Technical Expert Working Group Conference Call

Friday August 26, 2011
10:00 – 11:00 a.m.

CALL SUMMARY

Attendees:

EPA Region 3 and contractors: Wendy Gray, George Rizzo, Michelle Hoover, Karen Johnson, Enid Chiu, Kathy Martel (Cadmus), Laura Dufresne (Cadmus),

Steve Reiber (HDR)

EPA Cincinnati: Darren Lytle

The Washington Aqueduct and contractors: Mike Chicoine

DC Water and contractors: Rich Giani, Sarah Neiderer, John Civardi (Hatch Mott MacDonald),

DC Department of the Environment: William Slade

Concerned Citizen: Susan Kanen

Joint-Base Anacostia Bolling: Nicole Johnson

Agenda and Housekeeping Issues

Karen Johnson, Chief of the EPA Region III Groundwater Enforcement Branch, participated in the call in lieu of Bill Arguto who was on travel. The DC Water updates were discussed before the Washington Aqueduct update to accommodate attendee schedules. Otherwise, there were no changes or additions to the agenda. The meeting agenda is included as Attachment A to this call summary. Wendy Gray led the call.

Summary of Discussions by Topic Area

1. Comparison of Three DC Lead Service Pipe Loop Sites

Susan Kanen discussed observations and concerns from her site visits of the DC Water and Washington Aqueduct pipe loops in early July 2011. While on-site, Ms. Kanen collected samples from the loops and sent them to Virginia Tech for analysis. She thanked Rich Giani, Lloyd Stowe and Tom Jacobus for providing tours of the facilities and taking the time to meet with her. Ms. Kanen believes that the pipe loop research is critical to understanding the extent of lead leaching in the distribution system and stressed the importance of protecting the most vulnerable populations in DC from lead exposure. Prior to the TEWG call Ms. Kanen distributed a written report of her calculations to the TEWG members. Ms. Kanen's calculations assume that lead concentration increases linearly as

the period of stagnation increases from 6 to 24 hours, and that the volume of water contained in non-leaded loop components dilutes the lead concentration of samples from the pipe loop.

Ms. Kanen questioned whether the pipe loop experiments are appropriately representing or measuring the lead concentration generated by a lead service line. Regarding the DC Water pipe loops, Ms. Kanen believes that the recirculation of water in the loops for 24 hrs results in lower total lead leaching than in the distribution system because the lead concentration reaches the solubility equilibrium. She calculated the lead leaching rating rate in the loops to be 17 µg/ft per 8 hours, which would produce a total lead concentration in the system of 9 times the 15 µg/L action level. [Ms. Kanen and Rich Giani discussed Ms. Kanen's calculations of total lead leaching in detail via e-mail preceding the conference call. As explained in an e-mail to the TEWG, Mr. Giani reported that he applied Ms. Kanen's calculation method to a high-end lead profile from a customer's home and estimated a leaching rate of 1 µg lead per ft of pipe per 6 hrs.].

Rich Giani noted that the DC Water pipe loops are recirculating loops rather than stagnant loops. Mr. Giani explained that these recirculating pipe loops will leach more lead because there is a longer exposure time to lead pipes and more low lead concentration water is contained in the recirculating loop than would be contained in a partially-equilibrated stagnant pipe. Mr. Giani stressed that the purpose of the pipe loop experiments is to assess general trends in lead leaching and the lead results are not representative of water at customer taps. Mr. Giani noted that DC Water uses lead profile data to assess total lead leaching and that these data are more representative of lead levels in customer's water than the pipe loops. Ms. Kanen requested that Mr. Giani share lead profile data and Mr. Giani said that he could share lead profiles that would not indicate the full site address.

Ms. Kanen voiced a concern as to whether the pipe loop testing protocol was capturing the total amount of lead leached from the lead service pipes. Specifically, Ms. Kanen noted that the McMillan horizontal flow-through loops are sampled by collecting a 2 liter sample after an 8-hr stagnation period by slowly opening a valve at one end of the loop. She is concerned that this method does not capture particulate lead that has settled inside the pipe because the sample that she collected of water going down the drain contained 2 ppb lead. Ms. Kanen cited the difference between the percent of total lead that is particulate between the McMillan loops (60% particulate) and the diagonal Dalecarlia loops (90 % particulate) as evidence.

Ms. Kanen also questioned why the Dalecarlia loop B was not sampled immediately prior to her visit on July 7, 2011.

Ms. Kanen does not believe that the DC Water and Washington Aqueduct pipe loops demonstrate that lead levels in the distribution system are below the regulatory action level and indicated that she would describe her new "lead free alternative by pass" concept for lead service line replacement during a future TEWG call. Ms. Kanen concluded her comments by acknowledging that pipe loop experiments are large and complicated, but that she believes the research to be extremely valuable. Wendy Gray suggested that

comments and discussion could continue regarding Ms. Kanen's calculations over e-mail in advance of the next scheduled TEWG call.

2. DC Water Pipe Loop Update

Rich Giani distributed DC Water's latest pipe loop data prior to the call. He said that the lead concentration in pipe loop samples has gone up slightly this summer, which is typical of previous years. Otherwise, the lead concentrations are stable.

