this Policy, the Districts request that the Policy be modified to allow permits to include chlorine residual limits for both continuous and intermittent discharges where appropriate. This would allow dischargers such as the Districts more flexibility in meeting the limitations while maximizing reuse of treated effluent.

Although later in the Policy mixing zones are discussed, the calculation section in the Policy does not address calculating limits for areas with approved mixing zones. The language in this section should be revised to accommodate calculation of limits for discharges with approved mixing zones.

As mentioned previously in this letter, Appendix B contains a memo detailing the approach to chlorine residual regulation at 31 POTWs outside of California. Inasmuch as the majority of these states have adopted EPA's chlorine residual criteria into their water quality standards and they have either daily and/or longer-term limits in most cases, the Districts request that the State Board consider these approaches before deciding periods of one hour and four days are necessary to determine compliance.

"Compliance Schedule" – The Districts support the inclusion of a provision allowing compliance schedules for dischargers to meet the residual chlorine discharge limitations, and support increasing the allowable length of a compliance schedule from 3 years to 5 years. The Policy allows for a compliance schedule and states that justification must be provided before one is approved. The Districts request that the words "planned or" be added to the second item listed under justification, so it reads "2. Documentation that facility upgrades are planned or underway, if applicable." In many cases an agency may decide to upgrade facilities in order to comply, but may not have had sufficient time to begin such changes yet at the time of permit issuance.

The Districts also request that the issuance of a compliance schedule, in addition to being considered at permit issuance, reissuance or modification, also be allowed if deemed appropriate by the individual Regional Water Quality Control Board (Regional Board) if a discharger can show good cause. Furthermore, the Districts suggest that the Policy specify that interim residual chlorine limits be based on past performance at the specific discharge.

We also recommend that the language referring to "new or modified effluent limit" be removed in two places (one on page 5 and one on page 6 of the Policy) within this section. The Regional Boards should be afforded more discretion for providing dischargers with compliance schedules, other than just when new or more restrictive effluent limits are applied or other provisions of this Policy are applied in a permit. Again, if a discharger can show good cause, the Policy should allow the Regional Board to grant or extend a compliance schedule.

"Monitoring Requirements" - The monitoring requirements section of the Draft Policy states that "Continuous monitoring of chlorine residual or dechlorination residual concentrations shall be required in all facilities." The monitoring frequency is specified as "one or more data points, every minute." The equipment sensitivity level specified under the Quantification/Reporting Requirements is 1 μg/L.

As previous discussed at the workshops, the sensitivity and monitoring frequency requirements presented in the draft Policy do not reflect the actual limitations of the instruments currently available on the market or the realities of layers of variables (errors) in a continuous on-line field environment. We are unaware of any current on-line analytical technology that is capable of accurately or reliably measuring chlorine at 1 μg/L or with sufficient response time to take discrete measurements on one-minute intervals under continuous monitoring conditions in the field. Information we submitted in our October 2005 letter to you provides evidence of the sensitivity issues for continuous analyzers. Therefore, we continue to have significant concerns about the proposed approach because of these issues/problems.

"Quantification/Reporting Requirements" - Many points within the discussion of the quantification/reporting limit (QRL) need clarification. It is not clear how exactly the QRL should be determined and thus compliance with the QRL will be demonstrated. The draft Policy stipulates that the QRL is supposed to be at or below the facilities effluent limitation (page 6 of the Policy) except where evaluated on a case-by-case basis by each Regional Board. In previous submittals, the Districts have provided technical evidence to the SWRCB that a commercially available continuous chlorine analyzer could not accurately measure concentrations as low as 0.011 mg/L (the 4-day freshwater average objective). Despite requests to State Board staff and industry product manufacturers, the Districts have been unable to identify a continuous chlorine analyzer that can accurately measure as low as the proposed objectives in the Policy. Thus, every discharger in the State of California whose discharge is subject to this policy ostensibly will have to have a case-by-case evaluation to determine an alternate QRL. To achieve both efficiency and consistency, it makes more sense for the State Board to determine and set a reasonable QRL based on the equipment now available for continuously measuring chlorine residual. As written, the State Board is relying on each Regional Board to process requests for alternative QRLs and develop procedures for determining alternate QRLs, which will be a resource burden on the Regional Boards, and may actually have the effect of delaying the implementation of the Policy. Instead, the Districts request that the State Board develop a reasonable, achievable statewide QRL to be included in this Policy before it is adopted.[1]

Additionally, the Policy states that an alternate QRL may be determined if the discharger cannot achieve a QRL that meets the effluent limitation "and it is infeasible to show compliance via the presence of residual dechlorination agent or by another means." The Policy is not clear in the case that the discharger cannot achieve a QRL that meets their discharge limitation, but does have alternative means to demonstrate compliance. It is implied that utilizing an alternative means of compliance would not require the discharger to also pursue an alternative QRL nor to gain approval by the Regional Board to implement the selected alternative means of compliance. We strongly recommend that the SWRCB modify this section to clarify the existing language before releasing the draft Policy for formal public comment.

"Compliance Determination" – The Policy lists that compliance can be demonstrated with continuous monitoring analyzers for chlorine and dechlorinating agents. During the September 2005 workshops, it was our understanding that representatives from the State Board indicated that use of stoichiometric calculations would be acceptable in lieu of continuous monitors for dechlorinating agents, not just for use as a back-up method when continuous monitoring systems are off-line for calibration and maintenance (as implied in the Policy). As a result of follow-up conversations, a discharger was also told by a representative of the State Board that stoichiometric calculations could be substituted for on-line chlorine analyzers. Therefore, we request that the draft Policy be revised to clarify that 3 alternate methods can be used for compliance determination: continuous monitoring of chlorine residual; continuous monitoring of dechlorination residual; or stoichiometric calculations.

The Policy lists a number of back-up systems that are acceptable when continuous monitoring equipment is not available. The Policy lists Whole Effluent Toxicity (WET) testing as a potential back-up system but does not clarify how WET testing is used as an alternative to chlorine residual measurements. The Policy should specifically address the specifics of the WET testing, i.e., flow through or static tests, acute or chronic, what exposure duration and what testing frequency would be considered as an appropriate back-up to continuous measurement.

"Mixing Zones and Site Specific Objectives" – As previously mentioned in regards to chlorine sensitivity (see Appendix A), the Districts have performed toxicity testing recently that

[1] For example, the State of Ohio EPA has developed a Quantification Level of 50 ug/L for chlorine measurements. Any reported analytical result that is lower than the Quantification Level of 50 ug/L is considered to be in compliance with that limit, if permit limits are below that the Quantification Level. (The Quantification Level (QL) is the minimum concentration at which we can be confident that the numerical result is accurate.) Information is available at: http://web.epa.state.oh.us/dsw/guidance/permit9.pdf.

suggests that our receiving water may have a buffering capacity to partially protect aquatic life from residual chlorine. The Districts are committed to operate all our facilities to comply with every effluent limitation, but there have been times (infrequent and unavoidable) when chlorine has been discharged in amounts higher than our current discharge limitation of 0.50 mg/L. (A detailed exceedence summary was sent to the State Board in October 2005.) Our recent testing suggests that aquatic life may be able to tolerate short-term exceedances of residual chlorine discharge limits in some receiving waters without experiencing adverse impacts. Again, we request that the SWRCB pursue the development of an approved methodology for SSOs for short-term exposures as expeditiously as possible so that both the Regional Boards and dischargers will have sufficient guidance to pursue the successful and timely development of SSOs, as allowed under the draft Policy.

In conclusion, we thank the State Board for this opportunity to provide comments on this informal draft of the Chlorine Residual Policy, and look forward to continuing to work with you on this endeavor. If you have any questions about our comments, please contact the undersigned at (562) 699-7411, extension 2801 or Beth Bax at extension 2835.

Very truly yours,

James F. Stahl

Victoria O. Conway

Victoria O. Conway
Assistant Department Head
Technical Services Department

VOC:BCB:drs
Attachments

APPENDIX A

Chlorine Sensitivity Study

October-November 2005

Short-term Chlorine Sensitivity

The Biology Group at the County Sanitation Districts of Los Angeles County (Districts) conducted a series of 48-hour acute toxicity tests using *Ceriodaphnia dubia*. This included testing of chlorine-dosed samples collected from receiving water stations to determine short-term exposure limits of *Ceriodaphnia dubia* (*C. dubia*) in water with a quantifiable chlorine residual.

The design of these tests included five-minute exposures of *C. dubia* neonates to receiving water and dilution water samples dosed to a quantified chlorine residual between 0.45 mg/L and 1.2 mg/L. Test organisms were then transferred to non-chlorine-dosed samples after the five-minute exposure and survival responses were observed for 48 hours. Total chlorine residual was quantified by the Districts' laboratory using Standard Methods.

