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HEALTH HAZARD EVALUATION REPORT 72-10-15
HAZARD EVALUATION SERVICES BRANCH
DIVISION OF TECHNICAL SERVICES

Establishment: May Foundry
Salt Lake City, Utah

Report Prepared By: David J. Burton
Industrial Hygiene Engineer
Western Area Occupational
Health Laboratory

Raymond O. Rivera
Industrial Hygienist
Western Area Occupational
Health Laboratory

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

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MAY FOUNDRY
SALT LAKE CITY, UTAH

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SUMMARY DETERMINATION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees of the May Foundry, Salt Lake City, Utah, regarding exposure to formaldehyde, furfuryl alcohol, isopropyl alcohol, and dust in the resin-core operations.

Environmental measurements conducted on March 31, 1972 at the subject operations resulted in the following: airborne concentrations of formaldehyde ranged from 0.24 to 0.91, federal standard of 4.0 mg/M³; furfuryl alcohol - none detectable to 66, standard of 200 mg/M³; isopropyl alcohol - none detectable to 77, standard of 980 mg/M³; free silica <1.5 mg/M³, standard of 1.5 mg/M³.

Based upon these environmental findings and the fact that symptomatology suggestive of toxic effects common to these substances were not indicated in employee interviews, it is our determination that no hazard existed in the resin-core operations area at the time of this evaluation from exposure to these substances.

Copies of this Summary Determination as well as the Full Report of the evaluation are available from the Hazard Evaluation Services Branch, NIOSH, Cincinnati, Ohio 45202. Copies of both have been sent to:

- a) May Foundry, Salt Lake City, Utah
- b) Authorized Representative of Employees
- c) U.S. Department of Labor - Region VIII

For purposes of informing "affected employees," the employer will either (1) "post" the Summary Determination in a prominent place near where affected employees work or (2) provide a copy of the determination to each affected employee.

I. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health received such a request from an authorized representative of employees regarding exposure to formaldehyde, furfuryl alcohol, isopropyl alcohol, and dust in the resin core making operations at the May Foundry, Salt Lake City, Utah. The May Foundry is engaged in the production of large ferrous castings.

II. BACKGROUND HAZARD INFORMATION

A. Standards

The occupational health standards as promulgated by the U.S. Department of Labor (Federal Register, Part II, §1910.93, Tables G1, G2, G3) applicable to substances of this evaluation are as follows:

Mineral Dusts:

Quartz (Respirable)	$\frac{10 \text{ mg/M}^3}{\% \text{ SiO}_2 + 2}$
Inert (Respirable)	5 mg/M ³
Formaldehyde	4 mg/M ³
Isopropyl Alcohol	980 mg/M ³
Furfuryl Alcohol	200 mg/M ³

III. HEALTH HAZARD EVALUATION

On March 31, 1972, NIOSH representatives Messrs. Raymond O. Rivera and David J. Burton visited the May Foundry and Machine Company. The functions of the National Institute for Occupational Safety and Health and its relation to Section 20(a)(6) of the Occupational Safety and Health Act of 1970 and the purpose of

the visit were explained to Mr. , President and General Manager. Following the completion of the National Surveillance Network Part I questionnaire, Mr. accompanied us on a walk-through survey of the plant.

The May Foundry is basically engaged in the production of large ferrous castings which are then machined to specifications in another division of the company.

The problems described in the Hazard Evaluation Request were located at the north end of the building. On March 31, 1972 three men were engaged in the production of no-bake resin cores and molds. One thousand pounds of sand, fifteen pounds of resin, and four and one half pounds of catalyst were mixed in an automatic screw mixer just prior to being poured into wood molding forms. The base resin contained furan resins, furfuryl alcohol, and some urea formaldehyde. The catalyst contained toluene sulfonic acid, isopropyl alcohol, and water. The sand hardened in less than five minutes. The finished core was sprayed with a mixture of graphite and isopropyl alcohol and ignited to burn off the alcohol.

Area and personnel samples were taken for formaldehyde, furfuryl alcohol, isopropyl alcohol, and free silica. Findings are shown in the Tables at the end of the report.

