TECHNICAL REVIEW FORM

Title/Draft **RATE Exposure Assessment Modules** **EXA 409**		Authors: Eva McLanahan, John Stanek, Allen Davis, NCEA-RTP Project Officer/Organization/Address Eva McLanahan, NCEA-RTP
Date Review Requested 4/15/13	Date Review Required 4/29/13	Reviewer/Organization/Address Ellen Kirrane NCEA-RTP
Type of Publication/Audience: Training material		
Review Coordinator- E McLanahan		

You are asked to review and comment on the attached manuscript. Feel free to make notations on the manuscript as well as in the comments section below, particularly regarding your recommendations for revisions. If you are unable to review the manuscript by the required date above, please return it now. Your suggestions for alternate or additional reviewers will be welcomed.

SUMMARY RATING

Please rate the manuscript as follows: Satisfactory Unsatisfactory

Contents and scope	_Satisfactory____
Organization and presentation	_Satisfactory_
Quality of data and validity of analytical techniques	___see below_
Soundness of conclusions	__Satisfactory_
Editorial quality	Satisfactory__
Other (specify)	_____

RECOMMENDATIONS

☐ (1) Acceptable as is
x (2) Acceptable after minor revision
☐ (3) Acceptable after major revision
☐ (4) Not acceptable

If you have checked either 3 or 4 please specifically state reason(s) in the comments space below.

Ellen Kirrane 4/30/2013
Reviewer's Signature Date

Comments: (Use extra sheets if needed.)
slide 9

Bullet 1 –I'm not familiar with the standards for lead in soil that you mention later in the case study. My understanding is that superfund has a target blood Pb level that they use to determine the remediation soil levels (used to be 10 but they are probably revising this because of the new CDC level of concern) and they go backwards from the target level considering multiple pathways of Pb exposure. I'm not sure how the soil standards work in practice.

Slide 12

Bullet 1 – only Pb in fine PM is transported long distances. Pb associated with coarse PM generally deposits near the source

Bullets 3/4 – substantial amounts of Pb can be transported by runoff waters to surface waters and sediments. Pb can be remobilized to the water column from sediment

Slide 13
Sources of lead exposure (and their relative contribution to blood Pb) are really situation specific. Maybe reframe this slide so that it is more explicitly linked to the case study and then you can

avoid the complexities of thinking about the relative contribution of specific sources generally. For example, it is generally agreed that deteriorated paint is the number one cause of lead poisoning but in this case study, a specific child without lead-based paint at home is probably exposed from the emissions or contaminated soil. Regarding the last bullet, I would say that this is an active area of research – we know children are exposed to lead in soil and it shows up in their blood but there is more to learn about specifics of the relationship.

Slide 14
There seems to be a mix of high and low level effects of lead on this slide. There is a lot of controversy that may be worth acknowledging about the levels at which adults experience health effects (general consensus that OSHA should lower levels). Here is how we say it in the ES of the 3rd ERD Pb ISA if that is helpful:

Effects of Pb Exposure in Children

Multiple epidemiologic studies conducted in diverse populations of children consistently demonstrate the harmful effects of Pb exposure on IQ, academic performance, learning and memory. Epidemiologic studies also demonstrate the effect of Pb exposure on inattention, impulsivity, and hyperactivity in children. The evidence in children is supported by findings in animal studies demonstrating both analogous effects and biological plausibility at relevant exposure levels. A decrease in cognitive function has been observed in populations of children 4 to 11 years old with mean blood Pb levels between 2 and 8 μg/dL (Section 2.6.1.1). Evidence suggests that some Pb-related cognitive effects may not be reversible and that neurodevelopmental effects of Pb may persist into adulthood (Section 2.9.4). Pb exposure also causes hematologic effects (such as effects on blood cells or blood producing organs) in children and is associated with an increased risk of internalizing behaviors (e.g., withdrawn behavior and depressive symptoms), sensory and motor function decrements, atopic and inflammatory conditions (e.g., asthma and allergy) in children, as well as misconduct in older children and young adults. Uncertainties arising from the lack of information about the specific Pb-exposure histories which contribute to observed blood Pb levels are greater in adults and older children than in young children (Section 2.9.5). Despite some uncertainties regarding the interpretation of blood Pb levels in older children, it is clear that Pb exposure in childhood presents a risk; further, there is no evidence of a threshold below which there are no harmful effects from Pb exposure.