A preliminary test was conducted on October 17th using effluent from the Long Beach Water Reclamation Plant (WRP) and receiving water from station LC-R9W (downstream of the plant discharge) using a single test treatment and chlorine residual concentration. Results of this testing indicated that five minute exposures of up to 0.4 mg/L total residual chlorine in the receiving water and 0.8 mg/L in the final effluent were tolerated. However, dilution water control survival after 48 hours was 0%. Results of this preliminary testing are contained in Table 1.

Table 1: Short-term Chlorine Sensitivity of Long Beach WRP effluent and nearby receiving waters

Starting Water	**Rinse/Transfer Water**	**Chlorine Residual of Starting Water**	***C.* dubia Survival**	
			24 Hr Survival	**48 Hr Survival**
R9W chlorine-dosed	R9W	0.448 mg/L	100%	100%
R9W Un-dosed	R9W	0	100%	100%
Control Water	Control Water	0	100%	0%
LB WRP chlorine-dosed	LB WRP	0.8 mg/L	100%	100%
LB WRP Un-dosed	LB WRP	0	100%	100%

Multi-concentration testing was continued using receiving water in the vicinity of San Jose Creek WRP outfall. Samples were collected from above and below the plant's #002 outfall during periods when San Jose Creek WRP was not discharging. The upstream sample was collected at San

Jose Creek receiving water location C1 (approximately 100 yards above the #002 outfall) and the downstream sample was collected from San Jose Creek receiving water location C2 (approximately 200 yards below the #002 outfall). Originally, samples were taken from location C1 alone in order to determine the LC50 of *C. dubia* for 5-minute chlorine exposures. Samples were dosed with chlorine and then the residual was quantified by the laboratory. This test was performed October 27, 2005 and consisted of 4 replicates at each concentration. In each case, the rinse and final transfer phases were conducted in untreated water of the same type as the initiation water. The results are shown in Table 2. The experiment was repeated on November 2nd, 2005, with the addition of samples from receiving water location C2, to establish if the results were reproducable. The results are given in Table 3.

Table 2: Short-term Chlorine Sensitivity of water from location C1 – October 27, 2005

Starting Water	**Chlorine Residual of Starting Water**	**Mean Survival**		**Calculated LC50 (mg/L Cl_2)**	
		24 Hr	**48 Hr**	**24 Hr**	**48 Hr**
Control	0	100%	25%[1]	0.365 mg/L	0.357 mg/L
	0.283 mg/L	90%	25%		
	0.401 mg/L	15%	5%		
	0.783 mg/L	50%	5%		
	1.24 mg/L	0%	0%		
SJC-C1	0	85%	80%	1.03 mg/L	1.02 mg/L
	0.322 mg/L	95%	95%		
	0.528 mg/L	90%	90%		
	0.813 mg/L	100%	100%		
	1.18 mg/L	15%	10%		

[1] For the test results shown in Tables 2 and 3, the *C. dubia* in the un-dosed control water experienced significant toxicity. Inasmuch as this is an unexpected result, more careful handling procedures of the neonates were adopted, and the control survival in the un-dosed samples returned to a more reasonable percentage – see Table 5.

Table 3: Short-term Chlorine Sensitivity of water from locations C1 and C2 – November 2, 2005

Starting Water	**Chlorine Residual of Starting Water**	**Mean Survival**		**Calculated LC50 ($mg/L\ Cl_2$)**	
		24 Hr	**48 Hr**	**24 Hr**	**48 Hr**
Control	0	100%	30%[1]	0.657 mg/L	0.622 mg/L
	0.303 mg/L	85%	53.8%		
	0.534 mg/L	80%	30%		
	0.816 mg/L	5%	0%		
	1.11 mg/L	0%	0%		
SJC-C1	0	80%	80%	>1.24 mg/L	>1.24 mg/L
	0.255 mg/L	100%	100%		
	0.508 mg/L	100%	95%		
	0.761 mg/L	95%	70%		
	1.24 mg/L	100%	100%		
SJC-C2	0	100%	100%	>1.23 mg/L	>1.23 mg/L
	0.380 mg/L	100%	100%		
	0.575 mg/L	95%	95%		
	0.875 mg/L	100%	100%		
	1.23 mg/L	100%	100%		

These results confirmed higher sensitivity of *C. dubia* to chlorine in control water as opposed to the San Jose Creek receiving waters, but an LC50 value could not be calculated from these tests because 50% mortality was not achieved in the receiving waters. Further testing was conducted on November 16th to establish an LC50 value. The maximum value was increased to ~2.0 mg/L; the results are shown in Table 4.

Table 4: Short-term Chlorine Sensitivity of water from locations C1 and C2 – November 16, 2005

Starting Water	Chlorine Residual of Starting Water	Mean 48 Hr Survival	Calculated 48 Hr LC50 (mg/L Cl_2)
Control	0	85%	0.694 mg/L
	0.381 mg/L	90%	
	0.560 mg/L	60%	
	1.05 mg/L	0%	
	1.97 mg/L	0%	
SJC-C1	0	100%	>2.41 mg/L
	0.412 mg/L	100%	
	0.764 mg/L	95%	
	0.946 mg/L	100%	
	2.41 mg/L	75%	
SJC-C2	0	100%	>2.03 mg/L
	0.250 mg/L	100%	
	0.620 mg/L	95%	
	1.12 mg/L	35%	
	2.03 mg/L	90%	

These data show that the LC50 value was still higher than the maximum dosage for both receiving water stations. Further testing was conducted on November 21st, retaining the 5-minute exposure time but increasing the maximum dosage to ~4.0 mg/L. The results are in Table 5.

Table 5: Short-term Chlorine Sensitivity of water from locations C1 and C2 – November 21, 2005

Starting Water	Chlorine Residual of Starting Water	Mean 48 Hr Survival	Calculated 48 Hr LC50 (mg/L Cl_2)
Control	0	100%	0.257 mg/L
	0.283 mg/L	45%	
	0.882 mg/L	0%	
	2.10 mg/L	0%	
	4.20 mg/L	0%	
SJC-C1	0	95%	2.07 mg/L
	0.600 mg/L	100%	
	1.05 mg/L	95%	
	3.14 mg/L	0%	
	4.43 mg/L	0%	
SJC-C2	0	100%	3.03 mg/L
	0.464 mg/L	100%	
	1.18 mg/L	100%	
	1.81 mg/L	100%	
	3.15 mg/L	45%	

Summary

With these results, calculated LC50 values for each receiving water station were obtained that appeared consistent with previous tests. The results indicate that *Ceriodaphnia dubia* is much more sensitive to chlorine in a synthetic control dilution water environment than in receiving water. While long-term exposure will undoubtedly result in survival effects, short-term exposures to chlorine residuals of up to 1.0 mg/L did not result in 50% survival effects to *Ceriodaphnia dubia* in receiving waters. This study suggests that brief (5 minute or less) chlorine releases in the environment of less than 1.0 mg/L total chlorine could be tolerated in chlorine sensitive species such as *Ceriodaphnia dubia*.

APPENDIX B

Memorandum

LARRY WALKER ASSOCIATES

DATE:	12/13/05
TO:	Beth Bax
CC:	Ashli Desai Larry Walker
SUBJECT:	Los Angeles County Sanitation Districts Total Residual Chlorine Survey Results

AIRY KRICH-BRINTON

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As requested by the Los Angeles County Sanitation Districts (LACSD), Larry Walker Associates (LWA) extended a survey begun by the National Association of Clean Water Agencies (NACWA) concerning total residual chlorine. The original survey was directed to agencies that operate publicly owned treatment works (POTWs) outside of California and asked how USEPA's chlorine criteria have been implemented in these states, what alternative approaches have been used to translate criteria to NPDES permit limits, and what experiences other POTWs have had measuring very low levels of chlorine with chlorine residual continuous monitoring equipment. LWA extended the original survey to focus on how POTWs outside California complied with their permit limits for chlorine, numerically and through monitoring frequency. This memorandum presents the results of both surveys.

Description of Survey Participants

Agencies that operate POTWs from the following eleven states were surveyed by email and telephone (the number of agencies is in parentheses): Arizona (1), Colorado (6), Idaho (2), Indiana (1), Massachusetts (1), Michigan (1), Missouri (1), Ohio (1), Oregon (4), Virginia (1), and Washington (6). The adopted water quality criteria for these states are listed in Table 1. Twenty-five agencies operating a total of 44 POTWs were successfully surveyed, although the POTW in Missouri is not required to disinfect and thus was not included in the presented results. Of the remaining twenty-four agencies (43 POTWs), six agencies operate POTWs that disinfect using ultraviolet light (8 POTWs) and nineteen agencies operate POTWs that chlorinate (35 POTWs). The eight POTWs that disinfect using ultraviolet light were not included in the results because the majority of the questions did not apply. In addition, the four POTWs that use chlorine but discharge to marine waters were also not included. Therefore, eighteen agencies operating 31 POTWs are described herein that discharge to inland surface waters, estuaries or bays.

