preserving. Producers of chlorophenolic formulations used in surface protection have recently discontinued the product due to the pending hazardous waste regulations and it is expected that stocks will soon be exhausted. Alternatives to pentachlorophenate solutions which have been developed and are currently used include: iodo-prophenyl butyl carbamate, dimethyl sulfoxide, didecyl dimethyl ammonium chloride mixtures; sodium azide mixtures; iodo-prophenyl butyl carbamate, didecyl dimethyl ammonium chloride mixture; 8quinolinol, copper (II) chelate mixtures; iodo-prophenyl butyl carbamate mixtures; sodium ortho-phenylphenate mixtures; 2-(thiocyanomethylthio)benzothiozole (TCMTB) and methylene bis (thiocyanate) mixture; and zinc naphthenate mixtures.26

Industrial activities at saw mills with the potential to contaminate storm water include spills from surface protection areas, storage and mixing tank areas, treated wood drippage, transport or storage areas, maintenance and shop areas, and areas used for treatment/ disposal of wastes. Fugitive emissions from negative pressure spraying activities and hand spraying surface protection formulations may also result in the contamination of storm water.²⁷

Significant materials that have the potential to come in contact with storm water discharges at facilities practicing these activities include: all of the materials stated in 3.b. above (under untreated wood lumber and residue generation activities and untreated materials storage) plus treated lumber, treatment chemicals, and treatment equipment (dipping tanks, green chain, material handling equipment, etc.).

Pollutants which result from these types of surface protection operations may include the constituents of those surface protection chemicals listed above, as well as aggregate parameters such as BOD₅, COD, and TSS.

d. Wood Preservation Activities, and Chemicals and Preserved Wood Material Storage. Wood preserving is the application of chemicals to wood and wood products to preserve the structural integrity of the wood. Wood preserving is designed to prevent/delay the deterioration/decay of wood through the addition of flame retardants, water repellents, and chemicals. Wood preserving differs from wood surface

protection which is generally performed for aesthetic reasons.28

Wood preserving is accomplished by two steps. First, the moisture content of wood is reduced to increase its permeability (this is referred to as conditioning). Conditioning may be accomplished by: (1) allowing wood to dry at ambient temperatures; (2) kiln drying; (3) steaming the wood, then applying a vacuum; (4) dipping the wood in a heated salt bath; or (5) vapor drying, and immersing the wood in a solvent (usually naphtha or Stoddard solvent). After conditioning, wood is impregnated with a preservative for fire retardency, insecticidal resistance, and/ or fungicidal resistance. Preservation may be accomplished by either nonpressurized and pressurized methods. The nonpressurized method involves dipping stock in a bath containing the preservatives (either heated or at ambient temperatures), while pressurized methods involve subjecting the wood to the preservative when under pressure. After treatment, the wood stock is often subject to cleaning in order to remove excess preservative prior to stacking treated lumber products outside.29

There are a number of different avenues by which wood preserving wastes may contaminate storm water. These may include: drippage of condensate or preservative after pressurized treatment; washing after preservation to remove excess preservative, which usually occurs either in the treatment or storage areas; spills and leaks from process equipment and preservative tanks; fugitive emissions from vapors in the process, as well as blow outs and emergency pressure releases; and kick-back (phenomenon where preservative leaks as it returns to normal pressure) from the lumber.30

A wide variety of chemicals are used in the preservation of wood, the most common are creosote,

pentachlorophenol and inorganics. Creosote-based preservatives are mixtures of coal-tar derivatives and creosote solutions (creosotes fortified with insecticide additives such as

pentachlorophenol, arsenic trioxide, copper compounds or malathion). Pentachlorophenol preservatives are typically formulations using petroleum solvents and 5 percent total pentachlorophenol. Waxes and resins may also be added.31 Inorganic preservatives consist of arsenical and chromate salts and fluorides dissolved in water. The most commonly used inorganic preservatives include: 32 chromated copper arsenate (CCA); ammoniacal copper arsenate (ACA); acid copper chromate (ACC); chromated zinc chloride (CZC); and fluor-chromearsenate-phenol (FCAP).

Significant materials that have the potential to come in contact with storm water discharges at facilities practicing wood preservation include: all of the materials stated in 3.b. (untreated wood lumber and residue generation activities and untreated wood materials storage) plus treated lumber, treatment chemicals, and treatment equipment (preservative, tanks, preservative contaminated material handling

equipment).

Pollutants expected to be discharged from wood preserving facilities typically include conventional pollutants such as BOD₅, TSS and oil and grease, as well as toxics which are dependent upon the preserving formulations used. Organic solvent components such as benzene, toluene, xylene, and ethylbenzene can be found at pentachlorophenol preservation operations. Phenolic compounds such as phenol, chlorophenols, nitrophenols can be found at plants using pentachlorophenol and creosote preservatives. The polynuclear aromatic hydrocarbons of creosote, including anthracene, pyrene, and phenanthrene are often contained in the entrained oils. High phenolic, COD, and oil and grease concentrations have been noted to result from creosote and pentachlorophenol operations. Traces of copper, chromium, arsenic, zinc, and boron often can be found in the wastewaters of plants which use waterborne salt preservatives.33

e. Wood Assembly/Fabrication Activities and Final Fabricated Wood Product Storage. The industrial

²⁶ "Regulatory Guidance and Waste Reduction Manual for United States Sawmills (Draft)," EPA Office of Solid Waste, January 12, 1993.

²⁷ "Background Document Support the Proposed Listing of Wastes From Wood Preservation and Surface Protection Processes," EPA Office of Solid Waste, July 1987.

²⁸ "Background Document Supporting the Proposed Listing of Wastes from Surface Protection Processes, Part One Final Engineering Analysis Volume 1," EPA Office of Solid Wastes, February

²⁹ "Development Document for Effluent Limitations Guidelines and Standards for the Timber Products Point Source Category, Final (EPA 440/1-81/023)," EPA, Effluent Guidelines Division, January 1981.

^{30 &}quot;Background Document Support the Proposed Listing of Wastes From Wood Preservation and Surface Protection Processes," EPA Office of Solid Waste, July 1987.

^{31 &}quot;Background Document Support the Proposed Listing of Wastes From Wood Preservation and Surface Protection Processes," EPA Office of Solid Waste, July 1987.

^{32 &}quot;Background Document Support the Proposed Listing of Wastes From Wood Preservation and Surface Protection Processes," EPA Office of Solid Waste, July 1987

^{33 &}quot;Development Document for Effluent Limitations Guidelines and Standards for the Timber Products Point Source Category, Final (EPA 440/1-81/023)," EPA, Effluent Guidelines Division, January 1981.