INDUSTRIAL HYGIENE REPORT

PRELIMINARY SURVEY OF WOOD PRESERVATIVE TREATMENT FACILITY

AT

Utah Power and Light Pole Treatment Plant
Idaho Falls, Idaho

Survey conducted by
Stewart-Todd Associates, Incorporated
Wayne, Pennsylvania

May 29, 1980

Report written by

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Industrial Hygiene Division
Industrywide Studies Branch
Division of Surveillance, Hazard Evaluations, and Field Studies
National Institute for Occupational Safety and Health
Cincinnati, Ohio

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 agent which includes all wood preserving chemicals. This facility was selected on the criteria set forth in the Study Proposal based on information gathered in Phase I.

EMPLOYER REPRESENTATIVES CONTACTED:

Leroy Newland, Environmental Manager
Salt Lake City, Utah 801-535-2000

Steve Williams, Plant Manager, Idaho Falls, Idaho 208-522-6811

EMPLOYEE REPRESENTATIVES CONTACTED:

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ACKNOWLEDGEMENTS:

James L. Oser, NIOSH

Shiro Tanaka, M.D., NIOSH

Harry Gee, LFE Labs, Inc.

STANDARD INDUSTRIAL CLASSIFICATION OF PLANT:

SIC #2491
Wood Treatment Timber and Posts

ABSTRACT

A preliminary survey of the Utah Power & Light, Idaho Falls, Idaho, wood treatment plant was conducted in 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 May 29, 1980, provided familiarization with current and past process methods and controls utilized by the company to reduce occupational hazards. Employee classifications and accident prevention programs were reviewed and evaluated along with historical data and experience from air monitoring. Range finding air sampling was conducted during regular operations at potential employee exposure sites to determine maximum and typical exposure levels and to evaluate two methods of creosote analysis. The gravimetric determinations for solvent extractable high molecule weight coal tar pitch volatiles (CTPV) gave variable results from less than 0.017 to 0.428 mg/m^3. The correlation between methods as anticipated was poor. The absorption method alone showed consistent reproducibility. While some of these data show levels above the current occupational limits for coal tar containing materials, they are not indicative of actual or overage employee exposures. The samples were purposely taken downwind of the buff treatment tank to be certain of obtaining sufficient material for analytical purposes in the short-term period available while on site.

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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 Utah Power & Light, Idaho Falls, Idaho, wood treatment plant on May 29, 1980. The plant treats mixed conifer utility poles with creosote by a non-pressure butt process. This plant was selected because it was the only plant in the United States using this treatment chemical and processing method on a continuous basis.

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

DESCRIPTION OF THE FACILITY

The Utah Power & Light pole treating yard facility was built in 1926 on the present eleven acre site. The equipment and processing material and method have remained essentially unchanged since constructed, except for the pole framing building erected in 1978. They receive by rail car or truck, peeled poles which include Western Pine, Douglas Fir, or Western Cedar and other conifers. Only poles up to forty-five feet in length are treated by the plant. Longer poles are puchased treated, but can be framed in the yard to Utah Power specifications. Purchased poles typically Douglas Firs or Western Cedars, are full length treated with PCP oil or by the Cellon process. Treatment on site has always been done with creosote by the non-pressure butt dip method. The major part of the plant site is used for untreated pole storage. Poles received are air dried in the open for approximately six to twelve months until their moisture content is down to 22 - 25%.

There are three buildings in the yard. The administrative and plant manager's office where inventories, purchase orders and other records are kept is approximately 20' x 15'. The framing building where holes for cross arms are drilled and grounding wires are installed is 75' x 15'. Debarking and peeling are not done on site. Poles are sawed to length only when needed but this is not done routinely.

The facility has one butt treatment tank approximately 12' x 20'. On the average 200 poles are treated in two batches per week. The 20,000 poles per year are all used by the parent utility company in Utah. Poles for these low rain fall areas only typically require butt treatment for preservation in order to give thirty to forty years of service. Some poles for use in populated areas are painted aqua blue above ground for aesthetic reasons on request. This done by roller to minimize point use and personnel exposure.

The current work force is six employees which includes the plant manager, two pettybone operators and three yard attendants. It has remained essentially unchanged in recent years and the turn-over rate is low. The facility is operated five days per week for a single shift of approximately eight hours. The plant typically operates year round except in unique adverse weather conditions. There is no treatment plant operator per se and all five yard employees who can assist in the task of loading and unloading the butt tank can be exposed either during these tasks or when working downwind of the full heated tank in the pole yard. The plant manager in addition to checking loading and framing operations, also assists in filling the storage and butt treatment tanks, checks temperatures, and undertakes other tasks which can result in some exposure.

The employees are represented by the International Brotherhood of Electrical Workers. There are no females employed in the yard currently or retrospectively.

DESCRIPTION OF PROCESS

Poles peeled, graded and sized are received by rail car or truck for creosote treatment and framing. They are sorted and stacked for 6 - 12 months until moisture levels reduce to 22 - 25%.

Creosote is currently purchased from Reilly Chemical of Provo, Utah, in 3,000 gallon tank truck loads and pumped to a heated bulk storage tank for use. Poles are placed in the butt tank with pettybone lifts and the tank is filled to a 7 - 8 foot depth and heated to 240° F. That temperature is held for approximately 6 hours to boil out excess moisture. The creosote is permitted to cool down while being absorbed into the poles throughout the remainder of the day and overnight. The total loading, unloading and treatment cycle is two days. After draining the tank and removing the poles, quality control borings are done at approximately ground line to determine creosote concentration in lbs./cubic feet and depth of penetration. Poles can be loaded directly for shipment by the pettybones or stored in the yard for later distribution on demand.

