**Evaluation of Polycyclic Aromatic Hydrocarbons in Soil dumpsite and Borehole Water from selected locations in Rivers and Bayelsa State, Nigeria.**

**Victor Uchenna Okechukwu 1, Daniel Omeodisemi Omokpariola 1, \*, Valentine Ifenna Onwukeme 1, Eucheria Nkiru Nweke 1, 2 and Patrick Leonard Omokpariola 3**

1 Department of Pure and Industrial Chemistry, Nnamdi Azikiwe University, Awka, Nigeria.

2 Department of Chemistry, College of Education, Umunze Nigeria.

3 Directorate of Chemical Evaluation and Research, National Agency for Food and Drug, Administration and Control, Isolo, Lagos State, Nigeria.

**\*Correspondence:** **omeodisemi@gmail.com**

Received: date, Accepted: date, Published: date

**SUBLIMENTARY FILE (LANDSCAPE)**

**Appendix 1: Carcinogenic risk for PAHs from soil samples for Adults**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | NA | 2.50E-02 | 2.12E-03 | NA | NA | NA | 0 | 0 | 1.83E-01 | 0 | 1.75E-01 | 8.58E-05 | 3.98E-01 | 0 | 0 | 0 | 7.83E-01 |
| Dermal | NA | 1.32E-04 | 1.12E-05 | NA | NA | NA | 0 | 0 | 9.68E-04 | 0 | 9.24E-04 | 4.53E-07 | 2.10E-03 | 0 | 0 | 0 | 4.13E-03 |
| Inhalation | 1.02E+03 | 1.36E+02 | 1.15E+01 | NA | NA | NA | 0 | 0 | 9.94E+02 | 0 | 9.49E+02 | 4.65E+00 | 2.16E+03 | 0 | 0 | 0 | 5.27E+03 |
| Eliozu | Ingestion | NA | 2.93E-05 | 1.82E-03 | NA | NA | NA | 4.55E-05 | 0 | 3.09E-03 | 0 | 2.78E-01 | 4.09E-05 | 8.58E-02 | 0 | 0 | 0 | 3.69E-01 |
| Dermal | NA | 1.54E-07 | 9.59E-06 | NA | NA | NA | 2.40E-07 | 0 | 1.63E-05 | 0 | 1.47E-03 | 2.16E-07 | 4.53E-04 | 0 | 0 | 0 | 1.95E-03 |
| Inhalation | 6.08E+02 | 1.59E-01 | 9.85E+00 | NA | NA | NA | 2.47E-01 | 0 | 1.67E+01 | 0 | 1.51E+03 | 2.22E+00 | 4.65E+02 | 0 | 0 | 0 | 2.61E+03 |
| Eneka | Ingestion | NA | 2.51E-02 | 4.22E-06 | NA | NA | NA | 2.60E-05 | 0 | 3.21E-01 | 1.30E-06 | 0 | 2.47E-05 | 4.41E-01 | 0 | 0 | 0 | 7.86E-01 |
| Dermal | NA | 1.32E-04 | 2.23E-08 | NA | NA | NA | 1.37E-07 | 0 | 1.69E-03 | 6.86E-09 | 0 | 1.30E-07 | 2.33E-03 | 0 | 0 | 0 | 4.15E-03 |
| Inhalation | 4.73E+02 | 1.36E+02 | 2.29E-02 | NA | NA | NA | 1.41E-01 | 0 | 1.74E+03 | 7.05E-03 | 0 | 1.34E+00 | 2.39E+03 | 0 | 0 | 0 | 4.74E+03 |
| Oyigbo | Ingestion | NA | 2.60E-05 | 2.88E-03 | NA | NA | NA | 2.28E-05 | 0 | 2.49E-01 | 0 | 2.93E-04 | 2.92E-05 | 4.40E-01 | 0 | 0 | 0 | 6.93E-01 |
| Dermal | NA | 1.37E-07 | 1.52E-05 | NA | NA | NA | 1.20E-07 | 0 | 1.32E-03 | 0 | 1.54E-06 | 1.54E-07 | 2.32E-03 | 0 | 0 | 0 | 3.66E-03 |
| Inhalation | 4.44E+02 | 1.41E-01 | 1.56E+01 | NA | NA | NA | 1.23E-01 | 0 | 1.35E+03 | 0 | 1.59E+00 | 1.59E+00 | 2.39E+03 | 0 | 0 | 0 | 4.20E+03 |
| Woji | Ingestion | NA | 3.13E-02 | 9.28E-04 | NA | NA | NA | 0 | 0 | 3.05E-01 | 0 | 1.95E-04 | 4.29E-05 | 2.51E-01 | 0 | 0 | 0 | 5.89E-01 |
| Dermal | NA | 1.65E-04 | 4.90E-06 | NA | NA | NA | 0 | 0 | 1.61E-03 | 0 | 1.03E-06 | 2.26E-07 | 1.33E-03 | 0 | 0 | 0 | 3.11E-03 |
| Inhalation | 3.27E+00 | 1.70E+02 | 5.03E+00 | NA | NA | NA | 0 | 0 | 1.66E+03 | 0 | 1.06E+00 | 2.33E+00 | 1.36E+03 | 0 | 0 | 0 | 3.20E+03 |
| Yenagoa | Ingestion | NA | 2.15E-02 | 7.33E-04 | NA | NA | NA | 3.57E-05 | 0 | 2.80E-02 | 1.95E-06 | 2.81E-01 | 1.04E-04 | 0 | 0 | 0 | 0 | 3.31E-01 |
| Dermal | NA | 1.13E-04 | 3.87E-06 | NA | NA | NA | 1.89E-07 | 0 | 1.48E-04 | 1.03E-08 | 1.48E-03 | 5.47E-07 | 0 | 0 | 0 | 0 | 1.75E-03 |
| Inhalation | 5.99E+00 | 1.16E+02 | 3.97E+00 | NA | NA | NA | 1.94E-01 | 0 | 1.52E+02 | 1.06E-02 | 1.52E+03 | 5.62E+00 | 0 | 0 | 0 | 0 | 1.81E+03 |
| Control Site 1 | Ingestion | NA | 3.25E-05 | 3.25E-07 | NA | NA | NA | 0 | 0 | 1.30E-04 | 0 | 6.50E-05 | 3.25E-07 | 8.78E-03 | 0 | 0 | 0 | 9.00E-03 |
| Dermal | NA | 1.72E-07 | 1.72E-09 | NA | NA | NA | 0 | 0 | 6.86E-07 | 0 | 3.43E-07 | 1.72E-09 | 4.63E-05 | 0 | 0 | 0 | 4.75E-05 |
| Inhalation | 4.83E+02 | 1.76E-01 | 1.76E-03 | NA | NA | NA | 0 | 0 | 7.05E-01 | 0 | 3.52E-01 | 1.76E-02 | 4.76E+01 | 0 | 0 | 0 | 5.31E+02 |
| Control Site 2 | Ingestion | NA | 0 | 6.50E-07 | NA | NA | NA | 0 | 0 | 6.50E-05 | 0 | 1.30E-04 | 6.50E-07 | 9.75E-03 | 0 | 0 | 0 | 9.95E-03 |
| Dermal | NA | 0 | 3.43E-09 | NA | NA | NA | 0 | 0 | 3.43E-07 | 0 | 6.86E-07 | 3.43E-09 | 5.15E-05 | 0 | 0 | 0 | 5.25E-05 |
| Inhalation | 1.63E-01 | 0 | 3.52E-03 | NA | NA | NA | 0 | 0 | 3.52E-01 | 0 | 7.05E-01 | 3.52E-02 | 5.28E+01 | 0 | 0 | 0 | 5.41E+01 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene. A = Eliozu dumpsite; B = Yengoa dumpsite; C = Eneka dumpsite; D = Oyibo dumpsite; E = Woji dumpsite; F = Eleme dumpsite; G and H = Control sites.

