CertainTeed	Date May 5, 1980	To Hank Benhardt	Location and mail code Ambler - 258
Subject AMBLER PLANT INDUSTRIAL HYGIENE SURVEY December 3-7, 1979 and January 28-29, 1980		From Tom Shaffer T. C. Shaffer	Location and mail code VF 1125/4

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A-15

Please find attached the Industrial Hygiene Survey Report and the Engineering Study Results for the surveys which were conducted on December 3-7, 1979 and January 28-29, 1980. If there are any questions, please don't hesitate to contact me.

TCS/ejb

Attachment

PLAINTIFF'S EXHIBIT
CT-1209

01-25-0005

CTD018504

INDUSTRIAL HYGIENE SURVEY

Ambler A/C Pipe Plant
December 3-7, 1979
January 28-29, 1980

Introduction

An Industrial Hygiene Survey was conducted at the Ambler Asbestos-Cement Pipe Plant during the periods of December 3-7, 1979 and January 28-29, 1980.

The survey was conducted to supplement the on-going in-plant fiber exposure surveillance program and to measure employee exposures to total dust and noise. One hundred and fifty-six personal air sample measurements were made during the survey. A sound pressure level survey supplemented by 38 personal audiodosimetry exposures was also conducted.

The appendices to the report document the air sampling methodologies, the analysis techniques, and the current standards used in evaluating the data. The field notes and in-house laboratory documentation of this survey are on file in Corporate Health and Safety.

This report is an "Employee Exposure Record" as defined in 29 CFR 1910.20 and must be retained indefinitely in the plant and made available upon request to those federal officials/designees as specified in 29 CFR 1910.20 (d).

Summary

The results of this survey disclosed that all job functions presently meet the current 2 f/cc OSHA limit for asbestos except the Mixer Operator and Crusher Operator where the employees will wear respirators until engineering corrections are completed. The average time-weighted fiber levels in manufacturing jobs were found to be 1.14; finishing, 0.46; and in fittings the average personal exposure was 0.73 f/cc. The plant was informed of the excess levels and the affected employees were notified.

The Mixer Operator's exposures will be controlled by the installation of the CertainTeed Automatic Bag Opener which is expected to be completed during the first half of 1980. The crusher has been repaired to reduce

airborne fiber levels since these tests and installation of a new unit is planned. These engineering corrections should maintain fiber exposures at safe levels. Until such time as the corrections are completed the mandatory use of personal respirators will be continued for these two positions.

A sound level survey and personal audiodosimeter survey disclosed a number of job positions where the current OSHA noise limits are exceeded. Affected locations include the pipe machine, crusher, coupling mills, saws and lathes. Specific control measures are recommended in the text of this report. Until control measures are instituted and proven effective the use of personal hearing protection is necessary.

Industrial Hygiene Survey
Ambler A/C Pipe Plant
December 3-7, 1979
January 28-29, 1980

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Manufacturing Schedule During Survey

The pipe machine manufacturing and finishing operations being conducted during this survey were as follows:

		Manufacturing		Finishing
Day	Date	Day, 7-3	Afternoon, 3-11	
Monday	12/3/79	8", 2400 Pipe	-	-
Tuesday	12/4/79	14"-15" 3000	-	12" Sewer
Wednesday	12/5/79	21", 3300; 18" 4000	-	12" Sewer
Thursday	12/6/79	8", 3300 Until 4:00pm, 6", 150	6", 150	-
Friday	12/7/79	6", 150 pipe	-	-
Monday	1/28/80	8", 3300	-	-
Tuesday	1/29/80	8",3300 until 7:45am; 20-24" 150 until 11:05 am; 8", 150	-	-

Asbestos Fiber Measurements

Table I presented the results of the personal fiber sampling during the survey. A discussion of the fiber sampling results follow.

Fiber Dump

The Mixer Operator stages and dumps bags of asbestos fiber to the dump station which feeds asbestos to the Number 1 mixer by means of a bucket elevator. With the exception of the dump station opening, the system is enclosed. A local exhaust hood with an opening approximately 30 by 30 inches with an empty bag disposal port encloses the bucket elevator. The face velocity at the exhaust hood ranged from 300 to 500 linear feet per minute with the gate damper fully open. The Mixer Operator is required and was observed to wear a 3M 8710 respirator and special protective clothing while staging and dumping fiber. Approximately 24 bags per cycle are dumped with each cycle lasting about 15-20 minutes and occurring once per hour.

Personal exposure samples on the Mixer Operator on two consecutive days (Samples 8-12 and 13-18) measured 2.36 and 2.05 f/cc, slightly exceeding the OSHA Permissible Exposure Level of 2 fibers/cc for an 8-hour Time Weighted Average (TWA). Sample 16 is, as yet, an inexplicable anomoly. This 20 minute sample was taken while the Mixer Operator was on break in the locker-room and lunch room.

Exposures during bag dumping operations (Samples 5, 7, and 17) were found to range from 2.7 to 5.07 f/cc, averaging 3.8 f/cc. These measurements are within the OSHA peak exposure level of 10 f/cc. The operator was observed to wear a 3M 8710 respirator and disposable suit while dumping fiber.

Pipe Machine

Just prior to the December, 1979 survey, a new blending system had been

installed to reduce dust levels and to enhance the mixing of the dry asbestos-cement mixture with reclaimed water from the Saval. This new system was being shaken down during the December survey. At the time of the January visit, the installation was essentially completed. Air sample results for the Machine Tender and Manufacturing Supervisor, who spend the most time in the vicinity of the blender, demonstrate a reduction in fiber levels. In December, the Machine Tender's TWA was 2.2 f/cc (Samples 019-022) but in January it had been reduced to 1.3 and 0.8 (Samples 023-027 and 028-030). Likewise for the Manufacturing Supervisor the 2.7 f/cc TWA (Samples 031-033) was reduced to 1.26 (Samples 034-038).

The Press Operator's exposure (Samples 045-048) on 12/3/79 averaged 1.7 f/cc. A personal sample on the Press Operator on 12/6/79 could not be read due to excessive particulate contamination. Total dust measured at this position on 12/3/79 does not exceed the OSHA Nuisance Dust limit however.

Personnel TWA exposures for the Mandrel Operator, Pipe Stripper, Tray Loader, Autoclave Truck Driver, Utility Truck Driver, and Relief Operator were all found to be within current limits averaging about 0.5 f/cc.

Mandrel Cleaning

Mandrels occasionally have patches of asbestos/cement which adhere to the steel. An 11 minute sample on an employee hand-scraping a mandrel resting on the floor, measured 1.01 f/cc.

Crusher Operator

While operating the Crusher, the operator's exposure (Samples 067,068,070, 071) averaged about 3.0 f/cc. The operator was noted to occasionally enter the baghouse to manually shake the bags as they caked up. Mr. Randle was

observed to wear a 3M 8710 respirator while entering the baghouse on 12/6/79. The fiber level during this 5 minute operation was found to be 15.9 f/cc. The crusher area is posted as a respirator use area.

Finishing

Air sampling was conducted on employees involved in lathing 12" sewer pipe on Finishing Line 3 on December 4, 1979. Toward the end of the day, approximately 1:00 pm, the employees assumed equivalent positions on Finishing Line 2. The results (Samples 073-107) show all TWA personal exposures to range from 0.26 to 0.71 f/cc.

A general buildup of fiber concentration throughout the day can be seen in the Finishing Department data. During the first two hours, the overall average for all Finishing Line employees was 0.33 f/cc. Samples of the next two hours averaged 0.50 f/cc, then 0.60 f/cc and the last half hour of sampling (on Line 2) was 0.60 f/cc.

Fittings

The employee sampling results in the fittings department were found to range from 0.11 to 6.2 (Samples 108-149). The calculated 8-hour TWA exposures for all employees in this department ranged from 0.28 to 2.0 f/cc.

On December 5, the Fittings Department was monitored with personal samples at basically two hour intervals throughout the day. The average fiber levels here, like those seen at Finishing, tend to increase as the day progresses.

As the day proceeded, the averages were 0.34, 0.50, 0.97, and at the end of the day were 1.4 f/cc.

Respirators

Currently, 3M 8710 respirators are used at locations throughout the facility where required and by employees who choose to use one. There is a 3M white

cap to be used by employees entering the baghouse to perform repairs or to unclog the filters, however, this unit was not in working order at the time of the January survey. 3M 8710 disposable respirators were being used for this purpose.

A very large drawback with the 3M 8710 is that employees cannot be properly fit tested to assure us that when an employee is wearing the respirator, he is being properly protected. Undetected leaks around the nose or face due to facial contour lead to false security that the respirator is in fact offering protection. It is especially important that all employee's who are required to wear respirators be fit tested.

The respirator protection program should be upgraded to incorporate toxic dust filters for all job positions where we require the use of respiratos. These positions include Scrap Crusher and Mixer Operator. A single use respirator, 3M 9900, as well as other permanent half-mask respirators approved by NIOSH for protection against asbestos containing dusts should be utilized. These should also be made available to all employees who request a respirator. It is recommended that a "Personal Respirator Control" unit program be developed using the concepts presented in Section C of the CT Health and Safety Manual and Appendix II to this report.

Noise Survey

The noise survey was conducted in two parts. First, employees wore DuPont audiodosimeters set at 90 dB for an average six hours of their work day. The audiodosimeters are noise measuring devices which measure and accumulate the total noise dose above 90 dBA for the total time during which the employee wears the instrument. The resulting value is recalculated to determine the 8-hour exposure based on the assumption that the employee's work is fairly consistent throughout the day. This 8-hour value is compared to the OSHA 8-hour acceptable limit of 100%. The survey results are given in Table 3.

The second aspect of the noise survey consisted of sound pressure level and octave band analysis measurements of work locations throughout the facility. These engineering samples provide insight into the nature of the noise problem and means of engineering controls. These results are presented in Appendix III at the end of this report.

The OSHA Occupational Noise Exposure Standard, 29 CFR 1910.95, states that when employees are subjected to excessive sound pressure levels, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels to the acceptable limit, personal protective equipment (hearing protectors) shall be provided and used. Recommendations are included in the following sections to assist the engineering department with control measures to reduce operator exposure to the level where the use of hearing protectors will not be required.

Noise Survey Discussion

Fiber preparation. Exhibit I of Appendix III shows noise levels throughout the fiber preparation area. While working in and around this area where the sound pressure levels ranged between 83 and 94 dBA, the Mixer Operator's exposure was determined to be an acceptable 31% (on Table 3).

Pipe Machine. The noise levels at the pipe machine, presented in Exhibit 2, show that general operating conditions produce 86 to 91 dBA. The levels at the pipe machine increase to 99 dBA when the mandrels clang together. Air release noise was noted as a major source of noise when the new mandrel rolls into position. Altogether, these sources caused the Machine Tender and Mandrel Man to be overexposed.

Reduction of these noise exposure levels should start by installing air mufflers on all pipe machine air cylinders. Also, considerable noise is generated by the empty mandrel as it rolls into position within the pipe machine. Reduction of some of this noise could be accomplished by installing neophrene pads on metal to metal impact and roll surfaces. In the interim we recommend these employees wear hearing protectors.

Curing Tunnels. Along the curing tunnels, two employee positions were found to have excessive noise exposure, the Tray Loader, and the Utility Truck Driver. These over-exposures are believed to be due to the job of changing mandrels. Both of these employees push the mandrels into positions at the mandrel return conveyor.

It was observed that the employee's close proximity to the clanging mandrels accounts for the especially high noise does levels of 457% and 582% observed for the Utility Truck Driver, A. Schimmel, on 12/3/79 and 12/6/79 (Table 3).

Long term engineering control of this noise could be accomplished by the installation of a conveyor to replace hand rolling the mandrels at the mandrel change station. This would also help avoid back strain of those employees manually moving mandrels. At this time, a neophrene pad should be installed on the upper surface of the rails. Employees should be instructed to wear hearing protection while performing this job.

Crusher. Two audiodosimeter evaluations were made on 12/6/79 for the Crusher Operator and found to be 114% and 88%. Variation in this job position is due largely to the speed at which the individual works. During the actual crushing of pipe, the noise at the operator was found to be 102 to 108 dBA (Exhibit 3).

Reduction of this noise could be accomplished by lining the non-wearing surfaces inside the crusher with sound absorbing acoustic foam.

Finishing Department. On 12/4/79, audiodosimeters were worn by employees on Line 3 while 8" 150 was being lathed and belled. The employees who work at the front end of the line, Lathe Operator, Inspector, and Tester Operator, were found to have excessive noise exposures. Noise measurements in this area are presented in Exhibit 4 which identifies the high noise levels for these positions.

The noise levels during lathing (in the vicinity of the lathe) range between 95 and 102 dBA. Air release noise is most prominent at the Control Operator side where it ranges between 102 and 106 dBA. Background levels are 88 dBA.

Control of noise at this area should be initiated by the installation of air silencers at the Lathe Operator's station, control side. Neophrene pads should be installed on all rolling surfaces. These steps will help reduce noise, however, further study of the problem is needed to determine the possible effectiveness of changing tool design, of acoustic barriers and of acoustic absorbers.

