



A Public Agency 12800 RIDGE ROAD, SUTTER CREEK, CA 95685 • (209) 223-3018 Fax: (209) 257-5281

MEMORANDUM

To: Amador Water Agency, Board of Directors

From: Chris McKeage, Operations Manager

Date: November 23, 2009

Subj: Recent CDPH Comment Regarding Water Produced at the Tanner WTP.

The Amador Water Agency is charged with the responsibility of producing and delivering a safe and ample water supply to all its customers. Staff continues to work proactively with both our State regulators, wholesale customers and our retail customers alike. Safety and public health are our primary concern, but cost and efficiency are a constant driving factor as well.

Recently, the City of Jackson had three (3) lead samples that exceeded the MCL. Historically, to our knowledge, the city has always passed the 90th percentile MCL as required by state and federal law. However, recent chemical changes at the Tanner Water Treatment Plant (Tanner WTP) actually increased the corrosive effect of our water. The change which was prompted by recommendations made in a recent CDPH inspection report that suggested the agency could save some money and still provide an equal level of corrosion abatement. Unfortunately this ended up not being the case. As a result the Agency is ordering a new supply of corrosion inhibitor (Zinc-orthophosphate). This is the original corrosion inhibitor that the Tanner WTP has used for many years. While it is a little more expensive the corrosion mitigating performance is clearly superior.

Max Godde, the District Systems Operator of both the Jackson and Drytown systems, is working cooperatively with the Agency to conduct follow up water quality testing to verify the effectiveness of the Tanner WTP adjustments. The City of Drytown does seem to have one (1) sample site with other contributing factors. The Agency is interested in further investigation as to why the lead level of that particular site has tested consistently higher than the rest of the city. This test location negatively skews the data for the city as a whole. Ultimately we're sure a satisfying solution will be achieved.

The high lead levels of the recent Jackson and Drytown water quality testing prompted the November 16, 2009 CDPH letter which tries to make certain points and requests data. Previously in my letter to CDPH (see attached), I supplied the data and information we had,

including specific MSDS sheets, historical chemical dosing and plant water quality monitoring data. This was expected to meet the request made by CDPH.

The letter from CDPH goes on to discuss matters involving the LaMel Heights water system, Rabb Park, Ridgeway Pines, Pine Grove System and the Buckhorn Water Treatment Plant. All past lead and copper issues have been addressed and recent water quality data verifies this. These systems are not relevant to the current issue with the Tanner WTP which serves City of Jackson, Sutter Creek, Drytown, Amador City and now City of Plymouth.

Agency staff takes all water quality issues seriously and are working diligently to produce safe water at the most reasonable cost possible. If you or any of your customers have questions please have them give me a call at 209-257-5248 or attend our next board meeting on December 10, 2009 at 9:00 am for an update. I hope this letter and attached information is helpful.

Respectfully,



Chris McKeage,
Operations Manager

cc. Gene Mancebo, Interim General Manager, AWA
Doug Yardley, Water Production Supervisor, AWA
Michelle Opalenik, Amador EHD
Mike Daily, City of Jackson
Edwin Kaffer, Drytown CSD
Jay Olig, Pine Grove CSD
Frank Baumann, FJB Water Technology
Max Godde, Operator
Joseph Spano, P.E. CDPH

Encl. November 3rd response letter from AWA to CDPH
November 16th letter from CDPH to AWA

CM/ jm



A Public Agency 12800 RIDGE ROAD, SUTTER CREEK, CA 95685 • (209) 223-3018 Fax: (209) 257-5281

November 3, 2009

Mr. Joe O. Spano, P.E.
District Engineer
31 E. Channel Street, Ste: 270
Stockton, Ca 95202

RE: Water Corrosivity at Tanner Water Treatment Plant

This letter is in response to your emails of October 23, 2009 and October 27, 2009 regarding the corrosivity of water produced at the Tanner Water Treatment Plant. I have included a spreadsheet with the data you requested, but some added comment is needed.

- Historically the Tanner Water Treatment Plant added zinc orthophosphate to aid in corrosion control. Back in early 2009 after a discussion with you, staff decided to try a variant in the form of ortho-polyphosphate. The thought was that it was primarily the phosphate that mitigates water corrosivity and polyphosphate cost less than zinc orthophosphate. All of this was an effort to produce good quality water at a lower cost. In no way are we committed to staying with ortho-polyphosphate.
- The Agency started utilizing ortho-polyphosphate at the Tanner water treatment plant in July of 2009, but the plant recording forms did not get updated in the column description reflecting this change. Our forms have since been changed.
- As you can see in the accompanying graph the treated water leaving the clearwell has run fairly consistent in pH. Note that in May of 2007 we saw an increase in raw pH. This was about the time the Agency put the new Amador Pipeline into service. It seems the cement lining on the new ductile line leached some lime and for a period increased the pH level.
- Staff switched from 50% caustic soda to 25% years ago when the Tanner Water Treatment Plant was converted from Cl_2 gas to 12% sodium hypochlorite. This change allows the continued use of the existing feed system.

