

FILE NAME: Union Carbide (UC)

DATE: 1989

DOC#: UC063

DOCUMENT DESCRIPTION: Legal - Notes on the Deposition of Dernehl

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
25	4-15	Admitted knowledge that asbestos dust was hazardous and was concerned about asbestosis at the time of first visit to King City.
	20-25	King City began taking chest x-rays from day one of plant on the directive of Dr. Nale.
26	1-11	X-rays were done annually on employees by outside doctor at King City, and Union Carbide did not keep x-rays, the doctor did.
	12-16	Did not recall any epidemiological study done at King City.
	20-24	Recalled a specialist at one time reviewing a large number of x-rays to make sure that the local doctor did not miss anything.
27	6- 9	Thought specialist was a B reader and radiologist.
28	18-25 1- 7	This was done at the request of Union Carbide medical department in New York, probably at Dr. Lane's request.
29	1- 7	When asked if specialist was used because Union Carbide medical department at that time recognized exposure could result in disease, deponent replied that was known before Union Carbide ever started mining asbestos.
	8-24	When asked at the time of x-ray studies did medical department know asbestos could cause cancer and mesothelioma, replied knew of Selikoff studies with regard to cancer and asbestos.
34	16-21	Union Carbide medical department from 1955 to 1979 did its own research on industrial hygiene and toxicology at its own lab at Mellon Institute in Pittsburgh.
35	6-17	Other sites of research included Chemical Institute of Industrial Toxicology at Chapel Hill, Research Triangle in North Carolina and some in Illinois which were commissioned by Union Carbide but done by outside people.
36	18-25 1- 4	Union Carbide did its own research at Mellon consisting of about 35 people and headed by Dr. H. F. Smith, Jr.. Other workers included Dr. C. P. Carpenter, Urboano Pozzani and Carroll Weil.
	5-11	Union Carbide conducted research at Mellon from 1938 until deponent left, then set up own lab.

PAGE	LINE	DESCRIPTION
43	17-24	Policy of Union Carbide to have chest x-rays at all plants began in early 1940s.
44	10-21	Did not recall any Union Carbide directive to customers telling them to get annual chest x-rays but said that sale or marketing people may have told them to do so.
46	11-25	Before OSHA standards were set in 1972, did not believe Union Carbide issued literature to customers regarding how customers' employees should be protected but on what the workers should be protected against. This was done in the form of product bulletins and material safety data sheets if there were any on asbestos.
48	20-24	Reiterated customers were not told how to protect but what should be protected from.
49	1- 4	Exhibit 10, Material Safety Data Sheet - "Effects of Over Exposure" containing "Prolonged over exposure may result in lung disease."
55	9-12	Union Carbide did work on toxicology of Coalinga or calidria fiber.
56	7-22	Ex. 45, article written by Langer, Wolff, Rohl and Selikoff in Journal of Toxicology and Environmental Health.
57	6-17	Published in 1978 about study being done of Union Carbide Calidria RG 144 fiber.
58	1-11	Did not know of article. Knew that study was done at Mellon on toxicity of Calidria asbestos fibers.
59	7-11	Above calidria study was done in 1966.
60	5-25	Reason for the study - In 1960s, it was thought that long fibers caused asbestosis, and it was long fibers that a person needed to be protected against. Then a form of silicosis, a disease similar to asbestosis, produced by ultra fine particles of silica and silica powder developed in a groups of workers. Since these particles were so small and yet caused a similar disease, it was then thought that perhaps the small asbestos fibers could possibly cause asbestosis.
61	1-11	
	17-24	Was concerned in 1960s that calidria asbestos could have same effect as silica in humans.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
64	9-23	In 1960s not all Union Carbide technical reports concerning asbestos that were sent to customers were sent to the medical department but if made reference to any health problem it would be reviewed by the medical department.
66	1-25	Discussion of Ex. 4 "Asbestos Toxicology Report" by deponent and Dr. Lane.
68	5-22	While at Union Carbide asbestos reports were filed in files under "asbestos" along with anything picked up concerning asbestos.
69	20-24	Did not know when Asbestos Toxicology Report (Ex. 4) was published. Stated usually was dated.
70	11-16	Agreed that Ex. 32, dated 1-12-65, suggests report above was in 1964.
71	23-25 1	Agreed that report was based on medical literature at the time.
	5-14	Discussion of 3rd paragraph of report concerning waste control asbestos dust exposure and particular use of the wet processes when possible.
	15-17	Stated paper making process is a wet system.
72	18-25 1- 5	Admitted at beginning of wet system when fiber is dumped, dust would be released. Stated Union Carbide tried to handle by reducing the amount of dusting by pelletizing the product so there were no loose fibers in the bag so when dumped "less dust" and local exhaust ventilation at point of dumping could pick up and carry away dust more readily.
	6-13	Agreed that there was still dust with pellets.
	14-21	Stated that a paper board when cut, drilled or ground will not get dust to his knowledge.
73	15-24	In paragraph 3 of report, recommendations he made for dust control were a closed flow system, a wet process when possible, and adequate exhaust ventilation when openings were necessary.
74	2- 7	Stated recommended use of respirators also.
	16-20	Agreed with paragraph 3 and said it was "state of the art protection of that day and time."