If engineering controls cannot reduce the levels to 90 dBA, consideration should be given to administratively control the noise by having the employees change positions along the finishing line. Administrative control means that a man's exposure is controlled by limiting the amount of time he is exposed to noise. By rotating the employees through job positions on an hourly basis, and by engineering reductions, it may be possible to reduce all employee exposures to less than 100%. Until such time as the 8-hour exposures are less than 90 dBA, these employees must wear hearing protection.

Fittings Department. The audiodosimeter survey documented excessive noise exposures (greater than 100%) in approximately half of the fittings department job positions. For the remainder of the positions, the average was 55% of the allowable dose. Hearing protection was worn by only the FD9 Dry Coupling Saw Operator and the Pencil Sharpener Operator.

The #16 and #15 coupling mills are similar noise sources and reduction of the noise will be similar. Both units need air mufflers to reduce the periodic bursts of noise up to 96 dBA (Exhibit 5). Further reduction may be accomplished by the application of sound absorbing foam inside the mills. The #54 coupling mill was found to be well within the noise limit and fiber levels were also considerably lower than the #15 and #16 mills. Installation of a #54 mill type plastic cover on #15 and #16 mills would be expected to be highly beneficial for both noise and fiber levels.

The operator of the FD9 Dry Coupling Saw is exposed to levels of 92 to 96 dBA for 5 seconds and 90 dBA for 5 more seconds during one cut of an 8 inch pipe. Exhibit 6 shows that the background level between cuts is 85 dBA but is increased to 90 dBA when the #10 saw is cutting. The point to be made here is that the Dry Coupling Saw Operator's noise exposure level of 198% could be reduced if a sound absorptive barrier was built between the #9 and #10 units. In this way, when the #9 Saw Operator is changing stock, or resetting the pipe, the accruing noise dose for the #10 Saw will be reduced.

The #10 rework saw noise levels, Exhibit 7, could also be reduced by a sound absorptive barrier between the #9 and #10 saws. The present 8 ft high panel is not effective in materially reducing noise exposure levels and may in fact reflect noise and increase the operator's dose which was found to be 297%. The Rework Saw Operator works very close to the saw, manually pulling the blade down onto the piece being cut. The operator is in a direct line with noise generated during the cut. It is recommended that a sound absorptive barrier panel (with plastic viewing window) be built onto the saw handle so that as the blade is brought into position on the piece, the panel would absorb and reflect noise to reduce operator exposures.

The Universal Mill Operator was found to have an excessive noise level of 128%. This value is slightly higher than the level which may have been predicted by noise measurements presented in Exhibit 8. The observed noise dose may come from variation in products being manufactured and in manufacturing speed, but may also be due to adjacent machining activities. Installation of a small barrier at the mill and installation of noise barriers between fittings department equipment should effectively control the noise exposure at the Universal Mill.

The Korit Drills Operator's noise exposure of 122% could have been predicted by measurements taken and presented in Exhibit 9. Reduction of this noise exposure could be assisted by partial sound absorptive enclosures around the Korit Drills. A large enough opening must be left in the front to permit loading and unloading the stock. This measure would reduce the noise exposure

the operator receives from the operating drill when he is changing stock in the non-operating drill.

The Wet Saw Operator's exposure was found to be 102%, only slightly over the limit. Reduction of noise exposure here could be accomplished by installation of absorptive barrier walls or curtains throughout the fittings department.

The Pencil Sharpener Operator was exposed at a level of 163%. The noise measurements at this position, Exhibit 10, show very high levels of 99 dBA for nearly half of the operating time. A limited degree of noise reduction may be accomplished by installation of absorptive foam on the inside of the enclosure, however, this position is a prime candidate for control of noise by administrative controls. In this case, the operator's whole day exposure was 163%. If this operator could exchange positions mid-shift with an employee whose job had no noise exposure, the final noise exposure on each employee would be reduced to less than 100%.

In review, there is no fast and easy solution to the problem of noise in the fittings department. OSHA requires that noise be controlled by feasible administrative or engineering controls. Only when these methods fail to reduce sound levels to the acceptable limit is it appropriate to utilize a permanent hearing protection program.

Reduction of noise levels by engineering and administrative controls can be accomplished for nearly all the job positions found to be excessive by the audiodosimeter survey.

In the meantime, until noise levels are reduced to acceptable limits, all employees whose job positions were found to exceed 100% should be required to wear hearing protection. It is recommended that several types of hearing protectors be made available to employees so that they can choose the one most comfortable. These machines and job positions should be posted with signs requiring the use of hearing protection. These employees should also be provided with annual audiometric examinations.

Vacuum Cleaners. Several "Shop Vac" type cleaners were installed at locations in the plant to provide employees with means of cleaning dust from their clothes before going to lunch or on breaks. The vacuum cleaners do not have high efficiency filters and are not capable of removing all fibers before exhausting into the plant airspace.

It is recommended that these vacuums either be replaced with high efficiency vacuums or that the exhaust from the existing units be tied into the existing ventilation system.

Total Dust

A series of total dust samples were obtained on the first day of the December Survey. These results, ranging from 0.1 to 3.7 mg/M^3, are well below the OSHA Nuisance/Inert Dust Standard of 15 mg/M^3, however the silica content was not determined. Respirable free silica sampling was conducted in March and will be reported when silica analysis is completed.

Further Air Monitoring

Air monitoring was conducted in March for diethylenetriamine at the epoxy fabrication department; for carbon monoxide throughout the facility, and for respirable free silica at locations throughout the plant. These results will be reported under separate cover.

RECOMMENDATIONS

1. That a thorough review of the OSHA Asbestos Standard, 1910.1001, be conducted by a panel of plant management personnel to reassess the degree of Ambler plant compliance with that standard. Special emphasis should be placed on personal monitoring to determine 8-hour TWA exposures in those positions where excess levels were determined by this survey.

2. That followup work consisting of short term samples be taken in and around the restroom, locker room and lunch room areas.

3. That whenever any changes - minor or major - are made to the manufacturing process/system, fiber exposure measurements should be made and followup work done to assure that exposures are well within standards at all times.

4. That a plant level Respirator Control Unit Program be developed using the concepts presented in Section C of the CertainTeed Health and Safety Manual and Appendix II to this report.

5. That housekeeping be improved in the manufacturing area and also that it include vacuuming and cleaning of machine and structural surfaces in and around the area.

6. That engineering studies be made to isolate the fiber source at the pipe machine and to explore the feasibility of exhaust ventilation to control fibers.

7. That when dry scrap pieces of pipe are moved that they be wet down to control dust during disposal.

8. That a series of fiber samples be taken at the shot blaster, shot blasting area and on the Shot Blaster Operator while it is in operation.

9. That further monitoring be done on those employees involved in scrapping and sanding materials while on racks over their heads as well as those resting on the floor.

10. That those employees in the Finishing and Fittings Department vacuum more frequently throughout the shift to help reduce background fiber levels.

11. The text of this report contains a number of suggestions for the control of noise exposure. If the methods recommended or other engineering and/or administrative controls cannot feasibly reduce the noise to acceptable levels, a hearing conservation program to include the mandatory use of ear defenders and periodic audiometric testing of exposed employees must be implemented.

1-28-80

Flow Trough Pit	6:46	to 7:32	1.12
Pipe Mach Console	1:00	to 2:13	2.68
Flow Trough Pit	1:00	to 2:14	.363

1-29-80

Fiber Mixer Station	6:58	to 8:37	.51
Flow Trough Pit	7:01	to 8:01	.71
Pipe Mach - end of Run Roll	8:08	to 9:54	.31
" "	12:34	to 1:57	.71

TABLE 1

Dust/Fiber Exposures

POSITION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
lixer Operator 12/3/79	R. Dorin	Fiber	6:50a-9:00a	130	3.0 f/cc	1.7f/cc	Manufacturing 8" 2400 pipe. Wearing respirator
			9:00a-10:05a	65	0.38 f/cc		
			12:33p-1:57p	84	0.81 f/cc		Blast gate 1/2 open
		Total Dust	10:05a-12:33p	148	2.2 mg/M^3		
lixer Operator /28/80	R. Dorin	Fiber	10:07a-10:47	40	2.7 f/cc	-	5-7: Wearing respirator 5: Dumping Fiber
			10:47a-11:19a	32	5.9 f/cc	-	6: Staged Fiber/Waiting
			11:19a-11:45a	26	3.6 f/cc	-	7: Dumping fiber (Blast Gate 1/2 open.
lixer Operator /28/80	H. Meyers	Fibers	7:24a-8:34a	70	6.9 f/cc	2.36 f/cc	Wearing 8710 respirator and white suit.
			8:34a-8:50a	16	6.3 f/cc		Samples 8 & 9 , hood ventilation damper half open.
			8:50a-9:32a	42	0.94 f/cc		Mixer Operator training a new person
			9:32a - 1:00p	208	0.82 f/cc		9, Operation upset, baghouse failure.
			1:00-2:00p	60	VOID		12, Sample used twice
ixer Operator /29/80	H. Meyers	Fibers	6:42a-8:42a	120	0.66 f/cc	2.05 f/cc	14, Sample used twice.
			8:42a-10:42a	120	VOID		16, Very fine fibers around 5 um long while on break at locker room and lunch room.
			10:47a-12:12	90	1.27 f/cc		17, While dumping.
			12:12p 12:33p	21	13.98		Wearing respirator
			12:33-12:51p	18	5.07		
			12:51p-1:57p	66	1.0		
achine Tender 2/3/79	J. Low	Fibers	7:48a-9:15a	87	2.6 f/cc	2.2 f/cc	Manufacturing 8" 2400 pipe.
			9:15a-10:52a	97	1.6 f/cc		
			12:36p-1:45p	69	2.6 f/cc		
		Total Dust	10:52-12:36	104	1.8 mg/M^3		

TABLE 1

Dust/Fiber Exposures

No.	POSITION OCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
1	Mixer Operator	R. Dorin	Fiber	6:50a-9:00a	130	3.0 f/cc		Manufacturing 8" 2400 pipe.
2	12/3/79			9:00a-10:05a	65	0.38 f/cc	1.7f/cc	Wearing respirator
3				12:33p-1:57p	84	0.81 f/cc		Blast gate 1/2 open
4			Total Dust	10:05a-12:33p	148	2.2 mg/M^3		
5	Mixer Operator	R. Dorin	Fiber	10:07a-10:47	40	2.7 f/cc	-	5-7: Wearing respirator 5: Dumping Fiber
6	1/28/80			10:47a-11:19a	32	5.9 f/cc	-	6: Staged Fiber/Waiting
7				11:19a-11:45a	26	3.6 f/cc	-	7: Dumping fiber (Blast Gate 1/2 open.
8	Mixer Operator	H. Meyers	Fibers	7:24a-8:34a	70	6.9 f/cc		Wearing 8710 respirator and white suit.
9				8:34a-8:50a	16	6.3 f/cc	2.36 f/cc	Samples 8 & 9 , hood ventilation damper half open.
10	1/28/80			8:50a-9:32a	42	0.94 f/cc		Mixer Operator training a new person
11				9:32a - 1:00p	208	0.82 f/cc		9, Operation upset, baghouse failure.
12				1:00-2:00p	60	VOID		12, Sample used twice
13	Mixer Operator	H. Meyers	Fibers	6:42a-8:42a	120	0.66 f/cc		14, Sample used twice.
14				8:42a-10:42a	120	VOID		16, Very fine fibers around 5 um long while on break at locker room and lunch room.
15				10:47a-12:12	90	1.27 f/cc	2.05 f/cc	17, While dumping.
16	1/29/80			12:12p 12:33p	21	13.98		Wearing respirator
17				12:33-12:51p	18	5.07		
18				12:51p-1:57p	66	1.0		
9	Machine Tender	J. Low	Fibers	7:48a-9:15a	87	2.6 f/cc		
10	12/3/79			9:15a-10:52a	97	1.6 f/cc	2.2 f/cc	Manufacturing 8" 2400 pipe.
11				12:36p-1:45p	69	2.6 f/cc		
12			Total Dust	10:52-12:36	104	1.8 mg/M^3		

TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for sample period	REMARKS
23	Machine Tender	J. Love	Fibers	6:30a-8:37a	127	1.87 f/cc		
24				8:37a 8:49a	12	6.59 f/cc	1.30 f/cc	24, process upset, baghouse failure.
25	1/28/80			8:49a-10:06	77	1.3 f/cc		
26				10:06a 1:27a	201	0.3 f/cc		26, Removing scrap 2 minutes
27				1:27p-2:00p	33	3.28 f/cc		27, in area of control panel.
28	Machine Tender	J. Love	Fibers	6:54a-10:20a	206	0.57 f/cc		
29	1/29/80			10:20a-12:56p	156	0.93 f/cc	0.80 f/cc	
30				12:56p 2:01p	65	1.21 f/cc		30, Relieving Control Operator, & cleaning cylinders.
31	Manufacturing Supervisor	G. Jones	Fiber	2:15p-5:23p	188	2.0 f/cc		31, changing mandrels
	12/6/79			5:23p-7:00p	97	2.3 f/cc	2.7 f/cc	32, changing mandrels & cleaning mandrels.
33				7:00p-7:30p	30	8.6 f/cc		33, Shot Blasting Mandrels
34	Manufacturing	G. Jones	Fiber	6:27a-8:37a	130	0.78 f/cc		
35				8:37a-8:51a	14	5.74 f/cc	1.26	35, Process upset, baghouse failure.
36	1/28/80			8:51a-10:09a	78	1.66 f/cc		
37				10:09-12:45p	156	1.12 f/cc		37, scraping mandrels for 5 minutes.
38				12:45p-2:03p	78	1.11 f/cc		
39	Manufacturing Supervisor	G. Jones	Fibers	6:48 7:45p	57	VOID		39-43, VOID. Pump found inoperative at end of 43 sample period.
40				7:45a-8:00a	15	VOID		
41				8:00a-9:02a	62	VOID		
42				9:02a-10:50a	108	VOID		
				10:50a 1:07p	137	VOID		
44				1:07p-2:10p	63	1.11 f/cc		

TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
45	Press Operator	C. Worthington	Fiber	7:08a-9:05a	117	1.6 f/cc		Manufacturing 8" 2400 pipe.
46				9:05a-9:50a	45	1.9 f/cc	1.7 f/cc	
47				12:45-2:00p	75	VOID		Pump malfunction
48			Total Dust	9:50a-12:45p	175	1.3 mg/M^3		
49	Press Operator 12/6/79	C. Worthington	Fiber	3:25p-6:45	200	VOID		Heavy particulate-not countable
50	Mandrel Operator	J. Bickley	Fiber	7:09a-10:00a	171	0.65 f/cc		Manufacturing 8" 2400 pipe.
51	12/3/79			12:35p-1:51p	76	0.96 f/cc	0.75 f/cc	
52			Total Dust	10:00a-12:35p	155	0.82 mg/M^3		
53	Pipe Stripper 12/6/79	H. Meyers	Fiber	2:30p-6:20p	230	1.5 f/cc	-	Manufacturing 15" 3000 pipe.
54	Tray Loader	S. Mineo	Fiber	7:00a-11:50a	290	0.54 f/cc	0.50 f/cc	Manufacturing 15" 3000 pipe
55				11:50a-1:45p	115	0.41 f/cc		
56	Autoclave Truck Driver	F. Demedio	Fiber	8:05a-11:55a	230	0.15 f/cc	0.28 f/cc	Manufacturing 15" 3000 pipe.
57	12/6/79			11:55 a-1:40p	105	0.57 f/cc		
58	Utility Truck	H. Schimmel	Fiber	6:40a-7:03a	23	2.2 f/cc		Manufacturing 8" 2400 pipe.
59	Driver 12/3/79			7:03a-9:20a	137	0.26 f/cc	0.62 f/cc	
60				9:20a-12:40p	200	VOID		Sample used twice
61				12:40p-1:50p	70	0.79 f/cc		
62	Relief Operator	R. Jackson	Fiber	7:40a 9:10a	90	0.66 f/cc		Manufacturing 8" 2400 pipe.
63				9:10a-9:55a	45	0.20 f/cc	0.51 f/cc	
64				12:48p-1:45p	57	VOID		Sample used twice
65			Total Dust	9:55a-12:48p	173	0.24 mg/M^3		

TABLE 1

Dust/Fiber Exposures

No	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
66	Laborer 1/29/80	R. Lutz	Fibers	7:22a-7:43a	11	1.01	-	Employee scraping mandrels wearing 8710 respirator and white suit.
67	Crusher Operator	C. Randall	Fiber	7:00a-9:25a	145	2.7 f/cc	3.0 f/cc (Excluding 69, baghouse entry)	Manufacturing 15" 3000 pipe. Wearing respirator
68	12/6/79			9:25a-10:01a 10:06a-12:02p	152	3.5 f/cc		
69				10:01a-10:06a	5	15.9 f/cc		In dust collector shaking bags, wearing 3M8710 respirator.
70				12:02p-1:45p	103	2.6 f/cc		
71	Crusher Operator	R. Meyers	Fiber	2:30p-5:20p	170	1.5 f/cc	1.5 f/cc	
72	12/6/79			5:20p-6:15p	55	VOID		Pump malfunction.
73	Fork Truck Driver	S. Steltz	Fiber	7:30a-9:05a	95	0.17 f/cc	0.26 f/cc	Finishing Line 3
74				9:05a-11:00a	115	0.26 f/cc		12" Sewer Pipe (Lathing only)
75	12/4/79			11:00a-1:15p	135	0.24 f/cc		
76				1:15p-1:45p	30	0.58 f/cc		Finishing Line 2
77	Lathe Operator	A. DeClerico	Fiber	6:50a-9:00a	130	0.43 f/cc	0.60 f/cc	Finishing Line 3
78	12/4/79			9:00a-10:57a	117	0.62 f/cc		12" Sewer Pipe
79	(Control Side)			10:57a-1:15p	138	0.79 f/cc		
80				1:15p-1:45p	30	0.36 f/cc		Finishing Line 2
81	Lathe Operator	G. Meyers	Fiber	6:55a-9:00a	125	0.20 f/cc	0.30 f/cc	Finishing Line 3 (Driver Side)
82	12/4/79			9:00a-10:58a-	118	0.33 f/cc		12" Sewer Pipe.
83	(Drive Side)			10:58a-12:40p	102	0.38 f/cc		

TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
84	Q. C. Inspector	A. Mastromatto	Fiber	7:28a-9:05a	97	0.52 f/cc		Finishing Line 3
85	12/4/79			9:05a-11:00a	115	1.0 f/cc		12" Sewer Pipe.
86				11:00a-1:10p	130	0.76 f/cc	0.71 f/cc	
87				1:10p-1:45p	35	0.14 f/cc		Finishing Line 2
88	Tester Operator	G. Bojaciuk	Fiber	7:23a-9:01a	98	0.55 f/cc		Finishing Line 3 (Drive Side)
89	12/4/79			9:01a-11:00p	119	0.75 f/cc	0.67 f/cc	
90				11:00p-1:15p	135	0.77 f/cc		12" Sewer Pipe.
91				1:15p 1:45p	30	0.31 f/cc		Finishing Line 2
92	Beller	J. Handerhan	Fiber	7:40a-9:05a	85	0.28 f/cc		Finishing Line 3
93				9:05a-11:02a	117	0.32f/cc	0.55 f/cc	
94	2/4/79			11:02 1:12p	130	1.0 f/cc		12" Sewer Pipe
95				1:12p-1:45p	33	0.31 f/cc		Finishing Line 2
96	Beller	S. Wallace	Fiber	7:02a-9:07a	125	0.38 f/cc		Finishing Line 3 (Drive Side)
97	12/4/79			9:07a-11:05a	118	0.45 f/cc	0.67 f/cc	12" Sewer Pipe
98				11:05a-12:45p	100	0.52 f/cc		
99				12:45p-1:45p	60	1.99 f/cc		Finishing Line 2
100	Handler	N. Paone	Fiber	7:10a-9:07a	117	0.22 f/cc		Finishing Line 3
101	12/4/79			9:07a-11:04a	117	0.28 f/cc	0.37 f/cc	12" Sewer Pipe
102				11:04a-12:45p	101	0.54 f/cc		
103				12:45p-1:45p	60	0.58 f/cc		Finishing Line 2
104	Handler	M. McCarthy	Fiber	7:05a-9:11a	126	0.26 f/cc		Finishing Line 3 (Drive Side)
105	12/4/79			9:11a-11:02a	111	0.50 f/cc	0.40 f/cc	

Continued...

TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
106	Handler	M. McCarthy	Fiber	11:02a-12:45p	103	0.39 f/cc	0.40 f/cc	12" Sewer Pipe
107	Continued...			12:45p-1:45p	60	0.50 f/cc		Finishing Line 2
108	Mill Operator	C. Handschin	Fiber	7:25a-9:33a	128	0.26 f/cc	1.1 f/cc	30" Coupling Mill FD 16
109	12/5/79			9:33a-11:20a	107	0.55 f/cc		
110				11:20a-12:55p	95	2.2 f/cc		8" 3300
111				12:55p 1:45p	50	2.5 f/cc		
112	Mill Operator	F. Martncole	Fiber	7:30a-9:35a	125	0.59 f/cc	2.0 f/cc	30" Coupling Mill - FD 15
113	12/5/79			9:35a-11:20a	105	1.2 f/cc		
114				11:20a-12:55p	95	2.5 f/cc		8" 3300
115				12:55p-1:45p	50	6.2 f/cc		
116	Mill Operator	J. Zollo	Fiber	7:30a-9:30a	120	0.25 f/cc	0.32 f/cc	42" Coupling Mill-FD 54
117	12/5/79			9:30a 11:20a	110	0.18 f/cc		16" Sewer Pipe
118				11:20a 12:55p	95	0.42 f/cc		
119				12:55p 1:45p	50	0.58 f/cc		
120	Saw Operator	E. Cupid	Fiber	7:35a-9:35a	120	0.29 f/cc	0.59 f/cc	Dry Coupling Saw - FD 9
121	12/5/79			9:35a-11:25 a	110	0.52 f/cc		4" X 6" Couplings
122				11:25a-12:55p	90	1.16 f/cc		
123				12:55p-1:45p	50	0.44 f/cc		
124	Saw Operator	A. Echadarria	Fiber	7:10a-?	0	VOID	0.41 f/cc	Employee Lost Cassette
125	12/6/79			9:50a-11:55a	125	0.41 f/cc		Rework Saw FD 10
126				11:55a-1:40p	105	0.40 f/cc		
127	Saw Helper	D. Newman	Fiber	7:45a-9:25a	100	1.43 f/cc	0.44 f/cc	Rework Saw FD 10
128	12/5/79			9:25a-11:25a	120	0.54 f/cc		8" 3300
129				11:25a-1:45p	140	0.37 f/cc		

Ambler A/C Pipe Plant
Industrial Hygiene Survey
December 3-12, 1979

TABLE 1

Dust/Fiber Exposures

No. 79	Position Location (Date)	Name/Area	Analysis for	Time	Min.	Result	TWA for Sample Period	Remarks
130	Lathe Operator	T. Gray	Fiber	7:47-9:30a	103	0.38 f/cc		Nebel Lathe FD 8
131				9:30-11:25a	115	0.51 f/cc	0.37 f/cc	6" & 8 " FMS
132	(12-5-79)			11:25-1:00p	95	0.31 f/cc		Sebastion Lathe
133				1:00-1:45p	45	0.11 f/cc		FD 20
134	Lathe Operator	W. Barnett	Fiber	7:50-9:30a	100	0.38 f/cc		Laman Lathe FD 7
135				9:30-12:55p	205	0.31 f/cc	0.38 f/cc	16" Pipe
136	(12-5-79)			12:55-1:45p	50	0.70 f/cc		
137	Mill Operator	J. DeSilva	Fiber	7:55-9:32a	97	0.13 f/cc		Universal Boring Mill
138				9:32-11:25a	113	0.22 f/cc	0.28 f/cc	FD 13
139	(12-5-79)			11:25-1:00p	95	0.48 f/cc		6" Pipe
40				1:00-1:45p	45	0.35 f/cc		
41	Drill Operator	J. Diaz	Fiber	7:10-9:50a	160	0.66 f/cc		Korit Drill
42				9:50-11:55a	125	0.34 f/cc	0.46 f/cc	
43	(12-6-79)			11:55-1:40p	105	0.29 f/cc		
44	Saw Operator	N. Chancy	Fiber	8:45-11:25a	160	1.88 f/cc		Wet Saw
45				11:25-1:00p	95	1.69 f/cc	1.66 f/cc	16" 150
46	(12-5-79)			1:00-1:45p	45	0.84 f/cc		
47	Lathe	E. Moore	Fiber	7:40-9:52a	132	1.2 f/cc		Pencil Sharpener
48	Operator			9:52-11:55a	123	1.1 f/cc	1.1 f/cc	
49	(12-6-79)			11:55-1:40p	105	1.0 f/cc		
50	Finishing Supervisor (12-5-79)	R. Grudzinski	Fiber	8:15-2:00p	345	0.14 f/cc	0.14 f/cc	
51	Sweeper	H. Dukes	Fiber	10:10-12:45p	155	0.21 f/cc		
52	Operator (12-6-79)			12:45-3:00p	135	0.35 f/cc	0.28 f/cc	
53	Electrician	C. Beaver	Fiber	7:15-9:10a	115	0.84 f/cc		
54	(12-3-79)			9:10-1:45p	275	0.22 f/cc	0.40 f/cc	
55	Mechanic	J. DeMario	Fiber	7:40-12:40p	300	0.41 f/cc		
56	(12-6-79)			12:40-3:00p	140	0.36 f/cc	0.39 f/cc	Working on Finishing Line #2

INDUSTRIAL HYGIENE AUDIODOSIMETRY LOG

TABLE 2

PLANT: AMBLER PLANT DATE:

DEPARTMENT	EMPLOYEE	JOB TITLE	DATE	SAMPLE TIME (MINUTES)	CONDITIONS	CORRECTED 90 dBA 8-hour exposure
Manufacturing	R. Dorin	Mixer Operator	12/3/79	427		31%
Manufacturing	L. Low	Machine Tender	12/3/79	357	In Training	153%
Manufacturing	C. Worthington	Press Operator	12/3/79	412		78%
Manufacturing	J. Bickley	Mandrel Man	12/3/79	402		122%
Manufacturing	H. Meyers	Stripper	12/6/79	190	2nd Shift	46%
Manufacturing	S. Mineo	Tray Loader	12/6/79	405		109%
Manufacturing	F. DeMedio	Autoclave Truck Driver	12/6/79	335		92%
Manufacturing	A. Schimmel	Utility Truck Driver	12/3/79	430		457%
Manufacturing	A. Schimmel	Utility Truck Driver	12/6/79	405		582%
Manufacturing	F. Candelaria	Utility Truck Driver	12/6/79	255	2nd Shift	136%
Manufacturing	R. Jackson	Relief Operator	12/3/79	365		80%
Manufacturing	G. Jones	Supervisor	12/6/79	505	2nd Shift Changing mandrels & shot blasting	87%

INDUSTRIAL HYGIENE AUDIODOSIMETRY LOG

TABLE 2

PLANT: AMBLER PLANT DATE:

DEPARTMENT	EMPLOYEE	JOB TITLE	DATE	SAMPLE TIME (MINUTES)	CONDITIONS	CORRECTED 90 dBA 8-hour exposure
Manufacturing	C. Randall	Crusher Operator	12/6/79	405		114%
Manufacturing	R. Meyers	Crusher Operator	12/6/79	185	2nd Shift	88%
Finishing	S. Steltz	Fork Truck Driver	12/4/79	375	Line #3	61%
Finishing	A. DeClerico	Lathe Operator (Control side)	12/4/79	415	Line #3	318%
Finishing	G. Meyers	Lathe Operator (Drive side)	12/4/79	345		193%
Finishing	A. Mastrmatto	Inspector	12/4/79	377		156%
Finishing	G. Bojacfuk	Tester Operator	12/4/79	382		171%
Finishing	J. Handerhan	Beller	12/4/79	365		87%
Finishing	S. Wallace	Beller	12/4/79	403		92%
Finishing	N. Paone	Handler	12/4/79	395		52%
Finishing	M. McCarthy	Handler	12/4/79	400		VOID
Fittings	C. Hanschen	Mill Operator	12/5/79	380	Coupling Mill FD16	157%

INDUSTRIAL HYGIENE AUDIODOSIMETRY LOG

TABLE 2

PLANT: AMBLER PLANT DATE:

DEPARTMENT	EMPLOYEE	JOB TITLE	DATE	SAMPLE TIME (MINUTES)	CONDITIONS	CORRECTED 90 dBA 8-hour exposure
Fittings	F. Mirincole	Mill Operator	12/5/79	375	Coupling Mill FD15	95%
Fittings	J. Zollo	Mill Operator	12/5/79	375	Coupling Mill FD54	59%
Fittings	E. Cupid	Saw Operator	12/5/79	370	Dry Coupling Saw FD9	198%
Fittings	A. Echanarria	Saw Operator	12/6/79	390	Rework Saw FD10	297%
Fittings	D. Newman	Saw Helper	12/5/79	360	Rework Saw FD10	95%
Fittings	T. Gray	Lathe Operator	12/5/79	358	Nebel Lathe FD8	20%
Fittings	W. Barnett	Lathe Operator	12/5/79	355	Laman Lathe FD7	78%
Fittings	J. DeSilva	Mill Operator	12/5/79	350	Universal Mill FD13	128%
Fittings	J. Diaz	Drill Operator	12/6/79	390	Korit Drill FD28	122%
Fittings	N. Chancy	Saw Operator	12/5/79	300	Wet Saw FD21	102%
Fittings	E. Moore	Lathe Operator	12/6/79	360	Pencil Sharpener	163%
Fittings	H. Dukes	Sweeper Operator	12/6/79	290		28%

INDUSTRIAL HYGIENE AUDIODOSIMETRY LOG

TABLE 8

PLANT: AMBLER PLANT DATE:

DEPARTMENT	EMPLOYEE	JOB TITLE	DATE	SAMPLE TIME (MINUTES)	CONDITIONS	CORRECTED 90 dBA 8-hour exposure
Fittings	C. Beaver	Electrician	12/3/79	390		38%
Fittings	J. DeMario	Mechanic	12/6/79	440	Employee's coat may have interfered with sample.	31%

Monitoring/Analytical Procedures

and

Current Standards

Asbestos

Personal samples, Area samples which reflect employee exposure levels, and Engineering Area samples which do not reflect employee exposures were obtained on Millipore 0.8 micrometer Mixed Cellulose Ester Filters (MCEF). DuPont P4000 air sampling pumps were calibrated before and after each sampling day to approximately 2 liters per minute (lpm). In most cases, a series of 3 or 4 different filter samples were obtained for the person or area to establish an 8-hour time weighted average concentration (TWA).

The analysis was conducted according to the USPHS/NIOSH Membrane Filter Method for Evaluating Airborne Asbestos Fibers (P&CAM 239) by an experienced fiber counter who was trained by NIOSH. Fibers were counted on a Nikon Model 96982 phase contrast microscope at 400X magnification.

The current OSHA standard is given in 29 CFR 1910.1001. It calls for an employee TWA airborne limit of two fibers, longer than 5 micrometers, per cubic centimeter of air (f/cc). Also, no employee shall be exposed at any time to airborne concentrations in excess of 10 f/cc.

Noise

A Bruel & Kjaer 2209 precision sound level meter with B & K 4133 1/2 inch microphone was utilized to obtain sound pressure level measurements. This instrument was calibrated before and after this survey. The reference for all sound pressure level measurements is 0.0002 microbar.

DuPont Model D-376 audiodosimeters utilized during this survey were set at the 90 dB cutoff mode.

The audiodosimeters were calibrated before and after each day of dosimetry sampling utilizing the DuPont Audiodosimeter Calibrator Model C114 by the

direct reading method. Before and after each survey week the audiodosimeters were calibrated by the timed calibration procedure utilizing the DuPont calibrator C114 and the Model R225 readout. This calibration was done for 5 minutes, 10 seconds at 114 dB to give an expected 30% +/- 4% result.

The Permissible noise exposure given in OSHA 29 CFR 1910.95, ranges between 90 decibels for 8-hours per day through 115 decibels for a maximum duration of 1/4 hour per day according to the table below. Also, exposure to impulsive or impact noise should not exceed the 140 decibel peak sound pressure level ceiling value. The maximum permissible audiodosimeter dose is 100%.

PERMISSIBLE NOISE EXPOSURES

Duation per day, hours	dBA, slow response
8	90
6	92
4	95
3	97 97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

KEY ELEMENTS OF A RESPIRATOR PROGRAM

The Occupational Safety and Health Administration (OSHA) provides regulations for the use of respirators in OSHA standard, 29 CFR 1910.134. OSHA indicates that harmful levels of atmospheric contamination of dusts, fogs, fumes, mists, gases, smokes, sprays and vapors shall be prevented as far as feasible by accepted engineering controls. When effective engineering controls are not feasible or when they are being instituted, appropriate respirators are to be used. It is required that employers provide respirators which are applicable and suitable for the purpose intended. The employer is responsible for the establishment and maintenance of a respiratory protective program which includes the following eleven items.

1. Written Operating Procedure. The respirator procedures must be written and should address the selection and use of respirators. The location's procedures for items 2 through 11 should be discussed and explained in detail. Responsibilities for specific aspects of the program should also be specified in the Location's written respirator program.

2. Proper Selection. The selection of the appropriate respirator is based on the physical state of the substance (gas, vapor, particulate, etc...) the warning properties of the chemical, the toxicity of the agent involved, the protection factor of the respiratory device, and the airborne level of the agent. Other factors to be considered include permissible exposure levels, oxygen deficiency, and approved equipment.

3. Training and Fitting for the Employees. It is required that employees are instructed and trained in the proper use, limitations, selection, and maintenance of respirators. Employees should be trained in the nature of the hazard. The employee must be trained to check the fit of the respirator each time it is used.

Fitting through the use of quantitative fit testing (isoamyl acetate or irritant smoke) is also required.

4. Exclusive Employee Use. Where practicable, the respirators should be assigned to individual workers for their exclusive use.

5. Cleaning and Disinfecting. Respirators are to be regularly cleaned and disinfected. This must be done thoroughly after each use for respirators used by more than one worker. For respirators assigned to one worker, respirators must be cleaned and disinfected daily when they are routinely used throughout the day.

6. Storage. Respirators shall be stored in a convenient, clean, and sanitary location. It is especially important that rubber parts are stored so that they do not lose their original shape. A misshapen mask is essentially broken and no longer holds its approval.

7. Inspection and Maintenance. Respirators used routinely must be inspected during cleaning. Worn or deteriorated parts must be replaced.

   Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.

8. Work AREA Surveillance. Appropriate surveillance of work area conditions and degree of employee exposure shall be maintained.

   It is necessary to review the work area to identify contaminants and assess the degree of hazard on a regular basis.

9. Inspection and Evaluation of the Program. Regular inspections are required to insure that respirators are properly selected, used, cleaned, and maintained.

10. Medical Examination. OSHA indicates that an employee should not be required to use a respirator unless a physician has determined that the employee is physically able to perform the work and use the equipment. The respirator user's medical status should be reviewed periodically.

11. Approved Respirators. Approved (NIOSH/MSHA) respirators are to be used when they are available. The approvals on respirators apply to the respirators as whole units. The approval is valid for the whole unit in good condition. It is nullified by the mixing of components and by use of non-approved components.

This is a condensed summary of the OSHA regulations on the use of respirators. Background information on respirators is given in the following sources:

A Guide to Industrial Respiratory Protection, John A. Pritchard, Los Alamos Scientific Laboratory, HEW Publication No. (NIOSH) 76-189, 1976.

Practices for Respiratory Protection, ANSI Z88.2, 1969, American Standards Institute, Inc., 1430 Broadway, N.Y., N.Y., 10018.

OSHA Standard Method for Determination of Respiratory Protection Program Acceptability, Industrial Hygiene Field Operations Manual, OSHA Instruction CPL 2-2.20, April 2, 1979, Office of Field Coordination.

CERTAINTEED CORPORATION

REF. 0.0002 MICROBAR

EXHIBIT # 1

DATE: 12/3/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: Fiber Preparation EXPOSURE: DEPT. MANUFACTURING

CONDITIONS: Normal ENGINEER: T. Shaffer

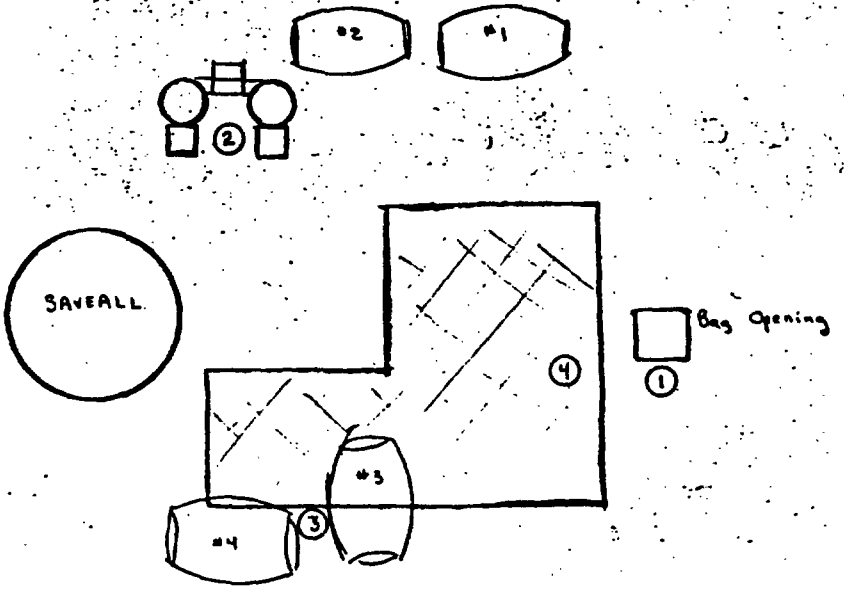
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/3/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1	8:46a	Mixer Operator at Fiber Dump	83													
2	8:50a	Between Willow Mills.	88		100		85	86	99	87	86	83	77	72	65	54
		#1 operating, #2 not operating														
3	8:52a	Ground Level between	89		94		86	88	90	84	88	87	82	76	72	64
		#3 and #4 MIXERS.														
4	9:00	On Deck, with screw conveyor	94													
		operating.														
4		On Deck, Screw Conveyor NOT	84													
		operating														