Effects of Pb Exposure in Adults

A large body of evidence from both epidemiologic studies of adults and experimental studies in animals demonstrates the effect of long-term Pb exposure on increased blood pressure (BP) and hypertension (Section 2.6.2). In addition to its effect on BP, Pb exposure leads to coronary heart disease and death from cardiovascular causes and is likely to cause cognitive function decrements, symptoms of depression and anxiety, reduced kidney function, and immune effects in adult humans. The extent to which the effects of Pb on the cardiovascular system are reversible is not well-characterized. It is also important to note that the frequency, timing, level and duration of Pb exposure causing the effects observed in adults has not been pinpointed, and higher past exposures may well have contributed to the development of health effects measured later in life. However, it is clear that Pb exposure can be harmful to the cardiovascular system and may also affect a broad array of organ systems in adults.

Slide 14 – level of concern needs to be changed

Slide 15 – I wouldn't use this slide it is too old. An alternative for adults may be a paper by Kosnett et al. 2007 (EHP) that tries to give reasonable levels that effects occur. The Pb ISA takes a somewhat different approach.

Slide 18 – not familiar with these standards and I'm wondering if lowering them is a consideration in light of change to CDC level of concern

Slide 19 – same comment as above

Slide 20 – Update the CDC level of concern numbers
No "natural" level of lead in blood of children. You can cite the most recent HANES data on blood Pb distributions. Table from Pb ISA is below:

Blood Pb levels (µg/dL) by age and sex, 2009-2010 NHANES.

Age	Sex	N	Avg.	Std. Dev.	5%	25%	50%	75%	95%	99%
1-5 yr	**Total**	**836**	**1.61**	**1.49**	**0.53**	**0.85**	**1.21**	**1.81**	**4.00**	**8.03**
	Male	429	1.59	1.32	0.51	0.83	1.22	1.84	4.09	7.49
	Female	407	1.64	1.65	0.54	0.90	1.20	1.77	3.69	9.59
6-11 yr	**Total**	**1009**	**1.05**	**0.74**	**0.42**	**0.61**	**0.83**	**1.22**	**2.36**	**4.29**
	Male	521	1.10	0.73	0.45	0.66	0.88	1.30	2.37	4.18
	Female	488	0.99	0.75	0.38	0.58	0.79	1.12	2.35	3.98
12-19 yr	**Total**	**1183**	**0.84**	**0.68**	**0.33**	**0.50**	**0.69**	**0.96**	**1.82**	**3.10**
	Male	632	0.98	0.69	0.40	0.58	0.80	1.11	2.09	3.91
	Female	551	0.69	0.62	0.30	0.44	0.57	0.79	1.31	2.25
20-59 yr	**Total**	**3856**	**1.50**	**1.83**	**0.44**	**0.72**	**1.08**	**1.70**	**3.53**	**7.27**
	Male	1843	1.88	2.33	0.56	0.92	1.37	2.12	4.49	9.68
	Female	2013	1.15	1.10	0.40	0.61	0.89	1.35	2.63	4.41
60+ yr	**Total**	**1909**	**2.09**	**1.51**	**0.72**	**1.16**	**1.69**	**2.53**	**4.79**	**8.28**
	Male	941	2.46	1.78	0.87	1.39	1.99	2.90	5.56	9.89
	Female	968	1.73	1.07	0.65	1.01	1.43	2.14	3.75	5.42
Overall	**Total**	**8793**	**1.50**	**1.57**	**0.43**	**0.72**	**1.10**	**1.76**	**3.66**	**7.21**
	Male	4366	1.75	1.88	0.50	0.84	1.29	2.05	4.31	8.62
	Female	4427	1.25	1.13	0.39	0.63	0.96	1.48	2.97	5.17

Source: { CDC, 2013, 1576426}