

APPENDIX K
STONE, DIMENSION, NEC COMMODITY REPORT

NATIONAL OCCUPATIONAL HEALTH SURVEY OF MINING

STONE, DIMENSION, NEC REPORT

Comments should be directed to:

Project Officer
National Occupational Health Survey of Mining
NIOSH
Division of Respiratory Disease Studies
1095 Willowdale Road
Morgantown, West Virginia 26505-2888

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This is one of a series of reports on the National Occupational Health Survey of Mining (NOHSM), which has been carried out by the National Institute for Occupational Safety and Health (NIOSH). The NOHSM began in May 1984, as an effort by NIOSH to obtain representative data related to occupational health from the mining industry. This particular report provides NOHSM data for the Stone, Dimension, NEC commodity. During the site selection process, three (3) sample sites were selected from the Stone, Dimension, NEC population of active mining facilities. Of these, two (2) were surveyed between August 28, 1986, and November 25, 1986, but because of production inactivity during the survey period, it was not possible to conduct a survey at the other site. 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 agent conditions; and one concerning welding processes. **Estimated** annual usage information is provided for chemical substances, both generic and trade names.

This report lists the survey findings in a number of individual tables representing the different products and conditions to which workers in the commodity were found to be

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potentially exposed. The following is a breakdown of these tables, including the number of agents associated with each table, for the Stone, Dimension, NEC commodity:

- Table K14 MSHA-regulated chemicals.
- Table K21 Chemical that had a NIOSH recommended exposure limit but is not MSHA-regulated.
- Table K32 Chemicals that have no NIOSH recommended exposure limit and are not MSHA-regulated.
- Table K4 . . .36 Trade name products.
- Table K54 Physical agent conditions.
- Table K67 Musculoskeletal overload conditions.
- Table K72 Welding processes.

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 120 mining operations were surveyed as the sample from a number of selected commodities. A different set of

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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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1095 Willowdale Road
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TABLE DEFINITIONS

AGENT NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)**	(2a) STANDARD DEVIATION	(3) %WORKERS EXPOSED (PREDICTED)**	(4) PREDICTED ANNUAL USAGE**	(5) OCCUPATIONS	(6) LOCATIONS
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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 (2a) represents the standard deviations for the projections to this entire commodity that are described in column (2). These standard deviations can provide a rough indicator of the variance about these projections.

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, an "*" 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.

**For the commodities in which NIOSH surveyed all of the active facilities, Columns 2, 3, and 4 are observed data rather than predicted data.

TABLE K1, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
ACETYLENE	7	20	17	19	68,243 GALS	604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (38%) 005 SURFACE SHOP (100%)
AMMONIUM CHLORIDE	3	9	7	8	14,621 LBS	379 DRYER OPTR; KILN OPTR (100%)	010 SURFACE MILL (19%)
CHROMIC ACID AND CHROMATES	3	9	7	8	73,106 LBS	579 SLURRY, MIXING OR PUMPING WRKR (100%)	010 SURFACE MILL (19%)
GASOLINE, LEADED	10	54	37	49	22,341 GALS	079 CRUSHER OPTR (100%) 616 LABORER; BULLGANG (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%) 389 FORKLIFT OPTR (100%) 618 GREASER; OILER (100%) 728 COMPLETE LOAD HAULDUMP CYCLE (100%)	010 SURFACE MILL (19%) 009 SURFACE MISC (33%) 004 SURFACE MINE (100%)

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TABLE K1, PAGE 2 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
HYDROGEN CHLORIDE	1	3	2	3	3 GALS	649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	009 SURFACE MISC (33%)
PROPANE	18	47	38	42	584,847 GALS	079 CRUSHER OPTR (100%) 579 SLURRY, MIXING OR PUMPING WRKR (100%) 618 GREASER; OILER (100%) 379 DRYER OPTR; KILN OPTR (100%) 604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	008 SURFACE CRUSHING (100%) 010 SURFACE MILL (100%)
SODIUM HYDROXIDE	1	3	2	3	3 GALS	649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	009 SURFACE MISC (33%)
TITANIUM DIOXIDE	4	12	10	11	677,270 LBS	579 SLURRY, MIXING OR PUMPING WRKR (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (25%)

