UC 1440-2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METALS DIVISION

P. O. BOX 579 · 1625 ROYAL AVE., NIAGARA FALLS, NEW YORK 1430

To: Messrs. G.R. Adams
W.B. DeAtley
R.L. Folkman
E.W. Kantz+R.G. Beverly
P.W. McDaniel
J.L. Myers
R.W. Rebholz+F.J. Shortsleeve
G. Rouse
J.B. Rouse
J.J. Sibley
A.G. Voress
J.J. Whittlesey

Date: June 4, 1980

Originating Dept.: "Calidria" Asbestos

Answering letter date:

Subject:

The attached report is pretty well self-explanitory but I will be glad to try to answer any questions you may have. The results show some fairly high exposures in the early days of our operations but also clearly demonstrate a long standing and effective program to reduce exposure. Although these are area concentrations, not personal exposures, they indicate that our operations have generally been in compliance with the standards that were applicable at the time. This is not a particular issue here so it has not been emphasized in the discussion.

These data are not the kind of thing we have ordinarily released in the past, but I feel the EPA has the power to obtain it if they feel it is worth the effort. It is not particularly sensitive information so it is recommended that we provide it.

We are about two months past the time it had been expected that we would provide this information and are receiving weekly phone calls inquiring about its progress. It would be very much appreciated if you could get any comments you wish to make back to me on Friday, June 6 or to John Myers by noon on Monday, June 9 so we can release the report.

Very truly yours,

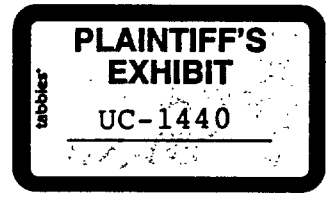
H. B. Rhodes

[redacted]

HBR:vs

Attachment

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DRAFT

June 4, 1980

Dr. Richard A. Ziskand
Science Applications, Incorporated
1801 Avenue of the Stars, Suite 1205
Los Angeles, California 90067

Dear Dr. Ziskand:

The attached report provides the information you requested regarding asbestos concentrations in the vicinity of the Union Carbide asbestos mine and mill in California. If you have any questions please let me know. We would be very interested to hear the results of your analysis of this data.

Very truly yours,

H.B. Rhodes

H.B. Rhodes
Technology Manager

HBR:vs

Attachments

A09641

D R A F T

June 3, 1980

OUTDOOR AIRBORNE ASBESTOS CONCENTRATIONS AT THE UNION CARBIDE ASBESTOS MINING AND MILLING OPERATIONS IN CALIFORNIA

Prepared at the request of:

Science Applications, Incorporated
1801 Avenue of the Stars, Suite 1205
Los Angeles, California 90067

By

H.B. Rhodes
Union Carbide Corporation
Metals Division
Niagara Falls, New York 14302

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INTRODUCTION

Science Applications, Incorporated under contract from the Environmental Protection Agency is conducting a study of the impact of various asbestos sources in California on the surrounding population. Union Carbide Corporation was asked and agreed to provide, certain historical information on airborne asbestos at their mine and mill. Particular emphasis was placed on property line measurements in order to estimate general population exposures.

BACKGROUND

The Union Carbide asbestos mill near King City, California started up in 1963 and has been in essentially regular operation since that time. The mill uses a unique wet process which greatly facilitates control of both worker exposure and environmental asbestos release.

Ore is mined by a cut-and-bench procedure in the Diablo Mountains about 55 road miles away. Mining takes place for about a two-month period every three years with the mined material stockpiled at the mine.

Ore is hauled to the mill by truck for about six months each summer. Sufficient material is stored at the mill to last through the winter when rain makes the mine site impassible.

A comprehensive industrial hygiene program has been carried out at this location since 1963. The program includes worker exposure monitoring, regular medical surveillance, and worker safety and health training. Extensive efforts have been made to reduce both exposure and emissions.

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ASBESTOS CONCENTRATION MEASUREMENTS

The main emphasis in the industrial hygiene program was on worker protection so the great majority of the concentration measurements were made in the direct proximity to the workers and were generally within the mill. Rather limited sampling was included, however, at the fence lines and occasionally at various places closer to the mill building. These data provided.

Seven sets of area samples have been collected over the years at the mine. With one exception, these were all in the immediate vicinity of active mining and milling operations. They are provided with the understanding that they are not property line measurements.

From 1963 through early 1969 concentrations were measured with the midget impinger. The NIOSH phase contrast method was adopted in mid-1969 and is still in use. No measurements have been made with electron microscopy procedures.

When the change from midget impinger to phase contrast microscopy was made in 1969, a rather crudely documented conversion factor of 2 fibers/cc >5μ per million particles per cubic foot was developed from comparative measurements. It is both well known and obvious that the conversion from particles to fibers is not a universal factor but will be considerably influenced by the characteristics of the dust cloud being sampled. A wide range of factors have been proposed for this conversion. Since the value of 2 falls within this range and since there is not basis to adjust it to any other value, it has been used in reporting the present data.

A09644

RESULTS AND DISCUSSION

The airborne concentrations measured from 1963 through the present in the vicinity around the mill are summarized in Table I and are shown graphically in Figure 1. A layout of the mill property is provided in Figure 2.

Figure 1 gives the airborne concentrations, expressed as fibers/cc >5μ, as a function of the month and year in which they were measured. The place where the measurement procedure was changed from midget impinger to optical phase contrast is also indicated. Most of the data were taken at the property boundry with that from the north fenceline indicated by an open circle and that from the south fenceline by a triangle. For several of the later years a substantial number of samples were collected in close proximity to the mill and these results are shown by the solid circles.

A very approximate trend line has been included on the Figure. It is immediately evident that a reduction in concentration of about three orders of magnitude has been made since the plant started up in the early 1960's. The fenceline levels are now generally below 0.1 fiber/cc which NIOSH has designated as the detection limit for the method[1]. As might be expected, the levels directly around the mill tend to be higher than the fenceline but are still quite low.

The data for the concentrations during the mining and hauling of asbestos ore are shown in Table 2 and Figure 3. It should be reiterated that these are not property line concentrations but were measured during active operations. Here there has been a reduction in concentration of approximately two orders of magnitude. The levels are now well below the current occupational standard of 2 fibers/cc >5μ.

(1) These data are included even though there are serious technical reservations regarding the reliability of the measurement method at this apparent concentration level. This is not the place to address this critically important issue.