**Appendix 2: Carcinogenic risk for PAHs from soil samples for Children**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | NA | 6.16E-02 | 5.23E-03 | NA | NA | NA | 0 | 0 | 4.51E-01 | 0 | 4.31E-01 | 2.11E-04 | 9.79E-01 | 0 | 0 | 0 | 1.93E+00 |
| Dermal | NA | 9.75E-04 | 8.27E-05 | NA | NA | NA | 0 | 0 | 7.14E-03 | 0 | 6.82E-03 | 3.34E-06 | 1.55E-02 | 0 | 0 | 0 | 3.05E-02 |
| Inhalation | 1.57E+02 | 2.09E+01 | 1.77E+00 | NA | NA | NA | 0 | 0 | 1.53E+02 | 0 | 1.46E+02 | 7.15E-01 | 3.32E+02 | 0 | 0 | 0 | 8.11E+02 |
| Eliozu | Ingestion | NA | 7.20E-05 | 4.47E-03 | NA | NA | NA | 1.12E-04 | 0 | 7.60E-03 | 0 | 6.84E-01 | 1.01E-04 | 2.11E-01 | 0 | 0 | 0 | 9.08E-01 |
| Dermal | NA | 1.14E-06 | 7.08E-05 | NA | NA | NA | 1.77E-06 | 0 | 1.20E-04 | 0 | 1.08E-02 | 1.59E-06 | 3.34E-03 | 0 | 0 | 0 | 1.44E-02 |
| Inhalation | 9.35E+01 | 2.44E-02 | 1.52E+00 | NA | NA | NA | 3.79E-02 | 0 | 2.57E+00 | 0 | 2.32E+02 | 3.41E-01 | 7.15E+01 | 0 | 0 | 0 | 4.01E+02 |
| Eneka | Ingestion | NA | 6.17E-02 | 1.04E-05 | NA | NA | NA | 6.40E-05 | 0 | 7.89E-01 | 3.20E-06 | 0 | 6.08E-05 | 1.08E+00 | 0 | 0 | 0 | 1.94E+00 |
| Dermal | NA | 9.76E-04 | 1.65E-07 | NA | NA | NA | 1.01E-06 | 0 | 1.25E-02 | 5.06E-08 | 0 | 9.62E-07 | 1.72E-02 | 0 | 0 | 0 | 3.06E-02 |
| Inhalation | 7.27E+01 | 2.09E+01 | 3.52E-03 | NA | NA | NA | 2.17E-02 | 0 | 2.67E+02 | 1.08E-03 | 0 | 2.06E-01 | 3.67E+02 | 0 | 0 | 0 | 7.29E+02 |
| Oyigbo | Ingestion | NA | 6.40E-05 | 7.08E-03 | NA | NA | NA | 5.60E-05 | 0 | 6.14E-01 | 0 | 7.20E-04 | 7.20E-05 | 1.08E+00 | 0 | 0 | 0 | 1.71E+00 |
| Dermal | NA | 1.01E-06 | 1.12E-04 | NA | NA | NA | 8.86E-07 | 0 | 9.71E-03 | 0 | 1.14E-05 | 1.14E-06 | 1.71E-02 | 0 | 0 | 0 | 2.70E-02 |
| Inhalation | 6.84E+01 | 2.17E-02 | 2.40E+00 | NA | NA | NA | 1.90E-02 | 0 | 2.08E+02 | 0 | 2.44E-01 | 2.44E-01 | 3.67E+02 | 0 | 0 | 0 | 6.47E+02 |
| Woji | Ingestion | NA | 7.70E-02 | 2.28E-03 | NA | NA | NA | 0 | 0 | 7.52E-01 | 0 | 4.80E-04 | 1.06E-04 | 6.18E-01 | 0 | 0 | 0 | 1.45E+00 |
| Dermal | NA | 1.22E-03 | 3.61E-05 | NA | NA | NA | 0 | 0 | 1.19E-02 | 0 | 7.59E-06 | 1.67E-06 | 9.78E-03 | 0 | 0 | 0 | 2.29E-02 |
| Inhalation | 5.03E-01 | 2.61E+01 | 7.73E-01 | NA | NA | NA | 0 | 0 | 2.55E+02 | 0 | 1.63E-01 | 3.58E-01 | 2.09E+02 | 0 | 0 | 0 | 4.92E+02 |
| Yenagoa | Ingestion | NA | 5.28E-02 | 1.80E-03 | NA | NA | NA | 8.80E-05 | 0 | 6.89E-02 | 4.80E-06 | 6.91E-01 | 2.55E-04 | 0 | 0 | 0 | 0 | 8.15E-01 |
| Dermal | NA | 8.36E-04 | 2.85E-05 | NA | NA | NA | 1.39E-06 | 0 | 1.09E-03 | 7.59E-08 | 1.09E-02 | 4.04E-06 | 0 | 0 | 0 | 0 | 1.29E-02 |
| Inhalation | 9.21E-01 | 1.79E+01 | 6.11E-01 | NA | NA | NA | 2.98E-02 | 0 | 2.33E+01 | 1.63E-03 | 2.34E+02 | 8.65E-01 | 0 | 0 | 0 | 0 | 2.78E+02 |
| Control Site 1 | Ingestion | NA | 8.00E-05 | 8.00E-07 | NA | NA | NA | 0 | 0 | 3.20E-04 | 0 | 1.60E-04 | 8.00E-07 | 2.16E-02 | 0 | 0 | 0 | 2.22E-02 |
| Dermal | NA | 1.27E-06 | 1.27E-08 | NA | NA | NA | 0 | 0 | 5.06E-06 | 0 | 2.53E-06 | 1.27E-08 | 3.42E-04 | 0 | 0 | 0 | 3.51E-04 |
| Inhalation | 7.42E+01 | 2.71E-02 | 2.71E-04 | NA | NA | NA | 0 | 0 | 1.08E-01 | 0 | 5.42E-02 | 2.71E-03 | 7.32E+00 | 0 | 0 | 0 | 8.17E+01 |
| Control Site 2 | Ingestion | NA | 0 | 1.60E-06 | NA | NA | NA | 0 | 0 | 1.60E-04 | 0 | 3.20E-04 | 1.60E-06 | 2.40E-02 | 0 | 0 | 0 | 2.45E-02 |
| Dermal | NA | 0 | 2.53E-08 | NA | NA | NA | 0 | 0 | 2.53E-06 | 0 | 5.06E-06 | 2.53E-08 | 3.80E-04 | 0 | 0 | 0 | 3.87E-04 |
| Inhalation | 2.51E-02 | 0 | 5.42E-04 | NA | NA | NA | 0 | 0 | 5.42E-02 | 0 | 1.08E-01 | 5.42E-03 | 8.13E+00 | 0 | 0 | 0 | 8.32E+00 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene. A = Eliozu dumpsite; B = Yengoa dumpsite; C = Eneka dumpsite; D = Oyibo dumpsite; E = Woji dumpsite; F = Eleme dumpsite; G and H = Control sites.

