PLAINTIFF'S EXHIBIT S-41
PENGAD-Bayonne, N. J.

RESULTS OF AIR SAMPLES

H.K. PORTER COMPANY
Charlotte, North Carolina

Report Prepared By:

Howard E. Ayer

July, 1964

32.16

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE

National Health Research & Training Facility
Bureau of State Services
1014 Broadway
Cincinnati 2, Ohio

July 20, 1964

RECEIVED
JUL 22 1964
OCCUPATIONAL HEALTH SECTION

Through: State Health Officer

Dr. W. L. Wilson, Chief
Occupational Health Section
North Carolina State Board
of Health
Raleigh, North Carolina

Dear Dr. Wilson:

Enclosed are three copies of results of air samples taken at the Charlotte Works, H. K. Porter Company, Charlotte, North Carolina. Counts on these samples have been completed for some time, but tabulation and calculation have only recently been finished.

As you know, a major part of our survey was done with membrane filters. For these filters, counts are reported for total fibers and for fibers longer than 10 μ. These counts were made on Millipore Type AA filters rendered transparent by a mixture of 50% diethyl oxylate and 50% dimethyl phthalate. The counts were made using a 4 mm (43X) objective with phase contrast illumination. Where fiber counts are shown on the same line with an impinger count, these represent simultaneous, adjacent samples by the two methods. Most other membrane filter samples at particular operations were taken by personal samplers worn for periods of 1-2 hours by the individual operator. General air samples were taken either by a sequential sampler or in an array of an elutriated and an unelutriated membrane filter, an elutriated midget impinger and an unelutriated midget impinger. The elutriated samples, which used a horizontal elutriator of the British National Coal Board Design ahead of the sampler, were merely to develop information as to relative "respirability," etc., and are not reported here.

There are no official limits established in this country for asbestos fiber counts. As with dust counting, the count obtained depends upon the sampling and counting method. We have compared impinger counts with companion membrane filter sample counts, and while there are differances between operations and between similar operations in different plants, it appears from samples taken so far that fiber counts by the

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previously described method are equivalent to impinger counts of 5 mppcf as follows:

Total fibers -- 50/cc
Fibers longer than 5 μ — 30/cc
Fibers longer than 10 μ — 15/cc

It should be emphasized that these numbers are averages, based on a limited number of samples in four plants. They are included only to give some significance to the large number of fiber counts reported. The fiber counts are a much more direct measure of the asbestos fiber exposure than the impinger dust count, and it might be prudent to suggest additional controls when the above concentrations are exceeded even if the impinger counts are within the 5 mppcf.

We hope that the above information will be helpful to you in discussing these results with the company. Counts on the other four North Carolina plants have been completed, and you will receive the other reports as soon as they can be typed.

Sincerely yours,

Howard E. Ayer

Howard E. Ayer
Senior Sanitary Engineer
Asst. Chief, Engineering Section
Research and Technical Services Branch

Enclosures

HK 001005

Results of Air Samples of February 1964
Charlotte Works, H.K. Porter Company

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample #	Total	10 μ +
Fiber Preparation					
Blender Operator-BZ	55	0.9	56	7.8	1.1
	215	0.8	216	6.2	3.1
	232	1.9	233	6.9	3.1
	235	1.2	234	6.2	0.7
	567	0.6	568	15.9	5.8
Person.			50M	5.4	1.4
			53	7.8	1.1
			203	8.3	0.5
			204	10.6	3.4
			206	11.0	1.2
Stock Packer-BZ	237	4.3	236	20.9	6.3
	569	7.3	570	68.6	9.6
Willow Operator-BZ	33	1.8	34	160.3	41.4
	211	3.7	212	14.0	1.2
Person.			58	15.2	5.4
			202	44.7	17.5
			214	72.6	17.4
Stock Opening-Person.			201	3.5	1.0
General Air - Seq.	18	0.4	19	5.0	1.2
	20	0.8	21	5.6	1.8
	22	1.2	23	10.1	3.4
	24	1.3	25	4.0	2.1
	26	0.9	27	7.0	1.4
			29	4.0	0.8
Seq.	40	1.3	41	15.0	2.9
	42	1.3	43	23.8	4.2
	44	4.4	45	17.9	2.8
	46	0.7	47	3.8	2.8
	48	1.5	49	10.1	1.0
	50I	1.0			

Notes on Abbreviations:
"Person." refers to personal samples on membrane filters
"BZ" refers to breathing zone samples by companion impinger & membrane filter
"Seq." refers to unattended samples taken by a sequential sampler

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Charlotte Works, H.K. Porter Co.