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PROPERTY LINE AIRBORNE ASBESTOS

CONCENTRATIONS - UNION CARBIDE CORPORATION

KING CITY ASBESTOS MILL

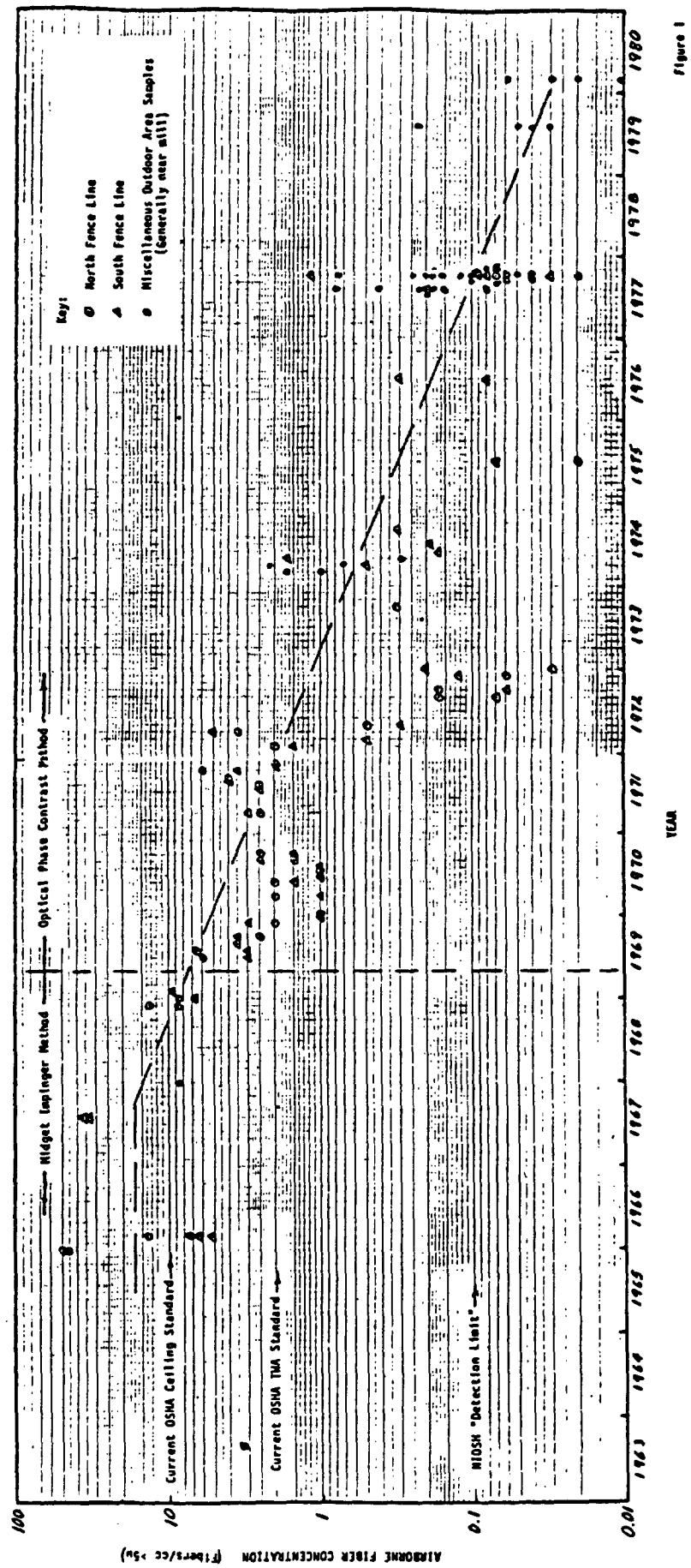
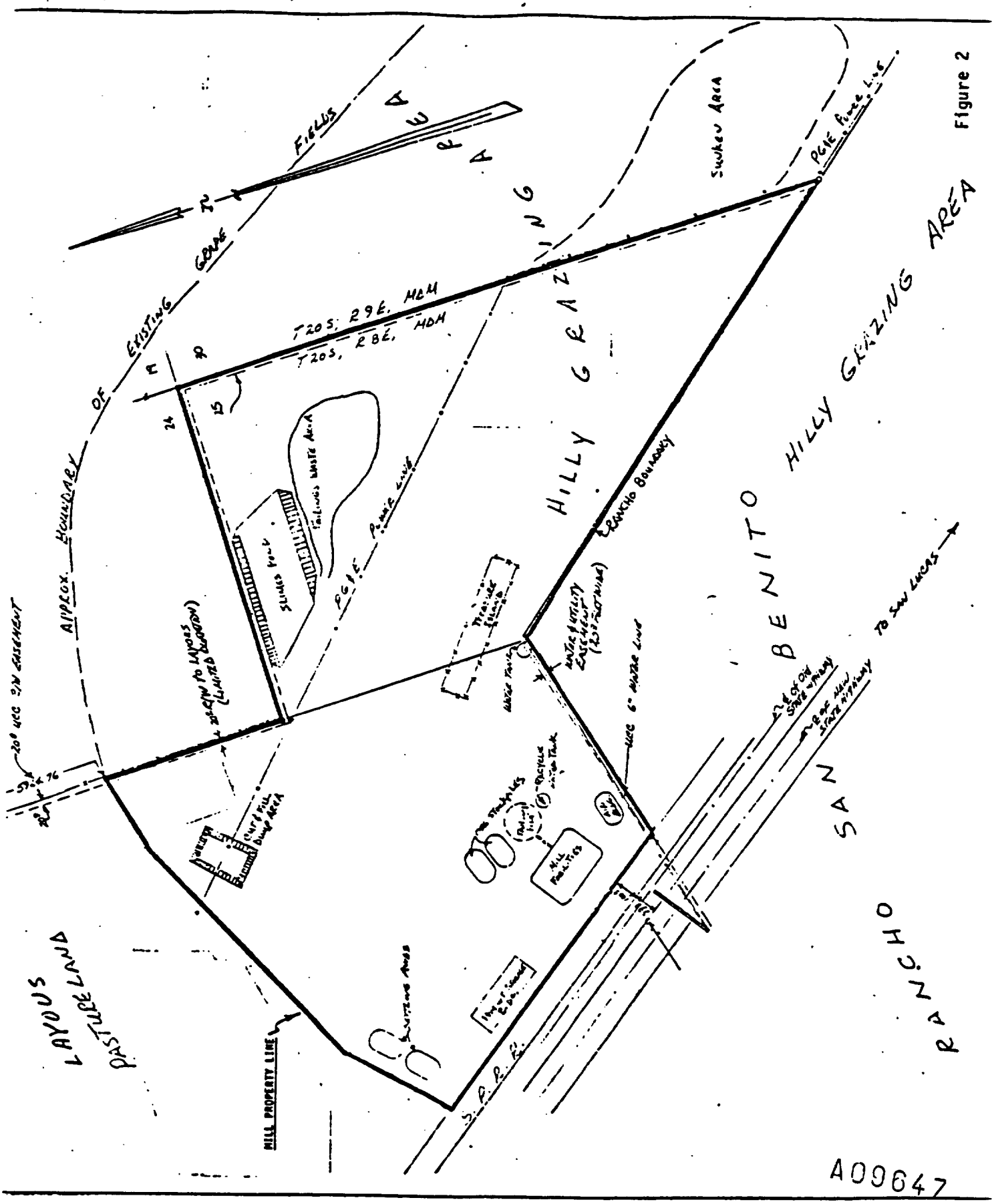


Figure 1

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Union Carbide trial exhibit UC-1440: H. B. Rhodes Memo Circulating Draft Report on Outdoor Airborne Asbestos C...
ACL Doc 16571 · Page 9 of 35