**Appendix 3: Non-carcinogenic risk for PAHs from soil samples for Adults**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | 7.30E-04 | 2.00E-02 | 1.70E-04 | 1.51E-04 | 1.56E-07 | 1.18E-05 | 0 | 0 | 2.93E-04 | 0 | 2.80E-04 | 1.37E-05 | 6.36E-05 | 0 | 0 | 0 | 2.17E-02 |
| Dermal | 6.17E-07 | 2.54E-07 | 7.17E-08 | 6.38E-08 | NA | 4.98E-09 | 0 | 0 | 1.24E-07 | 0 | 1.18E-07 | 5.79E-09 | 2.68E-08 | 0 | 0 | 0 | 1.29E-06 |
| Inhalation | 5.37E-02 | 7.52E-05 | 6.38E-05 | NA | NA | NA | 0 | 0 | 5.51E-05 | 0 | 5.26E-05 | 2.58E-06 | 1.20E-05 | 0 | 0 | 0 | 5.40E-02 |
| Eliozu | Ingestion | 4.35E-04 | 2.34E-05 | 1.45E-04 | 3.90E-07 | 0 | 2.37E-05 | 5.45E-07 | 0 | 4.93E-06 | 0 | 4.44E-04 | 6.54E-06 | 1.37E-05 | 0 | 0 | 0 | 1.10E-03 |
| Dermal | 3.67E-07 | 2.96E-10 | 6.13E-08 | 1.64E-10 | 0 | 1.00E-08 | 2.30E-10 | 0 | 2.08E-09 | 0 | 1.88E-07 | 2.76E-09 | 5.79E-09 | 0 | 0 | 0 | 6.38E-07 |
| Inhalation | 3.20E-02 | 8.79E-08 | 5.46E-05 | NA | 0 | NA | 1.37E-07 | 0 | 9.28E-07 | 0 | 8.35E-05 | 1.23E-06 | 2.58E-06 | 0 | 0 | 0 | 3.21E-02 |
| Eneka | Ingestion | 3.38E-04 | 2.00E-02 | 3.38E-07 | 3.51E-07 | 2.73E-07 | 2.70E-07 | 3.12E-07 | 0 | 5.12E-04 | 2.08E-07 | 0 | 3.95E-06 | 7.04E-05 | 0 | 0 | 0 | 2.09E-02 |
| Dermal | 2.86E-07 | 2.54E-07 | 1.43E-10 | 1.48E-10 | NA | 1.14E-10 | 1.32E-10 | 0 | 2.16E-07 | 8.77E-11 | 0 | 1.67E-09 | 2.97E-08 | 0 | 0 | 0 | 7.88E-07 |
| Inhalation | 2.49E-02 | 7.53E-05 | 1.27E-07 | NA | NA | NA | 7.81E-08 | 0 | 9.63E-05 | 3.91E-08 | 0 | 7.42E-07 | 1.32E-05 | 0 | 0 | 0 | 2.51E-02 |
| Oyigbo | Ingestion | 3.18E-04 | 2.08E-05 | 2.30E-04 | 1.99E-06 | 0 | 3.51E-05 | 2.73E-07 | 0 | 3.99E-04 | 0 | 4.67E-07 | 4.67E-06 | 7.04E-05 | 0 | 0 | 0 | 1.08E-03 |
| Dermal | 2.69E-07 | 2.63E-10 | 9.71E-08 | 8.39E-10 | 0 | 1.48E-08 | 1.15E-10 | 0 | 1.68E-07 | 0 | 1.97E-10 | 1.97E-09 | 2.97E-08 | 0 | 0 | 0 | 5.82E-07 |
| Inhalation | 2.34E-02 | 7.81E-08 | 8.64E-05 | NA | 0 | NA | 6.84E-08 | 0 | 7.49E-05 | 0 | 8.79E-08 | 8.79E-07 | 1.32E-05 | 0 | 0 | 0 | 2.36E-02 |
| Woji | Ingestion | 2.34E-06 | 2.50E-02 | 7.41E-05 | 2.29E-04 | 0 | 4.26E-06 | 0 | 0 | 4.88E-04 | 0 | 3.12E-07 | 6.86E-06 | 4.02E-05 | 0 | 0 | 0 | 2.58E-02 |
| Dermal | 1.97E-09 | 3.17E-07 | 3.13E-08 | 9.69E-08 | 0 | 1.80E-09 | 0 | 0 | 2.06E-07 | 0 | 1.32E-10 | 2.89E-09 | 1.70E-08 | 0 | 0 | 0 | 6.75E-07 |
| Inhalation | 1.72E-04 | 9.40E-05 | 2.79E-05 | NA | 0 | NA | 0 | 0 | 9.17E-05 | 0 | 5.86E-08 | 1.29E-06 | 7.55E-06 | 0 | 0 | 0 | 3.94E-04 |
| Yenagoa | Ingestion | 4.29E-06 | 1.72E-02 | 5.85E-05 | 1.52E-04 | 3.28E-05 | 3.90E-06 | 4.29E-07 | 0 | 4.47E-05 | 3.12E-07 | 4.49E-04 | 1.66E-05 | 0 | 0 | 0 | 0 | 1.79E-02 |
| Dermal | 3.62E-09 | 2.17E-07 | 2.47E-08 | 6.40E-08 | NA | 1.65E-09 | 1.81E-10 | 0 | 1.89E-08 | 1.32E-10 | 1.90E-07 | 7.00E-09 | 0 | 0 | 0 | 0 | 5.27E-07 |
| Inhalation | 3.15E-04 | 6.45E-05 | 2.20E-05 | NA | NA | NA | 1.07E-07 | 0 | 8.41E-06 | 5.86E-08 | 8.44E-05 | 3.12E-06 | 0 | 0 | 0 | 0 | 4.98E-04 |
| Control Site 1 | Ingestion | 3.45E-04 | 2.60E-05 | 2.60E-08 | 7.79E-08 | 0 | 0 | 0 | 0 | 2.08E-07 | 0 | 1.04E-07 | 5.19E-08 | 1.40E-06 | 0 | 0 | 0 | 3.73E-04 |
| Dermal | 2.92E-07 | 3.29E-10 | 1.10E-11 | 3.29E-11 | 0 | 0 | 0 | 0 | 8.77E-11 | 0 | 4.39E-11 | 2.19E-11 | 5.92E-10 | 0 | 0 | 0 | 2.93E-07 |
| Inhalation | 2.54E-02 | 9.76E-08 | 9.76E-09 | NA | 0 | NA | 0 | 0 | 3.91E-08 | 0 | 1.95E-08 | 9.76E-09 | 2.64E-07 | 0 | 0 | 0 | 2.54E-02 |
| Control Site 2 | Ingestion | 1.17E-07 | 0 | 5.19E-08 | 1.56E-07 | 0 | 5.20E-06 | 0 | 0 | 1.04E-07 | 0 | 2.08E-07 | 1.04E-07 | 1.56E-06 | 0 | 0 | 0 | 7.50E-06 |
| Dermal | 9.87E-11 | 0 | 2.19E-11 | 6.58E-11 | 0 | 2.20E-09 | 0 | 0 | 4.39E-11 | 0 | 8.77E-11 | 4.39E-11 | 6.58E-10 | 0 | 0 | 0 | 3.22E-09 |
| Inhalation | 8.59E-06 | 0 | 1.95E-08 | NA | 0 | NA | 0 | 0 | 1.95E-08 | 0 | 3.91E-08 | 1.95E-08 | 2.93E-07 | 0 | 0 | 0 | 8.98E-06 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene. A = Eliozu dumpsite; B = Yengoa dumpsite; C = Eneka dumpsite; D = Oyibo dumpsite; E = Woji dumpsite; F = Eleme dumpsite; G and H = Control sites.

