INDUSTRIAL HYGIENE REPORT

PRELIMINARY SURVEY OF WOOD PRESERVATIVE TREATMENT FACILITY

at

SEAMAN TIMBER COMPANY, INC.
Montevallo, Alabama

Survey conducted by:
Stewart-Todd Associates, Incorporated

July 26, 1979

Report written by

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Report Date

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Industrial Hygiene Section
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ABSTRACT: The Seaman Timber Company, Inc. (Standard Industrial Classification 2491) of Montevallo, Alabama was surveyed on July 26, 1979 to provide information on current and past processes used at the company, to review occupational safety and health procedures, to determine exposure concentrations of creosote (8001589) during routine wood treatment, to determine the need for comprehensive field studies to evaluate long term health effects associated with pressure treating of wood with creosote and chromated copper arsenate (7778418) (CCA), and to collect information for future technical reports. The company employs about 100 workers; 8 of these are actively engaged in wood treating. The company had no formal preemployment or periodical medical evaluation program for wood treatment employees but there was an initial employee orientation on good work practices, safety rules, and precautions, and periodic safety meetings. Two area air samples were taken near bundles of wood that had been unloaded from the processing cylinders after the creosote and coal tar (8007452) treatment, but no valid results were obtained. The authors conclude that inconsistencies in the laboratory procedure, compared with the NIOSH recommendations for evaluating airborne concentrations of creosote, resulted in poor analytical sensitivity, and inaccurate and invalid results.

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PURPOSE OF SURVEY:	This walk-through survey was conducted as a part of the Phase II study of the INDUSTRIAL HYGIENE ASSESSMENT OF NEW AGENTS - III, NIOSH Contract No. 210-78-0060. Specifically, this survey was for the first group which includes all agents used in wood preserving. This facility was selected on the criteria set forth in the Study Proposal based on information gathered in Phase I.
EMPLOYER REPRESENTATIVES CONTACTED:	James D. Seaman, President Phillip E. Lacey, Vice President James L. Standish, Treating Plant Superintendent Don Watler, Sales-Production Coordinator (205) 665-2536
EMPLOYEE REPRESENTATIVES CONTACTED:	N/A
ACKNOWLEDGEMENTS:	James L. Oser, NIOSH Battelle Columbus Laboratories (Richard E. Heffelfinger, Ph.D.) Shiro Tanaka, NIOSH
STANDARD INDUSTRIAL CLASSIFICATION OF PLANT:	SIC #2491 Wood Treatment

ABSTRACT

A preliminary survey of the Seaman Timber Company, Inc., Montevallo, Alabama, wood treating plant, was done as partial fulfillment of obligations to the National Institute for Occupational Safety and Health under Contract No. 210-78-0060, "Industrial Hygiene Assessment of New Agents - III." The field site visit of July 26, 1979 provided familiarization with current and past process methods and control procedures utilized to reduce exposure to wood preservation chemicals. Employee training and work practices were evaluated along with any historical data on the plant processes and past experience from working with the treatment chemicals.

Information on safety and medical programs were provided and discussed with the plant personnel. Range-finding air sampling was conducted during regular operations at potential employee exposure sites to evaluate maximum potential exposure levels. Two area air samples were collected on bundles of treated wood that had been removed from the cylinder following creosote/coal tar treatment. Procedural errors occurred during the analysis of these samples, therefore, no valid results were obtained.

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INTRODUCTION

Stewart-Todd Associates, Incorporated, in conjunction with the National Institute for Occupational Safety and Health, under Contract No. 210-78-0060, "Industrial Hygiene Assessment of New Agents - III," conducted a preliminary industrial hygiene survey at the Seaman Timber Company, Inc., Montevallo, Alabama, on July 26, 1979. This plant pressure treats wood using two primary treatment systems and was selected as being typical in size and process methods for the Southeastern United States wood treating plants.

The purpose of the preliminary survey is to gain familiarity with process methods and potential or known exposure conditions; evaluate test sampling methods; and determine the need for comprehensive field investigations to evaluate long-term health effects associated with pressure treating using creosote and CCA systems. The information obtained through this research effort may be utilized in technical reports on the wood preservative industry.

DESCRIPTION OF FACILITY

The wood processing and treatment plant was built in 1961 at the present location. Previously, from 1955-60, treating with creosote was done in a dip tank at another plant location in Montevallo.