SKETCH - REMARKS



CERTAINTEED CORPORATION

REF. 0.0002 MICROBAR

EXHIBIT # 2

DATE: 12/3/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: PIPE MACHINE AREA EXPOSURE: DEPT. MANUFACTURING

CONDITIONS: Normal Operations 90 f/min ENGINEER: T. Shaffer

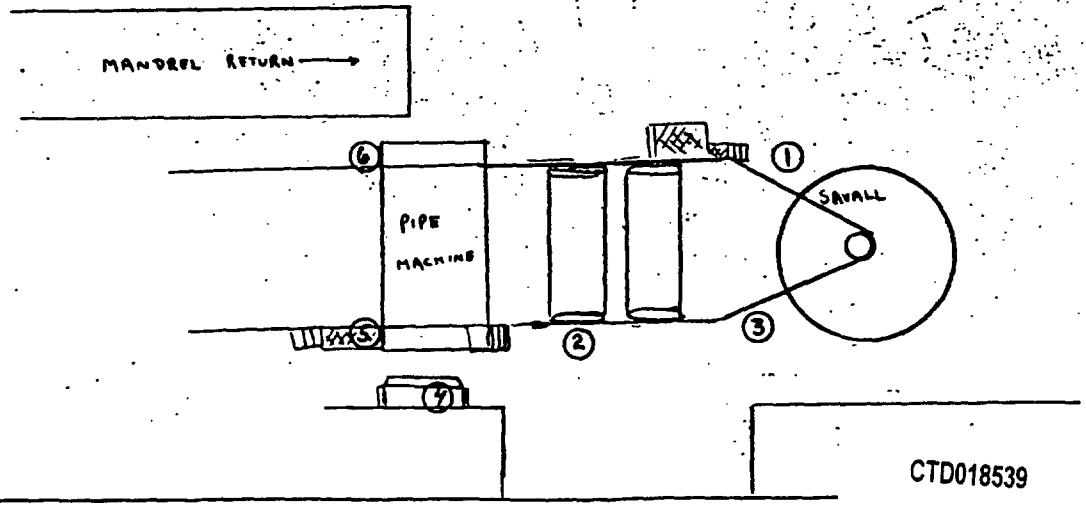
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/3/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1	9:03a	Machine Operating	89.5		96		85	86	89	86	88	85	82	76	71	65
2		Machine Operating	91		103		80	83	86	84	86	84	82	85	82	76
3		Machine Operating	86													
4		Control Station-operating	86													
		-Mandrel falling into position	94													
5		Press Operator, normal operating	86													
		Pipe rolling out at this position	99													
6		Mandrel Man Position - normal	86													
		Mandrel Change, Air Noise	98													
		Pipes hitting together at	94 96													
		mandrel return														

SKETCH - REMARKS



CTD018539

CERTAINTEED CORPORATION

REF. 0.0002 MICROBAR

EXHIBIT # 3

DATE: 12/3/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: MANDREL STRIPPER & SCRAP CRUSHER EXPOSURE: DEPT. MANUFACTURING

CONDITIONS: Normal ENGINEER: T. Shaffer

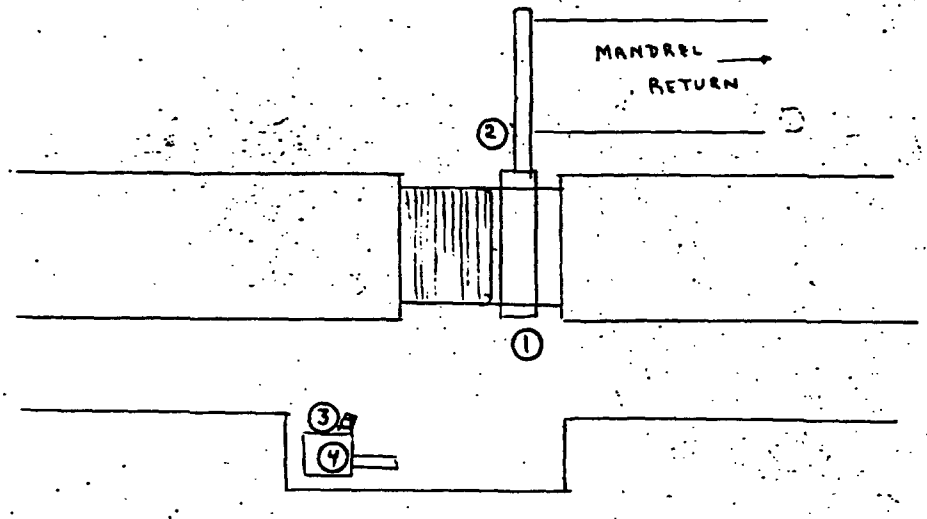
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/3/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1	9:30a	Aisle Between Stripper+Crusher	87													
2		Mandrel Puller - normal	86													
		-Puller in 90 per hour, 5 sec. each	91													
		-Puller return 90 per hour, 5 sec each	92													
3		At floor next to steps to Crusher	85													
4		Crusher Operator on Platform	85													
		- while Crushing	108			127.5										
			102			128										
						128.5										

SKETCH - REMARKS



CERTAINTEED CORPORATION

NOISE SURVEY SHEET

REF. 0.0002 MICROBAR

EXHIBIT C 4

DATE: 12/5/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: #3 Hydrotest Line EXPOSURE: DEPT. FINISHING

CONDITIONS: Normal, 8" 150 REF. A/R: ENGINEER: T. Shaffer

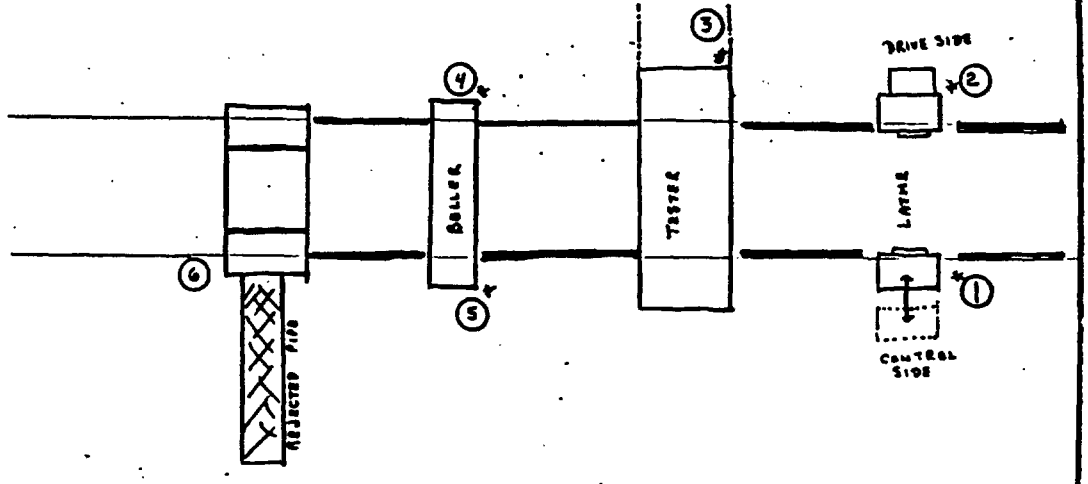
INSTRUMENT: B & K 2209 PSLM * 699106 B & K 1613 OCTAVE FILTER Serial 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" foam

CALIBRATOR: B & K 4203 #725195 CALIBRATION DATE: 12/5/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1		Control Side Lathe Operator, (10 sec.) Background	88													
		— Cutting, 24 sec.	95		99		80	83	85	87	94	93	92	87	83	80
		— Air Release Bursts, 6/cycle	102-106		99											
2		Drive Side Lathe Operator, Background (10 sec.)	88													
		Cutting, 24 sec.	96-102		100		80	80	82	86	94	93	89	85	70	70
3		Tester Operator, Background (10 sec.)	88													
		Cutting, 24 sec.	94-98			120	(Pipe banging together)									
4		Beller Background	84													
		Beller Air Release	95													
5		Beller Background	84													
		Beller Air Release	103													
6		Packagers Background	86													
		Beller Air Release	96													

SKETCH - REMARKS



CTD018541

DATE: 12/5/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: COUPLING MILLS #16, #15, #54 EXPOSURE: DEPT. FITTINGS

CONDITIONS: Normal ENGINEER: T. Shaffer

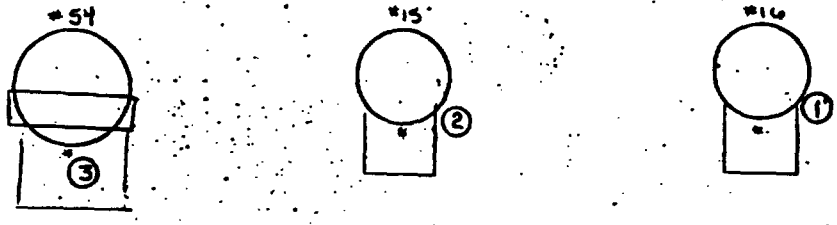
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/5/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1		#16 Operator, Background, 12sec	83/87													
		Milling 6" Duplex Ad. ACC1 , 12sec	96/100		97/100		80	81	82	84	82	95	94	101	85	—
		(higher noise value from air														
		release noise at back of mill														
2		#15 Operator, Background, 7sec.	88													
		Milling 8" 3300 3sec.	92													
		" " " 5sec	98		99		80	84	83	86	87	85	94	89	81	76
		Air Noise to	96													
77		#54 Operator, Background	84													
		Milling 16" 150 Couplings	88													

SKETCH - REMARKS



DATE: 12/5/79 PLANT: SHEET OF

JOB DESCRIPTION: #9 Dry Coupling Saw EXPOSURE: DEPT. Fittings

CONDITIONS: Normal ENGINEER: T. Shaffner

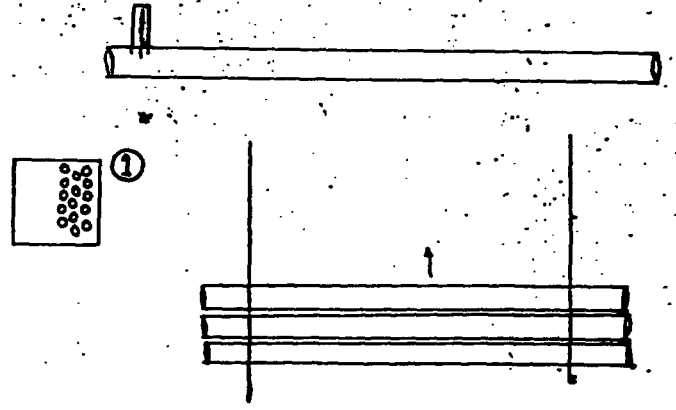
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" Foam

CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/5/79 BEFORE ✓ AFTER ✓

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1		Operator cutting 8" couplings														
		– Cutting, 5 seconds	92/96													
		– Cutting, 5 seconds	90													
		– Background, 5 sec.	85													
		-Background with #10 operating	90													

SKETCH – REMARKS



CERTAINTEED CORPORATION

REF. 0.0002 MICROBAR

EXHIBIT # 7

DATE: 12/3/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: #10 Rework Saw EXPOSURE: DEPT. FITTINGS

CONDITIONS: Normal ENGINEER: T. Staffin

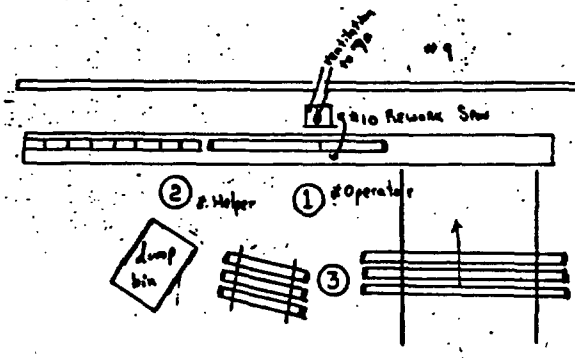
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/3/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1		Operator Background, 15 sec.	95													
		Cutting, 20 sec	106													
2		Helper Background, 15 sec.	94													
		Cutting, 20 sec	100													
3		Behind Operator –														
		– #10 Saw on but not cutting, #9 saw cutting	89													
		– #10 Saw on but not cutting, #9 saw not cutting	86													

SKETCH – REMARKS



CTD018544

DATE: 12/5/79 PLANT: SHEET OF

JOB DESCRIPTION: FD-13 UNIVERSAL BORING MILL / FD-7 LEHMAL LATHE EXPOSURE: DEPT. FITTINGS

CONDITIONS: ENGINEER: T. Shaffner

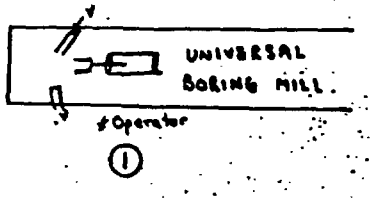
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

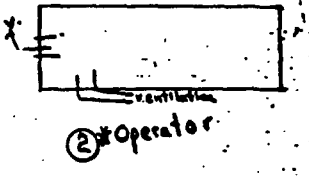
CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/5/79 BEFORE ?? AFTER ??

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1		Operator FD-13 Lehmac. Background	84													
		Cutting	91		94		79	81	81	83	88	86	86	85	80	70
2		Operator FD-7 Lehman Lathe														
		During operation some	98													
		Operator accomplishes approx. 60 units of 12" fluid tight gauge for 20 seconds each. Most of the time is consumed in using crane to load stock.														

