

PLAINTIFF'S EXHIBIT

CT-1429

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CertainTeed	Date	To	Location and mail code
	January 9, 1981	J. McGinley	2125/2B
Subject	Hillsboro A&B Plant Industrial Hygiene Survey FINAL REPORT	From	Location and mail code
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Attached find the final report for the Industrial Hygiene Surveys made at the Hillsboro A/C Pipe Plants A&B, May 27-30 and November 12-14, 1980.

Please contact me if you have any questions or comments.

JLW/tmf

01-25-0009 10/77

CTD020692

Industrial Hygiene Survey
Hillsboro A/C Pipe Plant #257
May 27-30, 1980
November 12-14, 1980

Introduction

Two Industrial Hygiene Surveys were conducted at the Hillsboro Asbestos-Cement Pipe Manufacturing location by Janis Woodson during May 27-30 1980 and November 12-14 1980.

The first survey, May 27-30, 1980 was conducted in the "A" Plant to supplement the on-going in-plant fiber exposure surveillance program and to measure the employees exposure to noise. A preliminary report and log of sample results was distributed to the plant on July 14, 1980.

The first initial start-up of Plant B was in December of 1979 with production running through March 1980. During the period March - October 1980 there was no production in B Plant. Since B Plant was not in operation at the time of the May survey a return trip was made November 12-14, 1980. Air samples and noise levels were obtained during this second initial startup and shakedown period of B Plant, with some follow up work done in A Plant. A preliminary report and log of sample results was distributed to the plant on December 18, 1980.

This report discusses the results of the two surveys at the Hillsboro A & B Plants, by devoting a separate section to each plant.

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 for at least 30 years in the plant and made available upon request to those authorized access to employee records as specified in 29 CFR 1910.20(d) and the CertainTeed Corporate Procedure Manual, section AD011.

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Hillsboro "A" Plant

One hundred-five air samples and 36 personal audiodosimetry samples were obtained during the week of May 27-30 1980. Of the 105 air samples, 100 were personal samples covering 32 job positions and establishing 34 time weighted averages. The other 5 air samples were taken in different areas of the plant.

During the November 12-14th survey some follow up work was done in plant A Finishing Department with 8 air samples obtained and sound pressure level measurements taken throughout the area.

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Hillsboro A/C Pipe Plant "A"
 Manufacturing Schedule
 May 27-30 1980
 November 14, 1980

	<u>Manufacturing Dept.</u> <u>1st Shift</u>	<u>Finishing Dept.</u> <u>1st Shift</u> <u>2nd Shift</u>	<u>Epoxy Dept.</u> <u>1st Shift</u>
Tuesday 5/27/80	--	12 & 16" 150 pipe 12"150 cplgs.	--
Wednesday 5/28/80	16" 150/200 pipe	-- 12" 150 pipe 8" 150 FM's	--
Thursday 5/29/80	--	8" 150 pipe 6" 200 TBIC 4 & 16" 150 couplings 8" 1/2 FM's	4"150 cplgs.
Friday 5/30/80	--	16" 150 pipe 16" 150 cplgs. 6" 150 pipe	--
Friday 11/14/80	--	6" sewer couplings 6" 1/4 FM's 20" couplings 6" rework	--

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ASBESTOS FIBER MEASUREMENTS

Table I shows the results of the 100 personal fiber samples giving individual sample results, and Time Weighted Averages where applicable. Table II shows the results of the 5 Environmental samples taken throughout the plant, and Table III gives the results of the follow-up samples taken in the Finishing Department during the November survey. A departmental breakdown of the samples and results can be further exemplified by Table IV.

In reviewing the sampling results, all results fell within the current OSHA 8-hour Time Weighted Average (TWA) asbestos standard of 2.0 f/cc, although a few samples/areas need further discussion, which follows.

Manufacturing Department

Twenty four samples were taken in this Department with a range from 0.015 to 0.53 f/cc. The average fiber count was 0.20 f/cc.

The fiber warehouse was found to have a level of 0.02 f/cc (Sample 101). One pallet of fiber was found tipped over with torn bags. This spill was cleaned up and bags were taped. With the doors open and the normal breezes that flow through the building any open bags would cause fiber to be carried throughout the area. It is recommended that all incidents such as this, be immediately cleaned up and bags taped. Also, any employee involved in the cleanup and working in the area should be wearing a respirator.

The Automatic Bag Opener is located between the fiber warehouse and the Manufacturing Department. The bags of asbestos are loaded on the conveyor from the warehouse.

The Bag Opener opens the bags and transfers the raw fiber into the mixers and eliminates human contact with the fiber. At the time of the survey, ventilation at the opener was tested by using a smoke tube. The system seemed to be working effectively, which is also shown by the result of the air samples taken in the work area. It is recommended that two things be corrected for more efficient use of the bag opener, (1) a slitted curtain be added to the bag opener where the bags enter the opener on the conveyor, (2) several latches were missing from the plexiglass doors. It is recommended that all latches be in working condition and used by the operator in order to make the best possible seal. All trash generated from this process is properly labeled and disposed of.

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The mixer operator makes approximately one dump per hour, (depending on the type of pipe being manufactured). Each dump consisted of approximately 30 bags. Since this is where raw fiber is introduced into the system, a greater possibility of accidental exposure to raw fiber exists, therefore it is recommended that respirators continue to be required in this area during the operation of the Bag opener, when staging the fiber and when cleaning the area. The TWA for this job position was 0.10 f/cc (Samples 001-004) with one 38 minute peak exposure sample of 0.06 (Sample 002). An area sample at the bag opener disclosed a level of 0.03 f/cc (Sample 102).

Three brooms and one oil mop were found in the area of the bag opener and were used for cleaning in the area. It is recommended that all brooms in all areas of the plant be eliminated and alternate methods for clean up be used. Oil mops, vacuums, and any wet method would be acceptable.

Three samples were taken in the area of the pipe machine to characterize the concentration during the manufacturing process. One sample (#103) located at the wetting screw had a level of 0.03 f/cc, another sample (#104) located at the recirculating ditch had a level of 0.068 f/cc. Sample #105 was located at the pipe machine roll-up chart and yielded a 0.015 f/cc.

It was noted that used felt is cut into strips and used as padding for machine parts that come into contact with pipe and is sometimes used as a curtain at the entrance to the curing tunnel. The felt inherently contains asbestos fibers and upon drying can be expected to release asbestos fibers when abraded. Although there isn't sampling data that condemns this practice, it is recommended that use of the used felt be discontinued and that old discarded felt be totally disposed of.

Personal exposures for the Machine Tender (#005-007), Press Operator (#008-010), Mandrel Handler (#011-013) and Utility (Relief) Person (#017-019) all positioned at the wet end of the machine, were found to be well within the OSHA standard. This plant has an automatic pipe stripper therefore no sampling data was obtained for this area. The Tray Loader (#014-016) was also found to be well below the current standard.

Finishing/Fitting Department

Sixty-three samples were collected in this department yielding a range of 0.011 to 2.52 f/cc with the average fiber count being 0.30 f/cc.

The 8 samples obtained during the November survey yielded a range of 0.078-0.55 f/cc.

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On May 27 and 28 Lathe Line #2 and 3 were sampled while running 12" and 16" 150 pipe respectively. Each job position was sampled, with all sample results being well within the 2.0 f/cc standard. Samples on Line #2 and 3 included the positions of the Lathe Operators (#020-029), Inspector (#030-032), Hydrotester Operators (#033-039), Bellers (#040-044), Pipe Handler (#045-047) and the Truck Driver (#048).

Although the exposure levels on the Lathe lines, was acceptable, general housekeeping at the lines should be upgraded. The major problem seemed to be when finished pipe rolled down the lathe table and the tester table to the Tester Operator, the pipe would bump against each other and any dust or tailings left in the pipe would be released and fall to the floor. At the end of the shift only some of this dust would be cleaned up. It is recommended that the work area get a more thorough clean up at the end of each shift in order to eliminate any build up of dust in the area over time.

The Coupling Tester Operator (Samples 049 and 050) and the 1/4 Tester Operator (Sample 051) were both within the OSHA limit, as was the Crusher Operator (Samples 053-056) with a range of 0.096 - 0.95 f/cc for these positions. The sample with results of 0.95 f/cc (#056) was a 21 minute peak exposure sample taken on the Crusher operator.

The crusher is located outside the plant next to the Finishing Department and has a canopy over it to protect the complete system from the weather. All rejected pipe, end pieces, etc. are taken to the crusher to be recycled into fines and used in manufacturing new pipe. During damp weather the system tends to block up therefore a minimum amount of crushing is done. It is not known what may have increased the crusher operators exposure during sample 056 but the Crusher System itself could be the source. The crusher area is posted as a required respirator area. The employee wears a 3M 8710 respirator during a block up (usually caused by damp weather), during clean-up, and while crushing during extra dry weather. It is recommended that the operator be required to wear a respirator at all times while in the area so that we can be assured his exposure remains below 2.0 f/cc. More sampling should be done to determine and document the levels of exposure for this position.

The small Coupling Cut Off Saw Operator (Samples 061-063), #3 Boring Mill Operator (Samples 069-072), Coupling Stacker (Samples 073 & 074), Fittings Inspector (Samples 075 & 076), #2 & 3 FM Lathe Operator (Samples 081-083) and the Fittings Maker (Samples 093 & 094) all fell well within the OSHA 8-hour Time Weighted Average (TWA) Asbestos Standard of 2.0 f/cc.

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The #1 Boring Mill Operator (Samples 064-067) had a TWA of 1.79 f/cc during the survey in May with individual samples being >2.52, 0.31, >1.83 and 0.73 f/cc while running 4" couplings. At this time it was recommended to the plant that this job position be resampled by the plant personnel in order to determine exactly what was causing the exposure. It was also recommended that respirators be worn by employees in the area and that a disposable suit also be worn while operating the #1 Boring Mill.

Plant sample results yielded unacceptable levels while running 8" MHA's. A study of the ventilation system led to the relocation of an exhaust line to the left side of the mill. The floor beneath the coupling conveyor was also wiped with oil to help control dust. The plant sampled this job position again after the changes were made and found the levels to be reduced to 0.69 f/cc & 0.72 f/cc while running 12" 150 couplings.

Follow up sampling done by Corporate Health & Safety on November 14, 1980 yielded levels of 0.29 & 0.24 f/cc with a TWA of 0.27 f/cc (Samples 142 & 143) while Boring 6" couplings. These results show that a great improvement has been made in the dust collection system and work practices of the employee. Although these levels are now well below the current OSHA limit it is still recommended that respirators be worn in this area until we can be assured that exposures will remain at these low levels for all sizes and ages of couplings. Since we have documented low levels of exposure on 6" and 12" couplings it is recommended that more testing be done on the other sizes of couplings run on this mill, also noting the date of manufacture for those couplings.

During the May survey the #1 FM Lathe Operator was sampled (Samples 079 & 080) and found to be well within the standard, although some work was needed on the ventilation at the lathe itself. These samples were taken before major changes were made to this operation. A 1/4 length saw was added in line before the lathe and the FM tester has been moved to the area so that this is now one complete operation. The ventilation system was redesigned to include the saw and to give better suction at the Lathe. Samples taken during the follow up survey in November revealed, again, levels well within the standard for the FM Lathe Operator (Samples 144 & 145) and the FM Lathe Helper (Samples 146 & 147).