Table 1. Water Quality Criteria for Chlorine

State	**Acute Fresh Water** - Aquatic Life (ug/L)	**Chronic Fresh Water** - Aquatic Life (ug/L)	**Acute Marine Water** - Aquatic Life (ug/L)	**Chronic Marine Water** - Aquatic Life (ug/L)	Mixing Zones Allowed (with some exceptions)
Arizona	---	---	---	---	Pending
Colorado	19 (1 day average)	11 (30 day average)	---	---	Yes
Idaho	19 (1 hour average)	11 (4 day average)	---	---	Yes
Indiana	19 (1 hour average)	11 (4 day average)	---	---	Yes
Massachusetts	USEPA: 19 (1 hour average)	USEPA: 11 (4 day average)	USEPA: 13 (1 hour average)	USEPA: 7.5 (4 day average)	Yes
Missouri	19 warm	10 warm, 2 cold	---	---	Yes
Michigan	None	None	---	---	Yes
Ohio	19 (maximum)	11 (average)	---	---	Yes
Oregon	19 (1 hour average)	11 (4 day average)	13 (1 hour average)	7.5 (4 day average)	Yes
Virginia	19 (1 hour average) or undetected	11 (4 day average) or undetected	None	None	Yes
Washington	19 (1 hour average)	11 (4 day average)	13 (1 hour average)	7.5 (4 day average)	Yes
Range	**19**	**2 – 11**	**13**	**7.5**	**Yes**

Of the 18 agencies that use chlorine for disinfection and discharge to inland surface waters, only one agency that operates two POTWs is required by permit to monitor with continuous on-line equipment. In this case, the agency is in Oregon and preferred continuous monitoring to frequent grab samples; three other agencies in Oregon with standard NPDES permits are not required to use continuous monitoring for compliance. Fifteen agencies operate POTWs (24 total) that are known to dechlorinate their discharge water. (Two POTWs are known not to dechlorinate, and it was not established in this survey whether five other POTWs dechlorinate and if they do, by what method.) The surveyed agencies are listed with treatment plant names, capacity, and disinfection/ dechlorination method in Table 2. The acronym WTP in Table 2 stands for Wastewater Treatment Plant.

Table 2. Survey Respondents That Use Chlorine for Disinfection

Agency	POTW	Treatment Capacity (MGD)	Disinfection	Dechlorination
Pima County Wastewater Management, Tucson, Arizona	Pima County Roger Road WTP	41 design	Chlorine	Liquid bisulfite
City of Boulder, Colorado	75th Street WTP	25 design	Chlorine	Sulfur dioxide
City of Brighton, Colorado	Brighton WTP	3 maximum monthly	Chlorine	Sodium bisulfate liquid
City of Golden, Colorado	Genesee WTP	0.25 design	Chlorine	Sodium thiosulfate
Metro Wastewater Reclamation District, Colorado	Metro District WTP	227 maximum monthly	Chlorine	Sulfur dioxide
City of Pocatello Water Pollution Control, Idaho	Pocatello WTP	12 design	Chlorine	Sulfur dioxide
City of South Bend, Indiana	South Bend WTP	48 design	Chlorine	Sulfur dioxide
Massachusetts Water Resource Authority, Massachusetts	Clinton WTP	3 design	Chlorine	Sodium bisulfite
Northeast Ohio Regional Sewer District, Ohio	Southerly WTP	175 design	Sodium hypochlorite	[a]
	Easterly WTP	155 design	Sodium hypochlorite	[a]
	Westerly WTP	40 design	Sodium hypochlorite	[a]
Clean Water Services, Oregon	Durham WTP	[a]	Chlorine	[a]
	Rock Creek WTP	[a]	Chlorine	[a]
City of Portland, Oregon	Columbia Blvd WTP	60 average	Chlorine	Liquid sodium bisulfite
Eugene/Springfield Regional Water Pollution Control Facility, Oregon	Eugene/ Springfield WTP	49 design	Chlorine	Sulfur dioxide
City of Gresham, Oregon	Gresham WTP	18 average	Chlorine	Sodium bisulfide
Hampton Roads Sanitation District, Virginia	9 WTPs	[a]	Chlorine	Sodium bisulfite
	Virginia Initiative Sanitary Treatment Plant	40 design	Chlorine	Sodium bisulfite
Spokane County Regional, Washington	Spokane WTP	44 design	Chlorine	Sulfur dioxide
City of Tacoma, Washington	Tacoma Central WTP	38 design	Chlorine	None
	Tacoma North End #3 WTP	7.2 design	Chlorine	None
City of Walla Walla, Washington	Walla Walla WTP	9 design	Sodium hypochlorite	Sodium bisulfite
City of Yakima, Washington	Yakima WTP	25 design	Chlorine	Sulfur dioxide
18 Agencies	**31 POTWs**	**0.25 – 175**		**24 dechlorinate**

[a] The information was not provided in the survey.

The receiving waters and reported beneficial uses are listed in Table 3. Sixteen of the agencies operate POTWs (19) that discharge to a freshwater river or lake, and two operate POTWs (12) that discharge to a salt waterbody. Nine of the receiving waters have municipal drinking water supply beneficial uses (3 did not respond), and 18 have contact recreational use or aquatic life protection designations (2 did not respond). Please take note that some agencies operate several plants, which may discharge to separate receiving waters.

Table 3. Receiving Waters and Beneficial Uses

Agency	POTW	Receiving water	Municipal supply	Contact recreation/ aquatic life
Pima County Wastewater Management, Tucson, Arizona	Pima County Roger Road WTP	Santa Cruz River	No	No
City of Boulder, Colorado	75th Street WTP	Boulder Creek	Yes	Yes
City of Brighton, Colorado	Brighton WTP	South Platte River	No	Yes
City of Golden, Colorado	Genesee WTP	Bear Creek	[a]	[a]
Metro Wastewater Reclamation District, Colorado	Metro District WTP	South Platte River	Yes	Yes
City of Pocatello Water Pollution Control, Idaho	Pocatello WTP	Portneuf River	No	Yes
City of South Bend, Indiana	South Bend WTP	St. Joseph River	[a]	[a]
Massachusetts Water Resource Authority, Massachusetts	Clinton WTP	Nashua River	Yes	Yes
Northeast Ohio Regional Sewer District, Ohio	Southerly WTP	Cuyahoga River		Yes
	Easterly WTP	Lake Erie	Yes	Yes
	Westerly WTP	Lake Erie	Yes	Yes
Clean Water Services, Oregon	Durham WTP	Tualatin River	No	Yes
	Rock Creek WTP	Tualatin River	No	Yes
City of Portland, Oregon	Columbia Blvd WTP	Columbia River	Yes	Yes
Eugene/Springfield Regional Water Pollution Control Facility, Oregon	Eugene/ Springfield WTP	Willamette River	Yes	Yes
City of Gresham, Oregon	Gresham WTP	Columbia River	Yes	Yes
Hampton Roads Sanitation District, Virginia	10 WTPs	Chesapeake Bay, James River, York River (all saline)	No	Yes
Spokane County Regional, Washington	Spokane WTP	Spokane River	[a]	Yes
City of Tacoma, Washington	Tacoma Central WTP	Commencement Bay	No	Yes
	Tacoma North End #3 WTP	Commencement Bay	No	Yes
City of Walla Walla, Washington	Walla Walla WTP	Mill Creek	No	No
City of Yakima, Washington	Yakima WTP	Yakima River	Yes	Yes
Summary	**POTWs discharging to:**	**Rivers/ lakes: 19 Salt/bays: 12**	**MUN: 9**	**REC, Aq: 18**

[a] The information was not provided in the survey.

Description of Permit Limits for Respondents

The POTWs using chlorine for disinfection have daily maximum, daily average, weekly average, or monthly average permit limits for chlorine, except one which has a limit for dechlorinating agent instead of chlorine. The permit limits for all the chlorinating POTWs are shown in Table 4.