TABLE K2, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

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

COMMODITY NAME: STONE, DIMENSION, NEC

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
DIESEL FUEL NO. 2	23	92	53	83	311,723 GALS	079 CRUSHER OPTR (100%) 389 FORKLIFT OPTR (100%) 604 MECHANIC (100%) 618 GREASER; OILER (100%) 728 COMPLETE LOAD #HAUL/DUMP CYCLE (100%) 379 DRYER OPTR; KILN OPTR (100%) 579 SLURRY, MIXING OR PUMPING WFKR (100%) 616 LABORER; BULLGANG (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (100%)	006 SURFACE CRUSHING (100%) 009 SURFACE MISC (67%) 010 SURFACE MILL (100%) 004 SURFACE MINE (100%)

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**TABLE K3, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA
 CHEMICALS FOUND ON MINE PROPERTY THAT HAVE NO NIOSH RECOMMENDATION OR MSHA EXPOSURE LIMIT
 COMMODITY NAME: STONE, DIMENSION, NEC**

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
DIATOMITE	10	29	24	26	584,847 LBS	579 SLURRY, MIXING OR PUMPING WRKR (100%) 604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (63%)
PHENOLPHTHALEIN	1	3	2	3	3 GALS	649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	008 SURFACE MISC (33%)
SILICIC ACID, DISODIUM SALT	10	29	24	26	436,635 LBS	579 SLURRY, MIXING OR PUMPING WRKR (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%) 604 MECHANIC (100%)	010 SURFACE MILL (63%)
THALLO BLUE	3	9	7	8	11,229 LBS	579 SLURRY, MIXING OR PUMPING WRKR (100%)	010 SURFACE MILL (19%)

TABLE K4, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

TRADE NAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

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MANUFACTURER'S NAME AND TRADE NAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
ARC ABRASIVES, INC. AMERICAN WHEEL 24GRIT VITRIFIED GRINDING WHEEL	6	18	14	16	15 LBS	604 MECHANIC (100%)	005 SURFACE SHOP (86%)
BEECHAM, INC. MITEE THREAD CUTTING OIL CLEAR	6	18	14	16	9 GALS	604 MECHANIC (100%)	005 SURFACE SHOP (86%)
BORDEN, INC. KRYLON INTERIOR/EXTERIOR ENAMEL NO 2504 BEIGE (AEROSOL)	6	18	14	16	111 LBS	604 MECHANIC (100%)	005 SURFACE SHOP (86%) 010 SURFACE MILL (38%)
CHAMPION LABORATORIES, INC. PYROIL STARTING FLUID STOCK NO 8-12 (AEROSOL)	1	6	5	6	32 LBS	728 COMPLETE LOAD /HAUL/DUMP CYCLE (100%)	004 SURFACE MINE (17%)
CHEVRON U.S.A., INC. CHEVRON BLOCK GREASE, LD	3	9	7	8	561 LBS	070 CRUSHER OPTR (100%) 618 GREASER; OILER (100%)	006 SURFACE CRUSHING (100%)
DIAMOND SHAMROCK CHEMICAL CO. LOMAR PW	3	9	7	8	11,697 LBS	379 DRYER OPTR; KILN OPTR (100%)	010 SURFACE MILL (19%)

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TABLE K4, PAGE 2 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

