Shell Oil Company • Shell Chemical Company
Interoffice Memorandum

MAY 4, 1984

FROM: P.J. SNYDER - SR. INDUSTRIAL HYGIENIST

TO: B.J. KERN MD - MEDICAL DIRECTOR

SUBJECT: ASBESTOS SURVEILLANCE

The attached work product reflects a review of the DPMC Asbestos Program. As you know the recent Corporate H & S Audit suggested that additional employees be considered for inclusion in the annual medical program. While one would always like to have additional data, I believe we are now in a position to revisit the issue of medical coverage.

Since this document is rather lengthy you may find the recommendations on Page 7 of interest. Briefly, the key findings are:

1) Additional employees should have been included in the medical program due to past exposure. I estimate this number at 100.

2) Maintenance personnel other than insulators have brief exposures to asbestos which theoretically could exceed 0.1 F/cc. Medical surveillance should therefore be expanded.

3) A mechanism needs to be established to assure participation in the exam program (eg. are all insulators included?).

4) Recent contract changes (associated maintenance) reinforce the need to consider expanding medical coverage to crafts other than insulators.

Lets discuss where we go from here.

Phil Snyder

Phil Snyder

Attachment

cc: R.R. Erickson
J.B. Gross
H.L. Lee
ECB Satellite
PJS Chron

LAM 016801

DPMC-10545

DPMC ASBESTOS MEDICAL PROGRAM REVIEW

I. INTRODUCTION

In 1981 DPMC Management expanded the Asbestos Medical Surveillance Program to include employees who worked as pipefitters and boilermakers prior to 1972. This was in addition to the insulators who were previously in the program. An action item for Health and Safety at that time, was to identify crafts who were presently in excess of the criteria for medical surveillance. Generally this 'action level' is defined as 0.1 fibers/cc, 8 hr. TWA, occurring on a "reasonably predictable and repeated basis". This determination had been deferred until additional information could be collected on asbestos exposure. This report addresses this issue and presents recommendations for future medical surveillance.

II. JOBS WITH POTENTIAL EXPOSURE TO ASBESTOS

Historically asbestos exposure has been associated with insulation fabrication, handling, demolition, cleanup, tear-out, re-insulating and from nearby workers engaged in such activities. During the time period 1962 - 1972 the number of crafts and employees potentially exposed was probably increased with the introduction of the "incidental maintenance clause".

A rank ordering of past asbestos exposure jobs is provided as Table 1. Jobs with current exposure to asbestos are summarized in Table 2. This summary does not reflect any impact (if any) of the recent "associated maintenance" contract provision.

TABLE 1

RANK ORDERING OF HISTORICAL ASBESTOS EXPOSURE

Work Group	Pre-1972 Exposure To Asbestos	1975 +
Insulators	Reinsulation & removal	Procedures in place
Pipefitters	Incidental insulation removal	Procedures in place
Carpenters	Cutting transite, lining welding enclosures with asbestos	Procedures in place
Laborers	Work area cleanup	Contractor cleanup
Pipefitters Boilermakers Welders	Entering vessels, furnaces containing asbestos	Minimized
Welders	Asbestos containing fire blankets	Eliminated
CA Plant Operators 1969 - 1973	Asbestos used routinely	Eliminated
Epon I Operators	Asbestos added to Epocryl 327	Eliminated
Mechanics	Performing brake jobs	Procedures in place to minimize exposure
Riggers	Removing old exchangers and vessels which were insulated with asbestos	Minimized
Pipefitters, Machinist, and Boilermakers	Cutting, installing and removing asbestos gaskets; sometimes with wire wheels	Procedures in place to minimize exposure
Warehouse Personnel	Handling asbestos gasket sheets, etc.	Procedures in place to minimize exposure
Tinners	Occasional covering insulation	Procedures required
Operators	-	Occasional exposure to asbestos if present