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
74	21-25	Stated it would be desirable to know dust concentrations where asbestos is dumped from bags into the pulp slurry.
75	1- 9	It would be desirable because this is where person could be exposed to asbestos dust when taken out of bag and where asbestos is exposed to outside air and can escape to said air. This included pelletized asbestos as well.
	10-21	Stated "concentrations should also be determined where dusting occurs in finishing products."
76	22-25 1- 2	Knew of no dust studies done by Union Carbide.
77	3-13 25 1- 2	Stated that responsibility of testing was customers and paragraph 3 told customers to test, and Union Carbide did not test in customers' plants.
	2-12	Stated would be surprised to hear of Union Carbide sampling at the point where bags are dumped and products finished.
	13-24	Pg 2 of report stated physical exams were "desirable" and should include chest x-rays. Stated it was known that breathing excessive quantities of asbestos would produce changes within the lung that would show on an x-ray.
78	1- 7	Did not recall if at time of report, he or Union Carbide knew mesothelioma could be caused by asbestos but admitted in earlier paragraphs of said report increases of incidents of cancerous tumors, especially of the lung, were discussed.
	8-10	Agreed mesothelioma is a cancerous tumor of the lining of the lung.
	19-25	Did not remember Ex. 5 which was report by Dr. I. C. Sayers with Union Carbide U. K. Limited. <i>S. Sayers</i>
79	1-17	Remembered only request for analytical assistance from Union Carbide which was to define the parameters of fibers that were to be used in testing.
80	1-15	Discussion of UICC, organization set up to determine characteristics of fibers to be tested to determine effects of asbestos in animals.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
83	7-14	Stated that Pg 4 of Ex. 5 raised questions about hazards, and some of concerns were addressed by materials sent for New York office and the report mentioned above (Ex.32).
84	15-25 1	Agreed based on the contents, Ex. 5 had something to say about the hazards of asbestos.
	14-23	Did not recall what "Carbide's replies have been based upon 2 communications set by New York office on March 22, 1966, and October 7, 1966" were and had no recollection of work of Newhouse and Thompson at London hospital. ✖
85	24-25 1- 5	Did not recall hearing of problems of London dock workers handling Union Carbide asbestos and their refusal to unload shipments.
87 88	25 1- 4	Agreed that in Sayers' report (Ex. 5) that Southall, Charles Turner Mill and Tullis Paper Mill raised questions to Sayers about the use of Union Carbide's asbestos in the mills.
	13-21	Discussion of Pg 8 entitled "Literature Surveys" but did not recall who made surveys.
89	22-25 1- 6	Stated medical department of Union Carbide did survey literature of material in U. S. on asbestos.
	7-24	Stated did not see reports in 1960s about South African asbestos mines concerning diseases.
90	25 1	Saw reports on Canadian chrysotile mine workers.
	6-25	Stated that in Sayers' report, some of cases cited were those in Canada which he had read.
91	1-14	Discussion of Dernehl's desire to know the dust concentrations when asbestos is dumped from bag. -
	15-25	Discussion of type of bag used.
92	9-16	Did not recall Union Carbide doing a dust count in a region of a freshly opened bag of pelletized and open products as was recommended in report. -
93	21-25	Discussion of industrial hygiene studies conducted at Charleston, West Virginia in plants 511 and 512 in 1962 and 1963.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
94	3-15	Agreed these studies were done to determine quantity of dust that was developed in sawing insulation that was applied to pipes.
	20-21	Reason done was to see how much dust was produced by process.
95	3-24	Discussion of Ex. 24 which was memo of 7-20-62 on said study and received by deponent.
96	1-17	Discussion of Ex. 25 which was memo of 12-3-62 from medical department of Plant 512 at Institute, West Virginia stating dust problems of sawing blocks and Johns-Manville's complaints that results from said Union Carbide studies did not match their observations.
	18-21	Manville's representative suggested supervisor of insulation department and industrial hygienist visit Manville to determine reason for discrepancy.
97	22-25 1-11	Ex. 26, memo of 12-4-62 from Sexton who was medical director to Giambruno who was a supervisor telling him not to send anyone to Manville to supervise and not to study Manville report but to continue own studies.
	12-25	Ex. 27, letter dated 10-23-63 from Sexton to Giambruno submitting report that indicated that 2 kinds of asbestos-containing insulation blocks cannot be processed with reasonable dust concentration that one other type can.
98	4-25	[Ex. 33, letter from deponent dated 6-7-67, to Dr. Hall which indicated that deponent did read Sayers' report.] ★
99	1-13	
	14-20	Stated Union Carbide did do studies in which material was injected into the belly cavities of guinea pigs, rats and rabbits. ✓
100	23-25 1- 4	Threshold limit value - "5 million particles per cubic foot will not be acceptable for the prevention of mesothelioma.")
	10-18	Stated that by 6-7-67, he was aware of mesothelioma and questioned that the threshold limit value was sufficient to prevent it.)
	19-25	Thought it possible that 1 million particles per cubic foot (1/5 of threshold limit value at that time) might not be enough to prevent mesothelioma.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
101	1- 6	Thought this concern was not passed on to customers. ★
102	7-25	Did not recall Ex. 34, letter of 6-13-67 (with toxicology report attached) from T. J. Hall to Frank Dexter, but remembered hearing of problems from badly damaged bags of asbestos and refusal of dock workers to unload.
103	1-16	Recalled shipments were in England but not if asbestos was in pellets or in what type of bags.
	17-22	Ex. 34 stated Dr. Dernehl followed very closely the areas of possible toxicity and carcinogenic properties of asbestos. Deponent objected to the word "very" but said he did follow these areas closely.
	23-25	Agreed following closely meant reviewing medical literature on the topic. ✎
104	1- 2	Admitted following also might mean going out and searching rather than just keeping abreast of materials in hand. ✎
105	24-25 1-20	Ex. 35, letter of 8-1-67 from Thomas Hall to Frank Dexter with copy sent to deponent.
106	21 1- 2	Ex. 36, letter of 11-30-67 from Hall to Dexter.
	19-25	Paragraph 2 of letter stated, "Perhaps it would be better to have this sort of publication ... first approved by Carl Dernehl before we finally agree." Deponent stated that "publication" did not really refer to Sayers' report.
107	2-12	In said letter "Ian" wanted permission to publish Union Carbide data which deponent believed have to do with asbestos data done by Union Carbide Belgium.
108	4-10	Handwritten notes of Sayers included in letter included the following, "Chrysotile fibers, being curved, are less likely to go deep into lungs. Injected chrysotile does cause cancer in rats, so the fact that in practice it is less responsible for tumor production is probably due to a greater elimination rate as well as it's geom."
★	✓ 22-25	Stated now agrees with Sayers so probably did so in 1967. ★

