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**WOOD PRODUCTS IN THE WASTE STREAM:
CHARACTERIZATION AND COMBUSTION EMISSIONS**

Final Report

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EXECUTIVE SUMMARY

DEFINING "CLEAN" AND "TREATED" WOOD

This study emphasizes understanding the differences in air emissions and ash characteristics from the combustion of "clean" wood compared to "treated" wood. Clean and treated wood are produced by a variety of municipal, commercial, industrial, agricultural, construction, and demolition activities. Treated wood is commonly referred to as "urban," "recycled," "treated," "dirty," and/or "demolition" wood. "Clean" wood is a by-product of harvesting activities connected with forest management, commercial logging, and site conversion. Harvested wood may be in the form of chips or stumps.

In most states evaluated in this study, the source and type of wood fuel affects the environmental permitting of facilities. Each state or province has either developed definitions for different wood fuels, or classifies combustion facilities according to the type of wood fuel burned. For this study and the final report, wood fuel types are divided into "clean" or "treated" wood. "Clean" wood is untreated and uncontaminated natural wood.

- "Clean" wood is generated by primary wood-products industries and some secondary wood-products industries. The resulting mill residue may consist of bark, chips, edgings, sawdust, shavings, or slabs. "Clean" wood is also generated by municipal, commercial, industrial, agricultural, construction, and demolition activities. This wood often ends up in the solid-waste stream, and consists of used pallets, dimensional lumber, and other untreated wood.
- "Treated" wood, or wood that has been treated, adulterated, or chemically changed in some way, includes material treated with glues, binders, or resins, such as plywood, particleboard, and wood laminates. "Treated" wood also includes material treated with paints, stains, or coatings, such as painted wood, stained wood, and plastic laminates. "Treated" wood also includes material impregnated with preservatives, such as creosote, pentachlorophenol, and chromated copper arsenate (CCA), in railroad ties, marine pilings, utility poles, and exterior-grade plywood. Construction and demolition waste may contain "treated" wood.

In this report, wood is referred to as "waste wood" when it is in its pre-processed form, and as "processed wood" when it has been prepared for fuel.

Federal, State, and Provincial Regulations

The project team reviewed existing federal, state, and provincial air, solid waste and energy policies, and regulations that relate to waste wood processing and combustion facilities, identified major trends in policies that affect the processing and use of waste wood for energy, and investigated ash disposal from waste-wood combustion facilities.

Major air quality regulatory issues that affect waste-wood combustion facilities include:

- Regulatory implications for permitting a "treated" or a "clean" wood combustion facility;
- The level of control and/or control equipment currently considered best available control technology; and
- Implications of the 1990 Clean Air Act Amendments for new and existing wood-combustion facilities.

Major findings developed from a review of federal and state air quality regulations include:

- Each state's air pollution regulatory agency has either developed definitions for different wood fuels or classifies facilities according to the type of wood fuel burned. Permit review procedures are generally more difficult and permit requirements more stringent for facilities burning "treated" wood (e.g. lower emission limits, additional controls, additional testing and record-keeping requirements) than for facilities burning "clean" wood.
- With the exception of California, "clean" wood-fired energy-recovery facilities are classified as wood boilers or combustion equipment compared to solid-waste combustors or incinerators. Burning "treated" wood is classified differently in some states, even when energy recovery is included.
- All wood-fired facilities in California are classified as resource-recovery facilities, along with municipal solid-waste incinerators, tire burners and sludge incinerators, subjecting them to the same level of agency review and public scrutiny as solid-waste incinerators.
- Best Available Control Technology (BACT) is required in most states regardless of whether Prevention of Significant Deterioration (PSD) applies. BACT-derived emission limits are usually much more stringent than federal New Source Performance Standards (NSPS) and state emission standards. Typical add-on control requirements for new facilities include electrostatic precipitators (ESPs) or baghouses for particulate control and selective non-catalytic reduction (SNCR) for nitrogen oxides (NO_x) control. Good combustion design, including selection of the combustor type, is usually required for carbon monoxide (CO) and volatile organic compounds (VOC) control.
- The non-attainment provisions of the 1990 Clean Air Act Amendments are not currently in effect. However, by November 15, 1992, new wood-fired combustors in areas not meeting NAAQS for ozone may require some combination of additional controls and emission offsets for VOC and/or NO_x emissions. The requirement for and/or degree of controls and offsets are functions of the classification or severity of non-attainment in the area, the quantity of VOC and NO_x emissions from the facility, and the area's mix of ambient NO_x and VOC concentrations.
- Hazardous air pollutant regulations are currently being written by the United States Environmental Protection Agency (EPA) pursuant to Title III of the 1990 Clean Air Act Amendments. Based on discussions with EPA, wood-fired boilers are in a subcategory of sources for which Maximum Achievable Control