**Supplementary Material**

**Understanding airborne contaminants produced by different fuel packages during training fires**

**Figures**



**Fig. S1**. Pallet and straw /simulated smoke floor plan



**Fig. S2** OSB floor plan



**Figure S3.** Styrene personal air concentrations measured on instructors and students by fuel type. The box and whiskers provide the minimum, 25th percentile, median, 75th percentile and maximum values. Exposures are significantly below NIOSH STEL (100,000 ppb).



**Figure S4.** Ethylbenzene personal air concentrations measured on instructors and students by fuel type. The box and whiskers provide the minimum, 25th percentile, median, 75th percentile and maximum values. Exposures are significantly below NIOSH STEL (125,000 ppb).



**Figure S5**. Toluene personal air concentrations measured on instructors and students by fuel type. The box and whiskers provide the minimum, 25th percentile, median, 75th percentile and maximum values. Exposures are significantly below NIOSH STEL (150,000 ppb).

**Tables**

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| **Table S1. Summary of personal air sampling for firefighters and instructors** |
| **Analyte** | **Job assignment**  | **Type of Participant** | **n** | **Duration of scenario range (min)** | **Sampling time during scenario range (min)** | **Median Sampling time during scenario (min)** |
| **HCN** | Pallet and straw | Instructor | 28 | 26 – 30 | 8 – 30 | 26 |
| Firefighter | 19 | 10 – 12 | 3 – 12 | 10 |
| Alpha OSB | Instructor | 12 | 25 – 28 | 8 – 28 | 27 |
| Firefighter | 9 | 11 – 13  | 5 – 13 | 9 |
| Bravo OSB | Instructor | 11 | 25 – 31 | 25 – 31 | 25 |
| Firefighter | 6 | 12 | 12 | 12 |
| **Total PAHs** | Pallet and straw | Instructor | 17 | 26 – 30  | 14 - 30 | 26 |
| Firefighter | 9 | 10 – 12 | 4 – 12  | 10 |
| Alpha OSB | Instructor | 9 | 25 – 28 | 13 – 28  | 27 |
| Firefighter | 5 | 11 – 13  | 5 – 13 | 10 |
| Bravo OSB | Instructor | 9 | 25 – 31  | 12 – 30 | 25 |
| Firefighter | 6 | 12 – 14 | 12 – 14  | 12 |
| **BTEX** | Pallet and straw | Instructor | 28 | 26 – 30 | 18 – 30  | 26 |
| Firefighter | 20 | 10 – 12 | 3 – 12 | 10 |
| Alpha OSB | Instructor | 12 | 25 – 28  | 11 – 28 | 25 |
| Firefighter | 11 | 11 – 13  | 5 – 13  | 10 |
| Bravo OSB | Instructor | 12 | 25 – 31  | 25 – 33  | 30 |
| Firefighter | 10 | 12 – 14 | 6 – 14  | 12 |
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| Table S2: Average personal air concentrations of individual PAHs by percent of total PAHs |
|  | Pallet and Straw | Bravo OSB | Alpha OSB |
| Compound (IARCA) | Percent of total PAHs |  |
| Anthracene (3) | 1 | 2 | 2 |  |
| Acenaphthene (3) | 1 | 1 | 1 |  |
| Benzo(a)anthracene (2B) | 1 | 1 | 1 |  |
| Benzo(a)pyrene (1) | 1 | 1 | 1 |  |
