

To National Drinking Water Advisory Council, Comments by Susan Kanen, 9/26/2012  
Drinking water chemist formerly with a federal agency, and an independent researcher since 2005,  
808-226-3669, skanen144@yahoo.com

Compliance with the Lead and Copper Rule (LCR) does not accurately determine if the public is exposed to harmful levels of lead leaching into drinking water from lead service lines (LSL).

- a) Research in DC on lead leaching in drinking water from LSL pipeloops is misrepresented and manipulated to falsely demonstrate results that underestimate lead leaching in an attempt to be consistent with LCR Compliance as presented by DC Water utility
- b) DC Water is manipulating LCR Compliance using site selection, sampling protocol, seasonal sampling
- c) Over time additional studies are documenting the failure of the LCR to be protective of public health. Included in my comments is a list of quotes from experts that lead contamination in drinking water from LSL is still an issue.

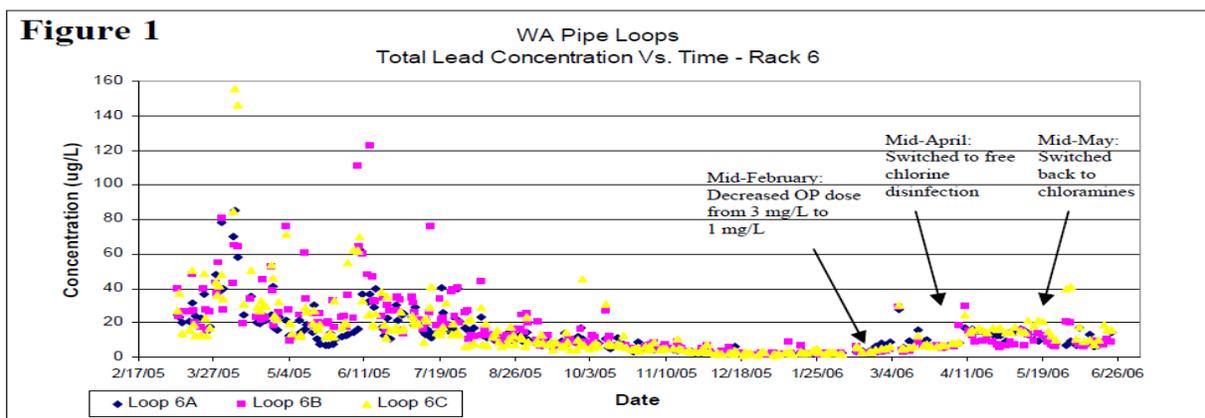
Adherence to the current LCR underestimates the exposure to the public of lead contamination of drinking water from LSL and the LCR is not protective of public health.

## DC LEAD PIPELOOP STUDIES

I observed the Dalecarlia LSL pipeloops in Washington, DC produce over 100 ppb lead at the 2005 summer temperature peak. This was one year after system-wide addition of orthophosphate corrosion inhibitor. There has been over 10,000 lead concentration data points in this experiment. The data was misrepresented online until July 2010 and manipulated data continues to be posted online to this day.

The EPA presentation of the data removed from online at the EPA website on DC Lead in July 2010:  
[http://www.epa.gov/dclead/WA\\_rack\\_6\\_Aug06.pdf](http://www.epa.gov/dclead/WA_rack_6_Aug06.pdf)

### *Washington Aqueduct Pipe Loop Study – Updated August 2006*



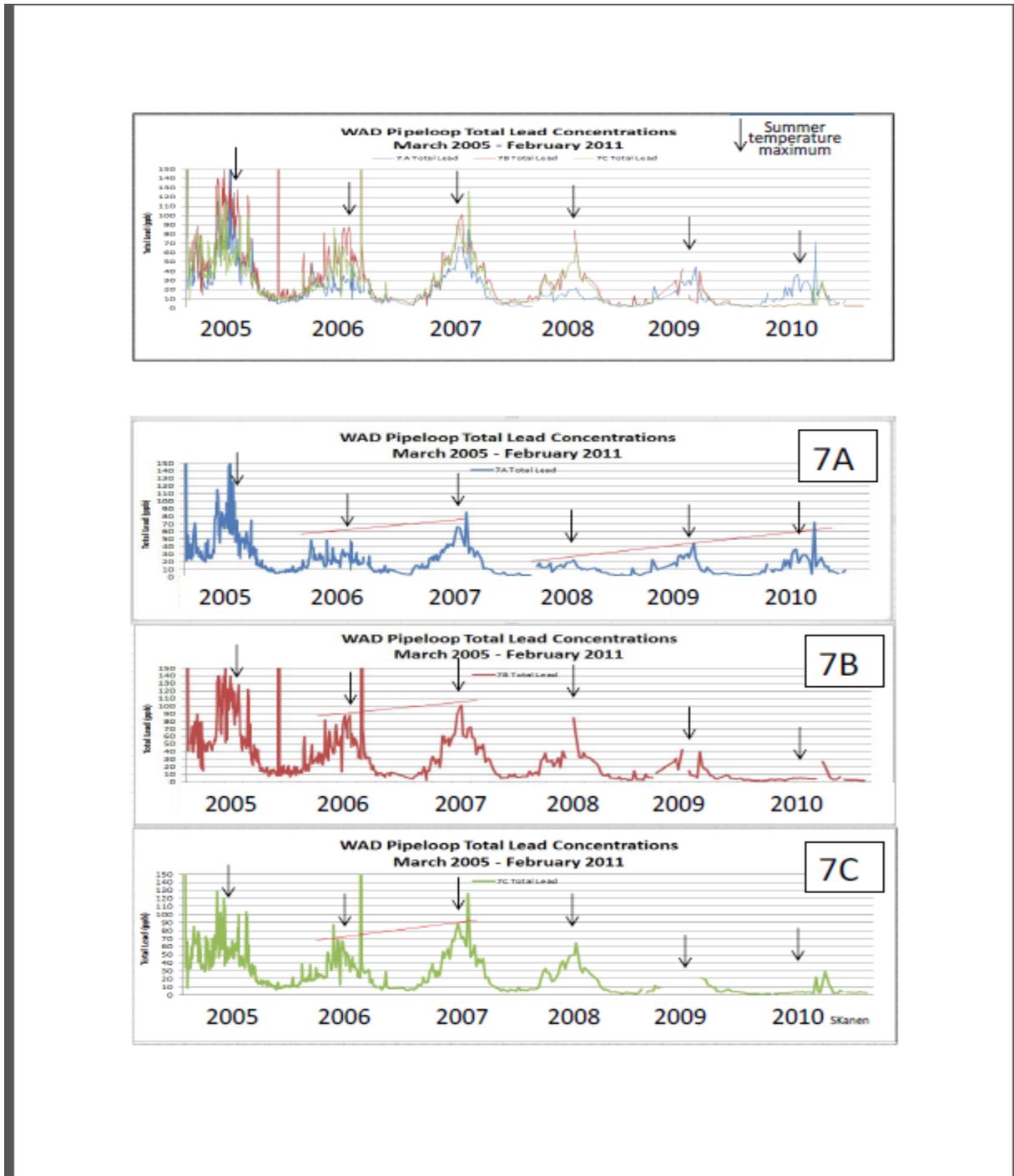
This 2006 chart above was from the data generated by the experimental conditions at Dalecarlia water treatment plant. From this chart, it looks like the lead was high and over time diminished to levels below 15 ppb and the lead leaching was solved once and for all end of 2005. The three loops of Rack 6 in this

chart with additional caustic added and were not representative of water distributed to DC residents as in Rack 7 with pH control using lime. The data from unrepresentative Rack 6 was further misrepresented by cutting off the data after June 2006 thus truncating the known recorded upturn in the lead results (data points from 30 to 60 ppb in Rack 6, summer 2006) due to warmer weather. This upturn can be seen on this chart although the expanded y axis obscures the amplitude of the returning upturn in lead results for the spring of 2006. All data points were reported are too low since not all the piping in the loops was lead and the additional water from plastic pipe diluted the lead results by a factor of about two times. A large font on the data points rather than a line chart further obfuscates the results. The lead in DC drinking water crisis was claimed to be solved at the time of second semester 2005 LCR Compliance results and the WA lead pipeloops research was misrepresented in an attempt to falsely confirm this. The EPA finally removed these two pages from their website on DC Lead, Corrosion Control Research in July 2010. The replacement charts in the years since representing this study are from three triplicate loops of Rack 7 which is more representative of distribution water to DC. I have been pointing out the continued misrepresentation in the data presentations recorded in the Technical Expert Working Group (TEWG) minutes since February 2011.

