University of Kentucky
College of Public Health
Epidemiology and Environmental Health

August 26, 2024

Pete Participant
123 No Street
East Palestine, OH 44413

RE: Silicone Wristband Test Results

Dear Pete Participant,

Thank you for your continued participation in the University of Kentucky East Palestine Health Tracking Study! I am writing to share some study results with you. You participated in the Silicone Wristband Pilot Study from 7/16/2023 - 7/23/2023. The wristbands were analyzed by the Human Health Exposure Analysis Resource Program at Duke University. In this letter you will find information about the chemicals measured in your wristband and how they compare to the 80 people who participated in the study.

Silicone wristbands are a new method to measure exposure to chemicals in one's environment. We are currently awaiting national comparison values to be published but want to share these results with you now. As comparison values become available, we will share them with you. Below is a brief summary of the key findings, thus far:

- Each wristband was analyzed for 135 semi-volatile organic compounds (SVOCs).
- The chemicals are grouped as: dioxins/furans, polycyclic aromatic hydrocarbons (PAHs), phthalates, flame retardants, polychlorinated biphenyls (PCBs), personal care products, pesticides, and nicotine.
- Most of these chemicals are not thought to be related to the train derailment, but they were provided to us by the lab and can be helpful for you in making decisions about product use and exposure.
- **No dioxins or furans were detected in any of the wristbands.**

In the following pages, we provide you with information about each group of chemicals and the values found for each chemical in your silicone wristband. If you have any questions, please contact me directly by phone at 859-562-2119 or email: Erin.Haynes@uky.edu.

We are grateful for your participation in this study as together we continue to evaluate the exposures and health impacts of the East Palestine train derailment.

Sincerely,

Erin N. Haynes, DrPH, MS
Kurt W. Deuschle Professor of Preventive Medicine and Environmental Health
Chair, Department of Epidemiology
University of Kentucky

Dioxins and Furans

- 17 dioxins and furans were analyzed in your wristband
- No dioxins or furans were detected in any wristbands from this study

Dioxins and furans were chemicals of concern following the train derailment and subsequent rail car burn. They form when burning occurs (forest fires or household trash) or during chemical reactions.

Polycyclic aromatic hydrocarbons (PAHs)

- 23 PAHs were analyzed in your wristband
- **12** of 23 **(52%)** of the PAHs were detected in your wristband
- **12** of 23 **(52%)** was the average number of PAHs detected in the East Palestine Wristband Study participants
- On average, male participants had two more PAHs detected than did women
- On average, participants who worked with heavy machinery had four more PAHs detected than those who did not
- On average, smokers and those exposed to secondhand smoke had two more PAHs detected than those who were not

Polycyclic aromatic hydrocarbons (PAHs) are produced during burning such as wildfires, trash, vehicle fuel, or cigarettes. The wildfires in Canada during the July 2023 study period may have increased the levels of PAHs in the air in and around East Palestine during the week the wristbands were worn. The heavy truck traffic removing the derailment debris may have also released PAHs.

We do not know if the levels measured in wristbands are associated with health effects. More information about PAHs can be found from the CDC. A fact sheet is attached for convenience.

Phthalates

- 10 phthalates were analyzed in your wristband
- **9** of 10 **(90%)** of the phthalates were detected in your wristband
- **9** of 10 **(90%)** was the average number of phthalates detected in the East Palestine Wristband Study participants

Phthalates are chemicals added to plastics to make them soft and flexible. Sources of phthalates include food packaging, personal care products, and fragrances. They are not thought to be associated with the derailment.

We do not know if the levels measured in wristbands are associated with health effects. Fact sheets for two of the most common phthalates are attached.

Flame Retardants

- 49 flame retardant chemicals were analyzed in your wristband
- **24** of 49 **(49%)** of the flame retardants were detected in your wristband
- **24** of 49 **(49%)** was the average number of flame retardants detected in the East Palestine Wristband Study participants

Flame retardants are added to products to reduce the flammability of materials, including furniture, building materials, and clothing. This group of chemicals includes organophosphate esters (OPEs) and brominated flame retardants (BFRs). Some OPEs may also be used in plastics. They are not thought to be associated with the derailment.

