

NATIONAL OCCUPATIONAL HEALTH SURVEY OF MINING

KYANITE REPORT

MARCH 22, 1990

COMMENTS SHOULD BE DIRECTED TO:

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NATIONAL OCCUPATIONAL HEALTH SURVEY OF MINING
NIOSH
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INTRODUCTION

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 Kyanite commodity. All four (4) of the Kyanite facilities, which were active during the site selection process, were selected to be surveyed. Of these, three (3) were surveyed in February, 1988, 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 exposure 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 potentially exposed. The following is a breakdown of these tables, including the number of agents associated with each table, for the Kyanite commodity:

Table 1 --	16 MSHA-regulated chemicals.
Table 2 --	2 Chemicals that have a NIOSH recommended exposure limit but are not MSHA-regulated.
Table 3 --	10 Chemicals that have no NIOSH recommended exposure limit and are not MSHA-regulated.
Table 4 --	119 Trade name products.
Table 5 --	5 Physical agent conditions.
Table 6 --	10 Musculoskeletal overload conditions.
Table 7 --	5 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 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
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 EXPOSED (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.

RUN DATE: 03/21/90

TABLE 1, PAGE 1

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
ACETYLENE	27	27	24	305,095 GALS.
(5) OCCUPATIONS	(6) LOCATIONS			
079 CRUSHER OPTR (50%)	009 SURFACE MISC (40%)			
379 DRYER OPTR; KILN OPTR (44%)	005 SURFACE SHOP (82%)			
602 ELECTRICIAN (100%)	006 SURFACE CRUSHING (42%)			
619 WELDER (100%)	007 SURFACE GRINDING (19%)			
	008 SURFACE FLTN, RGTS (29%)			
	010 SURFACE MILL, (29%)			
ACETYLENE TETRABROMIDE	13	13	12	300 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
379 DRYER OPTR; KILN OPTR (44%)	010 SURFACE MILL (12%)			
	008 SURFACE FLTN, RGTS (29%)			
ARGON	3	3	3	8,123 GALS.
(5) OCCUPATIONS	(6) LOCATIONS			
604 MECHANIC (14%)	007 SURFACE GRINDING (6%)			
	005 SURFACE SHOP (6%)			

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MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
CARBON DIOXIDE	3	3	3	6,824 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)	619 WELDER (100%)		010 SURFACE MILL (3%) 005 SURFACE SHOP (6%)	
DIPHENYL AMINE	8	8	7	2 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%) 649 ADMN, SUPERVISORY, MGT PERSNL (30%)	514 LABORATORY TECHNICIAN (100%)		010 SURFACE MILL (5%) 009 SURFACE MISC (100%)	
ETHYLENE GLYCOL	6	6	5	1,038 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)	679 FLOTATION/CONCTR OPTR (50%)		010 SURFACE MILL (5%) 008 SURFACE FLTN, RGTS (14%)	
HELIUM	2	2	2	17,406 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
514 LABORATORY TECHNICIAN (100%)			009 SURFACE MISC (40%)	

RUN DATE: 03/21/90

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

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
HYDROGEN CHLORIDE	8	8	7	33 LBS. 16 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)		514 LABORATORY TECHNICIAN (100%)		010 SURFACE MILL (5%)
649 ADMN, SUPERVISORY, MGT PERSNL (30%)				009 SURFACE MISC (100%)
MERCURIC CHLORIDE	11	11	10	25 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)		514 LABORATORY TECHNICIAN (100%)		010 SURFACE MILL (5%)
649 ADMN, SUPERVISORY, MGT PERSNL (30%)		679 FLOTATION/CONCTR OPTR (50%)		009 SURFACE MISC (100%)
				008 SURFACE FLTN, RGTS (14%)
NITRIC ACID	2	2	2	336 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
514 LABORATORY TECHNICIAN (100%)				009 SURFACE MISC (40%)
NITROGEN	3	3	3	3,142 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)		619 WELDER (100%)		010 SURFACE MILL (3%)
				005 SURFACE SHOP (6%)

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
NITROUS OXIDE	2	2	2	6,790 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
514 LABORATORY TECHNICIAN (100%)			009 SURFACE MISC (40%)	
PHOSPHORIC ACID	8	8	7	120 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)			010 SURFACE MILL (5%)	
649 ADMN, SUPERVISORY, MGT PERSNL (30%)			009 SURFACE MISC (100%)	
PROPANE	46	46	41	34,200 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
179 BALL, ROD, PEBBLE MILL OPTR (70%)			005 SURFACE SHOP (18%)	
514 LABORATORY TECHNICIAN (100%)			007 SURFACE GRINDING (19%)	
604 MECHANIC (57%)			009 SURFACE MISC (100%)	
649 ADMN, SUPERVISORY, MGT PERSNL (40%)			010 SURFACE MILL (61%)	
SULFURIC ACID	8	8	7	55 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)			010 SURFACE MILL (5%)	
(CONTINUED NEXT PAGE)				

MSHA REGULATED CHEMICALS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
SULFURIC ACID (CONTINUED)	8	8	7	55 LBS.
(5)				
OCCUPATIONS	(6) LOCATIONS			
649 ADMN, SUPERVISORY, MGT PERSNL (30%)	009 SURFACE MISC (100%)			
WOOD DUST (NONALLERGENIC)	14	14	12	4,680,000 LBS.
(5)				
OCCUPATIONS	(6) LOCATIONS			
379 DRYER OPTR; KILN OPTR (38%)	010 SURFACE MILL (24%)			
613 CLEANUP MAN (100%)				
649 ADMN, SUPERVISORY, MGT PERSNL (40%)				

RUN DATE: 03/21/90

TABLE 2, 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: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
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DIESEL FUEL NO. 2 73 73 65 1,075,603 GALS.

(5)

OCCUPATIONS

079 CRUSHER OPTR (100%)
367 SHOVEL OPTR (100%)
376 TRUCK DRIVER (100%)
379 DRYER OPTR; KILN OPTR (100%)
604 MECHANIC (100%)
618 GREASER; OILER (67%)
649 ADMN, SUPERVISORY, MGT PERSNL (100%)

179 BALL, ROD, PEBBLE MILL OPTR (70%)
368 BULLDOZER OPTR (100%)
378 MOBILE CRANE OPTR (100%)
602 ELECTRICIAN (100%)
613 CLEANUP MAN (100%)
619 WELDER (100%)
879 BAGGING OR PACKING WRKR (77%)

(6)

LOCATIONS

004 SURFACE MINE (65%)
005 SURFACE SHOP (53%)
006 SURFACE CRUSHING (37%)
007 SURFACE GRINDING (34%)
010 SURFACE MILL (95%)

FUEL OIL NO. 6

52

52

46 929,514 GALS.