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
109	12-17	Agreed that around 1967 he was concerned with Calridia asbestos fibers because they are short, fine and had a greater possibility of getting into the airways of the lungs. ★
110	1-18	Did not recall if Sayers' report was published but stated he viewed his role as that of a reviewer and not a final authority on whether to publish or not. —
	19-21	Ex. 33, document dated 4-28-67, from Bert Murray, an industrial hygienist, to D. C. Willard on studies of employees installing Kaylo insulation and the recommendation for continuation of the study.
112	25 1- 9	Per deponent, air studies were being done in 1967 in Charleston and Institute (Texas City was later) to determine if Union Carbide workers were being exposed to excessive amounts of asbestos.
	14-15	Declared Union Carbide had a concern about employees' exposure to asbestos long before 1967. —
	16-25	Stated first concerned when first started using asbestos including insulators applying and removing insulation and the way they were doing it and trying to see to it that they used appropriate respiratory protection while they were doing the work.
113	4-10	Air sampling began in early 1960s when industrial hygienists were used.
	11-16	Annual chest x-rays were started about 1941 at South Charleston; 1947 in Institute and Texas City; and all other plants when they were started. 40's
114	12-17	Ex. 39, memo of 9-29-75 from H. B. Rhoades to R. E. Byrne, Jr.
115	16-21	Stated after OSHA standards went into effect in 1972, Union Carbide did not offer air testing to customer plants.
	22-25	Discussion of John L. Myers, marketing manager for Calridia asbestos division. ✓
116	1- 6	Stated Union Carbide analyzing of air samples from customer plants was not being done because Union Carbide did not want to intrude on customers' operations.