Most of the permit limits are higher than that states' adopted water quality criteria for chlorine. Only five of the POTWs have effluent limits that are as low as USEPA water quality criteria for chlorine. This is mainly due to the allowance of mixing zones or dilution. The language in selected states' regulations for the use of mixing zones when issuing permits is as follows:

- Colorado: For discharges not exempted as explained in subsection 31.10(2), the permit limit for any parameter for which there is a water quality standard shall be that resulting in acute and chronic exceedance zones equal to or smaller than the respective acute and chronic regulatory mixing zones. *(Colorado Department of Public Health and Environment Water Quality Control Commission, Regulation no. 31, Basic Standards and Methodologies for Surface Water (5 CCR 1002-31).)*

- Idaho: After a biological, chemical, and physical appraisal of the receiving water and the proposed discharge and after consultation with the person(s) responsible for the wastewater discharge, the Department will determine the applicability of a mixing zone and, if applicable, its size, configuration, and location. *(Idaho Administrative Code, Department of Environmental Quality, EDAPA 58.01.02 – Water Quality Standards and Wastewater Treatment Requirements.)*

- Indiana: All surface water quality standards in this rule, except those provided in section 6(a)(1) of this rule, are to be applied at a point outside of the mixing zone to allow for a reasonable admixture of waste effluents with the receiving waters. Due to varying physical, chemical, and biological conditions, no universal mixing zone may be prescribed. *(Indiana Administrative Code, Article 2. Water Quality Standards.)*

- Massachusetts: Mixing zones are allowed except for:
    - Water supply intakes
    - Productive shellfish areas
    - Bathing beaches
    - Sensitive aquatic life habitats

    (Table 1.1 Summary of mixing zone policy, Massachusetts Surface Water Quality Standards Implementation Policy for Mixing Zones, 1993.)

- Michigan: A mixing zone is that portion of a water body allocated by the department where a point source or venting groundwater discharge is mixed with the surface waters of the state. Exposure in mixing zones shall not result in deleterious effects to populations of aquatic life or wildlife. As a minimum restriction, the final acute value for aquatic life shall not be exceeded when determining a wasteload allocation for acute aquatic life protection, unless it is determined by the department that a higher level is acceptable or it can be demonstrated to the department that an acute mixing zone is acceptable. *(Administrative Rules, Part 4. Water Quality Standards (Promulgated pursuant to Part 31 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.) Effective 1973, latest revision effective 1999.)*

- Ohio: Pursuant to Chapter 3745-2 of the Administrative Code, where necessary to attain or maintain the use designated for a surface water by these water quality standards, the director may establish, as a term of a discharge permit issued pursuant to Chapter 3745-33 of the Administrative Code or a permit to install issued pursuant to Chapter 3745-31 of the Administrative Code, a mixing zone applicable to the non-thermal constituents of the point source discharge authorized by such permit. For lakes and reservoirs (except Lake Erie) defined as state resource waters by rule 3745-1-05 of the Administrative Code, no mixing zone shall be permitted. *(Promulgated under: R.C. Section 119.03, Rule authorized by: R.C. Sections 6111.041.)*

- Oregon: Mixing zones are allowed and used in calculating effluent limits. For the Eugene/Springfield Regional Water Pollution Control Facility, the allowable mixing zone is that portion of the Willamette River from 20 feet upstream of the diffuser to 200 feet downstream of the diffuser. In addition, the Zone of Immediate Dilution (ZID) shall include that portion of the Willamette river within 50 feet downstream of the diffuser. The permit contains either technology or water quality based effluent limits for those parameters discharged by the permittee that the Department has determined require effluent limitations to comply with the water quality standards found in OAR 340-41-445 outside the above mixing zones. *(Charles Logue of Clean Water Services, Oregon, and Bob Sprick, Operations Supervisor for Eugene/Springfield Regional WPCF, response to NACWA Survey Questions, Total Residual Chlorine Standards & Permit Requirements, August 16, 2005.)*

- Virginia: The board may use mixing zone concepts in evaluating limitations for Virginia Pollutant Discharge Elimination System permits. (Many exceptions apply.) "Mixing zone" means a limited area or volume of water where initial dilution of a discharge takes place and where numeric water quality criteria can be exceeded but designated uses in the water body on the whole are maintained and lethality is prevented. (*9 VAC 25-260 Virginia Water Quality Standards. Statutory Authority: § 62.1-44.15 3a of the Code of Virginia.)*

- Washington: The allowable size and location of a mixing zone and the associated effluent limits shall be established in discharge permits, general permits, or orders, as appropriate. Mixing zone determinations shall consider critical discharge conditions. No mixing zone shall be granted unless the supporting information clearly indicates the mixing zone would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health as determined by the department. *(Chapter 173-201A WAC. Water Quality Standards for Surface Waters of the State of Washington.)*

Table 4. POTW Permit Limits

Agency	POTW	Daily Maximum (ug/L)	30-day Average (ug/L)	Mixing Zone
Pima County Wastewater Management, Tucson, Arizona	Pima County Roger Road WTP	50, upcoming 8	---	Yes
City of Boulder, Colorado	75th Street WTP	20	4	No
City of Brighton, Colorado	Brighton WTP	170	---	Yes
City of Golden, Colorado	Genesee WTP	11 [a]	19 [a]	No
Metro Wastewater Reclamation District, Colorado	Metro District WTP	19 (daily average)	11	No
City of Pocatello Water Pollution Control, Idaho	Pocatello WTP	58	25	Yes
City of South Bend, Indiana	South Bend WTP	50	---	Yes
Massachusetts Water Resource Authority, Massachusetts	Clinton WTP	30.4	17.6	Yes
Northeast Ohio Regional Sewer District, Ohio	Southerly WTP	21	---	Yes
	Easterly WTP	38	---	Yes
	Westerly WTP	38	---	Yes
Clean Water Services, Oregon	Durham WTP	26 [b]	---	Yes
	Rock Creek WTP	32 [c]	---	Yes
City of Portland, Oregon	Columbia Blvd WTP	280 (limit of residual dechlorinator at low flow), 1000 (at high flow)	---	N/A
Eugene/Springfield Regional Water Pollution Control Facility, Oregon	Eugene/ Springfield WTP	120 (daily average)	50	Yes
City of Gresham, Oregon	Gresham WTP	360	140	Yes
Hampton Roads Sanitary District, Virginia	9 WTPs	---	Weekly or monthly average must be undetected	Yes
	Virginia Initiative Sanitary Treatment Plant	---	2400 (weekly average), 200 (monthly average)	Yes
Spokane County Regional, Washington	Spokane WTP	8 summer 12 winter	---	No
City of Tacoma, Washington	Central WTP	325	124	Yes
	North End #3 WTP	590	220	Yes
City of Walla Walla, Washington	Walla Walla WTP	17.9	9.0	No
City of Yakima, Washington	Yakima WTP	29	12	Yes

[a] As specified in the Discharge Limitations section of the Genesee NPDES permit.

[b] Not to exceed 38 for more than 60 continuous minutes. In the event of continuous monitoring equipment failure, grab samples shall be taken every four (4) hours. The average of any six consecutive samples shall not exceed 0.026 mg/L and no individual grab sample shall exceed 0.038 mg/L.

[c] Not to exceed 48 for more than 60 continuous minutes. In the event of continuous monitoring equipment failure, grab samples shall be taken every four (4) hours. The average of any six consecutive samples shall not exceed 0.032 mg/L and no individual grab sample shall exceed 0.048 mg/L.

Description of Monitoring Frequency and Analytical Methods

The 31 POTWs that use chlorine for disinfection typically monitor for residual chlorine using a portable Hach monitor or other meter to detect chlorine using the DPD (Diethyl-P-Phenylene Diamine) colorimetric method or amperometric titration. The monitoring frequencies, analytical methods (meter type and/or EPA method), method detection limits (MDLs) and reporting limits (RLs) are shown in Table 5.