AREA AIRBORNE ASBESTOS CONCENTRATIONS
DURING MINING AND HAULING - UNION
CARBIDE CORPORATION ASBESTOS MINE

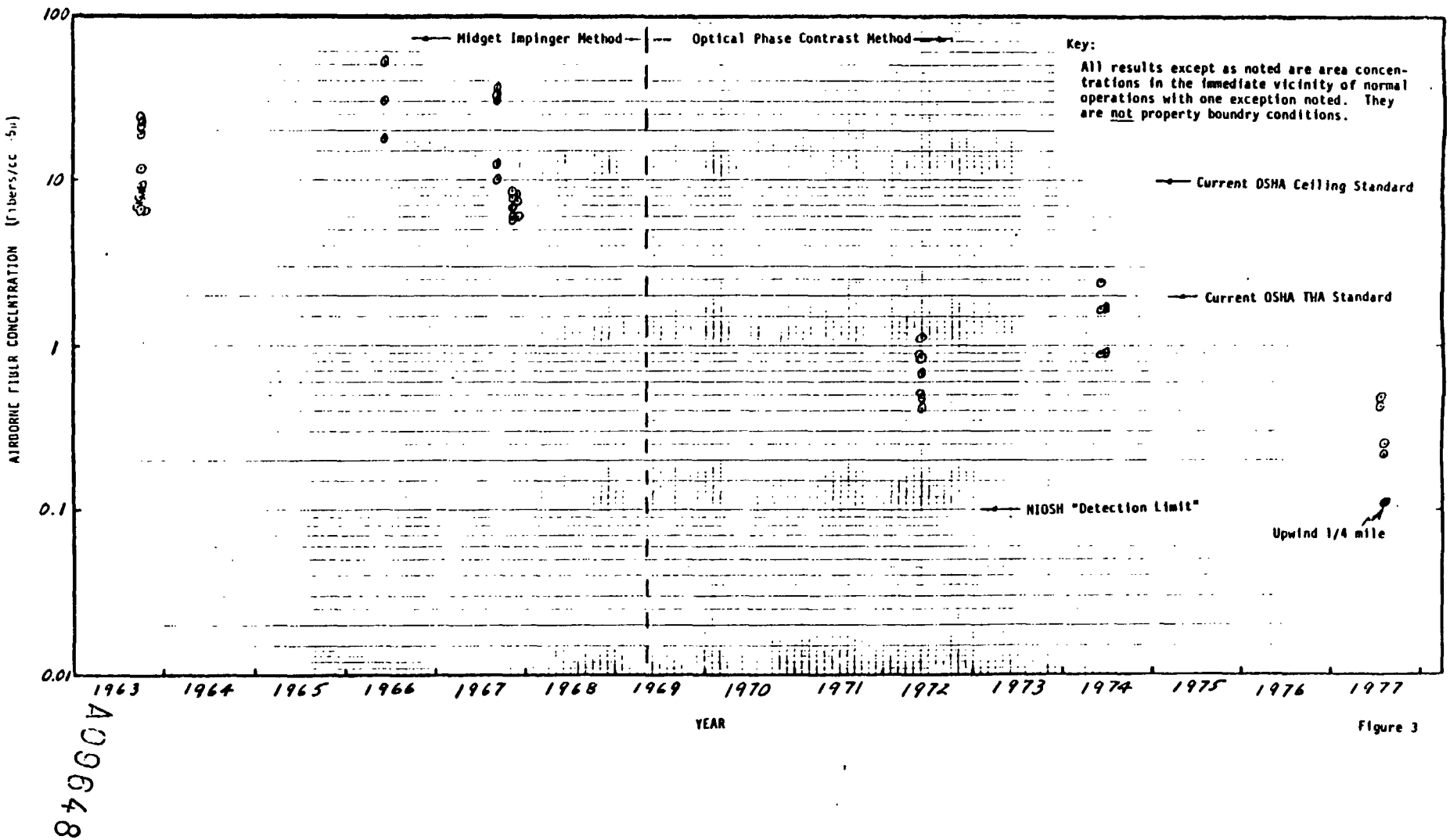


Figure 3

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TABLE I

AIRBORNE AREA FIBER CONCENTRATIONS

Sample Location	1963 Sept. Mppcf[1]	1963 Sept. f/cc[2]	1966 Jan. Mppcf	1966 Jan. f/cc	1966 March Mppcf	1966 March f/cc	1967 Aug. Mppcf	1967 Aug. f/cc	1968 Jan. Mppcf	1968 Jan. f/cc	1968 Dec. Mppcf	1968 Dec. f/cc
North Fence Line	-	-	22.7 24.1	45.8 48.2	3.8 7.0	7.6 14.0	-	-	-	-	6.6 4.4	13.2 8.8
South Fence Line	-	-	-	-	2.6 3.2	5.2 6.4	16.7 18.2	33.4 36.4	-	-	-	-
Mill Ore Stockpile	1.7	3.4	-	-	-	-	-	-	-	-	-	-
Parking Lot	-	-	-	-	-	-	-	-	-	-	-	-

Sample Location	1969 Jan. Mppcf[1]	1969 Jan. f/cc[2]	1969 Feb. Mppcf	1969 Feb. f/cc	1969 July f/cc[3]	1969 Aug. f/cc	1969 Sept. f/cc	1969 Oct. f/cc	1969 Dec. f/cc	1970 Jan. f/cc	1970 Apr. f/cc	1970 June f/cc	1970 July f/cc	1970 Aug. f/cc	1970 Sept. f/cc	1970 Oct. f/cc
North Fence Line	4.3	8.6	-	-	6	7.5	-	2.5	2	1	2	2	1	0	1.5	2.5
South Fence Line	3.4	6.8	4.8	9.6	3	3	3.5	3.5	3	1	1	1.5	1	1	2.5	2

Sample Location	1971 Apr. f/cc	1971 Aug. f/cc	1971 Sept. f/cc	1971 Oct. f/cc	1971 Nov. f/cc	1972 Feb. f/cc	1972 Mar. f/cc	1972 Apr. f/cc	1972 May f/cc	1972 Sept. f/cc	1972 Oct. f/cc	1972 Dec. f/cc	1973 Jan. f/cc	1973 Oct. f/cc	1974 Feb. f/cc	1974 Mar. f/cc	1974 Apr. f/cc	1974 May f/cc	1974 June f/cc	1974 July f/cc	1974 Sept. f/cc	1974 Oct. f/cc
North Fence Line	2.5	2.5	4.0	6.0	2.0	2.0	-	3.4	0.5	0.17	0.17	0.06	0.03	0.32	-	-	-	-	-	-	-	-
South Fence Line	3.0	2.5	4.0	3.5	2.0	1.5	0.4	5.1	0.3	0.07	0.06	0.24	0.21		-	-	0.5	1.7	0.17	0.19	0.31	-
South Edge, Tailings Dam	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-
Southeast Edge, Tailings Dam	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-
Product Storage Area	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	2.2	0.3	-	-	-	-
Mill Ore Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	0.7	-	-	-	-	-

Sample Location	1975 f/cc	1976 July f/cc	1977 August f/cc	1977 August f/cc	1977 August f/cc	1977 August f/cc	1977 October f/cc	1977 October f/cc	1977 October f/cc	1977 October f/cc	1978 f/cc	1979 Aug. f/cc	1980 Mar. f/cc
North Fence Line	0.02	-	0.08	0.15	0.07	0.04	0.04	0.02	0.06	0.06	-	-	-
South Fence Line	0.07	0.08 0.30*	0.20	-	0.09	-	0.03	1.17	-	0.08	-	-	-
Parking Lot	-	-	0.22	-	0.07	-	0.05	0.08	-	0.10	-	-	-
Back of Maint. Shop	-	-	0.41	-	0.07	-	0.09	0.25	-	0.06	-	-	-
East Corner of Mill (RG-244)	-	-	-	0.18	-	0.19	-	0.07	-	-	-	-	-
West Side of Mill (RG Surge Tank)	-	-	-	0.19	-	0.20	-	-	0.12	-	-	-	-
West Side of Mill (Main Bagger)	-	-	-	0.80	-	0.78	-	-	0.10	-	-	-	-
Southwest Corner (Gas Meter)	-	-	-	-	-	-	-	-	-	-	-	0.31	0.02
Electric Substation	-	-	-	-	-	-	-	-	-	-	-	0.04	0.03
North Loading Dock (S. Side)	-	-	-	-	-	-	-	-	-	-	-	0.05	0.06
North Loading Dock (N. Side)	-	-	-	-	-	-	-	-	-	-	-	0.03	0.01

*Near Water Tank

1. Mppcf = Millions of particles per cubic foot. Measured by midget impinger. Conversion factor of 2 fibers/cc >5μ per million particles per cubic foot used.
2. f/cc = Fibers longer than 5 microns per cubic centimeter.
3. All counts after July 1969 are by the membrane filter method.