Initially at the present location, a 4' x 42' cylinder was used for creosote treatment only. Later this was replaced with a 4' x50' cylinder. In 1964, a 4' x 52' cylinder was installed to treat wood with fluor-chrome-arsenate-phenol, FCAP. This treatment ended in 1966 and was replaced with a 6' x 50' cylinder for chromated copper arsenate (CCA) treating. In approximately 1970, two additional pressure cylinders were added, a 4' x 50' and a 4' x 70', both for creosote. Currently, three cylinders are used for creosote pressure treating and one is utilized for both CCA and flame retardant treating of wood.

All processes have remained essentially unchanged since 1970. A new 7' x 55' cylinder is being considered to replace one of the small creosote cylinders. A cylinder equipped with hydraulically operated doors is already on site. No other process changes are currently contemplated.

All cylinders are housed in a fairly new, well-ventilated building containing the transfer lines, pumps and recording and control equipment. An adjacent kiln drying shed is used for seasoning to reduce moisture in the wood prior to CCA treatment. The treatment plant and adjacent kiln drier include approximately 7200 sq. ft. of floor space on a three-acre site. The total wood processing plant is on a thirty-six acre tract. There are relatively little seasonal effects on the operations and the plant runs year-round.

DESCRIPTION OF WORK FORCE

The entire wood processing plant currently has approximately 100 employees. Eight of these are actively engaged in wood treating. The plant is operated three shifts per day for the typical work week. There are four employees on the first shift (daytime) and two on each of the remaining shifts.

One of the day shift employees is the Treating Plant Superintendent. He is responsible for production planning and scheduling, supervision of treating operations, plant safety, maintenance, and plant modifications. The Treating Operator maintains the boiler for the treatment chemicals and is responsible for the actual wood treatment. The Treating Operator Assistant loads and unloads charges from the cylinders, maintains boiler fuel, and assists the engineer in his duties.

None of the treatment personnel or other plant employees are union members. The workforce is quite stable, with many of them employed for a considerable length of time at the current plant site. There are no females currently employed in the yard crew or is there any history of females working near or in the treatment plant facility.

DESCRIPTION OF PROCESS

Creosote solution as an 80/20 mixture of creosote-coal tar is purchased from Allied Chemical by tank truck loads. It is pumped to storage and heated for use in the three smaller cylinders. Posts, mine and bridge timbers, building poles and squares, and railroad ties are steam-treated for 4-6 hours in the cylinder to condition the wood. Following this, a vacuum is applied to remove the moisture and then the creosote solution is injected under pressure for a period of 6-7 hours. The cylinder is drained and a final vacuum is drawn to remove excess oil. The charge is removed with a forklift and the tram cars are unloaded.

CCA is presently received as a 50% concentrate in 3,000 gallon tank car lots from Osmose Corporation. It is pumped to storage, diluted as needed and utilized for treatment at ambient temperatures. Wood to be treated is typically dimension lumber and building squares. It is first kiln dried to remove excess moisture and then loaded onto tram cars and pushed into the cylinder. A pre-vacuum is drawn, CCA solution is added, and pressure is applied for a treatment period varying from a few to six hours depending on the lumber thickness. At the end of the cycle, the solution is pumped to storage tanks, excess CCA is removed by vacuum, and the treated lumber is pulled from the cylinder.

The CCA treatment also includes an anti-fungal addition during the warm summer months, at the rate of a pint per 300 gallons of treating solution. Prior to 1976, the CCA concentrate was received in 30 gallon drums which were dumped and diluted for use as needed. Flame retardant treating using Osmose Corporation Flameproof (a borate solution) is also done in the CCA treating cylinder.

Following treatment, wood is stored in the inventory yards, or specific items are shipped to fill customer orders. The cylinders, bulk storage, and dilution tanks are essentially closed systems; if, pumps do not leak and the final vacuum effectively removes excess liquid treating solution.

Area exhaust ventilation is provided in the building housing the treatment cylinders, pumps, transfer lines, etc. This is primarily for heat control and comfort rather than fume control since the cylinders all open on the external front wall.

DESCRIPTION OF PAST EXPOSURES

The survey conducted by regulatory agencies or insurance carriers have included no air monitoring for treatment chemical exposures. Sound surveys have been conducted at the plant by Hewitt-Coleman Associates. They are the contractor for the Southeastern Lumbermen's Association, the plant insurance carrier. Based on their recommendation, some noise attenuation has been done in the wood processing areas.

There has been a limited history of photosensitization resulting from creosote/coal tar skin contact. For this reason, good personal hygiene and work practices are stressed.