TRADE NAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

MANUFACTURER'S NAME AND TRADE NAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
DOW CORNING CORP. DOW CORNING SLY-OFF 22 PAPER COATING	3	9	7	8	20,587 LBS	379 DRYER OPTR; KILN OPTR (100%)	010 SURFACE MILL (19%)
SILICONE RUBBER SEALANT CAT. NO. 732-3	9	26	21	24	164 GALS	379 DRYER OPTR; KILN OPTR (100%) 604 MECHANIC (100%)	010 SURFACE MILL (56%)
GO JO INDUSTRIES, INC. GOJO HAND CLEANER ORIGINAL FORMULA	1	6	5	6	51 LBS	728 COMPLETE LOAD /HAUL/DUMP CYCLE (100%)	004 SURFACE MINE (17%)
HEUBACH, INC. HEUBACH AQUIS, HEUCOPHTHAL GREEN	3	9	7	8	14,821 LBS	579 SLURRY, MIXING OR PUMPING WRKR (100%)	010 SURFACE MILL (19%)
LUBRIPLATE LUBRIPLATE SPRAY LUBE 'A' PART NO. 03463 (AEROSOL)	6	18	14	16	155 LBS	604 MECHANIC (100%)	005 SURFACE SHOP (66%) 010 SURFACE MILL (38%)
MPCDAVIS COLORS OXIDE RED	4	12	10	11	116,969 LBS	579 SLURRY, MIXING OR PUMPING WRKR (100%) 649 ADMIN, SUPERVISORY, MGT PERSONL (50%)	010 SURFACE MILL (25%)

TABLE K4, PAGE 3 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

TRADE NAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

APPENDIX K (CONT.)

MANUFACTURER'S NAME AND TRADE NAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
PFIZER PIGMENTS, INC. SUPERJET LAMPBLACK	3	9	7	8	36,553 LBS	578 SLURRY, MIXING OR PUMPING WPKR (100%)	010 SURFACE MILL (19%)
YELLOW OXIDE	4	12	10	11	116,969 LBS	578 SLURRY, MIXING OR PUMPING WPKR (100%) 648 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (25%)
POST TOOL & SUPPLY CO. FULLER WIRE WHEEL, 10-INCH	6	18	14	16	15 LBS	604 MECHANIC (100%)	005 SURFACE SHOP (66%)
RAMOS OIL CO., INC. LV1-100 OIL	10	29	24	26	146,212 GALS	378 DRYER OPTR; KILN OPTR (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%) 604 MECHANIC (100%)	010 SURFACE MILL (63%)

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TABLE K4, PAGE 4 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

TRADE NAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

MANUFACTURER'S NAME AND TRADE NAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
RAMOS OIL CO., INC. SOLVENT, UN1255	10	29	24	26	482 GALS	079 CRUSHER OPTR (100%) 618 GREASER; OILER (100%) 604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	006 SURFACE CRUSHING (100%) 010 SURFACE MILL (44%) 005 SURFACE SHOP (100%)
RELTON CORP. RELTON RAPID TAP CUTTING FLUID	6	18	14	18	3 GALS	604 MECHANIC (100%)	005 SURFACE SHOP (86%)
SHELL OIL CO. ALVANIA GREASE EP 2	12	35	29	32	4,913 LBS	079 CRUSHER OPTR (100%) 604 MECHANIC (100%) 379 DRYER OPTR; KILN OPTR (100%) 618 GREASER; OILER (100%)	005 SURFACE SHOP (86%) 006 SURFACE CRUSHING (100%) 010 SURFACE MILL (63%)
SHELL CRATER 2X FLUID	6	18	14	16	292 GALS	079 CRUSHER OPTR (100%) 618 GREASER; OILER (100%) 379 DRYER OPTR; KILN OPTR (100%)	006 SURFACE SHOP (100%) 010 SURFACE MILL (63%)

TABLE K4, PAGE 5 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

TRADE NAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

MANUFACTURER'S NAME AND TRADE NAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
SHELL OIL CO. SHELL DONAX TD FLUID	1	3	2	3	439 GALS	618 GREASER; OILER (100%)	009 SURFACE MISC (33%)
TURBO OIL T 150 65606	12	35	29	32	5,951 LBS	079 CRUSHER OPTR (100%) 604 MECHANIC (100%) 379 DRYER OPTR; KILN OPTR (100%) 618 GREASER; OILER (100%)	006 SURFACE CRUSHING (100%) 008 SURFACE MISC (33%) 010 SURFACE MILL (65%)
X-100 SAE 30 MOTOR OIL	1	3	2	3	877 GALS	618 GREASER; OILER (100%)	009 SURFACE MISC (33%)
TELEDYNE MCKAY, INC. MCKAY 6013 ELECTRODES	7	20	17	19	439 LBS	604 MECHANIC (100%) 649 ADMIN. SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (38%) 005 SURFACE SHOP (100%)