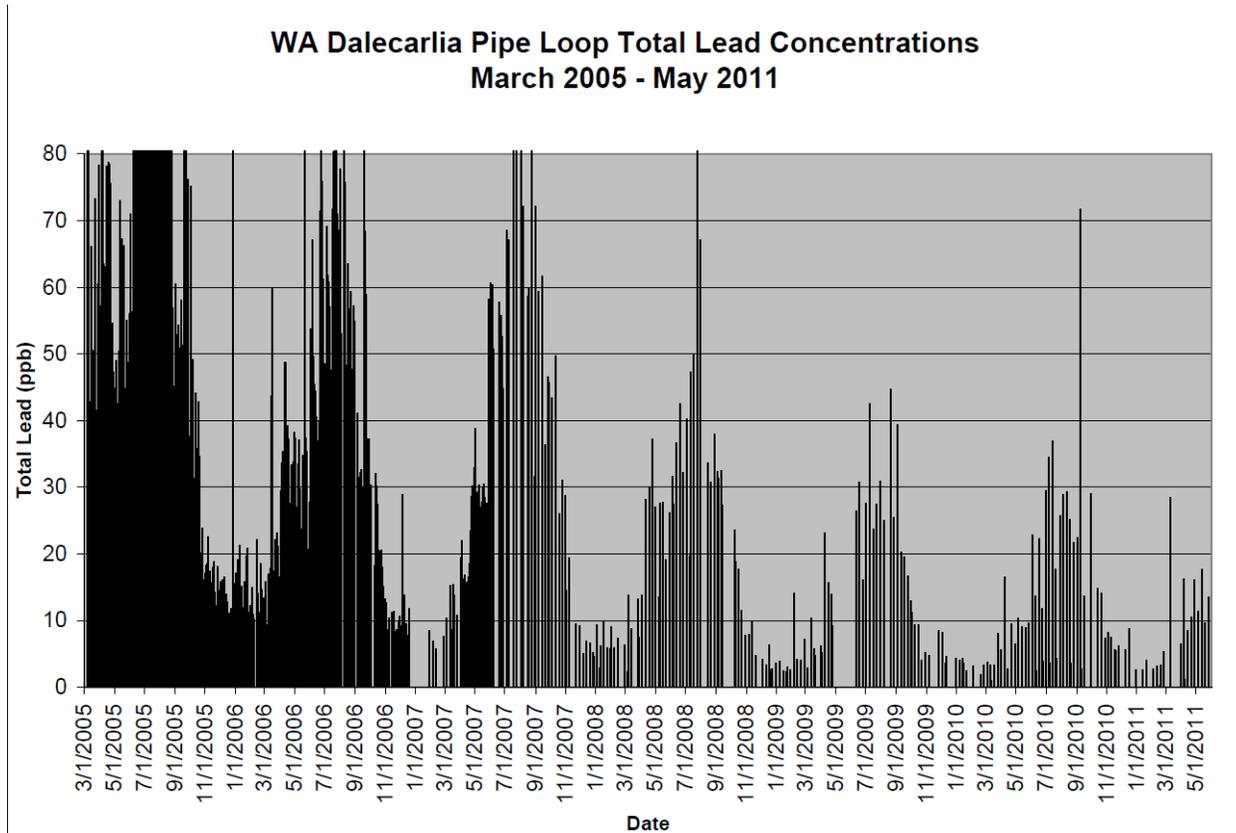
From my version of the data in the multi-colored line chart below, the three triplicate loops of Rack 7 can be clearly seen. Up to 4/2008 the triplicate values are in very good agreement and on parallel courses. Up to 4/2008 the three loops are consistently proportional to each other. The reason for this is at the time of startup, the 13 foot of LSL used for each loop was attached by the plumbers to variable amounts of nonleaded piping. The center loop 7B in red on my chart is usually more concentrated in lead since the center pipeloop was closer to the sample tap location. Loops 7A and 7C left and right were farther from the center tap and had more nonleaded piping and therefore their lines are consistently below 7B in lead concentration due to dilution of water contained in extra nonlead piping used to connect the loop to the sample taps. Before 4/2008 all three loops peaked each year at the summer's maximum temperature. Zoom in on the first chart below with all three loops. Also look at each three loop charted separately on the next page. Seasonal lead peak at the exact time of the temperature peak and the change in the proportion of the three loops to one another are patterns very well established for three years at WA loops. The repeating impression crafted by WA authored charts is that of continual improvement in lead levels, but careful observation of my version of the data shows times of increasing lead levels. Dates of unexplained missing samples are more apparent in my charts below. The same data is used by WA in the black bar graph later in this report has a much different effect. Misrepresenting the data in 2006 with the Rack 6 results continues again. In 2006, the EPA/WA chart lead levels dropped to successfully diminished levels over about 4 months, just like the LCR Compliance in DC success. This was exposed in the pipeloops chart with return of summer lead levels in rack 7 in 2006, 2007, up to 4/2008 when the appearance of the WA pipeloops data falls apart. Now the WA charts seem to be trying to show high levels at summer peaks slowly over 8 years diminish to acceptable <15 ppb. I didn't buy this story in 2005 and I don't buy it now. The WA pipeloops were/are being misrepresented and manipulated. This research is potentially of much better quality than looking at LCR Compliance data to assess effectiveness of corrosion control on lead leaching from LSL. The WA pipeloop data is from the same sites repeated in triplicate over years generating multiple lead concentration values with computer controlled sampling protocol and stable ambient conditions. In

future studies, I hope scientists will more carefully control the most important variables demonstrated at WA pipeloops of temperature and pH before assessing any other contributors to lead leaching from LSL.

Chart below authored by SKanen:



I produced the previous multicolored line chart from the same data that the Washington Aqueduct (WA) produced the following black bar chart below. Both charts appear in the June 2, 2011 TEWG minutes. <http://www.epa.gov/dclead/TEWG632011.pdf>