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample #	Total	10 μ +
Fiber Preparation (cont.)					
General Air-Seq. (cont.)			221	5.9	0.7
	227	0.4	222	2.6	0.4
	228	0.4	223	8.0	0.7
	229	0.7	224	1.6	0.9
	230	0.7	225	10.5	2.8
	231	0.6	226	12.6	2.8
Seq.	553	0.8	559	8.0	2.4
	554	0.6	560	6.3	2.8
	555	0.4	561	15.9	3.9
	556	1.3	562	4.8	1.3
	557	1.6	563	6.5	1.4
	558	0.9	564	3.5	1.8
	401	0.2	403	7.1	1.0
	405	0.5	407	6.9	1.4
	409	1.3	411	5.5	1.1
	413	0.7	415	14.9	4.5
Carding					
Fixer - BZ	10	1.6	9	16.1	6.0
	529	1.9	530	22.1	3.7
	548	1.3	549	18.5	2.5
	730	0.9	729	22.1	3.7
Person.			822	13.4	3.1
			823	11.7	3.2
			828	11.3	3.7
			829	12.4	3.6
Grinder - BZ	527	3.1	528	19.2	4.4

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Charlotte Works, H.K. Porter Co.

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample #	Total	10 μ +
Carding (continued)					
Card Operator-BZ	12	1.1	11	39.7	16.3
	51	0.8	52	8.5	2.1
	238	1.2	239	3.9	0.4
	521	2.2	522	36.6	7.1
	525	1.6	526	23.3	8.1
	545	2.1	546	34.7	4.4
	550	3.1	551	39.1	8.1
	425	1.0	424	19.1	2.9
Person.			103	19.9	4.7
			107	16.8	3.6
			108	12.2	4.7
			502	15.6	2.9
			503	36.8	7.4
			504	24.9	8.9
			505	28.9	10.2
			531	21.9	7.3
			532	14.9	2.9
			547	16.2	3.6
G.A.	3	1.2	1	38.3	8.8
Rover Hauler-BZ	524	1.8	523	16.8	4.3
	591	0.8	592	3.8	2.6
Person.			218	12.9	4.2
Lap Card Operator-BZ	423	1.5	422	7.3	1.5
Person.			205	16.1	4.8
General Air	4	2.6	5	24.0	8.0
	7	0.9	6	16.1	1.8
	17	1.5	14	43.5	25.8
	106	2.5	104	49.3	18.1
	109	0.8	111	11.8	4.9
	116	2.2	114	32.8	5.9
	119	1.5	117	33.7	5.4
Seq.	509	0.4	515	3.5	1.4
	510	0.3	516	7.8	1.0
	511	0.8	517	14.4	5.6
	512	0.6	518	15.1	1.4
	513	1.2	519	8.4	3.2

Charlotte Works, H. K. Porter Co.

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample #	Total	10 μ +
Carding (continued)					
General Air (cont.)	514	1.0	520	14.4	3.5
Seq.	533	1.0	537	12.6	3.5
	534	0.8	538	12.6	4.4
	535	0.2	539	17.0	3.2
	536	0.5	540	17.0	2.4
	541	1.8	543	36.0	9.8
	417	1.0	419	9.7	4.2
Amosite Carding					
Breathing Zone	392	0.5			
	393	0.3			
General Air	386	0.5	384	12.5	3.5
	389	0.3			
	391	0.6	390	16.5	9.2
Spinning					
Fixer - Person.			820	6.3	2.9
			826	2.2	1.7
Spinner Ring-BZ	69	0.3	68	3.4	0.9
	71	1.2	70	7.0	1.9
	74	0.5	73	4.3	2.0
	82	0.0	81	8.1	2.6
	84	1.1	83	5.4	1.5
	88	1.2	87	6.4	2.2
	314	0.8	315	20.5	8.8
	316	2.4	317	3.7	1.5
	372	0.3	373	5.2	3.4
	374	0.3	375	8.3	4.7
	380	2.2	381	2.8	0.6
	382	0.8	383	3.6	3.7
	585	0.4	586	3.8	
	595	1.0	596	2.1	1.5
	625	3.8	626	2.8	1.5

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Charlotte Works, H. K. Porter Co.