We do not know if the levels measured in wristbands are associated with health effects.

Polychlorinated Biphenyls (PCBs)

- 12 PCBs were analyzed in your wristband
- 1 of 12 **(8%)** of the PCBs were detected in your wristband
- **3** of 12 **(25%)** was the average number of PCBs detected in the East Palestine Wristband Study participants

PCBs are man-made products which were banned in 1979 and are not thought to be associated with the derailment. They are found in old electrical equipment, building materials, and contaminated sites.

We do not know if the levels measured in wristbands are associated with health effects. More information about PCBs can be found from the CDC. A fact sheet is attached for convenience.

Pesticides

- 20 pesticides were analyzed in your wristband
- **6** of 20 **(30%)** of the pesticides were detected in your wristband
- **5** of 20 **(25%)** was the average number of pesticides detected in the East Palestine Wristband Study participants
- The most common pesticides detected were DEET, Permethrin, Chlordane, and DDE

Pesticides are a broad class of chemicals used to prevent, destroy, repel, or mitigate pests, including insects, weeds, fungi, and rodents. The EPA has banned all uses of Chlordane and DDE, a breakdown product of DDT; however, because of their widespread use as pesticides and their persistence in the environment, they can be found in most US homes. They are not thought to be associated with the derailment.

We do not know if the levels measured in wristbands are associated with health effects.

Personal Care Products

- 3 personal care product chemicals were analyzed in your wristband
- **All 3** of the personal care product chemicals were detected in your wristband
- Nearly all participants had all three chemicals detected in their wristband
- Overall, levels were higher for participants who reported using perfume or cologne

These chemicals are found in fragrances, such as in perfume and cologne. They are not thought to be associated with the derailment.

We do not know if the levels measured in wristbands are associated with health effects.

Nicotine

- Nicotine **was not** detected in your wristband
- 27 people or 34% of the participants had nicotine detected in their wristband
- Participants who reported smoking cigarettes or other tobacco smoke-generating products, and/or being exposed to secondhand smoke had higher levels of nicotine
- Interestingly, several participants who reported not smoking nor being exposed to secondhand smoke had detected nicotine levels on their wristbands

Nicotine is a stimulant drug that is highly addictive and found in tobacco products. Exposure occurs from using tobacco products or being around others who do so. It is not thought to be associated with the derailment.

We do not know if the levels measured in wristbands are associated with health effects.

East Palestine Wristband Study Data, **Pete Participant,** 7/16/2023 - 7/23/2023

This is the full table of all chemicals analyzed in this study, including your levels, the range of levels found in participants in this study, and the percentage of all participants that each chemical was detected on. Levels are measured in nanograms which is *one-billionth* of a gram. This amount can be compared to one teaspoon of a chemical in the combined water of 2 Olympic sized swimming pools.