PAGE	LINE	DESCRIPTION
116	7-10	Did not know that in 1970s air sampling was being done as a marketing tool to alleviate fears. I.
Cross Examination by Mr. Polk:		
117	8-20	Agreed that people in Union Carbide corporate medical department were aware of hazards from asbestos when he arrived in 1947, and probably had some knowledge in 1930s. A ✓
	21-25	Agreed basis of knowledge was review of medical literature. ✓
118	13-21	Union Carbide had ability and resources to draw on outside organizations to conduct in-depth medical literature searches subsequent to 1947 including computerized medical literature through the Mellon Institute. ✓
119	25 1- 2	Late 1950s and early 1960s Mellon Institute was expanded to the point that they could put people on this kind of search. ✓
	3- 8	Stated knowledge of Union Carbide medical departments to asbestos hazards in 1947 was solely based on literature. ✓
	18-25	Stated first time Union Carbide would have information about hazards that they gathered that was not contained in literature was animal studies at Mellon Institute. ✓
120	3-10	Stated Union Carbide had knowledge in 1961 and 1962 by virtue of in-plant experience in West Virginia on dust concentration during certain manufacturing and maintenance operations.
122 123	13-25 1- 3	When he went to work at Union Carbide in 1947, he personally knew asbestos could cause asbestosis which is a progressive and fatal disease from his medical education at University of Wisconsin. ✓
	4- 8	Stated asbestosis is in part related to the dosage one inhales.
	9-19	Stated in early 1960s and not before, came to his attention that asbestos could lead to cancer. ✓
125	17-20	Union Carbide first established it industrial hygiene department in 1953.
126	10-13	Between 1953 and 1979 industrial hygiene department worked in tandem with medical department.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
126	24-25	Believed that in 1967, medical department prob-
127	1- 3	ably knew that there was a relationship between asbestos and mesothelioma.
	10-19	Believed incontrovertibly that asbestos can cause mesothelioma.
	20-24	Stated formulated this opinion in the early 1970s.
128	3- 7	This opinion was based on reliable epidemiological studies on various work groups which showed a statistical association between asbestos exposure and mesothelioma.
	11-15	Believed absence of valid studies before early 1970s on this subject.
129	4- 8	Stated did not believe any studies existed prior to 1967 because most were just counting cases of mesothelioma and making an association which might not be valid.
130	20-24	In 1947, when he joined Union Carbide he understood chrysotile asbestos fiber could cause asbestosis. ✓
131	8-18	Was not aware, prior to 1979, of any study Union Carbide did or commissioned for determining toxicity of chrysotile asbestos fiber as compared to another type of fiber or concerning the carcinogenicity of chrysotile asbestos.
132	15-18	Recalled cases of alleged asbestosis at Institute in Charleston from 1970 to this retirement.
134	20-22	Did not know that bakelite contained asbestos. ☆
136	18-21	Stated purpose of toxicology report was a request by marketing people for such a statement.)
137	9-16	Stated Union Carbide toxicology reports were not reviewed on a regular basis.
138	18-25	Stated that in 1967 believed Sayers' report to be reasonably accurate. >☆
141	10	Was a member of Union Carbide label committee from 1955 until 1978.
142	5-20	Made recommendations from a medical toxicology standpoint on labeling of asbestos which was adopted by committee with possible minor revisions.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
142	21-25	Discussion by medical department of possible labeling to include potential cancer was had but not adopted.
143	1- 6	Use of word "cancer" was rejected by committee.
144	4- 5	In 1947, knew that inhaled asbestos in excessive quantities could produce asbestosis.
	8- 9	Excessive quantities to him was anything in excess of 10 particles per cubic foot greater than 10 microns in length.
145	13-24	When asked if he personally felt it did any good to warn users of Union Carbide asbestos not to breathe dust they could not see, he said yes and likened it to warning people not to breathe gas.
148	8-24	As of 1960, Union Carbide had experts who could test and evaluate air levels for asbestos and the equipment to do so at some locations if desired.
149	1-10	Between 1960 and 1972, the expertise for this testing would have increased.
151	1-10	Reiterated that in 1940s his concern in asbestos relating to insulators using asbestos and manipulating it in pipe insulation and block insulation.
	11-15	Knew that asbestos was in some gaskets.
152	1-15	Believed asbestos-containing material was not a hazard unless disturbed or unless asbestos was released into air.
153	25	Believed sufficient valid epidemiological studies that indicated chrysotile asbestos can cause mesothelioma and lung cancer; and more conclusive evidence that this probability is 10 times greater if person smokes.
154	1- 5	
	11-14	Pointed out the fact that evidence shows asbestos picks up carcinogenic materials from cigarettes, binds and carries them wherever it travels.
156	10-12	In early 1970s knew of the effect between asbestos and cigarette smoking.
	16-25	First asbestos labels were applied to bags in early 1960s when Union Carbide began shipping.
157	7-12	Admitted that may be possible that early shipments of first year may have been without

