

## **List of Appendices and Appendix E**

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# **Roofing Materials Assessment: Investigation of Toxic Chemicals in Roof Runoff from Constructed Panels in 2013 and 2014**



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## Publication and Contact Information

These appendices are linked as a supplementary document to the report at:  
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## **Appendix A. Field Notes (zip file on web)**

Appendix A is linked to the report as a zip file on the web.

## **Appendix B. Data Tables (separate file on web)**

Appendix B is linked to the report as a separate file on the web.

## **Appendix C. Laboratory Data and Narratives (under Web Page as a zip file)**

Appendix C is available electronically on the publications summary page under Web Page. It is 92.4 megabytes.

The file is available until December 31, 2014. Thereafter, it will be available by request.

## **Appendix D. Data Qualifier Descriptions and Electronic Data (zip file on web)**

The following page provides the data qualifiers used as qualifiers in the electronic data, Excel spreadsheets.

The Excel files are linked to the report on the web as zip files.

## Detailed Qualifiers used in the Electronic Data Deliverable

The following qualifiers were used to provide greater detail and are listed in the final two columns of the electronic data deliverables:

- If a method blank had detectable levels of an analyte, roofing results within five times the method blank concentration were qualified as an estimate and flagged with a Bm.
- If an equipment rinse blank had detectable levels of an analyte, roofing results within five times the equipment rinse blank concentration were qualified as an estimate and flagged with a Be.
- If the analyte was detected between the reporting limit (RL) and method detection limit (MDL), the result was qualified as an estimate and flagged with a J for both metals and organics.
- If the analyte was not detected at the MDL, the result was qualified and flagged with a U.
- All dissolved metal results were qualified as estimates and flagged with an H, as none of them met the 15-minute holding time specified by EPA.
- If both the laboratory control spike (LCS) and the laboratory control spike duplicate (LCSD) percent recoveries were not within the quality control (QC) limits specified in the Quality Assurance (QA) Project Plan, the result was qualified as an estimate and flagged with an L.
- If both the matrix spike (MS) and the matrix spike duplicate (MSD) percent recoveries were not within the QC limits specified in the QA Project Plan, the result was qualified as an estimate and flagged with a M. For arsenic and copper, however, flags were applied only to those results for high concentrations, when the high concentration MS/MSDs were not within the percent recoveries specified in the QA Project Plan.
- If the relative percent difference between the MS and the MSD was not within the QC limits specified in the QA Project Plan, the result was qualified as an estimate and flagged with a G.
- If the spectral analysis for an analyte did not meet the laboratory QC limits, it was qualified as an estimated value and flagged with a P.
- If the surrogate recovery was lower than the laboratory QC limits, but greater than 10%, the data were qualified and flagged with an S. If the surrogate recovery was less than 10%, the data were rejected and flagged with an REJ-S.
- If the internal standard for an analyte did not meet the laboratory QC limits, the data were rejected and flagged with an REJ-is.
- If the initial calibration or the continuing calibration for an analyte did not meet the laboratory QC limits, the data were flagged with a cc.

## Appendix E. Relative Standard Deviation of Splits and Replicates (in this file)

Table E-1. Medians and ranges of the relative standard deviation (percent) of replicate samples.

Parameter	n*	Min	Max	Median	Average
<b>Total Metals</b>					
Arsenic	10	0.0	62	21	30
Cadmium	10	0.0	74	0.0	15
Copper	10	0.8	28	7	10
Lead	10	11.8	68	21	26
Zinc	10	3.1	89	20	26
<b>PAHs</b>					
1-Methylnaphthalene	3	0.0	62	1	21
2-Methylnaphthalene	3	0.6	43	1.0	15
Acenaphthene	3	0.0	1	0.6	1
Acenaphthylene	3	0.6	6	1.0	2
Anthracene	3	33.7	70	44.3	49
Benz[a]anthracene	3	0.6	5	1.0	2
Benzo(a)pyrene	3	1.0	33	10.2	15
Benzo(b)fluoranthene	3	1.0	50	5.3	19
Benzo(ghi)perylene	3	1.0	21	15.6	12
Benzo(k)fluoranthene	3	0.0	17	1.0	6
Chrysene	3	1.0	10	4.2	5
Dibenzo(a,h)anthracene	3	0.6	27	1.0	10
Fluoranthene	3	0.0	12	4.2	5
Fluorene	3	0.6	27	1.0	10
Indeno(1,2,3-cd)pyrene	3	1.0	16	2.9	7
Naphthalene	3	2.6	14	3.5	7
Phenanthrene	3	0.0	5	3.0	3
Pyrene	3	1.0	45	16.3	21
<b>Phthalates</b>					
Bis(2-ethylhexyl) phthalate	3	0.0	5	0.0	1.5
Butyl benzyl phthalate	3	0.0	0.0	0.0	0.0
Diethyl phthalate	3	0.0	0.0	0.0	0.0
Dimethyl phthalate	3	0.0	0.0	0.0	0.0
Di-N-butyl phthalate	3	0.0	0.0	0.0	0.0
Di-N-octyl phthalate	3	0.0	0.0	0.0	0.0