SKETCH - REMARKS



①



DATE: 12/5/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: KORIT DRILLS EXPOSURE: FD28 & 28A DEPT. FITTINGS

CONDITIONS: Normal ENGINEER: T. Shaffer

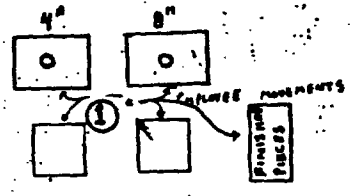
INSTRUMENT: B & K 2209 PSLM # 699106 B & K 1613 OCTAVE FILTER # 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K 4230 # 725195 CALIBRATION DATE: 12/5/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	Elapsed Time, Sec.	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
		Job activity	0														
		Loading 8" stock	39	89													
		Loading 4" stock	50	98		98		79	82	82	82	86	86	94	95	92	85
		Remove 8" stock	60	98													
		Remove 4" stock and pack on pallet	80	89													
			Recycle														

SKETCH - REMARKS



CERTAINTEED CORPORATION

NOISE SURVEY SHEET

REF. 0.0002 MICROBAR

EXHIBIT # 10

DATE: 12/5/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: PENCIL SHARPENER EXPOSURE: DEPT. FITTINGS

CONDITIONS:

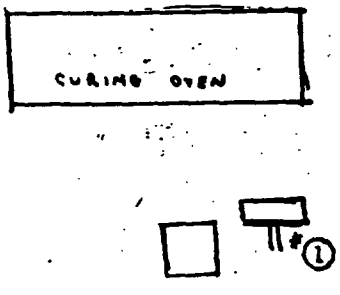
INSTRUMENT: B & K 2209 PSLM SERIAL 699106 B & K 1613 OCTAVE FILTER SERIAL 700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K TYPE 4230 # 725195 CALIBRATION DATE: 12/5/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1		Operator position, Background 20 sec.	88													
		Cutting 18 sec.	99		99		82	85	82	80	87	92	93	91	85	75

SKETCH - REMARKS



#3 Finishing Line

CERTAINTEED CORPORATION

REF. 0.0002 MICROBAR

EXHIBIT E 11

DATE: 12/5/79 PLANT: AMBLER SHEET OF

JOB DESCRIPTION: MISCELLANEOUS L_p Measurements EXPOSURE: DEPT.

CONDITIONS: Normal REF. A/R: ENGINEER: T. Shaffer

INSTRUMENT: B & K 2209 PSLM #699106 B & K 1613 OCTAVE FILTER #700934

MICROPHONE: B & K 4133 ½" PROTECTOR: 3" FOAM

CALIBRATOR: B & K 4230 725195 CALIBRATION DATE: 12/5/79 BEFORE 94 AFTER 94

STA. NO.	TIME	EMPLOYEE	NETWORK A		LIN.	PEAK HOLD	OCTAVE CENTER FREQ. (Hz.) 31.5	63	125	250	500	1K	2K	4K	8K	16K
1		Wet Cutoff Saw Operator-Backgr	85			•										
		FD 21 - While cutting →	92		94	•										
2		Epoxy Fabrication - All "	82-89													
		Background noise from Finishing														
3		Autoclave Area, on platform	82													
		near center autoclave														

SKETCH - REMARKS

INDUSTRIAL HYGIENE SURVEY
Engineering Study Results
for Asbestos fibers
Ambler A/C Pipe Plant

A number of environmental air samples were obtained during the December 3-7, 1979 and January 28-29, 1980 industrial hygiene surveys to assist the engineering staff in developing appropriate controls. This report discusses the results of these studies which are presented in tabular form at the end of the report. Table 1 includes the personal samples and Table 2 presents the engineering samples.

Fiber Dump Station

Analysis of the individual sequential samples indicates excessive exposures occur both during bag dumping and during staging and cleanup. To test the possible source of the latter, smoke test observations and air velocity measurements were made which indicated that the space heater located at the ceiling, about 10 feet from the staging area, produced an air current of 35 ft/min over the surface of the unopened bags. Though the bags are sealed, it was noted that fiber deposits on the bags or other surfaces were disturbed by the air flow from the heater.

We are recommending that the air from the heater be redirected away from the fiber dump area or the heater be replaced by a non-forced air heating unit. Greater attention to vacuum cleaning and proper work practices by the operator would also help reduce this exposure.

Another potential problem was observed when the operator partially closed the blast gate to reduce the exhaust hood velocity. The explanation given for this procedure was that with the hood fully open, fiber bags have been sucked into the hood. One operator stated that the high velocity with the hood opened had resulted in small clumps of fiber being blown into his face. We did not observe these phenomena during this survey. Sample 8 provides some insight into the fiber exposure problem from this procedure. This personal exposure sample with the gate half opened measured 6.9 f/cc. With the gate fully opened (Samples 10 and 11) the levels were 0.94 and 0.82 f/cc. Until

the automatic bag opener installation, currently underway, is completed, we strongly recommend that this operation only be conducted with the gate fully opened and a study be made of the optimal velocity to control fiber dispersion in this operation.

Sample 9 was taken during a 10 minute break, in the baghouse exhaust due to a frozen switching mechanism. The Mixer Operator and Supervisor immediately donned their respirators and the pipe machine was stopped to avoid continued generation of fibers. The Mixer Operator's exposure during this upset was measured at 6.3 fibers/cc. Exposure levels on the Machine Tender (Sample 24) and the Manufacturing Supervisor (35) during this upset were found to be 6.59 and 5.74 fibers/cc respectively. All were below the 10 f/cc OSHA ceiling limit. All three employees wore 3M 8710 respirators. A similar baghouse breakdown occurred later that morning from 9:39-10:06. Again, the pipe machine was immediately shut down and employees in the area wore respirators.

Sample 16 is worthy of some followup. This 21 minute personal exposure sample was taken on the Mixer Operator while the employee went to the locker room and the lunch room. Although tampering with the sample is not ruled out, we recommend that followup samples be taken by the plant. Specifically, we recommend that a few 10-20 minute samples be taken in the locker room, restroom, lunch room and from the baghouse exhaust. Of interest, is that the fibers on these samples were consistently fine fibers, less than 1 micron in diameter and about 5 microns in length.

A smoke tube survey was conducted throughout the mixing area to disclose any leaks and to judge the effectiveness of the ventilation system. This qualitative review found the system to be free to leaks and to provide effective control of fibers and dust at material transfer points.

Industrial Hygiene Survey
Ambler A/C Pipe Plant
Engineering Study Results for
Asbestos Fibers

This review was conducted on Tuesday, 1/29/80, the day after the baghouse failure. At the time of a baghouse failure, dust which is normally captured was blown out and came to rest on top of the transfer screw conveyors between mixers. This dust has not been cleaned from the surfaces within the intervening day of the breakdown. Although dust was not observed to be vibrating off the machinery, it can be expected that breezes of air would be capable of producing aerosols with this debris. The housekeeping program should be reviewed to provide regular vacuuming of all surfaces in the mixing area as well as throughout the plant, especially after process upsets.

It was noted that A/C mud is used as a general purpose sealer for the willow mills and blender to seal this machinery in an effort to prevent leaks of fiber into the air. It does an effective job; no leaks were observed while smoke testing the willow mills. While the A/C mud is wet, airborne fibers would not be expected to be a problem. However, this sealer must be scraped away to open the willow mills for the purpose of maintenance or repair of the units. An alternate non-asbestos sealer should be obtained and used to seal machinery.

Blender and Trough Areas

Just prior to the December, 1979 survey, a new blending system had been installed to reduce dust levels and to enhance the mixing of the dry asbestos-cement mixture with reclaimed water from the Saval. This new system was being shaken down during the December survey.

To test if fibers were being released, point source samples were collected one foot from the Blender at a height of 5 feet (Samples 211-217) on two different days. The fiber levels ranged from 0.8 f/cc to 5.0 f/cc. Likewise, point source samples taken about 6 feet above wetting trough (Samples 224-231) ranged from 2.8 to 14.1 f/cc.

One reason given for these emissions was an undersized mizer motor in the modified blender, resulting in blockage of the dry A/C mix. Contributing to

increased fiber levels during the shakedown period was the necessity of the Machine Tender and Manufacturing Supervisor to frequently open the access lid of the blender to observe the flow or unjam a clog, and the fact that the temporary lid on the blender was not adequately sealed.

Engineering changes to install a larger mixer motor and a better sealing access lid were completed in early January, 1980.

The followup survey on January 28-29, 1980, showed significant reductions in fiber exposure. The point source samples at the blender ranged from 0.27 to 1.13 f/cc (Samples 218-223). Above the trough, the point source fiber levels dropped to a range of 0.45 to 1.51 f/cc (Samples 232-237).

We strongly recommend that the plant management more stringently followup on any process engineering changes to include the measurement of fiber exposure changes association with such activities.

During the January survey , it was observed that A/C mud was being used as a temporary sealant to control fibers at the point where the mixer shaft enters the lid of the blender. The plant manager indicated that other seals had been tried but failed under the constant friction and positive pressure of the vessel. He described a method to change the ventilation at the screw conveyor which moves A/C dry mix out of the Number 4 mixer into the blender. It was suggested that a ventilation leg could be dropped down to the mixer's point of entry into the blender. It is recommended that this or other appropriate steps be taken to provide permanent control of dust at the mixer.

Pipe Machine

Although the Press Operator's exposure (Samples 45-49) on 12/3/79 averaged 1.7 f/cc, several other samples indicate excursions above 2 f/cc. An area

sample at the Rollup, approximately 5 feet from the Press Operator on 12/6/79 measured greater than 7.3 f/cc (Sample 244). A personal sample on the Press Operator on 12/6/79 could not be read due to excessive particulate contamination. Area samples on 1/28/80 at the Machine Control Panel (Samples 241 and 242) measured 0.37 f/cc and 4.69 f/cc. A 33 minute personal exposure sample (Sample 27) on the Machine Tender while working in the area of the control panel measured 3.28 f/cc.

In an attempt to determine the source of these excursions, a series of "Point Source" samples were taken in and around the pipe machine to see if the steam release from the process contained fiber. Two such samples, 249 and 251, measured levels of 0.94 and 1.08 f/cc. Three other samples, 248, 250, 252, were too heavily contaminated with particulates to count fibers.

We cannot say what the major source of the fiber release is at the pipe machine.

We do note however, that recirculated process water is used to clean the felt and cylinders. The water mist generated most probably contains some fiber. Airborne mist plus any dried settled mist can build up fiber on machine and structural surfaces and become resuspended by vibration, and/or air movements.

Smoke test and air velocity measurements were taken to observe air flow movement into the pipe machine area. The prevailing air currents on 1/28-1/29/80 were from the Mixing Department and measured at about 40 feet per minute. Between the curing tunnel and the building walls the air movement is irratic. No air currents from the Crusher were observed.

Crusher

A smoke tube analysis on 1/29/80 showed practically no air flow into the throat of the Crusher. One of two ventilation connections to the grinder feed chute was missing a 10" piece of flexible duct connection rendering the exhaust essentially useless. Also a metal plate about 18" X 24" on the underside of the crusher appeared to be missing. We are not aware of

its significance, if any.

The cloth bags which are located at the fines pipe line, are used by the Crusher Operator to judge the flow of material through the system. The fabric used cannot provide high efficiency filtration of asbestos fibers and is suspected as a fiber source in this area. Area samples 259, 260, 261 show fiber levels of 5.5, 2.4, and 3.3 f/cc which may come from the cloth bags or from find dust leaks which were observed to occasionally drift downward from the fines cyclone.

Mandrel Cleaning

The exhaust control ventilation at the shotblaster was reviewed during the January survey and found to be providing good capture velocities at the entrance and exit openings. With 1" of static pressure at the baghouse, the pipe openings (for 8" to 10") had face velocities of 200-250 linear feet per minute when the fans were on but not while the shotblaster itself was in operation.

During the operation of the shotblaster, it was observed that a cloud of dust is carried out with the mandrel as it exits the shotblaster. Most of this dust is expected to be shot, however, some asbestos fibers could also be encountered. Unfortunately, we were not able to obtain a personal sample of the operator during this procedure. It is recommended that personal air monitoring be conducted to assess fiber levels during shotblasting.

Mandrels occasionally have patches of asbestos/cement which adhere to the steel. We obtained a sample of an employee hand-scraping pipe which was resting on the floor. This sample, 66, on R. Lutz, resulted in an acceptable level of 1.01 f/cc. It was learned that the mandrels are also hand sanded with sand paper and scraped while they are in the racks over the worker's heads. It is recommended that short term samples (15 minutes) be obtained to assess fiber levels at these operations.

Finishing

Air sampling was conducted on employees involved in lathing 12" sewer pipe

on Finishing Line 3 on December 4, 1979. Toward the end of the day, approximately 1:00 pm, the employees assumed comparable positions on Finishing Line 2. The results, Table 1, Samples 73-107, show all TWA personal exposures to range from 0.26 to 0.71 f/cc.

A general buildup of fiber concentration throughout the day can be seen in the Finishing Department data. During the first two hours, the overall average for all Finishing Line employees was 0.33 f/cc. Samples of the next two hours averaged 0.50 f/cc, then 0.60 f/cc and the last half hour of sampling (on Line #2) was 0.60 f/cc.

The data provide insight into general background fiber levels in the plant which appear to generally increase through the day. It should be noted that there is no third shift finishing crew.

Also, field notes indicated that during the last half hour of sampling, the #2 Finishing Line was not actually operating. It appears that the fiber levels for the last half hour may reflect a general center plant background level of approximately 0.6 f/cc.

Fittings

The employee sampling results in the Fittings Department were found to range from 0.11 to 6.2 (Samples 108-149). The calculated 8-hour TWA exposures for all employees in this department ranged from 0.28 to 2.0 f/cc.