TABLE 2

CURRENT POTENTIAL ASBESTOS EXPOSURE

CRAFT	NO.	ACTIVITY	FREQUENCY	DURATION	COMMENTS
Boilermakers North	69 47	1) Removal of old asbestos gaskets off of exchangers and boilers.	1/month	30-60 min.	On the North side gaskets are usually removed by sandblasting
South	22	2) Occasionally remove asbestos insulation to make flanges accessible.	Once or twice per year.	5-15 min.	South side they are scraped off in place.
Carpenters North	26 16	1) Cutting asbestos transite as needed.	1/week - 1/month	5 min.-2 hrs.	Both North and South Carpenters utilize a water nozzle spray on saw while cutting also wear coveralls & disposable dust mask. (Contractors also cut the transite). Note: After the ship explosion (1981) the North Shop was repaired with transite. This took 3-4 months with all carpenters cutting transite.
South	10				
Insulators North	20 15	1) Remove asbestos insulation.	Daily-2X/week depending on location.	1-4 hours.	South side insulators le. frequent as associated with shutdowns & revisions on old units.
South (R Maintenance)	5	2) Cover asbestos insulation with tin.			
Mechanics	8	1) Repair of brake shoe linings. 2) Repair of manual clutch linings	2-8X/month	10 min.	For past 5 years they have utilized a high efficiency vacuum and wear coveralls and dust masks.

CURRENT POTENTIAL ASBESTOS EXPOSURE

CRAFT	NO.	ACTIVITY	FREQUENCY	DURATION	COMMENTS
Pipefitters North	73	1) Incidental maintenance involves occasionally removing asbestos insulation to get access to a flange.	North-only in non-routine situations. Maybe once or twice per month.	5-15 min.	
South	75	2) Removal of asbestos filled gaskets (usually these are greased and come off easily).	South - once per month per pipefitter.	5-15 min.	
Painters North	14	Sandblast the asbestos gaskets of exchanger heads.			Full sandblasting gear with with airline respirators are worn.
Tinners North	3	1) Until 1980-81 asbestos covers were put on the cumene filters by tinners. (Now replaced by fiber glass cloth).	Monthly		
		2) Occasionally tinners cover asbestos insulation with tin.	Weekly	1-4 Hours	

III ASBESTOSIS CASES

Ten Shell employees have recently been identified has having radiological findings compatible with a diagnosis of asbestosis (Table 3). Where possible each employee was interviewed to ascertain the known extent of his past asbestos exposures. Copies of these interviews without identifying information are provided (Attachment 1).

TABLE 3

ASBESTOSIS STUDY 12/83

Case	Years Since First Possible Exposure	Years Since Last Possible Exposure	Job Assignment	Comments
1	35	10[C]	Insulator	
2	35	10[C]	Pipefitter	
3	25	Not Determined	Engineer	
4	30	6	Insulator	Exposure prior to Shell signif.
5	35	6	Insulator	Exposure prior to Shell signif.
6	35	10[C]	Pipefitter	
7	30?	10[C]	Boilermaker	
8	35	35	Pipefitter	1 Yr. probable exposure
9	37	37	Welder	
10	38	34	Repairman/ Boilermaker	

In all cases the interviewee described early work activities that could have had high exposure, albeit frequently of short duration. A review of the jobs worked by these individuals offers an opportunity to consider what pre-1972 crafts other than pipefitters, boilermakers and insulators should be identified for the asbestos examination program.

IV. EXPOSURE LEVELS

The available asbestos monitoring data reveals considerable variation in exposure levels depending on wind conditions, work location, removal procedures, etc. (Attachment II). While exposures infrequently exceed the current OSHA limit of 2 F/cc, 8 Hr. TWA, exposures associated with asbestos removal wet or dry occasionally may exceed the medical surveillance criteria of 0.1 F/cc. In part, this is a function of the amount of time involved in insulation removal.

