F-6 OSHA

PLAINTIFF'S EXHIBIT

DOW-635

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THE DOW CHEMICAL COMPANY

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TITLE

SUMMARY OF PERSONAL AND AREA MONITORING FOR AIRBORNE ASBESTOS FIBERS IN DOW CHEMICAL U.S.A.

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DESCRIPTIVE SUMMARY WITH CONCLUSIONS

The current OSHA asbestos regulations 29CFR1926.58(f)(2) and 29CFR1910.1001(d)(2) state that objective data may be used to demonstrate that potential employee exposures to airborne asbestos fibers during asbestos-related activities are at or below the current action level of 0.1 fibers/cc as an 8-hour time-weighted average (TWA) (or below the more recent short-term exposure limit of 1 fiber/cc averaged over a 30-minute period). This may be done in lieu of actual monitoring. In order to assist industrial hygienists in making decisions about the need for monitoring employee exposures for certain tasks involving asbestos-containing materials, a summary of both personal and area monitoring data has been compiled from all available U.S. Area reports for the period from 1974 to 1987. These data have been separated into four broad areas of activity: asbestos removal from or maintenance of pipelines; removal of Transite boards or shingles; installation, maintenance, or removal of asbestos-containing gaskets; activities in chlor-alkali plants.

These data may be of assistance in determining the monitoring needs for future tasks involved with asbestos-containing materials. Judgement must be exercised in determining whether the tasks described in the summary are comparable to those anticipated in your location.

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SUMMARY OF PERSONAL AND AREA MONITORING FOR AIRBORNE ASBESTOS FIBERS IN DOW CHEMICAL U.S.A.

In order to determine whether or not monitoring will be required for future tasks associated with possible exposure to airborne asbestos fibers, personal and area monitoring data have been compiled and summarized from all available Dow Chemical U.S.A. industrial hygiene reports, as of June 1988. These data have been separated into four broad areas of activity: asbestos removal from or maintenance of pipelines; removal of Transite boards or shingles; installation, maintenance, or removal of asbestos-containing gaskets; activities in chlor-alkali plants.

For each task monitored and reported, approved procedures and guidelines for asbestos handling and removal were followed during the time of monitoring, including the wearing of appropriate respiratory protection. Consequently, the personal monitoring data represent potential exposures.

The data have been summarized in Table 1, which indicates the range and mean values both for the actual concentrations reported and for the 8-hour time-weighted average concentrations calculated in the various reports. In addition, the fractions of personal monitoring data which represent potential (if respiratory protection had not been used) overexposures, using both the OSHA PEL and the new OSHA short-term exposure limit, are given.

The individual monitoring results are divided into tables, with each table representing a group of related tasks. Each table indicates whether the samples was a personal or area sample, the duration of monitoring (in minutes), asbestos concentration in the fibers/cc, the 8-hour time-weighted average fiber concentration, any comments related to the sample, and the file number of the report from which the data were obtained. The 8-hour time-weighted average (TWA) is only indicated in those cases where it was given in the report. If more than one sample was used to calculate the TWA, it is given next to the last sample in the series. For example, in Table 2, the fifth through ninth samples (P1-P5) were all taken on the same person. The TWA was calculated to be <0.01 and is indicated in P5 row. The comments columns of the tables indicate whether the sample was taken inside or outside of a building and also what specific task was being performed, as indicated in the report.

COMMENTS RELATED TO SPECIFIC TABLES

Asbestos Removed from Pipelines

Table 2 summarizes the personal and area asbestos monitoring of personnel involved in asbestos removal from pipelines. If an H is indicated in the comments column, the report indicated the employee was a helper assisting the personnel

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involved in the removal process. The helpers' activities included transporting the bagged asbestos and cleanup. The G in the comments column means glove bags were specifically mentioned in the report as being used. No mention of glove bags does not necessarily mean that they were not used.

Asbestos Exposures Associated with Transite Removal

Table 3 is a summary of air monitoring during the removal of Transite boards or shingles.

Asbestos Gasket Maintenance

Table 4 is a summary of monitoring during activities related to Garlock gaskets. Cutting operations include cutting the gaskets with either a chisel blade, Bosch Unishears, or a Roller Cutter. If local exhaust ventilation, surfactant, or glove bags were used and specifically mentioned in the report, this has been indicated. If not indicated in the data, it does not necessarily mean they were not used.

