1984

PLAINTIFF'S
EXHIBIT
CT-130

JOHN P. McGINLEY
Testimony on Proposed OSHA Standard
on Workplace Exposure to Asbestos

INTRODUCTION

My name is John P. McGinley and I am the Vice President of Asbestos-Cement Pipe Operations for CertainTeed Corporation and a registered professional engineer. I have complete responsibility for the manufacturing operations at CertainTeed's two A-C pipe plants, which are located at Riverside, California, and Hillsboro, Texas. My responsibilities also extend to the design and modification of new and existing process equipment for the manufacture of A-C pipe, including all associated environmental controls.

I began working in the asbestos products industry while studying mechanical engineering in college. Since graduating in 1957, I have worked in the industry in both engineering and management capacities. My first fifteen years were in the engineering field. From 1959 to 1962, I worked exclusively on industrial hygiene projects. During that time, I conducted dust level sampling in various plants and designed and installed local exhaust ventilation systems for the various manufacturing processes. For the past 11 years, I have overseen A-C pipe manufacturing operations in various management positions.

Today I would like to address several aspects of OSHA's proposed standards as they relate to the A-C pipe industry. These issues and others are covered in my written testimony, which was prepared by CertainTeed's Corporate Industrial Hygiene group and myself. Although I am commenting as a representative of CertainTeed Corporation, I believe my associates at CAPCO and JM--the other domestic manufacturers of A-C pipe -- would support my views.

THE MANUFACTURING PROCESS

A-C pipe is manufactured from a closely-controlled mixture of chrysotile and crocidolite fibers, Portland cement and silica sand. My written testimony describes the process in detail. To make acceptable quality pipe economically, both chrysotile and crocidolite asbestos are required. A-C pipe manufacturers therefore oppose any OSHA action that would effectively ban either of these forms of asbestos.

DUST CONTROL HISTORY

The earliest existing records of asbestos exposures in CertainTeed's plants are from several U.S. Public Health Service and OSHA studies conducted from 1966 to 1972. This information is collected in Table I of my written statement. Compared to workplace conditions today, those exposure levels were high. In 1972, our insurer assisted us in developing monitoring programs, and by 1974 our own plant personnel began monitoring operations with the help of NIOSH training. In 1979, a newly founded corporate industrial hygiene group began periodic monitoring of all positions in our plants on an annual basis.

Our historical monitoring results reveal gradual improvements in exposure conditions over time. An example of these gradual improvements is railcar unloading of asbestos fiber, historically one of the dustiest operations in A-C pipe production. Improvements in asbestos packaging described in my written testimony have taken place over time. The result has been that the unloading of fiber bags from railcars has gone from one of the dustiest operations to among the cleanest in A-C pipe plants.

CURRENT DUST CONTROL PRACTICES

American A-C pipe producers have worked diligently not merely to comply with the current PEL, but to attain the lowest possible fiber levels at each work station. The low dust levels that exist today in A-C pipe manufacturing have been the result of a long learning process. A-C pipe manufacturers have experimented with new hood designs, modified cutting and finishing techniques, implemented employee educational programs, and upgraded housekeeping procedures in order to offer their workers maximum protection. Based on my visits to similar manufacturing plants in other countries, I believe the dust control technology employed by the three United States A-C pipe manufacturers represents the state of the art in the industry.

The keystone of this dust control technology is effective local exhaust ventilation, which removes a high percentage of the dust generated before it can enter the workplace atmosphere. The local exhaust ventilation system reduces employee exposures on most operations to between 0.5 and 1.0 fibers/cc. In our experience additional ventilation capacity will not generate significant further reductions. We have been able to reduce fiber levels at most work stations to 0.5 fibers/cc or lower by improving hood designs at the point source of dust generation and upgrading maintenance of the local exhaust ventilation system.

The implementation of good employee work practices and meticulous housekeeping are essential to reduce exposure levels below 0.5 fibers/cc. Local exhaust will not provide effective dust control if it is not supplemented with sound housekeeping and work practices.

We at CertainTeed also supplement the engineering controls with a variety of ancillary worker protection measures. CertainTeed's workplace monitoring program provides semiannual exposure sampling of each work station by plant personnel who have completed the NIOSH course on "Sampling and Evaluation of Airborne Dust". A separate team of Corporate Health and Safety industrial hygienists also sample each station annually.

CertainTeed provides medical surveillance for all employees in pipe plants through preplacement, annual and termination physical examinations. The examinations include health questionaires, measurements of vital signs, chest x-rays, visual acuity tests, audiograms, pulmonary function tests, urinalyses, blood counts and complete blood chemistries. In addition, CertainTeed provides educational programs on the health hazards of asbestos.

All employees receive instruction in respirator protection, although respirators are mandatory only for workers who perform relatively short-duration, high exposure operations, such as maintenance and cleanup.

CertainTeed's plants are equipped with showers, lockers and lunchroom facilities. We consider our entire plant a regulated area.

Current Exposure Levels

The great majority of our dust counts are around the 0.2 fibers/cc level. However, even with the application of local exhaust ventilation and the employment of good housekeeping procedures, we occasionally register counts in excess of 0.6 fibers/cc. Most of our work stations generate very low average levels of airborne fiber, but a few difficult areas remain. For example, we have not been able to consistently operate our pipe cutting saws below 0.5 fibers/cc. We have experimented with hood designs and new methods for cutting pipe, but with limited success. It may take considerable time before improvements are realized. The pipe formation machinery also presents difficult dust control problems, and does not consistently operate below 0.5 fibers/cc.