Operation		Impinger		Membrane Filter		
					Fibers/cc	
		Sample #	mppcf	Sample #	Total	10 μ +
Spinning (continued)						
Spinner Ring-BZ (cont.)		630	1.7	631	13.4	1.5
		638	2.3	637	12.6	5.2
		639	0.3	640	2.8	1.1
	Person.			150	8.8	2.5
				151	4.1	1.1
				153	10.4	2.4
				308	4.5	2.3
				309	4.5	2.5
				310	1.8	0.2
				311	2.9	1.0
				312	3.4	1.6
				313	5.4	2.2
				318	3.6	0.9
				319	7.9	4.4
				320	7.0	2.2
				321	4.7	2.2
				322	4.0	1.0
				323	6.5	1.9
				332	8.4	4.3
				333	7.0	3.4
				340	7.9	2.0
				341	6.4	3.8
				376	1.3	0.6
				377	1.4	0.8
				378	3.7	2.3
				379	0.3	0.2
				604	4.5	1.7
Doffer - BZ		593	1.6	594	3.5	2.4
	Person.			813	9.2	4.3
General Air		61	0.7	59	9.9	5.2
		66	0.0	64	2.3	0.9
		328	0.3			
		336	0.2	334	3.8	0.9
		370	0.8	368	7.9	2.1
	Seq.	57	0.9	304	8.4	5.3
		301	1.0	305	4.5	1.6
		302	0.9	306	13.3	8.1
				307	1.6	0.8

Charlotte Works, H. K. Porter Co.

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample #	Total	10 μ +
Spinning (continued)					
General Air (cont.)					
Seq.	358	0.5	352	3.8	1.6
	359	0.4	353	2.8	0.8
	360	0.4	354	4.5	1.6
	361	0.8	355	2.5	0.5
	362	0.4	356	2.1	1.0
	363	0.2	357	0.5	0.4
Twisting					
Fixer - Person.			821	3.6	0.8
			827	3.8	0.9
Twister - BZ	76	10.0	75	12.2	7.4
	80	3.8	79	4.2	2.2
	86	3.1	85	3.4	1.1
			90	5.0	1.3
			92	32.8	9.2
	330	2.4			
	331	9.4			
	338	3.3	339	9.1	1.8
	348	3.0	349	6.6	7.8
	350	4.2	351	1.4	0.4
	597	2.4	598	4.4	2.9
	599	4.2	600		
	601	1.4			
	606	5.5	607	14.6	10.3
	608	0.7	609	1.2	0.7
	623	3.5	624	10.7	2.0
	628	6.2	629	17.6	5.2
	632	1.7	633	12.8	4.6
	635	1.0	636	7.2	5.4
	653	3.9	654	4.4	1.6
	728	10.0	727	19.5	7.9
			737	30.0	13.6
	739	2.1	738	16.8	9.7

HK 001011

Charlotte Works, H. K. Porter Co.

Operation		Impinger		Membrane Filter		
					Fibers/cc	
		Sample #	mppcf	Sample #	Total	10 μ +
Twisting (continued)						
Twister	Person.			152	4.9	1.7
				154	15.0	6.9
				342	1.0	0.6
				343	5.9	1.8
				365	4.6	2.5
				603	2.5	0.8
				622	5.6	3.5
				627	8.6	2.9
				634	6.3	3.7
	Gen. Air	824	2.0			
General Air		346	2.3	344	5.0	1.8
	Seq.	573	0.4	579	7.3	—
		574	0.6	580	13.0	—
		575	0.8	581		
		576	0.5	582	7.0	2.8
		577	0.5	583	3.6	2.3
		578	0.7	584	5.0	3.5
	Seq.	616	0.4	610	1.2	0.5
		617	0.4	611	3.8	1.2
		618	0.4	612	6.4	2.3
		619	0.8	613	4.5	1.4
		620	0.5	614	0.8	0.4
		621	0.6	615	0.1	0.0

HK 001012

Charlotte Works, H. K. Porter Co.