Table 5. Total Chlorine Residual Monitoring and Analytical Methods

Agency	POTW	Permitted Monitoring Frequency	Analysis Method or Device	MDL (ug/L)	RL (ug/L)
Pima County Wastewater Management, Tucson, Arizona	Pima County Roger Road WTP	Grab 1/day	Hach meter DR 20-10	50	---
City of Boulder, Colorado	75th Street WTP	Every 3 hours	Amperometric DPD colorimetric analysis and Hach meter (alternative method)	---	50 (ampero) 100 (Hach)
City of Brighton, Colorado	Brighton WTP	Grab 3/day	Portable Hach meter	---	30
City of Golden, Colorado	Genesee WTP	Grab 5/week	DPD colorimetric with Hach meter DR 20-10 and amperometric titration	100 (DPD) 50 (ampero)	---
Metro Wastewater Reclamation District, Colorado	Metro District WTP	Grab 4/day (Hach) and 1/day (titrator)	DPD Hach colorimeter and Wallace Tierman amperometric titrator	50 (titrator) 100 (Hach)	---
City of Pocatello Water Pollution Control, Idaho	Pocatello WTP	Grab 5/week	Hach meter 81-67, EPA 330.5	---	100
City of South Bend, Indiana	South Bend WTP	Every 4 hours	Hach pocket colorimeter	---	20
Massachusetts Water Resource Authority, Massachusetts	Clinton WTP	Grab 3/day	Amperometric titration, EPA 330.1, Hach Chlorine Pocket Colorimeter	20	---
Northeast Ohio Regional Sewer District, Ohio	Southerly WTP Easterly WTP Westerly WTP	Grab 8/day	Amperometric titration, EPA 330.1, HACH Autocat 9000	5	50
Clean Water Services, Oregon	Durham WTP Rock Creek WTP	Continuously, or 6 grabs per day [a]	EPA method 330.1, Phenylarsine oxide (PAO) amperometric titration, Wallace & Tierman amperometric titrator Series A-790	---	25 [b]
City of Portland, Oregon	Columbia Blvd WTP	The meters are used to guarantee excess dechlorinator	Mild acid converts chlorine to free chlorine, titrate with potassium iodide standard buffer	None	None

Agency	POTW	Permitted Monitoring Frequency	Analysis Method or Device	MDL (ug/L)	RL (ug/L)
Eugene/Springfield Regional Water Pollution Control Facility, Oregon	Eugene/ Springfield WTP	Grab 1/day	Amperometric titration, EPA 330.1, Enterra Amperometric Titrator	---	20
City of Gresham, Oregon	Gresham WTP	Grab 1/day	Colorimetric test with DPD using Hach meter DR 7-10	---	20
Hampton Roads Sanitary District, Virginia	10 WTPs	Grab every 2 hours prior to dechlorination and effluent 1/day	DPD/FAS titration, EPA 330.4	100	100
Spokane County Regional, Washington	Spokane WTP	Grab 2/day	Hach residual analyzer	10	---
City of Tacoma, Washington	Central WTP North End #3 WTP	Grab 1/day	A current model using DPD	---	50
City of Walla Walla, Washington	Walla Walla WTP	Grab 1/day	Amperometric titration, SM4500-Cl-E	10 [c]	---
City of Yakima, Washington	Yakima WTP	Grab 3/week	Amperometric back titration with Hach meter, EPA 330.2, also SM4500-Cl-C	6 [d]	---
Summary	**Only one agency (2 POTWs) is required to monitor continuously.**				

[a] The permit monitoring requirements specify continuous monitoring with these notes:

Note 2. "In the event of malfunction of continuous monitoring equipment, monitoring using 6 grab samples per day may be substituted."

Note 3. "A positive bisulfite residual is considered proof of no chlorine in the effluent."

[b] This is not the manufacturer's MDL. It is a calculated reporting limit based on performance.

[c] This value is not a calculated MDL, but the value reported in the Standard Methods manual for that method.

[d] This value is not a calculated MDL, but the value reported in the handbook for the Hach meter.

Method of Compliance with Permit Limits for Chlorinating POTWs

Some POTWs have numeric permit limits below their respective Method Detection Limit (MDL, the analytical level defined for that method or instrument) or Reporting Limit (RL, a higher value adjusted to account for laboratory testing variability) therefore, compliance cannot be proven with the available chlorine measurements. Table 6 lists the POTWs and their ability to comply with permit limits and the specific permit language or a description of the unwritten convention that they use to comply, if any.

Table 6. Summary of Compliance Methods

Agencies and POTWs		Permit Limits		Monitoring Methods			Compliance Methods	
Agency	POTW	Daily Maximum (ug/L)	30-day Average (ug/L)	Permitted Monitoring Frequency	MDL (ug/L)	RL (ug/L)	Can equipment measure to permit limits?	Permit language or unofficial reporting procedure to enable compliance
Pima County Wastewater Management, Tucson, Arizona	Pima County Roger Road WTP	50 current, 8 future	---	Grab 1/day	50	---	Yes	None needed for the current permit limit.
City of Boulder, Colorado	75th Street WTP	20	4	Every 3 hours	---	50 (ampero) 100 (Hach)	No	Undetected values can be reported as less than the MDL.
City of Brighton, Colorado	Brighton WTP	170	---	3/day	---	30	Yes	None needed.
City of Golden, Colorado	Genesee WTP	11	19	Grab 5/week	100 (DPD) 50 (ampero)	---	No	The permit states that analytical results that are less than the MDL shall be considered to be zero for calculation purposes. If all are <MDL, report as "<MDL".
Metro Wastewater Reclamation District, Colorado	Metro District WTP	19	11	4/day (Hach) and 1/day (titrator)	50 (titrator) 100 (Hach)	---	No	The permit states that analytical results that are less than the MDL shall be considered to be zero for calculation purposes. If all are <MDL, report as "<MDL".
City of Pocatello Water Pollution Control, Idaho	Pocatello WTP	58	25	5/week	---	100	No	The permit states that results reported below the Minimum Level (100 µg/L) are considered in compliance. They can report values below the RL as 0.
City of South Bend, Indiana	South Bend WTP	50	---	Every 4 hours	---	20	Yes	None needed.
Massachusetts Water Resource Authority, Massachusetts	Clinton WTP	30.4	17.6	Grab 3/day	20	---	No	Undetected values can be reported as 0 or less than the MDL.
Northeast Ohio Regional Sewer District, Ohio	Southerly WTP	21	---	8/day	5	50	Yes, with MDL	The permit states that any analytical result reported less than the Ohio EPA Quantification Level (50 ug/L) shall be considered to be in compliance with that limit, if permit limits are below that limit.
	Easterly WTP	38	---					
	Westerly WTP	38	---					

Agencies and POTWs		Permit Limits		Monitoring Methods			Compliance Methods	
Agency	POTW	Daily Maximum (ug/L)	30-day Average (ug/L)	Permitted Monitoring Frequency	MDL (ug/L)	RL (ug/L)	Can equipment measure to permit limits?	Permit language or unofficial reporting procedure to enable compliance
Clean Water Services, Oregon	Durham WTP	26 (Not to exceed 38 in 60 minutes)	---	Continuously	---	25	Yes	Concentrations are reported as an average at 0.000 mg/L. A positive dechlorinator residual (bisulfite) can be used as proof of no chlorine in the effluent.
	Rock Creek WTP	32 (Not to exceed 48 in 60 minutes)	---					
City of Portland, Oregon	Columbia Blvd WTP	280 residual dechlorinator (low flow), 1000 (high flow)	---	The meters are used to guarantee excess dechlorinator	None	None	N/A: Meter maintains excess dechlorinating agent	They are in compliance as long as the meter measures excess dechlorinating agent.
Eugene/Springfield Regional Water Pollution Control Facility, Oregon	Eugene/ Springfield WTP	120	50	Grab 1/day	---	20	Yes	"If the permittee can show that the excursion did not result in a stream condition which exceeds the water quality standard for chlorine, then the excursion shall not be considered a violation of this permit."
City of Gresham, Oregon	Gresham WTP	360	140	1/day	---	20	Yes	None needed.
Hampton Roads Sanitary District, Virginia	9 WTPs	---	Weekly or monthly average <RL	Grab every 2 hours prior to dechlorination and effluent 1/day	100	100	Yes	Weekly or monthly average permit limits do not address individual excursions.
	Virginia Initiative Sanitary Treatment Plant	---	2400 weekly, 200 monthly ave					
Spokane County Regional, Washington	Spokane WTP	8 summer; 12 winter	---	Grab 2/day	10	---	No in summer, yes in winter	They may report <10 ug/L, as a "limit of quantification" (LOQ), which is their statistically derived MDL.
City of Tacoma, Washington	Tacoma Central WTP	325	124	1/day	---	50	Yes	None needed.
	Tacoma North End #3 WTP	590	220					

Agencies and POTWs		Permit Limits		Monitoring Methods			Compliance Methods	
Agency	POTW	Daily Maximum (ug/L)	30-day Average (ug/L)	Permitted Monitoring Frequency	MDL (ug/L)	RL (ug/L)	Can equipment measure to permit limits?	Permit language or unofficial reporting procedure to enable compliance
City of Walla Walla, Washington	Walla Walla WTP	17.9	9	Grab 1/day	10 (from Standard Methods)	---	Yes	Their analyzing method can report chlorine residual or dechlorinating agent. When dechlorinating agent is present, chlorine residual is reported as zero.
City of Yakima, Washington	Yakima WTP	29	12	Grab 3/week	6 (from Hach manual)	---	Yes	If they know about construction or repair that will result in an exceedence, they must notify the authorities in writing. Otherwise, same as above. Their permitted sampling frequency is less than their numerical permit limit averaging period. This is an implied exceedence allowance.