Asbestos Associated with Chlor-Alkali Operations

Table 5 includes activities related to Chlor-Alkali plants. The first ten samples from report LAD-CS-86.01 were taken during the cleaning of copper on cathodes by brushing with a wire brush. Based on these results, the procedure was changed to wiping with a wet cloth. The remaining results from this report reflect this change. Some of the reports in this area were very specific in indicating the activities each person was involved in. Because of the large variety of tasks monitored, the tasks were grouped together if they were commonly performed by the same person. For example, personnel indicated as L2 commonly performed debagging, mixing pulp, and loading/unloading of the oven. The groups do not mean that personnel performed all of those duties but were involved in one or more of the listed activities.

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with assistance from
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TABLE 1

Summary of 'ersonal Monitoring (in Dow Chemical USA) for Asbestos	Range of Concentrations Reported (f/cm3)	Mean of Concentrations Reported* (f/cm3)	Percent of Measurements with Short-Term Concentrations ≥ 1 f/cm^3 for ~30 minute sample	Range of 8-Hour TWA's Reported⊛ (f/cm3)	Mean of 8-Hour TWA's Reported* (f/cm3)	Percent of 8-Hour TWA's ≥0.1 f/cm3
I) Asbestos removal from steam lines and other pipelines: maintenance or prior to demolition	0.0009 - 1.31	0.180 n = 127	0.8	0.0007 - 0.43	0.11 n = 65	48
II) Removal of transite boards or shingles	0.007 - 0.07	0.03 n = 14	0	0.003 - 0.044	0.02 n = 8	0
III) Installation, maintenance, or removal of asbestos-containing gaskets	<0.01 - 2.00	0.17 n = 55	1.8	< 0.01 - 0.22	0.03 n = 32	3
IV) Various activities in Chlor-Alkali Plants	<0.002 - 3.08	0.056✱ n = 188	No short-term monitoring done	< 0.002 - 2.8	Not calculated--a large majority of samples collected were for >7 hours	5.9 ✩

⊛ Only 8-hour TWA's given in the reports are indicated.
*Values below the LOD were assumed to be at the LOD for the calculation of means.
✱With two anomalously high values not included, this mean becomes 0.028.
✩ For handbrushing copper or cathode to remove asbestos, cleaning out washer sump 3 out of 7 samples had concentrations in excess of 0.1 f/cc.
For debagging, mixing pulp, hooking up cathodes, loading and unloading oven, loading and unloading asbestos, removing cathodes, 6 out of 23 samples had concentrations in excess of 0.1 f/cc.
For washing cathodes, drawing cathodes, 1 out of 16 samples had concentrations in excess of 0.1 f/cc.
For the pulping operation, 1 out of 38 samples had a concentration in excess of 0.1 f/cc.

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TABLE 2

Summary of personal and area asbestos monitoring during asbestos removal from steam lines and other pipelines for maintenance activities or prior to demolition

Sample*	Time (min)	Fibers/cc	8 hr TWA+	Comments**	File # (Source)
P	30	1.31	0.08	I	HEH2.1-1-77(8)(MI)
P	30	0.15	0.009	I	"
P	20	0.06	<0.003	I	"
P	20	<0.06	<0.003	I	"
P1	5	0.33		I	"
P2	15	0.1		I	"
P3	15	<0.08		I	"
P4	10	<0.03		I	"
P5	15	<0.08	<0.01	I	"
P1	5	<0.25		I	"
P2	15	<0.08		I	"
P3	15	<0.08		I	"
P4	10	0.2		I	"
P5	15	<0.08	<0.01	I	"
P1	10	<0.13		I	"
P2	10	0.13	<0.005	I	"
P1	10	0.22		I	"
P2	10	0.16	0.008	I	"
P	630		0.096	I	A5-2695(TX)
P	630		0.057	I	"
P	630		0.031	I	"
P	630		0.135	I	"
P	630		0.079	I	"
P	180	0.21	0.08	I	LPAS-3128(TX)
P	180	0.37	0.14	H,I	"
P	125	0.77	0.2	I	"
P	125	0.61	0.16	H,I	"
A	434	<0.01		I	"
A	185	0.02		I	"
P	67	0.03	<0.01	O	LPAS-3129(TX)
P	66	0.01	<0.01	H,O	"
P	370	0.03	0.02	I	LPFP-3131(TX)
P	370	0.01	0.01	H,I	"
P	185	0.05	0.02	I	"
P	185	0.02	0.01	H,I	"
A	155	0.08		I	"
A	295	<0.01		I	"
P	270	<0.01	<0.01		LPAS-3133(TX)
P	270	<0.01	<0.01	H	"
P	315	0.01	0.01		"
P	315	0.01	0.01	H	"