(5)

OCCUPATIONS

079 CRUSHER OPTR (50%)
379 DRYER OPTR; KILN OPTR (100%)
604 MECHANIC (71%)
618 GREASER; OILER (67%)
649 ADMN, SUPERVISORY, MGT PERSNL (90%)

376 TRUCK DRIVER (33%)
602 ELECTRICIAN (100%)
613 CLEANUP MAN (100%)
619 WELDER (100%)
879 BAGGING OR PACKING WRKR (77%)

(6)

LOCATIONS

007 SURFACE GRINDING (28%)
006 SURFACE CRUSHING (16%)
010 SURFACE MILL (83%)

RUN DATE: 03/21/90

TABLE 3, 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: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
BORIC ACID (HBO2) , LITHIUM SALT	2	2	2	25 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
514 LABORATORY TECHNICIAN (100%)			009 SURFACE MISC (40%)	
CALCIUM HYDROXIDE	7	7	6	97,500 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (25%)		604 MECHANIC (21%)	010 SURFACE MILL (7%) 008 SURFACE FLTN, RGTS (14%)	
DENATURED ALCOHOL	10	10	9	385 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (44%)		679 FLOTATION/CONCTR OPTR (50%)	010 SURFACE MILL (12%) 008 SURFACE FLTN, RGTS (14%)	
DIIODOMETHANE	9	9	8	2 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (44%)		514 LABORATORY TECHNICIAN (100%)	010 SURFACE MILL (12%) 009 SURFACE MISC (40%)	

RUN DATE: 03/21/90

TABLE 3, PAGE 2 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: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
GASOLINE-LEADED	43	43	38	39,915 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
179 BALL, ROD, PEBBLE MILL OPTR (70%)				
602 ELECTRICIAN (100%)		379 DRYER OPTR; KILN OPTR (44%)		006 SURFACE CRUSHING (5%)
613 CLEANUP MAN (100%)		604 MECHANIC (64%)		005 SURFACE SHOP (29%)
619 WELDER (100%)		618 GREASER; OILER (33%)		004 SURFACE MINE (12%)
879 BAGGING OR PACKING WRKR (100%)		649 ADMN, SUPERVISORY, MGT PERSONL (30%)		007 SURFACE GRINDING (31%)
				010 SURFACE MILL (58%)
KEROSENE	10	10	9	3,000 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
679 FLOTATION/CONCTR OPTR (50%)		879 BAGGING OR PACKING WRKR (54%)		008 SURFACE FLTN, RGTS (14%)
				010 SURFACE MILL (12%)
NITRIC ACID, LANTHANUM(3+) SALT	2	2	2	13 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
514 LABORATORY TECHNICIAN (100%)				009 SURFACE MISC (40%)

RUN DATE: 03/21/90

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

COMMODITY NAME: KYANITE

CHEMICAL NAME	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	(4) PREDICTED ANNUAL USAGE
POTASSIUM DICHROMATE(VI)	8	8	7	2 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)			010 SURFACE MILL (5%)	
649 ADMN, SUPERVISORY, MGT PERSNL (30%)			009 SURFACE MISC (100%)	
POTASSIUM PERMANGANATE	2	2	2	1 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
514 LABORATORY TECHNICIAN (100%)			009 SURFACE MISC (40%)	
TIN CHLORIDE (SNCL2)	8	8	7	3 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)			010 SURFACE MILL (5%)	
649 ADMN, SUPERVISORY, MGT PERSNL (30%)			009 SURFACE MISC (100%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 1 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
A.P. GREEN REFRACTORIES CO.				
GREENSET-85-P 85% ALUMINA MORTAR WITH CHEMICAL BOND	3	3	3	15,500 LBS.
(5) OCCUPATIONS				
379 DRYER OPTR; KILN OPTR (19%)			(6) LOCATIONS 010 SURFACE MILL (5%)	
KRUZITE BRICK				
5	5	4	4	61,425 LBS.
(5) OCCUPATIONS				
379 DRYER OPTR; KILN OPTR (25%)			(6) LOCATIONS 010 SURFACE MILL (8%)	
MIZZOU CASTABLE PLUS				
8	8	7	7	18,000 LBS.
(5) OCCUPATIONS				
379 DRYER OPTR; KILN OPTR (44%)			(6) LOCATIONS 010 SURFACE MILL (14%)	
NO. 36 REFRACTORY CEMENT AIR SETTING HIGH ALUMINA BONDING MORTAR				
3	3	3	3	13,800 LBS.
(5) OCCUPATIONS				
379 DRYER OPTR; KILN OPTR (19%)			(6) LOCATIONS 010 SURFACE MILL (5%)	

RUN DATE: 03/21/90

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

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
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A.W. CHESTERTON CO.

CHESTERTON NR. 738 BELT-FLO, #80313

(5) OCCUPATIONS	3	3	3	2 GALS.
379 DRYER OPTR; KILN OPTR (19%)				
-----	-----	-----	-----	-----

CHESTERTON SPRASOLVO PENETRATING OIL, #81308
(AEROSOL)

(5) OCCUPATIONS	9	9	8	67 LBS.
379 DRYER OPTR; KILN OPTR (19%)				
-----	-----	-----	-----	-----
(6) LOCATIONS				
010 SURFACE MILL (5%)				
005 SURFACE SHOP (24%)				
007 SURFACE GRINDING (6%)				
-----	-----	-----	-----	-----

AIRCO, INC.

AIRCO CODE-ARC 309 MR ELECTRODE

(5) OCCUPATIONS	6	6	5	30 LBS.
379 DRYER OPTR; KILN OPTR (19%)				
619 WELDER (100%)				
-----	-----	-----	-----	-----
(6) LOCATIONS				
010 SURFACE MILL (5%)				
007 SURFACE GRINDING (6%)				
-----	-----	-----	-----	-----

RUN DATE: 03/21/90

TABLE 4, PAGE 3 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
AIRCO, INC.				
AIRCO COMPRESSED GAS, N.O.S., 75% ARGON, 25% CARBON DIOXIDE	3	3	3	4,712 GALS
(5) OCCUPATIONS				
604 MECHANIC (14%)	(6) LOCATIONS			
619 WELDER (100%)				
ALLIED CORPORATION				
SOLVAY FLAKE CALCIUM CHLORIDE, 77%, #060-7200	10	10	9	500 LBS.
(5) OCCUPATIONS				
604 MECHANIC (21%)	(6) LOCATIONS			
649 ADMN, SUPERVISORY, MGT PERSNL (30%)	008 SURFACE FLTNN, RGTS (48%)			
618 GREASER; OILER (33%)				
679 FLOTATION/CONCTR OPTR (50%)				
ALLOY RODS CORPORATION				
DUAL SHIELD TYPE 7000 WELDING WIRE	3	3	3	500 LBS.
(5) OCCUPATIONS				
604 MECHANIC (14%)	(6) LOCATIONS			
619 WELDER (100%)				
005 SURFACE SHOP (18%)				

RUN DATE: 03/21/90

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

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
ALLOY RODS, INC.				
ARCALLOY E304 ELECTRODES	3	3	3	50 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)	619 WELDER (100%)		007 SURFACE GRINDING (6%)	
			005 SURFACE SHOP (6%)	
			010 SURFACE MILL (2%)	
ARCALLOY WELDING ELECTRODES, E-309-16	1	1	1	10 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (7%)			010 SURFACE MILL (2%)	
AMALIE REFINING COMPANY / DIVISION OF WITCO CORPORATION				
AMALIE HIGH TEMP LITHIUM COMPLEX GREASE LC-2, NLGI NO. 2	2	2	2	21 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	

RUN DATE: 03/21/90

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

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
AMERICAN CYANAMID CO. / INDUSTRIAL PRODUCTS DIVISION				
CYANAMID SUPERFLOC 1202 FLOCCULANT	4	4	4	2,788 LBS.
(5) OCCUPATIONS				
618 GREASER; OILER (33%)	679 FLOTATION/CONCTR OPTR (50%)			
	(6) LOCATIONS			
	008 SURFACE FLTN, RGTS (19%)			
CYANAMID SUPERFLOC 330 FLOCCULANT	4	4	4	10,000 LBS.
(5) OCCUPATIONS				
618 GREASER; OILER (33%)	679 FLOTATION/CONCTR OPTR (50%)			
	(6) LOCATIONS			
	008 SURFACE FLTN, RGTS (19%)			
ANDERSON LABORATORIES, INC.				
BANCO BUFFER SOLUTION PH7	5	5	4	2 GALS.
(5) OCCUPATIONS				
514 LABORATORY TECHNICIAN (100%)	649 ADMN, SUPERVISORY, MGT PERSNL (30%)			
	(6) LOCATIONS			
	009 SURFACE MISC (100%)			