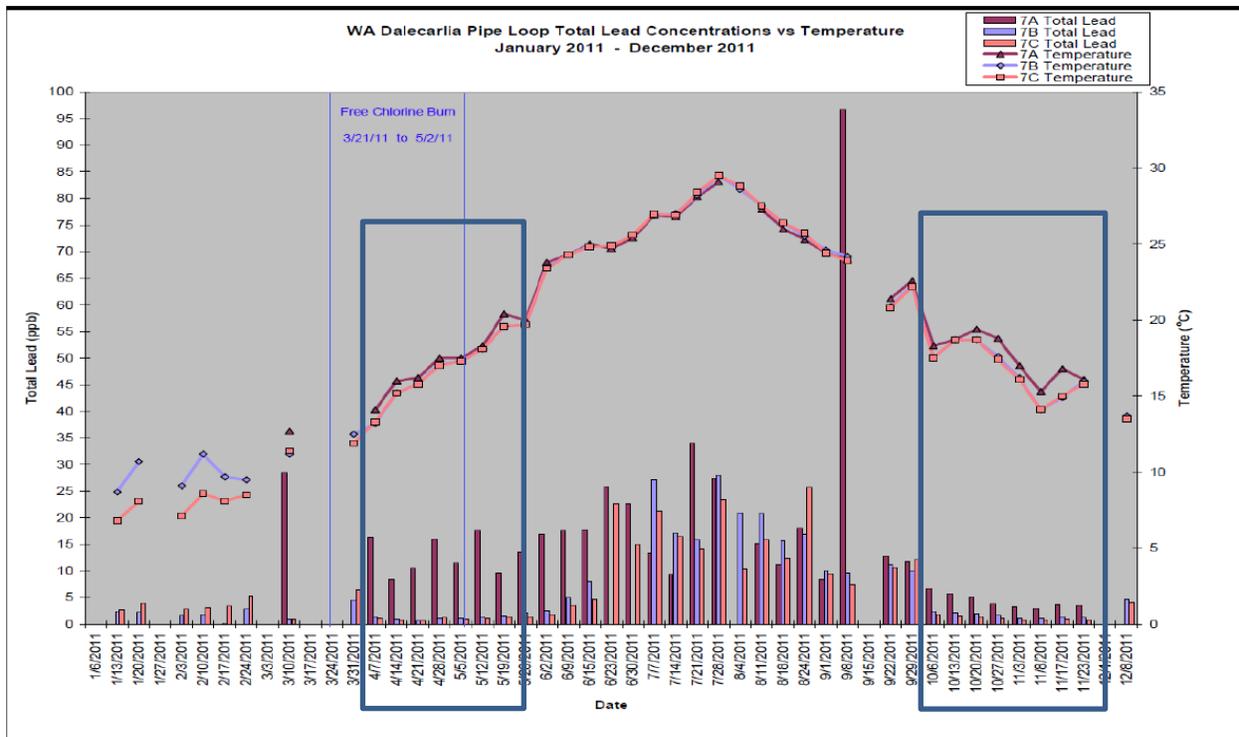
Note the WA version has no legend describing 3 separate loops or that they are from Rack 7 with lime not the discontinued Rack 6 experimental loops with caustic added as posted online until July 2010. The three separate triplicate loops 7A, 7B, 7C cannot be differentiated in this WA version. The data is grossly misrepresented and evidence of manipulation can be seen by comparing to my version of the same data. There is a lack of agreement in the three triplicate loops starting 4/2008 and the totally missing samples of loop 7C in summer 2009. In evidence is three years from 2005 to 4/2008 of lead leaching at over 100 ppb (correcting for sample dilution with plastic tubing) varying exponentially with temperature. After 4/2008 when the contractors no longer monitored this project at the WA, the data losses this pattern and summer peaks are missing and the three loops no longer agree. Now in 2013 predictably as a result of gross manipulation, the WA pipeloops charts have flat lined to no more lead leaching at all. See the chart presented for the Aug 2, 2013 TEWG meeting below. I believe this erroneous collection of data in the chart below is contrived to find agreement with the false impression of the low level of lead leaching from LSL done by DC Water in their presentation of LCR Compliance results.

Stagnation time manipulation was in evidence in the next chart below for WA pipeloops showing only 2011 data. This was hidden by in the black bar chart above by reformatting the three separate data series from loops 7A, 7B, and 7C to black (not the grey scale default setting) to hide in some years over 20% missing scheduled samples and that the three triplicate loops were no longer in agreement.

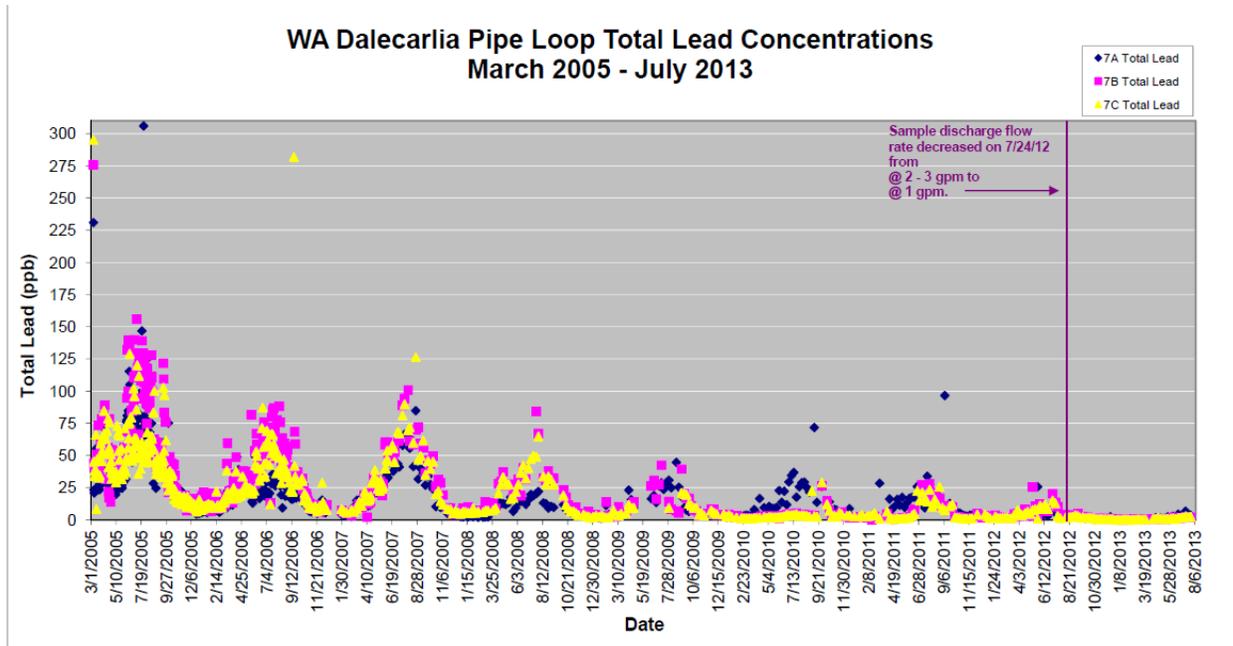
If stagnation time is manipulated in one loop, there can be no confidence that the technique of varying stagnation time is not an ongoing proposition. On my independent sampling there in July 2011, I was not allowed to observe stagnation time of samples in the loops and the LSL pipeloops were still generating 55 ppb lead (corrected for dilution water from non lead piping) as late as July 2011, seven years after optimal corrosion control treatment.

The room temperature deep in the lower floors of the Dalecarlia treatment plant is slightly different than river temperature and it takes time for the water in the lead pipeloops to equalize to ambient room temperature. The different lead and temperature results in loop 7A as opposed to 7B and 7C indicate the three triplicate loops were not soaking the same length of time therefore not leaching the same amount of lead in the spring and winter of 2011. See inside blue rectangles. Loop 7A has consistently higher temperatures than 7B and 7C for the dates that it has higher levels of lead leaching. All three loops, 7A, 7B, and 7C are supposed to be triplicate samples. Interesting that loop 7A with historically in 2005 to 4/2008 had lower lead levels than the other two loops, in 2009 and 2010, loop 7A has the highest lead levels of the three loops of Rack 7.

Evidence of stagnation time manipulation in the chart below:



Note in this latest WA version below, at my suggestion, the legend is back identifying the three separate loops. The deceptive bars with black reformatting are replaced by three colors of data points. Still their fonts are unnecessarily too large hiding much data. Despite all the irregularities I have pointed out over years, the EPA officials seem to do nothing to hold WA to account. I would volunteer to investigate this experiment with an independent committee to validate that all data was included and experimental conditions were not altered without notification over the course of the experiment.



Misrepresentation of the WA pipeloops in the following AWWA and EPA report:



## Contribution of Service Line and Plumbing Fixtures to Lead and Copper Rule Compliance Issues

The WA pipeloops are discussed in this report posted on

[http://www.epa.gov/dclead/corrosion\\_research.htm](http://www.epa.gov/dclead/corrosion_research.htm) with a link to

<http://www.waterrf.org/PublicReportLibrary/91229.pdf>

My assessment of this report:

### 3 Factors in Error in AwwaRF 3018 concerning WA Pipeloops:

- 1. Dilution by non-lead pipe = **2.0/1.1** ratio of total water volume to leaded pipe volume
- 2. Selective averaging of **concentration** values of lead at cooler temperatures taken from Nov05 –May06 Racks 2,3,6,7 and average to Nov05-Jan06 values for Racks 1,4,5. Only Rack 7 is valid, all racks used in AwwaRF 3018 average of **7.3 ug/l**. (true level at summer peaks of **80ug/l** for 2005,2006,2007)
- 3. Omitted factor for total number of liters in a LSL, a factor from 4.4 to 10 times. Using factor of 4.7 of Table 3.9:
- RESULTANT % ERROR IN **MASS** OF LEAD FROM LSL BASED ON WA PIPELOOPS= **683/17.1=4000%**

The data analysis of the WA pipeloops by the EPA and AWWARF missed the contribution of LSL to lead leaching as demonstrated at the WA pipeloops by a factor of 40X. Nevertheless the full report does affirm the major contribution of LSL to lead in drinking water contamination.

