Statement of Ralph Scott
Parents for Nontoxic Alternatives
Washington, DC

to the EPA Science Advisory Board

March 30, 2011

Good morning. I'm Ralph Scott with Parents for Nontoxic Alternatives. I've worked on lead poisoning prevention for more than 25 years, half of that time at the Alliance for Healthy Homes, originally founded as the Alliance to End Childhood Lead Poisoning. Today I want to speak about a study published by CDC researchers in January of this year entitled, "Association between children's blood lead levels, lead service lines, and water disinfection, Washington, DC, 1998–2006." It provides very important information for you to consider as you evaluate the science behind partial lead service line replacements. While identifying serious potential health threats from partial lead pipe replacements, the paper has several significant limitations that raise the possibility that partial replacements carry even greater risks than those presented.

According to the CDC study, the increase in risk for childhood lead poisoning associated with living in a home with a lead service line is greater at a 95% confidence level than the risk of EBL in a home with no lead service line. This finding held whether or not the water met the EPA lead action level. This fact tells us that the problem of millions of lead service lines in the U.S. needs to be addressed. Most relevant to your job, however, **the study found that between July 2004 and December 2006, living in a home with a partial lead service line replacement adds somewhere between no additional risk and double the risk for lead poisoning for a young child compared to living in a home with an intact lead service line with 95% probability, with the most likely added risk being about 40%** (see Table 3 in the study). While the data does not show that partial replacements actually make lead exposure worse to a 95% confidence level, they do show partial replacements are detrimental at a confidence level nearly as great.

Lest anyone think that CDC is being unduly alarmist in its publication of its findings, I want to note that CDC was very slow to release these disquieting conclusions about the lack of benefits, and probably detriments, of a widely-performed practice that is actually a legally-required remedial measure when utilities exceed the EPA lead action level. The CDC published its paper reluctantly and belatedly, three years after confirming the dangers of partial pipe replacements, and while trying to defend its now infamous 2004 report, which wrongly concluded that consuming water with very high lead levels over the course of several years did not lead to a single detectable case of lead poisoning among DC residents. Only after years of withering public criticism from lead poisoning prevention advocates, damaging press coverage, and two major congressional investigations of CDC's prior research did the agency get its partial replacement paper out into the public domain. **The fact that the risks associated with partials have been known for so long but no action has been taken to stop them once and for**

all, increases the urgency that the Science Advisory Board take a strong position on this issue.

Most of the other research that you'll see on the list of studies EPA staff has provided for your review examines what happens in anywhere from one home to a handful of homes after a partial replacement. The CDC paper looks at more than 700 homes with partials and compares them with nearly 3,000 homes with intact lead service lines. Although no study is perfect, **the statistical power of this study is far greater than any other to date.**

Another reason this study has great relevance to the question of health impacts of partial replacements is that it looks at the **blood lead levels** of resident children, rather than merely at water-lead levels. The importance of this is that **in studies that simply compare water-lead levels before and after partial pipe replacements, the water samples are small and discrete and thus can easily miss sporadically-released particulate lead that may be an important component of the lead to which residents are exposed.** Yet in the real world, children in homes with partial replacements are less likely to miss lead particles that may be released, and their exposure to such particles will show up in their blood lead levels -- if the blood tests are conducted soon after exposure. Moreover, most if not all of the other studies you've been provided do not look at water lead levels more than four months after the partial replacement, ignoring long-term lead elevations. **Blood lead levels, however, measure both long- and short-term water-lead exposure.**

In addition, **several limitations in the data used for the CDC research could have led to an <u>underestimation</u> of the positive association between lead poisoning risk and partial replacements**, including random errors in which homes have lead services lines or partial replacements (since it is well known that the list the researchers got from DC Water was imperfect -- it still is!), errors in lab results for blood lead levels, errors in reporting or entering blood lead levels, water use behaviors that might have mitigated exposure to lead in consumed water to a greater extent in homes with partial replacements, and the models CDC used for controlling for age of housing. **CDC acknowledges that they are likely underestimating the association between lead poisoning risk and partial replacements for all of these reasons in the paper's notes on pp. 5-6.**

Furthermore, the **exposure to lead from the well-known short-term water lead spikes, most likely caused by physical disturbance of the pipes during partial replacements, is undoubtedly under-measured by the blood tests reported in the CDC paper because of what is certainly a substantial time gap between the partial replacement and the child's blood test – a time period that averages about 9 months** for all DC children whose residences had partials and who had a subsequent blood lead test between 1998 and 2006. (See attached letter from CDC's Mary Jean Brown to EPA's Edward Ohanian, 8/28/09.) Also, **bottle-fed infants who may receive the largest exposures to lead from contaminated water are almost never**

documented – and thus are not considered in this paper – because blood tests are rarely performed for such young children.

Finally, the study may miss a stronger association between lead poisoning risk and partial replacements by failing to examine <u>all</u> the available data on DC homes with partial replacements where a resident child had a blood lead test in Washington DC in recent years. The CDC study looks only at partial replacements from mid-2004 through 2006. Please note that partial pipe replacements are required when corrosion control fails to bring the 90th percentile lead-in-water concentration below the lead action level of 15 ppb. CDC did not include in their analysis lead-in-water levels at hundreds of homes where partial replacements occurred in 2003 and the first half of 2004 when DC's water was the most corrosive and when, according to CDC's own findings, intact lead services lines were causing the most health harm. CDC also did not include homes where thousands more partial replacements occurred in 2007 and 2008 to determine the health effects of partials during a period when the water met the lead action level. Including the data from all of homes with partial replacements and children who had subsequent blood lead tests would provide more statistical power to CDC's analysis of the health impacts of partials, provide information about the impact of partial replacements under different water conditions, and might shed additional light on the duration of high lead levels in water following partial replacements. Presently, EPA maintains that post-partial replacement lead spikes are of short duration only, but there is no evidence in support of this and some that contradicts it.