Summary

Of the 18 agencies and 31 POTWs that use chlorine for disinfection and discharge to non-marine waters, one operates two POTWs that are required by permit to monitor with continuous on-line equipment even though other POTWs in the same state use grab samples for compliance determinations. Four additional agencies operate POTWs that use continuous on-line monitoring equipment to control the dechlorination feed and ensure that chlorine is undetected, but this information is not used to determine compliance with permit limits. Only five of the 31 POTWs have one or more permit limits as low as the USEPA criteria (or lower); the other 26 plants have mixing zones or dilution credits and are allowed higher end-of-pipe limits.

Thirty of the 31 POTWs have permit limits for residual chlorine. Of the 30 POTWs with chlorine permit limits, six POTWs (20%) use monitoring equipment that cannot detect chlorine at concentrations at or below their permit limits. Four of these six POTWs have language in their permit allowing a value greater than the permit limit to indicate compliance, and two have been allowed to report undetected values above the permit limit, although permission is not explicitly given in their permit.

Please contact me with any questions or concerns.

Attachments:

Survey questions
Survey raw results
Master summary table

Attachment 3: Suggested Edits on the Policy

TOTAL RESIDUAL CHLORINE AND
CHLORINE-PRODUCE OXIDANTS POLICY OF CALIFORNIA (Policy)

Introduction-

Chlorine is extremely toxic to aquatic life in both *freshwater*[1] and *saltwater*. Thus, every discharger that uses chlorine has the potential to cause *acute toxicity*. Although a chlorination-*dechlorination* process can be used and maintained, it can be incomplete, leaving *total residual chlorine* (TRC) in freshwater, or *chlorine-produced oxidants* (CPO) in saltwater. Consequently, TRC and CPO in wastewater discharges must be regulated.

The approach for addressing TRC and CPO currently varies between Regional Water Quality Control Boards (Regional Water Boards) and enforcement of violations has become difficult. A statewide chlorine Policy for TRC and CPO is needed to protect aquatic beneficial uses, promote consistency, and improve clarity for dischargers and water board permit writers.

This Policy establishes:

1. TRC and CPO objectives that apply to all *inland surface waters* and *enclosed bays* and *estuaries* throughout the State to protect aquatic life beneficial uses;
2. Consistent procedures to regulate TRC & CPO discharges that apply to *National Pollutant Discharge Elimination System* (NPDES) permits that contain one or more numeric water quality-based effluent limitations; and
3. A basis for equitable compliance determinations to adequately enforce violations of TRC or CPO effluent limitations in non-storm water NPDES permits.

Policy Applicability –

This Policy establishes, in Part I, TRC and CPO objectives that apply to all inland surface waters and enclosed bays and estuaries in California. The objectives apply to waters with beneficial uses including: warm freshwater habitat; cold freshwater habitat; inland saline water habitat; estuarine habitat; rare, threatened, or endangered species; migration of aquatic organisms; and spawning, reproduction and/or early development. Part II of this Policy establishes implementation procedures for the objectives. Part II of this Policy applies only to NPDES permits that contain one or more numeric water quality-based effluent limitations. Part II does not apply to NPDES permits that contain only requirements for best management practices, in lieu of numeric water quality-based effluent limitations, as authorized under 40 Code of Federal Regulations (CFR) section 122.44(k), revised as of July 1, 2004. The Policy supersedes any and all numeric TRC or CPO objectives and implementation provisions for TRC or CPO in regional water quality control plans (Basin Plans) for the same waters.

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[1] Italicized words throughout this document have attached definitions located in section titled "Definition of Terms".

Because this Policy establishes objectives that apply only to inland surface waters and enclosed bays and estuaries, the Policy does not apply to the direct reuse of recycled water that is conveyed to the use site without entering surface waters of the State. The Policy does apply to the indirect reuse of recycled water that is conveyed to the use site through inland surface waters of the State.

PART I

Objectives –

The following objectives apply to all inland surface waters and enclosed bays and estuaries to protect freshwater and saltwater aquatic life:

Continuous Chlorine Residual Discharge

	1-hr average (ug/L)	4-day average (ug/L)
TRC (freshwater)	19	11
CPO (saltwater)	13	7.5

Intermittent Chlorine Residual Discharge

	Instantaneous Maximum (µg/L)
TRC (freshwater)	$C = \frac{1070}{T^{0.740}}$
CPO (saltwater)	$C = \frac{63.1}{T^{0.43}}$
C = TRC or CPO instantaneous maximum objective (µg/L)	
T = Sum of intermittent discharge times (in minutes) during a 24-hour period, not to exceed 120 minutes.	

PART II

Determining the Need for Water Quality-Based Effluent Limits-

If a discharger used chlorine in its processes, the discharger's NPDES permit must include an effluent limit.

Calculation-

Effluent limitations for the continuous discharge of chlorine residual concentrations shall be expressed as the objectives above, in *1-hour average* and *4-day average*, rather than a weekly or monthly average. Because chlorine residual can be acutely toxic to fish and other aquatic life within minutes of exposure, weekly and monthly limits are not protective and are, therefore, impracticable.

For intermittent discharges of chlorine residual concentrations less than two hours per day, the objectives for intermittent discharges apply in lieu of the 1-hour and 4-day averages[2]. Intermittent discharges shall not exceed two hours in a 24-hour period. The combined length of time for all intermittent discharges within a 24-hour period cannot exceed 2 hours, and the combined discharge time shall be used in the intermittent discharge calculation in Part I above. For example a 15-minute discharge, which occurs 4-times in a 24-hour period will have a *T* of 60 minutes.

For discharges that can be either continuous or intermittent (e.g., in the situation where the water is discharged continuously at some times and intermittently at others due to circumstances such as water reuse demands, the NPDES permit for that discharge shall include both the continuous and intermittent chlorine residual objectives. The intermittent chlorine residual objectives shall apply when the discharge time is less than two hours in a 24-hour period, and the continuous objective shall apply at all other times.

Calculation procedures for discharges with mixing zones should be included here.

Compliance Schedules –

Where an *existing* discharger demonstrates that it is *infeasible* to promptly comply with a ~~new or more restrictive~~ chlorine residual effluent limit or other provision of this Policy, the discharger may request a compliance schedule from the permitting authority. A compliance schedule can be granted to existing dischargers, for example, to investigate the feasibility of acquiring new equipment, hire or train staff, or reconfigure treatment processes to help achieve compliance with this Policy. A compliance schedule may be issued at permit issuance, reissuance or modification, or if otherwise deemed appropriate by the individual Regional Water Quality Control Board (Regional Board) in the case of a discharger showing good cause.

A schedule of compliance shall require actions to be undertaken for the purpose of achieving compliance with this Policy. These actions shall demonstrate reasonable

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[2] Dischargers using chlorine in its processes that discharge the disinfected effluent to an inland surface water for more ~~greater~~ than 2 hours in a 24-hour period must comply with continuous chlorine discharge requirements.

progress toward attaining TRC and/or CPO effluent limitations or other provisions of this Policy.

The discharger must provide justification for the allowance of a compliance schedule, which shall include the following:

1. Documentation of efforts to control chlorine residual;
2. Documentation that facility upgrades are planned or underway, if applicable;
3. Documentation of an overall plan to gain compliance; and
4. A demonstration that the proposed schedule is as short as practicable.

Compliance schedules shall be as short as possible, but in no case exceed five years from the date that the compliance schedule is issued.permit is issued, reissued, or modified to include the new or more stringent effluent limits or other Policy requirements. The compliance schedule shall include interim TRC and CPO limitations that apply during the compliance period. The interim limitations will be based on past performance at the specific discharge.

-Compliance schedules shall not be allowed in permits for *new dischargers*.

Monitoring Requirements -

Dischargers must measure chlorine residual either directly or *indirectly*. The Regional Water Board shall require *continuous monitoring* of chlorine residual and/or dechlorination agent residual concentrations for all facilities unless an exemption is granted. Continuous monitoring is defined as monitoring that produces one or more data points every minute. Maintenance of continuous monitoring equipment shall be upheld per manufacture's specifications. The Regional Water Board may, however, exempt facilities on a case-by-case basis from continuous monitoring requirements where the discharger demonstrates, and the Regional Water Board determines, that continuous monitoring does not appropriately characterize the discharge and the exemption is adopted by the Regional Water Board through the NPDES permitting process. For example, facilities with intermittent chlorine residual discharges above 2 hours per 24-hour period could be exempted from the continuous monitoring requirement, if appropriate. In such cases, dischargers would become responsible for intermittent chlorine discharge monitoring.

Intermittent chlorine discharge monitoring must adequately characterize the discharge. If continuous chlorine monitoring is not used for intermittent discharges, gGrab samples shall be collected at least every 15 minutes during each intermittent period of chlorination. In addition, regardless of the duration of the intermittent chlorination event, at least one grab sample shall be collected when the discharge concentration is expected to be at the maximum of a chlorination event.