COMPLIANCE WITH PROPOSED PELs

The variability of airborne concentrations of asbestos makes assessment of the feasibility of a PEL of 0.5 fibers/cc difficult. Monitoring of specific jobs in our plants has produced varying results from day to day and from individual to individual. We apparently experience daily changes in airborne asbestos levels at any given work stations. Yet, there is no way to visually distinguish the difference in the workplace environment between levels slightly above 0.5 fibers/cc and levels below. Only after exposure monitoring results are available several days later do we know that levels were high at a particular time. In order to accommodate these fluctuations and assure compliance with a PEL of 0.5 fibers/cc we would have to operate at an average exposure level of about 0.2 fibers/cc. Most of the fluctuations would then fall under 0.5 fibers/cc although a small portion would still exceed that level.

A-C pipe manufacturers would be unable to comply with a PEL of 0.2 fibers/cc unless all workers wore respirators.

Although over half of the sample measurements in Certain-Teed's two plants show airborne levels less than 0.1 fibers/cc, a large number indicate fiber levels above 0.2 fibers/cc at the same work stations measured on different days. Although A-C pipe plants may attain long run exposure averages of near 0.2 fibers/cc, I know of no way to eliminate the large number of readings above that level.

Data Limitations

An additional source of difficulty in assessing the feasibility of the proposed PELs is that at such low levels the current measurement techniques are imprecise and subject to great biases. Dr. Eric Chatfield has thoroughly discussed the problems inherent in measuring airborne asbestos levels, and I do not have the expertise to add to his theoretical discussion. However, I would like to address the practical difficulties that measurement problems present to asbestos manufacturers.

Our experience shows that the current NIOSH counting method is subject to considerable bias. In the course of our industrial hygiene quality control program, CertainTeed has conducted several tests to evaluate the consistency of our asbestos monitoring results. The tests included duplicate counting of the same filter by plant personnel and their corporate counterparts, duplicate counting by different personnel in our corporate lab, and a round robin test using a NIOSH Proficiency Analytical Sample (PAT) involving both Corporate and Plant personnel.

A comparison of plant versus corporate counts on the same sample reveals a bias in results. Corporate results tended to be higher than plant calculations. One factor that may account for the bias is that the corporate lab uses a brand of microscope different from those used in the plants. NIOSH has shown that differences in microscopes can produce significant biases.

An intra-laboratory comparison of readers in the corporate lab demonstrates the subjective nature of the NIOSH counting method. Corporate counters, using the same equipment and operating under the same conditions, generated consistent biases in their results.

The Round Robin Test provides further evidence of both intra and inter-laboratory sources of error in measuring asbestos. Two plant counters, two corporate counters, and one Research and Development lab counter observed three wedges from a NIOSH Proficiency Analytical Testing sample. All five counters counted the wedges in their own laboratories, in a three-day span. The results are presented in Table III of my written statement. The counts on one slide ranged from 75.41 fibers/square millimeter to 1,133.77 fibers/square millimeter. Despite such a wide spread in values, I have been told by our corporate industrial hygenists that the results were within the PAT programs's acceptable counting range of ± 3 standard deviations. The data also disclosed a high count corporate bias similar to the bias observed in the inter-lab comparison study.

If these counts represented a 240 minute exposure sample at a flow rate of 2.0 liters per minute, a sample measurement could vary from 0.13 fibers/cc to 2.02 fibers/cc. A work-place manager attempting to determine his compliance status with a given PEL would have no way of knowing which value to trust. He also would have no way of knowing where in that range OSHA compliance measurements would fall. Thus, it becomes extremely difficult to assure compliance with any given PEL.

Measurement imprecision severely limits the usefulness of sampling data in planning new dust control strategies. Inter-day variations in sampling results hinder the ability of manufacturers to pinpoint problem areas in their plants. Frequently, samples taken on one day may indicate high airborne fiber levels at a certain workstation, but samples taken the following day will show low levels at the same station. Thus, plant managers have great difficulty obtaining an accurate picture of exposure patterns in their plants. Consequently, continued efforts to achieve improvements over the low levels that our plants have already achieved are somewhat hindered.

CONCLUSIONS

The Regulatory Analysis of the Proposed OSHA Standard on Asbestos, prepared for OSHA by the Research Triangle

Institute (RTI) and released in May of 1984 acknowledged that it would not be possible to achieve 0.5 fibers/cc at all times even in the best run A-C pipe plants. Certain operations such as bag house cleaning and maintenance will generate concentrations in excess of 0.5 fibers/cc. The RTI study concluded that where engineering controls and housekeeping techniques are already utilized to the limit of their effectiveness, further controls would achieve only marginal improvements.

These basic conclusions of the RTI report are correct. However, RTI's further suggestions of specific controls to generate reductions in some plants are misguided and poorly substantiated.

RTI's first suggestion advocates enclosed fiber introduction or, alternatively, automatic bag openers to introduce asbestos fiber into the manufacturing process. Our experience in A-C pipe production has been that either an automated debagger or a well run manual bag opening station can achieve equivalent low exposures around 0.1 f/cc on average. RTI's industry survey indicated an exposure range for the introduction and mixing stage, which presumably includes plants with manual bag openers, at 0.07 to 0.20 fibers/cc. At such low levels, even if further reductions were possible, they would probably be nondetectible.