RUN DATE: 03/21/90

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

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
ARCAIR COMPANY				
ARCAIR ALCLEAN ALUMINUM CLEANER AND DEOXIDIZING AGENT	1	1	1	2 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
619 WELDER (100%)			005 SURFACE SHOP (6%)	
ARCAIR PROTEX-SPRAY ANTI-SPATTER PLUS GUN PROTECTOR (AEROSOL)	1	1	1	2 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
619 WELDER (100%)			005 SURFACE SHOP (6%)	
ARCET INDUSTRIAL GAS				
MILD STEEL WELDING WIRE, AWS E70S-3	1	1	1	150 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
619 WELDER (100%)			005 SURFACE SHOP (6%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 7

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
ASHLAND OIL CO., INC. / MAC'S DIVISION				
NAPA MAC'S WATERLESS HAND CLEANER, #5005	3	3	3	18 LBS.
(5) OCCUPATIONS				
604 MECHANIC (14%)	(6) LOCATIONS 005 SURFACE SHOP (18%)			
BARBER-GREENE, INC. / TELSMITH DIVISION				
SMITHBRND EASY FLOW BACKING KIT, RESIN AND HARDENER, #12D91	5	5	4	418 LBS.
(5) OCCUPATIONS				
604 MECHANIC (36%)	(6) LOCATIONS 006 SURFACE CRUSHING (11%) 008 SURFACE FLTN, RGTS (14%)			
BASF CORPORATION / CHEMICALS DIVISION				
PLURACOL P410	10	10	9	2,700 LBS.
(5) OCCUPATIONS				
604 MECHANIC (21%) 649 ADMN, SUPERVISORY, MGT PERSNL (30%)	(6) LOCATIONS 008 SURFACE FLTN, RGTS (48%)			
618 GREASER; OILER (33%) 679 FLOTATION/CONCTR OPTR (50%)				

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RUN DATE: 03/21/90

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

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
BESTOLIFE CORPORATION				
BESTOLIFE 270 LEAD-BASE COMPOUND FOR DRILL COLLARS	4	4	4	2,750 LBS.
(5) OCCUPATIONS				
334 WAGON DRILL OPTR (100%)	833 DRILL HELPER; CHUCK TENDER (100%)			004 SURFACE MINE (24%)
(6) LOCATIONS				
BLACK & DECKER (US) INC.				
BLACK & DECKER A36 MSVA AM GRINDING WHEEL	3	3	3	4 LBS.
(5) OCCUPATIONS				
604 MECHANIC (14%)	619 WELDER (100%)			005 SURFACE SHOP (18%)
(6) LOCATIONS				
BOSTIK / EMHART				
NEVER-SEEZ ANTI-SEIZE AND LUBRICATING COMPOUND, #NS-160	5	5	4	30 LBS.
(5) OCCUPATIONS				
604 MECHANIC (36%)				005 SURFACE SHOP (18%) 007 SURFACE GRINDING (6%)
(6) LOCATIONS				

RUN DATE: 03/21/90

TABLE 4, PAGE 9 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
CHEMETRON CORPORATION / ALLOY RODS DIVISION				
ARCALOY WELDING ELECTRODES, E308-16	2	2	2	30 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
604 MECHANIC (14%)	007 SURFACE GRINDING (6%)			
CRC CHEMICALS USA				
CRC 5-56, #05005P (AEROSOL)	11	11	10	98 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
379 DRYER OPTR; KILN OPTR (38%)	010 SURFACE MILL (10%)			
618 GREASER; OILER (33%)	005 SURFACE SHOP (24%)			
	008 SURFACE FLTN, RGTS (5%)			
CRC CHEMICALS, USA				
CRC 3-36 (AEROSOL)	2	2	2	53 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
602 ELECTRICIAN (100%)	005 SURFACE SHOP (12%)			
	604 MECHANIC (7%)			

RUN DATE: 03/21/90

TABLE 4, PAGE 10 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
CYANAMID CANADA, INC.				
AERO XANTHATES 317	27	27	24	13,200 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
179 BALL, ROD, PEBBLE MILL OPTR (30%)				007 SURFACE GRINDING (9%)
613 CLEANUP MAN (100%)				008 SURFACE FLTN, RGTS (100%)
649 ADMN, SUPERVISORY, MGT PERSNL (70%)				010 SURFACE MILL (5%)
879 BAGGING OR PACKING WRKR (23%)				
DRESSER BAY STATE ABRASIVES				
C60 L5 V32 GRINDING WHEEL	2	2	2	60 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
833 DRILL HELPER; CHUCK TENDER (100%)				004 SURFACE MINE (12%)
DRYDEN OIL COMPANY, INC.				
DRYDENE HAND CLEANER PLUS PUMICE	3	3	3	84 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
602 ELECTRICIAN (100%)				005 SURFACE SHOP (12%)
618 GREASER; OILER (33%)				007 SURFACE GRINDING (3%)

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
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EXXON COMPANY, U.S.A. / DIVISION OF EXXON CORPORATION

VAR SOL 1	7	7	6	495 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (100%)				006 SURFACE CRUSHING (11%)
618 GREASER; OILER (33%)				005 SURFACE SHOP (24%)
				008 SURFACE FLTN, RGTS (5%)

FACET ENTERPRISES, INC. / P&D AUTOMOTIVE DIVISION

P&D LOTION HAND CLEANER WITH LANOLIN	2	2	2	6 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)				005 SURFACE SHOP (12%)

FEDERAL-MOGUL CORPORATION / BRILLIANT PRODUCTS DIVISION

BRILLIANT XL27 A24U GRINDING DISC	3	3	3	3 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)				006 SURFACE CRUSHING (11%)
				007 SURFACE GRINDING (6%)
				008 SURFACE FLTN, RGTS (10%)
				010 SURFACE MILL (3%)
				005 SURFACE SHOP (18%)

RUN DATE: 03/21/90

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

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
FEDERATED AUTOMOTIVE PARTS DISTRIBUTORS				
FEDERATED ANTIFREEZE SUMMER COOLANT	2	2	2	240 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	
GALIGHER ASH CO.				
ASHTEX RUBBER CEMENT	3	3	3	3 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (21%)			008 SURFACE FLTN, RGTS (14%)	
GENERAL CHEMICAL CORPORATION				
SODA ASH, LIGHT, COMMERCIAL SODIUM CARBONATE, #098-0105	27	27	24	260,000 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
179 BALL, ROD, PEBBLE MILL OPTR (30%)	604 MECHANIC (36%)			007 SURFACE GRINDING (9%)
613 CLEANUP MAN (100%)	618 GREASER; OILER (67%)			008 SURFACE FLTN, RGTS (100%)
649 ADMN, SUPERVISORY, MGT PERSNL (70%)	679 FLOTATION/CONCTR OPTR (100%)			010 SURFACE MILL (5%)
879 BAGGING OR PACKING WRKR (23%)				

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RUN DATE: 03/21/90

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

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
GENERAL REFRACTORIES COMPANY				
OLIVE HILL 36-48 RKB BRICK	5	5	4	58,500 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
379 DRYER OPTR; KILN OPTR (25%)	604 MECHANIC (7%)		010 SURFACE MILL (8%)	
GIBSON EXPLOSIVES PRODUCTS				
ANFO 100	4	4	4	30,000 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
334 WAGON DRILL OPTR (100%)	833 DRILL HELPER; CHUCK TENDER (100%)		004 SURFACE MINE (24%)	
600-PLUS BLASTING AGENT	2	2	2	6,300 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
334 WAGON DRILL OPTR (50%)	833 DRILL HELPER; CHUCK TENDER (50%)		004 SURFACE MINE (12%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 14 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
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GULF OIL CHEMICAL CORPORATION / EXPLOSIVES DEPARTMENT				
BLASTING AGENT, N.O.S.	2	2	2	4,200 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (50%)		833 DRILL HELPER; CHUCK TENDER (50%)	004 SURFACE MINE (12%)	

HERCULES, INC.