**Table ES.1  
Average % Contribution of Major Lead Sources**

Lead Source	Average % Contribution to Mass of Lead Measured at Tap during Profile Sampling <sup>(1)</sup>
Lead Service Lines	50% - 75%
Premise Piping	20% - 35%
Faucets	1% - 3%

<sup>(1)</sup> From sites with lead service lines. Based on "mass of lead" results measured at the tap from sequential samples collected for this study

The other two lead pipeloops sites are at the McMillan site in DC and at DC Water utility. Data from these two lead pipeloop sites, if examined carefully, erroneously portray lead leaching from LSL as a problem solved. Since most of the lead is particulate, the McMillan pipeloops being horizontal and sampled at low flow rate leave much of the lead generated behind sedimentated in the loop at the time of sampling see my report on Particulate Lead in the TEWG minutes of 3/2/2012. I demonstrated this in lead measurements of the water to drain immediately after sampling at the McMillan loops. The DC Water pipeloops are a recirculating system with the 100 liter tank water replaced every 24 hours. Any lead leached from LSL in about 1 liter is diluted 100X before sampling. The current DC Water pipeloops

generate lead at the rate of 9X an LCR Compliant sample. My calculations and concerns are outlined in TEWG minutes of 8/26/11 with these calculations below from sampling done July 2011.

All three pipeloop sites have been adjusted to give the public a false sense of security that the lead in water crisis is solved.

	Length of lead pipe, 1 foot contains 0.095 liter/ft	Lead results from 3 sites analyzed by Virginia Tech	Dilution by non-leaded components of the loop	Select a stagnation time	Total lead mass in ug generated per loop	Lead mass in <u>ug per foot LSL</u> , 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	<u>100 liters</u> 0.86	<u>8 hours</u> 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	<u>2.0 liters</u> 1.14	<u>8 hours</u> 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	<u>2.0 liters</u> 1.24	<u>8 hours</u> 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	<u>8 hours</u> 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

## DC WATER LCR COMPLIANCE SAMPLES

Do all sites used by DC Water for LCR Compliance meet Tier 1 requirements? NO

Errors in service line material record keeping is not a new problem with DC Water (WASA). <http://www.epa.gov/dclead/index.htm> in 2006 "DC WASA to Pay \$10,000 Penalty for Reporting Errors". Twelve samples were invalidated from the 2nd semester 2005 LCR Compliance list and 37 sites were removed from the 2006 LCR sampling list **because the LSL was fully replaced**. For 2<sup>nd</sup> semester 2012 LCR samples from Washington, DC, an amazing 67% rarely produce lead concentrations over 3 ppb in first or second draw. One explanation is some of these sites **have fully replaced LSL**. The site, 43XX 38th St NW, was removed from 2012 LCR sampling list since it no longer had LSL. 43XX 38th NW sampled 11/4/11 was posted online as having a copper service line on DC Water's 2nd semester 2011 LCR sample list. I was told it was posted as copper service in error online, that on 11/4/11 the site still had a partial LSL and it was replaced in 12/2011.

How the non LSL invalidations even showed up in 2005 was the customer wrote on their chain of custody-this house doesn't have a LSL. The second 2005 LCR Compliance was calculated with three sites on it with known LSL totally replaced, non Tier 1 for LCR left on because WASA didn't know at the time

of sampling and reporting the service material. This is OK with EPA. The final LCR calculation for 90 percentile for semester of 2<sup>nd</sup> semester 2005, the first LCR compliant semester in DC since exceeding LCR action level for lead, a change of **one site, one ppb of lead** and the whole city of Washington DC would be out of LCR Compliance. This is absurd. (on the second semester 2005 Compliance list with completely replaced LSL are "A" St. Huidekopper PI and Carrollsburg PI). Lisa Donahue of EPA wrote to file signed on June 4, 2006 there were OTHER fully replaced sites on 2<sup>nd</sup> 2005 LCR Compliance list. How many in 2005, in 2013? For years I have been concerned that up to 50% of the LCR Compliance list may be from fully replaced LSL based on Feb 2002 EPA Guidance documents. How would anyone know?

Since 2005, there are exactly 1666 LCR Compliance samples site collections from DC Water posted online (about 200 per year X8 years). I sorted them by site and marked samples I considered from a site that consistently with few exceptions from year to year produced <3ppb for lead for first and second draw. These could be fully replaced or altered LSL sites. Very disturbing are sites with lead data >3ppb that seem to convert from a lead producing site (>3ppb) **suddenly** in one semester to a non lead producing site (<3ppb) and remain non lead producing from then on. All the 2<sup>nd</sup> 2005 invalidated sites with nonLSL had less than 3 ppb lead for first and second draw. All three that were revalidated since they had truly LSL had at least one sample over 3 ppb averaging at 7ppb. Possibly, a true LSL may always produce at least one draw over 3ppb lead in water with 2005 protocol. (Pipeloops, 10,000 samples, even in the winter had measurable low lead levels all loops, usually over 3ppb.) Using this low lead level to point to other such fully replaced sites, there are 21 more low level sites in compliance 2nd 2005. Maybe the lost 10 sites of 0508093, are low level lead too and fully replaced LSL. From 2<sup>nd</sup> semester 2005 there were 3 (revalidated)+ 12 (invalidated and replaced)+21 (low producing lead < 3ppb) +10(missing from #0508093) possibly 46 non LSL sites. WASA may be approaching 50% fully lead replaced sites being initially submitted for 2nd 2005 compliance.

50% fully lead replaced sites is okay with EPA in a 2/2002 Guidance document. I checked for low level lead sites (<3ppb both draws) for first half 2006--close to 50% also!! This percentage has increased about 3% per year and is now 2<sup>nd</sup> 2012 semester at 67% of LCR Compliance samples at usually <3ppb first and second draw. All compliance semesters for at least 50% of sites <3ppb both draws pointing percentages of potentially fully replaced LSL being used for LCR Compliance. This would also explain EPA directing WASA in the past to ask more questions on the chain of custody forms to be sure that a home with a full lead replacement has at least as an alternative lead solder or interior lead pipes to assure Tier 1 status. If EPA is assured that a fully LSL replaced site meets the lead solder/interior pipes criteria they may or may not have just left it in the sampling pool up to 50% of the sampling sites. Next quote is from EPA Guidance Feb. 2002 interpreting the LCR law.

[http://www.epa.gov/ogwdw/lcrmr/pdfs/guidance\\_lcrmr\\_monitoring\\_reporting.pdf](http://www.epa.gov/ogwdw/lcrmr/pdfs/guidance_lcrmr_monitoring_reporting.pdf)

Labeled on page 19 (page 26 of 105 pdf): "**Tier I** sampling sites are single family structures: **with copper pipes with lead solder installed after 1982 (but before the effective date of your State's lead ban) or contain lead pipes; and/or** that are served by a lead service line." Labeled on page 20 (or page 27 of the pdf): "If your system contains lead service lines, then, if possible, half of the required sampling sites should be served by a lead service line. "

Research in the above AWWARF table states the LSL contributes 50-75% of lead in water contamination for LCR testing. With no LSL, making LCR Compliance is so much easier. **Every year** 2007-2012, an average of 30 LCR samples are from new sites that are added each year to DC Water's sampling pool. For 2012, also 17/26 of the new sites that are on the LCR Compliance list for the first time show up at with <3ppb first or second draw. A sample testing out at <15 ppb can be considered 'chemically' replaced. How can all these low producing sites at consistently <3ppb first or second draw possibly be worst case sites?