Quantification/Reporting Requirements –

On-line chlorine residual devices must have the ability to record measurements at no less than one per minute and record concentrations in parts per billion (ug/L or ppb). If possible, Oon-line devices shouldmust have a manufacturer's stated detection limit, scale range, or sensitivity below the permitted effluent limit. All standard calibration concentrations shall be within the detection range reported by the manufacturer. If possible, ~~T~~the minimum calibration concentration shall not be above the lowest effluent limit in the permit. The maximum calibration concentration must not be above the reported detection range for the instrument, or 500 mg/L if no upper detection bound is provided by the manufacturer. Calibration methods should follow the manufacturer's recommendations. Facilities should also follow manufacturer's recommendations regarding reagent replenishment and shelf life. Facilities must verify the solution concentration by Method 4500-CI E as found in Standard Methods for the Examination of Water and Wastewater, 20th edition, whose stated detection limit is 0.010 part per million. All off-line measurements of chlorine residual shall be performed using this analytical method.

The *quantification/reporting limit* (QRL) shall not exceed the facility's effluent limit. However, if the Regional Water Board determines on a case-by-case basis that a discharger cannot meet the QRL set at the effluent limit and that it is infeasible for the discharger to show compliance via the presence of residual dechlorination agent or by another means (see the Compliance Determination section of this Policy), the Regional Water Board may establish a QRL, provided that the discharger completes and submits a QRL study.

If a discharger CAN demonstrate on a continuous basis the presence of residual dechlorinating agent via stochiometric records (based on the same recording interval as the on-line chlorine analyzer) or with an on-line dechlorinating agent analyzer, then compliance with the QRL provisions in this Policy is not required.

All readings at or above the QRL shall be recorded as ug/L and all readings below the QRL shall be recorded as non-detects (ND) for averaging purposes. To determine compliance, the discharger shall do the following:

Compliance with the One-Hour Limit

All readings recorded beginning with the hour and for 59 minutes afterwards shall be collected. All ND readings within this time frame shall be converted to zero. From the readings, the discharger shall compute the arithmetic mean, which shall be the value that is compared with the permit effluent limit. A new determination shall be made for the next hour time period beginning with the next hour. There shall be 24 determinations per day.

Compliance with the Four-Day Limit

All readings recorded beginning at 12 a.m. on the first day until 11:59 p.m. of the fourth day shall be collected. All ND readings within this time frame shall be converted to zero. From the readings, the dischargers shall compute the arithmetic mean, which shall be the value that is compared with the permit effluent limit. A new determination shall be fore the next four-day period beginning with midnight.

Compliance with the Intermittent Limit

A single grab sample cannot exceed the instantaneous maximum effluent limitations for TRC or CPO. If the analytical result of a single grab sample is higher than the instantaneous maximum effluent limitation for TRC or CPO, a violation will be flagged and the discharger will be considered out of compliance for that single sample. Non-compliance for each sample will be considered separately.

Compliance Determination –

Continuous monitoring analyzers for chlorine residual and/or for dechlorination agent residual in the effluent are appropriate methods of process control. A positive residual dechlorination agent in the effluent indicates that chlorine is not present in the discharge, which demonstrates compliance with the effluent limits. Also, the combination of a chlorine residual analyzer and a corresponding stoichiometric check[3] for each chlorine residual measurement interval can be used to show compliance with the effluent limitations since it demonstrates the presence of residual dechlorination agent in the effluent. On a case-by-case basis, the Regional Water Board may approve other options for compliance determinations as long as the discharge can demonstrate with certainty the absence of chlorine residual at levels greater than the effluent limitation. Establishing a residual amount of dechlorinating agent This type of monitoring can also prove that some chlorine residual exceedances are false-positives. Reporting a positive dechlorination agent residual and a zero chlorine residual areis sufficient to show compliance with the chlorine residual effluent limit, as long as the instruments are maintained and calibrated in accordance with the manufacturer's recommendations.

When continuous monitoring systems are off-line, such as for calibration and maintenance, a back-up system must be in place to show compliance. These systems can include, but are not limited to, monitoring for dechlorination residual (bisulfite or sulfite analyzer), redundant analyzers, *stoichiometry* method, or grab samples (in 40 CFR 136.3 Table IB, revised as of July 1, 2004) using U.S. Environmental Protection Agency approved methods. However, if grab samples are used they must adequately characterize the discharge. This means collecting at least one sample at 15 minute intervals of the discharge prior to its release into the receiving water and until the continuous monitoring system is back on-line. If the system is off-line less than 15 minutess, at least one sample must be obtained.

If grab samples taken at the end-of-pipe show chlorine residual above the stated effluent limit, the discharger must begin receiving water monitoring to adequately characterize and assess impacts to aquatic life within the receiving water. During situations where sampling the receiving water becomes a safety hazard, such as during the night in a swift moving river, the discharger can develop an alternative method to assess impacts to the receiving water and aquatic life. The Regional Water Board must approve the alternative method, however, prior to the exceedance.

Any excursion exceedance over the 1-hour average or, 4-day average for continuous discharges, or the instantaneous maximum for of the intermittent discharges is a violation. If a discharger conducts continuous monitoring and the discharger can demonstrate, through data collected from the discharger's back-up monitoring system, thenthat a purported excursionexceedance was not reallywill not be considered an actual

[3] A stoichiometric check entails comparing the amount of dechlorinating agent used to the amount of chlorine (before dechlorination) and flow in the system to determine if a chlorine residual existed at a given point in time.

exceedance, but rather ~~reported as~~ a false-positive measurement (as described at the beginning of this section), then the false positive will not be a violation. ~~.~~

Mixing Zones and Site-Specific Objectives-

To the extent authorized by the applicable Basin Plan, a Regional Water Board may grant a *mixing zone* for a discharge of TRC or CPO. Allowance of a mixing zone is discretionary. If a Regional Water Board grants a mixing zone, the objectives for TRC and CPO shall be met throughout the receiving water except within the mixing zone.

A Regional Water Board may develop a site-specific objective for TRC and CPO, or both, whenever it determines, based on its best professional judgment, that the objectives in this Policy are inappropriate for a particular water body. Any site-specific objectives must be developed in compliance with State and federal laws and regulations.

Attachment 4: Letters from the Los Angeles County Department of Health Services Regarding UV Disinfection at Whittier Narrows Water Reclamation Plant

State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services

SANDRA SHEWRY
Director

ARNOLD SCHWARZENEGGER
Governor

April 26, 2006

Mr. Michael Shortt
Trojan Technologies, Inc
3020 Gore Rd
London, Ontario, Canada N5V4T7

Dear Mr. Shortt:

TROJAN 3000PLUS UV DISINFECTION WITH 4 IN. LAMP SPACING

Based on the "UV3000™Plus Validation Report" (February 2006) which documents work conducted at the County Sanitation Districts of Los Angeles County, the Water Recycling Committee of the California Department of Health Services extends the conditional acceptance of the Trojan 3000Plus UV disinfection system with 4 in. lamp spacing to include the use of the Heraeus lamp (Trojan part number 794447). At a minimum, the Trojan 3000plus UV systems with a 4-inch lamp spacing should be designed to deliver UV dose recommendations in the NWRI/AWWARF UV Disinfection Guidelines.

Since the water quality conditions of testing ranged from 53 to 77% transmittance and a flow range of 6.2 to 126.5 gpm/lamp, design and operational settings will be restricted to these ranges. The following equation (sans lamp aging and sleeve fouling factors) cited in the report should be used for designing and operating the UV system.

$$\text{Dose per bank} = 10^{(-4.63-(0.70*\log(\text{flow}))+(2.91*\log(\text{UVT}))+(1.09*\log(\text{Power})))}$$

The design example contained in your report provides the user with practical tips on how the equation can be used to size and, once commissioned, operate the system. The terms and conditions for applying the quartz sleeve fouling factor for the Trojan 3000plus™ remains unchanged, but the end-of-lamp-life (EOLL) factor has been revised for the Heraeus lamp cited above.

Based on the information contained in the report titled "Trojan 3000™Plus 9,000-Hour Lamp Age Factor Report Heraeus Lamp" (December 2005), the Water Recycling Committee of the California Department of Health Services conditionally accepts the use of 0.98 as the lamp aging factor for the Heraeus lamp model GA64T6H (Trojan part no. 794447). Should the manner in which the lamp or any of its components is manufactured be changed, it is the responsibility of Trojan Technologies, Inc to inform the Department's Water Recycling Committee so that a determination can be made regarding the need to retest and reevaluate the EOLL.