PAMAK 4 DISTILLED TALL OIL FATTY ACIDS

(5) OCCUPATIONS	27	27	(6) LOCATIONS	73,000 GALS.
179 BALL, ROD, PEBBLE MILL OPTR (30%)			007 SURFACE GRINDING (9%)	
613 CLEANUP MAN (100%)			008 SURFACE FLTN, RGTS (100%)	
649 ADMN, SUPERVISORY, MGT PERSNL (70%)			010 SURFACE MILL (5%)	
879 BAGGING OR PACKING WRKR (23%)				

HUNT CHEMICAL COMPANY

HUNTICOL 26

(5) OCCUPATIONS	17	17	(6) LOCATIONS	1,880 LBS.
179 BALL, ROD, PEBBLE MILL OPTR (30%)			007 SURFACE GRINDING (9%)	
613 CLEANUP MAN (100%)				
(CONTINUED NEXT PAGE)				

RUN DATE: 03/21/90

TABLE 4, PAGE 15 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
HUNT CHEMICAL COMPANY				
HUNTICOL 26 (CONTINUED)	17	17	15	1,880 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
649 ADMN, SUPERVISORY, MGT PERSNL (40%)				008 SURFACE FLTN, RGTS (52%)
879 BAGGING OR PACKING WRKR (23%)				010 SURFACE MILL (5%)
IG-LO PRODUCTS CORPORATION				
IG-LO ENGINE STARTING FLUID, #1015SF (AEROSOL)	3	3	3	57 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
376 TRUCK DRIVER (33%)				004 SURFACE MINE (6%)
604 MECHANIC (14%)				005 SURFACE SHOP (12%)
INGERSOLL-RAND CORPORATION				
1-R RECIP. LUBE	7	7	6	55 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
879 BAGGING OR PACKING WRKR (54%)				010 SURFACE MILL (12%)

RUN DATE: 03/21/90

TABLE 4, PAGE 16 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
IRECO				
IREMITE 42	4	4	4	8,000 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (100%)		833 DRILL HELPER; CHUCK TENDER (100%)	004 SURFACE MINE (24%)	
POWERGEL D, 65% STRENGTH	4	4	4	11,200 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (100%)		833 DRILL HELPER; CHUCK TENDER (100%)	004 SURFACE MINE (24%)	
J.W. HARRIS CO., INC.				
HARRIS ER308 WELDING WIRE	1	1	1	32 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
619 WELDER (100%)			005 SURFACE SHOP (6%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 17 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
LINCOLN ELECTRIC COMPANY				
AIRCO CODE-ARC 7018 MR ELECTRODES	21	21	19	3,300 LBS.
(5) OCCUPATIONS				
379 DRYER OPTR; KILN OPTR (44%)	(6) LOCATIONS			
619 WELDER (100%)				
604 MECHANIC (71%)				
649 ADMN, SUPERVISORY, MGT PERSNL (30%)				
AIRCO 6011 C MILD STEEL ELECTRODES				
	23	23	20	3,450 LBS.
(5) OCCUPATIONS				
379 DRYER OPTR; KILN OPTR (44%)	(6) LOCATIONS			
604 MECHANIC (79%)				
649 ADMN, SUPERVISORY, MGT PERSNL (30%)				
602 ELECTRICIAN (100%)				
619 WELDER (100%)				
JETWELD 3 ELECTRODE				
	4	4	4	1,400 LBS.
(5) OCCUPATIONS				
604 MECHANIC (29%)	(6) LOCATIONS			
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RUN DATE: 03/21/90

TABLE 4, PAGE 18 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
LINCOLN ELECTRIC COMPANY				
MANGJET ELECTRODE	8	8	7	700 LBS.
(5) OCCUPATIONS				
079 CRUSHER OPTR (50%)	376 TRUCK DRIVER (33%)			
604 MECHANIC (36%)	649 ADMN, SUPERVISORY, MGT PERSONL (10%)			
(6) LOCATIONS				
			006 SURFACE CRUSHING (26%)	
			005 SURFACE SHOP (18%)	
LOCTITE CORPORATION / AUTOMOTIVE AND CONSUMER GROUP				
PERMATEX AVIATION FORM-A-GASKET SEALANT LIQUID #3D	2	2	2	1 GALS.
(5) OCCUPATIONS				
604 MECHANIC (14%)				
(6) LOCATIONS				
			005 SURFACE SHOP (12%)	
PERMATEX HIGH TACK SPRAY-A-GASKET ADHESIVE SEALANT, PART NO. 99GA (AEROSOL)				
	2	2	2	3 LBS.
(5) OCCUPATIONS				
604 MECHANIC (14%)				
(6) LOCATIONS				
			005 SURFACE SHOP (12%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 19 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
LOCTITE CORPORATION / AUTOMOTIVE AND CONSUMER GROUP				
PERMATAX HIGH TACK SUPER ADHESIVE SEALANT, PART NO. 97B, #80060	2	2	2	1 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	
MAKITA USA, INC.				
MAKITA PART #741423-0 GRINDING DISC	3	3	3	3 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			006 SURFACE CRUSHING (11%)	
			007 SURFACE GRINDING (6%)	
			008 SURFACE FLTN, RGTS (10%)	
			010 SURFACE MILL (3%)	
			005 SURFACE SHOP (18%)	
MARSH STENCIL MACHINE COMPANY				
MARSH K-1 BLACK STENCIL INK	13	13	12	7 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
179 BALL, ROD, PEBBLE MILL OPTR (30%)			010 SURFACE MILL (22%)	
879 BAGGING OR PACKING WRKR (77%)				

RUN DATE: 03/21/90

TABLE 4, PAGE 20 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
MIDWEST INDUSTRIAL SUPPLY, INC.				
ICE FREE CONVEYOR WINTER OPERATING UNIT	3	3	3	83 GALS.
(5) OCCUPATIONS	(6) LOCATIONS			
679 FLOTATION/CONCTR OPTR (50%)	008 SURFACE FLTN, RGTS (14%)			
NATIONAL STARCH & CHEMICAL COMPANY				
LOAD-LOK 31-7972	18	18	16	990 GALS.
(5) OCCUPATIONS	(6) LOCATIONS			
179 BALL, ROD, PEBBLE MILL OPTR (40%) 879 BAGGING OR PACKING WRKR (77%)	010 SURFACE MILL (31%)			
NORTON COMPANY				
NORTON 39C60-18VK GRIND. WHEEL	3	3	3	45 LBS.
(5) OCCUPATIONS	(6) LOCATIONS			
604 MECHANIC (21%)	005 SURFACE SHOP (18%)			