**Appendix 4: Non-carcinogenic risk for PAHs from soil samples for Children**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | 5.99E-03 | 1.64E-01 | 1.39E-03 | 1.24E-03 | 1.28E-06 | 9.67E-05 | 0 | 0 | 2.40E-03 | 0 | 2.30E-03 | 1.13E-04 | 5.22E-04 | 0 | 0 | 0 | 1.78E-01 |
| Dermal | 4.27E-05 | 1.75E-05 | 4.96E-06 | 4.41E-06 | NA | 3.44E-07 | 0 | 0 | 8.56E-06 | 0 | 8.17E-06 | 4.00E-07 | 1.86E-06 | 0 | 0 | 0 | 8.89E-05 |
| Inhalation | 1.10E-01 | 1.54E-04 | 1.31E-04 | NA | NA | NA | 0 | 0 | 1.13E-04 | 0 | 1.08E-04 | 5.29E-06 | 2.45E-05 | 0 | 0 | 0 | 1.11E-01 |
| Eliozu | Ingestion | 3.57E-03 | 1.92E-04 | 1.19E-03 | 3.20E-06 | 0 | 1.95E-04 | 4.47E-06 | 0 | 4.05E-05 | 0 | 3.65E-03 | 5.37E-05 | 1.13E-04 | 0 | 0 | 0 | 9.01E-03 |
| Dermal | 2.54E-05 | 2.05E-08 | 4.24E-06 | 1.14E-08 | 0 | 6.92E-07 | 1.59E-08 | 0 | 1.44E-07 | 0 | 1.30E-05 | 1.91E-07 | 4.00E-07 | 0 | 0 | 0 | 4.41E-05 |
| Inhalation | 6.56E-02 | 1.80E-07 | 1.12E-04 | NA | 0 | NA | 2.80E-07 | 0 | 1.90E-06 | 0 | 1.71E-04 | 2.52E-06 | 5.29E-06 | 0 | 0 | 0 | 6.59E-02 |
| Eneka | Ingestion | 2.78E-03 | 1.64E-01 | 2.77E-06 | 2.88E-06 | 2.24E-06 | 2.22E-06 | 2.56E-06 | 0 | 4.20E-03 | 1.70E-06 | 0 | 3.24E-05 | 5.78E-04 | 0 | 0 | 0 | 1.72E-01 |
| Dermal | 1.98E-05 | 1.75E-05 | 9.86E-09 | 1.02E-08 | NA | 7.89E-09 | 9.10E-09 | 0 | 1.50E-05 | 6.07E-09 | 0 | 1.15E-07 | 2.06E-06 | 0 | 0 | 0 | 5.45E-05 |
| Inhalation | 5.10E-02 | 1.54E-04 | 2.60E-07 | NA | NA | NA | 1.60E-07 | 0 | 1.98E-04 | 8.01E-08 | 0 | 1.52E-06 | 2.72E-05 | 0 | 0 | 0 | 5.14E-02 |
| Oyigbo | Ingestion | 2.61E-03 | 1.70E-04 | 1.89E-03 | 1.63E-05 | 0 | 2.88E-04 | 2.24E-06 | 0 | 3.27E-03 | 0 | 3.84E-06 | 3.84E-05 | 5.77E-04 | 0 | 0 | 0 | 8.86E-03 |
| Dermal | 1.86E-05 | 1.82E-08 | 6.71E-06 | 5.80E-08 | 0 | 1.03E-06 | 7.96E-09 | 0 | 1.16E-05 | 0 | 1.37E-08 | 1.37E-07 | 2.06E-06 | 0 | 0 | 0 | 4.02E-05 |
| Inhalation | 4.80E-02 | 1.60E-07 | 1.77E-04 | NA | 0 | NA | 1.40E-07 | 0 | 1.54E-04 | 0 | 1.80E-07 | 1.80E-06 | 2.71E-05 | 0 | 0 | 0 | 4.83E-02 |
| Woji | Ingestion | 1.92E-05 | 2.05E-01 | 6.08E-04 | 1.88E-03 | 0 | 3.50E-05 | 0 | 0 | 4.00E-03 | 0 | 2.56E-06 | 5.63E-05 | 3.29E-04 | 0 | 0 | 0 | 2.12E-01 |
| Dermal | 1.37E-07 | 2.19E-05 | 2.16E-06 | 6.70E-06 | 0 | 1.25E-07 | 0 | 0 | 1.43E-05 | 0 | 9.10E-09 | 2.00E-07 | 1.17E-06 | 0 | 0 | 0 | 4.67E-05 |
| Inhalation | 3.53E-04 | 1.93E-04 | 5.72E-05 | NA | 0 | NA | 0 | 0 | 1.88E-04 | 0 | 1.20E-07 | 2.64E-06 | 1.55E-05 | 0 | 0 | 0 | 8.09E-04 |
| Yenagoa | Ingestion | 3.52E-05 | 1.41E-01 | 4.80E-04 | 1.24E-03 | 2.69E-04 | 3.20E-05 | 3.52E-06 | 0 | 3.67E-04 | 2.56E-06 | 3.68E-03 | 1.36E-04 | 0 | 0 | 0 | 0 | 1.47E-01 |
| Dermal | 2.50E-07 | 1.50E-05 | 1.71E-06 | 4.43E-06 | NA | 1.14E-07 | 1.25E-08 | 0 | 1.31E-06 | 9.10E-09 | 1.31E-05 | 4.84E-07 | 0 | 0 | 0 | 0 | 3.65E-05 |
| Inhalation | 6.46E-04 | 1.32E-04 | 4.51E-05 | NA | NA | NA | 2.20E-07 | 0 | 1.72E-05 | 1.20E-07 | 1.73E-04 | 6.39E-06 | 0 | 0 | 0 | 0 | 1.02E-03 |
| Control Site 1 | Ingestion | 2.83E-03 | 2.13E-04 | 2.13E-07 | 6.39E-07 | 0 | 0 | 0 | 0 | 1.70E-06 | 0 | 8.52E-07 | 4.26E-07 | 1.15E-05 | 0 | 0 | 0 | 3.06E-03 |
| Dermal | 2.02E-05 | 2.28E-08 | 7.58E-10 | 2.28E-09 | 0 | 0 | 0 | 0 | 6.07E-09 | 0 | 3.03E-09 | 1.52E-09 | 4.10E-08 | 0 | 0 | 0 | 2.02E-05 |
| Inhalation | 5.21E-02 | 2.00E-07 | 2.00E-08 | NA | 0 | 0 | 0 | 0 | 8.01E-08 | 0 | 4.01E-08 | 2.00E-08 | 5.41E-07 | 0 | 0 | 0 | 5.21E-02 |
| Control Site 2 | Ingestion | 9.59E-07 | 0 | 4.26E-07 | 1.28E-06 | 0 | 4.27E-05 | 0 | 0 | 8.52E-07 | 0 | 1.70E-06 | 8.52E-07 | 1.28E-05 | 0 | 0 | 0 | 6.16E-05 |
| Dermal | 6.83E-09 | 0 | 1.52E-09 | 4.55E-09 | 0 | 1.52E-07 | 0 | 0 | 3.03E-09 | 0 | 6.07E-09 | 3.03E-09 | 4.55E-08 | 0 | 0 | 0 | 2.23E-07 |
| Inhalation | 1.76E-05 | 0 | 4.01E-08 | NA | 0 | NA | 0 | 0 | 4.01E-08 | 0 | 8.01E-08 | 4.01E-08 | 6.01E-07 | 0 | 0 | 0 | 1.84E-05 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene. A = Eliozu dumpsite; B = Yengoa dumpsite; C = Eneka dumpsite; D = Oyibo dumpsite; E = Woji dumpsite; F = Eleme dumpsite; G and H = Control sites.