The large coupling saw was sampled and found to have levels of >1.85, 1.46 and 1.15 f/cc with a TWA of 1.56 f/cc while sawing 16"150 couplings. It should be noted that the operator wore a respirator at all times while operating the saw.

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The hood design and ventilation at this saw is poor but it is understood that this saw is to be replaced in the near future with a saw designed to cut from underneath, the same as the Small Coupling Saw and the new 1/4 length FM Saw are designed, both of which have good readings. Meanwhile, cleanup at the Large Coupling Cut-Off Saw should be upgraded in order to eliminate the dust that accumulated on the floor and the saw itself in the course of the work day.

Another contributing factor to this problem could be the location of the Large Coupling Saw and Rework Saw (Samples 090-092) both are located close to an exit door which stays open most all the time. When the wind is blowing from the south there seems to be a constant breeze coming into the plant. With this breeze, any dust on the floor or equipment could become airborne and carried throughout the Finishing/Fittings Department, this being one reason that a good and thorough cleanup is necessary.

Epoxy - Miscellaneous Departments

Areas that fall under this heading include Shipping and Laborers, Maintenance and Epoxy Departments.

One shipping department employee was sampled while banding trucks in the yard the sample #099 was for 310 minutes with results of 0.0036 f/cc. Two employees classified as laborers worked in B Plant Finishing Department rebanding 8"150 Pipe on second shift (Samples 057-060). Their TWA's for the shift were 0.32 and 0.065 f/cc.

A Maintenance Shift Mechanic was sampled and found to have a TWA of 0.017 f/cc (Sample 100). Most of his time was spent in the Maintenance Department area with a few trips made back to the Manufacturing Department.

The Epoxy Department was sampled while running 4" pipe and couplings. The pipe cleaning station operator is also the pipe epoxy coating operator. Levels of 0.013 and 0.032 f/cc (Samples 095 & 096) with a TWA of 0.026 f/cc were found for this operator. The Coupling Coater Operator (Sampled 097 & 098) had a TWA of 0.12 f/cc.

NOISE MEASUREMENTS

The noise survey was conducted by using Dupont Audiometers set at 90 dB, during the survey of May 27-30, 1980. The employees wore the dosimeters throughout the day while working at their normal jobs. The audiometers are noise measuring devices which measure and accumulate

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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 audiodosimetry results are given in Table V.

Followup work for noise was done during the November 12-14, 1980 survey using a sound level meter at locations throughout the A-plant Finishing and Fittings Department. The survey consisted of sound pressure level and octave band analysis measurements. These measurements provide insight into the nature of the noise problems and means of engineering controls. The diagrams and results are presented in Exhibit I through III of this report.

The results of the audiodosimetry survey indicated that 8 of the 36 job positions sampled had excessive noise levels. These 8 job positions were all located in the Finishing/Fittings Department.

Excessive noise levels were found for Lathe line #2 Lather Operators and Hydrotester operators tested on both the first shift and second shift. The results are shown in Table V, Samples #113, 114, 115, 117, & 118.

First shift on 5/28/80, Lathe Line 2 was running 8" & 12"150 pipe for 6 1/2 hours then changed to line 3 and ran 16"150 pipe for 1 1/2 hours.

The Lathe operators levels were measured to be 91%, (Sample 112) 149% (Sample 114) and the Hydrotester (Tester) operator had 293% (Sample 117). Noise levels as measured by the sound pressure level meter on 11/14/80 disclosed levels of 94-95 dBA for the Lathe operators when lathing 6" sewer pipe with a peak of 107 when pipe bang together on the lathe table and levels of 87-92 at the tester operators position. Second Shift this day ran 12"150 on line 2 for the full shift. The Lathe Operators results were found to be 187% (Sample 113) & 235% (Sample 115) and 120% (Sample 118) for the Tester Operator.

Line 3 was tested 5/30/80 while running 16"150 pipe. The audiodosimetry results were 178% (Sample 123) for the Lathe Operator and 120% (Sample 124) for the Hydrotester Operator. Lathe Line 3 was not running during the November survey so sound pressure levels were not obtained for those job positions.

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The main source of the noise for the 3 operators was the lathe itself while actually lathing the pipe ends and the air noise created when the lathe moves back from the finished pipe. The installation of air silencers at the lathe would help the noise problem considerably. A contributing factor at the lathe is the type of pipe and its hardness, which is due to a manufacturing process change. The harder the pipe the more noise that is created by the tools lathing the ends. Another factor adding to the overall problem is the pipe rolling on hard surfaces and bumping together. These levels contributed to high levels found in other areas of the Finishing/Fittings Department.

The Small Multiple Coupling Cut-Off Saw was found to have sound pressure level measurements of 91 dBA while both saws were in operation, another contributing factor to the noise level would be the truck traffic in this area. The audiodosimeter sample obtained during the May survey was voided due to a malfunction in the instrument. Although a noise dose was not obtained on this operation it seems from the other measurements taken in this area that this employee could be overexposed to noise.

The #1 Boring Mill had results of 151% (Sample 131) while boring 4" & 6" couplings with Sound Pressure level measurements of 91-92 dBA while boring. This job position is located between #1 and #2 Boring Mills, therefore excessive noise levels were created while both mills are running plus the other operations in the department. The operator's noise dose would also depend on the size of the coupling and its age/hardness plus the employee's work speed. Two means of noise reduction could be utilized - a panel or wall made of a sound absorbing material could be installed between #1 and #2 Boring Mill to cut down on noise generating from #2 plus an application of absorbing foam inside the 2 mills.

The #3 Boring Mill operators results were found to be 77% (Sample 132), as was the #1 FM Lathe Operator (#135), although, Sound Pressure level measurements for the #1 FM Lathe Operator & Helper work stations were found to have a range of 91-97 dBA while the FM Saw, lathe and tester were in operation.

The #2 & 3 FM Lathes Operator was found to have 99% (Sample 136) on the audiodosimeter test, which is almost the OSHA limit of 100%. The PAD adapter lathe and the Large FM Lathe were found to have sound pressure level measurements of 91-94 while machines were in operation.

The coupling tester operator (Sample 125) had a reading of 82% while running 16" 150 couplings during the May survey, which is acceptable by OSHA. Sound pressure level readings ranged from 85 (background noise) to 96-102 dBA. While in operation (16" couplings) the main source seems to be air noise created when actually testing the coupling.

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The Large Coupling Saw was found to have 134% reading on the audiodosimeter (Sample 137) while sawing 16"150 couplings. This saw was not in operation during the November noise survey therefore sound pressure level measurements were not obtained.

The Rework Saw was sampled for noise during the May survey (Sample 138) in which the employee wearing the dosimeter ran both the Large Coupling Saw and the Rework Saw at different intervals throughout the day. His exposure was 133%. Sound pressure level measurements revealed a background level of 87 while the saw was not in operation and a range of 93-96 dBA while the saw was in operation. A peak of 93 dBA was found when raising cut pipe from saw to roll on the table.

The Large Coupling Saw and Rework Saw are similar in design and therefore seem to have the same source of noise to be corrected. The operators for both saws work 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. To reduce the noise exposure at the rework saw, it is recommended that a sound absorbtive barrier panel (with a plastic viewing window) be built into the saw handle so that when the blade is brought into position on the piece, the panel would absorb and reflect noise to reduce operator exposure.

It is understood that the Large Coupling saw is to be replaced in the near future with a saw designed to cut similarly to the Small Coupling Saw & FM Saw already in operation. Until the new saw is installed hearing protection should be required for operators in this area. If the installation of the new Coupling Saw is to be delayed somewhat, it is recommended that the same panel as described for the rework saw, be installed on the Large Coupling Saw.

The Fittings Maker had a 144% (Sample 139) reading on the dosimeter while running 6" pipe on the fittings Lathe. This equipment was not in operation during the November survey, therefore no sound pressure level measurements were taken.

The Crusher Operator was sampled and found to have a reading of 269% (Sample 127). The exposure or noise dose received by the Crusher Operator largely depends on the speed at which the individual works. Sound pressure levels were not taken on November 14, because the operation was down due to rainy weather. Observations made of the Crushing Operation reveal that reduction of the noise level could be accomplished by lining non-wearing surfaces inside the crusher (especially the hood around the crusher entrance) with sound absorbing acoustic foam.

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When levels are analyzed and the overall picture is considered, the Lathe lines are the prime source with diminishing levels being found at greater distances from the lathe. The lathes, when in operation, affect employees exposures at other areas in the department. The audiodosimeter samples taken illustrate this, although each of the individual machines, themselves, are a source. Reduction of noise exposure in the department could be accomplished by installation of absorptive barrier walls or curtains throughout the area.

In review, there is no fast and easy solution to the problem of noise in the Finishing/Fittings department. OSHA requires that noise be controlled by feasible administrative or engineering controls. Only when these methods fail to reduce sound levels to acceptable limits 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.

"A" Plant Summary

The results of this survey disclose that all Time Weighted Averages of the 32 job functions sampled presently fall within the current OSHA 8-hour Time Weighted Average (TWA) asbestos standard of 2.0 fibers per cubic centimeter of air (f/cc).

One 155 minute sample of 4 samples (#064-067) taken on the #1 Boring Mill Operator was found to be >2.52 f/cc (Sample 064) resulting in a TWA of 1.79 f/cc for this position. This was the only sample taken in plant "A" found to be above 2.0 f/cc. Plant management was notified of these results and asked to resample this job function. Further sampling was done along with some changes made to the dust collection system to bring the fiber levels down to 0.29 & 0.24 f/cc with a TWA of 0.27 f/cc (Samples 142 & 143).

Personal Audiodosimeter Measurements reveal a number of job positions exceeding the current OSHA Noise limit of 90 dBA. Areas in need of improvement include: The Boring Mill, Large Coupling Saw, Crusher, Fittings Maker, and the finishing lathe lines, mainly the lathe themselves. Improvements made at the lathes would help to reduce the noise levels throughout the Finishing/Fittings Department.

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Hillsboro "B" Plant

The first initial start-up of Plant B was in December of 1979 with production running through March 1980. During the period March - October 1980 there was no production in B Plant. Since B Plant was not in operation at the time of the May survey a return trip was made November 12-14 1980. Air samples and noise levels were obtained during the second initial startup and shakedown period of B Plant.

Forty air samples and 5 personal audiodosimetry samples were obtained during the week of November 12-14, 1980, in the Manufacturing Department. B-Plant Finishing Department was not in operation at the time of this survey. Of the 40 air samples, 21 were personal samples covering 8 job positions and establishing 6 Time Weighted Averages. The other 19 air samples were taken in different areas of the B-Plant.

One thing to keep in mind when reviewing all of the sampling results from this survey, is that these samples were taken during a shakedown period with manufacturing interruptions for engineering changes, breakdowns and repairs, and that these levels are not necessarily the same levels that would be found during normal operations.

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Hillsboro A/C Pipe Plant "B"
Manufacturing Schedule
November 12-13, 1980

	<u>Manufacturing Dept.</u>
Wednesday 11/12/80	6" 150 pipe
Thursday 11/13/80	6" 150 pipe

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ASBESTOS FIBER MEASUREMENTS

Table VI shows the results of the 21 personal fiber samples giving individual sample results, and time weighted averages where applicable. Table VII shows the results of the 19 environmental samples taken throughout B-Plant. A departmental breakdown of the samples and results can be further exemplified by Table VIII.

In reviewing the sampling results, all areas seem to fall within the current OSHA 8 hour Time Weighted Average (TWA) asbestos standard of 2.0 f/cc, although a few samples need further discussion, which follows.