RUN DATE: 03/21/90

TABLE 4, PAGE 21 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
NORTON COMPANY				
NORTON 39C60-18VK GRINDING WHEEL	1	1	1	3 LBS.
(5) OCCUPATIONS				
619 WELDER (100%)			(6) LOCATIONS 005 SURFACE SHOP (6%)	
NUODEX, INC.				
ANDEROL 50 SYNTHETIC LUBRICANT	7	7	6	55 GALS.
(5) OCCUPATIONS				
879 BAGGING OR PACKING WRKR (54%)			(6) LOCATIONS 010 SURFACE MILL (12%)	
OIL-SORB INDUSTRIES				
AP-SORB SOLUBLE OIL ABSORBENT "ALL-PURPOSE INDUSTRIAL AND AUTOMOTIVE GRADE	2	2	2	3,200 LBS.
(5) OCCUPATIONS				
604 MECHANIC (14%)			(6) LOCATIONS 005 SURFACE SHOP (12%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 22 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
OIL-SORB INDUSTRIES				
AP-SORB SOLUBLE OIL ABSORBENT "ALL-PURPOSE" INDUSTRIAL AND AUTOMOTIVE GRADE	2	2	2	2,400 LBS.
(5) OCCUPATIONS				
604 MECHANIC (14%)			(6) LOCATIONS	005 SURFACE SHOP (12%)
PENNZOIL COMPANY				
PENNZOIL 303 MULTIPURPOSE GREASE, #7725	6	6	5	566 LBS.
(5) OCCUPATIONS				
179 BALL, ROD, PEBBLE MILL OPTR (30%) 604 MECHANIC (7%)			(6) LOCATIONS	007 SURFACE GRINDING (13%) 010 SURFACE MILL (5%)
RESISTANT MATERIALS SYSTEMS, INC.				
DURALL-55 WEAR RESISTANT COMPOUND KIT	2	2	2	224 LBS.
(5) OCCUPATIONS				
604 MECHANIC (14%)			(6) LOCATIONS	006 SURFACE CRUSHING (11%)

RUN DATE: 03/21/90

TABLE 4, PAGE 23 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
REXNORD CHEMICAL PRODUCTS, INC.				
NORDBAK BACKING MATERIAL	3	3	3	330 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (21%)			008 SURFACE FLTN, RGTS (14%)	
S.O.S. PRODUCTS CO., INC.				
SOS DARK CUTTING OIL, COLLOIDAL SULPHUR BASE, #CO-4-D	3	3	3	11 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (21%)			005 SURFACE SHOP (18%)	
SANI-FRESH INTERNATIONAL, INC.				
SANI-TUFF SUPER STRENGTH WATERLESS CLEANSER WITH GRIT	18	18	16	46 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%)			006 SURFACE CRUSHING (11%)	
379 DRYER OPTR; KILN OPTR (38%)			010 SURFACE MILL (10%)	
618 GREASER; OILER (67%)			007 SURFACE GRINDING (9%)	
			008 SURFACE FLTN, RGTS (5%)	
			005 SURFACE SHOP (35%)	

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHELL OIL COMPANY				
SHELL ALVANIA GREASE ZEP	9	9	8	3,200 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%)			004 SURFACE MINE (18%)	
376 TRUCK DRIVER (33%)			006 SURFACE CRUSHING (26%)	
604 MECHANIC (29%)			007 SURFACE GRINDING (3%)	
			008 SURFACE FLTN, RGTS (5%)	
			010 SURFACE MILL (3%)	
SHELL ALVANIA GREASE 1EP	10	10	9	2,800 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%)			004 SURFACE MINE (24%)	
376 TRUCK DRIVER (33%)			005 SURFACE SHOP (12%)	
604 MECHANIC (36%)			006 SURFACE CRUSHING (26%)	
SHELL DARINA AX	2	2	2	480 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 25 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHELL OIL COMPANY				
SHELL DONAX TA FLUID	4	4	4	330 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
376 TRUCK DRIVER (67%)			004 SURFACE MINE (12%)	
			005 SURFACE SHOP (12%)	
SHELL DONAX TD FLUID	2	2	2	165 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	
SHELL DONAX TG FLUID	6	6	5	550 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (50%)			005 SURFACE SHOP (24%)	
833 DRILL HELPER; CHUCK TENDER (50%)			004 SURFACE MINE (12%)	
SHELL LITHIUM BASE MP GREASE	4	4	4	54 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (21%)			008 SURFACE FLTN, RGTS (19%)	
			618 GREASER; OILER (33%)	

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHELL OIL COMPANY				
SHELL LITHIUM BASE MULTIPURPOSE GREASE	16	16	14	707 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%)	367 SHOVEL OPTR (50%)		006 SURFACE CRUSHING (5%)	
376 TRUCK DRIVER (67%)	379 DRYER OPTR; KILN OPTR (38%)		004 SURFACE MINE (18%)	
604 MECHANIC (29%)	618 GREASER; OILER (33%)		010 SURFACE MILL (10%)	
619 WELDER (100%)			007 SURFACE GRINDING (6%)	
			008 SURFACE FLTN, RGTS (14%)	
			005 SURFACE SHOP (18%)	
SHELL OMALA OIL H	8	8	7	2,000 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (38%)	604 MECHANIC (14%)		010 SURFACE MILL (14%)	
SHELL OMALA OIL 150	5	5	4	3,000 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%)	604 MECHANIC (14%)		006 SURFACE CRUSHING (21%)	
618 GREASER; OILER (67%)			010 SURFACE MILL (2%)	

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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	
SHELL OIL COMPANY								
SHELL OMALA OIL 220	12		12		11		1,600 LBS.	
(5) OCCUPATIONS								
079 CRUSHER OPTR (100%)								
376 TRUCK DRIVER (33%)								
618 GREASER; OILER (33%)								
(6) LOCATIONS								
179 BALL, ROD, PEBBLE MILL OPTR (40%)								
604 MECHANIC (21%)								
649 ADMN, SUPERVISORY, MGT PERSNL (10%)								
(5) OCCUPATIONS								
079 CRUSHER OPTR (50%)								
604 MECHANIC (21%)								
(6) LOCATIONS								
376 TRUCK DRIVER (33%)								
618 GREASER; OILER (33%)								
(5) OCCUPATIONS								
079 CRUSHER OPTR (100%)								
604 MECHANIC (21%)								
(6) LOCATIONS								
006 SURFACE CRUSHING (11%)								
008 SURFACE FLTIN, RGTS (19%)								
(6) LOCATIONS								
006 SURFACE CRUSHING (32%)								
008 SURFACE FLTIN, RGTS (19%)								
010 SURFACE MILL (2%)								