On December 5, the Fittings Department was monitored with personal samples at basically two hour intervals throughout the day. The average fiber levels here, like those seen at Finishing, tend to increase as the day progresses.

As the day proceeded, the averages were 0.34, 0.50, 0.97, and at the end of the day were 1.4 f/cc. These data suggest a general increase in the background fiber levels. The highest value of 6.2 f/cc was obtained at the end of the day while the daily cleanup of floors and equipment was underway.

Industrial Hygiene Survey
Ambler A/C Pipe Plant
Engineering Study Results for
Asbestos Fibers

We recommend that closer attention be given to both the reduction of fiber releases and more frequent vacuuming of deposited fibers throughout the shift to reduce levels in both the Finishing and Fittings Departments to the desired level of less than 0.5 f/cc.

Industrial Hygiene Survey
Ambler A/C Pipe Plant
Engineering Study Results for
Asbestos Fibers

Recommendations

1. That a thorough review of the OSHA Asbestos Standard, 1910.1001, be conducted by a panel of plant management personnel to reassess the degree of Ambler plant compliance with that standard. Special emphasis should be placed on personal monitoring to determine 8-hour exposures in those positions where excess levels were determined by this survey.

2. That the heater in the area of the fiber dump be redirected or replaced by a non-forced air heating unit.

3. That until the automatic bag opener is put in operation, the blast gate at the fiber dump be positioned to obtain optimal velocity for control of fiber dispersion.

4. That followup work consisting of short term samples be taken in and around the restroom, locker room and lunch room areas and at the baghouse exhaust.

5. That a non-asbestos sealer be used in place of the A/C mud presently being used in an around the manufacturing area.

6. That whenever any changes - - minor or major - are made to the manufacturing process/system, fiber exposure measurements should be made and followup work done to assure that exposures are well within standards at all times.

7. That the exhaust ventilation to the Mixer/Blender be changed to provide permanent control of dust at this area.

8. That a Personal Respirator Control Unit Program be developed using the concepts presented in Section C of the CertainTeed Health and Safety Manual and Appendix II to this report.

9. That housekeeping be improved in the manufacturing area and also that it include vacuuming and cleaning of machine and structural surfaces in and around the area.

Industrial Hygiene Survey
Ambler A/C Pipe Plant
12/3-7/79

TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
1	Mixer Operator	R. Dorin	Fiber	6:50a-9:00a	130	3.0 f/cc		Manufacturing 8" 2400 pipe.
2	12/3/79			9:00a-10:05a	65	0.38 f/cc	1.7f/cc	Wearing respirator
3				12:33p-1:57p	84	0.81 f/cc		Blast gate 1/2 open
4			Total Dust	10:05a-12:33p	148	2.2 mg/M^3		
5	Mixer Operator	R. Dorin	Fiber	10:07a-10:47	40	2.7 f/cc	-	5-7: Wearing respirator 5: Dumping Fiber
6	1/28/80			10:47a-11:19a	32	5.9 f/cc	-	6: Staged Fiber/Waiting
7				11:19a-11:45a	26	3.6 f/cc	-	7: Dumping fiber (Blast Gate 1/2 open.
8	Mixer Operator	H. Meyers	Fibers	7:24a-8:34a	70	6.9 f/cc.		Wearing 8710 respirator and white suit.
9				8:34a-8:50a	16	6.3 f/cc	2.36 f/cc	Samples 8 & 9 , hood ventilation damper half open.
10	1/28/80			8:50a-9:32a	42	0.94 f/cc		Mixer Operator training a new person
11				9:32a - 1:00p	208	0.82 f/cc		9, Operation upset, baghouse failure.
12				1:00-2:00p	60	VOID		12, Sample used twice
13	Mixer Operator	H. Meyers	Fibers	6:42a-8:42a	120	0.66 f/cc		14, Sample used twice.
14				8:42a-10:42a	120	VOID		16, Very fine fibers around 5 um long while on break at locker room and lunch room.
15				10:47a-12:12	90	1.27 f/cc	2.05 f/cc	17, While dumping.
16	1/29/80			12:12p 12:33p	21	13.98		Wearing respirator
17				12:33-12:51p	18	5.07		
18				12:51p-1:57p	66	1.0		
19	Machine Tender	J. Low	Fibers	7:48a-9:15a	87	2.6 f/cc		
20	12/3/79			9:15a-10:52a	97	1.6 f/cc	2.2 f/cc	Manufacturing 8" 2400 pipe.
21				12:36p-1:45p	69	2.6 f/cc		
22			Total Dust	10:52-12:36	104	1.8 mg/M^3		

TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for sample period	REMARKS
23	Machine Tender	J. Love	Fibers	6:30a-8:37a	127	1.87 f/cc		
24				8:37a 8:49a	12	6.59 f/cc	1.30 f/cc	24, process upset, baghouse failure.
25	1/28/80			8:49a-10:06	77	1.3 f/cc		
26				10:06a 1:27a	201	0.3 f/cc		26, Removing scrap 2 minutes
27				1:27p-2:00p	33	3.28 f/cc		27, in area of control panel.
28	Machine Tender	J. Love	Fibers	6:54a-10:20a	206	0.57 f/cc		
29	1/29/80			10:20a-12:56p	156	0.93 f/cc	0.80 f/cc	
30				12:56p 2:01p	65	1.21 f/cc		30, Relieving Control Operator, & cleaning cylinders.
31	Manufacturing Supervisor	G. Jones	Fiber	2:15p-5:23p	188	2.0 f/cc		31, changing mandrels
32	12/6/79			5:23p-7:00p	97	2.3 f/cc	2.7 f/cc	32, changing mandrels & cleaning mandrels.
				7:00p-7:30p	30	8.6 f/cc		33, Shot Blasting Mandrels
34	Manufacturing	G. Jones	Fiber	6:27a-8:37a	130	0.78 f/cc		
35				8:37a-8:51a	14	5.74 f/cc	1.26	35, Process upset, baghouse failure.
36	1/28/80			8:51a-10:09a	78	1.66 f/cc		
37				10:09-12:45p	156	1.12 f/cc		37, scraping mandrels for 5 minutes.
38				12:45p-2:03p	78	1.11 f/cc		
39	Manufacturing Supervisor	G. Jones	Fibers	5:48 7:45p	57	VOID		39-43, VOID. Pump found inoperative at end of 43 sample period.
40				7:45a-8:00a	15	VOID		
41				8:00a-9:02a	62	VOID		
42				9:02a-10:50a	108	VOID		
43				10:50a 1:07p	137	VOID		
				1:07p-2:10p	63	1.11 f/cc		

Industrial Hygiene Survey
Ambler A/C Pipe Plant
12/3-7/79

TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
45	Press Operator	C. Worthington	Fiber	7:08a-9:05a	117	1.6 f/cc		Manufacturing 8" 2400 pipe.
46				9:05a-9:50a	45	1.9 f/cc	1.7 f/cc	
47				12:45-2:00p	75	VOID		Pump malfunction
48			Total Dust	9:50a-12:45p	175	1.3 mg/M^3		
49	Press Operator 12/6/79	C. Worthington	Fiber	3:25p-6:45	200	VOID	-	Heavy particulate-not countable
50	Mandrel Operator	J. Bickley	Fiber	7:09a-10:00a	171	0.65 f/cc		Manufacturing 8" 2400 pipe.
51	12/3/79			12:35p-1:51p	76	0.96 f/cc	0.75 f/cc	
52			Total Dust	10:00a-12:35p	155	0.82 mg/M^3		
53	Pipe Stripper 12/6/79	H. Meyers	Fiber	2:30p-6:20p	230	1.5 f/cc	-	Manufacturing 15" 3000 pipe.
54	Tray Loader	S. Mineo	Fiber	7:00a-11:50a	290	0.54 f/cc	0.50 f/cc	Manufacturing 15" 3000 pipe
55				11:50a-1:45p	115	0.41 f/cc		
56	Autoclave Truck Driver	F. Demedio	Fiber	8:05a-11:55a	230	0.15 f/cc	0.28 f/cc	Manufacturing 15" 3000 pipe.
57	12/6/79			11:55 a-1:40p	105	0.57 f/cc		
58	Utility Truck Driver 12/3/79	H. Schimmel	Fiber	6:40a-7:03a	23	2.2 f/cc		Manufacturing 8" 2400 pipe.
59				7:03a-9:20a	137	0.26 f/cc	0.62 f/cc	
60				9:20a-12:40p	200	VOID		Sample used twice
61				12:40p-1:50p	70	0.79 f/cc		
62	Relief Operator	R. Jackson	Fiber	7:40a 9:10a	90	0.66 f/cc		Manufacturing 8" 2400 pipe.
63				9:10a-9:55a	45	0.20 f/cc	0.51 f/cc	
64				12:48p-1:45p	57	VOID		Sample used twice
65			Total Dust	9:55a-12:48p	173	0.24 mg/M^3		

Industrial Hygiene Survey
Ambler A/C Pipe Plant
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TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
66	Laborer 1/29/80	R. Lutz	Fibers	7:22a-7:43a	11	1.01	-	Employee scraping mandrels wearing 8710 respirator and white suit.
67	Crusher Operator	C. Randall	Fiber	7:00a-9:25a	145	2.7 f/cc		Manufacturing 15" 3000 pipe.
68	12/6/79			9:25a-10:01a 10:06a-12:02p	152	3.5 f/cc	3.0 f/cc (Excluding 69, baghouse entry)	Wearing respirator
69				10:01a-10:06a	5	15.9 f/cc		In dust collector shaking bags, wearing 3M8710 respirator.
70				12:02p-1:45p	103	2.6 f/cc		
71	Crusher Operator	R. Meyers	Fiber	2:30p-5:20p	170	1.5 f/cc		
72	12/6/79			5:20p-6:15p	55	VOID	1.5 f/cc	Pump malfunction.
73	Fork Truck Driver	S. Steltz	Fiber	7:30a-9:05a	95	0.17 f/cc		Finishing Line 3
74				9:05a-11:00a	115	0.26 f/cc	0.26 f/cc	12" Sewer Pipe (Lathing only)
75	12/4/79			11:00a-1:15p	135	0.24 f/cc		
76				1:15p-1:45p	30	0.58 f/cc		Finishing Line 2
77	Lathe Operator	A. DeClerico	Fiber	6:50a-9:00a	130	0.43 f/cc		Finishing Line 3
78	12/4/79			9:00a-10:57a	117	0.62 f/cc	0.60 f/cc	12" Sewer Pipe
79	(Control Side)			10:57a-1:15p	138	0.79 f/cc		
80				1:15p-1:45p	30	0.36 f/cc		Finishing Line 2
81	Lathe Operator	G. Meyers	Fiber	6:55a-9:00a	125	0.20 f/cc		Finishing Line 3 (Driver Side)
82	12/4/79			9:00a-10:58a-	118	0.33 f/cc	0.30 f/cc	12" Sewer Pipe.
83	(Drive Side)			10:58a-12:40p	102	0.38 f/cc		

Industrial Hygiene Survey
Ambler A/C Pipe Plant
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TABLE 1

Dust/Fiber Exposures

No.	POSITION LOCATION (DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
84	Q. C. Inspector 12/4/79	A. Mastromatto	Fiber	7:28a-9:05a	97	0.52 f/cc	0.71 f/cc	Finishing Line 3
85				9:05a-11:00a	115	1.0 f/cc		12" Sewer Pipe.
86				11:00a-1:10p	130	0.76 f/cc		
87				1:10p-1:45p	35	0.14 f/cc		Finishing Line 2
88	Tester Operator 12/4/79	G. Bojaciuk	Fiber	7:23a-9:01a	98	0.55 f/cc	0.67 f/cc	Finishing Line 3 (Drive Side)
89				9:01a-11:00p	119	0.75 f/cc		
90				11:00p-1:15p	135	0.77 f/cc		12" Sewer Pipe.
91				1:15p 1:45p	30	0.31 f/cc		Finishing Line 2
92	Beller 12/4/79	J. Handerhan	Fiber	7:40a-9:05a	85	0.28 f/cc	0.55 f/cc	Finishing Line 3
93				9:05a-11:02a	117	0.32f/cc		
94				11:02 1:12p	130	1.0 f/cc		12" Sewer Pipe
95				1:12p-1:45p	33	0.31 f/cc		Finishing Line 2
96	Beller 12/4/79	S. Wallace	Fiber	7:02a-9:07a	125	0.38 f/cc	0.67 f/cc	Finishing Line 3 (Drive Side)
97				9:07a-11:05a	118	0.45 f/cc		12" Sewer Pipe
98				11:05a-12:45p	100	0.52 f/cc		
99				12:45p-1:45p	60	1.99 f/cc		Finishing Line 2
100	Handler 12/4/79	N. Paone	Fiber	7:10a-9:07a	117	0.22 f/cc	0.37 f/cc	Finishing Line 3
101				9:07a-11:04a	117	0.28 f/cc		12" Sewer Pipe
102				11:04a-12:45p	101	0.54 f/cc		
103				12:45p-1:45p	60	0.58 f/cc		Finishing Line 2
104	Handler 12/4/79	M. McCarthy	Fiber	7:05a-9:11a	126	0.26 f/cc	0.40 f/cc	Finishing Line 3 (Drive Side)
105				9:11a-11:02a	111	0.50 f/cc		Continued...