<b>Parameter</b>	<b>n*</b>	<b>Min</b>	<b>Max</b>	<b>Median</b>	<b>Average</b>
<b>PBDE Congeners</b>					
PBDE-047	3	0.0	0.0	0.0	0.0
PBDE-049	3	0.0	0.0	0.0	0.0
PBDE-066	3	0.0	0.0	0.0	0.0
PBDE-071	3	0.0	0.0	0.0	0.0
PBDE-099	3	0.0	0.0	0.0	0.0
PBDE-100	3	0.0	0.0	0.0	0.0
PBDE-138	3	0.0	0.0	0.0	0.0
PBDE-153	3	0.0	0.0	0.0	0.0
PBDE-154	3	0.0	0.0	0.0	0.0
PBDE-183	3	0.0	0.0	0.0	0.0
PBDE-184	3	0.0	0.0	0.0	0.0
PBDE-191	3	0.0	0.0	0.0	0.0
PBDE-209	3	0.0	0.0	0.0	0.0

\* Number of samples included in statistics.

Table E-2. Medians and ranges of the relative standard deviation (percent) of split samples.

Parameter	n*	Min	Max	Median	Average
<b>Total Metals</b>					
Arsenic	28 <sup>a</sup>	0.0	106	10	23
Cadmium	30	0.0	116	0.0	14
Copper	30	0.0	27	5	8
Lead	30	0.0	47	16	16
Zinc	30	0.0	88	11	20
<b>PAHs</b>					
1-Methylnaphthalene	9	0.0	61	0	6
2-Methylnaphthalene	9	0.0	43	0.0	4
Acenaphthene	9	0.0	1	0.0	0.0
Acenaphthylene	9	0.0	40	0.7	9
Anthracene	9	0.0	87	0.0	21
Benz[a]anthracene	9	0.0	112	0.0	13
Benzo(a)pyrene	9	0.0	19	0.7	7
Benzo(b)fluoranthene	9	0.0	6	3.0	3
Benzo(ghi)perylene	9	0.0	16	0.0	4
Benzo(k)fluoranthene	9	0.0	17	8.2	8
Chrysene	9	0.0	26	4.9	8
Dibenzo(a,h)anthracene	9	0.0	1	0.0	0.0
Fluoranthene	9	0.0	27	3.1	6
Fluorene	9	0.0	19	0.0	2
Indeno(1,2,3-cd)pyrene	9	0.0	20	6.1	8
Naphthalene	9	0.0	12	4.0	4
Phenanthrene	9	0.0	24	4.8	5
Pyrene	9	0.0	16	4.8	6
<b>Phthalates</b>					
Bis(2-ethylhexyl) phthalate	9	0.0	5	0.0	1.0
Butyl benzyl phthalate	9	0.0	0.0	0.0	0.0
Diethyl phthalate	9	0.0	11	0.0	1.1
Dimethyl phthalate	9	0.0	0.0	0.0	0.0
Di-N-butyl phthalate	9	0.0	6.7	0.0	0.7
Di-N-octyl phthalate	9	0.0	0.0	0.0	0.0
<b>PBDE Congeners</b>					
PBDE-047	9	0.0	0.0	0.0	0.0
PBDE-049	9	0.0	0.0	0.0	0.0
PBDE-066	9	0.0	0.0	0.0	0.0
PBDE-071	9	0.0	0.0	0.0	0.0
PBDE-099	9	0.0	0.0	0.0	0.0

Parameter	n*	Min	Max	Median	Average
PBDE-100	9	0.0	0.0	0.0	0.0
PBDE-138	9	0.0	0.0	0.0	0.0
PBDE-153	9	0.0	0.0	0.0	0.0
PBDE-154	9	0.0	0.0	0.0	0.0
PBDE-183	9	0.0	0.0	0.0	0.0
PBDE-184	9	0.0	0.0	0.0	0.0
PBDE-191	9	0.0	0.0	0.0	0.0
PBDE-209	9	0.0	0.0	0.0	0.0

\* Number of samples included in statistics.

<sup>a</sup> Data for split rejected, nor RSD calculated.

Table E-3. Medians and ranges of the relative standard deviation (percent) of split samples using agitation and pitcher versus churn-splitter mixer and pump.

Metal	n*	Min	Max	Median	Average
<b>Split samples using pitcher</b>					
Arsenic	16 <sup>a</sup>	0.0	106	16	28
Cadmium	18	0.0	47	0.0	8.4
Copper	18	0.0	16	2.7	6.0
Lead	18	0.0	47	14	14
Zinc	18	0.6	75	10	19
<b>Split samples using mixer</b>					
Arsenic	12	0.0	61	11	18
Cadmium	12	0.0	116	0.0	23
Copper	12	0.9	27	6.8	10
Lead	12	0.0	47	13	18
Zinc	12	0.0	88	12	22

\* Number of samples included in statistics.

<sup>a</sup> Data for split rejected, nor RSD calculated.

## **Appendix F. Rain Gage Data (zip file on web)**

Appendix F is linked to the report as a zip file on the web.