3. DC Water Preliminary Lead and Copper Rule Results Update

Mr. Giani has not received results from the first round of compliance sampling for July, so he did not have any numbers to report.

Wendy Gray asked about the status of posting LCR data on the web. Sarah Neiderer from DC Water reported that the data have been gathered but they are waiting for IT support to get it posted. She expects it to be up on the DC Water within one month. DC Water will send an e-mail to the TEWG once the data are posted. The data on the website will be reported with the number of samples per date and will be reported in the same way they are reported to.

Susan Kanen asked if the data will include the amount of time between the first and second draw samples for each site and requested this information if possible. She believes that an average flush duration of 6 minutes between first and second draw will rinse out high lead levels in a lead service line (based on lead profile results and typical faucet flow rates). Ms. Kanen is concerned that LCR compliance sampling does not represent the lead concentrations in the lead service line and thus, is not representative of customer exposure. Ms. Kanen acknowledged that this may be more of a comment to EPA for regulatory consideration. Rich Giani noted that a review of the lead profile data may best answer her questions.

4. Washington Aqueduct Pipe Loop Update

Prior to the call, Mike Chicoine distributed graphs showing total and dissolved lead results for the control pipe loop. Mr. Chicoine noted that similar to the DC Water loops, the Washington Aqueduct pipe loops are used primarily to look at trends. The Washington Aqueduct also uses the pipe loops to evaluate process control.

Mr. Chicoine reported a small increase in total lead in both pipes loops during the summer months. Total lead for Dalecarlia ranged from approximately 20 to 35 µg/L and dissolved lead has increased by 1 – 1.5 µg/L. The pipe loops for McMillan also realized a summer increase. These trends track with temperature and are consistent with previous years.

To better understand the nature of particulate lead in the loops, the Washington Aqueduct was collecting additional samples this week to send to the University of Cincinnati for SEMs analysis.

Darren Lytle asked how the Aqueduct lab separates particulate lead from the dissolved lead portion (EPA is doing a study on the adsorption of particulate lead to filters). Mr. Chicoine reported that the Aqueduct uses a 0.45 micron 47 mm diameter filter. For the special study of particulate lead, the University of Cincinnati will be using a smaller, 0.2 micron 13 mm syringe filter. Mr. Chicoine wasn't sure about the type of filter material used, but will check and report back to Mr. Lytle. Mr. Chicoine said that the Aqueduct lab uses a standard procedure to separate dissolved from particulate lead (run de-ionized water through the filter first, add the sample, then analyze the entire sample that goes through the filter).

Susan Kanen reported that during her July site visit, she spent time with Lloyd Stowe and Patty Gamby to discuss why the Washington Aqueduct Dalecarlia loops B and C had been off-line for periods of time during 2008, 2009 and 2010. Mike Chicoine reported that he is aware that the loops have had maintenance issues from time to time such as a pump or fitting that needs to be replaced. The Aqueduct's protocol is to sample from the Dalecarlia loops once per week. Mr. Chicoine reported that if they collect a sample, they always analyze it. With respect to the most recent mechanical issues in June, Mr. Chicoine said that it was possibly a leaky hose and/or malfunctioning solenoid. Mr. Chicoine said that he also recalled that there was also a time period in March 2011 when all three loops had maintenance issues.

Ms. Kanen noted that she is concerned about samples that are scheduled to be taken and then are not present in the data set. She believes that missing samples should be explained. Ms. Kanen reiterated that 24 % of Dalecarlia pipe loop samples are missing from the data set for the last three years, although sample reporting has improved in 2011. She is concerned that the missing sample results are during trends of higher lead levels at times of higher temperature in the summer months. Ms. Kanen said she is concerned that the reported value of 34 ppb on July 21 would correspond to 55 µg/L in lead service lines.

Ms. Kanen recommended that the TEWG warn the public that water passing through lead pipes should not be used for infant formula. She noted that lead results are not reported from hot water samples and she cited issues of the quantity of formula ingested and the ratio of formula to body weight.

5. Update on Washington Aqueduct Treatment Changes (Addition of Caustic Soda and Disinfectant Change from Chlorine Gas to Sodium Hypochlorite)

Mike Chicoine reported that both the caustic soda and sodium hypochlorite feed systems are online and working well.

6. Other Items

The next call is scheduled for December 2nd at 10:00 a.m. EST. Wendy Gray requested that topics for the agenda be sent to her.

Attachment A: Call Agenda

1. Comparison of three DC lead service pipe loop sites
2. Washington Aqueduct pipe loop update
3. DC Water pipe loop update
4. DC Water preliminary lead and copper rule results update
5. Washington Aqueduct update on caustic/hypo project

