



DOW CHEMICAL U.S.A.

*cc: Aldous
Moore*

TEXAS DIVISION
FREEPORT, TEXAS 77541

April 12, 1976

**PLAINTIFF'S
EXHIBIT**
DOW-150

Joseph M. Griffin
Legal Department
47 Building
M I D L A N D

cc: R. L. Buell
F. D. Hoerger
D. J. Roberts

ASBESTOS - WORK PRACTICE HISTORY - TEXAS DIVISION

In response to your telephone call on March 11, I have reviewed the information in our files and am forwarding copies of seven items that reflect our understanding of the health hazards of exposure to asbestos and actions taken to minimize employee risk.

Perhaps this will help you in your effort to determine Dow's liability risk from employee exposures to asbestos. If review of this information generates further questions I will be happy to try to answer them for you.

I have omitted the Asbestos Handling Policy for the Texas Division Chlor-Alkali plants. I understand that the Chlor-Alkali Tech Center is including this in their compilation of information for you.

R. L. Daniel

R. L. Daniel
Environmental Health Services

bbs

Enclosures (7)

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AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

ASBESTOS AND HEALTH

Asbestos is an extremely useful mineral in our society--having more than 3,000 different applications.

Early in this century, a scarring disease of the lungs called "Asbestosis" was discovered. Control standards were established and, to my knowledge, no case of "classical" advanced asbestosis has occurred at our Company. This disease brought early death, usually in less than 20 years after first exposure.

Though there is no reason to believe we have ever exceeded the time-weighted average recommended for control of asbestos-containing dusts, it has now become apparent that these people exposed to the lower levels will develop various other forms of "asbestos disease" after a lapse period of 20 to 30 years. These diseases consist of

- (1) thickening of the pleura or lining of the lungs,
- (2) cancer of the lung,
- (3) cancer of the gastrointestinal tract, and,
- (4) malignant mesotheliomas--a deadly cancer of the lining of the lung or abdomen which is extremely rare except following asbestos exposure.

Studies by our Medical Department indicate that, though we thought our employees were exposed only to safe levels, the changing opinion of what constitutes a safe level has left us with a significant number of individuals who are potential victims of asbestos disease. We should therefore

- (1) institute procedures to minimize future exposure,
- (2) institute medical surveillance of the individuals at risk, and,
- (3) institute a campaign among the previously exposed group to discontinue smoking, which habit vastly enhances the chances of developing cancer of the lung.

Some Divisions have ongoing control programs of excellent quality and I have no doubt their people will gladly share their experience with anyone who has not yet established control.

Continued public information on this topic could eventually result in another case of environmental hysteria--we hope if such occurs we can say everything that can be done has been done. Let us be sure that, in addition to controlling our plant environment, we also insure that we are adding no asbestos dust to the community environment.

Corporate Medical Department
July 17, 1970

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THE DOW CHEMICAL COMPANY

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TEXAS DIVISION
FREEPORT TEXAS 77541

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September 11, 1970

B. J. Kinsel
B-108

cc: O. A. Easton

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ASBESTOS INSULATION - STATUS REPORT

As of the date of this report, the Insulator Shop has discontinued the installation of most asbestos-bearing pipe insulation. In cases where the service requirements are greater than 1500°F., we are still installing Kaylo 20, a calcium silicate, asbestos reinforced material. This use is limited, mostly, to tube-turns on LHP cracking furnaces. This work only comprises about 2% of the jobs we currently install. This is expected to continue until an adequate high temperature substitute is found.

All of the Kaylo, a calcium silicate asbestos-filled insulation for temperatures to 1200°F., has been removed from the shelves in the shops and has been returned to locations as directed by Stores. The field stocks are being shipped to Stores as they are located. It is felt that approximately 80% of these field stocks have been removed to date. We are still in the process of locating and eliminating these small amounts of material.

Engineering standards of E & CS and Texas Division are in the process of being revised. It is felt that finalization of these standards will take about eight weeks longer. Contractors are still being allowed to install Kaylo and Kaylo 20 on new construction although most of the new installations are in Carey-temp, a non-asbestos material.