labels but not done without label committee's knowledge or approval.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
158	5-13	Early labels may say "Avoid breathing dust." Later labels would be "Do not breathe dust."
	14-21	{ Believed that stronger warning should have been put on in late 1960s or early 1970s because well-established association between exposure to asbestos and mesothelioma and lung cancer. }
159	14-24	In late 1960s or early 1970s, believed long fibers of chrysotile type were different than short fibers of the coalinga type; that they do not act the same or cause the same kinds of diseases.

Re-cross Examination by Mr. Polk:

Cross Examination by Mr. Goldberg:

165	15-20	Preponderance of evidence suggested under certain circumstances chrysotile asbestos can cause mesothelioma, and those circumstances were generally rather large exposures.
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STATE OF MINNESOTA
DISTRICT COURT

COUNTY OF CARLTON
SIXTH JUDICIAL DISTRICT
7 PERSONAL INJURY/CAREY

Arthur A. Frehse and Helen J. Frehse,
husband and wife, Plaintiffs
vs.
Anchor Packing Company, et al.,
Defendants

VOL. II - TELEPHONIC DEPOSITION OF CARL DERNEHL, M. D. - 3-15-89

Direct Examination by Mr. Harvard:

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
180	23-25	Union Carbide began issuing toxicological or
181	1	toxicology reports to customers in 1956.
186	3-14	Reiterates that when he joined Union Carbide in 1947 knew from medical studies that asbestos used in insulation activities and in asbestos mining could cause asbestosis.
	15-25	In late '60s he knew of the association between asbestos and <u>lung cancer</u> .
187	10-16	When learned of association, he believed that asbestosis would not develop in a person who was exposed to asbestos which was below threshold limit value in his working lifetime.
	22-25	At the time, he believed there had to be a concentration sufficient to produce asbestosis before you could have any evidence of cancer.
188	9-19	Recalls threshold limit value being reduced during the '60s.
195	2-14	Reiterates reason for having new employees have chest x-rays at King City plant.
	15-24	States did not know if short fibers might cause asbestosis at that time but states it was prudent to keep an open mind and to x-ray to find out.
197	23-25	Union Carbide Ex. A entitled "Calidria
198	1- 3	Asbestos-Resin Grade RG 244, Tracheal Insufflation of Rat Lungs with Interpretation of Pathology after 30, 60, 90 and 180 Days."