Manufacturing Department

Thirty-five samples were taken in this department with a range from 0.0004 to 4.6 f/cc. The average fiber count was 0.36 f/cc.

The fiber warehouse was found to have a level of 0.05 f/cc (Sample 173).

The mixer operator was stationed mainly at the bag opener (Samples 150 - 154) and had a TWA of 1.1 f/cc covering 7 3/4 hours. Sample #150 for 60 minutes had a level of 4.6 f/cc. This sample was taken while the employee was involved in a cleanup at the Bag Opener flat conveyor. One 20 minute sample (#171), taken on a maintenance person also involved in this repair/cleanup, was heavily loaded with particulate. An exact count was not possible, however, in order to determine an exposure level an attempt was made to count the sample. The results were found to be in excess of 61 f/cc, which is above the current OSHA ceiling concentration of 10 f/cc. Two samples were taken on this employee covering 73 minutes which was insufficient sampling time to calculate a TWA for this employee.

The cleanup and repair of this block up at the Bag Opener flat conveyor involved the Maintenance person in the pit unclogging raw fiber and putting it in plastic bags, while the mixer operator was on the upper level emptying the bags back into the Bag Opener. All the employees in the area wore 3M 8710 air purifying respirators.

While the current OSHA Asbestos Standard 1910.1001 d2(1) of the Federal Register requires only air purifying respirators for levels from 10-100 f/cc short term exposures, it is our recommendation that when a block up of this type occurs or when an exposure of this level is expected or unknown the employees involved should be outfitted with powered air purifying respirators or supplied air respirators (continuous flow or pressure demand).

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The Hillsboro plant has three 3M White Cap units available for use. It is recommended that these units be stored and available for use in the areas of both plants where they are most likely needed, such as the mixer room/area for block ups, at the Dust Collectors for use upon entry into the Dust Collector and at the Crusher in case of a block up. The employees should be instructed in the proper use and care of these units and a regular check should be made of all units, to be assured they are clean and in working order.

Continuing on with the Mixer Operator job position, the Bag Opener was not working with 100% efficiency this day, the slitters were not cutting the bags completely so the Mixer Operator was having to slit some of the bags by hand, which meant having the plexiglass doors open for access into the opener. The employee wore a 3M 8710 respirator throughout the shift.

Area samples (#174-179) taken at the bag opener revealed levels with a range of 0.23 - 0.70 f/cc. These 6 samples characterized the areas at the bag compactor and control panel with all doors open, down to 1 door open, during dumps and without dumps. Specific notes for each sample can be found on table VII under the remarks column. Other area samples taken in the mixer room (#180-188) had a range of 0.13 - 0.32 f/cc. These samples all are well within the OSHA standard of 2.0 f/cc. A small leak was found at the willow mill yielding a level of 0.24 f/cc which was fixed immediately lowering the level to 0.13 f/cc.

The Machine Tender has a TWA of 0.20 f/cc (#155-157). The Control Operator had a TWA of 0.026 f/cc (#158-160) with area samples taken in the control operator work area revealing levels of 0.023 and 0.047 f/cc (#189 & 190).

Two of the three samples taken on the Mandrel Handler were voided (#162 & 163) as were the 2 area samples (#191 & 192), all due to heavy particulate concentration. A possible contributing factor to the uncountability of the samples could be the steam in the air, the samples that were voided showed a minimal fiber concentration. One sample of 5 taken in this area that was countable (#161) and revealed a level of 0.11 f/cc, it was a 171 minute sample. The plant has been asked to resample this job position to better determine the exposure levels in this area.

The Take Off Person had a TWA of 0.022 (#164-165) and the Relief Person had a TWA of 0.14 f/cc (#166-167). An area sample at the stripper revealed a level of 0.0004 f/cc. All the above samples are well within the OSHA standard.

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Title 29—Labor

§ 1910.1001

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Chapter XVII—Occupational Safety and Health Admin.

TABLE 2-3—MINERAL DUSTS

Exposure	Mppd*	Mg/M
Quartz (total dust).....	20	10mg/M ²
Quartz (respirable).....	5	2.5mg/M ²
Crystalline silica (total dust).....	20	10mg/M ²
Crystalline silica (respirable).....	5	2.5mg/M ²
Asbestos (total dust).....	20	10mg/M ²
Asbestos (respirable).....	5	2.5mg/M ²
Coal dust (total dust).....	20	10mg/M ²
Coal dust (respirable).....	5	2.5mg/M ²
Iron ore dust (total dust).....	20	10mg/M ²
Iron ore dust (respirable).....	5	2.5mg/M ²
Lead dust (total dust).....	20	10mg/M ²
Lead dust (respirable).....	5	2.5mg/M ²
Aluminum dust (total dust).....	20	10mg/M ²
Aluminum dust (respirable).....	5	2.5mg/M ²
Flour dust (total dust).....	20	10mg/M ²
Flour dust (respirable).....	5	2.5mg/M ²
Grain dust (total dust).....	20	10mg/M ²
Grain dust (respirable).....	5	2.5mg/M ²
Wood dust (total dust).....	20	10mg/M ²
Wood dust (respirable).....	5	2.5mg/M ²
Latex dust (total dust).....	20	10mg/M ²
Latex dust (respirable).....	5	2.5mg/M ²
Other dusts (total dust).....	20	10mg/M ²
Other dusts (respirable).....	5	2.5mg/M ²

Note: Conversion factors—
 * Millions of particles per cubic meter
 † Millions of particles per cubic foot of air, based on
 impinger sampler equipped by light-field techniques.
 ‡ The percentage of crystalline silica in the formula
 is the amount determined from air-borne samples, ex-
 cept in those instances in which other methods have been
 used.
 § As determined by the membrane filter method at
 40X magnification.
 ¶ Both concentration and percent quartz for the appli-
 cation of this limit are to be determined from the fraction
 passing a 5-μm sieve with the following characteristics:
 100% passing 5 μm; 90% passing 4.75 μm; 75% passing
 4.25 μm; 50% passing 3.75 μm; 25% passing 3.0 μm;
 10% passing 2.5 μm; 5% passing 2.0 μm; 2% passing
 1.5 μm; 1% passing 1.0 μm.

Aerodynamic diameter (unit density sphere)	Percent respirable fraction
2.5	90
3.0	75
3.5	50
4.0	25
4.5	10
5.0	5

The measurements under this table refer to the use of
 an AEC instrument,† the respirable fraction of coal
 dust is determined with a MRE the figure corresponding
 to that of 2.5 Mg/M² in the table for coal dust is 4.5 Mg/M².
 [39 FR 39502, June 27, 1974. Redesignated
 and amended at 40 FR 33073, May 28, 1975.]

§ 1910.1001 Asbestos.

(a) Definitions. For the purpose of this section, (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) Permissible exposure to airborne concentrations of asbestos fibers—(1) Standard effective July 7, 1972. The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(2) Standard effective July 1, 1976. The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) Ceiling concentration. No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(c) Methods of compliance—(1) Engineering methods. (i) Engineering controls. Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) Local exhaust ventilation. (a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein.

(b) See § 1910.8 concerning the availability of ANSI Z9.2-1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) Particular tools. All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits pre-

scribed in paragraph (b) of this section, such as, but not limited to, saws, scores, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) Work practices—(i) Wet methods. Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) Spraying, demolition, or removal. Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) Personal protective equipment—(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or suit rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iii) In emergencies.

(iv) Where both respirators and per-

sions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(3) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 FR 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(i) Air purifying respirators. A reusable or single use air purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) Powered air purifying respirators. A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) Type "C" supplied-air respirators. Continuous flow or pressure-demand class A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times those limits.

(iv) Establishment of a respirator program. (a) The employer shall establish a respirator program in accordance with the requirements of the American National Standards Practices for Respiratory Protection, ANSI Z88.2-1969, which is incorporated by reference herein.

Hillsboro A/C Plant
Industrial Hygiene Survey
November 12 - 14 1980

Table _____
Environmental Dust Exposures "B" Plant

No. 80	POSITION/ LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
184	Fiber Scale 11/12/80	Area	Fiber	2:46p 4:12p	86	0.13	---	pump setting 3' from floor on fiber scale
185	2nd Floor Mixer 11/12/80	Area	Fiber	11:10a 1:57p	167	0.25	---	pump located on 2nd floor hanging 3' from platform 20' above 1st floor
186				1:57p 4:15p	138	0.21		
187	Mixer #4/ Wetting Screw 11/12/80	Area	Fiber	11:13a 1:58p	165	0.32	---	pump setting 1' from #4 mixer 2' above covered wetting screw.
188				1:58p 4:07p	129	0.20		
189	Control Operator's Station 11/12/80	Area	Fiber	11:30a 2:40p	190	0.023		pump approx 5' from Roll-up/Press Section at operators station
190				2:40p 4:16p	96	0.047		
191	Mandrel Handler's Station 11/12/80	Area	Fiber	11:35a 2:40p	185	VOID	---	pump approx 5' from Roll-up/Press Section at operators station Void sample - heavy particulate ----- Void Sample - heavy particulate.
192				2:40p 4:17p	97	VOID		
193	Stripper Station 11/12/80	Area	Fiber	12:00N 4:20p	260	0.0004	---	No employees in area pump setting on Mandrel Return side on control panel approx. 4' from stripper

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Willsboro A/C Plant
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8-17

done 85

TABLE _____
Audiotosimetry Results "B Plant"

NO. 80	POSITION/ LOCATION (Date)	NAME	TIME	Min.	RESULTS		REMARKS
					Eight Hour %		
					Dosimeter		
					85 dBA	90 dBA	
Manufacturing Department							
194	Mixer Operator (11/13/80)	R. Lacy	10:15a 3:50p	335		87%	6"150 pipe employee in Mixing Room-normal operations
195	Machine Tender (11/13/80)	J. Owens	10:22a 3:55p	333		85%	6"150 pipe
196	Control Operator (11/13/80)	H. Cox	10:30a 3:50p	320		---	VOID SAMPLE
197	Mandrel Handler (11/13/80)	C. Salinas	10:33a 3:55p	322		185%	6"150 pipe Mandrel Return behind employee accounting for most of his exposure.
198	Relief Person 11/13/80	R. Pavelka	10:26a 5:00p	394		111%	This job position requires work in all areas of the Manufacturing Department
Miscellaneous Departments							
199	Crusher Operator 11/13/80	C. Harris	10:36a 12:00N ----- 1:30p 2:50p	164		193%	

CTD020714

Industrial Hygiene Survey
Hillsboro A/C Pipe Plant #257
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The Crusher Operator had a TWA of 0.78 f/cc (#168-170) with sample #169 being 1.7 f/cc. There was a block-up in the crusher system earlier that day (not on this sample) which might have reoccurred again during this sample although its not noted. The operator wore a 3M 8710 respirator during his shift. Because of the possible block-ups in the Crusher System it is recommended that this job position be posted a required respirator area.

NOISE MEASUREMENTS

The noise survey was conducted by using Dupont Audiometers set at 90 dB, during the survey of November 14, 1980. The employees wore the dosimeters throughout the day while working at their normal jobs. The audiometers 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 audiometry results are given in Table IX.

A sound level meter was used at locations throughout B-Plant Manufacturing department. The survey consisted of sound pressure level and octave band analysis measurements. The diagrams and results are presented in Exhibit IV and V of this report.