To further understand the benefit of wetting insulation prior to removal, a controlled test was set up. The results, as shown in Table 4, indicate that water helps but does not guarantee acceptable exposure levels. The work situation simulated was that of loosening the insulation with a wrench and removal by hand. Reportably pipefitters currently engage in such an activity 1-4X/month for 5-15 minutes each time. This would be especially true for overtime pipefitting work.

TABLE 4

MOCK ASBESTOS INSULATION REMOVAL

JANUARY 1984

Air Concentration	Sampling Time	Work Activity Simulated
.94 F/cc	11 Min.	Asbestos insulation inside bldg. was wet with water, loosened with a wrench and removed by hand.
3.22 F/cc	11 Min.	Same as above but not wet prior to removal.
1.33 F/cc	10 Min.	Asbestos insulation outside was wet with water, loosened with a wrench and removed by hand.
.44 F/cc	10 Min.	Same as above but not wet prior to removal.

Considering this limited assessment and the data presented in Attachment II one may conclude that any insulation removal (wet or dry) may result in a "peak" asbestos exposure between <.1 - 10. F/cc. This upper range would be a probably worse case exposure for partially wet or dry insulation.

If this exposure occurred for an estimated ten minutes then the 8 hr. TWA range would be:

$$\frac{(.1\ F/cc)(10\ Min.)}{(480\ Min.)} = <.1\ F/cc \qquad \frac{(10\ Min.)(5\text{-}10\ F/cc)}{(480\ Min.)}$$

$$= \quad <.1 \quad \text{upto} \quad .1 - .2\ F/cc$$

Although the actual exposure would be less if a respirator was worn, the criteria for medical surveillance would apply irrespective of respirator use.

V RECOMMENDATIONS

1. The following crafts should be added to the Asbestos Medical Program based on current exposure potential.

- Insulators (verify participation)
- Maintenance personnel expected to or permitted to remove or cut asbestos more than 5 days per year.

  Pipefitters
  Tinners
  Carpenters
  Mechanics

2. The following employees should be added to the Asbestos Medical Program based on past exposure potential.

Employees who worked prior to 1972 as:

Pipefitters - Verify
Boilermakers - Participation
Carpenters
Welders
Epon I Operators (Attachment IV)
CA Plant Operators (1969-1973)
Laborers

3. Per the DPMC Asbestos Order, annual asbestos training should be provided to current

Pipefitters	Insulators
Carpenters	Mechanics
Tinners	Warehousemen

4. All future "presumptive cases of asbestosis" should be identified and interviewed in regard to past asbestos work.

5. To comply with the OSHA Asbestos Regulation the following jobs must be monitored every 6 months, (1 day survey)

Tinners - Covering insulation

Insulators - Asbestos removal work

Carpenters - Cutting transite

Maintenance needs to assist Industrial Hygiene by coordinating air sampling and the field work.

6. Annually maintenance should review participation in the medical program for the jobs identified in #1 above.

ATTACHMENT 1

1) [redacted]
Previous Employment:
No application located.

Date	Occupation	Department	Location
2/48	General Helper	Utilities	Houston Refinery
3/48	Pipefitter Helper No.2	Eng. Field	Houston Refinery
8/48	Asbestos Helper No. 2	Eng. Field	Houston Refinery
8/49	Insulator Helper	Eng. Field	Houston Refinery
12/52	Insulator No.2	Eng. Field	Houston Refinery
2/53	Insulator No.1	Eng. Field	Houston Refinery

Narrative From Interview: 4/10/84

This employee has been assigned to the shop for the last 3 years. His work mostly involves fabrication of elbows, etc. The use of a vacuum on the saw has helped considerably over past practices (before 1970). There is only one shop insulator, the rest work in the field.

According to this insulator the wetting of asbestos prior to removal doesn't always work. One can't wet the insulation all the way through and some dust is initially generated when the metal cover is removed. Before 1974 his exposures were sometimes significant, and more frequent (less asbestos in the field today). In vessels insulators would sometimes breathe through rags (when the dust was annoying).