RTI also suggests wetting of fibers at an earlier stage in the production process. In current production methods, asbestos fiber is dry mixed with cement and silica sand before water is added. The current dry operation is not a manned workstation; it is completely enclosed and automated. Airborne dust concentrations are low -- generally less than 0.3 fibers/cc. Radical redesign of this operation would be costly and would make little sense. Operating wet often creates more exposure problems than it solves. The wet substance spills on the floor and dries, creating house-keeping headaches. In the manufacture of A-C pipe, Certain-Teed has found that wet processes are incompatible with local exhaust ventilation because the moist cement particles clogs the ducting, impairing the efficiency of the exhaust system.

A third suggestion by RTI is for manufacturers to receive asbestos fibers in an uncompressed state in order to reduce the need for willowing during production. While this suggestion seems attractive on its face, it too would create more problems than it would solve. Uncompressed fiber would be very difficult to handle, and it would increase the danger of asbestos exposure from torn bags.

RTI factored the use of respirators into its cost calculations for compliance in model plants. Consistent with the study's basic conclusion that no significant additional reductions in air concentrations are achieveable in A-C pipe plants through engineering controls, RTI's cost figures for compliance with proposed PELs include only the addition of respirators. At a PEL of 0.5 fibers/cc, RTI estimates 10% of the workforce in A-C pipe plants will require respirators; at a PEL of 0.2 fibers/cc, 50% and at 0.1 fibers/cc, 100%.

These estimates fail to consider the variability and measurement problems of asbestos. Plant managers are incapable of assuring continued airborne asbestos concentrations of less than 0.2 fibers/cc at any workstation. Atmosphere changes could easily drive daily readings above 0.2 fibers/cc. Measurement imprecisions would also generate readings above the 0.2 fibers/cc level, even at stations where the long term average is below that. Plant managers would not be able to determine at which areas of the plant airborne levels exceeded 0.2 fibers/ cc; therefore, to assure compliance they would need to require respirators for all workers.

The variability of asbestos concentrations and the imprecision of measurement techniques place asbestos manufacturers in a difficult position. Plant operators have no method of determining with an acceptable degree of certainty the airborne levels of asbestos concentration at any time. Consequently, compliance with a PEL as low as 0.2 fibers/cc becomes a guessing game. Unless manufacturers choose respirators, they may be subject to compliance violations if OSHA samples generate high readings, even if such readings are attributable to unusual variations or measurement error.

Members of the A-C pipe industry have already invested considerable time and money to install the best available engineering controls. A-C Pipe manufacturers in the U.S. have combined effective dust control engineering with sound housekeeping and a variety of educational, medical and monitoring programs in order to reduce exposures to the lowest possible level. As Dr. Bragg indicated in his feasibility report, asbestos control research has focussed with considerable success on optimizing current technologies. In the A-C pipe industry, where the best available controls have already been implemented, further improvements are likely to be minimal.

TESTIMONY OF ALFRED E. NETTER

INTRODUCTION

My name is Alfred E. Netter and I am the President of Supradur Manufacturing Corporation, a wholly-owned subsidiary of Supradur Companies, Inc. As President, I supervise the manufacturing of asbestos cement roofing and siding products and their marketing and sale in the United States and abroad. My position has exposed me to almost every aspect of the industry. As an officer and representative of Supradur I have had the opportunity to discuss industry issues with other A/C sheet manufacturers in the United States and abroad. Through my manufacturing responsibilities I have acquired a thorough understanding of the manufacturing process of A/C sheet. As supervisor of sales and marketing I have gained insight into the unique and useful qualities of asbestos cement sheet products.

THE PRODUCT

The asbestos cement sheet industry produces a range of products including roofing and siding, flat sheets, corrugated sheets, cooling tower fill and other specialized products. These products have a variety of applications. Asbestos roofing and siding is used primarily in residential property, and occasionally in schools, churches and historic restoration projects. Flat sheets and corragated sheets are widely used in industry, in large factory-type buildings and in farms as roofing and siding. Cooling tower fill is used in the construction of the interior of power plant cooling towers, which cool water for reuse in power generators.

Asbestos cement sheet products are widely used because of their unique and useful properties. A/C sheet is fire proof and heat resistant, and it resists chemical attack and decay. It is flexible yet it does not break easily. In addition, asbestos cement products are frequently the only materials which can satisfy the rigid specifications of design engineers. For example, asbestos cement is the material best suited for use as cooling tower fill where long life in a wet environment is essential.

A/C sheet products represent exceptional value. They typically last for several decades, are low in cost and require little maintenance. Even where the unique properties of A/C sheet do not make it the only reasonable choice, contractors often prefer these products over other materials because of their durability and low price.

Risk of Exposure During Product Application

The potential for asbestos exposure during construction operations involving A/C sheet products is minimal. Because the asbestos is encapsulated or bound into the final asbestos cement sheet there is no danger of exposure from handling the product unless further fabrication of the product is needed at the job site. Ordinarily, cutting or processing of roofing and siding is not necessary after primary manufacturing because the product is pre-drilled and pre-cut. Flat or corragated sheets may require infrequent job site cutting and fitting to meet construction design specifications. Contractors may use a variety of special tools which are designed with either dust collection devices or water spray in order to cut the sheets with minimum fiber exposure. These tools, combined with the ability of manufacturers to do much of the specified cutting in the factory, maintain exposures at the construction site at negligible levels. Once the product is fitted and put in place, there is virtually no danger of fiber release during its useful life.

Manufacturers of asbestos cement sheet products supply to their customers work practice pamphlets at no extra charge in order to minimize the possibility of mishandling of the material. If further instruction is needed, salesmen trained in the use of acceptable tools are dispatched to the job site for training sessions. In addition, the products are securely packaged and labeled in order to avoid possible damage during transport and misuse during construction that could lead to asbestos fiber exposure.