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample #	Total	10 μ +
Twisting (continued)					
General Air (cont.)					
Seq.	641	0.3	647	10.5	6.0
	642	0.5	648	10.5	4.2
	643	0.9	649	3.8	2.1
	644	0.6	650	8.0	4.6
	645	0.7	651	5.2	2.8
	646	0.7	652	4.2	2.1
Winding					
Winder - BZ	78	1.2	77	5.7	2.9
	589	1.7	590	7.9	1.0
	716	0.2	717	2.1	0.6
	721	0.8	722	2.8	1.1
Person.			364	6.0	3.7
			366	4.5	1.3
			367	6.6	0.8
Weaver					
Weaver Cloth-BZ			94	6.2	2.9
	97	0.2	96	1.5	0.7
	98	0.5	99	6.7	1.4
	100	0.7	101	11.8	5.0
	241	0.4	242	3.2	0.7
	244	0.6	243	12.2	5.6
	253	0.6	252	12.4	5.6
	257	0.3	2[illegible]	6.2	1.5
	399	0.3	398	42.7	1[illegible].2
	658	0.4	659	7.8	4.0
	705	0.3	704	2.7	1.3
	707	0.3	706	5.1	2.5
	709	0.6	708	4.2	3.1
	712	1.0			
	801	0.4	802	3.7	1.0

HK001013

Charlotte Works, H. K. Porter Co.

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample	Total	10 μ +
Weaving (continued)					
Weaver Cloth (cont.)					
Person.			240	2.5	0.9
			247	1.4	2.5
			251	10.3	4.9
			397	8.0	3.4
Weaver Tape-BZ	169	0.9	168	15.8	6.4
	171	0.4	170	6.9	1.5
	173	0.3	172	2.5	0.6
	175	0.4	174	1.1	0.6
	388	0.2			
	656	2.8	657	33.2	11.1
	663	0.5	664	3.6	1.1
	715	0.9	714	15.1	4.9
Person.			155	9.5	0.3
			156	7.7	1.5
			157	3.4	0.5
			160	2.7	1.7
			161	4.1	0.6
			162	1.8	0.8
			164	2.7	0.9
			166	2.2	1.1
			396	5.2	1.5
Fixer - Person.			812	15.4	4.5
			819	4.4	0.8
			825	5.8	3.2
Creeler - BZ	661	0.2	662	1.3	0.2
Person.			159	2.5	0.7
			163	2.2	0.2
			39.	9.3	2.7
Warper & Beam-BZ	659I	0.3	660	0.6	0.1[illegible]
	719	1.5	718	12.9	5.6
Person.			394	9.5	4.8
Winder-C & Q --BZ	254	0.3	255	4.1	1.6
	711	0.7	710	6.5	2.5
Person.			165	4.1	1.2
			245	6.4	4.8

HK 001014

Charlotte Works, H. K. Porter Co.

Operation	Impinger		Membrane Filter		
				Fibers/cc	
	Sample #	mppcf	Sample #	Total	10 μ +
Weaving (continued)					
Yarn Hauler--Person.	167		167	4.4	1.3
			814	10.7	3.2
Rope, Wick, Braid & Cord					
Slubber Operator-BZ	220	0.9	219	9.1	2.3
Person.			217	14.6	3.5
Former Rope & Wick-BZ	37	0.7	36	8.7	1.2
	571	0.6	572	14.6	6.9
Person.			210	8.7	2.3
			421A	4.1	2.3
Winder, Rope, Cord Wick - BZ	421	1.5	39	172.5	25.2
	427	1.1	426	13.0	6.5
Person.			213	9.1	3.1
Finishing					
Inspector - Person.			803	1.2	0.5
			804	0.3	0.1
			805	1.8	0.8
			806	3.1	0.9
			807	1.2	0.8
Gen. ir	808	0.1	809	0.7	0.0
	817	0.1	818	1.2	0.2
Treatment & Finishing-BZ	810	0.1	811	28.7	9.4
Person.			816	0.6	0.5
Gen. Air	726	0.2	725	2.1	0.7
Calender-Gen. Air	724	0.2	723	3.0	1.3
Miscellaneous					
Gen. Maintenance-BZ	207	4.3	209	9.8	2.6
Janitor - BZ	703	1.8	702	11.5	3.9
Person.			103	19.9	4.7
Ventilation	732	0.6	731	1.0	0.7
	734	0.0	733	2.5	0.0

HK 001015