As we discussed last week the Agency became aware of the high level of lead and copper in Jackson and high follow up sample in Drytown. We decided to up our ortho-polyphosphate feed rate from 2 ppm to 3 ppm and bring the finished water pH up to 8. Max Godde the operator of both the above systems agreed to re-sample the failed sites. Based on those results Amador Water Agency will decide to either maintain the higher level of dosing, or consider going back to zinc orthophosphate. For many years before the use of ortho-polyphosphate, the areas of Sutter Creek, Jackson and Amador City have met the 90% MCL for both lead and copper. Drytown for some reason has had some elevated levels of lead and copper which may need further investigation.

Though we have corrosive water and our alkalinity is low, the adjustments of pH and use of zinc orthophosphate historically has been sufficient to meet State Regulations. Staff will move to explore the range of our existing mitigating ability to improve any corrosive tendencies.

We look forward to any assistance afforded by the Department to analyze out Tanner Water Treatment Plant Quality.

If you have any questions or concerns do not hesitate to contact me at 209-257-5248.

Respectfully,

A handwritten signature in blue ink, appearing to read "Chris Mckeage".

Chris Mckeage
Operations Manager
Amador Water Agency

CM: jm

CC. Gene Mancebo, Interim General Manager
Doug Yardly, Water Supervisor
Eric Christeson, Interim Engineering Supervisor
Michelle Opalenik, Environmental Health Specialist

0310003 Tanner Water Treatment Plant Corrosivity of Water
2007

	Average ZnPO ₄ mg/L	Average PO ₄ mg/L	Average (25%) Caustic Soda mg/L	Finished pH	Raw pH
Jan-07	1.0		1.7	7.3	7.0
Feb-07	1.1		2.2	7.2	7.0
Mar-07	1.0		2.0	7.3	7.1
Apr-07	1.1		2.2	7.5	7.3
May-07	2.0		1.0	7.7	7.5
Jun-07	1.1		*	8.0	7.5
Jul-07	1.4		*	7.9	7.6
Aug-07	1.4		*	7.7	7.3
Sep-07	1.6		*	7.6	7.3
Oct-07	1.6		*	7.7	7.4
Nov-07	1.6		*	7.8	7.5
Dec-07	1.6		*	7.6	7.2

* June 2007-May 2008 Caustic Soda feeder was turned off because the treated water pH was high due to switching over to the new Amador Transit Pipeline.

2008

	Average ZnPO ₄ mg/L	Average PO ₄ mg/L	Average (25%) Caustic Soda mg/L	Finished pH	Raw pH
Jan-08	1.5		*	7.7	7.9
Feb-08	1.5		*	7.5	7.7
Mar-08	1.3		*	7.7	7.7
Apr-08	1.4		*	7.7	7.7
May-08	1.4		*	7.6	7.4
Jun-08	1.3		0.07	7.7	7.4
Jul-08	1.3		0.7	7.7	7.3
Aug-08	1.4		0.5	7.8	7.4
Sep-08	1.5		0.6	7.6	7.4
Oct-08	1.7		0.5	7.6	7.4
Nov-08	2		1.6	7.6	7.6
Dec-08	2		1.6	7.7	7.5

When Tanner WTP started injecting sodium hypochlorite instead of chlorine gas we switched from 50% to 25% Caustic Soda. Logs were never changed. Made changes to logs for Oct-09