Today pipefitters will sometimes remove asbestos without following precautions. Relatively speaking they (the pipefitters) have the second highest exposure potential. Most older insulators can tell the difference between asbestos and non-asbestos insulation. However, operators don't know what areas contain asbestos and don't generally identify it for them. This employee stated that the craft foremen were pretty strict on following the work practices.

2) [redacted]
Previous Employment:
9/43 - 2/43 Jess McNell - Tractor Operator
1/44 - 7/46 US Marines - Telephone installer
7/46 - 7/48 Westinghouse Electric - Installer

Date	Occupation	Department	Location
7/48	General Helper	Eng. Field	Houston Refinery
8/48	Pipefitter Helper No.2	Eng. Field	Houston Refinery
2/49	Pipefitter Helper No.1	Eng. Field	Houston Refinery
2/53	Pipefitter No.2	Eng. Field	Houston Refinery
2/53	Pipefitter No.1	Eng. Field	Houston Refinery

Interview: This employee declined to discuss asbestos.

3) [redacted]

No previous employment reported.

Date	Occupation	Department	Location
6/49	Jr. Lab Assistant	Mfg. Research Lab	Houston Refinery
6/50	Lab Assistant	Mfg. Research Lab	Houston Refinery
8/51	Technician Lab	Mfg. Research Lab	Houston Refinery
8/52	Military Reserve	(8/10/52 - 8/25/52)	
6/53	Military Reserve	(6/7/53 - 6/23/83)	
1/54	Military Leave		
1/56	Released to return to school.		
2/58	Technologist		
3/59	Technologist		
3/60	Technologist		
6/61	Technologist		
6/64	Engineer		
7/65	Engineer		
7/68	Sr. Engineer		
7770	Group Leader		
9/73	Process Manager		
4/77	Process Manager		

4) [redacted]

Previous Employment:
"Insulator. 24 years experience in Chemical Plant". (Diamond Shamrock, Painesville Works) Navy: Radioman

Date	Occupation	Department	Location
2/77-83	Insulator No. 1	Maint. Engr.	DPMC

Narrative From Interview: 4/10/84

Worked at Diamond Shamrock (Ohio) as an insulator between 1953 and 1976. Even in 1974-1976 they had no required precautionary procedures as does Shell. Insulators were only told about the hazard of asbestos not required to do anything different.

This individual indicated that he always had used a "paper type" (Martindale) respirator even at Diamond. Much of his work at Diamond involved cutting and fabricating insulation outside.

This employees assignments today are predominately at Resins. Some areas have asbestos, some don't. He encounters asbestos occasionally as during dismantlements and shutdowns.

This employee stated that he was glad that he has had no effects from his past exposure (evidently he has not experienced overt symptoms from his asbestosis). He currently smokes less than 1 pack a day.

Regarding current work practices he stated that the "wet procedure" is pretty effective in reducing dust levels. Residual asbestos on piping is hosed off. This employee appeared to be reasonably knowledgeable of asbestos' hazards and very aware of the hazard associated with contaminating his work clothes. He did indicate, however, that for small jobs coveralls would not be used. He is careful that his family doesn't handle his work clothing. This employee further indicated that the management of contaminated clothing isn't stressed by Shell. He occasionally brings contaminated garments to the Tool Room in unlabeled bags. He doesn't use paper coveralls because they lack pockets. Regarding other crafts, he indicated that pipefitters don't have respect for asbestos. He occasionally has to get fitters out of an area where insulation is being removed.

Overall, this insulator stated that Shell had a pretty good safety program, with one exception. At Diamond Shamrock walking through roped off areas and not posting areas when work was going on overhead wasn't tolerated by management.

5) [redacted]

Previous Employment:
4/1/48 - 1976 Insulator Group Leader at Diamond Shamrock.