DESCRIPTION OF MEDICAL, INDUSTRIAL HYGIENE AND SAFETY PROGRAMS

Medical assistance, as needed for accidents and illnesses involving employees, is provided by Drs. Leslie Hubbard and Lewis Kirkland, 226 North Salem Road, Montevallo, Alabama. There is currently no formal pre-employment or periodic medical evaluation program for the treatment or wood processing employees. Local Rescue units and the Montevallo Hospital Ambulance provides all emergency treatment.

The safety program is directed by Phillip Lacey. All employees are given an initial orientation on good work practices, safety rules and precautions. Periodic, but informal, safety meetings are held with employees and supervisors on a plant-wide or operating-area basis.

Work uniforms are provided along with a commercial laundering service. In addition, safety glasses and gloves are available for tasks and areas requiring their use. Safety shoes are required, but not provided by the company. Air-line, full-face respirators are used in situations such as cylinder or tank entry. Clothing change and shower facilities are provided for the treatment plant employees.

INSPECTION OF THE PLANT

An industrial hygiene walk-through survey of the wood treatment plant was conducted following the opening meeting and preliminary discussions with plant management. James Seaman, President of the company, provided the basic description of current process equipment, methods, and experience. He also answered specific queries on process changes, prior history and possible future plant modifications. Additional imput was provided by Jim Standish, Treatment Plant Superintendent. Personal protective equipment and supplies, along with personal hygiene and work practices were reviewed.

Area air monitoring was conducted on bundles of treated wood that had been removed from the cylinders following the creosote/coal tar treatment. Visible steam and/or fume emissions were evident during the unloading of the creosote cylinders and from treated wood stacks after they were moved to the yard area for temporary storage. These airborne concentrations are representative of maximum potential peak exposures encountered by the assistant treating operator or yard personnel while performing tasks in close proximity to the treated wood. Typically, exposure times at these locations would not be expected to be greater than a couple minutes per cylinder charge. Operators and yard crew assisting in the unloading operations utilized protective gloves.

DESCRIPTION OF SURVEY METHODS

The NIOSH Sampling and Analytical Method, P & CAM 217, was utilized for evaluating airborne levels of creosote. Bendix BDX-41 air sampling pumps, pre- and post-calibrated with a Universal Pump Calibrator, Model 302, were operated at flow rates of 1.5-20 liters per minute (LPM).

The sampling train included a glass fiber, type A prefilter and a 0.8 micron, silver membrane filter with a cellulose backup pad in a 37 mm, 3-piece closed-face cassette. In the laboratory, the filters were analyzed by a cyclohexane Soxhlet extraction, evaporation, and gravimetric determination of residue.

RESULTS

The air samples collected on the bundles of treated wood showed spurious results. The blank filter used in the analysis showed higher levels of extractable aromatic hydrocarbons than either sample. The area samples contained 0.9 and 0.6 mg. cyclohexane extractables; whereas, the blank had 1.2 mg. Therefore, no valid air concentrations could be calculated.

ANALYSIS AND DISCUSSION

Following the review of the sample data, laboratory procedures used for the sample analysis were investigated. A number of inconsistencies in the techniques used, compared with those recommended in the NIOSH method, were found. A Soxhlet extraction was used instead of ultrasound; the 5 milliliter soluble portion was evaporated to dryness instead of a 1 milliliter fraction; and a vial was used for gravimetric determination instead of a teflon cup. All of the modifications resulted in poor analytical sensitivity and therefore, inaccurate and invalid data.

ZAMAN TIMBER COMPANY, INC.
Montevallo, Alabama

APPENDIX A
AIR MONITORING RESULTS

Survey Date: 7/26/79

SAMPLE DESCRIPTION:	PUMP # SAMPLE #	SAMPLING TIME (Min.)	FLOW RATE TOTAL AIR VOLUME	COMPONENT	CONCENTRATION
Area sample on bundle of treated railroad cross-ties; bundle had been removed from cylinder in morning; at 1:30 sample was moved to bundle of posts that had been removed from #3 cylinder at 1:15; later, the sample was moved again to another bundle of posts since the first was being shipped out of the yard.	BDX-60 SEA-001	11:50-1:30 1:32-2:04 2:08-3:47 231 min.	2.03 LPM 0.479 m^3	Cyclohexane Extractables	0.9 mg. Invalid sample; blank is greater than sample value.
Area Sample - on stack of treated posts after removal from cylinder: steam and/or fumes were visible above the treated stack of posts. Material had been removed from cylinder at 1:15.	BDX-104 SEA-002	11:52-3:47 235 min.	1.55 LPM 0.365 m^3	Cyclohexane Extractables	0.6 mg. Invalid sample: Blank is greater than sample value
Blank Filter				Cyclohexane Extractables	1.2 mg.

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