2009

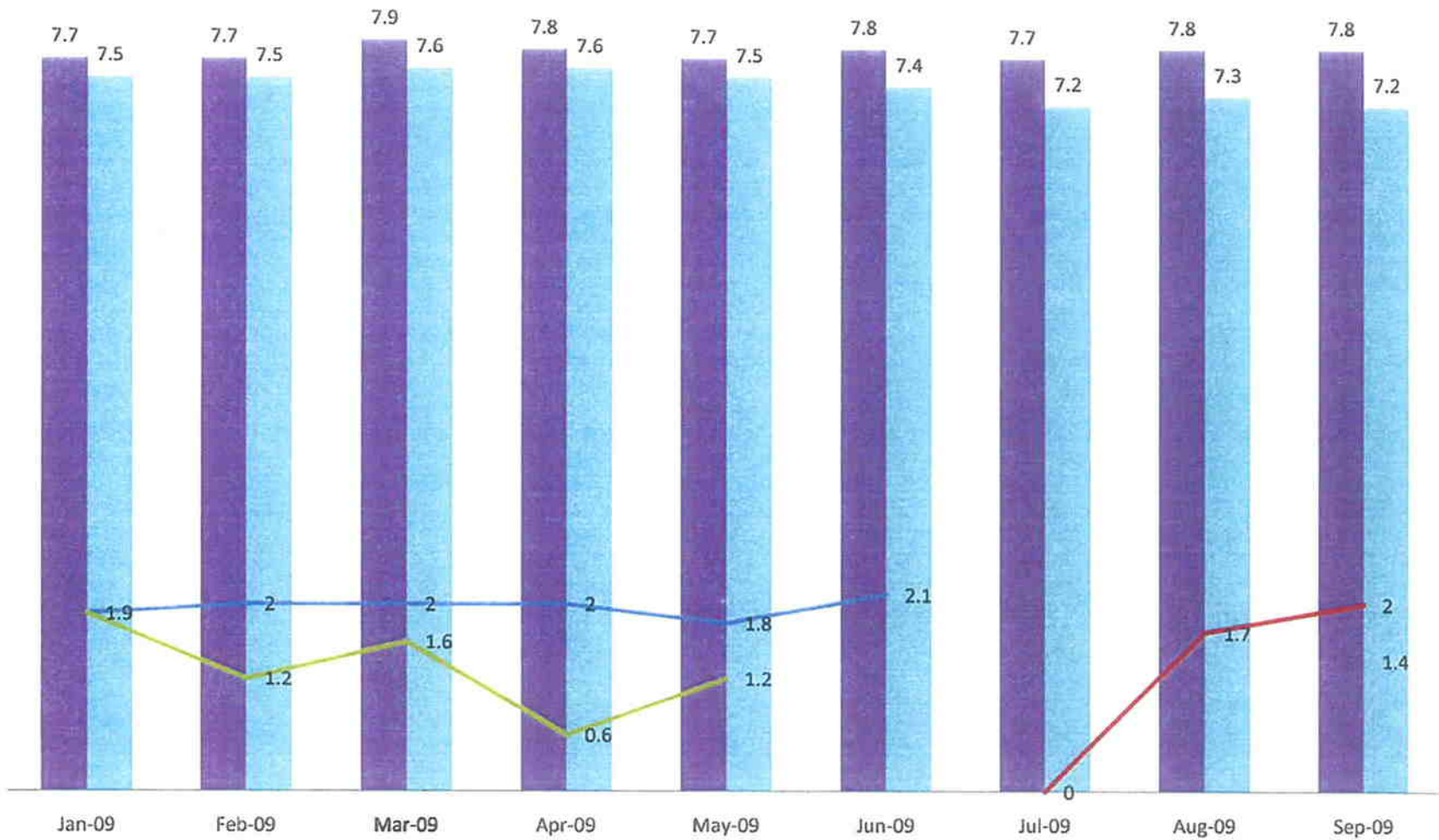
	Average ZnPO ₄ mg/L	Average PO ₄ mg/L	Average (25%) Caustic Soda mg/L	Finished pH	Raw pH
Jan-09	1.9		1.9	7.7	7.5
Feb-09	2		1.2	7.7	7.5
Mar-09	2		1.6	7.9	7.6
Apr-09	2		0.6	7.8	7.6
May-09	1.8		1.2	7.7	7.5
Jun-09	2.1		**	7.8	7.4
Jul-09		*1.8	**	7.7	7.2
Aug-09		1.7	**	7.8	7.3
Sep-09		2	1.4	7.8	7.2