I am requesting that the EPA to do an **independent audit of LCR Compliance samples for service line material**. What documentation of LSL does DC Water actually have on their LCR sampling list? Is 50% fully replaced LSL still acceptable for LCR site selection?

Are all samples that are collected used in calculating LCR Compliance? NO

It is not reasonable that any samples be thrown out at all since this invalidates getting a representative sample citywide. This was done recently in New Orleans where high leaded samples were not included in the LCR percentile calculations. From FOIA'ed data, WA submitted samples from the work order# 0508093 that had 64 samples with 32 first draw and 32 second draw samples. Ten first draw samples within the sequence did not appear on the LCR Compliance list. These were not invalidated due to non LSL material. Were the results thrown out? Why? (#0508093-007, 009, 011, 027, 031, 041, 045, 053, 055, 057).

A very high percentage of sample bottles distributed to DC Water customers do not return. How do we know when these potential samples are lost to the sampling pool? Were they pretested with paper strip tests for lead and discarded if high? I recommend a serial number be placed on sample bottles and the customers mail in a postcard to EPA verifying they took the samples, sealed them with a tamperproof seal, placed them outside for pickup, and noticed they were picked up.

I observed in 2005 many sample bottles (about 200 a week in 2005) labeled for LCR Compliance including names and addresses and date sample. Some returned at one time having had samples in them but were never logged in for LCR testing. Only 400 per year are needed to sample for LCR. Why all the bottles?

Does LCR sampling protocol target portion of water stagnant in LSL? NO

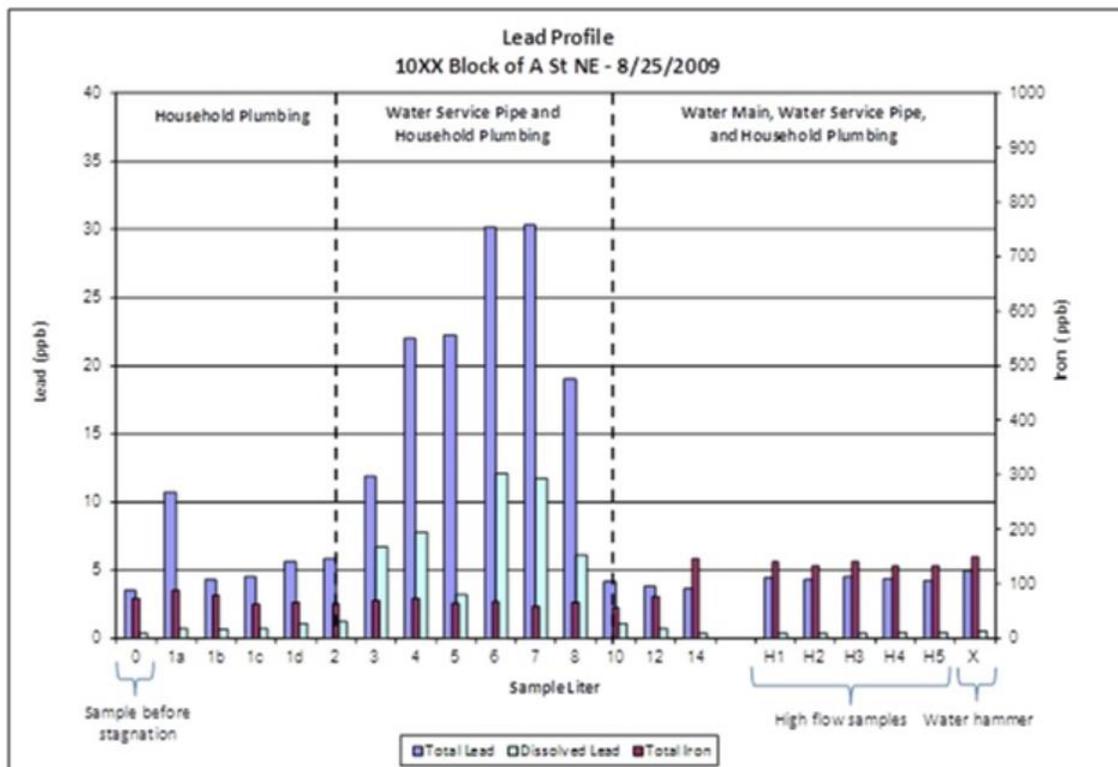
From lead profiles, the water stagnant in the LSL is captured in about the 3<sup>rd</sup> to 11<sup>th</sup> liter depending on the site. A tap flows about 7 liters per minute. The LSL exposed water starts to come out the tap at about the time of 30 seconds (0.5 minutes X 7 liters/minute= 3.5 liters into the lead profile) and ends at two minutes (2 minutes X 7 liters/minute = 14 th liter) after the tap is turned on. The first draw sample does not catch the portion of the water exposed to LSL. FOIA'ed results from 2<sup>nd</sup> semester LCR for DC document that the time between 1<sup>st</sup> and 2<sup>nd</sup> draw for LCR Compliance samples averaged 6 minutes. Any water contaminated by LSL is long gone by then. The LCR must be amended to drop the protocol of flushing until a temperature change between draws. No one will answer when I ask during TEWG conference calls, how long the tap runs between LCR samples currently. Also any preflushing the night before removes any water left in the plumbing that may have been exposed to LSL prior to sampling.

Are LCR samples representative of the known highest lead leaching times of the year? NO

All three lead pipeloop research sites demonstrate that the lead levels peak during the summer. DC Water LCR Compliance sampling (see below) routinely misses an average of 60 consecutive days each summer.

				TOTAL	DAYS MISSED		
					MAY	June	JULY
2005	15-Apr	TO	26-Jul	70	15	30	25
2006	19-May	TO	24-Jul	64	11	30	23
2007	24-May	TO	23-Jul	58	6	30	22
2008	5-Jun	TO	29-Jul	58	0	30	28
2009	21-May	TO	27-Jul	65	9	30	26
2010	27-May	TO	27-Jul	58	3	30	25
2011	19-May	TO	26-Jul	66	11	30	25
2012	29-May	TO	23-Jul	53	1	30	22

Example of a Household Lead Profile



This lead profile posted on DC Water website. Note liters #2-10 represent LSL exposure. Lead leaches from the LSL exposed liters at 30 ppb on 8/25/09. This is not the hottest day of that year and most likely it was taken in the morning after stagnation for 6 hours at night which is not the warmest time of the day. This is just an example and may not be the worst case DC Water has in their files. They are reluctant to say on the TEWG calls. As demonstrated at WA pipeloops, the lead concentration that leaches from

LSL doubles every 5 degrees C. This profile could potentially be 60 ppb in the portion stagnant in the LSL at the highest possible temperature it is exposed and this in 2009, five years after EPA declared DC Water LCR Compliant. Much of this lead (up to 70%) is particulate and therefore can sediment and dislodge at a variable rate exposing consumers to much higher slugs of lead precipitate should the flow rate of water sampling be greater for the consumer than the low flow rate recommended by paid consultants to DC Water for LCR sampling.

## Quotes:

12/2005 **Investigation of Higher Than Standard Lead Concentrations in Drinking Water From Washington, D.C**

[Adarkwah, N. E.](#); [Ararso, I.](#); [Garcia, N.](#); [Goldman, A.](#); [Lieu, C.](#); [Mondragon, J.](#); [Swamy, V.](#); [Unigarro, M.](#); Cuff, K. <http://adsabs.harvard.edu/abs/2005AGUFMED43A0839A>

“The majority of samples collected from the D.C. area were obtained from schools and homes located in the central north-northeast section of the District. Of these samples, 72% contained lead in excess of the EPA action limit. Despite reports that lead levels have fallen significantly over the past year, 63% of all homes tested during the second year of our study still contained lead levels that exceed the EPA limit.”