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TABLE K4, PAGE 6 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

TRADE NAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

MANUFACTURER'S NAME AND TRADE NAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
TELEDYNE MCKAY, INC. MCKAY 7018XLM ELECTRODES	7	20	17	19	731 LBS	604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (38%) 005 SURFACE SHOP (100%)
THE BOC GROUP, INC. EASY-ARC 7018 MR LOW HYDROGEN IRON POWDER ELECTRODES	7	20	17	19	585 LBS	604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (38%) 005 SURFACE SHOP (100%)
THE UNITED OIL CO., INC. DURALENE PERMANENT ANTIFREEZE	1	6	5	6	354 LBS	649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	008 SURFACE MISC (33%)

TABLE K4, PAGE 7 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA
TRADE NAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

MANUFACTURER'S NAME AND TRADE NAME PRODUCTS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE	(5) OCCUPATIONS	(6) LOCATIONS
THE UNITED OIL CO., INC. SUPER C-3 SAE 10 DURALENE MACK EOK-2 SF-CC-CD	2	13	11	12	354 GALS	389 FORKLIFT OPTR (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	004 SURFACE MINE (17%) 009 SURFACE MISC (33%)
SUPER C-3 SAE 40 DURALENE	3	19	16	17	643 GALS	389 FORKLIFT OPTR (100%) 728 COMPLETE LOAD HAUL/DUMP CYCLE (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	009 SURFACE MISC (33%) 004 SURFACE MINE (33%)
WOLF DISTRIBUTORS MAKITA #741402-9AP A24P GRINDING DISC	6	18	14	16	79 LBS	604 MECHANIC (100%)	005 SURFACE SHOP (86%) 010 SURFACE MILL (38%)

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TABLE K5, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

PHYSICAL AGENT CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

PHYSICAL AGENT CONDITION	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE [NOT APPLICABLE]	(5) OCCUPATIONS	(6) LOCATIONS
NOISE	23	92	53	83		079 CRUSHER OPTR (100%) 388 FORKLIFT OPTR (100%) 604 MECHANIC (100%) 618 GREASER, OILER (100%) 728 COMPLETE LOAD /HAULD/JUMP CYCLE (100%) 379 DRYER OPTR; KILN OPTR (100%) 579 SLURRY, MIXING OR PUMPING WRKR (100%) 616 LABORER; BULLGANG (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (100%)	006 SURFACE CRUSHING (100%) 005 SURFACE SHOP (100%) 006 SURFACE MISC (87%) 010 SURFACE MILL (100%) 004 SURFACE MINE (100%)
SEGMENTAL BODY VIBRATION	6	18	14	16		604 MECHANIC (100%)	005 SURFACE SHOP (86%) 010 SURFACE MILL (36%)

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TABLE K5, PAGE 2 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA
PHYSICAL AGENT CONDITIONS IDENTIFIED ON MINE PROPERTY
COMMODITY NAME: STONE, DIMENSION, .1/EC

PHYSICAL AGENT CONDITION	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE [NOT APPLICABLE]	(5) OCCUPATIONS	(6) LOCATIONS
TEMPERATURE (PROCESS RELATED)	16	47	38	42		079 CRUSHER OPTR (100%) 604 MECHANIC (100%) 618 GREASER; OILER (100%) 379 DRYER OPTR; KILN OPTR (100%) 579 SLURRY, MIXING OR PUMPING WRKR (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	006 SURFACE CRUSHING (100%) 010 SURFACE MILL (100%)
WHOLE BODY VIBRATION	12	32	29	32		079 CRUSHER OPTR (100%) 604 MECHANIC (100%) 579 SLURRY, MIXING OR PUMPING WRKR (100%) 618 GREASER; OILER (100%)	006 SURFACE CRUSHING (100%) 009 SURFACE MISC (33%) 010 SURFACE MILL (75%)

APPENDIX K (CONT.)