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TABLE II

AIRBORNE CONCENTRATIONS

DURING MINING AND HAULING OPERATIONS

SEPTEMBER, 1963

Sampling Location and Operation	Remarks	Mppcf[1]	f/cc[2]
Alongside wobbler during loading trucks.	Variable wind direction and speed so that sampling location is upwind of dust part of time.	4.2 3.8 3.3 3.9	8.4 7.6 6.6 7.8
Riding caterpillars cleaning mine site.	Much large, nonrespirable material noted.	9.6 10.9 11.3 11.8	19.2 21.8 22.6 23.6
Walking across ore pile.	Light breeze (5 mph) from west and south.	3.2 3.4	6.4 6.8
Riding pick-up with windows open on road from mine.	Deep dust on portions of road.	4.7 6.0	9.4 12.0
	JUNE, 1966		
Beside operator of front loader (no cab) loading ore truck.	Contractor operator.	26.0	52.0
Area around truck during loading.	Visible dust.	15.4	30.8
General area around grizzly during truck loading.	Much loose, finely divided material on ground.	14.2	28.4
	AUGUST, 1967		
Beside operator on caterpillar while loosening ore pile.	Not visibly dusty nor very windy.	6.3 5.0	12.6 10.0
Beside operator on front loader while loading grizzly. Conveyor system operating.	Visibly dusty but not very windy.	18.0 15.1 16.7	36.0 30.2 33.4
	OCTOBER, 1967*		
Self-propelled.	Short section of haul road dry and dusty, no wind.	4.4	8.8
Scraper, mining and stockpiling ore 4350 level.	Road freshly watered, no wind.	2.9	5.8
Bulldozer) Push loading scrapers) Ore, 4350 level)	Freshly exposed ore, not watered, no wind.	3.0 3.4 3.9	6.0 6.8 7.8
Bulldozer clearing rocks from pit floor.	Pit floor, not watered, no wind.	4.0	8.0
Front end loader) Feeding screening plant)	Maneuvering area watered several hours earlier, very light breeze.	3.7 3.0	7.4 6.0

(1) Millions of particles per cubic foot.

(2) Fibers/cc >5μ. A conversion factor of 2 f/cc >5μ per

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*The following description of dust control practices in effect was contained in the report of this survey:

"The sampling was conducted on the afternoon of October 25, 1967. All samples were collected adjacent the operator of the particular equipment while performing normal operations. All haul roads and the front end loader maneuvering area adjacent to the mine stock pile had been watered in accordance with standard practice during the mining operations.

It has been practice to water down the front end loader maneuvering area on alternate days pending repair of the air conditioning system. During mining operations it is practice to have a water truck on duty continuously to water mine haul roads, dump areas and the loading area adjacent to the mine stock pile and screening plant. Scraper loading areas were not watered since the freshly exposed asbestos ore is damp. Watering overburden loading areas, however, was found at times to be necessary due to visible dust concentrations."

JUNE, 1972

Sample Location and Time	Conditions	f/cc
1. Front end loader screening ore - 10:10 a.m.	Slight overcast - wind 10-15 mph from north ground and ore damp - cab open on loader - operator wearing respirator - water truck working in area. 70°F - cat working on pile.	1.14
2. At picnic table - 10:19 a.m.	Same as #1. Filter stained by diesel smoke from loader.	0.42
3. Same as #1 - 10:48 a.m.	Same as #1.	0.86
4. Same as #2 - 10:55 a.m.	Same as #1. Filter stained by diesel smoke from loader.	0.68
5. On Cat pushing ore.	Same as #1.	0.86
6. By oil shed - 12:25 p.m.	Wind 10-15 mph fron north. No machinery operating - ground damp - 78°F.	0.48
7. Same as #6 - 12:25 p.m.	Same as #6.	0.50

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MAY, 1974

Location, Time, Min. of Sampling, & Temp.	Conditions	f/cc
1. Mine pit area, east side, 11:05 a.m., 65°F, 30 min.	1. Clear day with east-west intermittent wind about 5-10 mph. 2. Full mining operation. 3. Sampler hand carried around the area.	1.70
2. Mine pit area, west side, 11:45 a.m., 65°F, 15 min.	1. Same as above. 2. Sample was taken for 15 min. because mining operation was stopped for lunch break.	2.46
3. Screening area, 12:35 p.m., 65°F, 30 min.	1. Full screening operation. 2. Clear day with intermittent wind, east-west, at about 5-10 mph. 3. Sampler was hand-carried around the area: 0-10 min. -- Loading section 11-20 min. -- Screening section 21-30 min. -- Stockpile section 4. Full loading operation in hauling trucks. Note: Visible dusts were observed during the loading and screening operations, but the dust could be too big and heavy for the sampler to collect with face down.	0.90
4. Top of ore stockpile, 1:10 p.m., 65°F, 30 min.	1. Clear day with intermittent wind of about 5-10 mph, directions changed to west-east. 2. Full mining operation.	0.90
5. Top of future stockpile, 1:55 p.m., 67°F, 30 min.	1. Same as above.	1.60

A09652

AUGUST 9, 1977

Subject: Area Samples
Location: Joe 5 Minesite (see sketch for Location).
Conditions:
1) Full screening operations.
2) Dozer operation on stockpile.
3) Ore truck loading.
4) Moving oversize material.
5) 2-10 mph intermittent wind (use wind meter).
6) Weather temperature of 92° F.

Remarks: The Joe 5 Mine area has been extremely dry since 8-1-77 because of the exhaustion of the "normal" year arround water supply. The Location of today's samples (see sketch) are such that maximum dust conditions exist whenever traffic passes.

Sample No:	Time	Remarks	f/cc
1-1	11:10 AM-12:10 PM	175A performing +1" rock removal; pick-up traffic. (none*)	0.23
1-2	12:10 PM- 1:10 PM	Four ore trucks and 2 loaders passed; dusty conditions. (none*)	0.65
1-3	1:10 PM- 2:10 PM	Two ore trucks passed; 125A loader performing +12" rock removal. (none*)	0.70
1-4	2:10 PM- 3:10 PM	125A performing +12" rock removal. (none*)	0.29
		Average:	0.47
2-1	11:15 AM-12:15 PM	175A performing +1" rock removal; pick-up traffic. (none*)	0.30
2-2	12:15 PM- 1:15 PM	5 ore trucks passed; 175A loader loading trucks; possible Diesel exhaust with sample. (lots*)	0.61
2-3	1:15 PM- 2:15 PM	1 ore truck passed; same as above. (little to lots*)	0.43
2-4	2:15 PM- 3:15 PM	Light traffic (Pick-up). (none*)	0.37
		Average:	0.43

(*) filter discolored from diesel smoke.