**Association between children’s blood lead levels, lead service lines, and water disinfection, Washington, DC, 1998–2006** [Environ Res.](#) 2011 Jan;111(1):67-74. doi: 10.1016/j.envres.2010.10.003. Epub 2010 Nov 26

[http://www.washingtonpost.com/wp-srv/metro/documents/cdc\\_dc\\_water12012010.pdf](http://www.washingtonpost.com/wp-srv/metro/documents/cdc_dc_water12012010.pdf)

“Conclusions: LSLs were a risk factor for elevated BLLs even when WASA met the EPA water action level”

## Public Health Protection under the EPA Lead and Copper Rule

Dr. Yanna Lambrinidou and Dr. Marc Edwards Posted on **April 1, 2013** by **Public Health Law Research**

<http://blogs.law.harvard.edu/billofhealth/2013/04/01/public-health-protection-under-the-epa-lead-and-copper-rule/>

“The LCR’s monitoring requirement allows utilities to conduct testing in ways that can miss serious lead-in-water problems in their jurisdictions. This can lead to prolonged exposures by consumers who assume that their water is safe.”

## **Detection and Evaluation of Elevated Lead Release from Service Lines: A Field Study**

*Environ. Sci. Technol.*, 2013, 47 (16), pp 9300-9307 Publication Date (Web): July 23, 2013 DOI: 10.1021/es4003636 Miguel A. Del Toral, Andrea Porter, and Michael R. Schock

“current sampling protocols will often considerably underestimate the peak lead levels and overall mobilized mass of waterborne lead in a system with lead service lines.”

### **Summary and suggestions for action**

The research from lead pipe loops in DC has been misrepresented and manipulated and underestimates the concentration of lead leaching from LSL. Adherence to LCR is NO guarantee that the public is safe from significant lead exposure from LSL. I observed the >100 ppb particulate lead peak at the WA pipeloops in summer 2005. Others too are also coming to realize that the public is exposed to lead leaching into drinking water from LSL at levels detrimental to health; despite the claims of DC lead pipeloop research and DC Water LCR Compliance numbers.

To the National Drinking Water Advisory Council, please support:

- 1) A public warning not to use tap water from LSL for making infant formula
- 2) Appoint independent committee including myself to investigate misrepresentation and manipulation of lead pipeloops at Dalecarlia, McMillian Plants and the DC Water utility.
- 3) Investigate DC Water LCR Compliance sites actually confirm LSL Tier 1 requirements (full lead or partial lead) and are not altered to miss lead leaching from LSL.
- 4) Amend LCR protocol to sample water actually stagnant in LSL at warmest time of the year and representative-of-actual-use high flow rate. Prohibit pre-flushing before LCR sampling.

# Non-Ferrous Founders' Society



1480 Renaissance Drive • Suite #310 • Park Ridge, IL 60068

Phone: 847-299-0950 • Fax: 847-299-3598 • E-mail: [nffstaff@nffs.org](mailto:nffstaff@nffs.org) • <http://www.nffs.org>

February 25, 2013

Reduction of Lead in Drinking Water Act of 2011

Jeff Kempic

U. S. Environmental Protection Agency

1200 Pennsylvania Avenue, NW

**Mail Code:** 4607M

Washington, DC 20460

Dear Mr. Kempic:

The Non-Ferrous Founders' Society (NFFS) respectfully submits the enclosed comments in response to the request for additional input put forth during the public meeting on Implementation of the Reduction of Lead in Drinking Water Act that was held on Thursday, August 16, 2012.

To begin, the Society and its member foundries understand the difficult position that Congress placed the agency in, and the difficult challenge the agency faces in developing the standards and regulatory approaches required to achieve the objectives of the Lead Free Act within the constraints of the legislatively-mandated effective date. We commend the agency for its open outreach to stakeholders – including the manufacturers of products that fall under this law –to understand their concerns. We believe that an honest and open dialogue among all parties can provide the basis for successful development of the implementing standards, regulations, and enforcement mechanisms required by the law.

The Non-Ferrous Founders' Society and its member foundries stand ready to collaborate with the EPA in implementing this legislation, thereby achieving the goal of reducing the lead exposures from potable water. To that end, we are pleased to provide our input and comments as contained in the following pages.

Sincerely,

A handwritten signature in black ink, appearing to read 'Andrew S. Mallon'. The signature is fluid and cursive, with a large initial 'A' and 'M'.

Executive Director

JLM/  
Enclosure

# Reduction of Lead in Drinking Water Act of 2011

## Comments on the Scheduled January 4, 2014 Implementation by the Non-Ferrous Founders' Society

### Introduction

The Reduction of Lead in Drinking Water Act was signed on January 4, 2011 and becomes effective on January 4, 2014. It changes the definition of lead free materials used in potable water applications from 8% to not more than 0.25%, and, in addition, expands the definition to cover both the plumbing fittings and fixtures. It was modeled in part upon the AB 1953 law enacted in the state of California that was passed into law on September 30, 2006, with an effective date of January 1, 2010.

EPA held a stakeholder meeting in August of 2012, at which time the agency noted that enacting the required standards and regulations to implement the new law would not be as simple as taking the existing rules and changing the allowable content limit for lead from 8% to 0.25%. In fact, the agency identified several key questions on implementing the requirements of the Act where it needed to solicit additional input from the industry before proceeding.

### Background

Many metalcasting industry organizations - including both the Non-Ferrous Founders' Society and the American Foundry Society - opposed the enactment of the AB 1953 regulation when it was first introduced in California in 2006. Among the reasons cited for this opposition, it was felt that the current performance-based standard (NSF 61), which evaluates the quality of the water coming out of the faucet for consumption, ensured the integrity of California drinking water and adequately protected consumers. Industry suggested that AB1953 legislation represented a rejection of the value of the NSF-61 performance standard and the NSF process in favor of an arbitrary content formula proposed within the bill without proper scientific consideration or justification. Other arguments against AB 1953 were also presented, which in retrospect are no longer deemed relevant to these comments.

Despite this opposition, and almost immediately upon the introduction of AB 1953 bill, the industry formed a consortium comprised of eleven metalcasters, six alloy producers, two

plumbing product manufacturers, a research lab, and three industry trade associations to discuss the technological implications of the enactment of the bill and to begin to lay out a roadmap to research the practical application of various alternative no-lead copper alloys. The consortium established seven sub-committees, each charged with investigation of a critical area of concern, including: health effects; alternative materials, including bismuth and silicon alloys; and production considerations (casting, machining, plating, etc.). The results of the consortium's research efforts were published in 2010.

Upon the enactment of AB 1953, and despite their prior opposition to its passage in California, the industry supported the introduction in Congress and eventual passage of national legislation which became The Reduction of Lead in Drinking Water Act of 2011, although not entirely for altruistic reasons. Rather, it was the industry's position that enactment of a national lead content standard for plumbing brass was vastly preferable to having to address a plethora of lead content rules as might be enacted by each of the 50 states. In fact, in the period between the enactment of the California law in 2006 and the passage of the RLDW Act in 2011, similar though varying laws had already been proposed or enacted by several other states.

### **Current Status and General Concerns**

Upon its introduction, and even at its enactment, AB 1953 was a seriously flawed bill. It established a lead content limit for plumbing brass with no scientific investigation or justification as to whether it would achieve the goal of reducing lead exposures from water consumption. Rather, since lead exposure is known to have significant health effects, the law was guided by the common but impractical assumption that the only acceptable exposure risk level for lead should be zero. The level the law set also gave no consideration to whether companies that produce the products to be regulated could in fact actually meet the requirements of the law, nor did it provide any guidance for enforcement or standards for determining compliance. And it gave no consideration whatsoever to the costs that would be imposed on any of the affected parties, including producers, consumers, or public water systems.

To address some of the shortcomings within AB 1953, its companion bill (SB 651) proposed to strengthen the law by clarifying some of its terms and definitions, and by including a

requirement for third party certification. This is done primarily to ensure that all potable water component manufacturers – both foreign and domestic – would be required to comply with its requirements. But again, while outlining an enforcement inspection methodology, the law still gave little if any guidance on how the state of California would pay for its enforcement.