COMPARISON of THREE DC LEAD SERVICE LINE PIPELOOP SITES

by Susan Kanen

8/26/2011

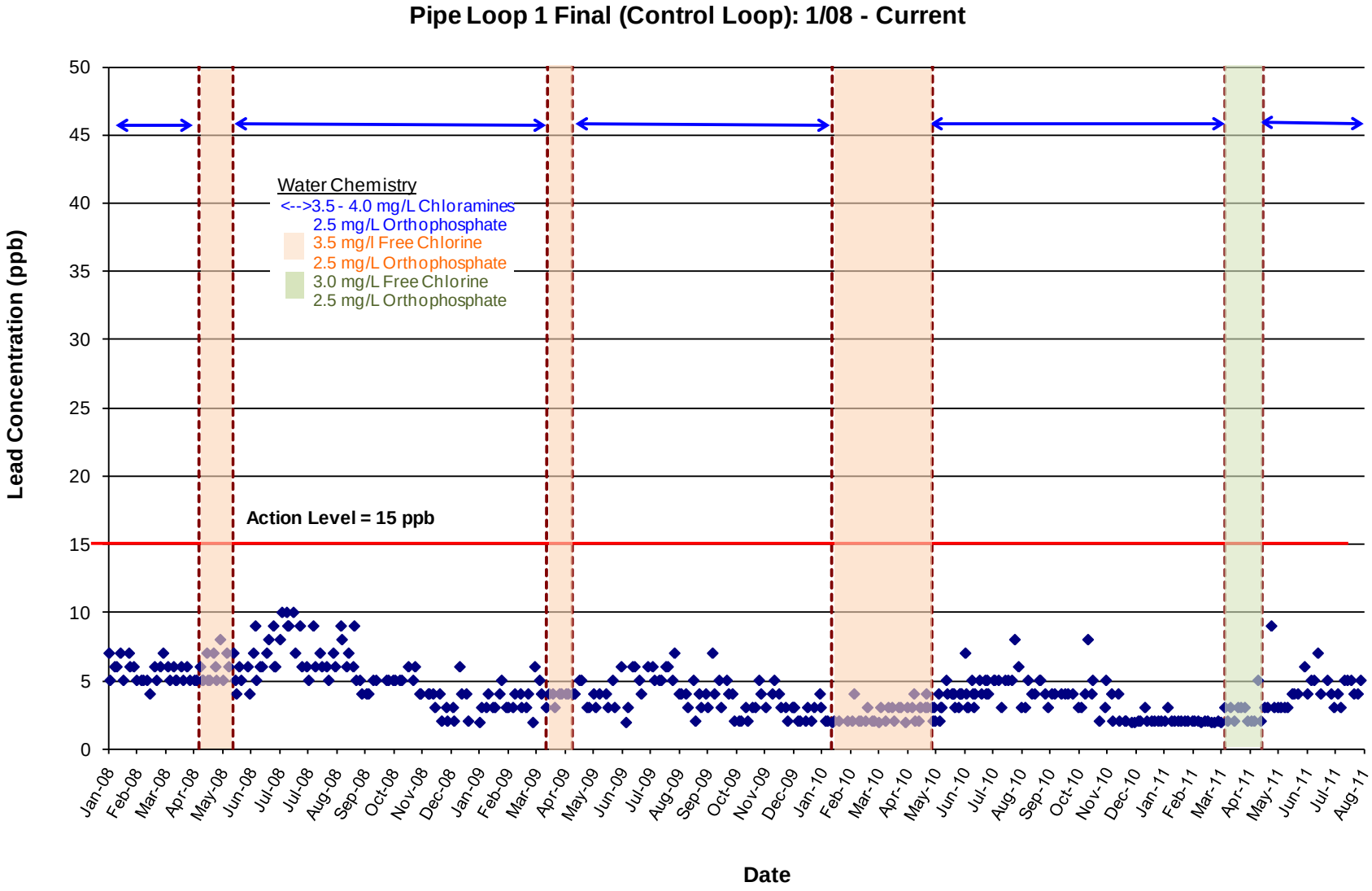
TEWG Conference call

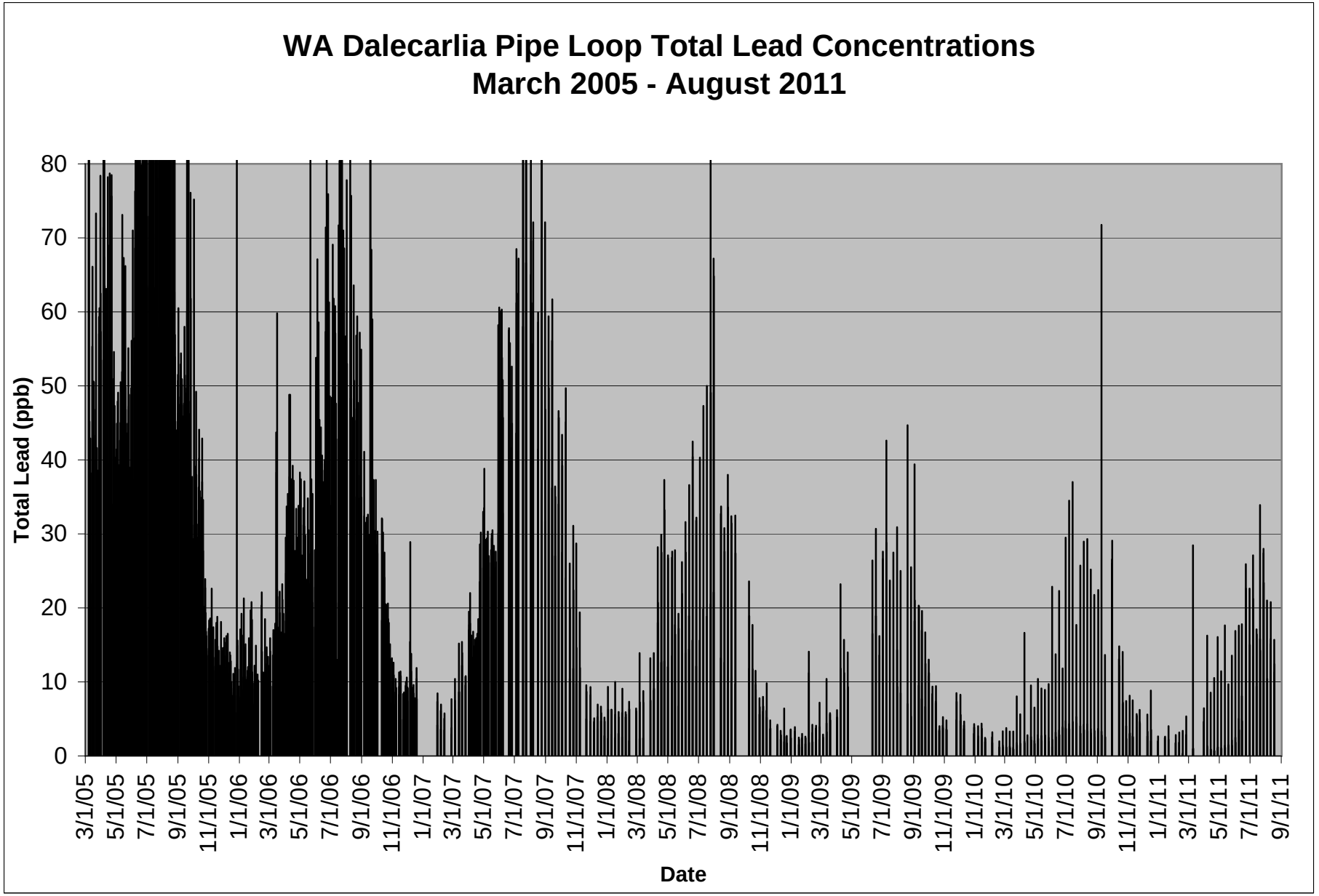
	Length of lead pipe, 1 foot contains 0.095 liter/ft		Lead results from 3 sites analyzed by Virginia Tech	Dilution by non-leaded compo-nents of the loop	Select a stagnation time	Total lead mass in ug generated per loop	Lead mass in **ug per foot LSL**, 8 hours stagnation, temperature 28 deg C, pH 7.7	All lead generated contained in the water volume inside lead pipe	Comparing to 15 ppb compliant samples
SITE	Calculate: ⇨		ppb or ug/liter	times	times	equals	divide by feet of lead pipe per loop	divide by 0.095liter/ ft	divide by 20 ppb
WASA 7/12/2011	9 ft (0.86 liter)		**4 ppb**	100 liters 0.86	8 hours 24 hours	155ug	155 ug/ 9 ft = **17** ug/ft	180 ppb or ug/liter	**9X**
McMillan 7/8/2011	12 ft (1.14 liter)		**3.5 ppb** Loop 3	2.0 liters 1.14	8 hours 8 hours	6.1ug *10ug	6.1 ug/12ft = **0.51** ug/ft *10 ug/12ft = **0.83** ug/ft	5.4 ppb *8.7 ppb	***0.44X**
Dalecarlia 7/7/2011	13 ft (1.24 liter)		**27 ppb** Loop 7B	2.0 liters 1.24	8 hours 8 hours	44 ug	44 ug/13ft = **3.4** ug/ft	36 ppb	**1.8X**
LCR compliant sample	10.5 ft (1.0 liter)		<15 ppb	none	8 hours 6 hours	<20 ug	<20 ug/10.5 ft=**<1.9ug**/ft	20 ppb for 8 hours stagnation	1X