**Appendix 5: Carcinogenic risk for PAHs from borehole water samples for Adults**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | 8.12E-13 | 1.86E-11 | NA | NA | NA | 4.22E-12 | 3.25E-12 | 7.63E-09 | 1.14E-13 | 0 | 0 | 0 | 1.63E-10 | 0 | 0 | 7.82E-09 | 8.12E-13 |
| Dermal | 1.28E-12 | 2.92E-11 | NA | NA | NA | 6.64E-12 | 5.11E-12 | 1.20E-08 | 1.79E-13 | 0 | 0 | 0 | 2.55E-10 | 0 | 0 | 1.23E-08 | 1.28E-12 |
| Inhalation | 1.96E-05 | 4.48E-04 | NA | NA | NA | 1.02E-04 | 7.84E-05 | 1.84E-01 | 2.74E-06 | 0 | 0 | 0 | 4.27E-03 | 0 | 0 | 2.30E-01 | 1.96E-05 |
| Eliozu | Ingestion | 1.89E-10 | 1.52E-11 | NA | NA | NA | 4.64E-11 | 1.63E-12 | 4.40E-09 | 8.12E-14 | 0 | 0 | 0 | 2.36E-10 | 0 | 0 | 4.88E-09 | 1.89E-10 |
| Dermal | 2.98E-10 | 2.40E-11 | NA | NA | NA | 7.29E-11 | 2.55E-12 | 6.91E-09 | 1.28E-13 | 0 | 0 | 0 | 3.70E-10 | 0 | 0 | 7.68E-09 | 2.98E-10 |
| Inhalation | 4.56E-03 | 3.67E-04 | NA | NA | NA | 1.12E-03 | 3.92E-05 | 1.06E-01 | 1.96E-06 | 0 | 0 | 0 | 6.20E-03 | 0 | 0 | 2.26E-01 | 4.56E-03 |
| Woji | Ingestion | 5.69E-13 | 2.24E-11 | NA | NA | NA | 7.07E-12 | 3.25E-12 | 3.09E-11 | 7.31E-14 | 0 | 0 | 0 | 2.11E-10 | 0 | 0 | 2.76E-10 | 5.69E-13 |
| Dermal | 8.94E-13 | 3.53E-11 | NA | NA | NA | 1.11E-11 | 5.11E-12 | 4.85E-11 | 1.15E-13 | 0 | 0 | 0 | 3.32E-10 | 0 | 0 | 4.33E-10 | 8.94E-13 |
| Inhalation | 1.37E-05 | 5.41E-04 | NA | NA | NA | 1.70E-04 | 7.84E-05 | 7.44E-04 | 1.76E-06 | 0 | 0 | 0 | 5.56E-03 | 0 | 0 | 6.10E-02 | 1.37E-05 |
| Control Site 1 | Ingestion | 8.12E-14 | 1.63E-14 | NA | NA | NA | 8.12E-13 | 0 | 2.44E-12 | 3.25E-14 | 0 | 0 | 0 | 5.69E-11 | 0 | 0 | 6.03E-11 | 8.12E-14 |
| Dermal | 1.28E-13 | 2.55E-14 | NA | NA | NA | 1.28E-12 | 0 | 3.83E-12 | 5.11E-14 | 0 | 0 | 0 | 8.94E-11 | 0 | 0 | 9.47E-11 | 1.28E-13 |
| Inhalation | 1.96E-06 | 3.92E-07 | NA | NA | NA | 1.96E-05 | 0 | 5.88E-05 | 7.84E-07 | 0 | 0 | 0 | 1.50E-03 | 0 | 0 | 1.70E-03 | 1.96E-06 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene.