Dioxins and Furans			
Chemical	**Your value (ng/g)**	**Study Participants Range (ng/g)**	**% detected in Study Participants**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2378TCDD)	**Not detected**	Not detected	0%
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (12378PECDD)	**Not detected**	Not detected	0%
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (123789HXCDD)	**Not detected**	Not detected	0%
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (123678HXCDD)	**Not detected**	Not detected	0%
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (123478HXCDD)	**Not detected**	Not detected	0%
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1234678HPCDD)	**Not detected**	Not detected	0%
2,3,7,8-tetrachlorodibenzofuran (2378TCDF)	**Not detected**	Not detected	0%
2,3,4,7,8-Pentachlorodibenzofuran (23478PECDF)	**Not detected**	Not detected	0%
1,2,3,7,8-Pentachlorodibenzofuran (12378PECDF)	**Not detected**	Not detected	0%
2,3,4,6,7,8-Hexachlorodibenzofuran (234678HXCDF)	**Not detected**	Not detected	0%
1,2,3,7,8,9-Hexachlorodibenzofuran (123789HXCDF)	**Not detected**	Not detected	0%
1,2,3,6,7,8-Hexachlorodibenzofuran (123678HXCDF)	**Not detected**	Not detected	0%
1,2,3,4,7,8-Hexachlorodibenzofuran (123478HXCDF)	**Not detected**	Not detected	0%
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1234789HPCDF)	**Not detected**	Not detected	0%
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1234678HPCDF)	**Not detected**	Not detected	0%
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	**Not detected**	Not detected	0%
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	**Not detected**	Not detected	0%
Polycyclic Aromatic Hydrocarbons (PAHs)			
3-Methylcholanthrene	**Not detected**	Not detected	0%
7,12-Dimethylbenz(a)anthracene	**Not detected**	Not detected	0%
Acenapthene	**9.41**	Not detected - 26.2	86%
Acenaphthylene	**5.65**	Not detected - 8.69	91%
Anthracene	**3.42**	Not detected - 20.4	91%
Benz[a]anthracene	**Not detected**	Not detected - 11.1	63%
Benzo[a]pyrene	**Not detected**	Not detected - 14.0	44%
Benzo[e]pyrene	**9.49**	Not detected - 25.2	73%
Benzo(c)phenanthrene	**Not detected**	Not detected - 6.12	23%
Benzo[j,b,k]fluoranthene	**7.21**	Not detected - 59.2	58%
Benzo(g,h,i)perylene	**1.11**	Not detected - 24.9	56%
Dibenz(a,h)anthracene	**Not detected**	Not detected - 3.72	3%
Dibenz[a,l]pyrene	**Not detected**	Not detected - 14.0	9%
Dibenz[a,i]pyrene	**Not detected**	Not detected	0%
Dibenz[a,h]pyrene	**Not detected**	Not detected	0%
Chrysene	**5.71**	Not detected - 51.7	89%
Fluorene	**7.29**	Not detected - 54.0	93%

Polycyclic Aromatic Hydrocarbons (PAHs)			
Chemical	**Your value (ng/g)**	**Study Participants Range (ng/g)**	**% detected in Study Participants**
Fluoranthene	**20.8**	4.28 - 359	100%