Technical Development is working in the area of finding substitutes for materials which contain asbestos such as transite, haveg, etc.

It is felt at this time that existing safety rules regarding the use of respirators for "hazardous dusts" are adequate to require the use of respirators by all personnel when dismantling the existing insulation materials. Subsequent to additional talks with the Safety Department, we expect to formally communicate with all supervisors involved. The Functional Superintendents have already talked with the Zone Superintendents regarding the use of respirators, when handling these products.

We had some minor difficulties with Purchasing's getting us into the Carey-temp business, but these were ironed out quickly. I feel that we are now "over the hump" as far as the change over occurs. There are a great many loose ends which still need to be gathered up. I will keep you informed as we change specifications, types of materials, handling procedures, etc.

F. B. Crouch
F. B. Crouch

/wb

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ASBESTOS USAGE - STATE OF MAINTENANCE DEPARTMENT AT PRESENT

Briefly, we feel that the highest exposure rates are experienced by the Insulator Group which handles the material on a day-in and day-out basis, both maintenance and construction. The next highest group would be the Brickmasons who apply the loose asbestos fill used in the mag pot program. Next in the exposure-time-weighted factor would be the persons who occasionally fabricate asbestos-bearing materials such as transite, haveg, and the like. The last on the exposure list would be those persons who occasionally perform demolition of asbestos-bearing insulation within the plants such as removal to facilitate repairs, etc., and handling loose material torn off existing lines prior to sending to the dump grounds.

Presently, we have discontinued all purchasing of asbestos-bearing insulating pipe covering with exception of certain selected sizes of Kaylo 20, a high temperature pipe covering material, used for temperatures from 1200°F to 2200°F. Only use we are aware of for this material is certain light hydrocarbon plant furnaces tube-turn bends.

We have made a concerted effort to eliminate the small stocks of asbestos pipe covering which are scattered throughout the division. I believe we have accomplished this goal to the tune of about 95% complete. We have also returned all asbestos pipe covering from our supplier (Gulf Supply) back to the manufacturer.

Presently, we believe that only about 2% of the insulators' work within the division is made up of asbestos pipe covering. (\$4,000 to \$5,000 to eliminate all existing stocks.)

Insulating materials we are using to replace asbestos are:

1. Fiberglass - both in "snap-on" and loose blankets, ambient to 350°F.
2. Foamglass - 450° to 800°F - also used where temperatures cycle excessively and for Dowtherm service. 15% more expensive than asbestos.

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3. Careytemp 1500 - ambient to 1500°F - expanded perlite - fiberglass reinforced. Some problems associated with application but best available at present. Same cost as asbestos.

Several other areas we are working on:

1. Have problems with loose fill insulation used when setting mag pots. This generates a terrific amount of dust when asbestos shorts are used. We have found that "Super 48" by "48 Insulations, Inc." mineral wool makes less dust than asbestos shorts and contains only about 10% asbestos. The texture is slightly damp or moist feeling, thus cutting down on the dust problem. When our brickmasons are using this material, they have been wearing respirators. We have been assured by the manufacturers of "Super 48" that by October 16 they will be producing an asbestos-free insulation in bags marked as such. The composition of this material is a mineral wool made from copper slag.
2. Fabricating of asbestos-reinforced plastics such as transite, haveg, micarta, where dusts become a problem in operations such as sawing and grinding. We have no problem with insulators wearing respirators when this work is going on. Saws have been developed with vacuum systems to reduce amount of dust, but we still wear respirators as we still get quite a bit of residual dust.
3. Our foremen have been notified that respirators are to be worn by the employees when significant amounts of insulation are to be removed when demolition occurs. We have not yet made it a firm rule to wear respirators in any situation where dusts of asbestos occur, but I believe this will be only a short time before we do. Due to gathering evidence

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of existing hazards.

The last principal area I want to cover is that of new construction.

We are currently in the process of changing the Texas Division standards which will require the elimination of Kaylo (asbestos-type pipe covering) from the list of approved material. The Construction Department is continuing with all new construction in asbestos in which the material is on the job site, but any other new work will have the Careytemp 1500 or expanded pearlite installed in lieu of asbestos. This change took place about the 5th of October.