Given the many ways that the study likely underestimates the association between lead poisoning risk and partial replacements, the CDC partials study is a powerful document that points to the need for precaution regarding any policy that would allow, much less require, partial replacements to be done. Also, given that partials may at least sometimes make lead exposures worse and definitely not reduce them, it makes no sense to spend thousands of dollars per home to partially replace these pipes.

It is remarkable that the press discovered and highlighted the fact that the CDC paper's data showed that **partials in all likelihood make things worse than leaving the whole lead line in the ground,** given that CDC downplays this conclusion in the paper. In one place, CDC says "**no significant difference in risk** was found between children in households with" partials and intact LSLs at blood lead levels at or above 5 or at or above 10, and in another place they say "partial replacement of LSLs **did not result in a decrease** in the association between LSL and elevated BLL." It's only when one absorbs Table 3 that one sees the statistical likelihood is far, far greater that partial replacements make things worse than it is that they make things better or are neutral.

Finally, the CDC paper does not address all the mechanisms whereby partial replacements may cause water lead elevations. On the one hand, it is widely accepted that physical disturbance of the lead pipe can create lead shavings, loosen leaded solder and release lead rust inside pipes, causing lead spikes at the tap that last for a few weeks or months. But **newly published research highlights long-established**

concerns that galvanic corrosion is also important in at least some situations. Lead contamination at the tap produced by galvanic corrosion can be both dissolved and particulate. Likewise, **EPA's Office of Water also has downplayed galvanic corrosion and continues to point to faulty research that purports to show it is not a real problem.** EPA never mentioned it once in any of the agency's presentations at a day-long meeting last November in Philadelphia about revisions to the Lead and Copper Rule. I urge you to study the research about this issue and to insist that EPA take galvanic corrosion into account as the agency revises the LCR in light of science.

As you undertake your work to evaluate the impacts of partial lead pipe replacement, you will be relying on EPA staff for background information and guidance. We are afraid that because the agency has vigorously promoted partials over the years as a solution to lead contaminated water and even disregarded local public health concerns in DC in 2004 to successfully push for the continuation of an accelerated partial lead pipe replacement program, **EPA has a real stake in wanting to find that partials are beneficial or at least do no harm.** If the SAB were to conclude otherwise, the agency may need to accept the harmful nature of its 20-year policy, consider banning partial replacements or requiring full service line replacements as an alternative remedial measure in its revised LCR, or even be forced to assist those with potentially harmful partial replacements from past activity. Please do not allow any EPA bias influence your fair and thorough evaluation of the science.

August 28, 2009

Edward Ohanian PhD
US EPA
Via email ohanina.edward@epa.gov

Dear Ed,

I am writing to respond to your email of August 17, 2009 and to thank you for your careful review and for allowing your staff to also provide us with expert advice. I have responded to your latest points below:

A. Confusion as to Coding of Lead Service Lines (LSL). Your description of how the LSLs were coded is correct. However the analyses conducted were:
    a. For Table 2 we compared Category 4 households + Category 2 and 3 households where the replacement work was done AFTER the blood lead level (thus all these households had a LSL at the time of the child's blood lead test) to Category 1 household + Category 2 and 3 households where the replacement work was done BEFORE the blood lead level (thus this category included both households without a LSL as well as those with partial or full replacement).

    b. For a Table 3 we compared Category 1 households to Category 2 households where the replacement work was done BEFORE the blood lead level. We also compared Category 2 households where the replacement work was done BEFORE the blood lead level to Category 3 households where the replacement work was done BEFORE the blood

lead level but as you indicate the numbers of full replacement households is very small.

B. We have done additional analyses on the time between replacement of LSLs and blood lead test as you and the reviewers from the journal both suggested. The relationship for risk for blood lead level 5-9 or ≥ 10 µg/dL does not vary significantly by time to partial replacement as indicated in the table below (p=0.68). However, we are unable to control for other possible sources of lead in these children's environments, the vast majority of whom live in housing built before 1950 where the risk for exposure to lead paint and lead contaminated house dust and soil is high. It seems reasonable to recommend that water testing continue in these homes until water lead levels <15 ppb are sustained and to continue to consider these as part of the high risk pool for the water testing done to comply with the lead and Copper Rule.

Table X: Mean Time from Replacement to Blood Lead Level (BLL) Test by Blood Lead Level Category for Children Whose Residences Had an LSL Partially Replaced On or Before the Date of the BLL Test, Children <6 Years of Age, Washington, DC, 1998–2006

	Blood Lead Level (µg/dL)						
	<5 µg/dL		5-9 µg/dL		≥10 µg/dL		
	n	Mean (95% CI)	n	Mean (95% CI)	n	Mean (95% CI)	p-value
Time (in days) from date of Replacement of Date to Blood Lead Test	274	279 (254-304)	71	258 (217-299)	25	258 (184-332)	0.68

C. I have reviewed the documents that you suggested but in the final analysis they seem to indicate that although the stage was set for increased lead in water due to build up of the mineral scale with lead, it was not until chloramine was added to the water that fluctuations in the pH 'facilitated the release of lead in water'. Thus without the change, the lead levels in the water would not have increased.

While I also appreciate that system wide application of orthophosphate did not occur until August 23, 2004, the more conservative approach is to use the first date that orthophosphate was added as the date of the change since we have not been able to quantify the percent of households affected at any point in time during the process.

Sincerely,
Mary Jean