RUN DATE: 03/21/90

TABLE 4, PAGE 28 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHELL OIL COMPANY				
SHELL RIMULA OIL 30	9	9	8	605 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (100%)			005 SURFACE SHOP (12%)	
604 MECHANIC (14%)			004 SURFACE MINE (41%)	
SHELL ROTELLA OIL 10W	5	5	4	440 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
376 TRUCK DRIVER (33%)			004 SURFACE MINE (18%)	
			005 SURFACE SHOP (12%)	
SHELL ROTELLA OIL 20W/20	7	7	6	165 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (38%)			010 SURFACE MILL (10%)	
			007 SURFACE GRINDING (3%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 29 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHELL OIL COMPANY				
SHELL ROTELLA T MULTIGRADE, 15W-40	13	13	12	440 GALS.
(5) OCCUPATIONS				
376 TRUCK DRIVER (67%) 604 MECHANIC (29%)	379 DRYER OPTR; KILN OPTR (38%) 619 WELDER (100%)		(6) LOCATIONS	004 SURFACE MINE (12%) 010 SURFACE MILL (10%) 005 SURFACE SHOP (29%)
SHELL ROTELLA T 30	17	17	15	660 GALS.
(5) OCCUPATIONS				
367 SHOVEL OPTR (50%) 378 MOBILE CRANE OPTR (100%) 619 WELDER (100%)	376 TRUCK DRIVER (100%) 604 MECHANIC (29%) 879 BAGGING OR PACKING WRKR (54%)		(6) LOCATIONS	004 SURFACE MINE (29%) 005 SURFACE SHOP (29%) 010 SURFACE MILL (12%)
SHELL SPIRAX HD 85W/140	4	4	4	1,080 LBS.
(5) OCCUPATIONS				
604 MECHANIC (29%)			(6) LOCATIONS	005 SURFACE SHOP (24%)

RUN DATE: 03/21/90

TABLE 4, PAGE 30 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHELL OIL COMPANY				
SHELL TELLUS OIL 10	1	1	1	55 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%)			006 SURFACE CRUSHING (5%)	
SHELL TELLUS OIL 32	5	5	4	275 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
368 BULLDOZER OPTR (100%)			004 SURFACE MINE (18%) 005 SURFACE SHOP (12%)	
SHELL TELLUS OIL 68	8	8	7	5,775 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
367 SHOVEL OPTR (50%) 879 BAGGING OR PACKING WRKR (23%)			004 SURFACE MINE (6%) 005 SURFACE SHOP (24%) 010 SURFACE MILL (5%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 31 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHELL OIL COMPANY				
SHELL TORCULA OIL 100	2	2	2	193 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (50%)	833 DRILL HELPER; CHUCK TENDER (50%)		004 SURFACE MINE (12%)	
SHELL TORCULA OIL 68	2	2	2	275 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (50%)	833 DRILL HELPER; CHUCK TENDER (50%)		004 SURFACE MINE (12%)	
SHELL TURBO OIL 320	3	3	3	165 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)	618 GREASER; OILER (33%)		007 SURFACE GRINDING (9%)	
SHELL TURBO OIL 68	1	1	1	80 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
618 GREASER; OILER (33%)			007 SURFACE GRINDING (3%)	

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
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SHELL OIL COMPANY

SHELL TURBO T OIL 220	4	4	4	248 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)		618 GREASER; OILER (67%)	007 SURFACE GRINDING (9%) 008 SURFACE FLTN, RGTS (5%)	

SHELL VALVATA OIL J-680	2	2	2	385 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%)		376 TRUCK DRIVER (33%)	006 SURFACE CRUSHING (11%)	

SHELL X-100 SINGLE GRADE MOTOR OIL, SAE 30	14	14	12	935 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
079 CRUSHER OPTR (50%) 604 MECHANIC (29%) 619 WELDER (100%)		379 DRYER OPTR; KILN OPTR (38%) 618 GREASER; OILER (67%)	006 SURFACE CRUSHING (5%) 007 SURFACE GRINDING (9%) 008 SURFACE FLTN, RGTS (10%) 010 SURFACE MILL (12%) 005 SURFACE SHOP (18%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 33

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SHERWIN-WILLIAMS COMPANY / INDUSTRIAL SUPPLY SPRAYON PRODUCTS DIVISION				
SPRAYON 607 BELT DRESSING (AEROSOL)	3	3	3	8 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)			010 SURFACE MILL (5%)	
SKIL CORPORATION				
SKIL DISC GRINDING WHEEL, #72020	1	1	1	1 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (7%)			005 SURFACE SHOP (6%) 007 SURFACE GRINDING (3%) 010 SURFACE MILL (2%)	
SPARTAN CHEMICAL COMPANY				
SPARTAN CUSTOM CAR WASH LIQUID DETERGENT CONCENTRATE	3	3	3	15 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
679 FLOTATION/CONCTR OPTR (50%)			008 SURFACE FLTN, RGTS (14%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 34

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
SPARTAN CHEMICAL COMPANY				
SPARTAN GERMICIDAL BOWL CLEANER	1	1	1	3 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
613 CLEANUP MAN (100%)			007 SURFACE GRINDING (3%)	
SPARTAN TNT TUB AND TILE CLEANER (AEROSOL)	1	1	1	28 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
613 CLEANUP MAN (100%)			007 SURFACE GRINDING (3%)	
STERLING ABRASIVE PRODUCTS CO.				
GALAXY TYPE 27 A24RG GRINDING DISC	1	1	1	8 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
619 WELDER (100%)			005 SURFACE SHOP (6%)	

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
STULZ-SICKLES STEEL CO.				
STULZ MANGANESE XL ELECTRODES	3	3	3	350 LBS.
OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)				006 SURFACE CRUSHING (16%)
TEXACO REFINING AND MARKETING, INC.				
TEXACO CRATER 5X	6	6	5	420 LBS.
OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)				010 SURFACE MILL (10%)
604 MECHANIC (7%)				
THERMACOTE WELCO				
WELCO ALLOY ER308L	2	2	2	40 LBS.
OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)				007 SURFACE GRINDING (6%)

RUN DATE: 03/21/90

TABLE 4, PAGE 36 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
THERMACOTE WELCO				
WELCO-MATIC WELDING WIRE, ALLOY 4043	1	1	1	16 LBS.
(5) OCCUPATIONS				
619 WELDER (100%)			(6) LOCATIONS	
			005 SURFACE SHOP (6%)	
TOPSALL LUBRICANTS				
TOPSALL SYNTHOLUBE NS	8	8	7	900 LBS.
(5) OCCUPATIONS				
379 DRYER OPTR; KILN OPTR (19%)			(6) LOCATIONS	
604 MECHANIC (14%)			010 SURFACE MILL (14%)	
649 ADMN, SUPERVISORY, MGT PERSNL (10%)				
UNIVERSAL COOPERATIVES, INC.				
B660 MULTIPURPOSE GREASE	13	13	12	175 LBS.
(5) OCCUPATIONS				
079 CRUSHER OPTR (50%)			(6) LOCATIONS	
604 MECHANIC (21%)			006 SURFACE CRUSHING (26%)	
879 BAGGING OR PACKING WRKR (54%)			010 SURFACE MILL (19%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 37 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
UNIVERSAL GRINDING WHEEL CO., INC.				
UNIVERSAL PRECISION UNI-CUT A24UBF T27 GRINDING DISC	1	1	1	3 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (7%)			005 SURFACE SHOP (6%)	
			007 SURFACE GRINDING (3%)	
			010 SURFACE MILL (2%)	
UNOCAL				
UNOCAL STEAVAL B-110	12	12	11	2,640 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
179 BALL, ROD, PEBBLE MILL OPTR (30%)			007 SURFACE GRINDING (22%)	
602 ELECTRICIAN (100%)			010 SURFACE MILL (10%)	
618 GREASER; OILER (33%)				
U2 ENGINEERED PRODUCTS				
U2 ENGINE STARTER, #10700 (AEROSOL)	2	2	2	12 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	