The results of the audiometry survey indicated 3 of the 5 job positions sampled had excessive noise levels. These job positions were in the Manufacturing department. (The Finishing Dept. was not in operation during this survey.) The 3 positions are Mandrel Handler 185% (#197), Relief Person 111% (#198) and the Crusher Operator 193% (#199). The other 2 samples taken on the Mixer Operator and Machine Tender were under the 100% allowable dose. The control operator sample (#196) was void due to an equipment failure.

The mixer room was measured with the sound level meter and found to have levels of 82 - 85 dBA.

The noise levels at the pipe machine, presented in Exhibit V, show that general operating conditions produce 87 to 95 dBA. The levels at the pipe machine increase to 110/120 dBA when the mandrels clang together on the mandrel return conveyor. Air release noise was noted as a major source of noise when the press section moves up and the new mandrel rolls into position. Altogether, these are sources contributing to the Mandrel Handlers and control operators overexposure.

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Hillsboro A/C Pipe Plant #257
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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 neoprene pads on metal to metal impact and roll surfaces. In the interim we recommend these employees wear hearing protectors.

The Relief Person works throughout the Manufacturing dept. Therefore he receives noise from many different sources. He does relieve the Mandrel Handler so a large percentage of his dose could be from the Mandrel return conveyor.

The Crusher Operator sample of 193% (#199) was taken during a full day work shift. During the shift the employee was involved in a block-up and helped to repair it. Sound level measurements were not taken at this operators station because it was not in operation November 14, due to damp weather. Observations made of the Crushing Operation reveal that a reduction of the noise level could be accomplished in much the same manner as the A-Plant Crusher by lining non-wearing surfaces inside the crusher (especially the hood around the crusher entrance) with sound absorbing foam.

The 3 job positions, Mandrel Handler, Relief Person and the Crusher Operator that exceeded 100% OSHA noise dose should be required to wear hearing protection until the noise levels are reduced by engineering or administrative controls.

B-Plant Summary

The results of this survey disclose that all time weighted averages calculated on the job positions sampled, fall within the current 8 hour Time Weighted Average of 2.0 f/cc.

One sample (#171) taken on the maintenance person for 20 minutes exceeds the 10 f/cc ceiling concentration for a peak exposure sample. The 3M White Cap units should be made readily available to those employees involved in breakdowns and clean-ups such as this.

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The plant personnel should be sampling the air in B-Plant on a daily basis while the plant is in the shakedown stage. A permanent schedule for sampling should be established once the plant is operating normally.

Three job positions exceed the 100% allowable noise dose, those were the Mandrel Handler, Relief Person and the Crusher Operator. These 3 positions should be required hearing protection work areas until engineering or administrative controls are instituted.

FURTHER AIR MONITORING

A-Plant

The present fiber exposure surveillance program in A-Plant should be continued but expanded to include more frequent sampling in all areas of the plant with more emphasis on 8 hour Time Weighted Averages for those employees sampled.

It is recommended that the areas with samples exceeding 1.0 f/cc (Large Coupling Saw Operator) and any other area that possibly could exceed 1.0 f/cc be monitored on a regular basis in order to be assured that levels remain below the current limit of 2.0 f/cc established by OSHA.

It is also recommended that whenever any changes - minor or major - are made to the manufacturing process/system, in the Finishing/Fittings Dept. and the Crusher Area, fiber exposure measurements should be made and followup work done to assure that exposures are well within standards at all times.

B-Plant

A fiber surveillance program should be established for the new B-Plant, with frequent sampling done during the start-up and shakedown period. One purpose of samples taken during this period is to document the fiber levels during engineering and manufacturing process changes and to show the improvements in the exposure levels brought about by those changes.

Once the plants functions are considered normal manufacturing operations, then the program for sampling can be put on a regular sampling schedule, with emphasis placed on 8 hour shift sampling with Time Weighted Averages.

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Tables IV and VIII show the number of samples taken in each department of A and B Plants and the average airborne fiber concentration for each department. On the right side of the table there are 3 columns, one is headed - Percent >2.0 f/cc. This gives the percentage of samples taken during this survey that exceed the current OSHA limit of 2.0 f/cc. The other 2 columns are headed - Percent >0.5 f/cc and percent >0.1 f/cc. These columns were included in the table to give an idea of the percentage of samples exceeding the levels now under consideration by OSHA. This table was also included to give an idea of where most work would be needed to bring the plant into compliance with the new level.

RESPIRATORS

It is necessary that a written respirator program be established to formally address the use of respirators at the plant. Respirators are required in areas where a level exceeding 2.0 f/cc is found, until engineering or other changes are made and an acceptable level is achieved. Currently, 3M 8710 respirators are used at locations throughout the facility where required and by employees who choose to use one.

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 a false security that the respirator is in fact offering protection. It is especially important that all employees 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 respirators.

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 those 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 I to this report.

Industrial Hygiene Survey
Hillsboro A/C Pipe Plant #257
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FURTHER NOISE WORK

A-Plant

In discussing the areas with noise problems, some suggestions have been made to help reduce the noise levels. A more extensive analysis should be made by engineering personnel to determine the exact cause of the noise and the necessary steps to be taken.

B-Plant

A more detailed study of the noise problems in B-Plant should be made after the plant is operating at normal production, this should also include the Finishing Line and the Crusher.

HEARING PROTECTION

Until noise levels are reduced to acceptable limits, all employees whose job positions were found to exceed 100% (audiometer results) 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. If engineering controls cannot reduce the levels to 90 dBA, consideration should be given to administratively control the noise by having the employees change work positions. Administrative control means that a person'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.

CTD020719

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RECOMMENDATIONS

A-Plant

1. A slitted curtain should be added to the bag opener, where the bags enter the opener on the conveyor.
2. All latches on the bag opener should be repaired and used by the Mixer Operator.
3. General Housekeeping should be upgraded at the Lathe Lines, Rework Saw and Large Coupling Saw to include a thorough cleanup at the end of each shift.
4. The Engineering Department should be consulted for the improvement of the dust collection system at the finishing lathe lines to remove tailings and dust from inside pipe. The job positions in this area should be sampled regularly to measure the effect of the changes made.
5. Further sampling should be done at the Crusher and #1 Boring Mill on all sizes of couplings run at this mill.
6. The Large Coupling Saw should be replaced as soon as feasibly possible, otherwise, the present dust collection system should be redesigned for better efficiency.
7. The fiber surveillance program should be expanded to include more frequent sampling throughout the plant with more emphasis on full day sampling and 8-hour Time Weighted Averages.
8. Posted required respirator areas should be the Automatic Bag Opener, Crusher Area, the #1 Boring Mill and the Large Coupling Saw.
9. Air Silencers should be installed at the lathe lines.
10. A wall made of sound absorbant material should be installed between #1 and #2 Boring Mill and/or an application of sound absorbing foam inside each mill.
11. A sound absorbant panel should be added to the Rework Saw handle. This should also be done to the Large Rework Saw if it is not replaced in the near future.

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12. A sound absorbant foam should be applied to non-wearing surfaces at the Crusher including the hood at the entrance to the Crusher.
13. An installation of sound absorbant barrier walls or curtains should be made throughout the Finishing/Fittings area.
14. Posted required hearing protection areas should be: The Lathes & Testers #2 & 3, the Crusher, #1 Boring Mill, Large Coupling Saw and the Fittings Machine.

B-Plant

15. The Mandrel Handlers job position should be resampled immediately to better determine the exposure levels in this area.
16. A constant (daily) surveillance of fiber levels should be made in the B-Plant until the Manufacturing operation is considered normal and all levels are within OSHA limits.
17. When normal manufacturing operations are achieved a regular surveillance program should be established.
18. A posted required respirator area should be at the Crusher Area and the automatic Bag Opener.
19. A more detailed and extensive study should be made of the noise levels in the B plant, including the finishing line and Crusher.
20. Posted required hearing protection areas should be at the Mandrel Handler's job position and the Crusher Operator's job position, which would include the Relief Operator when he is in these areas.
21. A sound absorbant foam should be applied to non-wearing surfaces at the Crusher, including the hood at the entrance to the crusher.

General

22. All fiber spills should be cleaned up immediately and all torn bags taped.
23. All brooms in all areas of the plant should be eliminated and alternate methods such as oil mops, vacuums and any wet method should be used for cleanup.
24. The use of old felts should be discontinued and old discarded felts should be totally disposed of.

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25. Areas with samples exceeding 1.0 f/cc or any area that could possibly exceed 1.0 f/cc should be sampled on a regular basis.
26. 3M white cap units should be in working order and stored in areas of the plant where they would most likely be used. Employees should be educated in the use and cleaning of this equipment.
27. A review and upgrading of the present Respirator program should be made.

CTD020722

Industrial Hygiene Survey
 Pillsboro Plant
 May 27-30, 1980

TABLE I
 PERSONAL DUST EXPOSURES

A-Plant

No. 80	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT (f/cc)	TWA (f/cc)	REMARKS
MANUFACTURING DEPARTMENT								
001	Mixer Operator 5/28/80	J. Chambers	Fiber	8:17 a	123	0.059	0.098	16"150 pipe Made 2 dumps
002				10:20 a	38	<0.057		1 dump made (24 min.)
003				10:58 a	183	0.18		
004				2:01 p	114	0.028		
				3:55 p				
005	Machine Tender 5/28/80	R. Rodriguez	Fiber	8:20 a	150	0.32	0.43	16"150 pipe
006				10:50 a	195	0.53		
007				2:05 p	105	0.38		
				3:50 p				
	Press Operator 5/28/80	R. Pavelka	Fiber	8:10 a	135	0.28	0.32	16"150 pipe Fans Operating
				10:25 a	230	0.29		
009				2:15 p	100	0.46		
010				2:15 p				
				3:25 p				
011	Mandrel Handler 5/28/80	J. R. Wood	Fiber	8:10 a	170	>0.46	0.36	16"150 pipe
012				11:00 a	185	0.19		
013				2:05 p	112	0.50		
				3:57 p				
014	Tray Loader 5/28/80	G. Sulak	Fiber	8:25 a	175	0.062	0.082	16"150 pipe
015				11:20 a	167	0.085		
016				2:07 p	98	0.11		
				3:45 p				
017	Utility (Relief) Person 5/28/80	J. A. Wood	Fiber	8:52 a	150	0.093	0.21	Unrolled old felt from Mandrel (5 min.)
018				11:22 a	158	0.36		
019				2:00 p	115	0.17		Emptied sweeper twice
				3:55 p				
020	Line #2 Lathe Operator 5/27/80	K. Lentz	Fiber	10:57 a	128	0.14	0.16	12"150 pipe
021				1:05 p	105	0.24		CTD020723
022				2:50 p	65	0.058		Line 3 16"150 pipe
				3:55 p				

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TABLE I (con't)
PERSONAL DUST EXPOSURES
A-Plant