The transition of the reduction of lead content in plumbing brass regulation to the national level placed the task of overcoming the shortcomings within the California law in the hands of Congress. Regrettably, the enactment of the Safe Drinking Water Act Amendments has once again simply shifted the problem downstream. Congress adopted the national lead content limit for plumbing brass and established its effective date, but shifted the burden of enacting the required standards and regulations to implement the new law to the EPA. The problem of enforcing the law was delegated to the states.

During the stakeholder meeting on August 16, 2012, EPA staff suggested that the issues surrounding the implementation of the Safe Drinking Water Amendment would probably not be answered in a timely fashion for manufacturers. The agency has elected to incorporate revisions of the lead free content to the proposed *Lead and Copper* rule scheduled to be proposed in 2013, then, as a best case scenario, to promulgate final revisions somewhere around the date at which the SDWA amendments go into effect. It will take time to resolve questions such as product marking & labeling, third party certification, and treatment techniques that are applied to public water supply systems, but making these revisions as part of the national primary drinking water rule means they would go into effect three years after the Lead and Copper regulation is promulgated. Doing a separate rule would take considerably longer for the agency. Meanwhile, the lower lead content limits become the law of the land on January 4, 2014, and there is no regulation that the agency can use to change the effective date of the legislation.

### **Specific Input Requests from EPA Stakeholder Meeting Held 8-16-2012**

During the stakeholder meeting, the agency posed several questions for which it is seeking guidance from the affected parties.

***Should manufacturers be required to demonstrate that a product is lead free, and if so how?*** The lack of compliance / enforcement guidance was one of the principal flaws in AB 1953. The requirement for third party certification was added to address that deficiency, as

well as to establish a basis for assuring that all products being offered in the marketplace would meet the requirements of the law. We believe this is the only valid mechanism by which to assure that products are lead free.

There is no way to visually inspect a product to verify that it meets the content limits of the law. Nor does EPA have either the expertise or resources necessary to specify how such testing should be performed. Should the agency therefore certify or approve third-party certifiers? We believe not. Third party certifiers have already been functioning for many years, and very successfully. Organizations such as the American National Standards Institute (ANSI) already have established procedures to achieve that objective. Should EPA mandate that a particular certifying agency be used? Absolutely not. Such action would create a certification backlog far worse than could ever be imagined. Even the International Organization for Standardization (ISO) allows for any qualified certification service (registrar) to be engaged.

Should companies be allowed to self-certify that their products are lead-free? Again, we say no. Some level of assurance beyond “*we say they are*” is needed - for the consumer, for the marketplace, and for those manufacturers who have invested heavily to assure that their products do indeed meet the law. Several agencies can provide certification/listing of NSF 372 compliance. Other test methods should also be permitted as long as equivalence is established.

***How should lead content be calculated?*** The law states that *the weighted average lead content of a pipe, pipe fitting, plumbing fitting, or fixture assembly shall be calculated to address total wetted exposure of the product, based upon each component’s wetted surface area and maximum % lead content.* The lead content of the non-wetted areas are not of concern.

It is important to bear in mind that this is a content-based law. The lead content of the surface or wetted areas must be in conformance, but no treatment, wash or coating will conform to the “*content*” limit for the material. The lead leaching provisions of the earlier law were not retained in the current revision, notwithstanding the incorporation by reference of NSF 61 as a voluntary consensus standard.

***How should lead-free products be identified?*** Lead free products that meet the California AB 1953 law are already being manufactured and have been in the marketplace since January, 2010. Some manufacturers have elected to make products from both the lead-free and traditional materials, and to label products as to whether or not they are *suitable for potable water applications*, but those markings might be different for each product and/or product line, and what works in one application may not work in another.

Some manufacturers choose to incorporate a mark on the casting itself noting that it is made of a lead-free material. This mark means little to the consumer, but is essential in the recycling of products to avoid contamination of the scrap stream and to maintain the value of more expensive metal. Moreover, there are several alternative materials already in use that meet the lead content law, but might have different alloying elements. Identifying these varying materials is more important in recycling than in in-service application. Industry must be the best judge as to how these products can and should be marked.

Painting, marking, and labelling products do impose a cost on the manufacturer, but these costs pale in comparison to the cost of adapting or changing the manufacturing process itself to the lead-free material. Put another way, what goes on the outside costs far less than what goes into the product. Foundries and plumbing manufacturers have been engaged in the effort to adapt their manufacturing systems to make lead-free products since 2006.

***Should all plumbing products be required to meet the lead-free definition, or should there be "dual lines" of products allowing higher lead content for some statutorily noted exemptions?*** The law does not portend to outlaw the manufacture or the offer in commerce of products not intended for use in potable water applications. Moreover, the law as enacted contains two exemptions – one for products specifically intended for non-potable applications, the other for products such as shower valves, service saddles, or water distribution main gate valves that are 2 inches in diameter or larger. EPA does not, in our opinion, have the authority to change the intent of the law, to restrict or eliminate the manufacture or distribution of products not required to conform to the Safe Drinking Water Act Amendments, nor to mandate how they will be manufactured. The question of whether there should be “dual lines” of products has been answered within the language of the law.

***If dual product lines are allowed, how should non-potable products be identified?*** As previously noted, such products already exist in the marketplace without markings. Parts made from traditional materials (7 or 8% lead) make no reference on packaging or labeling claiming to be lead free. If products that are lead-free and thus suitable for potable water application are properly identified, no physical markings on non-potable water products should be required.

Product packaging or labelling is the most efficient way to inform the consumer that a product is fit for use in drinking water applications. Once a product has been purchased or installed, the consumer does not care how it was marked. Moreover, a non-conforming product that was introduced into commerce legally on or before January 3, 2014 cannot be used in the installation or repair of a PWS or residential or non-residential facility providing water for human consumption after the effective date of the SDWA amendments. However, it is impossible to guarantee that even an informed consumer will not knowingly misapply a product not intended for use in potable water applications. As a matter of enforcement delegated to the states, EPA should not try to regulate against such an occurrence.

***Should just the package be labelled, or should there be some sort of identification on the product itself, or should both be required?*** The purpose of the marking should dictate what is required. A label should be adequate to inform the consumer that a pipe, pipe fitting, plumbing fitting, or fixture assembly is suitable for drinking water use. A mark on a lead-free product – even if not readable or even visible to the consumer – is better used to distinguish lead-free materials in recycling. As stated above, product packaging or labelling is the most efficient way to inform the consumer that a product is fit for use in drinking water applications.

***Can one part of a system or facility be repaired using lead-free component parts and returned to service, even if other component parts that were not repaired do not meet the new lead-free definition?*** The law does not require that products currently in service must meet the definition of lead free. While the replacement of components must be done with parts that meet the content limits of the law, the law does not specifically require that every part of a system or facility – including those not being replaced – be returned to service as 100% lead-free. Clearly, over time, all parts will become lead-free, but the costs of

replacement can be spread over the useful life of the component, thus mitigating the cost impact.

***What about routine check, then reinstalling old non-compliant product?*** As a corollary to the previous comments, it is logical to presume that a product that is removed for routine inspection and found to be performing properly does not need to be replaced – even though it does not meet the content limit imposed by the law. Mandating the replacement of properly-functioning elements of the water distribution system was not intended and is not mandated by the law, and would simply add needless costs.

***Will industry have difficulty meeting certification or labelling requirements by Jan. 4, 2014, because obtaining an ANSI accredited third-party certification takes time?*** Conforming products are already in the marketplace in several states, and foundries and plumbing manufacturers are positioning to being able to supply these products on a national basis prior to January 4, 2014. While it might be considered useful to have a uniform labeling system in place prior to the effective date of the SDWA Amendments, EPA has already acknowledged that this cannot be achieved – perhaps unless done on a voluntary basis by industry. However, even gaining EPA's endorsement of a voluntary labeling regime is both improbable and unrealistic.

ANSI accredited third-party certification takes time, and domestic manufacturers are already struggling to meet this objective. However, as the only acceptable means of demonstrating that products being offered in the marketplace will in fact meet the content limits of the law, they are aware that this must be accomplished. EPA cannot definitively regulate how that certification is to be attained prior to the effective date of the law.