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
200	14-25	Ex. 47 identified earlier showed development of fibrotic nodules within the lung from material and the importance of keeping the dust concentration in air at a low level below threshold or at or below the threshold limit value.
201	1- 7	
202	16-20	Reason for marketing calidria asbestos in pellet form was to reduce dusting.
203	13-25	Ex. 48 identified as "Calidria Asbestos" and "Asbestos Toxicology Report" dated of 5-8-69.
205	6-16	Asbestos toxicology reports included known and proven types of adverse reactions as well as some suggested associations not yet proven.
206	9-21	Discussion of use of toxicology reports by the marketing department who requested or required said reports.
208	12-25	Ex. 49 identified as "Union Carbide Internal Correspondence, March 21, 1970. Subject Toxicity of Calidria Asbestos" with typed name of "C.U. Dernehl, M. D., Associate Medical Director."

Recross Examination by Mr. Polk:

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
217	1-13	Reiterates there is an association and an established cause and effect relationship between cigarette smoking and lung cancer.
218	9-15	Ex. 32 - Memo of 1-12-65, subject "Asbestos Toxicology Report" by Thomas Hall.
219	13-25	Disagrees that said memo indicates that Union Carbide recognized an association between lung cancer and exposure to asbestos.
220	1- 7	
223	14-19	As of January 12, 1965, admits there was information that suggested association between asbestos and lung cancer but he did not agree with it.
226	7-25	States basis for his knowledge that the sole purpose for pelletizing Calidria asbestos was to reduce dusting was learned from someone who

conducted him at plant visits to King City, California.

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
227	23-25	States if assumed asbestos being sold to Conwed was in open fiber form, it would be <u>more hazardous</u> than pelletized form. ★
228	1- 3	
229	10-25	His definitions of the terms "association" and "causal relationship" are given. }
230	1- 4	
233	4- 5	2-8-66 letter from Bud Pufahl to Peter R. Cheston.
234	21-25 1-11	Does not recall telling Mr. Pufahl that papers reviewed "Do not by any means present incontrovertible proof nor do they profess to do so", and Union Carbide's "position should remain that in the U.S. experience there has been no increased incidence of lung cancer when the threshold limit has not been exceeded," but agrees with it in the time frame of 1966.
**** Page 238 is missing. Recross by Brownson is to begin here.		
239	1-14	Reference to Ex. 49, letter of 3-31-70 from witness in which he writes, "Some people believe there is an association between exposure to asbestos dust and the development of lung cancer and mesothelioma. There is no information regarding Calridia asbestos in this respect as yet. It would be prudent to assume that Calridia asbestos will behave like other asbestos in this regard."
	21-24	Agrees that thought above statements could be possibilities.
241	2- 6	Did not believe as of 3-31-70 that mesothelioma could be caused by exposure to any type of asbestos at levels below the threshold limit value.
242	7-25 1- 8	Ex. 48, an asbestos toxicology report dated 5-8-69, states, "From the data available it appears that the TLV of 5 million particles per cubic foot may not be low enough to protect against mesothelioma."

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
243	3-13	Ex. 33, letter from witness to Dr. Hall dated 6-7-67, witness wrote, "It is probable that the 5 million particles per cubic foot will not be acceptable for the prevention of mesothelioma. I have no idea what concentration might be effective in preventing this disease and I am wondering whether a level of 1 million particles per cubic foot would be acceptable."
244	14-16	Believed 5 million particles per cubic foot was probably too high to prevent mesothelioma since it was reduced to two.
245	16-25	Thinks as of August of 1972, Union Carbide had the right to inform its customers that on the basis of current knowledge, which was threshold limit value, they could expect their employees to be protected against the hazard.
246	1- 2	
	3- 6	Hazard of mesothelioma would have been considered in this setting of the threshold limit value.
249	16-19	Believed if Union Carbide had done surveys on air samplings at Conwed, Union Carbide would have informed the Conwed that they were within the threshold limit value.

Cross Examination by Mr. Thornsjo:
Redirect Examination by Mr. Harvard:

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION</u>
260	15-24	Evidence is that the short fiber (Calridia) is cleared from the lungs more rapidly than is the long fibers because they are small enough to be readily moved out of lung. Also the short fiber is less in diameter which gives it different characteristics from the long fiber.
261	12-16	States that asbestos is a chemical entity, and the length does not matter because it still remains asbestos.

Recross Examination by Mr. Polk

<u>PAGE</u>	<u>LINE</u>	<u>DESCRIPTION:</u>
263	4- 7	States first knew cigarette smoking was hazardous to health in '80s.