No. 80	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT (f/cc)	TWA (f/cc)	REMARKS
FINISHING DEPARTMENT (continued)								
023	Line #2 Lathe Operator 5/28/80 2nd Shift	R. Banik	Fiber	5:35 p	120	0.13	0.12	12"150 pipe
024				7:35 p	120	0.10		
025				9:35 p	17	0.052		Lathed 14 pipe
026				9:52 p	78	0.14		
027	Line #2 Lathe Operator 5/27/80	C. Flaherty	Fiber	10:55 a	130	0.057	0.20	12"150 pipe
028				1:05 p	105	0.41		
029				2:50 p	65	0.12		Line 3 16"150 pipe
030	Line #2 Inspector 5/27/80	R. Jones	Fiber	10:58 a	129	0.049	0.10	12"150 pipe Line #1 Tester
				1:07 p	103	0.14		
032				2:50 p	65	0.14		
033	Line #2 (1) Hydrotester Operator 5/27/80	L. Sonnenberg	Fiber	10:58 a	129	0.11	0.15	12"150 pipe Line #1 Tester
034				1:09 p	102	0.22		
035				2:51 p	59	0.12		Line #3 16"150 pipe
036	Line #2 (1) Hydrotester Operator 5/28/80 2nd Shift	L. Humphrey	Fiber	5:45 p	112	0.31	0.28	12"150 pipe Line #1 Tester
037				7:37 p	140	0.15		
038				9:57 p	15	0.87		
039				10:12 p	53	0.39		
040	Line #2 (1) Beller 5/27/80	A. Huse	Fiber	10:45 a	139	0.028	0.086	12"150 pipe
041				1:04 p	101	0.13		
042				2:45 p	65	0.15		Line #3 16"150 pipe
044	Line #2 (1) Beller 5/27/80	J. Blackman	Fiber	10:50 a	134	0.016	0.0399	12"150 pipe
				1:04 p	31	0.12		

CTD020724

Industrial Hygiene Survey
Hillsboro Plant
May 27-30, 1980

TABLE I (con't)
PERSONAL DUST EXPOSURES
A-Plant

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT (f/cc)	TWA (f/cc)	REMARKS
FINISHING DEPARTMENT (continued)								
045	Line #2 (1) Handler 5/27/80	C. Cavitt	Fiber	10:45 a 1:03 p	138	0.057	0.12	12"150 pipe
046				1:03 p 2:45 p	102	0.13		
047				2:45 p 3:50 p	65	0.23	305	Line #3 16"150 pipe
048	Finishing Truck Driver 5/30/80	R. Cortinas	Fiber	9:00 a 2:20 p	320	0.031	0.031	Running Line #3 16"150 pipe
049	Coupling Tester Operator 5/30/80	G. Granner	Fiber	8:30 a 10:55 a	145	0.35	0.27	16"150 pipe
050				10:55 A 2:00 A	185	0.20	330	
051	1/4 Tester Operator 5/28/80 2nd. Shift	J. Wooten	Fiber	5:10 p 7:40 p	150	0.19	287	Void sample - Pump Problems
052				7:40 p 9:57 p	137	---		
054	Crusher Operator 5/29/80	C. Harris	Fiber	8:50 a 11:22 a	152	0.26	0.25	
				11:22 a 1:18 p	116	0.24		
055				1:18 p 2:25 p	97	0.096		
056				2:55 p 3:01 p and 3:20 p 3:35 p	21	0.95	356	
057	Laborer 5/28/80 2nd. Shift	J. Neff	Fiber	5:20 p 7:45 p	145	0.011	0.32	In Plant B Rebanding 8"150 pipe
058				7:45 p 11:02 p	197	0.55	342	
059	Laborer 5/28/80 2nd. Shift	F. Schnitzius	Fiber	5:22 p 7:46 p	144	0.027	0.065	In Plant B Rebanding 8"150 pipe
060				7:46 p 11:02 p	196	0.091	340	
061	Small Coupling Cut-Off Saw Operator 5/29/80	L. Hill	Fiber	8:05 a 11:17 a	192	0.034	0.055	4"150 couplings
062				11:17 a 2:45 p	208	0.077		
063				2:45 p 3:45 p	60	0.043	460	6"200 TBIC

CTD020725

Industrial Hygiene Survey
Millsboro Plant
May 27-30, 1980

TABLE I (con't)
PERSONAL DUST EXPOSURES
A-Plant

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT (f/cc)	TWA (f/cc)	REMARKS
FINISHING DEPARTMENT (continued)								
064	#1 Boring Mill Operator 5/29/80	J. Slovák	Fiber	8:00 a	155	>2.52	1.79	4"150 Couplings
065				10:35 a	15	0.31		Bore 33 Couplings
066				10:50 a	145	>1.83		
067				1:15 p	92	0.73		
068				2:47 p	63	—		Void - Pump problems
069	#3 Boring Mill Operator 5/29/80	M. Clements	Fiber	7:55 a	145	0.33	0.14	16"150 couplings
070				10:20 a	15	0.22		Bore 17 couplings
071				10:35 a	160	0.082		
072				1:15 p	150	< .011		
073	Coupling Stacker 5/27/80	C. Brown	Fiber	11:05 a	126	0.29	0.32	12"150 Couplings
074				1:11 p	169	0.34		
075	Fittings Inspector 5/27/80	Scott	Fiber	11:00 a	130	0.22	0.19	12"150 Couplings
076				1:10 p	160	0.18		CTD020726
077	#1 FM Lathe Operator 5/28/80 2nd. Shift	A. Coaster	Fiber	4:25 p	135	—	0.058	Void - pump problems
078				6:40 p	150	—		Void - pump problems
079				9:10 p	16	0.070		Machined 11-8"150 FM's
080				9:26 p	124	0.056		
081	#2 & #3 FM Lathe Operator 5/29/80	W. Poston	Fiber	8:20 a	180	0.035	0.090	8" 1/2 Length FM's and 16" PAD adaptors
082				11:20 a	190	0.14		
083				2:30 p	80	—		Void - pump problems
084	Large Coupling Saw Operator 5/28/80 2nd. Shift	C. Flaherty	Fiber	4:30 p	70	—	—	Void - pump problems
085				6:40 p	12	—		Void - pump problems
086				6:52 p	50	—		Void - pump problems

Industrial Hygiene Survey
 Millsboro Plant
 5/27-30, 1980

TABLE I (con't)
 PERSONAL DUST EXPOSURES
 A-Plant

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA	REMARKS
FINISHING DEPARTMENT (continued)								
087	Large Coupling Saw Operator 5/29/80	J. Foster	Fiber	8:00 a 10:55 a	175	>1.85	1.56	16"150 pipe/couplings
088				10:55 a 11:14 a	19	1.46		Made 20 cuts
089				11:14 a 1:16 p	122	1.15		
090	Rework Saw (Random Saw) Operator 5/29/80	J. Foster	Fiber	1:16 p 1:31 p	15	0.16	0.29	8"150 random Lengths
091				1:31 p 2:52 p	81	0.14		Made 20 cuts
092				2:52 p 3:40 p	48	0.57		
093	Fittings Maker 5/30/80	K. Estes	Fiber	8:55 a 10:55 a	120	<0.011	<0.0083	6" Pipe operating the Fittings Lathe
094				10:55 a 2:25 p	210	<0.0068		
JOY LINE								
095	Cleaning Station Operator 5/29/80	G. Miller	Fiber	9:12 a 11:27 a	135	<0.013	0.026	4"150 pipe
096				11:27 a 3:35 p	278	0.032		
097	Coupling Coater Operator 5/29/80	M. Smith	Fiber	9:12 a 11:57 a	165	0.20	0.12	4"150 Couplings
098				11:57 a 1:33 p	96	0.002		
SHIPPING DEPARTMENT								
099	Bander 5/30/80	D. Raulston	Fiber	9:10 a 2:20 p	310	0.0036	0.0036	
100	Manufacturing Shift Mechanic 5/30/80	T. Woodruff	Fiber	10:20 a 2:10 p	230	0.017	0.017	

CTD020727

Industrial Hygiene Survey
 llaboro Plant
 ay 27-30, 1980

Table II
 ENVIRONMENTAL DUST SAMPLES

No.	POSITION LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT f/cc	TWA f/cc	REMARKS
101	Fiber Warehouse 5/30/80	Area	Fiber	9:32 a 11:00 a	88	<0.023	—	pump 5' from floor in warehouse
102	Bag Opener 5/30/80	Area	Fiber	9:25 a 10:20 a	55	<0.033	—	pump setting 4' from floor on Bag Opener above Bag Compressor (Manufacturing 16"150 pipe)
103	Wetting Screw 5/30/80	Area	Fiber	9:40 a 11:05 a	85	0.030	—	pump setting 4' from floor on mixer motor 4' from Screw (manu- facturing 16"150 pipe)
104	Recirculating Ditch 5/30/80	Area	Fiber	11:05 a 1:15 a	130	0.068	—	at feed flow Trough 4' above pit (manufacturing 16"150 pipe)
105	Roll Up Chart 5/30/80	Area	Fiber	11:00 a 1:15 p	135	0.015	—	pump 5' from floor 5' from rollup charts 30' from press section (manufacturing 16"150 pipe)

CTD020728

Ilseboro A/C Plant
Industrial Hygiene Survey
November 12 - 14 1980

Table III
Personal Dust Exposures "A" Plant

No. 80	POSITION/ LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULTS F/CC	TWA FOR SAMPLE PERIOD	REMARKS
142	#1 Boring Mill Operator (11/14/80)	J. Slovsk	Fiber	7:50a 11:45a	235	0.29	0.27 430	Boring 6" cplgs
143				11:45a 3:00p	195	0.24		
144	#1 F M Lathe Operator (11/14/80)	A. Coaster	Fiber	7:55a 10:00a	125	0.10	0.084 430	6" 1/4 length FM's
145				10:00a 3:05p	305	0.078		
146	#1 F M Lathe Helper (11/14/80)	T. Brown	Fiber	8:20a 10:00a	100	0.11	0.15 510	6" 1/4 length FM's
147				10:00a 3:10p	310	0.16		
148	Large Coupling Saw and Rework Saw Operator (11/14/80)	J. Foster	Fiber	8:00a 1:35p	335	VOID	—	1/4 hour Coupling Saw 3 1/4 hrs. putting rings in couplings 1 1/2 hrs Rework Saw Void sample heavy particulate
149				1:35p 3:05p	90	0.55		6" Rework

CTD020729

Table IV
Hillsboro A/C Pipe Plant ("A")
Survey of May 27-30 1980 **

<u>Department</u>	<u>No. Samples</u>	<u>Mean</u>	<u>Percent >2.0 f/cc</u>	<u>Percent >0.5 f/cc</u>	<u>Percent >0.1 f/cc</u>
Manufacturing	24	0.20f/cc	0	8	54
Finishing/ Fittings _	63	0.30f/cc	2	14	65
Epoxy Lining	4	0.02f/cc	0	0	0
Miscellaneous (Shipping, Crusher)	<u>6</u>	<u>0.12f/cc</u>	0	0	33
Plant	97*	0.25f/cc	1%	11%	58%

* 8 of the 105 samples taken were voided due to problems in the field.