* July 06, 2009 Switched from ZnPO₄ to PO₄

** Caustic Soda turned off because finish water pH was at 7.8.

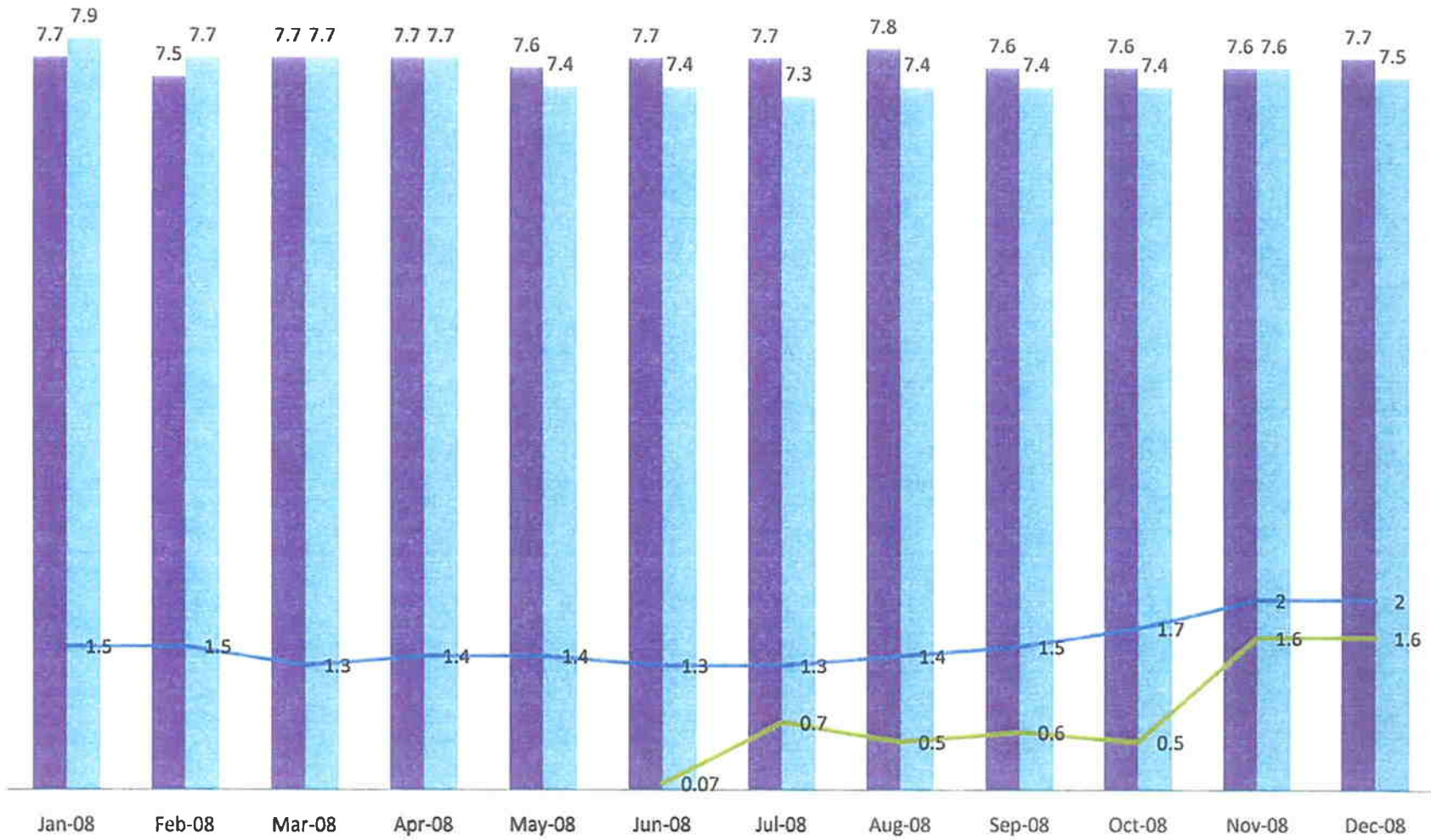
Tanner Corrosivity Rates 2009

■ Finished pH
 ■ Raw pH
 — Average ZnPO4 mg/L
 — Average PO4 mg/L
 — Average (25%) Caustic Soda mg/L