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AUGUST 19, 1977

Subject: Area (3) air samples
Location: Joe 5 Pit (see sketch)
Conditions: 1.) Full screening & Truckloading operation.
2.) Dozer operation on stockpile.
3.) Approximately 5 mph wind with gusty to 10 mph.
4.) Temperature 90° F.

Remarks: Sample No. 3, upwind, approximately $\frac{1}{4}$ mile southeast of Joe 5 Pit center. Approx. elevation 4400'.

Sample No.	Time	Remarks	f/cc
1-1	11:20 AM- 12:20 PM	No traffic.	0.27
1-2	12:20 PM- 13:20 PM	Light traffic within 50'.	0.38
1-3	13:20 PM- 14:20 PM	" " " "	0.20
1-4	14:20 PM- 15:20 PM	No traffic.	0.14
		Average:	0.25
2-1	11:25 AM- 12:25 PM	No traffic.	0.12
2-2	12:25 PM-13:25 PM	Light traffic within 100'.	0.13
2-3	13:25 PM- 14:25 PM	" " " "	0.34
2-4	14:25 PM- 15:25 PM	No traffic.	0.29
		Average:	0.22
3-1	11:40 AM- 12:40 PM	Dormant area, hill top.	0.16
3-2	12:40 PM- 13:40 PM	" " " "	0.10
3-3	13:40 PM- 14:40 PM	" " " "	0.12
3-4	14:40 PM- 15:40 PM	" " " "	0.05
		Average:	0.11

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June 12, 1980

OUTDOOR AIRBORNE ASBESTOS CONCENTRATIONS AT THE UNION CARBIDE ASBESTOS MINING AND MILLING OPERATIONS IN CALIFORNIA

Prepared at the request of:

Science Applications, Incorporated
1801 Avenue of the Stars, Suite 1205
Los Angeles, California 90067

By

H.B. Rhodes
Union Carbide Corporation
Metals Division
Niagara Falls, New York 14302

A09657

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INTRODUCTION

Science Applications, Incorporated, under contract with the Environmental Protection Agency, is conducting a study of the impact of various asbestos sources in California on the surrounding population. Union Carbide Corporation was asked, and agreed to provide, certain historical information on airborne asbestos at its mine and mill. Particular emphasis was placed on property line measurements in order to estimate general population exposures.

BACKGROUND

The Union Carbide asbestos mill near King City, California started up in 1963 and has been in essentially regular operation since that time. The mill uses a unique wet process which greatly facilitates control of both worker exposure and environmental asbestos release.

Ore is mined by a cut-and-bench procedure in the Diablo Mountains about 55 road miles from King City. Mining takes place for about a two-month period every two years and the ore is stockpiled at the mine-site. Ore is hauled to the mill by truck for about six months each summer. Sufficient material is stored at the mill to last through the winter when weather conditions inhibit mining operations and hauling.

A comprehensive industrial hygiene program has been carried out at this location since 1963. The program includes worker exposure monitoring, regular medical surveillance, and worker safety and health training. Extensive efforts have been made to reduce both exposure and emissions.

A09658

ASBESTOS CONCENTRATION MEASUREMENTS

The main emphasis of the industrial hygiene program is on worker protection so the great majority of the airborne measurements are made in the direct proximity to the workers and are generally within the mill. Rather limited sampling has been included, however, at the fence lines and occasionally at various places closer to the mill building. These external data are provided.

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A09659

RESULTS AND DISCUSSION

The airborne concentrations measured from 1963 through the present in the vicinity around the mill are summarized in Table I and are shown graphically in Figure 1. A layout of the mill property is provided in Figure 2.

Figure 1 gives the airborne concentrations, expressed as fibers/cc >5μ, as a function of the month and year in which they were measured. The place where the measurement procedure was changed from midget impinger to optical phase contrast is also indicated. Most of the data were taken at the property boundary with that from the north fenceline indicated by an open circle and that from the south fenceline by a triangle. For several of the later years a substantial number of samples were collected in close proximity to the mill and these results are shown by the solid circles.

A very approximate trend line has been included on the Figure. It is immediately evident that a reduction in concentration of about three orders of magnitude has been made since the plant started up in the early 1960's. The fenceline levels are now generally below 0.1 fiber/cc which NIOSH has designated as the detection limit for the method[1]. As might be expected, the levels directly around the mill tend to be higher than the fenceline but are still quite low.

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PROPERTY LINE AIRBORNE ASBESTOS

CONCENTRATIONS - UNION CARBIDE CORPORATION

KING CITY ASBESTOS MILL

Figure 1

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TABLE I

AIRBORNE AREA FIBER CONCENTRATIONS

Sample Location	1963 Sept.		1966 Jan.		1966 March		1967 Aug.		1968 Jan.		1968 Dec.	
	Mppcf[1]	f/cc[2]	Mppcf	f/cc	Mppcf	f/cc	Mppcf	f/cc	Mppcf	f/cc	Mppcf	f/cc
North Fence Line	-	-	22.7	45.8	3.8	7.6	-	-	-	-	6.6	13.2
			24.1	48.2	7.0	14.0					4.4	8.8
South Fence Line	-	-	-	-	2.6	5.2	16.7	33.4	-	-	-	-
					3.2	6.4	18.2	36.4				
Mill Ore Stockpile	1.7	3.4	-	-	-	-	-	-	-	-	-	-
Parking Lot	-	-	-	-	-	-	-	-	-	-	-	-

Sample Location	1969 Jan.		1969 Feb.		1969 July	1969 Aug.	1969 Sept.	1969 Oct.	1969 Dec.	1970 Jan.	1970 Apr.	1970 June	1970 July	1970 Aug.	1970 Sept.	1970 Oct.
	Mppcf[1]	f/cc[2]	Mppcf	f/cc	f/cc[3]	f/cc	f/cc	f/cc	f/cc	f/cc	f/cc	f/cc	f/cc	f/cc	f/cc	f/cc
North Fence Line	4.3	8.6	-	-	6	7.5	-	2.5	2	1	2	2	1	0	1.5	2.5
South Fence Line	3.4	6.8	4.8	9.6	3	3	3.5	3.5	3	1	1	1.5	1	1	2.5	2

Sample Location	1971 Apr. f/cc	1971 Aug. f/cc	1971 Sept. f/cc	1971 Oct. f/cc	1971 Nov. f/cc	1972 Feb. f/cc	1972 Mar. f/cc	1972 Apr. f/cc	1972 May f/cc	1972 Sept. f/cc	1972 Oct. f/cc	1972 Dec. f/cc	1973 Jan. f/cc	1973 Oct. f/cc	1974 Feb. f/cc	1974 Mar. f/cc	1974 Apr. f/cc	1974 May f/cc	1974 June f/cc	1974 July f/cc	1974 Sept. f/cc	1974 Oct. f/cc
North Fence Line	2.5	2.5	4.0	6.0	2.0	2.0	-	3.4	0.5	0.17	0.17	0.06	0.03	0.32	-	-	-	-	-	-	-	-
South Fence Line	3.0	2.5	4.0	3.5	2.0	1.5	0.4	5.1	0.3	0.07	0.06	0.24	0.21		-	-	0.5	1.7	0.17	0.19	0.31	-
South Edge, Tailings Dam	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-
Southeast Edge, Tailings Dam	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-
Product Storage Area	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	2.2	0.3	-	-	-	-
Mill Ore Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	0.7	-	-	-	-	-