Date	Occupation	Department	Location
2/77-83	Insulator No. 1	Maint. Engr.	DPMC

Narrative From Interview: 4/10/84

He has worked at Diamond Shamrock since 1948. Also wore respirators about as often as he does now at Shell. However, he runs into less asbestos at DPMC since it is slowly being replaced.

He changes his clothing in the Carpenter Shop (not the changehouse), but he does shower before leaving work. Contaminated clothing is given to the Tool Room for cleaning in labeled bags.

Regarding pipefitters, he suggested that their asbestos exposure is about 5 minutes per day on days when they encounter it. In some occasions this may be extended especially on overtime work. By personal observation pipefitters don't always use respirators. Sometimes it is difficult to tell whether or not insulation is asbestos especially if the covering metal is new. This probably presents a greater problem to new, younger pipefitters.

6) [redacted]

Previous Employment:
9/47-6/48 General Helper, C.F. Braun, LaPorte,Tx.
8/46-9/47 Truck Driver, Dayton, TX.

Date	Occupation	Department	Location
6/48	General Helper	Eng. Field	Shell Chemical
7/48	Pipefitter Helper No.2	Eng. Field	Shell Chemical
12/48	Pipefitter Helper No.1	Eng. Field	Shell Chemical
2/53	Pipefitter Helper No.2	Eng. Field	Shell Chemical
9/53	Pipefitter No.1	Eng. Field (IC)	Shell Chemical

Narrative From Interview 4/9/84

Since 1948 this employee has worked as a pipefitter. In reference to early asbestos exposure, he described working along side insulators and personally removing asbestos as necessary. On occasion the clothes he wore home were "white" with insulation.

This employee noticeably becomes short of breath upon exertion. He described his present difficulty in climbing pipe racks. He now has to stop to catch his breath before proceeding with the work. This employee indicated that he has never smoked.

Reportably the asbestos exposure today (in comparison to the past) is like "day and night". This improvement is mostly attributable to the current practices followed by insulators, (which began about 8 yrs. ago). Current asbestos jobs include: 1) scraping (sometimes sawing) off gaskets and 2) removing insulation (5-10 min. jobs). Sometimes water is used to remove asbestos, sometimes not - depending on the individual. . A pipefitter may remove asbestos 2X/week. As this employee has worked OP-II since 1969, the above description of current practices would only apply to the Olefins OP-II area. This employee ranked pipefitters as having the second highest exposure potential (after insulators). Respectively #3 and #4 were boilermakers and machinists.

Prior to Shell this individual worked for C.F. Braun as a brickmason helper. No asbestos exposure was attributed to this job.

7) [redacted]

Previous Employment:
46-47 Self employed mechanic.
1/51-7/52 Millwright at Portland Cement
Millwright at Ethyl Corp.
Millwright at Rheem Manufacturing

Date	Occupation	Department	Location
9/52	General Helper	Eng. Field	Shell Chemical
10/52	Loader	Shipping	Shell Chemical
10/52	General Helper	Eng. Field	Shell Chemical
1/53	Truck Driver No.2	Eng. Field	Shell Chemical
1/53	General Helper	Eng. Field	Shell Chemical
4/53	Loader	Shipping	Shell Chemical
9/53	Boilermaker Helper #2	Eng. Field	Shell Chemical
5/54	Boilermaker Helper #1	Eng. Field	Shell Chemical
6/60	Boilermaker #2	Eng. Field	Shell Chemical
8/63	General Helper	Eng. Field	Shell Chemical
8/66	Operator #2	P Operations	Shell Chemical
12/66	Loader	Shipping	Shell Chemical
7/67	Operator	Shipping	Shell Chemical
6/68	Loader	Shipping	Shell Chemical
10/68	Boilermaker	Maint.Eng.	Shell Chemical

Narrative From Interview 4/9/84

As a General Helper, this employee primarily assisted the boilermakers, pipefitters and machinists. His contact with asbestos during this time was related primarily to working in areas where asbestos was being removed. At times it would look like "snow falling from overhead". Boilermakers frequently knocked off asbestos insulation to get to the heads of exchangers or boilers. This employee recalled having his clothes covered by asbestos on occasions. Respirators were not available until early 70's, however, goggles were the only way to keep it out of eyes and sometimes a rag would be tied around the nose and mouth if conditions were intolerable.