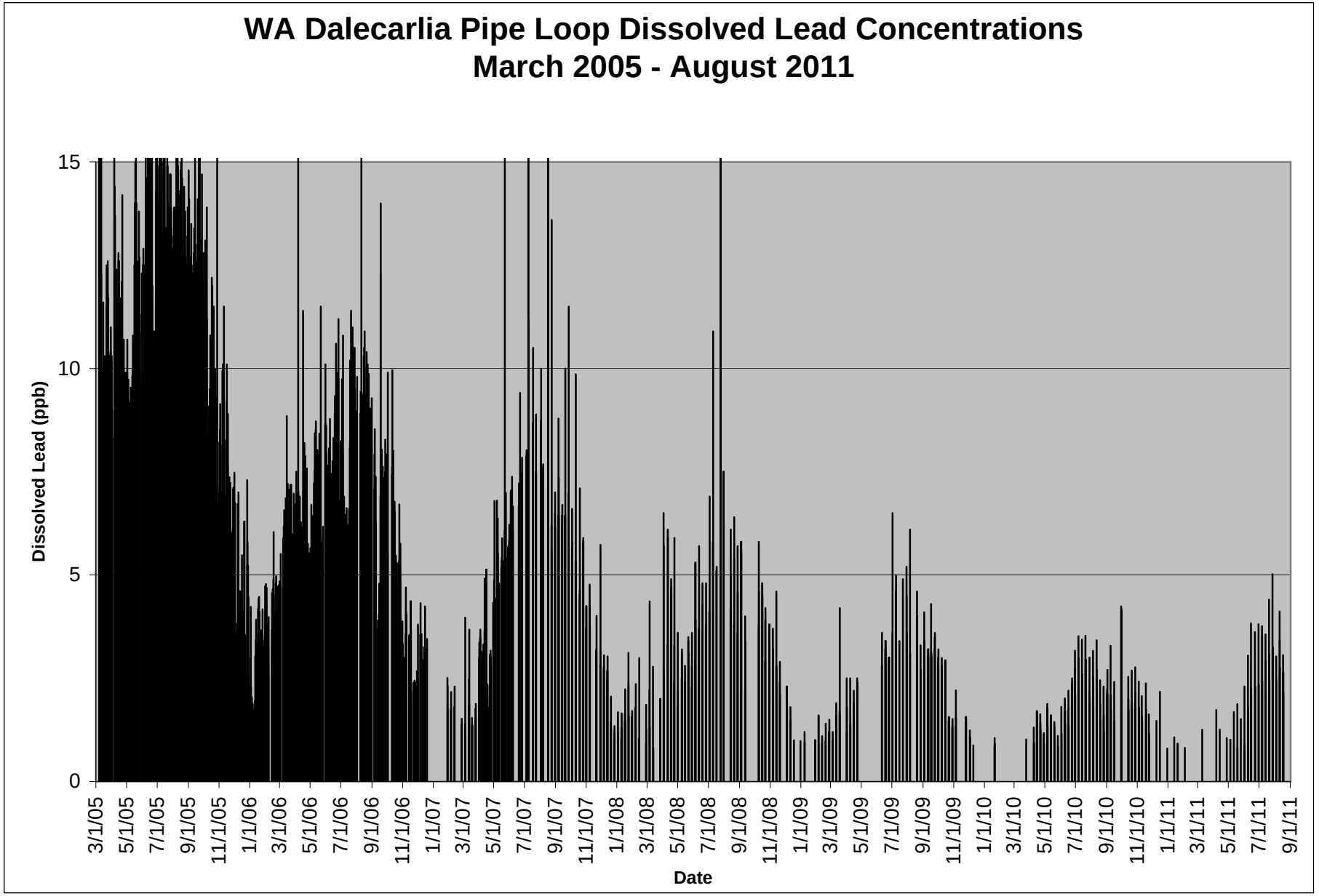
*includes ug of lead flushed by two volumes of water through the loops to the drain immediately after sampling, does not include any ug lead generated during 8 hour stagnation left behind in the loop after sampling

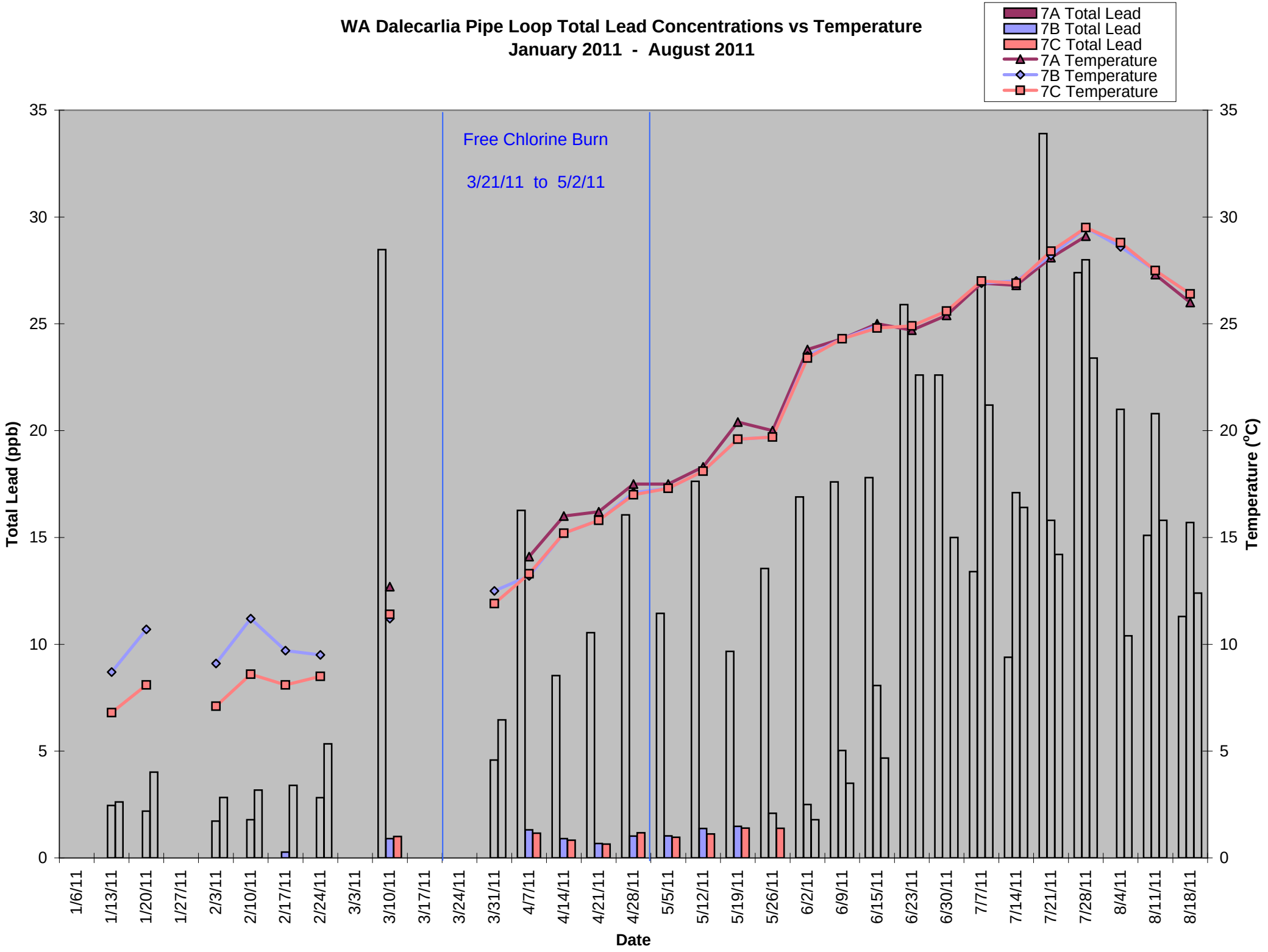
After seven years, corrosion control below 15 ppb of lead leaching into drinking water from lead service lines has not been demonstrated at these three DC pipeloop sites.