This is a brief summary of where we stand in the Maintenance program of elimination of asbestos exposure hazards.

F. B. Crouch

/bs

October 13, 1970

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ASBESTOS USE - STATUS OF IN TEXAS DIVISION

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We recently ran a survey of the use of asbestos in the Division with the object of answering 3 questions - 1) Where is asbestos used 2) What protective gear is being used and 3) What have people been told about asbestos.

Where is asbestos used? In addition to the use of asbestos containing materials/^{for insulation purposes}~~that have been used~~ throughout the Division, asbestos is used in our chlorine areas for cell diaphragms in cell manufacturing. and repair for facilities and in all chlorine plants for pulping cells. Asbestos is also used in the Mag Cell areas for insulation in pot settings and in numerous other ways for the sealing of leaks in the cells and vent systems.

In addition to the use of new asbestos, we also have the problem of tearing out of insulation throughout the plant as well as the disposing of used asbestos in the chlorine and magnesium areas.

There is also in use materials of construction such as transite and haveg that are asbestos containing materials.

What protective gear is being used?

In most of the areas where asbestos is being used, either installed or disposed, we now have some form of protective gear in use. Our insulators have been wearing respirators for sometime. Cell Manufacturing folks have had a good protective program for about the last 1½ to 2 years. Recently the Mag folks started using more pro-

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protective gear. I would say that the insulator and Cell Manufacturing and repair people have a good program with good supervisory control. With some of the other crafts who occasionally remove and dispose asbestos materials, the use of protective gear is variable, probably relative to the degree of exposure. Contractors in the Division presently do not wear much in the way of protective gear.

What have people been told?

Asbestos information which our folks have received varies widely. Some have been told little, if anything -- others that asbestos is hazardous to the lungs -- and others that it causes lung problems including cancer. Probably the best informed are those who have been under the periodic examination program where the doctors have apparently discussed asbestos candidly. Contractors probably have been told little about the hazards of asbestos.

Now, I'll turn this over to Jack Crouch who will discuss the effort by the Maintenance folks in substituting some different materials for asbestos containing materials.

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ASBESTOS RECOMMENDATIONS

1. Develop a Dust-Asbestos informational type program for division employees and contractors. (Similar to other hazardous material programs which have been developed.)
2. Develop and audit safe work procedures for minimizing the generation of asbestos dust. Procedure must include protective gear as a final precaution.
3. Continue to pursue the replacement of asbestos with reasonable economic substitutes. (Recognize that asbestos is probably irreplaceable in certain applications.)
4. Develop procedures for accounting for asbestos used and in monitoring asbestos exposures.
5. Continue periodic physical program on division employees who have reasonable exposure to asbestos.

D. J. Kilian, M. D.
F. B. Crouch
R. C. Walker

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WHAT IS IT BEING USED

ABSTRACTS USAOE IN THE TEXAS DIVISION

HOW USED

PROTECTIVE EQUIPMENT

WHAT ARE THE
KNOWN RISKS

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Chlor-Alkali #1	Class 1 Operators	Pulp Cells - Dry & Wet	MSA Gasfoe mouthbit respirator-usually worn-for about 1 1/2 years	Respirator to lungs.
Chlorine #1	Class 1 & 2 Operators	Pulp Cells-Dry & Wet	MSA Gasfoe Mouthbit- usually - for about 20 years.	Can cause lung problems and to wear worn ing with asbestos - 1 year ago.
Chlorine #3	Class 1 & 2 Operators, Control C operators, Class 1 Cell Mtc.	Drawing cathodes, pulp cells - dry & wet. Dis- mantle old cells	Acme Duo Seal or Welch with dust pad. Nastron T- MSA Gasfoe mouthbit when mix to pulp cells. Usually worn-for 1 year.	Causes lung problems
Chlorine #4	Control C & Class 2 day Operators	Pulp cells - dry & wet	Welch with dust pad - usually worn for about 8 months.	Can cause lung problems including cancer.
Chlorine #5	Class 1 Cell Mtc. Drawing, cathodes & patch. Class 1 Operators & Utility Pulp.	Draw cathodes, pulp cells- dry & wet. Dismantle old cells.	Acme Duo Seal - usually worn - good control-for about 2 years.	In group settings & job line-up. Can cause lung problems including cancer.
Cell Manufacturing	All Class 2 Operators (82 men relate)	Draw cathodes. Seldom dismantle old cells	Nastron T7 - good control - also in job procedure. Used about 1 year.	Can cause lung problems including cancer.
Magresium #1	Plasterers, building operators, running repair, brickmasons, utility.	Filled loose along Cell	Hose & mouth O/MG	Nothing
Magresium #3		for insulation. Shoveled loose when pot is pulled & pumped into sludge chute	Carpenters & rasons - dust respirators and is a requirement.	
Mag Chlor 1		Use paper for insulation, use rope to seal crucible cover & new anode seal.		