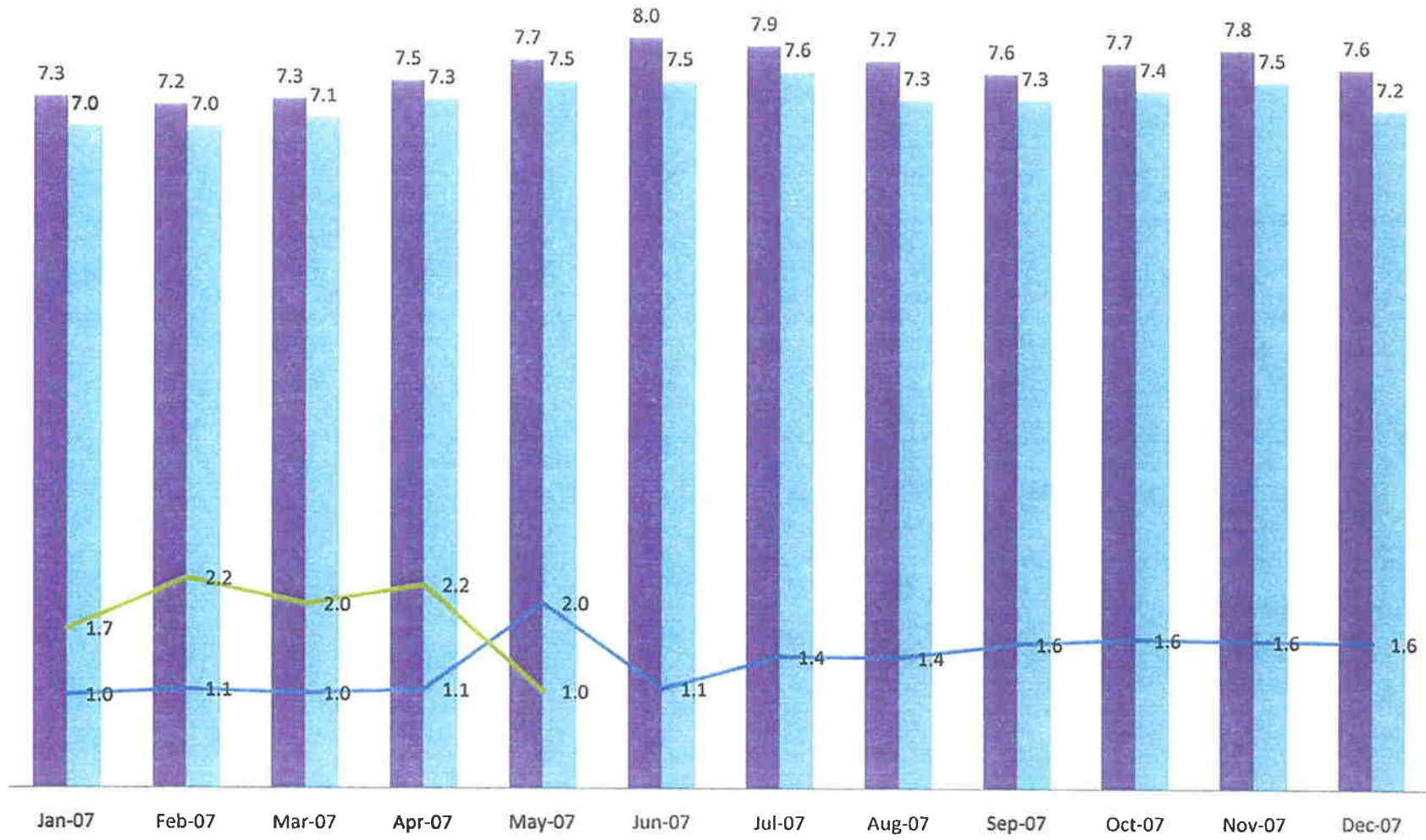
Tanner Corrosivity Rates 2008

■ Finished pH
 ■ Raw pH
 — Average ZnPO4 mg/L
 — Average PO4 mg/L
 — Average (25%) Caustic Soda mg/L



Tanner Corrosivity Rates 2007

■ Finished pH
 ■ Raw pH
 — Average PO4 mg/L
 — Average ZnPO4 mg/L
 — Average (25%) Caustic Soda mg/L





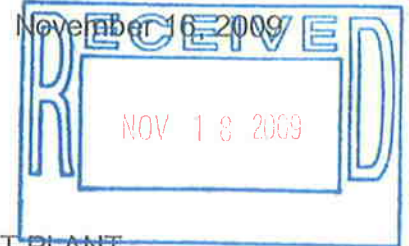
MARK B HORTON, MD, MSPH
Director

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



ARNOLD SCHWARZENEGGER
Governor

Mr. Gene Mancebo, Interim General Manager
Amador Water Agency
12800 Ridge Road
Sutter Creek, CA 95685



CORROSIVITY OF WATER FROM TANNER WATER TREATMENT PLANT

The Department has reviewed the letter of November 3, 2009, from Chris McKeage, Amador Water Agency Operations Manager, regarding the corrosivity of the water produced at the Agency's Tanner Water Treatment Plant. The Amador Water Agency (AWA) has an extensive history of serving corrosive water and an even more extensive reluctance to implement conventional corrosion control treatment at its water treatment plants to abate the exceedences of the lead and copper rule action levels established to measure the public health impact related to the distribution of corrosive water.

Water systems that exceed lead and/or copper action levels are required by regulation to conduct a corrosion control study to define the corrosion control treatment strategy best suited to abate the corrosivity of the water entering the distribution system. Since there are few licensed corrosion control engineers qualified to conduct corrosion control studies and since the cost of such studies is typically burdensome, particularly for small water systems, the Department has offered the services of Dr. Frank Baumann, an employee of the Department that is also a licensed Corrosion Control Engineer to water systems for many years.

The most significant waste of resources related to the implementation of a corrosion control strategy involved the Amador Water Agency's LaMel Heights water system. Monitoring in the summer of 2004 demonstrated that the water being served to the customers of the LaMel Heights water system was corrosive. Perhaps this should not have been surprising since the water storage tank that had been in service at LaMel Heights for many years was extensively corroded.

Dr. Baumann's analysis of the problem quickly revealed that the water was corrosive because of the high level of carbon dioxide dissolved in the water from the well. Carbon dioxide combines with water to form carbonic acid, the constituent responsible for the corrosivity of the water. Dr. Baumann recommended that an air stripper be installed to remove the dissolved carbon dioxide from the water as the most reasonable means of abating the corrosivity of the water.