## **Conclusion**

Congress adopted the national lead content limit for plumbing brass and established its effective date at January 4, 2104 but shifted the burden of enacting the required standards and regulations to implement the new law to EPA. EPA has already stated that, as a best case scenario, incorporating the revisions into the national primary drinking water rule cannot be achieved until perhaps three years **after** the SDWA amendments take effect, and there is no regulation the agency can use to change the effective date of the legislation. EPA should

recognize that this is a content-based law and be guided accordingly when developing the implementing standards. Meanwhile, states must be prepared to enforce the law upon its effective date, but must also be prepared to exercise great discretion in enforcing against standards, procedures and protocols that will not be finalized for several years after the effective date of the law.

The Non-Ferrous Founders' Society and its member foundries stand ready to collaborate with the EPA in implementing the Safe Drinking Water Act amendments, thereby achieving the goal of reducing the lead exposures from potable water. To that end, we have been pleased to provide our input and comments as contained in these pages, and we will welcome the chance to respond directly to any comments and/or questions the agency may have on anything noted herein.

**Public Comment on Lead and Copper for October 9 and 10 NDWAC Meeting  
September 4, 2013 at 10:59 am by e-mail to the DFO**

Dear Mr. Simon:

Due to the distance I would not be able to attend any meetings however I would like to address some concerns that we have here in Sturgis S.D. We have been testing for lead and copper for around fifteen years with no bad results but yet we must continue to do these tests that are costly. Also there is a new rule that we must start using no lead meters and repair fittings in January of 2014 which I have no problem with other than the fact that we were not told about this rule until sometime around November of 2012 and they did not stop selling the leaded fittings until just recently. This left a lot of small rural cities and water systems with an expensive inventory that we will have to replace in January of 2014 at a very high cost and for no good reason as I have stated we have been testing with no bad results. We should be able to use our inventory and replace with no lead fittings when we run out of our inventory. I would think there should be waivers allowed for the lead and copper if everything has been testing ok for that many years.

Thanks  
Dale Olson  
Water Superintendent  
City of Sturgis,S.D  
605-347-4425

## **Statement by the Non-Ferrous Founders' Society to the National Drinking Water Advisory Council Meeting, October 9-10, 2013**

Good afternoon. My name is James L. Mallory, and for the past 28 years I have been proud to serve as the Executive Director of the Non-Ferrous Founders' Society (NFFS), a 70 year old trade association representing the non-ferrous metalcasting industry. Many NFFS members produce castings that are used in potable water delivery systems nationwide. Other NFFS members are ingot producers that supply the alloyed material melted by foundries that is then cast into valves, faucets, water meters and other such components.

The Society was pleased to submit written comments on February 25, 2013 in response to EPA's request for input on issues surrounding the implementation of the Reduction of Lead in Drinking Water amendments to the Safe Drinking Water Act. We have provided copies of those comments for distribution to this committee, and we respectfully ask that they be referenced in their entirety and appended to this statement for the record. But let me try to summarize and reiterate some of the concerns raised in that document.

The Reduction of Lead in Drinking Water Act that was signed into law on January 4, 2011 and which becomes effective on January 4, 2014 changes the definition of lead free materials used in potable water applications from 8% to not more than 0.25%. The amendments were modeled in part upon the AB 1953 law enacted in the state of California that was passed into law on September 30, 2006, with an effective date of January 1, 2010.

At its stakeholder meeting last August, EPA stated that enacting the required standards and regulations to implement the new law is not be as simple as taking the existing rules and changing the allowable content limit for lead from 8% to 0.25%. The agency identified several key questions on implementation issues and solicited input from the industry before proceeding. The response from our association, as well as those from other organizations representing our industry, was crafted in response to that request.

The metalcasting industry has been actively engaged in seeking alternative materials for plumbing applications that could reduce lead exposures in drinking water for more than 20 years. As EPA moves to implement the new requirements incorporating the Reduction of Lead

in Drinking Water Act of 2011, agency officials need to consider the current Safe Drinking Water Act (SDWA) requirements and how they have been successfully implemented and regulated by States, municipalities, and end users without significant governmental oversight. Substantial reductions of lead in drinking water have already been achieved through the implementation of national standards such as AWWA and ASTM, through user specifications as part of contracts and bid documents, by demonstrations of compliance, and as a result of industry and trade group oversight.

Almost immediately upon the introduction AB 1953 in 2008 California in 2008, the metalcasting industry formed a diverse consortium to investigate the technological implications of the bill and to begin to lay out a roadmap to research the practical application of various alternative no-lead copper alloys. The results of the consortium's research efforts were published in 2010, but investigations into the viability of other potential replacement alloys for plumbing applications continued to be pursued.

At its introduction, and even upon its enactment, AB 1953 was a seriously flawed bill. It established a lead content limit for plumbing brass with no scientific investigation or justification as to whether it would achieve the goal of reducing lead exposures from water consumption. Rather, the law was guided by the common but impractical assumption that the only acceptable exposure risk level for lead is zero.

The transition of the reduction of lead content in plumbing brass regulation to the national level placed the task of overcoming the shortcomings within the California law in the hands of Congress, but regrettably once again the problem simply shifted downstream. Congress adopted the national lead content limit for plumbing brass and established its effective date, but delegated the burden of enacting the required standards and regulations to implement the new law to the EPA.

During the August stakeholder meeting, EPA suggested that the implementation issues could not be answered in a timely fashion for manufacturers. Instead, the agency elected to incorporate revisions of the lead free content to the proposed *Lead and Copper* rule, which we now know is a central issue being addressed at this meeting. However, given the presumed schedule to enact the Lead and Copper Rule, it is obvious that the SDWA amendments will have been the law at least several years before the implementing

regulations will be enacted. So how should this committee proceed? Let me try to offer a few suggestions.

1. The lack of compliance / enforcement guidance was one of the principal flaws in AB 1953. A requirement for third party certification was added to address that deficiency, as well as to establish a basis for assuring that products being offered in the marketplace would meet the requirements of the law. The Non-Ferrous Founders' Society agrees that this is the only valid mechanism by which to assure that products are truly lead free, but some consideration must be given to both the cost of the testing and the practical enforcement of the law. If domestic producers are required to provide third-party documentation as evidence of compliance, then the same rules must be applied to products made in other countries and imported for sale in the U.S. Failing to do that places American manufacturers that are required to pay for testing at a competitive disadvantage in the marketplace. Without effective enforcement, a law is nothing more than a suggestion.
2. The committee should not try to specify how lead-free products are to be marked, labelled, or otherwise packaged. Lead free products are already being manufactured and have been in the marketplace since January, 2010. Some metalcasters went "lead free" even before that. Some companies make products from both lead-free and traditional materials and label products as to whether or not they are *suitable for potable water applications*, but the markings may be different for each product and/or product line, and what works in one application may not work in another. If products that are lead-free - and thus suitable for potable water applications - are properly identified, it really shouldn't matter whether a common system of marking has been applied. Moreover, EPA has already acknowledged that a uniform labeling system cannot be achieved prior to the effective date of the SDWA Amendments. Imposing new marking or labeling requirements years after the law takes effect – and after companies have already made significant product marketing investment decisions - is both impractical and counter-productive.
3. The committee **MUST NOT** seek to reduce the content limits for lead and copper beyond the level specified in the current law. As previously noted, the metalcasting

industry has been voluntarily seeking ways to reduce the lead content in plumbing brass, and significant investments in retooling production lines have already been made by many companies in their efforts to meet the 0.25% content limit. As the agency has itself recognized, enacting the required standards and regulations to implement the new law is not be as simple as taking the existing rules and changing the allowable content limit for lead from 8% to 0.25%. Changing production capabilities, switching materials within a metalcasting facility, is far more complicated – and costly - than that.

In conclusion, the Society and I thank the agency for allowing me the opportunity to present this statement today, and we stand ready to assist the Council in its further discussions on the proposed regulatory revisions to the Lead and Copper Rule under the SDWA and other program issues as may be helpful.