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NATIONAL OCCUPATIONAL HEALTH SURVEY OF MINING

GILSONITE REPORT

SEPTEMBER 29, 1987

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 gilsonite commodity, which was surveyed during May, June, and July, 1984. Seven gilsonite mines were surveyed. 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 are being collected by surveyors who travel to each mine site. The survey sites have been chosen so as to provide a statistically valid representation of each commodity. 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 physical exposure conditions; and one welding processes. Estimated annual usage information is provided for chemical substances, both generic and tradenames.

For the gilsonite commodity, Table 1 contains 4 chemicals which were found on mine property and are regulated by MSHA. During the 7 surveys, no chemicals were encountered which would be displayed in Table 2 (chemicals found on mine property that have a NIOSH recommended exposure limit but are not regulated by MSHA). Four chemicals were found which have no NIOSH or MSHA exposure limit (Table 3). Table 4 lists 49 tradename products to which workers in the gilsonite commodity were found to be potentially exposed. Table 5 describes potential exposures to noise, segmental vibration and whole-body vibration, the only physical agents observed by the surveyor. Table 6 lists potential exposures to musculoskeletal conditions involving diminished light as well as frequent, heavy, and awkward lifting. Table 7 indicates the three welding processes: metal arc welding, shield metal arc welding, and oxyacetylene welding, which were observed to be used in the gilsonite 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 year of the NOHSM, approximately 150 mining operations are surveyed as the sample from a number of selected commodities. A different set of commodities is surveyed during each year.

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.

Interested parties should direct their requests to:

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

TABLE DEFINITIONS

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

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.

TABLE 1, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(6) LOCATIONS
ACETYLENE	4	4	3	1,451 LBS.	004 SURFACE MINE (50%) 005 SURFACE SHOP (17%)
PROPANE	18	18	13	3 LBS.	007 SURFACE GRINDING (100%) 010 SURFACE MILL (46%)
GLYCERIN	1	1	<1	3 GALS.	010 SURFACE MILL (4%)
HYDROGEN CHLORIDE	1	1	<1	5 GALS.	004 SURFACE MINE (50%)

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: GILSONITE			
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

TABLE 3, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

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

COMMODITY NAME: GILSONITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(6) LOCATIONS
DIESEL FUEL NO. 2	1	5	3	82,211 GALS.	009 SURFACE MISC (5%)
OCCUPATIONS					
921 HOIST OPTR (13%)					
DIESEL FUEL NO. 1	1	1	<1	13,961 GALS.	
OCCUPATIONS					
782 FRONT-END LOADER OPTR (100%)					009 SURFACE MISC (5%) 010 SURFACE MILL (4%)
LIGNITE	12	12	8	154,000 LBS.	
OCCUPATIONS					
879 BAGGING OR PACKING WRKR (67%)					010 SURFACE MILL (46%)
GASOLINE-UNLEADED	10	10	7	59,687 GALS.	
OCCUPATIONS					
376 TRUCK DRIVER (100%)					009 SURFACE MISC (20%) 010 SURFACE MILL (23%)

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TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
ALLSTATE WELDING PRODUCTS DIVISION					
ALLSTATE CHAFFER ROD - .125 INCH, 1H202304	3	3	2	32 LBS.	
(5) OCCUPATIONS					
619 WELDER (75%)					005 SURFACE SHOP (17%)

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VITALIFE	7	9	6	878 GALS.	
(5) OCCUPATIONS					
921 HOIST OPTR (88%)					(6) LOCATIONS
					009 SURFACE MISC (35%)

BORDEN INC, DEPT. CP

KRYLON GLOSSY WHITE 1501, AEROSOL	2	2	1	120 LBS.	
(5) OCCUPATIONS					
456 ENGINEER; TECHNICAL SERVICES (100%)					(6) LOCATIONS
					009 SURFACE MISC (10%)

TABLE 4, PAGE 2 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
BOYLE-MIDWAY INC.					
EASY-OFF WINDOW CLEANER	1	5	3	136 GALS.	
(5) OCCUPATIONS					
921 HOIST OPTR (13%)					009 SURFACE MISC (5%)
CAL/INK					
CAL-SET FAST SETTING CONTAINER INK , 90-BLACK	12	12	8	4 GALS.	
(5) OCCUPATIONS					
879 BAGGING OR PACKING WRKR (67%)					010 SURFACE MILL (46%)
CAL/INK MIRA-SET PAPER GLOSS RED	12	12	8	4 GALS.	
(5) OCCUPATIONS					
879 BAGGING OR PACKING WRKR (67%)					010 SURFACE MILL (46%)
CHEVRON USA INC.					
CHEVRON AUTOMATIC TRANSMISSION FLU ID	6	6	4	886 GALS.	
(5) OCCUPATIONS					
604 MECHANIC (86%)					005 SURFACE SHOP (33%)