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ASBESTOS USAGE IN THE TEXAS DIVISION

WHERE IS IT BEING USED	WHO IS USING IT	HOW USED	PROTECTIVE EQUIPMENT	WHAT KIND OF WORKING CONDITIONS
Low Carpenter Shop - Plant Wide	Insulators, yard, laborers, boilermakers, pipefitters, etc.	Mix & apply, remove the old.	Dust respirators by Insulators for about 2 years. Usually nothing	Insulators - can cause lung problems & cancer - by Supv. & NCA. Check-- nothing.
Plant Wide by Contractors	Insulators, laborers, carpenters, fitters, masons, boilermakers.	Application, destruction, mix with epoxy, cut siding, gasket material, stress relieving.	None	Nothing

FORMS OF ASBESTOS				
Refract Exports	Used in Chlorine Cell cathode drawing and dry pulping, Mag Cell insulation filler, filler for Epoxies, etc. Many forms.			
Refract Block (KATLO-20 etc.)	High temperature (2200°F) insulation by Owens-Corning. Now used only for greater than 1500°F service pipe insulation. Cutting must be done.			
Refract	Cut in shop and on the job. Siding.			
Acidic	Acetic acid filled Phenolic Resin. Do much grinding. Are able to replace much if not all with Derivatives.			
Gloves	Used as Gasketing, etc.			
Coatings	For handling hot materials.			
	As filler and by itself.			

J-3/lcs
10/12/70

Latest word on asbestos won't be the last

Scientific evidence against asbestos continues to accumulate, and OSHA's much-delayed exposure standard goes on bringing criticism from all concerned parties. Meanwhile, millions of workers remain exposed to asbestos dust in plants throughout the world.

□ Bad news about asbestos continues to make headlines. In September, for instance, Joseph A. Califano, Secretary of Health, Education, and Welfare (HEW), drew attention to an alarming statistic in a new study by the National Cancer Institute (NCI) and the National Institute of Environmental Health Sciences (NIEHS): An astonishing 17% of all cancer deaths in the U.S. over the next few decades will be linked to some previous exposure to asbestos.

Speaking at the AFL-CIO National Conference on Occupational Safety and Health, Califano said that the NCI/NIEHS report definitely rejects the conventional estimate that 1 to 5% of all U.S. cancer incidence is related to occupational exposure to carcinogenic agents. Estimates of 20% to as high as 38% are not unreasonable, he added.

EXPOSURE THAT KILLS—The joint

study estimates that between 8 and 11 million U.S. workers have been exposed to asbestos since the beginning of World War II. Of these, about 4 million have been "heavily exposed,"—i.e., worked directly with the material most of the time—and 4 to 7 million have received "peripheral" exposure—e.g., of the sort that a maintenance worker would get in a plant where asbestos was being installed.

The NCI/NIEHS report assumes that 20 to 25% of those in the first group will die of lung cancer, 7 to 10% of pleural or peritoneal mesothelioma (a particularly lethal cancer), and 8 to 9% of gastrointestinal cancer. Assuming that the risk to the second group is 25% that of the first one, the report concludes that a total of 2.15 million workers will die over the next 30 to 35 years, or about 67,000 per year. This

represents a whopping 17% of all cancers detected annually in the U.S.