** Eight samples taken in the Finishing Department during the November survey are not included in this table.

CTD020730

Hillsboro A/C Pipe Plant
Industrial Hygiene Survey
5/27-30 1980

Table V
AUDIODOSIMETRY RESULTS
A-Plant

No.	POSITION/LOCATION (Date)	NAME	TIME	MIN.	Results for 8 hr % Dosimeter		REMARKS
					85 dBA	90 dBA	
MANUFACTURING DEPARTMENT							
106	Mixer Operator 5/28/80	J. Chambers	8:17 a 3:55 p	458		10	16"150 Pipe
107	Machine Tender 5/28/80	R. Rodriguez	8:20 a 3:50 p	450		53	16"150 Pipe
108	Control Operator 5/28/80	R. Pavelka	8:10 a 3:55 p	465		23	16"150 Pipe
109	Mandrel Handler 5/28/80	J. R. Wood	8:10 a 3:57 p	467		85	16"150 Pipe
110	Tray Loader 5/28/80	G. Sulak	8:25 a 3:45 p	440		14	16"150 Pipe
111	Utility Person 5/28/80	J. A. Wood	8:52 a 3:55 p	423		38	16"150 Pipe
FINISHING DEPARTMENT							
	Line #2 Lathe Operator 5/27/80	K. Lentz	10:57 a 3:55 p	298		91	8" & 12"150 Pipe 1/2 hr Line 3 16"150 Pipe
113	Line #2 Lathe Operator 5/28/80 2nd Shift	R. Banik	5:35 p 11:10 p	335		187	12"150 Pipe
114	Line #2 Lathe Operator 5/27/80	C. Flaherty	10:55 a 3:55 p	300		149	8" & 12"150 Pipe 1 1/2 hr Line 3 16"150 Pipe
115	Line #2 Lathe Operator 5/28/80 2nd Shift	J. R. Curry	5:35 p 11:10 p	335		235	12"150 Pipe
116	Line #2 Inspector 5/27/80	R. Jones	10:58 a 3:55 p	297		43	8" & 12"150 Pipe 1 1/2 hr Line 3 16"150 Pipe
117	Hydrotester Operator Line #2 (1) 5/27/80	L. Sonnenberg	11:00 a 3:50 p	290		293	8" & 12"150 Pipe 1 1/2 hr Line 3 16"150 Pipe
118	Line #2 Tester Operator 5/28/80 2nd Shift	L. Humphrey	5:45 p 11:05 p	320		120	12"150 Pipe
119	Line #2 (1) Beller 5/27/80	A. Huse	10:45 a 3:50 p	305		34	8" & 12"150 Pipe 1 1/2 hr Line 3 16"150 Pipe

CTD020731

Table V (con't)
AUDIODOSIMETRY RESULTS

A-Plant

No.	POSITION/LOCATION (Date)	NAME	TIME	MIN.	Results for 8 hr % Dosimeter		REMARKS
					85 dBA	90 dBA	
FINISHING DEPARTMENT (continued)							
120	Line #2 (1) Beller 5/27/80	J. Blackman	10:50 a 1:35 p	165		62	8" & 12" 150 Pipe 1 1/2 hr Line 3 16" 150 Pipe
121	Line #2 (1) Handler 5/27/80	C. Cavitt	10:45 a 3:50 p	305		91	8" & 12" 150 Pipe 1 1/2 hr Line 3 16" 150 Pipe
122	Line #3 Lathe Operator 5/30/80	K. Lantz	9:00 a 2:25 p	325		72	16" 150 Pipe
123	Line #3 Lathe Operator 5/30/80	C. Flaherty	9:00 a 2:25 p	325		178	16" 150 Pipe
124	Hydrotester Operator Line #3 5/30/80	L. Sonnenberg	9:05 a 2:25 p	320		120	16" 150 Pipe
125	Coupling Tester Operator 5/30/80	G. Cranner	8:30 a 2:00 p	330		82	16" 150 Couplings
126	1/4 Tester Operator 5/28/80 2nd Shift	J. Wooten	5:10 p 11:05 p	355		77	8" 150 FM's
127	Crusher Operator 5/29/80	C. Harris	8:50 a 3:35 p	228		269	
128	Laborer 5/28/80 2nd Shift	J. Neff	5:20 p 11:02 p	342		24	In B Plant Rebanding 8" 150 Pipe
129	Laborer 5/28/80 2nd Shift	F. Schnitzius	5:22 p 11:02 p	340		24	In B Plant Rebanding 8" 150 Pipe
130	Small Coupling Cutoff Saw 5/29/80	L. Hill	8:05 a 3:45 p	460		-	Void Sample
131	#1 Boring Mill Operator 5/29/80	J. Slouk	8:00 a 3:50 p	470		151	4" 150 -6 1/2 hrs 6" 200 -1 1/2 hrs
132	#3 Boring Mill Operator 5/29/80	M. Clements	7:55 a 3:45 p	470		77	16" 150 Couplings
133	Coupling Stacker 5/28/80	C. Brown	9:00 a 4:00 p	420		67	16" 150 Couplings
134	Fittings Inspector 5/27/80	Scott	11:00 a 3:50 p	290		-	Void - Problems with Dosimeter

CTD020732

Ulsboro A/C Pipe Plant
Industrial Hygiene Survey
May 27-30 1980

Table V (con't)
AUDIODOSIMETRY RESULTS
A-Plant

No.	POSITION/LOCATION (Date)	NAME	TIME	MIN.	Results for 8 hr % Dosimeter		REMARKS
					85 dBA	90 dBA	
FINISHING DEPARTMENT (continued)							
135	#1 FM Lathe Operator 5/28/80 2nd Shift	A. Coaster	4:25 p 11:30 p	425		77	8"150 1/4 Length FM's
136	#2 & #3 FM Lathes Operator 5/29/80	W. Poston	8:20 a 3:50 p	450		99	8"150 1/2 Length FM's & 12" Pad Adaptors
137	Large Coupling Saw Operator 5/28/80 2nd Shift	C. Flaherty	4:30 p 7:42 p	192		134	16"150 Couplings
138	Large Coupling Saw & Rework Saw Operator 5/29/80	J. Foster	8:00 a 3:40 p	460		133	16"150 Couplings 5 1/4 hrs 8"150 Randoms 2 3/4 hrs
139	Fitting Maker 5/30/80	R. Estes	8:55 a 2:25 p	330		144	Running 6" Pipe On Fittings Lathe
WELDING DEPARTMENT							
140	Epoxy Cleaning Station 5/29/80	G. Miller	9:12 a 3:35 p	383		64	4"150 Pipe Cleaning 3 1/4 Hrs
141	Boiler Operator 5/28/80	J. Wilson	9:05 a 4:15 p	415		48	Plant B

CTD020733

Hillsboro A/C Pipe Plant
Industrial Hygiene Survey
November 12 - 14 1980

TABLE VI
Personal Dust Exposures "B" Plant

No. 80	POSITION/ LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT P/CC	TWA FOR SAMPLE PERIOD	REMARKS
Manufacturing Department								
150	Mixer Operator 11/13/80	R. Lacy	Fiber	8:05a 9:05a	60	4.6	1.1 465	6"150 pipe Helping unblock bucket elevator at Bag opener
151				9:05a 9:35a	30	0.26		Bag opener not working with 100% efficiency having to slit Bags by hand One window to Bag opener open all the time
152				9:35a 11:20a	105	0.36		
153				11:20a 1:40p	140	1.0		Employee wore a 3M 8710 Respirator throughout the entire shift.
154				1:40p 3:50p	130	0.46		
155	Machine Tender 11/13/80	J. Owens	Fiber	8:15a 11:01a	166	0.21	0.20 690	6"150 pipe
156				11:01a 1:45p	164	0.17		
157				1:45p 3:55p	130	0.23		
158	Control Operator 11/13/80	H. Cox	Fiber	8:07a 11:00a	173	0.025	0.026 463	6"150 pipe visable mist at press section
159				11:00a 1:42p	162	0.027		
160				1:42p 3:50p	128	0.026		
161	Mandrel Handler 11/13/80	C. Salinas	Fiber	8:10a 11:01a	171	0.11	—	6"150 pipe
162				11:01a 1:46p	165	VOID		Void sample - heavy particulate
163				1:46p 3:55p	129	VOID		Steamy area feel mist in air Void sample - heavy particulate

CTD020734

Hillsboro A/C Pipe Plant
Industrial Hygiene Survey
November 12 - 14 1980

Table VI (con't)
Personal Dust Exposures "B" Plant

No. 80	POSITION/ LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT F/CC	TWA	REMARKS
164	Take off Person 11/13/80	J. Payne	Fiber	10:35a 1:35a	180	0.022	0.022 385	6"150 pipe Trayloader
165				1:35p 5:00p	205	0.022		
166	Relief Person 11/13/80	R. Pavelka	Fiber	10:26a 1:52p	206	0.13	0.14 394	6"150 pipe
167				1:52p 5:00p	188	0.15		
Miscellaneous Departments								
168	Crusher Operator 11/13/80	C. Harris	Fiber	8:45a 10:36a	111	0.36	0.78 275	Secondary Crusher Block-up 8:45a - 9:30a ----- Employee wore a 3M 8710 Respirator throughout entire shift
				10:36a 12:00N	84	1.7		
170				1:30p 2:50p	80	0.37		
171	Maintenance Person 11/13/80	M. Ruda	Fiber	8:42a 9:02a	20	>61*	-----	*Working on a mixing system Block-up at flat conveyor for the Bag opener. All employees in the area wore 3M 8710 Respirators ----- at water treatment slurry tank.
172				9:02a 9:55a	53	0.32		

* Note - filter heavily loaded with particulate actual count would be greater than 60f/cc.

CTD020735

Hillsboro A/C Plant
Industrial Hygiene Survey
November 12 - 14 1980

Table VII
Environmental Dust Samples "B" Plant

No. 80	POSITION/ LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
173	Fiber Warehouse 11/12/80	Area	Fiber	11:04a 2:03p	179	0.050	—	pump 4' from floor setting on a pallet of ML 6 fiber located near the Bag opener. all doors in area open
174	Bag Opener at Compactor 11/12/80	Area	Fiber	11:00a 1:47p	167	0.39	—	6"150 pipe 2 windows on Bag Opener open. pump sitting on Bag Compactor 1' from window 2' from platform
175				1:47p 4:13p	146	0.41		
176	Bag Opener at Control Panel 11/13/80	Area	Fiber	8:30a 9:02a	32	0.23	—	no dump made. 1 window, nearest control panel, open. —
177				9:02a 9:37a	35	0.65		one dump made 1 window nearest control panel open —
178				9:37a 11:15a	98	0.43		pump setting at control panel 1' from window 4' from platform
179				11:15a 1:37p	142	0.70		
180	Mixer Operator's Desk 11/12/80	Area	Fiber	11:52a 2:46p	174	0.16	—	pump setting 4' from floor after clean up of #1-#2 mixer area
181	Willow Mill 11/12/80	Area	Fiber	10:56a 11:40a	44	0.24	—	small leak in Willow Mill -- 11:30 leak fixed 11:30 - 11:50 block up/ cleanup #2 mixer area —
182				2:03p 4:10p	127	0.13		sample taken to measure effectiveness of repair work made to stop leak on Willow Mill
183	Willow Mill 11/13/80	Area	Fiber	8:27a 10:21a	114	0.22	—	more sealing/repair work done on Willow Mills

CTD020736

Hillsboro A/C Plant
Industrial Hygiene Survey
November 12 - 14 1980

Table VII (con't)
Environmental Dust Samples "B" Plant

No. 80	POSITION/ LOCATION (Date)	NAME/AREA	ANALYSIS FOR	TIME	MIN.	RESULT	TWA for Sample period	REMARKS
184	Fiber Scale 11/12/80	Area	Fiber	2:46p 4:12p	86	0.13	---	pump setting 3' from floor on fiber scale
185	2nd Floor Mixer 11/12/80	Area	Fiber	11:10a 1:57p	167	0.25	---	pump located on 2nd floor hanging 3' from platform 20' above 1st floor
186				1:57p 4:15p	138	0.21		
187	Mixer #4/ Wetting Screw 11/12/80	Area	Fiber	11:13a 1:58p	165	0.32	---	pump setting 1' from #4 mixer 2' above covered wetting screw.
188				1:58p 4:07p	129	0.20		
189	Control Operator's Station 11/12/80	Area	Fiber	11:30a 2:40p	190	0.023	---	pump approx 5' from Roll-up/Press Section at operators station
190				2:40p 4:16p	96	0.047		
191	Mandrel Handler's Station 11/12/80	Area	Fiber	11:35a 2:40p	185	VOID	---	pump approx 5' from Roll-up/Press Section at operators station Void sample - heavy particulate
192				2:40p 4:17p	97	VOID		
193	Stripper Station 11/12/80	Area	Fiber	12:00N 4:20p	260	0.0004	---	No employees in area pump setting on Mandrel Return side on control panel approx. 4' from stripper

CTD020737

TABLE VIII
Hillsboro A/C Pipe Plant ("B")
November 11-14, 1980

<u>Department</u>	<u>No. Samples</u>	<u>Mean</u>	<u>Percent >2.0 f/cc</u>	<u>Percent >0.5 f/cc</u>	<u>Percent >0.1 f/cc</u>
Manufacturing	35	0.36 f/cc	3%	11%	80%
Miscellaneous (Crusher, Maintenance)	5	12.8 f/cc*	20%	40%	100%
Plant	40**	1.9 f/cc	5%	17%	94%

* Exceedingly high due to one sample of >61.0 f/cc.