The Amador Water Agency rejected the recommendation related to the installation of stripper to volatilize carbon dioxide from the water as the water was contacted with stripping air because there would be a cost associated with the purchase of a stripper. However, AWA observed that when water from the well was left in an open beaker for an extended period of time, some of the carbon dioxide would naturally volatilize from the water, resulting in some increase in the water pH. While that is an interesting observation, AWA also observed that the water had to be held in the beaker for a considerable length of time to facilitate a moderate increase in the pH. In other words, while a considerable concentration of carbon dioxide was dissolved in the water in the aquifer, the fraction of that carbon dioxide that would easily escape from the water at ambient conditions was not sufficient to abate the corrosivity of the water. Furthermore, AWA did not propose a viable strategy for containing the well water in a shallow tank or tanks with large open surfaces to facilitate the escape of the carbon dioxide from the water surface to simulate the level of de-carbonation that was observed when the water was detained in the beaker. It is likely that the benefit was achievable on a few gallons of water a day, but not practical when the well was pumping the large volume of water needed to meet the domestic water demand of a community of about 50 residences. From that point, AWA reasoned that bubbling a small flow of air from an air compressor through a pipe filled with water could also strip some of the carbon dioxide from the water. That observation is also not surprising since the experiment involves a crude form of air stripping, using the principle recommended by Dr. Baumann but in a low efficiency apparatus in which channeling would limit its effectiveness. AWA proposed to construct a similar column located adjacent to the proposed new tank to aerate the well water as it was pumped from the well in order to affect some level of volatilization of carbon dioxide from the water as it was pumped into the tank. Typically, such columns are packed with media to minimize channeling and to optimize the contact between the water and the stripping air dispersed in the bottom of the tower. However, such packed columns do not typically perform well in such as application because the naturally occurring minerals in the water tend to plug packed columns as the minerals precipitate and accumulate on the media. Therefore, while a column with no packing material to control channeling is too inefficient to be effective, a packed column is subject to plugging. That is why the water treatment industry developed tray columns that are designed to easily accommodate the cleaning of accumulated solids from the trays periodically.

Ultimately, AWA did not construct the stripping column it had proposed and elected to abate the corrosivity of the LaMel ground water by adding calcium hydroxide to the well water. Since carbon dioxide dissolved in water yields carbonic acid, the addition of calcium hydroxide, a base, to the water facilitates a neutralization reaction in which calcium carbonate is the salt that is produced as a result of that neutralization reaction. While the chemistry suggests that neutralizing carbonic acid with calcium hydroxide will abate the corrosivity of the acid water, calcium carbonate is sparingly soluble in water, so the precipitation of calcium carbonate becomes an additional problem that needs to be resolved.

The interesting aspect of the use of chemical neutralization of the acidity of the water is that Dr. Baumann determined that it would be necessary to add calcium hydroxide at a dosage rate of 70 mg/L to abate the corrosivity of the water. However, the Operations Manager for AWA responded that the pH of the water could be increased to a level slightly in excess of 7 pH units with a much smaller dose. It was his contention that a pH of 7.0 units represents "neutral" water, so any increment of pH in slight excess of 7 units would render the water non-corrosive. While the Department informed AWA that a pH slightly in excess of 7.0 units was not the determinant of the abatement of the corrosivity of the water available from the LaMel Heights well, AWA insisted that it was not necessary to utilize the calcium hydroxide feed rate calculated when the corrosion control study was conducted.

While the chemistry of the water from the LaMel Heights well suggests that simple chemical neutralization of the carbonic acid is viable, it is the understanding of the Department that AWA subsequently experienced problems with the accumulation of precipitated calcium carbonate in the water storage tank and the distribution system. This was a predictable result based on the fact that stripping of the carbon dioxide from the water was the appropriate solution to the problem and that the feeding of calcium hydroxide was an alternate selected by AWA because of its notion that chemical feeding was an inexpensive, simple approach that appealed to the Agency. In response, AWA substituted a considerable dose of sodium hydroxide for calcium hydroxide to correct the corrosivity of the water. While it appears that this addressed the calcium carbonate precipitation issue, it did necessitate introducing a considerable dose of sodium into the water served to the LaMel Heights customers. Ultimately, the exercise took years of communications among the Agency, the Department, and the Corrosion Control Engineer and the expenditure of excessive resources that could have been utilized more appropriately. In addition, it left AWA implementing a treatment approach that still involves the hauling, handling, and feeding of considerable quantities of highly corrosive basic chemicals that could have been avoided if stripping of the carbon dioxide from the water had been implemented. Many details of the LaMel Heights water corrosivity issue are presented in the Department's letter to the Agency dated January 25, 2007.

Issues related to the corrosivity of water served by Amador Water Agency have also been experienced in the Buckhorn water system. Historically, the Ridgeway Pine water system and the Rabb Park water systems had exceedences of at least one of the lead and copper rule action levels. The Pine Grove Community Services District water system continues to have exceedences of the lead action level and is hopeful that AWA can implement corrosivity abatement strategies at the Buckhorn treatment plant to return the Pine Grove system to compliance.