Substitutes

Although there are substitutes available in the marketplace, they are generally more expensive and none have demonstrated the durability of asbestos cement sheet products. Most of these materials have poorer dimensional stability and resistance to warp than A/C sheet products. Consequently, the non-asbestos materials are a poor substitute to asbestos cement sheet in applications such as roofing and siding where the durability and longevity of the product is crucial.

THE PRIMARY MANUFACTURING INDUSTRY

Fewer than 5 plants, employing approximately 500 workers, manufacture asbestos cement sheet in the United States. My best estimate is that total annual U.S. production is somewhere around 100,000 tons.

Control of Asbestos Exposure in the Workplace

Since the early 1960's manufacturers have become increasingly aware of the dangers of asbestos fiber exposure to workers. By early 1970 OSHA had begun to regulate permissable dust levels. Spurred on by OSHA's actions and the threat of civil liability for asbestos related diseases, manufacturers invested large sums of money to install ventilation systems, and institute programs to educate workers in proper work practices and housekeeping techniques. Experience has shown that while engineering controls will remove a large portion of the airborne dust, sound housekeeping and work practices are essential to reduce exposures to the 0.5 fiber/cc level or below. In addition to keeping airborne dust levels low, the A/C sheet industry has attacked fiber exposure through integrated programs of industrial hygiene which include routine monitoring, medical surveillance and examination, worker training, work practice requirements, housekeeping practices, respirator programs, locker room facilities and warning signs.

The cost to manufacturers of these integrated asbestos controls has been high. At Supradur, approximately 70% of our total capital expenditures in the last four years has been for dust control equipment. The operating cost associated with monitoring, medical surveillance, respirators and other non-engineering controls is also considerable.

Compliance with Proposed PEL's

Even with these extensive recent expenditures our current levels would not meet the proposed PEL of 0.5 fibers/cc on an acceptable fraction of all workdays. To reduce plant-wide fiber exposures to this level we would have to install additional equipment at a substantial cost.

Typically, only the dustiest operations such as sanding or cutting generate readings as high as 1.0 fibers/cc. The majority of employees at Supradur are exposed to fiber levels well below this level. The large investment for the installation of additional ventilation equipment, which would be necessary to reduce average plant-wide fiber levels to 0.5 fibers/cc, would benefit only the few individuals who work at high exposure work stations. Yet, our engineers advise me that even this additional equipment cannot assure compliance with a PEL of 0.5 fibers/cc an acceptable fraction of the time. At PELs of 0.2 fibers/cc or below, Supradur would have no choice but to require that all employees wear respirators.

CONCLUSIONS

Supradur supports OSHA's attempts to reduce asbestos fiber exposure levels in the workplace. However, OSHA must maintain a proper perspective on asbestos health issues. The asbestos-related problems rooted in exposures prevalent 30 years ago are almost completely irrelevant to the industry as it exists today. The asbestos industry has progressed from a complete absence of dust controls to the point where every feasible control is being employed. Many manufacturers have already reduced exposures to the lowest possible level. OSHA must consider whether its proposals of improved fiber levels are realistic. It must not adopt such a stringent standard the manufacturers are forced to choose between financial viability and compliance with unreasonable exposure levels. OSHA must also consider whether it can reasonably expect plants to spend huge sums on dust control when the EPA might soon effectively ban asbestos production by regulation.

The Regulatory Analysis of the Proposed OSHA Standard on Asbestos, performed by the Research Triangle Institute (RTI) on behalf of OSHA in 1984, concluded on the basis of its own survey that asbestos sheet plants would employ engineering devices to comply with a PEL of 0.5. fibers/cc. RTI stated further that manufacturers would require widespread use of respirators to achieve 0.2 or 0.1 fibers/cc. These basic conclusions of the RTI study are correct. A/C sheet manufacturers can generally achieve a 0.5 fibers/cc level with additional engineering controls, although, as Dr. Gordon Bragg indicates in his feasibility report, some particular operations, such as sheet sanding, may have difficulty with this level. However, to consistently attain levels of 0.2 or 0.1 fibers/cc manufacturers would have to require widespread use of respirators.

Although respirators represent an unpopular option for workers and management, they may ultimately be necessary as a supplement to engineering controls in some areas of production. However, OSHA should attempt to set a PEL that can in most instances be met through engineering controls and work practices. Respirators should only be relied upon where best available technological controls and work practices are not capable of reducing exposures to an acceptable level.

ORAL STATEMENT OF
RICHARD ALEXANDER

INTRODUCTION

My name is Richard Alexander and I am the Director of Research for Monsey Products Company of Kimberton, Pennsylvania. Monsey is a manufacturer of asbestos coatings. It has six manufacturing facilities across the United States. At Monsey, I am responsible for product formulation, quality control, and oversight of workplace asbestos exposures.

I have spent my entire professional career in the asbestos coatings industry. Since graduating from MIT in 1949 with a degree in chemical engineering, I have held a variety of positions with asbestos coatings manufacturers. At one time I was the president of a small texture paint and basement waterproofing company. I have acted as Director of Research at Monsey since 1978. Through the years I have also held many offices in the Society for Coatings Technology.

INDUSTRY

Three are approximately 20 major producers of asbestos coatings in the United States. A typical coatings plant employs 10 to 15 workers and produces about 2.5 to 3.0 million gallons per year. About 70% of total production contains asbestos and only 5 to 6 individuals work directly with asbestos. In asbestos coatings production the asbestos becomes encapsulated by the mixture at an early stage. The risk of exposure to workers who do not handle the fiber directly is, therefore, minimized.