Susan Kanen, chemist August 26, 2011








WA Dalecarlia Pipe Loop Total Lead Concentrations vs Temperature
January 2011 - August 2011
7A Total Lead
7B Total Lead
7C Total Lead
7A Temperature
7B Temperature
7C Temperature
Free Chlorine Burn
3/21/11 to 5/2/11
Total Lead (ppb)
Temperature (°C)
Date
0
5
10
15
20
25
30
35
1/6/11
1/13/11
1/20/11
1/27/11
2/3/11
2/10/11
2/17/11
2/24/11
3/3/11
3/10/11
3/17/11
3/24/11
3/31/11
4/7/11
4/14/11
4/21/11
4/28/11
5/5/11
5/12/11
5/19/11
5/26/11
6/2/11
6/9/11
6/15/11
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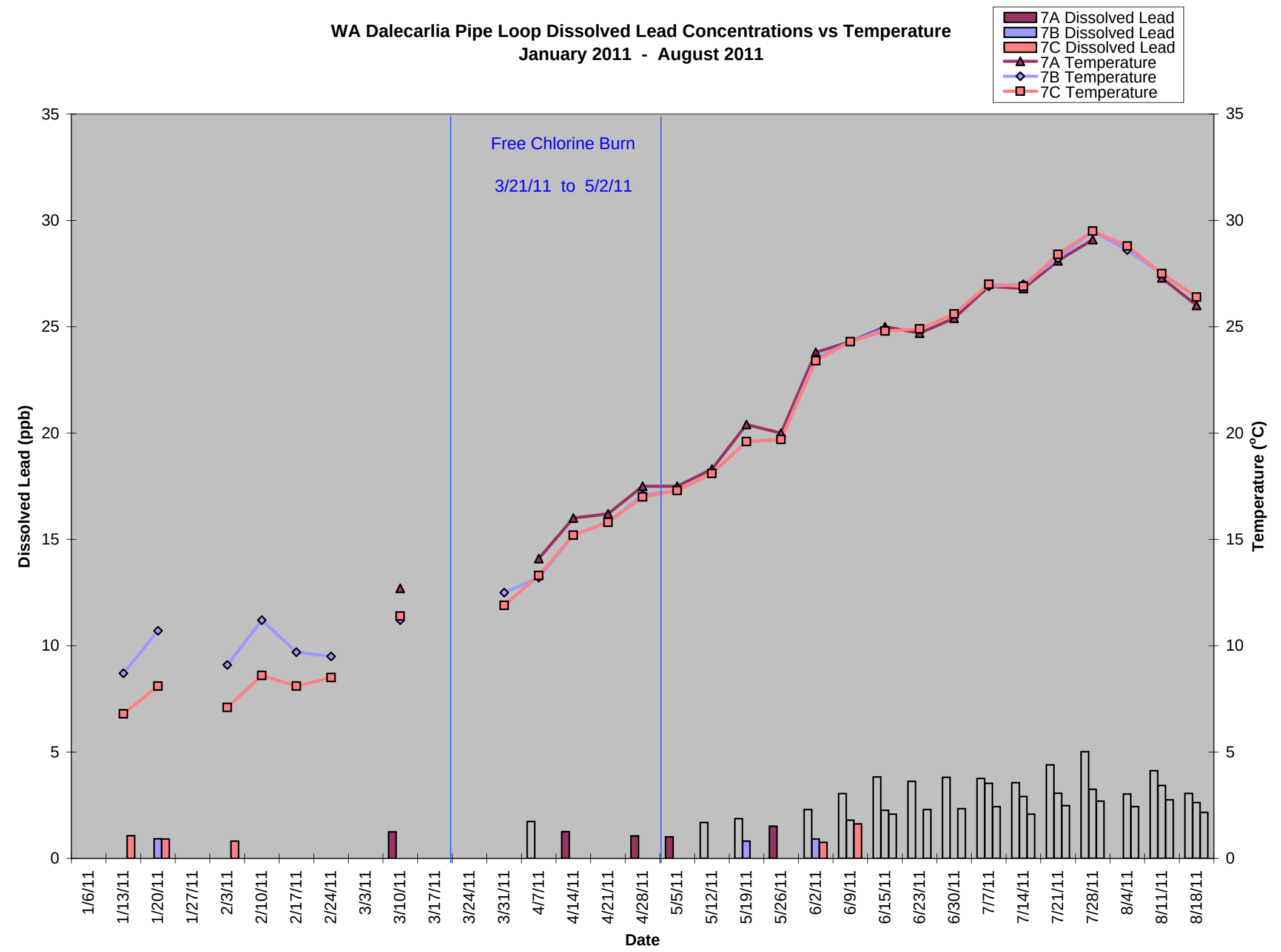
8/4/11
8/11/11
8/18/11