DESCRIPTION OF PAST EXPOSURES

The plant reported neither adverse exposure experience from creosote exposure or specific monitoring conducted for occupational purposes. There is no record of insurance, consultant or regulatory evaluation of the plant, or employees. The process has essentially remained unchanged in that time period and while creosote odor is readily obvious downwind of the butt tank, there is no immediate indication of eye or respiratory irritation.

DESCRIPTION OF MEDICAL, INDUSTRIAL HYGIENE AND SAFETY PROGRAMS

Utah Power & Light does not presently have a formal Medical Surveillance program. Pre-employment examinations are done, but they are oriented to health problems which might affect an individual's capability to do a specific job or his/her usefulness throughout the plant. There is a voluntary yearly medical examination program for which the company contributes $15.00. There are currently no specific medical parameters recommended or required for these examinations.

Safety and health assistance is provided from the Salt Lake City offices by Norman Maxfield, a supervisor, in that area of responsibility. He makes periodic site visits to meet with plant employees and to discuss matters of health and safety concern. Utah Power does not have any industrial hygiene staff, but uses the services of Radian Corporation in Salt Lake City, Utah, when needed. There are employees trained in first aid on site and the local emergency rooms of Idaho Falls Consolidated Hospital, Inc., at Riverview and Parkveiw, can be reached in a few minutes driving time for more elaborate treatment.

Safety and other protective equipment available to employees for their use include coveralls, gloves, face shields or goggles, half face respirators and disposable 3M-8710 dust masks. Work clothing

and coveralls are laundered by the employees themselves. Shower and clothing change facilites are available, but not in general use. Washup is typically done before eating and at quitting time, however, it is not required. Lunch and other breaks are taken in the administrative or work buildings.

PLANT INSPECTION

An Industrial Hygiene walk-through survey of the entire plant site was conducted following the preliminary discussion with the plant and environmental managers. Details on present and past treatment methods, equipment, and production levels were provided by Steve Williams. Personal protective equipment was discussed and examined in addition to work practices used to minimize health and safety risk.

Air sampling was done downwind in near proximity to the butt tank specifically to permit collection of sufficient creosote vapor to test two alternative analytical methods from the same field samples. These airborne concentrations, which reflect maximum exposure levels when checking tank level or other tasks requiring close proximity for short intervals of time, are also useful in determining sampling limitations for follow-up comprehensive survey work with creosote. All the sampling was done when the tank was at or approaching its final treatment temperature, again reflecting maximum potential airborne levels. Visible emmissions were evident downwind.

The use of protective gear during pole loading operations was limited to gloves when handling poles and chains etc. Tank filling is done remotely so no respirators were in use or needed.

DESCRIPTION OF SURVEY METHOD

All creosote samples were collected by the NIOSH P & CAM 217 method. Bendix BDX-41 air sampling pumps, pre & post calibrated with a universal pump calibrator Model 302, were operated at flow rates of 1.2-1.7 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-faced cassette. In the laboratory the filters were extracted by sonication with 5 ml of cyclohexene. A 1 ml aliquot was taken to dryness in a pre-tared teflon boat and the solvent residue was analyzed gravemetrically on a 6-place analytical balance. Duplicate 1 ml aliquots of the extract were analysed for absorbance in the 252 nanometer Ultra Violet spectrum band on a Beckman DU spectrophotometer. Absorbance values were compared with sample standards prepared from the creosote solution obtained while on site at the plant. The lower detection limit for the gravimetric method is 5 micrograms and 0.20 micrograms for the UV absorbance procedure.

RESULTS AND DISCUSSIONS

All four samples taken for time periods varying from approximately 1.5 to 3 hours showed levels well above the detection limit by the UV absorbance procedure. (See appended data) The levels increased as the treatment tank was heated to approaching maximum temperature conditions. In view of the close proximity of the sampling equipment, the airborne concentrations are not exceptionally high. They represent maximum potential peak exposures for an employee checking the creosote level in the tank. It should be noted that this would require only a very short period of time and would only occur while filling the tank prior to the treatment cycle.

In contrast the gravimetric results on the same samples showed highly variable results with 3 of 4 below the limits of detection. These confirm previous experiences which suggests that this analytical method has inherent problems with samples of less than 100 ug per filter. The data by the gravimetric method does not reflect vapor and odor levels observed during the sampling period. Comparisons were done however because a considerable body of historic exposure data has utilized the gravimetric technique.

Power & Light Pole
atment Plant
Idaho Falls, Idaho

AIR MONITORING RESULTS

Date: May 29, 1980

SAMPLE DESCRIPTION	PUMP# SAMPLE#	SAMPLING TIME (min)	FLOW RATE TOTAL AIR VOLUME	COMPONENT	CONCENTRATION µg	CONCENTRATION µg/m³
Area sample downwind of butt tank West side of tank Wind out of SE Sample cassette fastened to railing	BDX-99 UPL-01	9:22-12:17 175 min.	1.690 lpm 0.296 m³	Creosote		
				Gravemetric	<5	<16.9
				UV absorbtion	26.75	90.4
Downwind side	BDX-124 UPL-04	9:23-12:23 180 min.	1.233 lpm 0.222 m³	Creosote		
				Gravemetric	95	427.9
				UV absorbtion	41.25	185.8
Downwind side	BDX-47 UPL-03	10:43-12:19 96 min.	1.379 lpm 0.132 m³	Creosote		
				Gravemetric	<5	<37.9
				UV absorbtion	30.25	229.2
Downwind side	BDX-66 UPL-02	10:43-12:18 95 min.	1.446 lpm 0.137 m³	Creosote		
				Gravemetric	<5	<36.5
				UV absorbtion	44.25	323.0