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
CHEVRON DELO 300 MOTOR OIL, SAE 10 W	6	6	4	220 GALS.	005 SURFACE SHOP (33%)
(5) OCCUPATIONS					
604 MECHANIC (86%)					
CHEVRON DELO 400 MOTOR OIL, SAE 15 W-40	6	6	4	882 GALS.	005 SURFACE SHOP (33%)
(5) OCCUPATIONS					
604 MECHANIC (86%)					
CHEVRON DELO 400 MOTOR OIL, SAE 30	6	6	4	305 GALS.	005 SURFACE SHOP (33%)
(5) OCCUPATIONS					
604 MECHANIC (86%)					
CHEVRON POLYUREA EP GREASE-2	5	6	4	585 LBS.	007 SURFACE GRINDING (100%)
(5) OCCUPATIONS					
488 DRY SCREENING PLANT OPTR (100%)					

TABLE 4, PAGE 4 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
CHEVRON STANDARD ATF SPECIAL	6	6	4	12 GALS.	
(5) OCCUPATIONS					
604 MECHANIC (86%)					005 SURFACE SHOP (33%)
PINION GREASE - MS	6	6	4	200 LBS.	
(5) OCCUPATIONS					
488 DRY SCREENING PLANT OPTR (100%)					(6) LOCATIONS
					007 SURFACE GRINDING (100%)
TRACTOR HYDRAULIC FLUID	12	12	8	110 GALS.	
(5) OCCUPATIONS					(6) LOCATIONS
488 DRY SCREENING PLANT OPTR (100%)			604 MECHANIC (86%)		007 SURFACE GRINDING (100%)
					005 SURFACE SHOP (33%)
UNIVERSAL GEAR LUBRICANT, 80W-90	6	6	4	720 LBS.	
(5) OCCUPATIONS					(6) LOCATIONS
604 MECHANIC (86%)					005 SURFACE SHOP (33%)

TABLE 4, PAGE 5 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
CONOCO					
AUTOMATIC TRANSMISSION FLUID, DEXR 11	1	1	<1	415 GALS.	
OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)
CONOCO ANTIFREEZE AND COOLANT	1	1	<1	446 GALS.	
OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)
CONOCO TYPE F	1	1	<1	72 GALS.	
OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)
DN-600 MOTOR OIL	1	1	<1	255 GALS.	
OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)

TABLE 4, PAGE 6 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

ANUFACTURE'S NAME AND RADENAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(6) LOCATIONS
HYDRAULIC OIL #32	1	1	<1	55 GALS.	
(5) OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)
PAR SAE 10 MOTOR OIL	1	1	<1	36 GALS.	
(5) OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)
PAR SAE 30 MOTOR OIL	1	1	<1	108 GALS.	
(5) OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)
PAR 20 MOTOR OIL	1	1	<1	36 GALS.	
(5) OCCUPATIONS					
604 MECHANIC (14%)					005 SURFACE SHOP (6%)

TABLE 4, PAGE 7 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
SUPER LUBE M MOLY GREASE	1	1	<1	360 LBS.	005 SURFACE SHOP (6%)
(5) OCCUPATIONS					
604 MECHANIC (14%)					
SUPER SA GREASE	1	1	<1	240 LBS.	
(5) OCCUPATIONS					(6) LOCATIONS
604 MECHANIC (14%)					005 SURFACE SHOP (6%)
SUPER SAE 30	1	5	3	891 GALS.	
(5) OCCUPATIONS					(6) LOCATIONS
921 HOIST OPTR (13%)					009 SURFACE MISC (5%)
UNIVERSAL GEAR LUBRICANT, SAE 80W- 90	1	1	<1	4,800 LBS.	
(5) OCCUPATIONS					(6) LOCATIONS
604 MECHANIC (14%)					005 SURFACE SHOP (6%)