WA Dalecarlia Pipe Loop Dissolved Lead Concentrations vs Temperature
January 2011 - August 2011
7A Dissolved Lead
7B Dissolved Lead
7C Dissolved Lead
7A Temperature
7B Temperature
7C Temperature
Free Chlorine Burn
3/21/11 to 5/2/11
Dissolved Lead (ppb)
Temperature (°C)
Date
0
5
10
15
20
25
30
35
1/6/11
1/13/11
1/20/11
1/27/11
2/3/11
2/10/11
2/17/11
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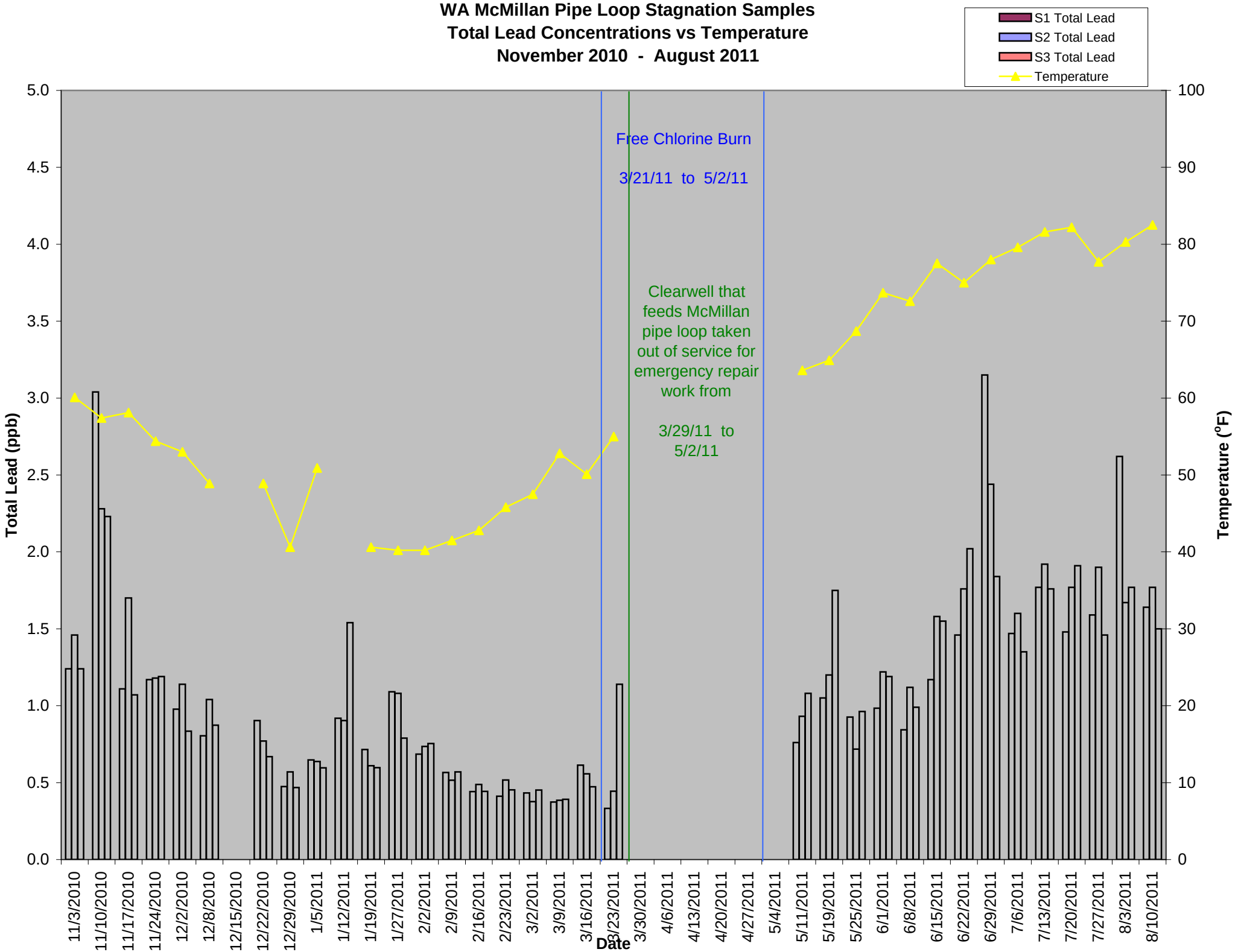
8/18/11


