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NATIONAL OCCUPATIONAL HEALTH SURVEY OF MINING

PYRITES REPORT

OCTOBER 4, 1989

COMMENTS SHOULD BE DIRECTED TO

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INTRODUCTION

This is one of a series of reports on the National Occupational Health Survey of Mining (NOHSM), which is being carried out by the National Institute for Occupational Safety and Health (NIOSH). This particular report provides NOHSM data for the Pyrites commodity, which was surveyed during March, 1988. Only one Pyrite facility was surveyed; that was the only active operation listed by MSHA when the sample was drawn. The NOHSM began in May, 1984, as an effort by NIOSH to obtain representative data related to occupational health from the mining industry. The data collected were similar to the information previously obtained in non-mining studies. Specifically, NOHSM data include:

- a. Occupational health program and policy information;
- b. An inventory of all health-related substances found on mine property; and
- c. A series of worksite observations which detail potential exposure to chemical and physical agents.

These data were collected by surveyors who traveled to each mine site. The survey sites were chosen so as to provide a statistically valid representation of each commodity at the time of the NOHSM sample selection. With this representative sample, NIOSH can project survey data to the entire mining industry.

The NOHSM is being carried out primarily as a service to the Mine Safety and Health Administration (MSHA), and secondarily as a source of information for NIOSH investigators and other interested parties. MSHA plans to use the data for three purposes:

1. To set regulatory priorities and write improved health standards;
2. To improve compliance with existing standards; and
3. To identify and determine research needs and priorities.

This transfer of information to MSHA is mandated by Section 201 of the 1977 Federal Mine Safety and Health Amendments Act.

This report identifies potential exposures and provides the associated numbers of workers, the occupations of those workers, and the locations on the mine property where the potential exposures were observed. This information is categorized into seven tables: four concerning chemical agents; one concerning musculoskeletal overload conditions; one concerning physical exposure conditions; and one concerning welding processes. Estimated annual usage information is provided for chemical substances, both generic and tradenames.

For the Pyrites commodity, no chemicals were found for Tables 1, 2, and 3. Table 4 lists 14 tradename products to which workers in the commodity were found to be potentially exposed. Table 5 describes potential exposure to one physical agent: noise. Table 6 lists potential exposures to the following four musculoskeletal conditions: heavy lifting; neck and/or back movement; forearm and shoulder movement; and frequent lifting. Table 7 indicates the two welding processes: shield metal arc welding and oxyfuel gas cutting, which were observed to be used in the Pyrites commodity.

It is extremely important that the limitations of the reported data be recognized. The data do not in any way document exposures or exposure levels. The data only indicate potential exposures. The term "potential exposure" means the agent was observed to be present at one or more worksites in such a way that there was a possibility of workers being exposed to the agent.

Likewise, the usage data presented in some of the tables are only a guide to the projected magnitude of usage and should not be taken as precise information. The usage data are based on estimates provided by mine management. It is expected that these estimates have widely varying accuracy. Occasionally, an item may be represented as having an annual usage of zero with workers observed to be potentially exposed. This may occur because annual usage estimates are generally based on purchases of the 12 months immediately preceding a survey. Therefore, items purchased prior to that 12 month period may be represented as having a zero annual usage rate even though potential exposures were observed during the survey. Other zero annual usage occurrences could involve recyclable items such as some catalysts and desiccants, items such as paints and coatings which are applied prior to the 12 month period but which are present in the workplace in such a way as to present a potential exposure, and obsolete items which are no longer actively used on the property but to which employees could still be potentially exposed in the course of their work. Furthermore, all the estimates were rounded to the nearest whole number, with all quantities between 0 and 1 being reported as 1. Thus, extremely small usage levels may actually be lower than estimated. With this possible exception, NIOSH believes the relative magnitude to be appropriately represented.

Another limitation to be observed is the terminology associated with the commodity, occupation, and location. These terms were adapted directly from MSHA information and applied by NIOSH. NIOSH recognizes that other

parties may prefer other commodity, occupation, or location terminology. The MSHA terms were used because of MSHA's close interest in the data.