Sample Location	1975 f/cc	1976 July f/cc	1977 August f/cc	1977 August f/cc	1977 August f/cc	1977 August f/cc	1977 October f/cc	1977 October f/cc	1977 October f/cc	1977 October f/cc	1978 f/cc	1979 Aug. f/cc	1980 Mar. f/cc
North Fence Line	0.02	-	0.08	0.15	0.07	0.04	0.04	0.02	0.06	0.06	-	-	-
South Fence Line	0.07	0.08 0.30*	0.20	-	0.09	-	0.03	1.17	-	0.08	-	-	-
Parking Lot	-	-	0.22	-	0.07	-	0.05	0.08	-	0.10	-	-	-
Back of Maint. Shop	-	-	0.41	-	0.07	-	0.09	0.25	-	0.06	-	-	-
East Corner of Mill (RG-244)	-	-	-	0.18	-	0.19	-	0.07	-	-	-	-	-
West Side of Mill (RG Surge Tank)	-	-	-	0.19	-	0.20	-	-	0.12	-	-	-	-
West Side of Mill (Main Bagger)	-	-	-	0.80	-	0.78	-	-	0.10	-	-	-	-
Southwest Corner (Gas Meter)	-	-	-	-	-	-	-	-	-	-	-	0.31	0.02
Electric Substation	-	-	-	-	-	-	-	-	-	-	-	0.04	0.03
North Loading Dock (S. Side)	-	-	-	-	-	-	-	-	-	-	-	0.05	0.06
North Loading Dock (N. Side)	-	-	-	-	-	-	-	-	-	-	-	0.03	0.01

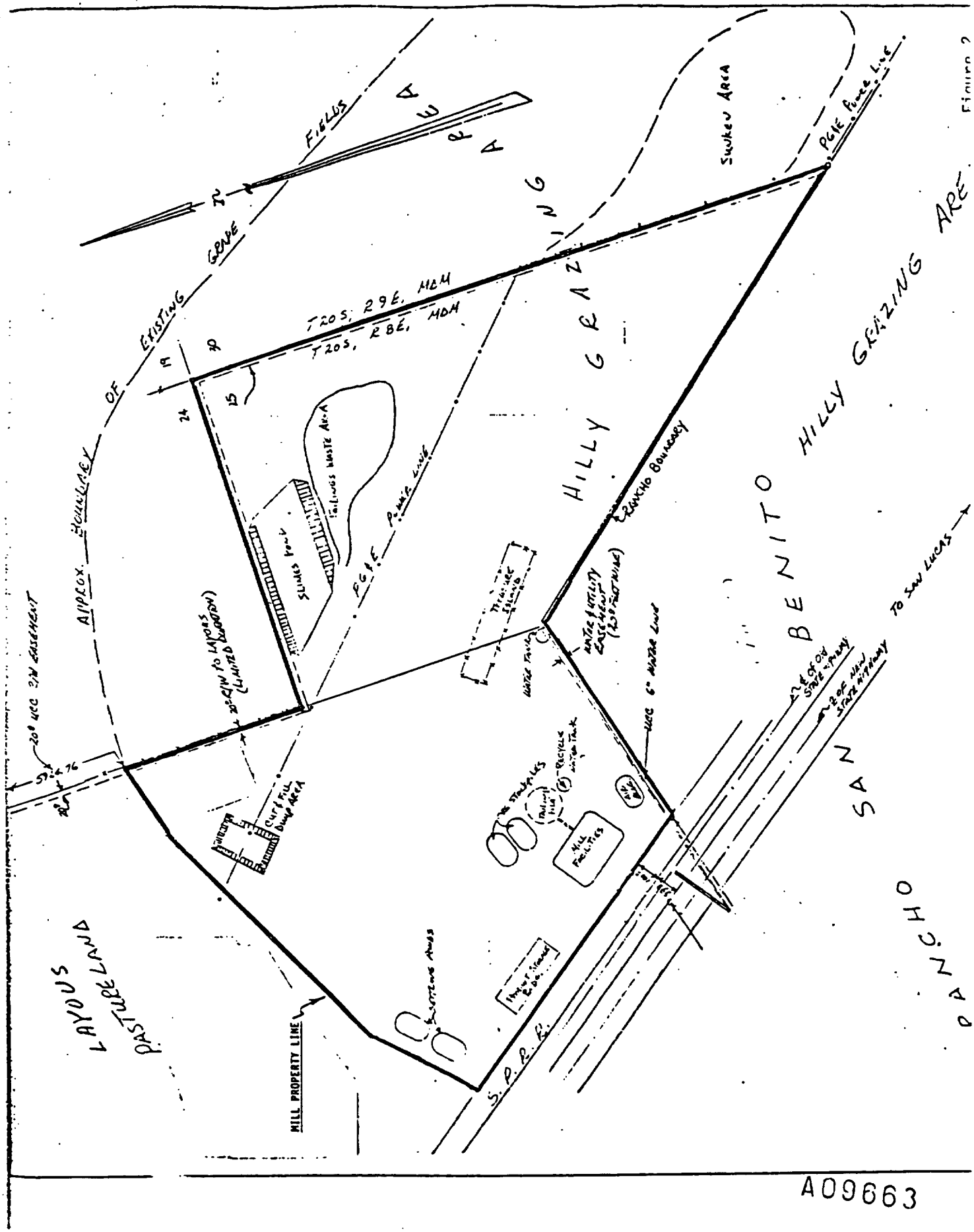
*Near Water Tank

1. Mppcf = Millions of particles per cubic foot. Measured by midget impinger. Conversion factor of 2 fibers/cc .5μ per million particles per cubic foot used.

2. f/cc = Fibers longer than 5 microns per cubic centimeter.