**Appendix 6: Carcinogenic risk for PAHs from borehole water samples for Children**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | NA | 3.12E-13 | 7.14E-12 | NA | NA | NA | 1.62E-12 | 1.25E-12 | 2.93E-09 | 4.37E-14 | 0 | 0 | 0 | 6.24E-11 | 0 | 0 | 3.00E-09 |
| Dermal | NA | 5.09E-13 | 1.16E-11 | NA | NA | NA | 2.65E-12 | 2.04E-12 | 4.78E-09 | 7.13E-14 | 0 | 0 | 0 | 1.02E-10 | 0 | 0 | 4.90E-09 |
| Inhalation | 8.22E-02 | 3.92E-05 | 8.96E-04 | NA | NA | NA | 2.04E-04 | 1.57E-04 | 3.68E-01 | 5.48E-06 | 0 | 0 | 0 | 8.55E-03 | 0 | 0 | 4.60E-01 |
| Eliozu | Ingestion | NA | 7.27E-11 | 5.85E-12 | NA | NA | NA | 1.78E-11 | 6.24E-13 | 1.69E-09 | 3.12E-14 | 0 | 0 | 0 | 9.05E-11 | 0 | 0 | 1.88E-09 |
| Dermal | NA | 1.19E-10 | 9.55E-12 | NA | NA | NA | 2.91E-11 | 1.02E-12 | 2.76E-09 | 5.09E-14 | 0 | 0 | 0 | 1.48E-10 | 0 | 0 | 3.06E-09 |
| Inhalation | 2.15E-01 | 9.13E-03 | 7.35E-04 | NA | NA | NA | 2.24E-03 | 7.84E-05 | 2.12E-01 | 3.92E-06 | 0 | 0 | 0 | 1.24E-02 | 0 | 0 | 4.52E-01 |
| Woji | Ingestion | NA | 2.18E-13 | 8.62E-12 | NA | NA | NA | 2.71E-12 | 1.25E-12 | 1.19E-11 | 2.81E-14 | 0 | 0 | 0 | 8.11E-11 | 0 | 0 | 1.06E-10 |
| Dermal | NA | 3.56E-13 | 1.41E-11 | NA | NA | NA | 4.43E-12 | 2.04E-12 | 1.93E-11 | 4.58E-14 | 0 | 0 | 0 | 1.32E-10 | 0 | 0 | 1.73E-10 |
| Inhalation | 1.08E-01 | 2.74E-05 | 1.08E-03 | NA | NA | NA | 3.41E-04 | 1.57E-04 | 1.49E-03 | 3.53E-06 | 0 | 0 | 0 | 1.11E-02 | 0 | 0 | 1.22E-01 |
| Control Site 1 | Ingestion | NA | 3.12E-14 | 6.24E-15 | NA | NA | NA | 3.12E-13 | 0 | 9.36E-13 | 1.25E-14 | 0 | 0 | 0 | 2.18E-11 | 0 | 0 | 2.31E-11 |
| Dermal | NA | 5.09E-14 | 1.02E-14 | NA | NA | NA | 5.09E-13 | 0 | 1.53E-12 | 2.04E-14 | 0 | 0 | 0 | 3.56E-11 | 0 | 0 | 3.78E-11 |
| Inhalation | 2.54E-04 | 3.92E-06 | 7.84E-07 | NA | NA | NA | 3.92E-05 | 0 | 1.18E-04 | 1.57E-06 | 0 | 0 | 0 | 2.99E-03 | 0 | 0 | 3.41E-03 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene.