** A total of 52 samples were taken:

8 in A-Plant - 1 sample voided*
44 in B-Plant - 4 samples voided*

(The 5 samples were voided due to heavy particulate concentration.)

CTD020738

Hillsboro A/C Plant
Industrial Hygiene Survey
November 12 - 14 1980

Table IX
Audiotosimetry Results "B Plant"

NO. 80	POSITION/ LOCATION (Date)	NAME	TIME	Min.	RESULTS		REMARKS
					Eight Hour % Dosimeter		
					85 dBA	90 dBA	
Manufacturing Department							
194	Mixer Operator (11/13/80)	R. Lacy	10:15a 3:50p	335		87%	6"150 pipe employee in Mixing Room-normal operations
195	Machine Tender (11/13/80)	J. Owens	10:22a 3:55p	333		85%	6"150 pipe
196	Control Operator (11/13/80)	H. Cox	10:30a 3:50p	320		---	VOID SAMPLE
197	Mandrel Handler (11/13/80)	C. Salinas	10:33a 3:55p	322		185%	6"150 pipe Mandrel Return behind employee accounting for most of his exposure.
198	Relief Person 11/13/80	R. Pavelka	10:26a 5:00p	394		111%	This job position requires work in all areas of the Manufacturing Department
Miscellaneous Departments							
199	Crusher Operator 11/13/80	C. Harris	10:36a 12:00N ----- 1:30p 2:50p	164		193%	

CTD020739

DATE: 11/14/80 PLANT: Hillsboro A/C A-Plant SHEET OF

JOB DESCRIPTION: #2 Lathe line EXPOSURE: DEPT. Finishing

CONDITIONS: Running 6" Sewer Pipe (all Equipment operating) REF. A/R: ENGINEER:

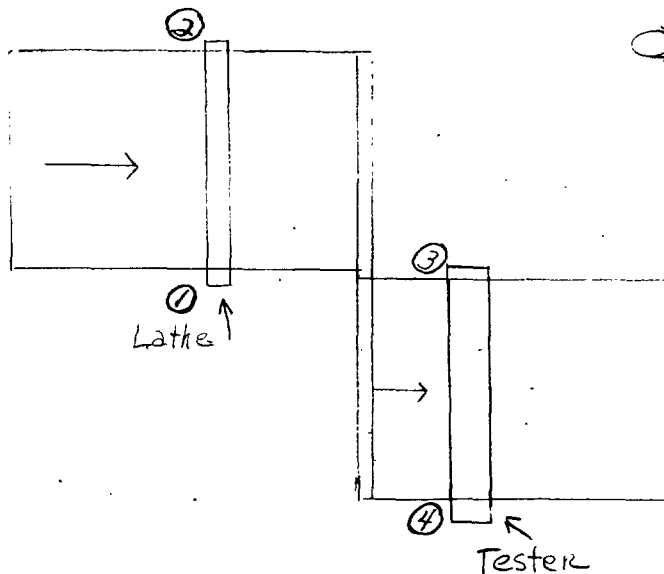
INSTRUMENT: B & K 2209 PSLM B & K 1613 OCTAVE FILTER

MICROPHONE: B & K PROTECTOR:

CALIBRATOR: B & K CALIBRATION DATE: 11/14/80 BEFORE 9:00a AFTER 2:00p

STA. NO.	TIME	EMPLOYEE	NETWORK		PEAK HOLD	OCTAVE CENTER FREQ. (Hz.)										
			A	LIN.		31.5	63	125	250	500	1K	2K	4K	8K	16K	
①	11:30a	at lathe operators Station 3' from lathe/pipe	95 93	98		93	80	84/86	86	89	92	88	86	75	70	
②	11:30a	at lathe operators station 3' from lathe/pipe	94	96		93	82	86	86	87	86	87	83	82	73	
③	11:40a	Tester Operators Station	87	93		84	80	81	84	82	80	73	72	70	65	
④	11:40a	opposite - contra side of tester	92	93		84	81	83	84	86	84	84	70	75	65	
		Pipe Banging together			107											

SKETCH - REMARKS



Lathe Line #2

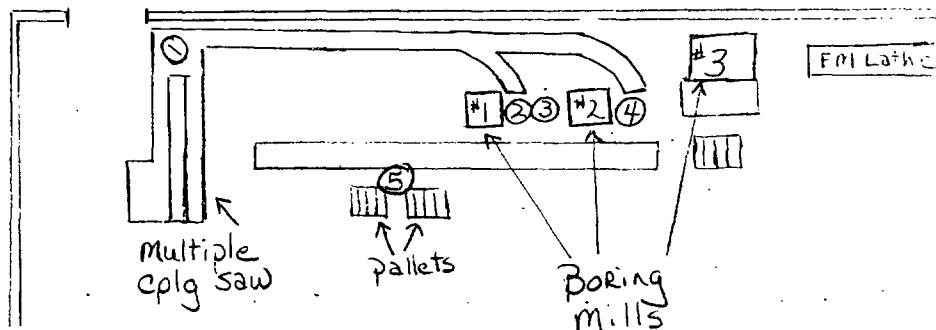
CTD020740

DATE: 11/14/80 PLANT: Hillsboro s/c A-Plant SHEET OF
JOB DESCRIPTION: Finishing/Fittings Dept DEPT.
CONDITIONS: 6" Couplings (all equipment in operation) ENGINEER:
INSTRUMENT: B & K 2209 PSMA B & K 1613 OCTAVE FILTER

MICROPHONE: B & K PROTECTOR:
CALIBRATOR: B & K CALIBRATION DATE: BEFORE AFTER

STA. NO.	TIME	EMPLOYEE	NETWORK		PEAK HOLD	OCTAVE CENTER FREQ. (Hz.)										
			A	LIN.		31.5	63	125	250	500	1K	2K	4K	8K	16K	
①	9:16a	at small multiple coupling cutoff operator's station Both saws in oper.	91	96		86/ 92	82	84	84	85	82	82/ 88	75/ 77	66/ 74	65	
②	9:16a	#1 Boring Mill open station 2' from door on Boring Mill while boring.	92	97		86	85	94	87	87	86	83	79/ 82	75/ 85	75	
③	9:20	Between Boring Mills	91	(Both		Boring Mills in operation)										
④	9:22	#2 Boring Mill open station 2' from door while boring	91	94		86/ 88	86/ 91	92	88	86	84	81	81	72/ 80	71	
⑤	9:45	at palletizing area 12' from Boring Mill #1	88	94		90/ 94	89/ 91	91	88	84	84	81	75/ 84	72	71	

SKETCH - REMARKS



CTD020741

DATE: 11/14/80 PLANT: Hillsboro A/C & Plant SHEET OF

JOB DESCRIPTION: Finishing / Fittings Dept EXPOSURE: DEPT.

CONDITIONS: all equipment in operation in Dept. REF. A/R: ENGINEER:

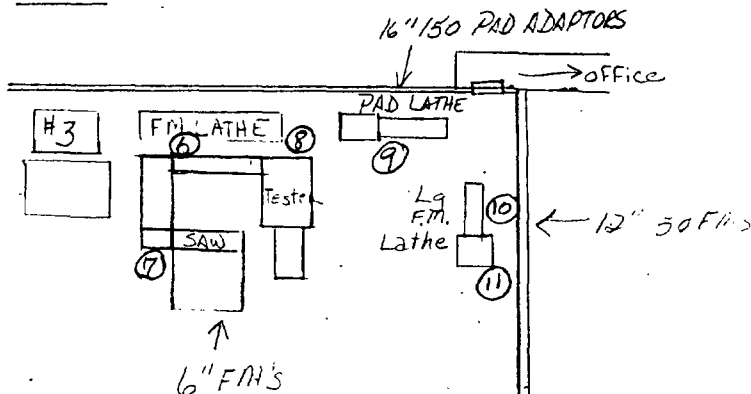
INSTRUMENT: E & K 2208 PSLM B & K 1613 OCTAVE FILTER

MICROPHONE: B & K PROTECTOR:

CALIBRATOR: B & K CALIBRATION DATE: BEFORE AFTER

STA. NO.	TIME	EMPLOYEE	NETWORK		PEAK HOLD	OCTAVE CENTER FREQ. (Hz.)									
			A	LIN.		31.5	63	125	250	500	1K	2K	4K	8K	16K
6	9:42a	7M Lathe Operators	96	101		95	87	92	92	92	93	91	84	85	70
		Platform 1' from lathe 20' from Saw													
7	9:50a	7M Saw operators	95	98		92	83	84	91	90	90	88	87	82	74
		Platform 3' from blade													
7		when Saw not op.	91												
8	10:50a	7M Lathe Operators	97	101		96	85	90	90	90	93	90	89	80	79
		platform 1 1/2' from lathe													
9	11:00	PAD Lathe Operator	92	96		90	86	87	88	88	89	86	85	76	68
10	11:05	Large 7M Lathe oper	91/94	84/98		95	82	86	88	89	86	85	80	73	66
		3' from lathe 12' 5FM's													
11	11:10	Lg 7M Lathe 10' from	92	90	98		95	82	85	88	87	86	80	86	70
		Lathe													

SKETCH - REMARKS



CTD020742

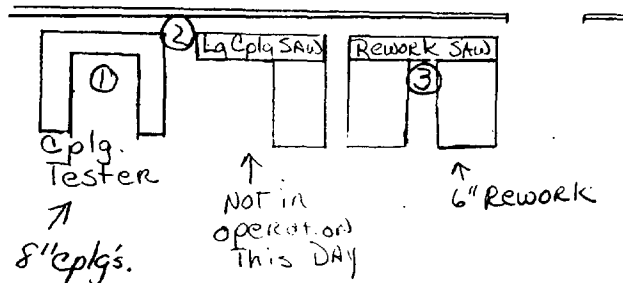
DATE: 11/14/80 PLANT: Hillshors &c A-Plant SHEET OF
JOB DESCRIPTION: Finishing Fittings Dept. DEPT.
CONDITIONS: All Equipment in operation except 8" Cplg Saw
INSTRUMENT: B & K 2207 PSM B & K 1613 OCTAVE FILTER

MICROPHONE: B & K PROTECTOR:

CALIBRATOR: B & K CALIBRATION DATE: BEFORE AFTER

STA. NO.	TIME	EMPLOYEE	NETWORK			PEAK HOLD	OCTAVE CENTER FREQ. (Hz.)										
			A		LIN.		31.5	63	125	250	500	1K	2K	4K	8K	16K	
1	1:45	Background Noise	85	86 1/2	92		82	82	82	82	84	80	79	73	70	69	
2	1:45	Air Noise at tester when oper.	96	96	96												
3	1:36	Rework Saw oper. position while sawing 6" rework	96		98		82	82	84	87	90	92	91	89	85	82	
3	1:36	rework saw when not sawing	87														
3	1:36	when taking pipe from saw to table				93											

SKETCH - REMARKS



CTD020743

REF. 0.0002 MICROBAR

EXHIBIT # IV

DATE:	11/14/80	PLANT:	Hillsboro B-Plant	SHEET	OF
JOB DESCRIPTION:	B Plant Mixing Room		EXPOSURE:	DEPT.	
CONDITIONS:	Shakedown Period		REF. A/R:	ENGINEER:	
INSTRUMENT: B & K 2209 PSLM			B & K 1613 OCTAVE FILTER		

MICROPHONE: B & K

PROTECTOR:

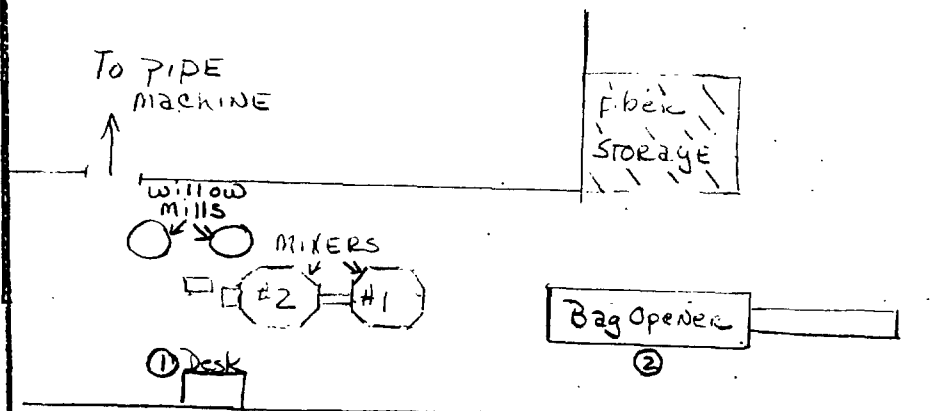
CALIBRATOR: B & K

CALIBRATION
DATE:

	BEFORE	AFTER
1. <i>Staphylococcus aureus</i>	100%	100%
2. <i>Staphylococcus epidermidis</i>	100%	100%
3. <i>Staphylococcus saprophyticus</i>	100%	100%
4. <i>Staphylococcus sciuri</i>	100%	100%
5. <i>Staphylococcus carnosus</i>	100%	100%
6. <i>Staphylococcus pasteuri</i>	100%	100%
7. <i>Staphylococcus hyicus</i>	100%	100%
8. <i>Staphylococcus aureus</i>	100%	100%
9. <i>Staphylococcus epidermidis</i>	100%	100%
10. <i>Staphylococcus saprophyticus</i>	100%	100%
11. <i>Staphylococcus sciuri</i>	100%	100%
12. <i>Staphylococcus carnosus</i>	100%	100%
13. <i>Staphylococcus pasteuri</i>	100%	100%
14. <i>Staphylococcus hyicus</i>	100%	100%
15. <i>Staphylococcus aureus</i>	100%	100%
16. <i>Staphylococcus epidermidis</i>	100%	100%
17. <i>Staphylococcus saprophyticus</i>	100%	100%
18. <i>Staphylococcus sciuri</i>	100%	100%
19. <i>Staphylococcus carnosus</i>	100%	100%
20. <i>Staphylococcus pasteuri</i>	100%	100%
21. <i>Staphylococcus hyicus</i>	100%	100%
22. <i>Staphylococcus aureus</i>	100%	100%
23. <i>Staphylococcus epidermidis</i>	100%	100%
24. <i>Staphylococcus saprophyticus</i>	100%	100%
25. <i>Staphylococcus sciuri</i>	100%	100%
26. <i>Staphylococcus carnosus</i>	100%	100%
27. <i>Staphylococcus pasteuri</i>	100%	100%
28. <i>Staphylococcus hyicus</i>	100%	100%
29. <i>Staphylococcus aureus</i>	100%	100%
30. <i>Staphylococcus epidermidis</i>	100%	100%
31. <i>Staphylococcus saprophyticus</i>	100%	100%
32. <i>Staphylococcus sciuri</i>	100%	100%
33. <i>Staphylococcus carnosus</i>	100%	100%
34. <i>Staphylococcus pasteuri</i>	100%	100%
35. <i>Staphylococcus hyicus</i>	100%	100%
36. <i>Staphylococcus aureus</i>	100%	100%
37. <i>Staphylococcus epidermidis</i>	100%	100%
38. <i>Staphylococcus saprophyticus</i>	100%	100%
39. <i>Staphylococcus sciuri</i>	100%	100%
40. <i>Staphylococcus carnosus</i>	100%	100%
41. <i>Staphylococcus pasteuri</i>	100%	100%
42. <i>Staphylococcus hyicus</i>	100%	100%
43. <i>Staphylococcus aureus</i>	100%	100%
44. <i>Staphylococcus epidermidis</i>	100%	100%
45. <i>Staphylococcus saprophyticus</i>	100%	100%
46. <i>Staphylococcus sciuri</i>	100%	100%
47. <i>Staphylococcus carnosus</i>	100%	100%
48. <i>Staphylococcus pasteuri</i>	100%	100%
49. <i>Staphylococcus hyicus</i>	100%	100%
50. <i>Staphylococcus aureus</i>	100%	100%
51. <i>Staphylococcus epidermidis</i>	100%	100%
52. <i>Staphylococcus saprophyticus</i>	100%	100%
53. <i>Staphylococcus sciuri</i>	100%	100%
54. <i>Staphylococcus carnosus</i>	100%	100%
55. <i>Staphylococcus pasteuri</i>	100%	100%
56. <i>Staphylococcus hyicus</i>	100%	100%
57. <i>Staphylococcus aureus</i>	100%	100%
58. <i>Staphylococcus epidermidis</i>	100%	100%
59. <i>Staphylococcus saprophyticus</i>	100%	100%
60. <i>Staphylococcus sciuri</i>	100%	100%
61. <i>Staphylococcus carnosus</i>	100%	100%
62. <i>Staphylococcus pasteuri</i>	100%	100%
63. <i>Staphylococcus hyicus</i>	100%	100%
64. <i>Staphylococcus aureus</i>	100%	100%
65. <i>Staphylococcus epidermidis</i>	100%	100%
66. <i>Staphylococcus saprophyticus</i>	100%	100%
67. <i>Staphylococcus sciuri</i>	100%	100%
68. <i>Staphylococcus carnosus</i>	100%	100%
69. <i>Staphylococcus pasteuri</i>	100%	100%
70. <i>Staphylococcus hyicus</i>	100%	100%
71. <i>Staphylococcus aureus</i>	100%	100%
72. <i>Staphylococcus epidermidis</i>	100%	100%
73. <i>Staphylococcus saprophyticus</i>	100%	100%
74. <i>Staphylococcus sciuri</i>	100%	100%
75. <i>Staphylococcus carnosus</i>	100%	100%
76. <i>Staphylococcus pasteuri</i>	100%	100%
77. <i>Staphylococcus hyicus</i>	100%	100%
78. <i>Staphylococcus aureus</i>	100%	100%
79. <i>Staphylococcus epidermidis</i>	100%	100%
80. <i>Staphylococcus saprophyticus</i>	100%	100%
81. <i>Staphylococcus sciuri</i>	100%	100%
82. <i>Staphylococcus carnosus</i>	100%	100%
83. <i>Staphylococcus pasteuri</i>	100%	100%
84. <i>Staphylococcus hyicus</i>	100%	100%
85. <i>Staphylococcus aureus</i>	100%	100%
86. <i>Staphylococcus epidermidis</i>	100%	100%
87. <i>Staphylococcus saprophyticus</i>	100%	100%

[illegible]

SKETCH - REMARKS



CTD020744

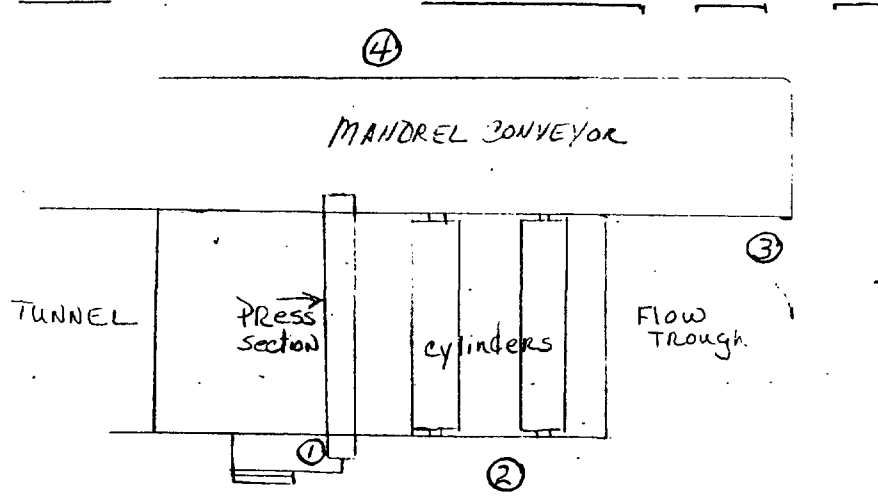
DATE: 11/14/80 PLANT: Hillsboro B-Plant SHEET OF
JOB DESCRIPTION: 6" 150 Pipe EXPOSURE: DEPT. Manufacturing
CONDITIONS: Shakedown Period REF. A/R: ENGINEER:
INSTRUMENT: B & K 2209 PSLM B & K 1613 OCTAVE FILTER

MICROPHONE: B & K PROTECTOR:

CALIBRATOR: B & K CALIBRATION DATE: BEFORE AFTER

STA. NO.	TIME	EMPLOYEE	NETWORK			PEAK HOLD	OCTAVE CENTER FREQ. (Hz.)										
			A		LIN.		31.5	63	125	250	500	1K	2K	4K	8K	16K	
①	2:10	Control operator station (roll up)	91		93		79	82	84	88	90	85	81	76	73	61	
①		while mandrel in press section (roll up)	59/90														
①		Press section moving up				107											
②		at cylinders (control side)	87/88														
③		at Flow trough	90/95														
④		Mandrel Return				110/120											

SKETCH - REMARKS



CTD020745

APPENDIX I
Monitoring/Analytical Procedures
and
Current Standards

Asbestos

Personal samples, Area samples which reflect employee exposure levels, and ~~Engineering Area~~ ^{ENVIRONMENTAL ENGINEERING} 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 eight 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

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%.

sum?

CTD020746

Appendix I
Monitoring/Analytical Procedures
and Current Standards

Permissible Noise Exposures

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

CTD020747

APPENDIX II

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.

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KEY ELEMENTS OF A RESPIRATOR PROGRAM - Cont'd...

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.

CTD020749

KEY ELEMENTS OF A RESPIRATOR PROGRAM - Cont'd...

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.

CTD020750