More recently, the Amador County Environmental Health Department issued a citation to the Drytown Community Services District for exceedences of the lead and copper action levels in the Drytown water system. At about the same time, the City of Jackson provided the Department with results of its most recent lead and copper monitoring that revealed that the City has exceeded the lead action level. Therefore, it is evident that

the water distributed from AWA's Tanner water treatment plant is also corrosive and that further treatment is needed to abate the corrosivity of the Tanner plant treated water.

In an e-mail communication dated October 23, 2009, the Department requested that AWA provide specific information regarding the Agency's treatment practices related to corrosion control measures practiced at the Tanner treatment plant so that the Department's Corrosion Control Engineer could evaluate the chemistry of the water and the treatment practices in order to recommend treatment strategies to abate the action level exceedences in the Drytown and City of Jackson water systems. The note asked for information about Tanner plant corrosion control practices during different time periods. The Department is under the impression that one corrosion control strategy was utilized at the Tanner plant for a considerably long period of time. That will be referred to as the baseline treatment strategy during the baseline period. A discussion with the Amador Local Primacy Agency (LPA) indicates that on or about February 7, 2008, AWA changed from that baseline strategy to a first amended strategy in response to lead and copper rule action level exceedences that occurred in Drytown in 2008. For purposes of this discussion, the period beyond about February 7, 2008 will be referred to as the period of the first change in corrosion control treatment in response to an action level failure. The LPA indicates that the change made on or about February 7, 2008 consisted of an increase in the dose of zinc orthophosphate added to the water being treated at the Tanner water treatment plant. The LPA also informed the Department that on or about July 8, 2009, AWA changed its corrosion control strategy and began using an ortho-polyphosphate corrosion inhibitor in place of the previously used zinc orthophosphate. Therefore, it appears that July 8, 2009 began the period of the second change in corrosion control treatment.

Lead and copper monitoring by the City of Jackson in August 2009 showed that the City exceeded the lead action level. In addition, in August and September of 2009, sampling by the Drytown CSD showed that Drytown experienced a gross exceedence of the lead action level and an exceedence of the copper action level. The Amador LPA has indicated that AWA changed its corrosion control strategy by increasing its ortho-polyphosphate dose to 2 mg/L and its target pH to 7.7 units on September 9, 2009, possibly in response to these latest action level exceedences in Drytown and the City of Jackson. This implies that September 9, 2009 might be the start date of a third change in AWA's corrosion control strategy for the Tanner plant water.

In order to assist the Drytown CSD and the City of Jackson in returning to compliance, the Department asked AWA for the following information for the baseline period before February 7, 2008, for the period between February 7, 2008 and July 8, 2009, for the period between July 8, 2009 and September 9, 2009, and for the period beyond September 9, 2009:

1. What was the range and average dose of 50% caustic soda added to the treated water during each of the four periods, and what was the final water pH?

2. What was name and the range and average dose of the corrosion inhibitor added to the water during each of the four periods? Corrosion inhibitors are chemicals such as zinc orthophosphate and ortho-polyphosphates.
3. What was the exact chemical composition and chemical formula of the corrosion inhibitor added during each of the four periods? If possible, scan any product specifications, labels, and other literature for each of the different corrosion inhibitors to aid in defining the composition and the characteristics of the different corrosion inhibitors.
4. What was the dilution factor or the actual percentage of active ingredient of each corrosion control chemical used during each of the four periods? This is extremely important since adding 2 mg/L of a chemical that contains only 50% of the active ingredient is only as effective as a 1 mg/L dose of the neat active ingredient.

It is the Department's understanding that zinc orthophosphate was used as the corrosion inhibitor during the baseline period. Since zinc orthophosphate can be purchased in numerous different chemical compositions (with respect to percent zinc and percent phosphate) and in solutions of different concentration or strength of active ingredient, that information is essential to aid the Department in refining its interpretation of the meaning of the doses and feed rates reported in the monthly filter plant reports. The Department has seen a number of products represented as zinc orthophosphate even though one may have a zinc to phosphate ratio of 1 to 10, while another product may have a zinc to phosphate ratio of 10 to 1. Clearly, this range of products will perform vastly differently in abating corrosivity, and the Department needs to know the chemical compositions, ingredient ratios, and concentrations of active ingredients of all chemicals used for corrosion abatement in order to make meaningful recommendations to the Drytown CSD and the City of Jackson.