A separate report will be prepared for each commodity surveyed as a part of the NOHSM. During each segment of the NOHSM, approximately 150 mining operations were surveyed as the sample from a number of selected commodities. A different set of commodities was surveyed during each segment. NIOSH plans for use of these data in the future include:

- a. Encourage MSHA use of the data, as outlined above;
- b. Determine the ranges of exposure to various agents, as required by Section 201 of the 1977 Federal Mine Safety and Health Amendments Act;
- c. Assist in setting priorities for mine-related occupational health research; and
- d. Respond to questions from other parties regarding occupational health aspects of the mining industry.

Information beyond that presented in this report has been collected during the NOHSM. All of the information not protected by trade secret claims is available to the public upon detailed written request. Other categories of available information include:

- a. Management policies related to occupational health;
- b. Duration of potential exposures;
- c. Operations associated with potential exposures;
- d. Controls employed with potential exposures; and
- e. Results of bulk dust analyses for silica, metals, and fibers.

Interested parties should direct their requests to:

Project Officer
National Occupational Health Survey of Mining
NIOSH
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944 Chestnut Ridge Road, Room 140
Morgantown, WV 26505-2888

TABLE DEFINITIONS

<u>AGENT NAME</u>	(1)	(2)	(3)	(4)	(5)	(6)
	# WORKERS POTENTIALLY EXPOSED	# WORKERS POTENTIALLY EXPOSED	% WORKERS POTENTIALLY (PREDICTED)	PREDICTED ANNUAL USAGE	OCCUPATIONS	LOCATIONS
	(OBSERVED)	(PREDICTED)	(PREDICTED)			

Column (1) represents the total number of workers in occupations within this commodity in which a potential exposure to an agent was observed or identified through questioning of mine management or workers. This number only includes workers from the NOHSM sample sites. A "potential exposure" means the agent was observed to be present at the worksite in such a way that there was a possibility of workers being exposed to the agent. The potential exposures do not imply any exposure level, nor do they imply the absence or presence of controls.

Column (2) represents the number of workers within this commodity predicted to be potentially exposed to each agent. This number reflects a projection to this entire commodity, based on data obtained at NOHSM sample sites.

Column (3) represents the percentage of workers within this commodity predicted to be potentially exposed to each agent. Column (3) is obtained by dividing column (2) by the projected total population of workers in the commodity.

Column (4) represents the number of gallons (GAL) or the number of pounds (LBS) of each chemical that NIOSH has estimated to be used per year. This number is obtained from projections based on estimates of usage provided by mine management, and should only be used in determining the order of magnitude of usage. It should not be used as a precise figure. This number reflects a projection to this entire commodity, based on data obtained at NOHSM sample sites. In some cases, where usage data was unavailable, a "*" appears in this column.

Column (5) contains the occupations observed to have a potential for exposure to this agent. In each occupation, the percentage of workers with a potential for exposure to the agent is given in parentheses. This number only includes data obtained at NOHSM sample sites.

Column (6) contains the locations where workers were observed to have a potential for exposure to this agent at the NOHSM sample sites. The percentage of workers in each listed location with a potential exposure to the agent is given in parentheses. This number only includes data obtained at NOHSM sample sites.

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: PYRITES

CHEMICAL NAME	(1)	(2)	(3)	(4)
	#WORKERS POTENTIALLY EXPOSED (OBSERVED)	#WORKERS POTENTIALLY EXPOSED (PREDICTED)	%WORKERS POTENTIALLY EXPOSED (PREDICTED)	PREDICTED ANNUAL USAGE

NO DATA FOR THIS TABLE IN THIS COMMODITY

RUN DATE: 09/19/89

TABLE 2, PAGE 1

NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED
TO BE TRADE SECRET.