Formaldehyde samples were taken in midget impingers using sequential area samplers and Unico personnel samplers. Alcohol samples were taken with charcoal tubes and MSA personal monitor pumps (Model G). Silica samples were taken with personal monitor pumps using Dorr-Oliver 10mm cyclones, followed by 37mm filters. An area sampler collecting dust through a 10 liter-per-minute cyclone-plus-filter was used to collect a sample which was analyzed for free silica content.

Results and Conclusions:

Results are shown in the Tables following this report

Exposures to formaldehyde and isopropyl alcohol were well below Federal Standards and the employees involved did not mention any symptoms common to excessive formaldehyde or isopropyl alcohol exposures. Thus it is our opinion that no hazard existed at levels found in the work place during the sampling period.

Airborne respirable dust was found to contain 4.6% free silica. The appropriate Federal Health Standard is thus:

$$TLV^* = \frac{10 \text{ mg/M}^3}{\% \text{ SiO}_2 + 2} \quad (1)$$

$$TLV = \frac{10 \text{ mg/M}^3}{6.6} \quad (2)$$

$$TLV = 1.5 \text{ mg/M}^3 \quad (3)$$

Exposures to free silica were at or below this recommended limit. This would indicate a non-hazardous condition. Additionally, employees expressed no complaints of dyspnea or chronic coughing, first signs of diffuse nodulation. It should be noted, however, that with simple nodular silicosis no clinical symptoms are evidenced.

Time-weighted average exposures to furfuryl alcohol were well below the present Federal Standards. The time weighted average exposure of the Core Maker, was 25 mg/M³, slightly higher than a proposed new TLV of 20 mg/M³*. The first symptom normally experienced following exposure to furfuryl alcohol is ocular irritation. None of the employees expressed complaints of such irritation. Other symptoms described in the literature (headache, nausea, dizziness) were also absent. It is thus our conclusion that at the levels measured no hazard existed.

IV. RECOMMENDATIONS

It should be noted that both isopropyl and furfuryl alcohol are readily absorbed through the skin. Should production increase or should employees experience repeated skin exposure, rubber gloves would provide an additional safeguard against intoxication.

*Threshold Limit Values of Airborne Contaminants, ACGIH, 1971, "Notice of Intended Changes."

TABLE I

FORMALDEHYDE SAMPLES

Area Samples

<u>Sample Number</u>	<u>Location</u>	<u>Concentration</u> <u>mg/M³</u>	<u>Percent of</u> <u>Allowable</u>
8151	No-Bake Core Making Operation	0.25	8
8153	" " " "	0.32	11
8156	" " " "	0.91	30
8158	" " " "	0.28	9
8160	" " " "	0.27	9
8162	" " " "	0.24	8

Personnel Samples

8165	Core Maker	0.35	12
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TABLE II

FREE SILICA SAMPLES

<u>Sample Number</u>	<u>Name, Location</u>	<u>Concentration - mg/M³</u>
B88	Coremaker, Asst.	.8
C66	Coremaker	1.9
751	(% Free Silica Determination = 4.6%)	

Time Weighted Averages (8-Hour Day), Free Silica Exposures

Coremaker, Asst.	<1.5 mg/M ³
Coremaker	<1.5 mg/M ³

TABLE III
CHARCOAL TUBE SAMPLES

Sample Number	Job	Furfuryl Alcohol		Isopropyl Alcohol	
		Concentration mg/M ³	Percent of Federal Standard	Concentration mg/M ³	Percent of Federal Standard
8135	Coremaker	66	33	77	8
8136	Coremaker	32	16	31	3
8137	Apprentice	11	6	32	3
8138	Coremaker	25	13	55	6
8140	Asst. Coremaker	N.D.*	-	N.D.	-
8141	Asst. Coremaker	N.D.	-	56	6
8142	Asst. Coremaker	N.D.	-	19	2
43	Coremaker	30	15	26	3
8144	Apprentice	N.D.	-	42	4
8145	Coremaker	N.D.	-	21	2

Time Weighted Averages (8-Hour Day), Furfuryl Alcohol Exposures

Coremaker: 25 mg/M³
 Asst. Coremaker: <20 mg/M³
 Apprentice: <20 mg/M³

* Not Detected.