**Appendix 7: Non-carcinogenic risk for PAHs from borehole water samples for Adults**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | 5.09E-06 | 4.99E-08 | 1.14E-06 | 2.91E-06 | 1.65E-08 | 3.00E-07 | 3.90E-08 | 4.00E-09 | 9.38E-06 | 1.40E-08 | 0 | 0 | 0 | 2.00E-08 | 0 | 0 | 1.90E-05 |
| Dermal | 1.60E-05 | 2.36E-08 | 1.80E-06 | 4.58E-06 | NA | 4.72E-07 | 6.12E-08 | 6.28E-09 | 1.48E-05 | 2.20E-08 | 0 | 0 | 0 | 3.14E-08 | 0 | 0 | 3.77E-05 |
| Inhalation | 1.09E+04 | 5.45E-02 | 1.25E+01 | NA | NA | NA | 2.83E-01 | 2.18E-02 | 5.12E+01 | 7.63E-02 | 0 | 0 | 0 | 1.09E-01 | 0 | 0 | 1.09E+04 |
| Eliozu | Ingestion | 1.33E-05 | 1.16E-05 | 9.36E-07 | 4.49E-08 | 2.40E-08 | 2.01E-07 | 4.28E-07 | 2.00E-09 | 5.40E-06 | 9.99E-09 | 0 | 0 | 0 | 2.90E-08 | 0 | 0 | 3.20E-05 |
| Dermal | 4.18E-05 | 5.49E-06 | 1.47E-06 | 7.07E-08 | NA | 3.15E-07 | 6.73E-07 | 3.14E-09 | 8.50E-06 | 1.57E-08 | 0 | 0 | 0 | 4.55E-08 | 0 | 0 | 5.84E-05 |
| Inhalation | 2.84E+04 | 1.27E+01 | 1.02E+01 | NA | NA | NA | 3.11E+00 | 1.09E-02 | 2.95E+01 | 5.45E-02 | 0 | 0 | 0 | 1.58E-01 | 0 | 0 | 2.84E+04 |
| Woji | Ingestion | 6.66E-06 | 3.50E-08 | 1.38E-06 | 7.19E-08 | 5.99E-09 | 2.00E-07 | 6.52E-08 | 4.00E-09 | 3.80E-08 | 8.99E-09 | 0 | 0 | 0 | 2.60E-08 | 0 | 0 | 8.50E-06 |
| Dermal | 2.09E-05 | 1.65E-08 | 2.17E-06 | 1.13E-07 | NA | 3.15E-07 | 1.02E-07 | 6.28E-09 | 5.97E-08 | 1.41E-08 | 0 | 0 | 0 | 4.08E-08 | 0 | 0 | 2.38E-05 |
| Inhalation | 2.13E+04 | 5.72E-02 | 2.26E+01 | NA | NA | NA | 7.11E-01 | 3.27E-02 | 3.11E-01 | 7.36E-02 | 0 | 0 | 0 | 2.12E-01 | 0 | 0 | 2.13E+04 |
| Control Site 1 | Ingestion | 1.57E-08 | 4.99E-09 | 9.99E-10 | 3.75E-09 | 2.25E-09 | 1.00E-07 | 7.49E-09 | 0 | 3.00E-09 | 4.00E-09 | 0 | 0 | 0 | 6.99E-09 | 0 | 0 | 1.49E-07 |
| Dermal | 4.95E-08 | 2.36E-09 | 1.57E-09 | 5.89E-09 | NA | 1.58E-07 | 1.18E-08 | 0 | 4.71E-09 | 6.28E-09 | 0 | 0 | 0 | 1.10E-08 | 0 | 0 | 2.51E-07 |
| Inhalation | 3.36E+01 | 5.45E-03 | 1.09E-02 | NA | NA | NA | 5.45E-02 | 0 | 1.63E-02 | 2.18E-02 | 0 | 0 | 0 | 3.81E-02 | 0 | 0 | 3.37E+01 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene.