CHEMICALS FOUND ON MINE PROPERTY THAT HAVE A NIOSH RECOMMENDED EXPOSURE LIMIT BUT ARE NOT REGULATED BY MSHA

COMMODITY NAME: PYRITES

CHEMICAL NAME	(1)	(2)	(3)	(4)
	#WORKERS POTENTIALLY EXPOSED (OBSERVED)	#WORKERS POTENTIALLY EXPOSED (PREDICTED)	%WORKERS POTENTIALLY EXPOSED (PREDICTED)	PREDICTED ANNUAL USAGE
-----	-----	-----	-----	-----

NO DATA FOR THIS TABLE IN THIS COMMODITY

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CHEMICALS FOUND ON MINE PROPERTY THAT HAVE NO NIOSH RECOMMENDATION OR MSHA EXPOSURE LIMIT

COMMODITY NAME: PYRITES

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
	-----	-----	-----	-----

NO DATA FOR THIS TABLE IN THIS COMMODITY

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: PYRITES

MANUFACTURE'S NAME AND TRADENAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(6) LOCATIONS
AMOCO					
AMOCO 300 MOTOR OIL SAE 30	7	7	54	100 GALS.	
OCCUPATIONS					
079 CRUSHER OPTR (100%)					006 SURFACE CRUSHING (100%)
879 BAGGING OR PACKING WRKR (100%)					010 SURFACE MILL (50%)
AMOLIS LUBRICANT NO. 8-X (AERO SOL)	4	4	31	6 LBS.	
OCCUPATIONS					
649 ADMN, SUPERVISORY, MGT PERSNL (100%)					010 SURFACE MILL (50%)
DIESEL PREMIUM NO. 1	7	7	54	41,600 GALS.	
OCCUPATIONS					
079 CRUSHER OPTR (100%)					006 SURFACE CRUSHING (100%)
679 FLOTATION/CONCTR OPTR (100%)					010 SURFACE MILL (50%)
300 MOTOR OIL	7	7	54	100 GALS.	
OCCUPATIONS					
079 CRUSHER OPTR (100%)					006 SURFACE CRUSHING (100%)
649 ADMN, SUPERVISORY, MGT PERSNL (100%)					010 SURFACE MILL (50%)

(CONTINUED NEXT PAGE)

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: PYRITES

MANUFACTURE'S NAME AND TRADENAME PRODUCTS	COMMODITY NAME: PYRITES			PREDICTED ANNUAL USAGE	(6) LOCATIONS
	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)		
300 MOTOR OIL (CONTINUED)	7	7	54	100 GALS.	
(5) OCCUPATIONS					
879 BAGGING OR PACKING WRKR (100%)					
					010 SURFACE MILL (50%)

COMFORT GAS CO.

PROPANE	3	3	23	2,000 GALS.	
(5) OCCUPATIONS					
879 BAGGING OR PACKING WRKR (100%)					
					010 SURFACE MILL (38%)

CRC CHEMICALS USA

CRC 2-26 MULTI-PURPOSE SPRAY N O. 02005	1	1	8	2 LBS.	
(5) OCCUPATIONS					
514 LABORATORY TECHNICIAN (100%)					
					010 SURFACE MILL (13%)

DIEDIRLH CONST. CO.

ACETYLENE	1	1	8	38,896 GALS.	
(5) OCCUPATIONS					
649 ADMN, SUPERVISORY, MGT PERSNL (100%)					
					010 SURFACE MILL (13%)

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: PYRITES

MANUFACTURE'S NAME AND TRADENAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(6) LOCATIONS
FISKE BROTHERS					
LUBRIPLATE NO. 630	7	7	54	216 LBS.	
(5) OCCUPATIONS					
079 CRUSHER OPTR (100%)			649 ADMN, SUPERVISORY, MGT PERSNL (100%)		006 SURFACE CRUSHING (100%)
679 FLOTATION/CONCTR OPTR (100%)					010 SURFACE MILL (50%)

HOBART WELDING CO.

E7018 ELECTRODES	1	1	8	200 LBS.	
(5) OCCUPATIONS					
649 ADMN, SUPERVISORY, MGT PERSNL (100%)					010 SURFACE MILL (13%)

LINCOLN ELECTRIC CO.