When asked the difference between conditions of earlier years 50's & 60's and today, this employee said "There is no comparison between how it was then and now". He was referring to the work practices which require it to be wet, bagged, with coveralls and respiratory protection. The frequency of boilermakers having to remove the insulation has also been dramatically reduced because there "just isn't as much asbestos around". Occasions may still occur but they are infrequent compared to earlier years.

This employee believes the pipefitters and boilermakers to be second only to the insulators in asbestos exposure.

The areas this employee worked were field assignments all over the Chemical Plant. He was a Plannable Boilermaker for several years. Since 1983 he has been assigned to E Maintenance.

Regarding the time spent as a Loader in Shipping Dept. he commented on exposure to BPA and resins dusts in the Warehouse.

8) [redacted]

Previous Employment:
7/40-7/42 Westinghouse Electric - Motor Repairman
7/42-11/45 U.S. Navy-Radioman
1/46-3/48 The Texas Co.-Painter

Date	Occupation	Department	Location
4/48	General Helper	Eng. Field	Houston Refinery
5/48	Pipefitter Helper No.2	Eng. Field	Houston Refinery
8/48	Pipefitter Helper No.1	Eng. Field	Houston Refinery
9/52	Instrument Man Help.No.2	Eng. Field	Houston Refinery
10/52	Instrument Man Help.No.1	Eng. Field	Houston Refinery
2/56	Instrument Man No.2	Eng. Field	Houston Refinery
6/56	Instrument Man No.1	Eng. Field	Houston Refinery
11/76	Instrument Man/Foreman	Eng. Field	Houston Refinery

Interview: Not Conducted (Retired)

9) [redacted]

Previous Employment:
8/46-7/48 The Texas Co. - Tank Truck Operator
4/46-8/46 H.H. Hardy - Guniter*
*Reason for leaving was "doctor advised".

Date	Occupation	Department	Location
7/48	General Helper	Eng. Field	Shell Chemical
9/48	Loader	Shipping	Shell Chemical
9/48	General Helper	Eng. Field	Shell Chemical
9/48	Welder Helper	Eng. Field	Shell Chemical
2/53	Welder No.1	Eng. Field (IC)	Shell Chemical
5/68	Welder/Craft Foreman	Eng. Field	Shell Chemical

Narrative From Interview 4/9/84

This employee clearly remembered working with an insulator in the removal of asbestos at G Plant during the first week of employment. During this initial 3 month assignment as a general helper and loader, he had "a few days" of definite exposure to asbestos. His assignment as a welder since 1948 was associated with asbestos exposure upto the time period when its hazards were better managed (early 70's). Welder field assignments did not actually involve insulation removal. However, after insulation was removed he would have to work in areas which were contaminated with the asbestos. On at least some occasions the loose asbestos would be on scaffolding (some jobs required him to work lying down on contaminated surfaces). This welders work historically has been associated with furnaces and reactors. This employee noted welders past use of asbestos fire blankets and gloves. Before asbestos controls were put in place asbestos contaminated piping was brought into the shop. As in the field the loose fibers after the insulation was removed resulted in some potential exposure. This employee has predominately worked in the shop since 1974. Prior to Shell he worked for H.H. Hardy as a guniter and could not recall any exposure to asbestos.

10) [redacted]

Previous Employment:
12/43-4/44 Worked on fathers farm.
9/41-1/43 Dairy Work
9/43-12/43 North American, Dallas - Plating and Buffing
Has been at Sulfur Springs with father since 12/43.