**Appendix 8: Non-carcinogenic risk for PAHs from borehole water samples for Children**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PAHs |  | Nap | Ace | Acy | Flu | Phen | Ant | Flua | Pyr | \*BaA | \*Chry | \*BbF | \*BkF | \*BaP | \*DBA | B(ghi)P | \*Icp | Σ PAHs |
| Eleme | Ingestion | 8.47E-06 | 8.31E-08 | 1.90E-06 | 4.85E-06 | 2.74E-08 | 5.00E-07 | 6.48E-08 | 6.65E-09 | 1.56E-05 | 2.33E-08 | 0 | 0 | 0 | 3.32E-08 | 0 | 0 | 3.16E-05 |
| Dermal | 6.91E-06 | 1.02E-08 | 7.75E-07 | 1.98E-06 | NA | 2.04E-07 | 2.64E-08 | 2.71E-09 | 6.37E-06 | 9.49E-09 | 0 | 0 | 0 | 1.36E-08 | 0 | 0 | 1.63E-05 |
| Inhalation | 2.17E+04 | 1.09E-01 | 2.49E+01 | NA | NA | NA | 5.67E-01 | 4.36E-02 | 1.02E+02 | 1.53E-01 | 0 | 0 | 0 | 2.18E-01 | 0 | 0 | 2.18E+04 |
| Eliozu | Ingestion | 2.21E-05 | 1.94E-05 | 1.56E-06 | 7.48E-08 | 3.99E-08 | 3.34E-07 | 7.12E-07 | 3.32E-09 | 8.99E-06 | 1.66E-08 | 0 | 0 | 0 | 4.82E-08 | 0 | 0 | 5.33E-05 |
| Dermal | 1.81E-05 | 2.37E-06 | 6.36E-07 | 3.05E-08 | NA | 1.36E-07 | 2.90E-07 | 1.36E-09 | 3.67E-06 | 6.78E-09 | 0 | 0 | 0 | 1.97E-08 | 0 | 0 | 2.52E-05 |
| Inhalation | 5.68E+04 | 2.54E+01 | 2.04E+01 | NA | NA | NA | 6.22E+00 | 2.18E-02 | 5.90E+01 | 1.09E-01 | 0 | 0 | 0 | 3.16E-01 | 0 | 0 | 5.69E+04 |
| Woji | Ingestion | 1.11E-05 | 5.82E-08 | 2.30E-06 | 1.20E-07 | 9.97E-09 | 3.33E-07 | 1.08E-07 | 6.65E-09 | 6.32E-08 | 1.50E-08 | 0 | 0 | 0 | 4.32E-08 | 0 | 0 | 1.41E-05 |
| Dermal | 9.05E-06 | 7.12E-09 | 9.37E-07 | 4.88E-08 | NA | 1.36E-07 | 4.42E-08 | 2.71E-09 | 2.58E-08 | 6.10E-09 | 0 | 0 | 0 | 1.76E-08 | 0 | 0 | 1.03E-05 |
| Inhalation | 2.84E+04 | 7.63E-02 | 3.01E+01 | NA | NA | NA | 9.48E-01 | 4.36E-02 | 4.14E-01 | 9.81E-02 | 0 | 0 | 0 | 2.83E-01 | 0 | 0 | 2.85E+04 |
| Control Site 1 | Ingestion | 2.62E-08 | 8.31E-09 | 1.66E-09 | 6.23E-09 | 3.74E-09 | 1.67E-07 | 1.25E-08 | 0 | 4.99E-09 | 6.65E-09 | 0 | 0 | 0 | 1.16E-08 | 0 | 0 | 2.49E-07 |
| Dermal | 2.14E-08 | 1.02E-09 | 6.78E-10 | 2.54E-09 | NA | 6.81E-08 | 5.09E-09 | 0 | 2.03E-09 | 2.71E-09 | 0 | 0 | 0 | 4.75E-09 | 0 | 0 | 1.08E-07 |
| Inhalation | 6.71E+01 | 1.09E-02 | 2.18E-02 | NA | NA | NA | 1.09E-01 | 0 | 3.27E-02 | 4.36E-02 | 0 | 0 | 0 | 7.63E-02 | 0 | 0 | 6.74E+01 |

\*-Carcinogenic PAHs; Nap – Naphthalene; Ace – Acenaphthene; Acy – Acenaphthylene; Flu – Fluorene; Phen – Phenanthrene; Ant – Anthracene; Flua – Fluoranthene; Pyr – Pyrene; BaA – Benzo(a)anthracene; Chry–Chrysene; BbF– Benzo(b)fluoranthene; BkF – Benzo(k)fluoranthene; BaP – Benzo(a)pyrene; DBA – Dibenz(ah)anthracene;B(ghi)P – benzo(g,h,i)perylene; Icp – indeno(1,2,3-cd) pyrene.