**TABLE K6, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA
MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY**

COMMODITY NAME: STONE, DIMENSION, NEC

	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE [NOT APPLICABLE]	(5) OCCUPATIONS	(6) LOCATIONS
AWKWARD LIFTING	10	54	38	49		079 CRUSHER OPTR (100%) 616 LABORER; BULLGANG (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%) 389 FORKLIFT OPTR (100%) 618 GREASER; OILER (100%) 728 COMPLETE LOAD HAUL/DUMP CYCLE (100%)	010 SURFACE MILL (19%) 009 SURFACE MISC (33%) 004 SURFACE MINE (100%)
FINGER AND HANDS	7	35	22	31		079 CRUSHER OPTR (100%) 618 GREASER; OILER (100%) 616 LABORER; BULLGANG (100%)	004 SURFACE MINE (67%) 010 SURFACE MILL (19%)
FREQUENT LIFTING	7	45	37	41		389 FORKLIFT OPTR (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%) 616 LABORER; BULLGANG (100%) 728 COMPLETE LOAD HAUL/DUMP CYCLE (100%)	009 SURFACE MISC (33%) 004 SURFACE MINE (100%)

APPENDIX K (CONT.)

**TABLE K6, PAGE 2 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA
MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY**

COMMODITY NAME: STONE, DIMENSION, NEC

	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE [NOT APPLICABLE]	(5) OCCUPATIONS	(6) LOCATIONS
HEAVY LIFTING	10	54	37	49		079 CRUSHER OPTR (100%) 389 FORKLIFT OPTR (100%) 618 GREASER; OILER (100%) 728 COMPLETE LOAD /HAUL/DUMP CYCLE (100%) 616 LABORER; BULLGANG (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (19%) 009 SURFACE MISC (33%) 004 SURFACE MINE (100%)
LOWER LIMB	16	61	36	55		079 CRUSHER OPTR (100%) 604 MECHANIC (100%) 618 GREASER; OILER (100%) 379 DRYER OPTR; KILN OPTR (100%) 616 LABORER; BULLGANG (100%)	004 SURFACE MINE (67%) 010 SURFACE MILL (75%)

APPENDIX K (CONT.)

TABLE K6, PAGE 3 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA
 MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: STONE, DIMENSION, NEC

MUSCULOSKELETAL CONDITION	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE [NOT APPLICABLE]	(5) OCCUPATIONS	(6) LOCATIONS
NECK AND/OR BACK	12	58	35	51		389 FORKLIFT OPTR (100%) 616 LABORER; BULLGANG (100%) 604 MECHANIC (100%) 649 ADMN. SUPERVISORY, MGT PERSNL (50%)	008 SURFACE MISC (83%) 004 SURFACE MINE (83%) 008 SURFACE SHOP (88%)
WRIST	9	26	21	24		379 DRYER OPTR; KILN OPTR (100%) 604 MECHANIC (100%)	008 SURFACE SHOP (86%) 010 SURFACE MILL (56%)

TABLE K7, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA

WELDING POTENTIAL EXPOSURES

COMMODITY NAME: STONE, DIMENSION, NEC

WELDING PROCESS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(2a) STANDARD DEVIATION	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE [NOT APPLICABLE]	(5) OCCUPATIONS	(6) LOCATIONS
METAL ARC WELDING	7	20	17	19		604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (38%) 005 SURFACE SHOP (100%)
OXYFUEL GAS CUTTING	7	20	17	19		604 MECHANIC (100%) 649 ADMIN, SUPERVISORY, MGT PERSNL (50%)	010 SURFACE MILL (38%) 005 SURFACE SHOP (100%)

APPENDIX K (CONT.)