3. All counts after July 1969 are by membrane filter method.

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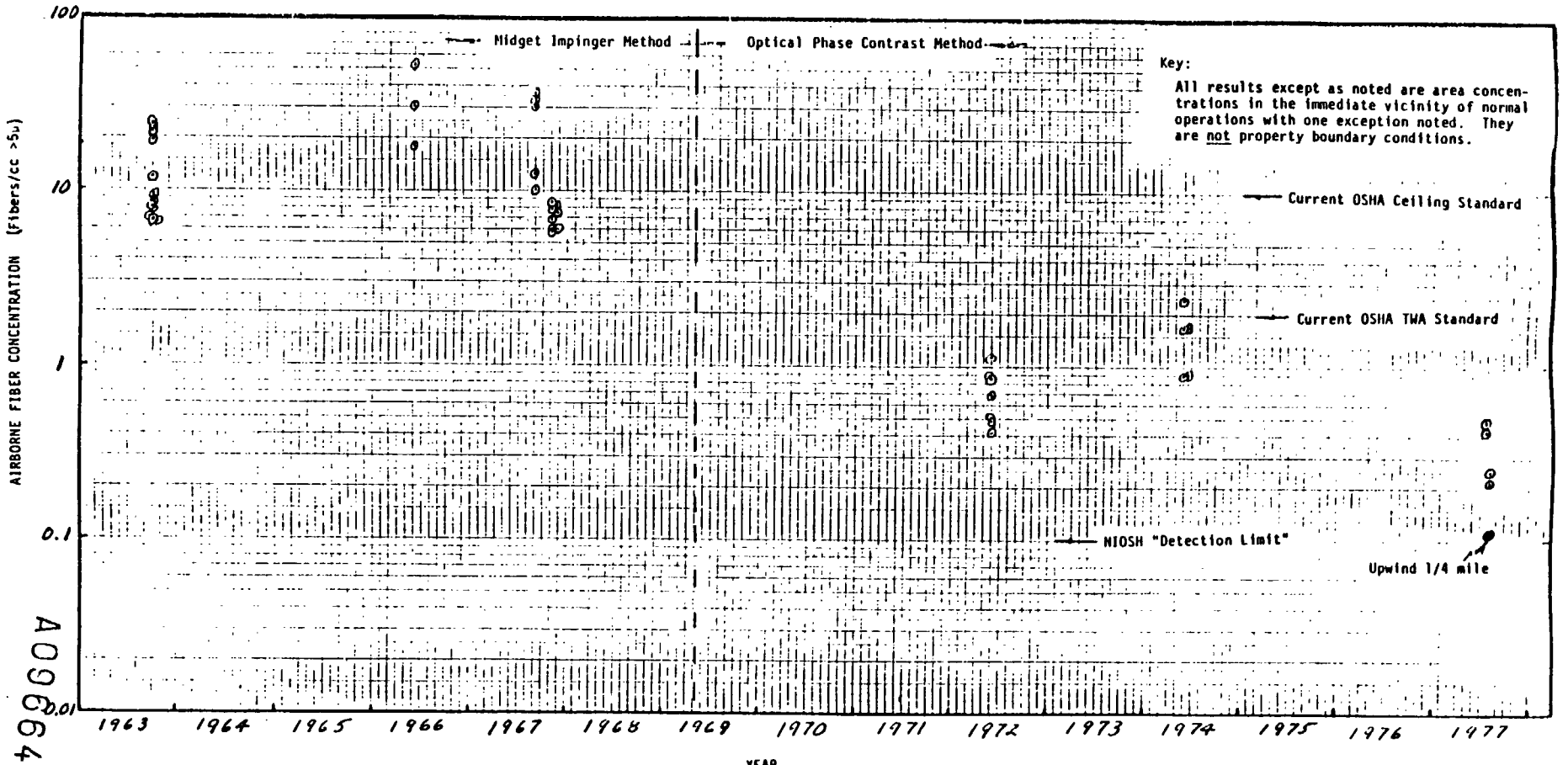

HILLY GRAZING
BENITO
HILLY GRAZING ARE
SAN
PANCHO
LAYOUS
PASTURE LAND
HILL PROPERTY LINE
EXISTING GROVE
FIELDS
SWALE
SUNKEN AREA
PG&E POWER LINE
T20S, R9E, MDM
T20S, R8E, MDM
RANCHO BOUNDARY
TO SAN LUCAS
S.P.R.R.
A09663

Union Carbide trial exhibit UC-1440: H. B. Rhodes Memo Circulating Draft Report on Outdoor Airborne Asbestos...
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AREA AIRBORNE ASBESTOS CONCENTRATIONS

DURING MINING AND HAULING - UNION

CARBIDE CORPORATION ASBESTOS MINE



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Figure 3

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TABLE II

AIRBORNE CONCENTRATIONS

DURING MINING AND HAULING OPERATIONS

SEPTEMBER, 1963

Sampling Location and Operation	Remarks	Mppcf(1)	f/cc(
Alongside wobbler during loading trucks.	Variable wind direction and speed so that sampling location is upwind of dust part of time.	4.2 3.8 3.3 3.9	8.4 7.6 6.6 7.8
Riding caterpillars cleaning mine site.	Much large, nonrespirable material noted.	9.6 10.9 11.3 11.8	19.2 21.8 22.6 23.6
Walking across ore pile.	Light breeze (5 mph) from west and south.	3.2 3.4	6.4 6.8
Riding pick-up with windows open on road from mine.	Deep dust on portions of road.	4.7 6.0	9.4 12.0
	JUNE, 1966		
Beside operator of front loader (no cab) loading ore truck.	Contractor operator.	26.0	52.0
Area around truck during loading.	Visible dust.	15.4	30.8
General area around grizzly during truck loading.	Much loose, finely divided material on ground.	14.2	28.4
	AUGUST, 1967		
Beside operator on caterpillar while loosening ore pile.	Not visibly dusty nor very windy.	6.3 5.0	12.6 10.0
Beside operator on front loader while loading grizzly. Conveyor system operating.	Visibly dusty but not very windy.	18.0 15.1 16.7	36.0 30.2 33.4
	OCTOBER, 1967*		
Self-propelled.	Short section of haul road dry and dusty, no wind.	4.4	8.8
Scraper, mining and stockpiling ore 4350 level.	Road freshly watered, no wind.	2.9	5.
Bulldozer) Push loading scrapers) Ore, 4350 level)	Freshly exposed ore, not watered, no wind.	3.0 3.4 3.9	6. 6. 7.
Bulldozer clearing rocks from pit floor.	Pit floor, not watered, no wind.	4.0	8.
Front end loader) Feeding screening plant)	Maneuvering area watered several hours earlier, very light breeze.	3.7 3.0	7. 6.

(1) Millions of particles per cubic foot.

(2) Fibers/cc >5u. A conversion factor of 2 f/cc >5u per

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(October 1967 - Continued)

*The following description of dust control practices in effect was contained in the report of this survey:

"The sampling was conducted on the afternoon of October 25, 1967. All samples were collected adjacent to the operator of the particular equipment while performing normal operations. All haul roads and the front end loader maneuvering area adjacent to the mine stock pile had been watered in accordance with standard practice during the mining operations.

It has been practice to water down the front end loader maneuvering area on alternate days pending repair of the air conditioning system. During mining operations it is practice to have a water truck on duty continuously to water mine haul roads, dump areas and the loading area adjacent to the mine stock pile and screening plant. Scraper loading areas were not watered since the freshly exposed asbestos ore is damp. Watering overburden loading areas, however, was found at times to be necessary due to visible dust concentrations."

JUNE, 1972

Sample Location and Time	Conditions	f/cc
1. Front end loader screening ore - 10:10 a.m.	Slight overcast - wind 10-15 mph from north ground and ore damp - cab open on loader - operator wearing respirator - water truck working in area. 70°F - cat working on pile.	1.14
2. At picnic table - 10:19 a.m.	Same as #1. Filter stained by diesel smoke from loader.	0.42
3. Same as #1 - 10:48 a.m.	Same as #1.	0.86
4. Same as #2 - 10:55 a.m.	Same as #1. Filter stained by diesel smoke from loader.	0.68
5. On Cat pushing ore.	Same as #1.	0.86
6. By oil shed - 12:25 p.m.	Wind 10-15 mph fron north. No machinery operating - ground damp - 78°F.	0.48
7. Same as #5 - 12:25 p.m.	Same as #6.	0.50

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MAY, 1974

Location, Time, Min. of Sampling, & Temp.	Conditions	f/cc
1. Mine pit area, east side, 11:05 a.m., 65°F, 30 min.	1. Clear day with east-west intermittent wind about 5-10 mph. 2. Full mining operation. 3. Sampler hand carried around the area.	1.70
2. Mine pit area, west side, 11:45 a.m., 65°F, 15 min.	1. Same as above. 2. Sample was taken for 15 min. because mining operation was stopped for lunch break.	2.46
3. Screening area, 12:35 p.m., 65°F, 30 min.	1. Full screening operation. 2. Clear day with intermittent wind, east-west, at about 5-10 mph. 3. Sampler was hand-carried around the area: 0-10 min. -- Loading section 11-20 min. -- Screening section 21-30 min. -- Stockpile section 4. Full loading operation in hauling trucks. Note: Visible dusts were observed during the loading and screening operations, but the dust could be too big and heavy for the sampler to collect with face down.	0.90
4. Top of ore stockpile, 1:10 p.m., 65°F, 30 min.	1. Clear day with intermittent wind of about 5-10 mph, directions changed to west-east. 2. Full mining operation.	0.90
5. Top of future stockpile, 1:55 p.m., 67°F, 30 min.	1. Same as above.	1.60

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AUGUST 9, 1977

Subject: Area Samples
Location: Joe 5 Minesite (see sketch for Location).
Conditions:
1) Full screening operations.
2) Dozer operation on stockpile.
3) Ore truck loading.
4) Moving oversize material.
5) 2-10 mph intermittent wind (use wind meter).
6) Weather temperature of 92° F.