RUN DATE: 03/21/90

TABLE 4, PAGE 38

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
VERSACHEM CORPORATION				
VERSACHEM LOW VOLATILE SILICONE BLACK RTV GASKET MAKER, TYPE 273	2	2	2	2 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	
WAGNER DIVISION / COOPER INDUSTRIES, INC.				
WAGNER PREMIUM BRAKE FLUID, HEAVY DUTY DOT 3	2	2	2	20 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (14%)			005 SURFACE SHOP (12%)	
WD-40 COMPANY				
WD-40 (AEROSOL)	15	15	13	98 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
602 ELECTRICIAN (100%)				005 SURFACE SHOP (41%)
618 GREASER; OILER (33%)				008 SURFACE FLTN, RGTS (5%)
				010 SURFACE MILL, (12%)

RUN DATE: 03/21/90

TABLE 4, PAGE 39 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

TRADENAME PRODUCTS FOUND ON MINE PROPERTY

COMMODITY NAME: KYANITE

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
WILLARD INDUSTRIES, INC.				
ALLOY NO. 7 INGOTS BABBIT	3	3	3	1,000 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
604 MECHANIC (21%)			005 SURFACE SHOP (18%)	
WORKMAN ELECTRONIC PRODUCTS, INC.				
SUPER WISSH WITH SILICONE, #36-048 (AEROSOL)	3	3	3	24 LBS.
(5) OCCUPATIONS			(6) LOCATIONS	
379 DRYER OPTR; KILN OPTR (19%)			010 SURFACE MILL (5%)	
WORLD-WIDE PRODUCTS / DIVISION PWT				
DRILLING FOAM	2	2	2	40 GALS.
(5) OCCUPATIONS			(6) LOCATIONS	
334 WAGON DRILL OPTR (50%)			004 SURFACE MINE (12%)	
833 DRILL HELPER; CHUCK TENDER (50%)				

PHYSICAL AGENT CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: KYANITE

PHYSICAL AGENT CONDITION	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)
NOISE	87	87	77

(5)
OCCUPATIONS

079 CRUSHER OPTR (50%)
334 WAGON DRILL OPTR (100%)
368 BULLDOZER OPTR (100%)
378 MOBILE CRANE OPTR (100%)
514 LABORATORY TECHNICIAN (100%)
604 MECHANIC (100%)
618 GREASER; OILER (100%)
649 ADMN, SUPERVISORY, MGT PERSNL (100%)
833 DRILL HELPER; CHUCK TENDER (100%)

179 BALL, ROD, PEBBLE MILL OPTR (100%)
367 SHOVEL OPTR (50%)
376 TRUCK DRIVER (100%)
379 DRYER OPTR; KILN OPTR (81%)
602 ELECTRICIAN (100%)
613 CLEANUP MAN (100%)
619 WELDER (100%)
679 FLOTATION/CONCTR OPTR (100%)
879 BAGGING OR PACKING WRKR (100%)

(6)
LOCATIONS

009 SURFACE MISC (40%)
005 SURFACE SHOP (53%)
006 SURFACE CRUSHING (79%)
007 SURFACE GRINDING (91%)
008 SURFACE FLTN, RGTS (76%)
004 SURFACE MINE (82%)
010 SURFACE MILL (53%)

RADIATION, MISCELLANEOUS

21

21

19

(5)
OCCUPATIONS

379 DRYER OPTR; KILN OPTR (56%)
618 GREASER; OILER (33%)

604 MECHANIC (36%)
649 ADMN, SUPERVISORY, MGT PERSNL (60%)

(6)
LOCATIONS

010 SURFACE MILL (36%)

SEGMENTAL BODY VIBRATION

14

14

12

(5)
OCCUPATIONS

334 WAGON DRILL OPTR (100%)
619 WELDER (100%)

604 MECHANIC (64%)
833 DRILL HELPER; CHUCK TENDER (100%)

(6)
LOCATIONS

007 SURFACE GRINDING (6%)
005 SURFACE SHOP (47%)
004 SURFACE MINE (24%)

PHYSICAL AGENT CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: KYANITE

PHYSICAL AGENT CONDITION			
(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)	
TEMPERATURE (PROCESS RELATED)			
			(4)
			(5)
OCCUPATIONS			(6) LOCATIONS
379 DRYER OPTR; KILN OPTR (100%)			005 SURFACE SHOP (29%)
604 MECHANIC (100%)			010 SURFACE MILL (73%)
618 GREASER; OILER (67%)			
649 ADMN, SUPERVISORY, MGT PERSNL (50%)			
WHOLE BODY VIBRATION			
			(4)
			(5)
OCCUPATIONS			(6) LOCATIONS
079 CRUSHER OPTR (100%)			004 SURFACE MINE (53%)
367 SHOVEL OPTR (100%)			006 SURFACE CRUSHING (63%)
376 TRUCK DRIVER (100%)			008 SURFACE FLTN, RGTS (100%)
379 DRYER OPTR; KILN OPTR (100%)			007 SURFACE GRINDING (100%)
604 MECHANIC (71%)			010 SURFACE MILL (69%)
618 GREASER; OILER (100%)			
679 FLOTATION/CONCTR OPTR (100%)			

RUN DATE: 03/21/90

TABLE 6, PAGE 1

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: KYANITE

	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)
MUSCULOSKELETAL CONDITION			
AWKWARD LIFTING	6	6	5
(5) OCCUPATIONS			(6) LOCATIONS
604 MECHANIC (43%)			005 SURFACE SHOP (12%) 006 SURFACE CRUSHING (16%) 007 SURFACE GRINDING (3%) 008 SURFACE FLTIN, RGTS (14%) 010 SURFACE MILL (2%)
FOREARM, ARM, AND SHOULDER	10	10	9
(5) OCCUPATIONS			(6) LOCATIONS
604 MECHANIC (71%)			005 SURFACE SHOP (41%) 006 SURFACE CRUSHING (16%) 007 SURFACE GRINDING (6%) 008 SURFACE FLTIN, RGTS (14%) 010 SURFACE MILL (2%)
DIMINISHED LIGHT	26	26	23
(5) OCCUPATIONS			(6) LOCATIONS
179 BALL, ROD, PEBBLE MILL OPTR (70%) 604 MECHANIC (14%) 679 FLOTATION/CONCTR OPTR (50%)	379 DRYER OPTR; KILN OPTR (63%) 619 WELDER (100%) 879 BAGGING OR PACKING WRKR (23%)		007 SURFACE GRINDING (31%) 005 SURFACE SHOP (18%) 008 SURFACE FLTIN, RGTS (14%) 010 SURFACE MILL (34%)

RUN DATE: 03/21/90

TABLE 6, PAGE 2

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: KYANITE

	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)
MUSCULOSKELETAL CONDITION			
FINGER AND HANDS	17	17	15
(5)			(6)
OCCUPATIONS			LOCATIONS
379 DRYER OPTR; KILN OPTR (19%)			004 SURFACE MINE (12%)
604 MECHANIC (79%)	602 ELECTRICIAN (100%)		006 SURFACE CRUSHING (26%)
649 ADMN, SUPERVISORY, MGT PERSNL (10%)	619 WELDER (100%)		008 SURFACE FLTN, RGTS (24%)
			005 SURFACE SHOP (71%)
			007 SURFACE GRINDING (19%)
			010 SURFACE MILL (20%)
FREQUENT LIFTING	15	15	13
(5)			(6)
OCCUPATIONS			LOCATIONS
179 BALL, ROD, PEBBLE MILL OPTR (40%)			010 SURFACE MILL (25%)
879 BAGGING OR PACKING WRKR (54%)	379 DRYER OPTR; KILN OPTR (25%)		
HEAVY LIFTING	41	41	36
(5)			(6)
OCCUPATIONS			LOCATIONS
179 BALL, ROD, PEBBLE MILL OPTR (70%)	334 WAGON DRILL OPTR (100%)		006 SURFACE CRUSHING (16%)
379 DRYER OPTR; KILN OPTR (25%)	602 ELECTRICIAN (100%)		007 SURFACE GRINDING (13%)
604 MECHANIC (79%)	619 WELDER (100%)		008 SURFACE FLTN, RGTS (14%)
833 DRILL HELPER; CHUCK TENDER (100%)	879 BAGGING OR PACKING WRKR (100%)		005 SURFACE SHOP (29%)
			004 SURFACE MINE (24%)
			010 SURFACE MILL (47%)