TABLE 4, PAGE 8 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
10W-30 MOTOR OIL	1	1	<1	495 GALS.	005 SURFACE SHOP (6%)
(5) OCCUPATIONS					
604 MECHANIC (14%)					
OW CHEMICAL CO.					
COMPONENT B - TRIETHANOLAMINE 85	12	12	8	13,680 LBS.	(6) LOCATIONS
(5) OCCUPATIONS					
879 BAGGING OR PACKING WRKR (67%)					010 SURFACE MILL (46%)
ISKE BROTHERS REFINING CO.-LUBRIPLATE DIV.					
LUBRIPLATE, #630AA	1	5	3	1,357 LBS.	(6) LOCATIONS
(5) OCCUPATIONS					
921 MOIST OPTR (13%)					009 SURFACE MISC (5%)
IOYT-LLYOD CO.					
LPS 1	1	1	<1	4 LBS.	(6) LOCATIONS
(5) OCCUPATIONS					
602 ELECTRICIAN (20%)					005 SURFACE SHOP (6%)

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
IDEAL INDUSTRIES, INC.					
NO-LOX, NAED 3250	1	1	<1	1 LBS.	005 SURFACE SHOP (6%)
(5) OCCUPATIONS					
602 ELECTRICIAN (20%)					
LINCOLN ELECTRIC CO.					
FLEETWELD LH-90, 5/32 D	1	1	<1	200 LBS.	004 SURFACE MINE (50%)
(5) OCCUPATIONS					
619 WELDER (25%)					
FLEETWELD 180, 1/8 T	1	1	<1	200 LBS.	004 SURFACE MINE (50%)
(5) OCCUPATIONS					
619 WELDER (25%)					
FLEETWELD 180, 3/32 C	1	1	<1	50 LBS.	004 SURFACE MINE (50%)
(5) OCCUPATIONS					
619 WELDER (25%)					

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
FLEETWELD 180, 5/32 T	1	1	<1	50 LBS.	
(5) OCCUPATIONS					
619 WELDER (25%)					004 SURFACE MINE (50%)
FLEETWELD 5P - 3/32T - 316Y	3	3	2	200 LBS.	
(5) OCCUPATIONS					
619 WELDER (75%)					(6) LOCATIONS
					005 SURFACE SHOP (17%)
FLEETWELD 5P 5/32T	3	3	2	400 LBS.	
(5) OCCUPATIONS					
619 WELDER (75%)					(6) LOCATIONS
					005 SURFACE SHOP (17%)
FLEETWELD 5P-7V11, 1/8D	3	3	2	1,100 LBS.	
(5) OCCUPATIONS					
619 WELDER (75%)					(6) LOCATIONS
					005 SURFACE SHOP (17%)

TABLE 4, PAGE 11 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
LOCTITE CORP.					
PERMATAX STARTING FLUID, AEROSOL	1	1	<1	50 LBS.	005 SURFACE SHOP (6%)
(5) OCCUPATIONS					
604 MECHANIC (14%)					
MID-AMERICAN RESEARCH CHEMICAL CORPORATION					
MARC DOUBLE STRENGTH CONCENTRATED DESCALER	3	3	2	78 GALS.	009 SURFACE MISC (5%) 005 SURFACE SHOP (11%)
(5) OCCUPATIONS					
413 JANITOR (100%)					
804 PLUMBER; PIPE FTR; MILLWRT (100%)					
MARC-155, MAX REMOVER, AEROSOL	1	1	<1	36 LBS.	009 SURFACE MISC (5%)
(5) OCCUPATIONS					
413 JANITOR (100%)					
MARC-55, HEAVY DUTY DRAIN CLEANER	2	2	1	36 GALS.	005 SURFACE SHOP (11%)
(5) OCCUPATIONS					
804 PLUMBER; PIPE FTR; MILLWRT (100%)					

TABLE 4, PAGE 12 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

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
STADIA					
STADIA MARKING INK, #R4 COLOR BLAC K	6	6	4	5 GALS.	
OCCUPATIONS					
879 BAGGING OR PACKING WRKR (33%)					010 SURFACE MILL (23%)
TEMPO PRODUCTS CO.					
TEMPO SILICONE SPRAY, AEROSOL	1	1	<1	2 LBS.	
OCCUPATIONS					
602 ELECTRICIAN (20%)					005 SURFACE SHOP (6%)
THE ALPHA LUX CO.					
REAGENT FOR SPEEDY MOISTURE TESTER	19	19	13	15 GALS.	
OCCUPATIONS					
488 DRY SCREENING PLANT OPTR (100%)			514		007 SURFACE GRINDING (100%)
879 BAGGING OR PACKING WRKR (67%)					010 SURFACE MILL (50%)