| Benzo(b)fluoranthene (2B) | 1 | 1 | 1 |  |
| Benzo(g,h,i)perylene (3) | 1 | < 1 | < 1 |  |
| Benzo(k)fluoranthene (2B) | < 1 | < 1 | < 1 |  |
| Chrysene (2B) | 1 | 1 | 1 |  |
| Dibenzo(a,h)anthracene (2A) | 2 | 1 | 1 |  |
| Fluorene (3) | 6 | 9 | 7 |  |
| Fluoranthene (3) | 5 | 4 | 5 |  |
| Indeno(1,2,3-cd)pyrene (2B) | 1 | 1 | < 1 |  |
| Naphthalene (2B) | 68 | 66 | 66 |  |
| Phenanthrene (3) | 7 | 8 | 10 |  |
| Pyrene (3) | 4 | 4 | 4 |  |
| Total PAHs | 100 | 100 | 100 |  |
| 1. IARC classification categories: 1= Carcinogenic to humans, 2A=Probably carcinogenic to humans, 2B=Possibly carcinogenic to humans, 3=Not classifiable as to its carcinogenicity to humans
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| **Table S3. VOCs air concentrations by location and type of fuel package**  |
| ***VOCs*** | **Fuel Type** | **Location** | **n** | **ND (%)** | **Median** | **Range** |
| Propene (ppm) | Pallet | Downwind | 4 | 0 | 0.0045 | 0.0029 – 0.013 |
|  | Background | 2 | 50 | 0.000457 | < 0.000354 – 0.000560 |
|  | Inside Structure | 4 | 0 | 4.10 | 3.70 – 4.60 |
| Simulated smoke | Background | 2 | 50 | 0.000677 | < 0.000354 – 0.001 |
|  | Inside Structure | 4 | 25 | 0.00091 | < 0.000354 – 0.0037 |
| Bravo OSB | Background | 1 | 100 | < 0.000354 | < 0.000354 |
|  | Downwind | 2 | 0 | 0.029 | 0.017 – 0.041 |
|  | Inside Structure | 2 | 0 | 1.04 | 0.087 – 2.00 |
|  OSB | Background | 1 | 100 | < 0.000354 | < 0.000354 |
|  | Downwind | 2 | 0 | 0.0084 | 0.0075 – 0.0093 |
|  | Inside Structure | 2 | 0 | 1.24 | 0.770 – 1.70 |
| Chloromethane (ppm) | Pallet | Downwind | 4 | 0 | 0.00565 | 0.0049 – 0.013 |
| Background | 2 | 0 | 0.000665 | 0.00061 – 0.00072 |
| Inside Structure | 4 | 0 | 5.15 | 3.30 – 6.90 |
| Simulated smoke | Background | 2 | 0 | 0.000735 | 0.00062 – 0.00085 |
| Inside Structure | 4 | 0 | 0.000805 |  0.00067 – 0.00093 |
| Bravo OSB | Background | 1 | 100 | 0.001 | 0.001 |
| Downwind | 2 | 0 | 0.00385 | 0.0027 – 0.0050 |
| Inside Structure | 2 | 0 | 0.887 | 0.074 – 1.70 |
|  Alpha OSB | Background | 1 | 0 | 0.0007 | 0.0007 |
| Downwind | 2 | 0 | 0.0054 | 0.0042 – 0.0066 |
| Inside Structure | 2 | 0 | 0.615 | 0.590 – 0.640 |
| Acetone (ppm) | Pallet | Downwind | 4 | 0 | 0.00875 | 0.0075 – 0.023 |
| Background | 2 | 0 | 0.00535 | 0.0048 – 0.0059 |
| Inside Structure | 4 | 0 | 4.55 | 3.60 – 5.50 |
| Simulated smoke | Background | 2 | 0 | 0.0207 | 0.0054 – 0.036 |
| Inside Structure | 4 | 0 | 0.0425 | 0.034 – 0.051 |
| Bravo OSB | Background | 1 | 0 | 0.022 | 0.022 |
| Downwind | 2 | 0 | 0.014 | 0.010 – 0.018 |
| Inside Structure | 2 | 0 | 0.632 | 0.063 – 1.200 |
|  Alpha OSB | Background | 1 | 0 | 0.0050 | 0.0050 |
| Downwind | 2 | 0 | 0.0089 | 0.0078 – 0.010 |
| Inside Structure | 2 | 0 | 0.775 | 0.720 – 0.830 |