RUN DATE: 03/21/90

TABLE 6, PAGE 3

NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: KYANITE

	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)
MUSCULOSKELETAL CONDITION			
LOWER LIMB	39	39	35
(5) OCCUPATIONS			(6) LOCATIONS
079 CRUSHER OPTR (100%)	334 WAGON DRILL OPTR (100%)		007 SURFACE GRINDING (22%)
376 TRUCK DRIVER (33%)	379 DRYER OPTR; KILN OPTR (100%)		008 SURFACE FLTN, RGTS (33%)
602 ELECTRICIAN (100%)	604 MECHANIC (79%)		010 SURFACE MILL, (44%)
618 GREASER; OILER (100%)	619 WELDER (100%)		005 SURFACE SHOP (29%)
833 DRILL HELPER; CHUCK TENDER (100%)			006 SURFACE CRUSHING (47%)
			004 SURFACE MINE (24%)
NECK AND/OR BACK	59	59	52
(5) OCCUPATIONS			(6) LOCATIONS
079 CRUSHER OPTR (100%)	179 BALL, ROD, PEBBLE MILL OPTR (30%)		005 SURFACE SHOP (71%)
334 WAGON DRILL OPTR (100%)	368 BULLDOZER OPTR (100%)		006 SURFACE CRUSHING (74%)
376 TRUCK DRIVER (33%)	379 DRYER OPTR; KILN OPTR (100%)		007 SURFACE GRINDING (28%)
602 ELECTRICIAN (100%)	604 MECHANIC (79%)		008 SURFACE FLTN, RGTS (67%)
613 CLEANUP MAN (100%)	618 GREASER; OILER (100%)		004 SURFACE MINE (53%)
619 WELDER (100%)	649 ADMN, SUPERVISORY, MGT PERSNL (10%)		010 SURFACE MILL (59%)
679 FLOTATION/CONCTR OPTR (100%)	833 DRILL HELPER; CHUCK TENDER (100%)		
879 BAGGING OR PACKING WRKR (46%)			
PRONE OR SUPINE LYING	4	4	4
(5) OCCUPATIONS			(6) LOCATIONS
604 MECHANIC (29%)			005 SURFACE SHOP (24%)

MUSCULOSKELETAL OVERLOAD CONDITIONS IDENTIFIED ON MINE PROPERTY

COMMODITY NAME: KYANITE

	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)
MUSCULOSKELETAL CONDITION			
WRIST	14	14	12
(5) OCCUPATIONS			(6) LOCATIONS
602 ELECTRICIAN (100%)			006 SURFACE CRUSHING (26%)
619 WELDER (100%)			008 SURFACE FLTN, RGTS (24%)
	604 MECHANIC (79%)		005 SURFACE SHOP (71%)
	649 ADMN, SUPERVISORY, MGT PERSNL (10%)		007 SURFACE GRINDING (19%)
			010 SURFACE MILL (15%)

WELDING POTENTIAL EXPOSURE

COMMODITY NAME: KYANITE

(1)
#WORKERS
POTENTIALLY
EXPOSED
(OBSERVED)

(2)
#WORKERS
POTENTIALLY
EXPOSED
(PREDICTED)

(3)
%WORKERS
POTENTIALLY
EXPOSED
(PREDICTED)

WELDING PROCESS

SHIELD METAL ARC WELDING

25

22

(5)

OCCUPATIONS

079 CRUSHER OPTR (50%)
379 DRIVER OPTR; KILN OPTR (44%)
604 MECHANIC (79%)
649 ADMN, SUPERVISORY, MGT PERSONL (30%)

376 TRUCK DRIVER (33%)
602 ELECTRICIAN (100%)
619 WELDER (100%)

(6)
LOCATIONS

005 SURFACE SHOP (82%)
006 SURFACE CRUSHING (47%)
007 SURFACE GRINDING (19%)
008 SURFACE FLTN, RGTS (29%)
010 SURFACE MILL (31%)

ELECTROGAS WELDING

3

3

(5)

OCCUPATIONS

604 MECHANIC (14%)

619 WELDER (100%)

(6)
LOCATIONS

005 SURFACE SHOP (18%)

OXYFUEL GAS CUTTING

25

22

(5)

OCCUPATIONS

079 CRUSHER OPTR (50%)
379 DRIVER OPTR; KILN OPTR (44%)
604 MECHANIC (79%)
649 ADMN, SUPERVISORY, MGT PERSONL (30%)

376 TRUCK DRIVER (33%)
602 ELECTRICIAN (100%)
619 WELDER (100%)

(6)
LOCATIONS

005 SURFACE SHOP (82%)
006 SURFACE CRUSHING (42%)
007 SURFACE GRINDING (19%)
008 SURFACE FLTN, RGTS (29%)
010 SURFACE MILL (29%)

RUN DATE: 03/21/90

TABLE 7, PAGE 2 NOTE: THIS TABLE DOES NOT CONTAIN TRADE SECRET DATA.

WELDING POTENTIAL EXPOSURE

COMMODITY NAME: KYANITE

WELDING PROCESS	(1) #WORKERS POTENTIALLY EXPOSED (OBSERVED)	(2) #WORKERS POTENTIALLY EXPOSED (PREDICTED)	(3) %WORKERS POTENTIALLY EXPOSED (PREDICTED)
PLASMA ARC CUTTING	3	3	3
(5) OCCUPATIONS	(6) LOCATIONS		
604 MECHANIC (14%)	619 WELDER (100%)	010 SURFACE MILL (3%)	005 SURFACE SHOP (6%)
GAS TUNGSTEN ARC SPOT WELDING	2	2	2
(5) OCCUPATIONS	(6) LOCATIONS		
604 MECHANIC (14%)	007 SURFACE GRINDING (6%)		

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				14.	
16. Abstract (Limit: 200 words) This report prepared by the National Occupational Health Survey of Mining presented statistics concerning safety in kyanite facilities (SIC-1459). Three kyanite facilities were surveyed in February, 1988; another site was inactive at the time of the survey. Information on products and conditions to which workers were potentially exposed was provided in tabular form. For the kyanite commodity there were 16 Mine Safety and Health Administration (MSHA) regulated chemicals, two chemicals that had NIOSH recommended exposure limits but that are not regulated by MSHA, ten chemicals that had neither NIOSH nor MSHA recommended exposure limits, 119 trade name products, five physical agent conditions, ten musculoskeletal overload conditions, and five welding processes. The number of workers potentially exposed to each product or condition was included, and information was provided on the occupations of potentially exposed workers and locations where workers had potential exposure. For each chemical, an estimate of the annual usage was made.					
17. Document Analysis a. Descriptors b. Identifiers/Open-Ended Terms NIOSH-Publication, Miners, Mining-industry, Aluminum-compounds, Occupational-exposure, Musculoskeletal-system, Welders, Occupational-hazards, Silicates c. COSATI Field/Group					
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