DUST CONTROL HISTORY

Before the hazards of asbestos exposure were recognized, few precautions were taken to control the generation of dust during the manufacturing process. Suppliers shipped loose asbestos in burlap bags. Workers emptied the asbestos into open mixing vessels generating thick clouds of dust. At the time, the dust was only considered a cleaning problem, not a health hazard.

Once the health effects of asbestos exposures were discovered, manufacturers began developing methods to minimize dust generation during production. Mixing vessels were enclosed, eliminating a major source of airborne dust. Packaging also underwent major changes. Pressure packed bricks of compact asbestos fibers replaced loosely packed bags. This reduced airborne dust. Subsequent palletization and shrink wrapping also made handling easier.

CURRENT PRACTICES

The introduction of pressure packed fibers prompted three additional modifications. Manufacturers had to employ mechanical fluffers in the charging port in order to separate the compressed fibers. Because this process generated a large amount of dust, manfacturers also had to install local exhaust ventilation. The installation of ventilation in turn required the addition of a duct system and a bag house. The exhaust system was later extended to the mixing vessel to eliminate the escape of dust.

Eventually, manufacturers developed bag opening stations to provide dust control during the manual introduction of fiber into the charging chute. These stations utilize local exhaust ventilation to remove airborne dust during the cutting and emptying of asbestos bags. They also provide enclosure and local exhaust ventilation for the disposal of empty bags.

Although engineering devices have accounted for major reductions in exposure levels, manufacturers have attacked many smaller sources of airborne dust through improvements in work practices. Workers now receive extensive training in the proper techniques for cleaning spilled asbestos, repairing broken fiber bags, and vacuuming the workplace. The combination of engineering controls and improved work practices has effectively eliminated the high exposure to airborne asbestos dust that was common in the workplace just two decades ago.

Ancillary Programs

A complete occupational asbestos control program must supplement its engineering controls and work practice techniques with other protective measures.

All Monsey workers who come in direct contact with unencapsulated asbestos are given preplacement and annual physical examinations. They are also monitored annually or semi-annually for airborne asbestos exposure. The measurements are conducted according to NIOSH procedures typically by outside laboratories. Most asbestos coating companies are too small to create their own measurement laboratory.

Worker training is a key ingredient in any asbestos control program. At Monsey, all workers who handle asbestos fibers directly are specially trained in the hazards of asbestos, the use of protective clothing, proper bag-opening techniques, bag disposal procedure, the proper handling of broken bags and the operation of local exhaust ventilation systems and specialized vacuum systems. Worker training is supplemented by constant reminders and signs warning of the presence of asbestos fiber.

Monsey also supplies disposable respirators to all workers who might come in contact with unencapsulated asbestos. Respirators present an acceptable solution to intermittent high exposure situations where engineering controls are inappropriate. Monsey's policy has been to require workers to wear respirators only in very dusty operations such as maintenance or repair of the ventilation system. Workers can see the obvious need for respiratory protection in such operations. For example, no worker would ever question the need for a respirator in a bag house. We have had few problems with worker acceptance of respirators for these occasional dusty procedures.

CURRENT EXPOSURES

Once the necessary engineering controls are in place and all other controls are applied, the risk of asbestos exposure is essentially limited to three areas: receiving and storage, introduction and release from the mixing vessel prior to full incorporation of the fiber into the product. Small spillover exposures are also possible at workstations which are in close proximity to those that handle unencapsulated asbestos. Once the asbestos is fully incorporated into the pitch-like liquid during mixing, it is effectively encapsulated and the risk of airborne dust is virtually eliminated.

The installation of the best available engineering controls combined with the employment of sound work practices can keep workplace asbestos exposures quite low. Eight hour time weighted average exposures in all workplaces at Monsey's plants are currently well below the PEL of 2.0

fibers/cc. Monsey's newest plant, which is equipped with state of the art dust controls, consistently achieves average exposures well below 0.5 fibers/cc. The older Monsey plants, which employ less sophisticated bag opening systems, average dust levels of around 0.5 fibers/cc for workstations that directly handle asbestos fiber, but they occasionally experience measurements around 1.5 fibers/cc.

COMPLIANCE WITH PROPOSED PELs

Under OSHA's enforcement system the PEL does not act as a limit on long term average exposures; instead, it applies to each individual exposure reading. A manufacturer cannot defend against a citation by showing that its long term averages were below the PEL. A proposed PEL, therefore, is feasible only if it can be met regularly.

The difficulty with attempting to comply with a given PEL is that airborne fiber counts are subject to unexplained variations. Statistics generated during the past four years of monitoring at Monsey's Kimberton, Pennsylvania plant illustrate the problem. Of the 23 exposures measured, fifteen were above the generally accepted limit of detectability of 0.1 fibers/cc. All fifteen of these exposures were on workers at the introduction and mixing stage. The workers were performing the same functions with the same work practices and dust controls during each measurement.

Yet the fifteen samples showed wide variation. Six measured below 0.5 fibers/cc, five were between 0.5 fibers/cc and 1.0 fibers/cc and four were between 1.0 fibers/cc and 2.0 fibers/cc.

Several conclusions follow from this data. Considerable variations in day-to-day exposures are apparently a fact of life in asbestos coatings manufacturing. The achievement of very low exposures on a given day does not assure long term compliance with the PEL. The low exposures may only be reflecting the lower end of the variability spectrum. Even though the sample results showed that our plant had maintained an average exposure level of well below 2.0 fibers/cc, there was still about a 5% chance that we would have exceeded the PEL on any given day. A PEL that can be complied with a large percentage of the time will produce long term averages well below the PEL.