Date	Occupation	Department	Location
4/44	General Helper	Gas	Houston Refinery
8/45	Repairman Helper	Car	Houston Refinery
1/46	General Helper	Eng. Field	Chemical
8/46	Boilermaker Helper	Eng. Field	Chemical
6/48	Boilermaker No.2	Eng. Field	Chemical
6/49	Boilermaker No.1	Eng. Field	Chemical
1/72	Craft Foreman & BM #1	Eng. Field	Chemical
2/74	Zone Foreman	Maint. Eng.	Chemical
2/77	Foreman DPC (Zone A)	Maint. Eng.	Chemical
11/80	Maintenance Foreman	Int.& Solv.	Chemical

Narrative From Interview 4/18/84

This employee is currently a multi-craft foreman in A Maintenance. He worked as a boilermaker in the Chemical Plant from 1946-1974.

One significant recollection this employee had about asbestos was how craftsmen would often use air hoses to blow the insulation away from their immediate work areas. He also recalled using a hammer to remove asbestos insulation around the bolts on exchanger heads. The cleanup of stripped insulation was poor. "Unless it was a tripping hazard, it was left in the area". When asked which crafts were probably exposed the most frequently he named pipefitters and boilermakers as second and third to the insulators.

Today he feels the usage of proper protective controls is about 80% by all of the crafts. The "associated maintenance" which is now in effect he feels will involve additional crafts in insulation contact ie. instrument men, electricians, machinists.

This employee was not aware that an annual training requirement exists for asbestos at DPMC. He feels that reinforcement of training is very important and suggested that our department design a presentation for all of the crafts which includes demonstrating how indestructable asbestos is.

Regarding protective clothing for asbestos he felt that paper coveralls should be specified for asbestos work because they can be disposed of. He commented that if craftsmen wear cloth coveralls for asbestos that they are likely to keep them on for the duration of the day.

Additional Interview:

(Not An Asbestosis Case)

[redacted] 4/19/84

This employee is currently an hourly maintenance foreman at Aromatics. Since 1976 he has worked as a pipefitter in Maintenance East.

The frequency of contact an individual pipefitter might be involved in an asbestos related job this employee estimated as once or twice a month for 15-20 minutes. The practice used today is to have the insulation checked to determine if it is asbestos before performing the work. If this cannot be done it is assumed to be asbestos. Pipefitters may not always wear coveralls, however, most will wear a respirator and sometimes wet the insulation and cover the ends to keep it from shaking out while performing their work. This employee did recall an occasion where he found out after the job that the insulation was asbestos and no protective clothing was worn. For most of the jobs he plans now he tries to have the insulation removed in advance to avoid having other crafts exposed to asbestos during insulation removal. (This was done recently in preparation for the Aromatics' Shutdown). He personally does not beat off insulation with tools but will use a saw or cut it to minimize dust because he has to clean up his own mess.

This employee is not presently in any of the medical programs at DPMC. He feels that pipefitters and boilermakers with service prior to 1975 should be included in an asbestos medical program and that perhaps a random number of various craftsmen could be included post 1975 - Asbestos Medical Program.

He does not think the "associated maintenance concept" will be affected any differently in regard to asbestos exposure. He also mentioned that craftsmen working in the Utilities may have more frequent contact with asbestos.

When asked the order he would rank different crafts exposed to asbestos he named insulators #1, laborers #2, carpenters #3 and all of the other crafts #4.

Overall the craftsmen are pretty knowledgeable about asbestos. It is frequently discussed in Safety Meetings. Practices probably vary depending on individuals and foreman but generally precautions are followed, to his knowledge.