The joint study's figures on exposure for workers are taken from HEW estimates (the department believes that 1.5 to 2.5 million U.S. workers are still being exposed to asbestos), while the fatality percentages are borrowed directly from a World Health Organization (WHO) position paper issued in early 1977. This link with the WHO document is confirmed by Joseph Wagoner, special assistant for carcinogenesis with the Occupational Safety and Health Administration (OSHA), who was a member of the group of health experts that authored the WHO study.

Meanwhile, a spokesman for NCI/NIEHS says that the joint report is basically an update of epidemiological data on asbestos, in the light of new information uncovered in the past year.

Whatever its origin, the NCI/NIEHS work is attracting its share of criticism by way of an attack on Califano's recent statement. Some claim that the HEW secretary is unnecessarily alarming the public. Asbestos no longer causes widespread sickness because working conditions have changed, they say.

Dr. Irving J. Selikoff, a well-known authority on asbestos, and director of Mt. Sinai Medical Center's Environmental Health Laboratory (New York City), notes that "Califano's remarks are projections based on limited data, and probably represent an upper limit." But he warns that even if Califano's figures are off by a factor of two, the problem is enormous.

However, a spokesman for the American Cancer Soc. (ACS), New York City, feels that the NCI/NIEHS report does overstate the problem.

INDUSTRY RESPONSE—The Asbestos Information Assn. (AIA), Arlington, Va., an organization of asbestos processors, says that the NCI/NIEHS data are being analyzed by the group's scientific advisors, and that a statement will be issued when the study is complete. Meanwhile, an AIA press release calls the report "simply another extrapolation in statistical terms from the same data which have been available to the international scientific community for some time."

Another AIA press release, issued in response to a Califano statement (made in April) regarding a large



Fiberglass insulation, an alternative to asbestos, is considered safer

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U.S. firms still use it, despite its checkered career

The term "asbestos" comprises a group of impure magnesium silicate minerals—e.g., chrysotile, amosite—that occur in fibrous form. Reports of the toxic properties of asbestos date back to the 1920s in the U.S. However, it wasn't until the war broke out, when millions of workers were employed in shipyards insulating warships, that mass exposure to asbestos dust occurred in this country.

The material enjoyed wide popularity as an insulator in plants and buildings until 1970, when, in response to mounting evidence of its toxic properties, manufacturers stopped producing insulation made of loosely bound asbestos fiber.

The Asbestos Information Assn. says that the 3,000 asbestos products made today in the U.S. contain chemically and physically bound fibers that do not flake off. Current end-use breakdown: asbestos cement products (pipe, sheets), 22.4%; roofing products, 34.9%; asbestos paper, 4.3%; flooring products, 15.6%; packing and gaskets, 2.8%; thermal and electrical insulation, 1.2%; friction products (brake linings), 8.8%; coatings and compounds, 2.7%; plastics, 3.0%; textiles, 1.0%; and miscellaneous, 3.3%.

outbreak of asbestos-related diseases among World War II shipyard workers, explains that such a heavy exposure to asbestos existed before medical information revealed the dangers involved. Since then, millions of dollars have been spent in dust-control equipment by miners, millers, processors and manufacturers of asbestos.

In addition, note other asbestos-industry spokesmen, the type of products made in the past—e.g., asbestos thermal insulation—are no longer produced. They were phased out in the early 1970s, when the inherent hazards became apparent (see box).

Nevertheless, asbestos is still used as an insulator or fire retardant in more than 3,000 products ranging from water pipes to brake linings. And an estimated 500 million tons of the material are still around in plants and buildings throughout the U.S., according to Roy Steinfurth, administrator of the insulation health-hazards programs for the International Assn. of Heat and Frost Insulators and Asbestos Workers (Washington). Workers still exposed to asbestos are not adequately protected, charges Selikoff.