E 6010 ELECTRODE	1	1	8	50 LBS.	
(5) OCCUPATIONS					
649 ADMN, SUPERVISORY, MGT PERSNL (100%)					010 SURFACE MILL (13%)

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TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: PYRITES

MANUFACTURE'S NAME AND TRADENAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(6) LOCATIONS
MALLINCKRODT					
HYDROCHLORIC ACID 2612	1	1	8	3 GALS.	
(5) OCCUPATIONS					
514 LABORATORY TECHNICIAN (100%)					010 SURFACE MILL (13%)
NITRIC ACID 2704	1	1	8	2 GALS.	
(5) OCCUPATIONS					
514 LABORATORY TECHNICIAN (100%)					010 SURFACE MILL (13%)
VAN WATERS & ROGERS					
METHYL ISOBUTYL CARBINOL	4	4	31	550 GALS.	
(5) OCCUPATIONS					
649 ADMN, SUPERVISORY, MGT PERSNL (100%)			679 FLOTATION/CONCTR OPTR (100%)		010 SURFACE MILL (50%)
SODIUM ISOPROPYL XANTHATE	4	4	31	330 GALS.	
(5) OCCUPATIONS					
649 ADMN, SUPERVISORY, MGT PERSNL (100%)			679 FLOTATION/CONCTR OPTR (100%)		010 SURFACE MILL (50%)

PHYSICAL AGENT CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: PYRITES

(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)
8	8	62

PHYSICAL AGENT CONDITION

NOISE

(5)
OCCUPATIONS

079 CRUSHER OPTR (100%)
649 ADMN, SUPERVISORY, MGT PERSNL (100%)

514 LABORATORY TECHNICIAN (100%)
679 FLOTATION/CONCTR OPTR (100%)

(6)
LOCATIONS

006 SURFACE CRUSHING (100%)
010 SURFACE MILL (63%)

MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: PYRITES

	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	
MUSCULOSKELETAL CONDITION				
FOREARM, ARM, AND SHOULDER	7	7	54	
				(6) LOCATIONS
OCCUPATIONS				
649 ADMN, SUPERVISORY, MGT PERSNL (100%)		679 FLOTATION/CONCTR OPTR (100%)		010 SURFACE MILL (88%)
879 BAGGING OR PACKING WRKR (100%)				
FREQUENT LIFTING	3	3	23	
				(6) LOCATIONS
OCCUPATIONS				
879 BAGGING OR PACKING WRKR (100%)				010 SURFACE MILL (38%)
HEAVY LIFTING				
				(6) LOCATIONS
OCCUPATIONS				
649 ADMN, SUPERVISORY, MGT PERSNL (100%)	4	4	31	010 SURFACE MILL (50%)
879 BAGGING OR PACKING WRKR (100%)				
NECK AND/OR BACK				
				(6) LOCATIONS
OCCUPATIONS				
649 ADMN, SUPERVISORY, MGT PERSNL (100%)		679 FLOTATION/CONCTR OPTR (100%)		010 SURFACE MILL (88%)
879 BAGGING OR PACKING WRKR (100%)				

WELDING POTENTIAL EXPOSURE

COMMODITY NAME: PYRITES

WELDING PROCESS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(6) LOCATIONS
SHIELD METAL ARC WELDING	1	1	8	010 SURFACE MILL (13%)
(5) OCCUPATIONS				
649 ADMN, SUPERVISORY, MGT PERSNL (100%)				
OXYFUEL GAS CUTTING	1	1	8	
(5) OCCUPATIONS				
649 ADMN, SUPERVISORY, MGT PERSNL (100%)				010 SURFACE MILL (13%)

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16. Abstract (Limit: 200 words) This report provides data on health hazards gathered by the National Occupational Health Survey of Mining for the pyrites commodity. One pyrite facility was visited during the data gathering process. No Mining Safety and Health Administration regulated chemicals or chemicals with a NIOSH recommended exposure limit were found on mine property. A list of 14 tradename products which were found on site and to which employees might be exposed during their work was included. Annual usage was estimated for chemical substances. Four musculoskeletal conditions were noted: heavy lifting, neck and/or back movement, forearm and shoulder movement, and frequent lifting. The only physical agent found to which there was potential exposure was noise. Two welding processes were used at the site: shield metal arc welding and oxyfuel gas cutting.						
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