In addition, the Amador Water Agency must accurately describe, represent, and report the characteristics of the chemicals used in water treatment when reporting to the Department on a monthly basis. For many years, AWA has been reporting that it has been using 50% caustic soda for pH control at the Tanner plant. Yet, the letter to the Department dated November 3, 2009, states that AWA discontinued using 50% caustic soda and substituted 25% caustic soda when the Tanner plant began using sodium hypochlorite as a disinfectant. That change occurred about 5 years ago. Such misreporting constitutes data falsification and should not be tolerated by AWA management. Similarly, the Department understands that a polyphosphate corrosion inhibitor was substituted for the zinc orthophosphate around July 8 of 2009. Yet, the monthly operating reports for July, August, September, and October of 2009 continue to report, "ZINC" as a water additive. If the term "ZINC" is used on a reporting form, the form should at least include a foot note clearly stating that the term, "ZINC" represents zinc orthophosphate. In addition, the footnote needs to define the actual chemical composition of the zinc orthophosphate used since one supplier's zinc orthophosphate could have 100 times as much orthophosphate active corrosion control ingredient a a zinc orthophosphate provided by another supplier and visa versa. The same concepts

apply to the use and reporting of phosphate corrosion inhibitors, all of which are reported by AWA simply as "PO4". The reporting of more specific information is essential. While the November 3, 2009 letter from AWA indicates that reporting forms have been changed, it will be interesting to see if the reporting forms provide chemical compositions, strengths, and similar information to clearly specify the exact type and dose of each active ingredient being added to the water.

With respect to the adjustment of the pH of the water treated at the Tanner plant, the monthly reports indicate that during some months, AWA adds caustic soda to the treated water while in other months, no caustic soda is added. What criteria are utilized by AWA in determining whether or not to add caustic soda and what criteria are used to determine the dose that is appropriate?

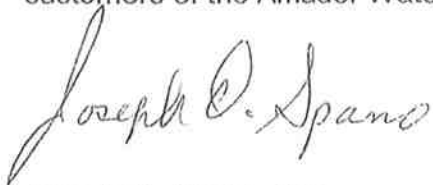
While these questions were asked via e-mail in October, very little useful information was provided in AWA's November 3, 2009 letter. As a result, the Department's corrosion control engineer is no better able to assist in recommending water treatment strategies to abate the lead and copper action level exceedences in Drytown and Jackson today that was possible many months ago.

Furthermore, changing types and doses of corrosion abatement chemicals on a trial and error basis, while waiting for each future round of lead and copper monitoring to indicate the success of each change is an inexact art. It is recommended that AWA regularly perform Water Quality Parameter monitoring on the water from its Tanner and Buckhorn water treatment plants and use the data in the calculation of the Langlier Index for each of the waters. The Langlier Index better quantifies the corrosivity of water and better facilitates the prediction of the success that should be expected from any corrosion control strategy.

With the information requested in this letter, the Department will have its corrosion control consultant evaluate the water stabilization strategy being used by AWA at the Sutter Creek plant to determine if an alternate approach might better abate the corrosivity of that water. It is the Department's hope that it can obtain some cooperation from the Amador Water Agency so that solutions to problems can be expedited. Asking the Department to review countless proposals to implement strategies that are designed to achieve small percentages of water quality improvements that have been repeatedly demonstrated to be achievable with more conventional treatment approaches only wastes the resource of both the Department and AWA. If AWA believes it can achieve needed results with techniques that apply only a small percentage of the level of treatment that has been demonstrated to be necessary for decades, including techniques that are documented in engineering design manuals and have been accepted as industry standards for decades, it is recommended that AWA establish pilot scale demonstration projects and operate those facilities for extended periods of time on small streams of water that can either be returned to the raw water supply for conventional treatment or wasted. If such efforts allow AWA to collect enough information and data over a long enough period of time to facilitate peer review of the results by acknowledged experts in the water industry to

facilitate the acceptance and updating of the treatment standards that are commonly practiced in the industry, a clear path will be established for the issuance of permits for such new technologies by the Department. However, if the Agency's pilot testing, instead, confirms that there is good science behind the treatment processes that are already accepted as best available technologies, the projects should be abandoned without repeated consideration by the Department of every minor process adjustment that can be conceived by Agency personnel, even if there is no reason to consider that the new approaches will produce desirable results. Since employees are being furloughed several days each month, staff time must be focused on priority regulatory items, leaving no time to consider ideas that are in conflict with accepted water treatment practices.

If you have any questions regarding this matter or the nature of the information needed to assist in the resolution of the continuing lead and copper action level exceedences by customers of the Amador Water Agency, contact me at 209-948-3816.



Joseph O. Spano, P.E.
District Engineer
Southern California Branch
Drinking Water Field Operations

cc: Chris McKeage, Operations Manager, AWA
Board of Directors, Amador Water Agency
Michelle Opalenik, Amador EHD
Mike Daly, City of Jackson
Edwin Kaffer, Drytown CSD
Jay Olig, Pine Grove CSD
Frank Baumann, FJB Water Technology
Max Godde, Operator

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