Remarks: The Joe 5 Mine area has been extremely dry since 8-1-77 because of the exhaustion of the "normal" year arround water supply. The Location of today's samples (see sketch) are such that maximum dust conditions exist whenever traffic passes.

Sample No:	Time	Remarks	f/cc
1-1	11:10 AM-12:10 PM	175A performing +1" rock removal; pick-up traffic. (none*)	0.23
1-2	12:10 PM- 1:10 PM	Four ore trucks and 2 loaders passed; dusty conditions. (none*)	0.65
1-3	1:10 PM- 2:10 PM	Two ore trucks passed; 125A loader performing +12" rock removal. (none*)	0.70
1-4	2:10 PM- 3:10 PM	125A performing +12" rock removal. (none*)	0.29
		Average:	0.47
2-1	11:15 AM-12:15 PM	175A performing +1" rock removal; pick-up traffic. (none*)	0.30
2-2	12:15 PM- 1:15 PM	5 ore trucks passed; 175A loader loading trucks; possible Diesel exhaust with sample. (lots*)	0.61
2-3	1:15 PM- 2:15 PM	1 ore truck passed; same as above. (little to lots*)	0.43
2-4	2:15 PM- 3:15 PM	Light traffic (Pick-up). (none*)	0.37
		Average:	0.43

(*) filter discolored from diesel smoke.

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JOB NO. DATE

SUBJECT DATE BY

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AUGUST 19, 1977

Subject: Area (3) air samples
Location: Joe 5 Pit (see sketch)
Conditions: 1.) Full screening & Truckloading operation.
2.) Dozer operation on stockpile.
3.) Approximately 5 mph wind with gusty to 10 mph.
4.) Temperature 90° F.

Remarks: Sample No. 3, upwind, approximately $\frac{1}{4}$ mile southeast of Joe 5 Pit center. Approx. elevation 4400'.

Sample No.	Time	Remarks	f/cc
1-1	11:20 AM- 12:20 PM	No traffic.	0.27
1-2	12:20 PM- 13:20 PM	Light traffic within 50'.	0.38
1-3	13:20 PM- 14:20 PM	" " " "	0.20
1-4	14:20 PM- 15:20 PM	No traffic.	0.14
		Average:	0.25
2-1	11:25 AM- 12:25 PM	No traffic.	0.12
2-2	12:25 PM-13:25 PM	Light traffic within 100'.	0.13
2-3	13:25 PM- 14:25 PM	" " " "	0.34
2-4	14:25 PM- 15:25 PM	No traffic.	0.29
		Average:	0.22
3-1	11:40 AM- 12:40 PM	Dormant area, hill top.	0.16
3-2	12:40 PM- 13:40 PM	" " " "	0.10
3-3	13:40 PM- 14:40 PM	" " " "	0.12
3-4	14:40 PM- 15:40 PM	" " " "	0.05
		Average:	0.11

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VI.E.5

UC : 49-2

UNION CARBIDE

INTERNAL CORRESPONDENCE

METALS DIVISION • P. O. BOX 579 · 4625 ROYAL AVE., NIAGARA FALLS, NEW YORK 1

To (Name) R. E. Byrne, Jr.
Division G. L. Dickson
Location T. P. Norris
J. E. Walsh

Date July 29, 1980

Originating Dept. "Calidria" Asbestos

Answering letter date

Copy to B. L. Ingalls
J. J. Sibley
F. L. Smith
H. B. Rhodes
File

Subject Dust Count Reports

Effective immediately, all dust count reports for your customers will be sent to you for distribution to the appropriate person in the company involved. It is desirable that you hand deliver the report rather than mail it.

Upon delivery of the report, please send a letter to Blair, with a copy to me, confirming the date of delivery and the person to whom the report was delivered. Blair will file your letter with the dust count report and my copy will be placed in the "permanent" file. A copy of Blair's or Fred's letter transmitting the report to you will also be placed in the "permanent" file.

John L. Myers

JLM:dal

A09672

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VI.E.5

TECHNICAL SERVICE REPORT
Union Carbide Corporation
Metals Division
P. O. Box 579
Niagara Falls, New York 14302

To: R. E. Byrne, Jr.
B. L. Ingalls
J. L. Myers

Copies: File

Date: July 18, 1980

Author: F. L. Smith

NB File No.: 2332-42-44

Fiber Identification as a Function of Sampling Time

REVISED 7/30/80

Introduction

Interest has been generated in ascertaining the effect of long term air monitoring (up to ~16 hours) on millipore filter loading and readability in determining airborne mineral fiber identification. The following aspects were investigated:

1) Filter background particulate interference on samples collected outdoors at UCC Metals, Niagara Falls, NY, for periods of 4, 8, and 16 hours.

2) Filter background particulate interference on samples collected indoors at UCC Metals, Niagara Falls, NY, for periods of 8 and 16 hours.

Summary and Conclusions

Samples collected by the membrane filter method outdoors are limited to ~8 hours sampling time. Due to extraneous airborne dusts and organic material the filter background density increases to the point the mineral fiber may be obscured.

Samples collected indoors in two selected laboratories at UCC Metals, however, show a lower density of background particulate and exhibit better clarity. Fiber identification is possible with sampling times approaching 16 hours.

F. L. Smith

FLS:dal
Attachment

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Summary of Air Monitorings

Sample	Location	Time	Remarks
F-44	Outdoors - South fench of research parking area.	255 min. 4.25 hrs.	Very lightly loaded. Density = ∿50 particles/ field
F-39	Same as F-44.	445 min. 7.4 hrs.	Moderately loaded but readable. Density = ∿150-200 particles/field.
F-48	Same as F-44.	948 min. 15.8 hrs.	Many spherical particles evenly distributed. Density = >300 particles/ field Mineral fiber difficult with this loading.
H-18	Indoors - dust count lab #205. Located above air conditioning control.	450 min. 7.5 hrs.	Very lightly loaded. Density = <15 particles/ field
F-49	Same as H-18.	865 min. 14.45 hrs.	Many fine particles but readable. Density = ∿200-300 particles/field
H-11	Indoors - Lab #118. Located above cowles mixer, north side of room.	443 min. 7.4 hrs.	Very lightly loaded. Density = <15 particles/ field
F-29	Same as H-11.	865 min. 14.45 hrs.	Many particles but readable. Density = ∿200-300 particles/field

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