As with all UV systems, it will be recommended that any Trojan 3000plus™ UV system be commissioned before being issued a permit. Such a test should demonstrate the reactor meets its design objectives by confirming:

1. the hydrodynamic conditions within the reactor are no worse than those present during validation testing, and

2. the lamp output produces an intensity field similar to that present during validation testing.

As a reminder, regulations and recommendations (by regulatory agencies) provide minimum design and operational criteria. These minimum requirements do not and should not preclude utilities from designing and installing systems with greater UV dose delivery to address pathogens that may be more difficult to disinfect than the present enteric virus surrogates. While no one can predict what the future regulatory objectives will be, we must constantly remind ourselves that, for water recycling, establishing a reliable consistent ever present barrier to human pathogens is the primary objective of disinfection in water recycling.

At present, the UV disinfection guidelines target 4 logs of enteric inactivation using poliovirus as the target organism. Poliovirus has been the surrogate enteric virus for a number of years. Until recently enteric viruses were thought to have been well represented by the poliovirus with respect to their susceptibility to UV disinfection. Recent research indicates that double stranded DNA viruses may be capable of UV repair and much more resistant to UV disinfection than poliovirus. This means the working model or surrogate for enteric viruses is probably not conservative when it comes to UV disinfection.

We do not anticipate an immediate change in public policy, but based on the UV disinfection requirements and targets in drinking water, there may be changes in the future. The proposed UV Disinfection Guidance Manual cites a reduction equivalent dose of 110 mJ/cm^2 for 1.5 logs of virus inactivation (based on adenovirus). A UV system designed and commissioned to deliver a 100 mJ/cm^2 would be short of achieving or obtaining a 1.5 log virus inactivation credit and well short of the UV dose needed to achieve a 4 log reduction of enteric virus. Granted the UVDGM tables are for drinking water, nevertheless, they represent a significant change in the surrogate and subsequent UV dose required to achieve enteric virus inactivation.

Occurrence data indicates the presence of adenovirus (by tissue culture assay) in secondary effluent, an agency such as the County Sanitation Districts of Los Angeles County might consider it prudent to establish a UV system design objective at a level above that recommended in the NWRI/AWWARF UV Guidelines. Until occurrence data provides us with better information on which to base a risk assessment, the current water quality objectives and the targets used to achieve those objectives will not change. However, it might not be in the best interest of a wastewater utility to simply design a system to meet current minimum regulatory recommendations.

Additional comments/recommendations/questions

"UV3000™Plus Validation Report" (February 2006)

pg. ES1 – The report references a November 2005 report. However, the original report (dated November 2005) was revised. The report is now dated February 2006 and should be referenced as such in the report. A search and replace to remove the November 2005 reference should be done and a revised report submitted to the Department.

pg. 14 – It appears as though it was over three years since the radiometer was calibrated. Is this a normal time interval? If not, this is something that should be checked. Se pg. 27 comment below.

pg. 27 – A statement regarding whether or not the collimated beam work passed the NWRI QA/QC requirement would be helpful. This should include a summary comparison of the QA/QC criteria and the actual collimated beam data.

This particular collimated beam test was very close to failing the NWRI/AWWARF QA/QC (one more data point outside the boundary). Is GAP EnviroMicrobial Services an ELAP certified laboratory for wastewater or water microbiological work? If not, you may want to consider using an ELAP certified laboratory for future work. Granted, ELAP does not certify for MS2 phage assays, but the QA/QC and good laboratory practices employed by ELAP certified laboratories may produce results that are not so close to failing the NWRI/AWWARF QA/QC criteria.

pg. 33 – Section 5.2.4 discusses the double bank testing from another report. The log removal additivity mentioned is correct, but only if the hydraulic independence between the modules is maintained. It is also possible the variability in the bioassay results might also mask any hydraulic impacts.

"Trojan 3000™Plus 9,000-Hour Lamp Age Factor Report Heraeus Lamp" (December 2005),

pg. 6 – In the description of the NFT apparatus, it is not clear how the lamp output from one lamp is isolated from the output of the second lamp. The statement makes it clear the output from the top lamp is measured, but it is unclear to one unfamiliar with the device how the output from the top lamp is isolated from any stray photons from the lower lamp.

pg. 12 – Consistently adding 20 percent to the intensity is a “key” assumption and the key is not the 20 percent, but the assumption the addition is consistent. Is there any data or fundamental understanding regarding UV sensors to support this assumption?

pg. 14 – How do you know the difference in the radiometer readings was associated with drift in the radiometer and not a combination of radiometer drift and variability in lamp output?

pg. 17 – Would you agree that the use of an EOLL based on average lamp performance is sufficient for the design of UV systems because the variability in lamp output is sufficiently accounted for the validation testing, i.e., the bioassay? Is there a way to measure the output of the lamps in the field? Velocity profiles used for commissioning will provide a partial picture of the UV dose delivered, but will not ensure the intensity field in the reactor is similar to the one in the validation study.

pg. 20 – Similarly, how does one know the source of the variability? Is it safe to assume the variability was in the radiometer and not the lamps? If so, how? One source of variability may dominate, but once that source of variability is reduced, another source will control the variability observed.

Should you have any questions regarding the content of this letter, please feel free to contact me at (510) 620-3499.

Very truly yours,

Original signed by

Richard H. Sakaji, PhD, PE
Senior Sanitary Engineer

cc: Water Recycling Committee
chron

Chi-Chang Tang
County Sanitation Districts of Los Angeles County
1955 Workman Mill Rd
Whittier, CA 90601

Andrew Salveson
Carollo Engineers
2700 Ygnacio Valley Road, Suite 300
Walnut Creek, CA 94598

October 24, 2005

Mr. Michael Shortt
Trojan Technologies, Inc
3020 Gore Rd
London, Ontario, Canada N5V4T7

Dear Mr. Shortt:

TROJAN 3000PLUS UV DISINFECTION WITH 4 IN. LAMP SPACING

Based on the "UV3000™Plus Validation Report" (June 2005) that documents work conducted at the County Sanitation Districts of Los Angeles County, the Water Recycling Committee of the California Department of Health Services conditionally accepts the Trojan 3000Plus UV disinfection system with 4 in. lamp spacing. At a minimum, the Trojan 3000plus UV systems with a 4-inch lamp spacing should be designed to deliver UV dose recommendations in the NWRI/AWWARF UV Disinfection Guidelines.

Since the water quality conditions of testing ranged from 53 to 77% transmittance and a flow range of 2.9 to 37.8 gpm/lamp, design and operational settings will be restricted to these ranges. The following equation cited in the report should be used for designing and operating the UV system.

$$\text{Dose per bank} = 0.78*10^{(-4.29-0.67*\log(\text{flow})+3.09*\log(\text{UVT})+0.70*\log(\text{Power}))}$$

The design example, using this equation, provides the user with practical tips on how the equation can be used to size and, once commissioned, operate the system. The terms and conditions for applying the previously accepted lamp age and quartz sleeve fouling factors for the Trojan 3000plus™ will apply.

As with all UV systems, it will be recommended that any Trojan 3000plus™ UV system be commissioned before being issued a permit. Such a test should demonstrate uniform flow distribution through each reactor train and hydrodynamic conditions within the reactor similar to that present during validation testing ultimately demonstrating that the reactor meets its design objectives.

Normally, velocity profile matching could be used in lieu of bioassay for commissioning the UV system, but the velocity measurements and profiles reported are outside the tolerance (±20% of theoretical hydraulic residence time) recommended by the NWRI/AWWARF guidelines. Based on this and other tests it is not reasonable to accept these velocity profiles as a substitute for bioassay commissioning, unless the built UV system matches the velocity profiles documented in this report (within the tolerances of the instrumentation). As always we will continue to work with you on alternatives for commissioning UV systems.

As a reminder, regulations and recommendations (by regulatory agencies) provide minimum design and operational criteria. These minimum requirements do not and should not preclude utilities from designing and installing systems with greater UV dose delivery to address pathogens that may be more difficult to disinfect than the present enteric virus surrogates. While no one can predict what the future regulatory objectives will be, we must constantly remind ourselves that, for water recycling, establishing a reliable consistent ever present barrier to human pathogens is the primary objective of disinfection in water recycling.

At present, the UV disinfection guidelines target 4 logs of enteric inactivation using poliovirus as the target organism. Poliovirus has been the surrogate enteric virus for a number of years. Until recently enteric viruses were thought to have been well represented by the poliovirus with respect to their susceptibility to UV disinfection. Recent research indicates that double stranded DNA viruses may be capable of UV repair and much more resistant to UV disinfection than poliovirus. This means the working model or surrogate for enteric viruses is probably not conservative when it comes to UV disinfection.

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