Indeno(1,2,3-cd)pyrene	**5.37**	Not detected - 27.5	71%
Naphthalene	**Not detected**	Not detected - 127	6%
Perylene	**Not detected**	Not detected - 3.51	5%
Phenanthrene	**45.7**	Not detected - 561	99%
Pyrene	**18.8**	Not detected - 147	99%
Phthalates			
di-methyl phthalate (DMP)	**Not detected**	Not detected - 144	23%
di-ethyl phthalate (DEP)	**354**	99.5 - 23100	100%
dibutyl phthalate (DBP)	**2680**	184 - 16900	100%
di-isobutyl phthalate (DiBP)	**593**	195 - 21300	100%
benzyl butyl phthalate (BBP)	**211**	33.6 - 17300	100%
Bis (2-ethylhexyl) adipate (DEHA)	**1450**	456 - 67000	100%
Bis(2-ethylhexyl) phthalate (DEHP)	**2610**	74.3 - 18500	100%
Bis (2-ethylhexyl) terephthalate (DEHT)	**27500**	6980 - 4080000	100%
di-isononyl phthalate (DINP)	**29000**	5560 - 1200000	100%
trioctylmetallitate (TOTM)	**388**	110 - 44400	100%
Flame Retardants			
2,4,4'-tribromodiphenyl ether (BDE 28)	**Not detected**	Not detected - 16.9	21%
2,2',4,4'-tetrabromodiphenyl ether (BDE 47)	**8.52**	2.19 - 2400	100%
2,3',4,4'-tetrabromodiphenyl ether (BDE 66)	**Not detected**	Not detected - 55.5	18%
2,2',3,4,4'-pentabromodiphenyl ether (BDE 85)	**Not detected**	Not detected - 174	19%
2,2',4,4',5-pentabromodiphenyl ether (BDE 99)	**Not detected**	Not detected - 3400	86%
2,2',4,4',6-pentabromodiphenyl ether (BDE 100)	**Not detected**	Not detected - 558	34%
2,2',4,4',5,5'-hexabromodiphenyl ether (BDE 153)	**Not detected**	Not detected - 397	31%
2,2',4,4',5,6'-hexabromodiphenyl ether (BDE 154)	**Not detected**	Not detected - 362	33%
2,2',3,4,4',5',6-heptabromodiphenyl ether (BDE 183)	**Not detected**	Not detected	0%
Decabromodiphenyl ether (BDE 209)	**6.26**	Not detected - 117	81%
2-Isopropylphenyl diphenyl phosphate (2IPPDPP)	**75.2**	Not detected - 1330	99%
3-Isopropylphenyl diphenyl phosphate (3IPPDPP)	**9.88**	Not detected - 79.4	66%
4-Isopropylphenyl dipheynyl phosphate (4IPPDPP)	**122**	Not detected - 408	99%
2-tert-butylphenyl diphenyl phosphate (2tBPDPP)	**Not detected**	Not detected - 1.69	3%
2,4-Diisopropylphenyl diphenyl phosphate (24DIPPDPP)	**116**	Not detected - 369	68%
4-tert-butylphenyl diphenyl phosphate (4tBPDPP)	**140**	1.09 - 1330	100%
Bis(2-isopropylphenyl) phenyl phosphate (B2IPPPP)	**86.1**	Not detected - 306	75%
Bis (3-isopropylphenyl) phenyl phosphate (B3IPPPP)	**Not detected**	Not detected - 6.76	3%
Bis (4-isopopylphenyl) phenyl phosphate (B4IPPPP)	**12.9**	Not detected - 77.8	56%
bis(2-tert-butylphenyl) phenyl phosphate (B2tBPPP)	**Not detected**	Not detected	0%
bis(4-tert-butylphenyl) phenyl phosphate (B4tBPPP)	**128**	Not detected - 839	96%
Bis (2,4-diisopropylphenyl) phenyl phosphate (B24DIPPPP)	**Not detected**	Not detected - 269	6%
Bistribromophenoxyethane (BTBPE)	**Not detected**	Not detected - 14.7	1%