WA McMillan Pipe Loop Stagnation Samples
Total Lead Concentrations vs Temperature
November 2010 - August 2011
S1 Total Lead
S2 Total Lead
S3 Total Lead
Temperature
Free Chlorine Burn
3/21/11 to 5/2/11
Clearwell that feeds McMillan pipe loop taken out of service for emergency repair work from
3/29/11 to 5/2/11
Total Lead (ppb)
Temperature (°F)
Date
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
0
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20
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40
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60
70
80
90
100
11/3/2010
11/10/2010
11/17/2010
11/24/2010
12/2/2010
12/8/2010
12/15/2010
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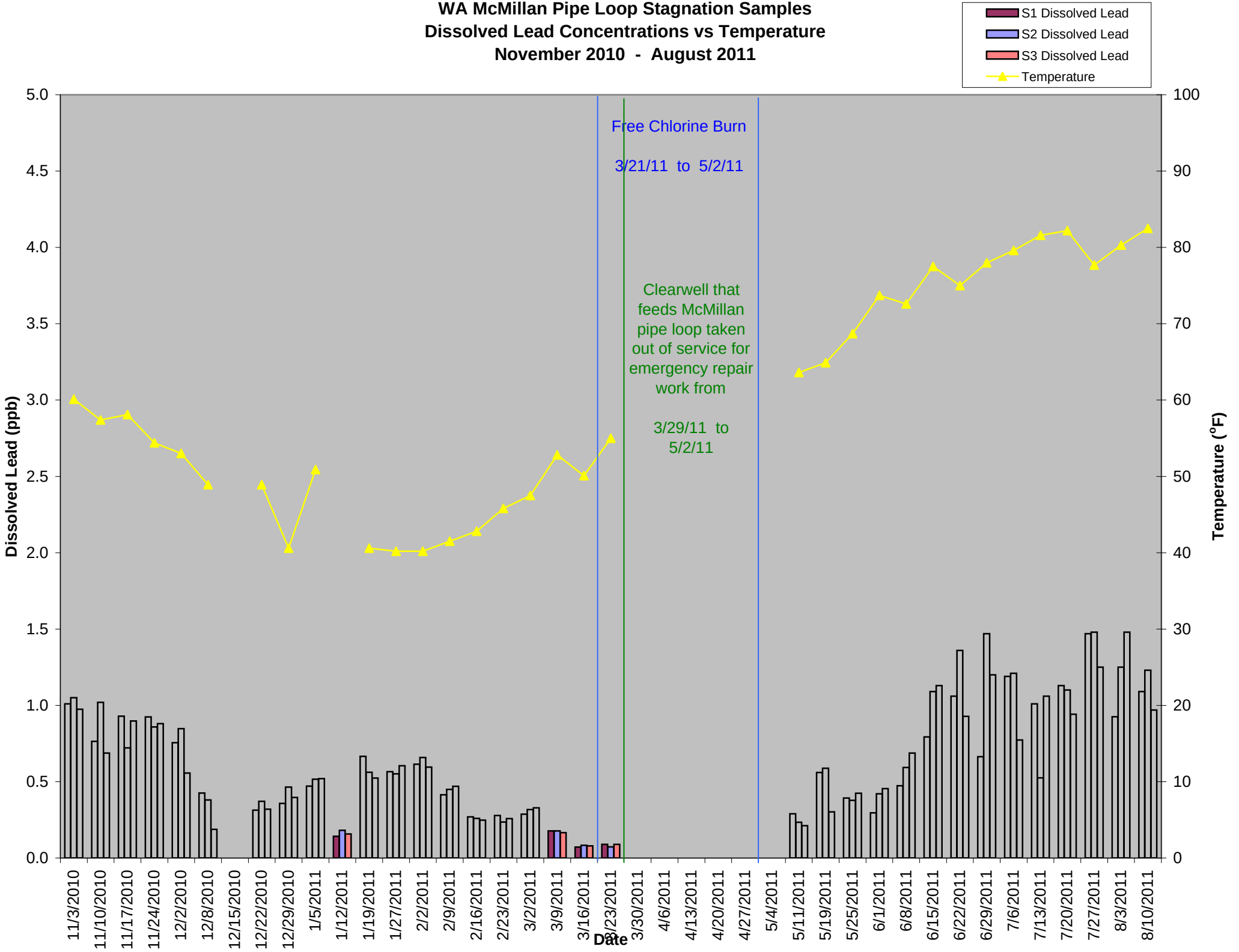
WA McMillan Pipe Loop Stagnation Samples
Dissolved Lead Concentrations vs Temperature
November 2010 - August 2011
S1 Dissolved Lead
S2 Dissolved Lead
S3 Dissolved Lead
Temperature
Free Chlorine Burn
3/21/11 to 5/2/11
Clearwell that feeds McMillan pipe loop taken out of service for emergency repair work from
3/29/11 to 5/2/11
Dissolved Lead (ppb)
Temperature (°F)
Date
5.0
4.5
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3.0
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