CIGARETTE LINK—Industry spokesmen also point out that exposure to asbestos alone may not be enough to cause lung cancer—the disease most commonly associated with the breathing of asbestos fibers—and that the connection between exposure and cigarette smoking has not been stressed enough. Says John A. McKinney, president of Johns-Manville Corp. (a

leading maker of asbestos products): "Clinical evidence shows that lung cancer in asbestos workers is virtually limited to those who smoke cigarettes, and that for practical purposes, lung cancer as an asbestos-related disease would not be a problem were it not for cigarette smokers."

AIA is currently on a vigorous campaign to persuade industry workers to stop smoking.

"There is no doubt that exposure and cigarette smoking have a synergistic effect," says an ACS spokesman, "but since so many workers included in past studies were smokers or ex-smokers, it's difficult to assess the risk to non-smokers."

The synergism is acknowledged in the WHO document. "Both cigarette smoking and exposure to asbestos independently cause lung cancer. However, when present together, they act in a multiplicative fashion." The NCI/NIEHS study agrees, and admits that it would be an error to attempt to blame each type of cancer mentioned in the report on an exclusive cause.

A NEW STANDARD?—The current flareup of the asbestos controversy is of more than marginal interest to OSHA, which has been trying to modify present rules governing exposure to the material (the agency is studying the NCI/NIEHS report).

For more than three years, OSHA has been pushing a proposal to reduce the permissible level of airborne fibers in the workplace from a present value of 2 fibers/cm³ to 0.5 fiber/cm³ on an

8-h, time-weighted basis, with a 15-min ceiling of 5 fibers/cm³. All limits apply only to fibers longer than 5 μ m. (NIOSH, which serves in an advisory capacity, has recommended a limit of 0.1 fiber/cm³.)

OSHA is currently evaluating the economic impact of the proposed standard, which is bound to affect both processing and use of the material.

Predictably, industry response to the idea has not been favorable. AIA calls the 0.5-fiber/cm³ limit "not technically feasible," and recommends instead the adoption of 2 fibers/cm³ as a permanent standard—one that can be realized at a reasonable cost for dust control.

On the other side of the spectrum, Roy Steinfurth, the asbestos workers' spokesman, feels that the only acceptable level is no asbestos exposure at all. The union official says that, even if the exposure level is reduced to 0.5 fiber/cm³, a worker would breathe in 4 million fibers in an 8-h workday. He estimates that as many as 50% of the members of his organization will eventually die of asbestos-related diseases.

In Europe, there is also a move to cut down on the exposure level, which has been 2 fibers/cm³ in the past few years. Italy, which lacks asbestos deposits, is attempting to phase out the material completely. Sweden moved to a 1-fiber/cm³ standard a year ago, and U.K. authorities are clamoring for a reduction of the present limit.

Critics who complain that the OSHA proposal does not go far enough in protecting workers also question why the standard should apply only to fibers longer than 5 μ m. Both Selikoff and Wagoner, for example, believe that the smaller fibers are even more active in producing lung tumors. And, according to Selikoff, "For each fiber longer than 5 μ m, there may be as many as 100 shorter ones."

OSHA's Health Standards Project Officer William Warren says that the 5- μ m length was the most practical alternative because detection equipment does not pick up anything smaller. Warren notes that available monitoring units detect only "from a few percent to 50%" of the actual number of fibers in a sample.

INSULATION DANGER—Spot checks with a number of U.S. insulation manufacturers turned up no one still making the asbestos-containing version. However, there are still tons of it

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installed in chemical plants all over the world. Since the asbestos is loosely bound, the cutting, handling and tearing down of such insulation poses a health hazard.

"If the insulation is intact, there's no problem," says an engineer with Britain's ICI, Ltd., "Whenever maintenance requires stripping down and removal, we replace with a substitute material." He adds that the firm does not specify asbestos for any new plants.

"We stopped using asbestos for insulation about seven or eight years ago," claims the safety manager of a U.S. refinery. "Although it is cheaper and easier to apply, the health risks persuaded us to switch to fiberglass and calcium carbide." He further notes that although some asbestos is still used, it is of the bonded type, which does not present a potential dust hazard.

The indirect risks of asbestos insulation were highlighted in a recent study of maintenance workers at American Cyanamid's facility in Bound Brook, N.J. The survey, commissioned by the

International Chemical Workers Union (ICWU), Washington, and carried out by the Mt. Sinai Medical Center, identifies the risks faced by maintenance workers (other than insulation installers) when working in the vicinity of an insulation job.