Industrial Hygiene Survey
Ambler A/C Pipe Plant
12/3-7/79

TABLE 1

Dust/Fiber Exposures

No.	POSITION (LOCATION DATE)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
06	Handler	M. McCarthy	Fiber	11:02a-12:45p	103	0.39 f/cc	0.40 f/cc	12" Sewer Pipe
07	Continued...			12:45p-1:45p	60	0.50 f/cc		Finishing Line 2
08	Mill Operator	C. Handschin	Fiber	7:25a-9:33a	128	0.26 f/cc	1.1 f/cc	30" Coupling Mill FD 16
09	12/5/79			9:33a-11:20a	107	0.55 f/cc		
10				11:20a-12:55p	95	2.2 f/cc		8" 3300
11				12:55p 1:45p	50	2.5 f/cc		
12	Mill Operator	F. Martncole	Fiber	7:30a-9:35a	125	0.59 f/cc	2.0 f/cc	30" Coupling Mill - FD 15
13	12/5/79			9:35a-11:20a	105	1.2 f/cc		
14				11:20a-12:55p	95	2.5 f/cc		8" 3300
15				12:55p-1:45p	50	6.2 f/cc		
6	Mill Operator	J. Zollo	Fiber	7:30a-9:30a	120	0.25 f/cc	0.32 f/cc	42" Coupling Mill-FD 54
7	12/5/79			9:30a 11:20a	110	0.18 f/cc		16" Sewer Pipe
8				11:20a 12:55p	95	0.42 f/cc		
9				12:55p 1:45p	50	0.58 f/cc		
0	Saw Operator	E. Cupid	Fiber	7:35a-9:35a	120	0.29 f/cc	0.59 f/cc	Dry Coupling Saw - FD 9
1	12/5/79			9:35a-11:25 a	110	0.52 f/cc		4" X 6" Couplings
2				11:25a-12:55p	90	1.16 f/cc		
3				12:55p-1:45p	50	0.44 f/cc		
4	Saw Operator	A. Echadarria	Fiber	7:10a-?	0	VOID	0.41 f/cc	Employee Lost Cassette
5	12/6/79			9:50a-11:55a	125	0.41 f/cc		Rework Saw FD 10
6				11:55a-1:40p	105	0.40 f/cc		
7	Saw Helper	D. Newman	Fiber	7:45a-9:25a	100	1.43 f/cc	0.44 f/cc	Rework Saw FD 10
8	12/5/79			9:25a-11:25a	120	0.54 f/cc		8" 3300
9				11:25a-1:45p	140	0.37 f/cc		

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No: 79	Position Location (Date)	Name/Area	Analysis for	Time	Min.	Result	TWA for Sample Period	Remarks
130	Lathe Operator	T. Gray	Fiber	7:47-9:30a	103	0.38 f/cc		Nebel Lathe FD 8
131				9:30-11:25a	115	0.51 f/cc	0.37 f/cc	6" & 8 " FMS
132	(12-5-79)			11:25-1:00p	95	0.31 f/cc		Sebastion Lathe FD 20
133				1:00-1:45p	45	0.11 f/cc		
134	Lathe Operator	W. Barnett	Fiber	7:50-9:30a	100	0.38 f/cc		Laman Lathe FD 7
135				9:30-12:55p	205	0.31 f/cc	0.38 f/cc	16" Pipe
136	(12-5-79)			12:55-1:45p	50	0.70 f/cc		
137	Mill Operator	J. DeSilva	Fiber	7:55-9:32a	97	0.13 f/cc		Universal Boring Mill
138				9:32-11:25a	113	0.22 f/cc	0.28 f/cc	FD 13
139	(12-5-79)			11:25-1:00p	95	0.48 f/cc		6" Pipe
140				1:00-1:45p	45	0.35 f/cc		
41	Drill Operator	J. Diaz	Fiber	7:10-9:50a	160	0.66 f/cc		Korit Drill
42				9:50-11:55a	125	0.34 f/cc	0.46 f/cc	
43	(12-6-79)			11:55-1:40p	105	0.29 f/cc		
44	Saw Operator	N. Chancy	Fiber	8:45-11:25a	160	1.88 f/cc		Wet Saw
45				11:25-1:00p	95	1.69 f/cc	1.66 f/cc	16" 150
46	(12-5-79)			1:00-1:45p	45	0.84 f/cc		
17	Lathe	E. Moore	Fiber	7:40-9:52a	132	1.2 f/cc		Pencil Sharpener
18	rator			9:52-11:55a	123	1.1 f/cc	1.1 f/cc	
19	12-6-79)			11:55-1:40p	105	1.0 f/cc		
0	Finishing Supervisor (12-5-79)	R. Grudzinski	Fiber	8:15-2:00p	345	0.14 f/cc	0.14 f/cc	
51	Sweeper	M. Dukes	Fiber	10:10-12:45p	155	0.21 f/cc		
52	Operator (12-6-79)			12:45-3:00p	135	0.35 f/cc	0.28 f/cc	
153	Electrician	C. Beaver	Fiber	7:15-9:10a	115	0.84 f/cc		
154	(12-3-79)			9:10-1:45p	275	0.22 f/cc	0.40 f/cc	
55	Mechanic	J. DeMario	Fiber	7:40-12:40p	300	0.41 f/cc		
56	(12-6-79)			12:40-3:00p	140	0.36 f/cc	0.39 f/cc	Working on Finishing Line #2

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Industrial Hygiene Survey
Ambler A/C Pipe Plant
12/3-7/79

TABLE 2

Engineering (Non-Personal) Samples

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	REMARKS
201	Fiber Warehouse 12/7/79	Area Sample	Fiber	8:50a-1:25p	275	0.48 f/cc	
202	Fiber Dump Station	Area Sample Just below damper.	Fiber	9:25a-9:55a	30	2.4 f/cc	Pump hanging on front of dump station 1' above opening.
203	12/3/79			12:35p-2:45p	130	0.56 f/cc	
204			Total Dust	9:55a-12:35p	160	0.10 mg/M^3	Manufacturing 8" 2400 pipe.
205	Fiber Dump Station	Area - Just below damper	Fibers	6:58-8:40a	102	0.86 f/cc	
206	1/29/80			12:35p-1:57p	82	1.05 f/cc	206, Made 2 dumps.
207	Fiber Dump Station	Area- Just below damper	Fibers	6:42a-7:31a	49	0.11 f/cc	207, Dumped 6 minutes.
208	1/28/80			1:20p-2:12p	52	0.22 f/cc	208, Dumped 5 minutes.
	2nd Floor Manufacturing 12/7/79	Area Sample	Fiber	7:55a-1:30-	335	0.82 f/cc	Near mixers, manufacturing 6" 150 pipe.
210	2nd Floor Manufacturing 12/7/79	Area Sample	Fiber	7:55a-1:30p	335	0.79 f/cc	Near fines bin.
211	Blender Area	Area Sample 2 ft from Mixer Motor, Height 5 ft.	Fiber	9:23a-10:00a	37	0.80 f/cc	Near #4 Mixer
212	12/3/79			12:30-1:35p	65	1.3 f/cc	Manufacturing 8" 2400 pipe.
213				1:35p 2:45p	70	1.8 f/cc	
214			Total Dust	10:00a 12:30p	150	0.74 f/cc	
215	Blender Area	Area Sample 2 ft. from Mixer Motor, Height 5 ft.	Fiber	3:25p-5:00p	95	4.3 f/cc	Near #4 Mixer
216	12/6/79			5:00p-6:00p	60	5.0 f/cc	Manufacturing 6" 150 pipe
217				6:00p-6:30p	30	3.5 f/cc	

Industrial Hygiene Survey
Ambler A/C Pipe Plant
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TABLE 2

Engineering (Non-Personal) Samples

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	REMARKS
218	Blender	Area-Height 5 ft. 2 feet from Mixer Motor	Fibers	6:48a-7:30a	42	0.27 f/cc	Blender started approximately 7:15 am.
219	1/28/80			1:13p-2:12p	59	0.39 f/cc	
220	Blender	Area-Height 5 feet, 2 feet from Mixer Motor	Fibers	6:58a-8:06a	72	1.13 f/cc	220 & 221, men scraping and painting #4 mixer frame.
221	1/29/80			8:06a 10:50a	164	0.34 f/cc	
222				10:50a-12:30p	100	0.40 f/cc	
223				12:30p 2:04p	94	0.43 f/cc	
224	Trough Area	Area Sample	Fiber	9:20a-10:00a	40	14.1 f/cc	6' from floor above mix trough.
225	12/3/79			12:35p-1:35p	60	6.1 f/cc	Manufacturing 8" 2400 pipe.
226				1:35p-2:45p	70	9.7 f/cc	
			Total Dust	10:00a 12:35p	155	3.7 mg/M^3	
228	Trough Area	Area Sample	Fiber	3:25p 5:00p	95	2.8 f/cc	6' from floor above mix trough.
229	12/6/79			5:00p-6:00p	60	3.0 f/cc	
230				6:00p-6:35p	35	6.3 f/cc	Manufacturing 6" 150 pipe
231	Trough Area 12/7/79	Area Sample	Fiber	11:45a-1:15p	90	5.6 f/cc	3' from floor on rail at trough. Manufacturing 6" 150 pipe.
232	Trough Area	Area Height 5 feet above covered viewing hold.	Fiber	6:45a-7:30a	45	0.51 f/cc	232, No visible emissions in trough area.
233	1/28/80			1:13p-2:12p	61	1.51 f/cc	Startup 7:30am 233, Water level stayed constant. little steam or dust produced.
234	Trough	Area-Height 5 feet above covered viewing hole.	Fibers	7:01 8:08a	67	0.79 f/cc	
235				8:08a-10:54a	166	0.45 f/cc	
236	1/29/80			10:54a-12:30p	95	1.13 f/cc	
237				12:30p-2:04p	94	0.72 f/cc	

Industrial Hygiene Survey
Ambler A/C Pipe Plant
12/3-7/79

TABLE 2

Engineering (Non-Personal) Samples

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	REMARKS
238	Machine Control Panel	Area Sample On console.	Fiber	9:30a-9:55a	25	2.1 f/cc	Manufacturing 8" 2400 pipe.
239				12:30p 1:50p	80	1.4 f/cc	
240			Total Dust	9:55a-12:35p	160	1.4 mg/M^3	
241	Machine Control Panel	Area on top of console	Fiber	6:50a-7:30a	40	0.37 f/cc	
242	1/28/80			1:13p-2:12p	59	4.69 f/cc	
243	Roll Up Area	Area Sample	Fiber	3:25p 5:15p	110	VOID	Heavy particulate not countable
244	12/6/79			5:15p-6:35p	80	7.3 f/cc	Manufacturing 6" 150 pipe.
245	Roll Up	Area under deck next to Machine Operator's Control Box.	Fiber	7:02a 8:10a	68	0.46 f/cc	
246 1/29/80	1/29/80			8:10a 9:54a	104	0.20 f/cc	246, 20-24" pipe
247				12:37p 2:00p	83	0.61 f/cc	247, 8" pipe.
	Pipe Machine	Area-Samples	Fibers	7:10a 8:47a	97	VOID	248, Above rollup
249				8:47a-10:23a	96	0.94 f/cc	249, Center machine, upper level, on catwalk next to vacuum.
250	1/29/80			10:24a 12:33p	129	VOID	250, West side upper level, near vacuum.
251				12:33p 1:50p	77	1.08 f/cc	251, West side upper level, on catwalk toward fiber.
252				10:33a-1:34p	181	VOID	252, East side just above cylinde 248, 250, 252 - Heavy particulate not countable.
253	Machine Flow Trough 12/3/79	Area Sample at valves, Height 4 feet.	Fiber	6:35a-7:05a	30	0.97 f/cc	Taken at start up cylinders being installed, Manufacturing 8" 2400 pipe.
254	Tunnel Entrance 12/3/79	Area Sample Between bin and workers.	Fiber	6:55a-7:03	8	4.3 f/cc	Clean up of scrap pipe before production.
255	Pipe Stripper Area - 12/6/79	Area Sample	Fiber	2:35p-6:45p	250	0.59 f/cc	Pump hanging 5' above pipe on tunnel conveyor.
256	Crusher Area 12/7/79	Area Sample	Fiber	7:45a-9:55a	130	0.32 f/cc	At entry to Crusher
				9:55a-11:15a	80	1.5 f/cc	
258				11:15a-1:30p	135	0.52 f/cc	

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Industrial Hygiene Survey
Ambler A/C Pipe Plant
12/3-7/79

TABLE 2

Engineering (Non-Personal) Samples

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	REMARKS
259	Crusher Area	Area Sample	Fiber	7:45a-9:55a	130	5.5 f/cc	In crusher area hanging on rail near isle.
260	12/7/79			9:55a-11:15a	80	2.4 f/cc	
261				11:15a-1:30p	135	3.3 f/cc	
262	Crusher Area	Area Sample	Fiber	7:45a-9:55a	130	0.58 f/cc	In crusher area hanging on rail near wall.
263	12/7/79			9:55a-11:15a	80'	0.91 f/cc	
264				11:15a-1:30p	135	1.1 f/cc	