Data Limitations

Problems with current measurement techniques also hinder an assessment of the feasibility of the proposed PELS. The scarcity of monitoring data makes translating it into useful form difficult. With only 23 samples available to characterize the past four years, the distribution of possible exposures cannot be calculated with a high degree of confidence.

More frequent sampling of the workplace would increase the amount of data, but would not offer a practical solution to measurement uncertainty. Most coatings firm are small and their monitoring needs do not justify constructing and staffing their own measurement laboratories. They generally hire outside laboratories to analyze samples collected in their plants. Monsey currently pays about $45 per sample for laboratory analysis. This does not include our own costs for monitoring and collecting the samples and shipping them to the lab. Increasing the frequency of sampling would be even more time consuming and expensive.

Further imprecision is created by the possibility of measurement bias. Doctors Chatfield and Bragg have already discussed the types of biases that can influence results. However, with the limited number of sample results obtained for our plant we cannot determine whether our data is biased. Our ignorance of any bias makes our estimates of workplace exposures even more uncertain. Additionally we cannot determine the statistical nature of day-to-day exposure variability over time.

A further source of measurement difficulty stems from the counting method. Non asbestos particles are sometimes mistaken for asbestos fibers. One company has registered unusually high dust counts on days when asbestos was not being used in the plant.

Feasibility Estimates

In order to allow for fluctuation in exposure levels due to variability and measurement uncertanty and assure compliance with a PEL on a regular basis, asbestos coatings producers must achieve levels of exposure well below the PEL. In the older Monsey plants, only the debagging operation consistently generates time weighted averages above 0.5 fibers/cc although other operations occasionally exceed that level. Our newest plant is equipped with a "state of the art" debagging station that can comply with a PEL of 0.5 fibers/cc on a regular basis. Compliance with a pel of 0.5 fibers/cc may be possible in the older plants through the installation of more sophisticated bag opening stations, better work practices, the addition of more local exhaust ventilation capacity. However major engineering changes cannot be completed in less than a year, and even then a PEL of 0.5 fibers/cc could pose some problems at some workstations.

At a PEL of 0.2 fibers/cc even our newest plant would frequently generate exceedences. Compliance on an acceptable fraction of days would not be possible without full-time respirator use.

CONCLUSIONS

The Research Triangle Institute's (RTI) Regulatory Analysis of the Proposed OSHA Standard on Asbestos included an analysis of the asbestos coatings industry. Although I agree with the conclusion that coatings manufacturers are capable of meeting a PEL of 0.5 fibers/cc with the appropriate modifications, I question several other aspects of the report.

RTI's estimate of 78 coatings plants appears to be low. For example, RTI counted only two of Gibson-Homans' fourteen plants. Also, there are over 100 roof coating manufacturers alone, exclusive of other types of surface coating companies.

I must also question RTI's production and sales volume figures. If 78 plants produce 87 million gallons of coatings annually, generating $6 million worth of sales per plant as RTI estimates then the retail price of asbestos coating would be approximately $5 per gallon. The actual price is near $1 per gallon.

Finally I must question RTI's projections of the amount and cost of the additional local exhaust ventilation that plants would need to achieve 0.5 fibers/cc. RTI's estimate of 2500 cfm of additional local exhaust ventilation at a cost of approximately $18,000 may assume that only one workstation per plant will require additional exhaust. Although the debagging area is the most difficult dust control operation, all three stages in the production process will require more exhaust ventilation to reach 0.5 fibers/cc. My engineers have calculated that the modifications that Monsey's older plants would need to achieve exposure levels comparable to levels currently existing in our new "state of the art" plant would cost $60,000 to $100,000 per plant. This represents a per station cost of about $20,000 to $33,000.

In defense of RTI an accurate characterization of the coatings industry is a difficult task. The large number and different types of coatings producers are not well suited to RTI's survey format. The potential for error in describing the industry was great. However, RTI's basic feasibility assessment was accurate. Coatings manufacturers can comply with a PEL of 0.5 fibers/cc through engineering controls, but they cannot achieve 0.2 fibers/cc without full shift use of respirators.

ORAL STATEMENT OF
MARSDEN HUTCHINS

INTRODUCTION

My name is Marsden Hutchins and I am the Vice President and Production Manager at Quin-T Corporation of New Hampshire. Quin-T operates two plants. Our Tilton, New Hampshire plant produces asbestos tissue, paper, millboard and composites; our Erie, Pennsylvania plant produces a line of asbestos papers and beater-add gaskets.

I began working in the asbestos paper industry in 1952, four years after acquiring a masters degree in chemical engineering from the University of Maine. I worked for sixteen years at Johns-Manville as a research engineer responsible for the development of all types of asbestos paper products and beater-add gaskets. In 1969, I became plant manager for the Johns-Manville asbestos paper plant in Tilton, New Hampshire, which was later acquired by Quin-T. In my current capacity at Quin-T, I am responsible for plant management. I am also Quin-T's director of research and engineering.

Today I would like to address several aspects of OSHA's proposed standard as it relates to the asbestos paper and beater-add gasket industries.

THE PRODUCT

The unique properties of asbestos make it an extremely versatile material for commercial application. It is non-flammable, highly durable, and heat and chemical resistant. Purified multi-ply asbestos paper and millboard act as excellent low voltage insulation because of their ability to conduct heat and their uniform electrical resistance. Asbestos is low in cost and is easily processed into tissue, paper, heavy felts and millboards using modified paper making equipment.