TABLE 4, PAGE 13 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: GILSONITE

MANUFACTURER'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
WD-40 COMPANY					
WD-40	2	2	1	14 LBS.	
(5) OCCUPATIONS					
602 ELECTRICIAN (20%)			60% MECHANIC (14%)		005 SURFACE SHOP (11%)
3M CO.					
3M PREMIUM CONTACT CLEANER	1	1	<1	3 LBS.	
(5) OCCUPATIONS					
602 ELECTRICIAN (20%)					005 SURFACE SHOP (6%)
3M COMPANY					
SCOTCH 3M PREMIUM CONTACT CLEANER, AEROSOL	4	4	3	108 LBS.	
(5) OCCUPATIONS					
602 ELECTRICIAN (80%)					005 SURFACE SHOP (22%)

TABLE 5, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

PHYSICAL AGENT CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: GILSONITE

PHYSICAL AGENT CONDITION	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)		(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)		(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)		(6) LOCATIONS
	61	85	59				
NOISE							
(5) OCCUPATIONS							
058 DRIFT MINER (100%)							001 UNDERGROUND MINE (100%)
488 DRY SCREENING PLANT OPTR (100%)							006 SURFACE CRUSHING (100%)
921 HOIST OPTR (100%)							007 SURFACE GRINDING (100%)
							010 SURFACE MILL (69%)
							009 SURFACE MISC (40%)

SEGMENTAL BODY VIBRATION	8	13	9				(6) LOCATIONS
(5) OCCUPATIONS							
921 HOIST OPTR (100%)							009 SURFACE MISC (40%)

WHOLE BODY VIBRATION	35	53	37				(6) LOCATIONS
(5) OCCUPATIONS							
058 DRIFT MINER (100%)							001 UNDERGROUND MINE (100%)
879 BAGGING OR PACKING WRKR (33%)							006 SURFACE CRUSHING (100%)
							009 SURFACE MISC (20%)
							010 SURFACE MILL (23%)

TABLE 6, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: GILSONITE

MUSCULOSKELETAL CONDITION	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)		(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)		(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)		(6) LOCATIONS
	12	12	12	12	8		
AWKWARD LIFTING							
(5) OCCUPATIONS							
879 BAGGING OR PACKING WRKR (67%)							010 SURFACE MILL (46%)
DIMINISHED LIGHT							
(5) OCCUPATIONS							
058 DRIFT MINER (100%)	25		43		30		001 UNDERGROUND MINE (100%)
FREQUENT LIFTING							
(5) OCCUPATIONS							
879 BAGGING OR PACKING WRKR (67%)	12		12		8		010 SURFACE MILL (46%)
HEAVY LIFTING							
(5) OCCUPATIONS							
879 BAGGING OR PACKING WRKR (100%)	18		18		13		010 SURFACE MILL (69%)

TABLE 7, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN DATA CLAIMED TO BE TRADE SECRET.

WELDING POTENTIAL EXPOSURE

COMMODITY NAME: GILSONITE

WELDING PROCESS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(6) LOCATIONS
METAL ARC WELDING	3	3	2	
(5) OCCUPATIONS				
619 WELDER (75%)				005 SURFACE SHOP (17%)
SHIELD METAL ARC WELDING	1	1	<1	
(5) OCCUPATIONS				
619 WELDER (25%)				004 SURFACE MINE (50%)
OXYACETYLENE WELDING	3	3	2	
(5) OCCUPATIONS				
619 WELDER (75%)				005 SURFACE SHOP (17%)

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15. Supplementary Notes			
16. Abstract (Limit: 200 words) The data on potential exposures to chemical and physical agents presented in this report were gathered by the National Occupational Health Survey of Mining by visiting seven gilsonite mines. Four chemicals were found on m(e property which were regulated by the Mine Safety and Health Administration (MSHA). Four chemicals were found which have no NIOSH or MSHA limitations set. Forty nine tradename products were listed to which workers were potentially exposed. Potential exposures to the following physical agents were noted: noise, segmental vibration, and whole body vibration. Musculoskeletal conditions which could be harmful involve diminished light as well as frequent, heavy, and awkward lifting. Three welding processes were in use: metal arc welding, shield metal arc welding, and oxyacetylene welding. Estimated annual usage information was provided for both generic and tradename chemical substances.			
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