MEMO

Job **TNG Energy from Waste Facility, Eastern Creek, Treated Wood Waste (TWW)**
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Treated wood waste (TWW)

Treated wood waste (TWW) represents a large proportion of wood waste arising. A WRAP study [1] on waste composition found that (including laminated and veneered wood) an average of 85% of the wood from the observed Civic Amenity sites and 23% of the wood from the observed construction and demolition sites was treated.

TWW is defined as wood that has been treated with one or more of the following:

- Copper Chromium Arsenic (CCA)
- Copper Organics
- Creosote
- Light Organic Solvent Preservatives (LOSP)
- Micro-emulsion
- Paint / stain
- Varnish

EfW plants must incinerate waste aligning with the relevant requirements of Australian and NSW Regulatory Framework.

According to NSW Energy from Waste Policy Statement (chapter 4 Energy recovery facilities, technical criteria) the gas resulting from the process should be raised to a minimum temperature of 850 °C for two seconds after the last injection of combustion air. If waste has a content of more than 1% of halogenated organic substances, expressed as chlorine, the temperature should be raised to 1,100 °C for at least 2 seconds after the last injection of air.

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[1] Options and Risk Assessment for Treated Wood Waste, The Waste & Resources Action Programme http://www2.wrap.org.uk/downloads/Options_and_Risk_Assessment_for_Treated_Wood_Waste.6ac4f667.2237.pdf

Certain wood wastes are treated with preservatives or coatings like listed above.

One of the main sources for organic chlorine is varnish containing Polychlorinated biphenyl (PCB).

To get an idea of what the maximum chlorine content in treated wood might be, a calculation with following assumptions is made:

Wood size:	0.0254 m x 1 m x 1 m (1 inch thickness)
Varnish thickness on wood:	100 µm, coated both sides
Specific weight wood	700 kg/m^3
Specific weight varnish	900 kg/m^3
Calculated weight wood	17.8 kg
Calculated weight varnish on treated wood	90 g
Percentage of varnish on wood	0.5%

The chlorine content of PCB varies from 19% to 71% depending on PCB configuration[2]. In building materials up to 33 g/kg of PCB's have been found[3] (e.g.in caulking materials). Assuming the unrealistic case of 71% chlorine and 33 g/kg of PCB in varnish this would result in a chlorine content of 2.3% in the varnish.

The wood content in the different waste streams of the TNG design fuel varies from 0% to 58.20%. The waste stream with the highest wood content is CRW.

Assuming that all wood waste in CRW is treated with a varnish containing 33 g/kg PCB, the contribution of this PCB to the chlorine concentration of CRW would be less than 0.01% (58.2%x0.5%x2.3%).

Conclusion

Even in a worst case scenario the chlorine contribution of PCB's from TWW to the overall chlorine concentration of the waste is negligible. As a result there is no need to raise the combustion temperature to 1,100°C because of processing TWW.

[2] Polychlorinated biphenyl (PCB) is an organic chlorine compound with the formula $C_{12}H_{10-x}Cl_x$. There are 209 configurations with 1 to 10 chlorine atoms.

[3] CHARACTERIZATION OF POLYCHLORINATED BIPHENYLS IN BUILDING MATERIALS AND EXPOSURES IN THE INDOOR ENVIRONMENT; KM Coghlan, MP Chang, et. al.; Environmental Health and Engineering, Inc., Newton, MA, USA