Content and Emission Characteristics of Artificial Wax Firelogs

Victor Li – Environment Canada

Steven Rosenthal – US EPA

Environment Canada Environnement Canada

EPA United States Environmental Protection Agency

Purpose:

To verify the emission characteristics from these products during the burning cycle and evaluate the content of the residues after the burning has been completed.

Test protocol

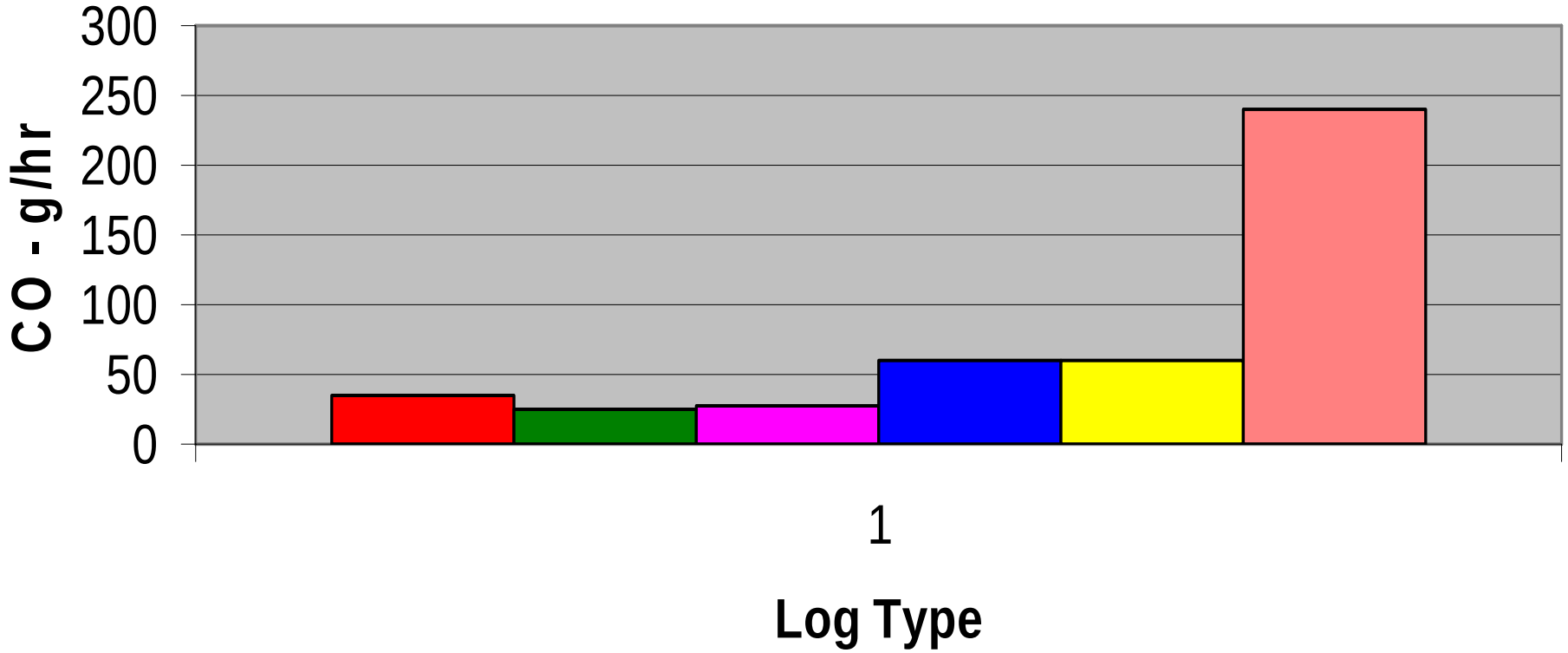
- The logs were collected from locations in Ontario and the US.
- The product emissions were collected and tested for particulates and other emission components such as PAH. An analysis of the residue after burning was done.
- The products used for this test are as follows: Northland and Pine Mountain made by Conros, Easy Time and Xtra-Time Firelog by Duraflame, and Java–Log by Robustion Technologies
- Cordwood results are from other studies.

Results

- Emissions – PM and CO were about 1/4 and 1/5 respectively of cordwood. There were some comparisons made between chemicals as well, such as PAH in which the amount emitted was about 1/15 of cordwood.

- The emissions of benzo(a)pyrene (BaP), and other polycyclic aromatic hydrocarbons (PAHs), Level 1 and 2 substances under GLBTS, are generally not detected or at low levels.

Emission Rate - Carbon Monoxide (CO)



Results (continued)

- Residue:

  Aluminum – 2,550 to 6,210 mg/kg residue
  Chromium – 14 to 147 mg/kg residue
  Copper – 70 to 2,190 mg/kg residue
  Magnesium – 3,750 to 12,900 mg/kg

- Wax content was also measured. The variation was not as great (44% to 55%).

- The heat content of these logs is quite high (12,620 to 15,190 Btu/lb, dry basis) compared to oak cordwood (about 8,300 Btu/lb)

Conclusions

- The overall $PM_{2.5}$ emissions from the wax firelogs was less than regular cordwood.
- The PAH levels were generally less than 10 mg/hr.
- The residue levels indicated some large variations between log brands and types.
- The wax used has traditionally been a paraffin based product with relatively high oil content. However, some companies have looked at alternative products and combinations such as various plant and petroleum oils and stearic acid.
- The study provided new information on the residue composition.