The asbestos paper industry manufactured a variety of general and specialized products. The major products, asbestos commercial paper, bonded paper and felts are discussed in my written statement. Some other more specialized applications of asbestos paper products include use as a diaphragm material in fuel cells, batteries, and electrolytic cells, and paper for pharmaceutical filtration.

Beater-add gaskets dominate the automotive gasket market. They are made by adding rubber latex to asbestos fiber slurry and forming the mixture into a paper web. The ability of asbestos fiber to readily attract latex particles makes it ideal for use in gaskets. Asbestos is the only known material that resists compression and actually expands with "working" and pressure to form a continuous, increasingly tight seal.

Risk of Fiber Release in Product Applications

Many asbestos paper products either require no further fabrication after manufacturing or are fabricated in a manner unlikely to release measureable quantities of asbestos. The most significant exception is in gasket materials. Gaskets are frequently produced by secondary fabricators who, starting with rolls, slit, stamp and coat gasketing material into gaskets. Although potential exposures during gasket fabrication are high without proper protection, a well controlled operation should rarely measure above 0.5 fibers/cc. The gaskets themselves do not pose an exposure hazard. Most gaskets remain in place for the life of the car and those that are removed retain most of their bonded properties.

Substitutes

Asbestos paper products are being replaced wherever it is possible to create economically competitive substitutes with comparable properties. However, the low cost and proven performance of asbestos sometimes make substitution difficult. A comparison of asbestos and non-asbestos gaskets provides an illustration. The non-asbestos gaskets are more difficult to manufacture and more costly. They also create more problems for fabricators and they do not consistently exhibit the same reliable properties as do asbestos gaskets.

Non-asbestos gaskets have been available for some time, but their limited properties and relatively high cost have hampered their marketability.

As research continues, more alternatives to asbestos will undoubtedly appear. Major marketing and regulatory incentives currently exist to avoid asbestos in products. However, non-asbestos materials generally cost more, have more limited physical properties and have to be developed for each specific application.

DUST CONTROL HISTORY

Major asbestos manufacturers began searching for ways to protect workers from asbestos exposure even before OSHA's inception. Industry members have invested time and money in an effort to reduce workplace exposures. Researchers have developed new dust control equipment, engineers have studied production techniques and monitored work stations, and plant supervisors have given more attention to hygiene and work practices. Through this constant effort, manufacturers have progressively lowered dust levels.

New dust control technologies began to appear in the mid 1960's. A major breakthrough occurred when suppliers switched from shipping asbestos in loosely woven, burlap bags to pressure-packed, paper and plastic bags. Except for an occasional spill, improved packaging has virtually eliminated exposures during shipping and handling. Subsequent advances to pulpable bags have even eliminated the need for bag opening operations for some types of paper production. New designs in bag opening systems have reduced exposures where pulpable bags can not be utilized. The installation of hoods and ventilation systems over beaters and pulpers have also helped to improve conditions.

Although innovations in engineering controls have been essential in reducing workplace exposures, improvements in housekeeping have been equally important. The adoption of wet cleaning, the use of vacuums instead of brooms and the disposal of bags in plastic containers are all examples of housekeeping measures that have contributed significantly in lowering dust levels.

The type of product manufactured has also influenced exposure levels. Most of the paper industry's health problems were associated with the production of old line starch bonded paper, felt, and millboard. The binders in these products were inexpensive and durable, but they also allowed fiber release when the paper web was flexed. Substitutes have replaced much of the old line paper production. The modern varieties of paper, felt and millboard are bonded with high percentages of rubber latex or resin emulsions which provide strong, flexible bonds. Latex or resin bonded products meet the OSHA "Bonded" classification and minimize fiber release.

Sampling data, compiled by monitoring operations at Quin-T since 1972, illustrate the extent of progress that has been made in reducing workplace exposures. Fiber levels at all stations have declined, some dramatically. For example at the beater work station, monitoring during the early 1970's consistently indicated exposures above 2.0 fibers/cc and many above 5.0 fibers/cc. Since the installation of a scrap pulper and block breaker system in 1979, no samples have registered levels above 1.0 fibers/cc and only two have been above 0.5 fibers/cc. Although progress at other stations has not been as dramatic as at the beater operation, all work stations easily comply with the current PEL of 2.0 fibers/cc.

There is no single solution to all asbestos fiber exposure problems. With the exception of breakthroughs in fiber packaging, no individual dust control innovation has generated great exposure reductions. Rather, each step has produced gradual improvements. The control of fiber levels has been the product of a learning process. Current control systems have evolved through persistent effort and repeated experimentation over time.

CURRENT BEST PRACTICES

Paper manufacturers achieve compliance with current asbestos standards through a combination of engineering controls and carefully supervised work practices. Almost every segment of production must rely to some extent on engineering devices to keep exposures low. A well controlled stock preparation area should include local-exhaust ventilation for the bag-opening station and, if necessary, a wet dust cleaning system over the mixer. Exhaust systems should be installed over slitters and trim handlers, and possibly in the drying operation. The wet end of the machine, the most difficult area for engineering control, should be enclosed as much as possible in order to isolate the mist from showers and fiber slurry dilution systems.

A well run plant must also supplement its engineering controls with good work habits. Poor work practices can counteract engineering efforts. Quin-T has emphasized the need for safe work practices to its employees. We believe that common sense and careful attention to proper procedures contribute significantly to exposure reduction beyond that achieved by engineering controls alone.

Meticulous housekeeping is equally important. Spilled asbestos cannot be left on floors or around work areas. Prompt cleaning with the proper equipment prevents unnecessary exposures.