ATTACHMENT II

HISTORICAL ASBESTOS BREATHING ZONE

EXPOSURE DATA

Cleanup

Date	F/cc	Sampling Time	Activity	Type
1972	4.5	2 Min.	Field cleanup	Unibestos
DOSH Study	1.5	7	Field cleanup	Unibestos
DOSH Study	2.7	5	Field cleanup	Unibestos
DOSH Study	1.0	6	Field cleanup	Magnesium
DOSH Study	1.6	17	Field cleanup	Magnesium
DOSH Study	.3	35	Field cleanup	Magnesium
DOSH Study	1.43	22	Field cleanup	Magnesium
DOSH Study	1.36	22	Field cleanup	Magnesium
DOSH Study	4.5	15	Field cleanup	Magnesium
DOSH Study	1.6	31	Field cleanup	Magnesium
11/72	.15	22	Cleanup	Thermobestos
11/72	.32	16	Cleanup	Thermobestos
11/72	.35	30	Installing insulation (EA)	Thermobestos
7/78	0.01	190	Christensen Laborers	
7/78	0.04	190	Cleaning up asbestos	
7/78	0.01	180	insulation during	
7/78	0.01	190	demolition of	
7/78	0.02	120	water softeners	
7/78	0.04	110	(Wet)	

Demolition

1972	2.55	15	Removing from	Unibestos
DOSH Study	2.62	15	charge pump	
DOSH Study	.16	15	Removing from	
DOSH Study	.93	15	transfer line	
DOSH Study	.54	9	Removing from	Firetard cov
DOSH Study	1.64	9	exchangers	ing and bloc
				insulation
DOSH Study	.85	15	"	"
DOSH Study	1.01	15	"	"
DOSH Study	.51	15	"	"
DOSH Study	1.77	15	"	"
DOSH Study	.26	9	"	"
DOSH Study	1.76	9	"	"
DOSH Study	1.02	11	"	"
DOSH Study	1.63	11	"	"

Date	F/cc	Sampling Time	Activity	Type
Demolition (cont'd)				
Christenson Co. - Utilities/Water Treaters				
7/78	.02	120	Cleanup of wet insulation	
7/78	.01	190	"	
7/78	.04	190	"	
7/78	.01	180	"	
7/78	.01	190	"	
7/78	.04	110	"	
Carpenter Const. Insulators - 1978 Demolition of Water Softeners				
8/78	0.17	195 Min.	Stripping insulation	
8/78	0.09	165	from water softeners.	
8/78	0.73	200	(Insulation wet)	
8/78	0.54	150		
MIMI Pipefitters At Sulfur Recovery Unit/EP				
8/78	.03	130	Removal and disposal	
8/78	.20	120	of asbestos insul-	
8/78	.14	125	ation off piping in a	
9/78	.39	125	wet condition	
9/78	.14	120		
8/78	.25	123		
10/78	.18	132		
B & R Insulators at DU 1 & 3				
3/80	.02	115	Stripping insulation	-
3/80	.01	150	from column.	-
3/80	.01	180	"	-
B & R Insulators during DU-2 Shutdown				
4/83	0.15	445	Stripping insulation	
4/83	0.10	435	off piping - wet.	
4/83	0.12	451		
B & R Insulators at Thermal Cracking				
5/83	0.38	420	Stripping insulation	
5/83	0.21	420	off piping - wet.	
5/83	0.37	420		
5/83	0.65	420		

Date	F/cc	Sampling Time	Activity	Type
Replacement				
1972 DOSH Study (File 752)	.45	19	Wiring used insulation in place.	Unibestos
	1.5	19		
	.72	37		
	1.24	37		
	1.34	15		
	1.98	15		
Fabrication				
1972 DOSH Study	.20	40	Cut fabrication of insulation in Shop. Saw has exhaust ventilation	Thermobestc (6% asbestos
	.45	30		
	.36	10		
	.43	90		
	.13	120		
	.13	85		
	.16	20		
11/72	.37	30	Cutting and handling outside.	Thermobestc
11/72	1.28	19		
4/79	1.1	19	Cutting outside at Solvents & Treating.	Transite