According to Larry Ahern, director of health and safety for ICWU, the results show that 44% of all workers, regardless of job function, had some form of asbestos-related lung abnormality. One group of workers exposed for less than one month experienced a significant increase in the incidence of lung disease.

Worse, the researchers discovered that many of the workers' relatives, who had not been in direct contact with the material, were affected. "About 123 wives were sick," says Steinfurth.

HOW ABOUT SUBSTITUTES?—Such popular asbestos replacements as fiberglass, mineral wool and calcium silicate may have health hazards of their own, but these have yet to be identified.

In a criteria document issued in

April 1977, NIOSH said: "Fibrous glass seems to be considerably less hazardous than asbestos . . . and, until more information is available, the recommended standard can also be applied to other manmade mineral fibers." The NIOSH paper suggests a standard of 3 fibers/cm³ for fibers of less than 3.5- μ m dia. Larger fibers are not thought to be respirable.

Ralph Zumwalde, an industrial hygienist at NIOSH, points out that most of the exposure to fiberglass involves fibers with diameters greater than 3.5 μ m, even though some special products contain thinner ones.

"Fiberglass is an irritant, and can cause skin irritation or upper respiratory irritation," says Dr. Donald J. Billmaier, assistant medical director of Owens-Corning Fiberglas Corp. (Toledo, Ohio, "but our studies show that there are no chronic adverse health effects from using the material."

Calcium silicate is classified as a nuisance dust, not a fiber. The OSHA standard is 15 particles/cm³ for the respirable fraction.

Vincent Cavaseno

Gulf Coast buildup may ease olefin glut

□ A more hopeful outlook for ethylene derivatives is triggering major expansions in the Gulf Coast area, and these may help alleviate, at least locally, the ethylene surplus that is predicted through the early 1980s (*Chem. Eng.*, Mar. 27, p. 80).

Consider, for example, the current buildup at the Raporte, Tex., complex of the USI Div. of National Distillers and Chemical Corp. The company, which last year increased its high-density polyethylene (HDPE) capacity to 500 million lb/yr, boosted its low-density polyethylene (LDPE) capacity by 200 million lb/yr this spring. Another ethylene-consuming addition is under way—USI will complete early next year a vinyl acetate monomer expansion. This will raise monomer capacity from 375 million lb/yr to 600 million lb/yr. The three expan-

sions will consume a total of just under 500 million lb/yr of ethylene.

Shell has marked the tenth anniversary of its complex at Geismar, La., by inaugurating ethylene oxide and ethylene glycol trains, now about 60% completed. About a year ago, the company began work to increase oxide production from 300 to 700 million lb/yr, and glycol output from 150 to 350 million lb/yr. "This expansion will be ready for startup in early 1979," says plant manager Fred Foster. The ethylene oxide boost will require 340 million lb/yr of ethylene raw material.

Shell will also add flexibility to the Gulf Coast ethylene distribution system with a new 254-mi ethylene pipeline that will run from Mont Belvieu (just east of Houston) to Napoleonville, La., near Shell's petrochemical

plant at Norco. The company is building a 1.5-billion-lb/yr ethylene plant there, which is expected to go onstream in 1981. Says A. R. Flora, Shell's olefins business manager, "The pipeline will help to eliminate spot shortages in Texas and Louisiana complexes, which are the heart of the petrochemical industry."

USI executives now speak more optimistically about the future of downstream products, and predict a better supply/demand balance. According to George Kappas, vice-president of National Petrochemicals Corp. (jointly owned by National Distillers and Owens-Illinois), "HDPE is currently moving away from oversupply."

"At present," says Kappas, "there is a slight surplus of HDPE. However, producers are not building up year-end inventories, and demand is growing steadily. Consequently, in 1980 and 1981, supply and demand will be somewhat tighter than they are today." Kappas notes that domestic need for the resin has grown at an average annual rate of more than 11% since 1971. LDPE will be in balance by 1980, according to USI estimates.