East Palestine Wristband Study Data, **Pete Participant,** 7/16/2023 - 7/23/2023

Flame Retardants			
Chemical	**Your value (ng/g)**	**Study Participants Range (ng/g)**	**% detected in Study Participants**
Bis (2-ethyl hexyl)-2,3,4,5-tetrabromophthalate (BEHTBP)	**Not detected**	Not detected - 531	31%
2-Ethylhexyl diphenyl phosphate (EHDPP)	**35.5**	15.8 - 8600	100%
2-ethyl hexyl-2,3,4,5-tetrabromobenzoate (EHTBB)	**2.74**	Not detected - 428	78%
Decabromodiphenyl ethane (DBDPE)	**50.2**	Not detected - 122	95%
Octabromotrimethylphenylindane (OBIND)	**Not detected**	Not detected	0%
Tris(3-isopropylphenyl) phosphate (T3IPPP)	**Not detected**	Not detected	0%
Tris(4-isopropylphenyl) phosphate (T4IPPP)	**Not detected**	Not detected - 1.25	1%
Tris(4-tert-butylphenyl) phosphate (T4tBPP)	**8.68**	Not detected - 750	36%
Tetrabromobisphenol A (TBBPA)	**Not detected**	Not detected - 75.9	1%
Tri-(2-butoxyethyl)-phosphate (TBOEP)	**108**	4.5 - 6460	100%
Tris(2-chloro-ethyl) phosphate (TCEP)	**8.78**	Not detected - 373	90%
Tris(chloropropyl) phosphate (TCPP)	**68.3**	29.4 - 10300	100%
Tris (2,3-dibromopropyl) isocyanurate (TDBPIC)	**Not detected**	Not detected	0%
Tris (2,4-dichloro-isopropyl) phosphate (TDCPP)	**387**	14.7 - 12500	100%
Tris(3,5-dimethyl phenyl) phosphate (TDMPP)	**Not detected**	Not detected - 22.0	15%
Tris(2-ethylhexyl) phosphate (TEHP)	**21.9**	0.87 - 1270	100%
Triethyl phosphate (TEP)	**9.59**	Not detected - 128	99%
Tri-iso-butyl-phosphate (TiBP)	**8.51**	Not detected - 86.0	96%
Triisopropyl phosphate (TiPP)	**Not detected**	Not detected	0%
Tri-m-cresyl phosphate (TmCP)	**8.04**	Not detected - 184	53%
Tri-n-butyl-phosphate (TnBP)	**25.5**	Not detected - 297	89%
Tri-o-cresyl phosphate (ToCP)	**Not detected**	Not detected - 190	26%
Tri-p-cresyl phosphate (TpCP)	**Not detected**	Not detected - 12.4	1%
Tripentyl phosphate (TPeP)	**Not detected**	Not detected	0%
Triphenyl phosphate (TPHP)	**406**	15.6 - 2300	100%
Tripropyl phosphate (TPrP)	**Not detected**	Not detected	0%
Polychlorinated Biphenyls (PCBs)			
3,3'-Dichlorobiphenyl (PCB11)	**1.20**	Not detected - 5.65	79%
2,4,4'-Trichlorobiphenyl (PCB28)	**Not detected**	Not detected - 77.3	40%
2,2',4,4'-Tetrachlorobiphenyl (PCB47)	**Not detected**	Not detected - 11.6	14%
2,2',4,6'-Tetrachlorobiphenyl (PCB51)	**Not detected**	Not detected	0%
2,2',5,5'-Tetrachlorobiphenyl (PCB52)	**Not detected**	Not detected - 20.4	25%
2,3',4,5'-Tetrachlorobiphenyl (PCB68)	**Not detected**	Not detected - 13.2	13%
2,2',4,5,5'-Pentachlorobiphenyl (PCB101)	**Not detected**	Not detected - 31.7	36%
2,3',4,4',5-Pentachlorobiphenyl (PCB118)	**Not detected**	Not detected - 23.4	23%
2,2',3,4,4',5'-Hexachlorobiphenyl (PCB138)	**Not detected**	Not detected - 46.4	15%
2,2',4,4',5,5'-Hexachlorobiphenyl (PCB153)	**Not detected**	Not detected - 43.4	10%
2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB180)	**Not detected**	Not detected - 36.2	4%
2,2',3,4,4',5',6-Heptachlorobiphenyl (PCB183)	**Not detected**	Not detected - 7.67	3%

East Palestine Wristband Study Data, **Pete Participant,** 7/16/2023 - 7/23/2023

Pesticides			
Chemical	**Your value (ng/g)**	**Study Participants Range (ng/g)**	**% detected in Study Participants**
DEET	**227.4**	Not detected - 1,940,000	99%
Atrazine	**Not detected**	Not detected	0%
Lindane	**Not detected**	Not detected - 3.59	8%
Malathion	**Not detected**	Not detected - 657	3%
Chlorpyrifos	**Not detected**	Not detected - 77.4	10%
Fipronil	**Not detected**	Not detected - 1970	33%
Cyprodinil	**Not detected**	Not detected	0%
trans-Chlordane	**105.1**	Not detected - 764	51%
cis-Chlordane	**27.90**	Not detected - 868	26%
Oxyfluorfen	**Not detected**	Not detected - 6.91	3%
p,p'-DDE	**12.50**	Not detected - 24.0	45%
Chlorfenapyr	**Not detected**	Not detected	0%
Trifloxystrobin	**Not detected**	Not detected - 4.42	11%
Propiconazole	**Not detected**	Not detected	0%
cis-Permethrin	**506.6**	Not detected - 61700	79%
trans-Permethrin	**165.9**	Not detected - 84900	73%
Cypermethrin	**Not detected**	Not detected - 12400	21%
Pyraclostrobin	**Not detected**	Not detected - 7.73	3%
Azoxystrobin	**Not detected**	Not detected - 158	36%
Fluoxastrobin	**Not detected**	Not detected	0%
Personal Care Products			
4-tertoctylphenol (4tOP)	**21.5**	3.25 - 94.2	100%
Nonylphenol isomer mix (NP)	**587**	Not detected - 4420	95%
Lillial	**421.2**	2.21 - 7500	100%
Nicotine			
Nicotine	**Not detected**	Not detected - 36200	34%