Other protection measures also contribute to a sound exposure reduction program. Perhaps the most important is worker training. Manufacturers must foster an attitude of care and concern among their workers. Quin-T educates its workers about the dangers of asbestos, the synergistic effect of smoking and exposure, safe handling and housekeeping techniques and proper work practices. The Quin-T New Hampshire plant also forbids smoking and hires only non-smokers.

Quin-T also provides respirator protection to employees. Single-use respirators are available to all workers. They are mandatory for workers performing intermittent, high exposure operations such as cleaning of spills, handling scrap, and dusting rolls.

COMPLIANCE WITH PROPOSED PELS

The combination of engineering controls, work practices, and auxillary worker protection programs at Quin-T's New Hampshire plant maintain present average exposures at a level well below 2.0 fibers/cc. However, current averages exceed 0.5 fibers/cc at several work stations. Even if it were possible to somehow drive these averages below 0.5 fibers/cc, it would not necessarily assure compliance with a PEL of 0.5 fibers/cc.

The data compiled through years of sampling at Quin-T illustrate the difficulty of assessing the feasibility of the proposed PELs. Our samples frequently show wide variations in fiber counts at each workplace from test to test. For example, at the beater work station the same laboratory measured .054 fibers/cc on March 5, 1984 and 0.56 fibers/cc about a month later. Many factors such as pump operations, the person being tested, the person conducting the sample, the weather, specific run conditions and building ventilation could influence sample readings. With so many variables and such potentially wide swings in measurement results, Quin-T cannot safely predict compliance with a PEL below 0.5 fibers/cc.

Problems with measurement bias also make an assessment of the feasibility of proposed PELs difficult. A careful examination of Quin-T's past monitoring results illustrates how exposure measurements can be affected by laboratory bias. To check for bias we conducted a comparison of measurements taken simultaneously by two laboratories. One of the laboratories generated consistently lower values than the other. At the baler workstation, this difference was as large as a factor of ten. Quin-T had no indication that either laboratory departed from NIOSH analytical procedures.

As Dr. Bragg previously discussed in his testimony, the laboratory conducting the measurements can influence the exposure levels obtained. At Quin-T, uniformly low sampling results of one laboratory in comparison to the results of several other laboratories strongly suggested a bias. However, at plants that have not been able to compile sampling data from several different laboratories, such clear indications of bias are not so readily discernible. In those plants, the measurement bias may go undiscovered.

Measurement bias and sampling variability are two variables over which manufacturers have little control; yet, both can potentially exert great influence on sampling results. With current measurement techniques, monitoring programs can provide plant managers only an imprecise description of asbestos levels in the workplace. Manufacturers can estimate exposure levels in their plants, but they are never quite sure how their sampling data will compare to OSHA's compliance sampling results.

Under the current OSHA compliance scheme, a single measured exceedence of the PEL merits a citation. Plants must therefore operate at average levels significantly lower than the PEL to assure that count fluctuations due to either variations or measurement flaws will not exceed the PEL. Quin-T's best estimate for paper production is that all operations can reduce average exposures to below 0.5 fibers/cc with appropriate controls, but averages cannot be sufficiently reduced to eliminate all fluctuations above 0.5 fibers/cc. Exceedences would occur, but they would be relatively infrequent. If OSHA were willing to tolerate these occasional fluctuations, then manufacturers could comply with a PEL of 0.5 fibers/cc.

At a PEL of 0.2 fibers/cc the exceedences would occur much more frequently. Even with constant monitoring and expensive overhauls of the wet end of the paper machine Quin-T could not assure compliance an acceptable fraction of the time. A PEL of 0.2 fibers/cc would necessitate full shift use of respirators.

Conclusions

The Regulatory Analysis of the Proposed OSHA Standard on Asbestos, published by the Research Triangle Institute (RTI) included a survey of asbestos paper and gasket manufacturers. The study concluded that paper manufacturers could comply with a PEL of 0.5 fibers/cc through the installation of limited enclosures, better employee training and improved work practices. This conclusion underestimates the effort that would be necessary to attain 0.5 fibers/cc an acceptable amount of the time. The wet end operation alone would require substantial modification. Quin-T has already fully enclosed portions of this operation and installed shields, but further enclosure and the addition of exhaust ventilation would be necessary to comply with a 0.5 fibers/cc PEL. In addition, isolation of the wet end would require major changes in the heating and makeup air system in our plant. Other areas of the production process might also require substantial modification.

The study also predicted compliance at 0.2 fibers/cc through increased local exhaust ventilation and improved training. It did not mention use of respirators to achieve this level. RTI fails to realize that the measures needed to attain compliance with a PEL of 0.5 fibers/cc represent the best available dust control practices. Additional controls would not achieve significant further reductions. These measures might enable some work stations to comply with a PEL of 0.2 fibers/cc, but many would still exceed that level much of the time. In order to comply with a PEL of 0.2 fibers/cc, manufacturers would have to require most or all workers to wear respirators.

The study's conclusions about gasket manufacturers were generally accurate. Paper gasket producers are probably capable of meeting a PEL of 0.5 fibers/cc, but at 0.2 fibers/cc plant-wide use of respirators would be required.

In sum, OSHA's regulatory efforts must be tempered by a realistic view of the industry. Manufacturers have already reduced exposure levels to a fraction of those commonly encountered in the 1960's. In manufacturing, the high levels of airborne asbestos fiber in the workplace that have been associated with health problems are a thing of the past. In industry segments where exposure levels are approaching the lowest possible levels attainable through best available dust control techniques, further reductions will be extremely difficult.