* P=PERSONAL (IF FOLLOWED BY A NUMBER, IE P1-5, THE SERIES OF SEQUENTIALLY NUMBERED SAMPLES WAS TAKEN FOR THE SAME PERSON); A=AREA
**G=GLOVE BAGS; H=HELPER; I=INSIDE; O=OUTSIDE
@ OVERLOADED WITH FIBERS AND DEBRIS
+ THE TWA IS INCLUDED ONLY IF IT WAS GIVEN IN THE REPORT

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Table 2. (Continued)

Sample*	Time (min)	Fibers/cc	8 hr TWA+	Comments**	File # (Source)
P	302	0.01	0.01	H	"
P	302	0.05	0.01	H	"
A	362	<0.01			"
A	411	<0.01			"
P	125	0.79	0.21	I	LPM-3132(TX)
P	125	0.12	0.03	H,I	"
P	135	0.08		I	B10-2795(TX)
P	137	0.19		I	"
P	129	0.07		H,I	"
P	132	0.1		H,I	"
P	255	0.03		O	B54-3014(TX)
P	195	0.14		O	"
P	255	<0.001		H,O	"
P	195	0.01		H,O	"
P1	202	<0.01		O	B54-2935(TX)
P2	210	0.21	0.11	O	"
P1	202	0.39		O	"
P2	211	0.27	0.33	O	"
P	216	0.09		O	"
P1	202	0.18		O	"
P2	213	0.07	0.12	O	"
A	205	<0.01		O	"
P	74	0.21		I	B12-3016(TX)
P	70	0.35		I	"
P	178	0.11		O	B17-2998(TX)
P	190	0.12		O	"
P	181	0.13		O	"
P	183	0.09		O	"
P1	187	0.02		H,O	"
P2	179	0.02	0.02	H,O	"
P	357	0.06		O	HEH35.12-44793-9(21)(MI)
P	416	@		O	"
P	450	0.03		I	"
P	430	0.006		O	"
P	438	0.04		O	"
P	438	0.09		O	"
P	420	@			"
P	420	@			"
A	484	<0.003			"
A	462	0.007			"
A	454	0.007			"
P1	190	0.08		I	B25-3024(TX)
P2	180	0.02	0.04	I	"
P1	190	0.13		I	"
P2	175	0.07	0.08	I	"
P1	231	0.1		I	"
P2	220	0.07	0.08	I	"

* P=PERSONAL (IF FOLLOWED BY A NUMBER, IE P1-5, THE SERIES OF SEQUENTIALLY NUMBERED SAMPLES WAS TAKEN FOR THE SAME PERSON): A=AREA
**G=GLOVE BAGS; H=HELPER; I=INSIDE; O=OUTSIDE
@ OVERLOADED WITH FIBERS AND DEBRIS
+ THE TWA IS INCLUDED ONLY IF IT WAS GIVEN IN THE REPORT

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Table 2 (Cont.)

Sample*	Time (min)	Fibers/cc	8 hr TWA+	Comments**	File # (Source)
P1	230	0.26		I	"
P2	217	0.24	0.23	I	"
A	200	0.01		I	"
A	180	<0.003		I	"
A	228	0.02		I	"
A	220	0.18		I	"
P	210	@		I	B24-3117(TX)
P	210	0.78	0.34	I	"
P	210	0.28	0.12	I	"
P1	210	0.12		I	"
P2	210	0.33	0.2	I	"
P1	210	0.35		I	"
P2	210	0.25	0.26	I	"
P1	210	0.3		I	"
P2	210	0.13	0.19	I	"
P1	210	0.17		I	"
P2	210	0.32	0.21	I	"
P1	317	0.38		I	B1-2990(TX)
P2	205	0.14	0.31	I	"
P1	270	0.56		I	"
P2	206	0.23	0.41	I	"
P1	273	0.2		I	"
P2	208	0.2	0.2	I	"
P1	180	0.07		O	A18-2943(TX)
P2	236	0.01	0.03	O	"
P1	180	0.05		O	"
P2	260	0.06	0.05	O	"
A	166	<0.003		O	"
A	250	<0.002		O	"
A	162	<0.003		O	"
A	244	<0.002		O	"
P1	187	@		I	B24-3058(TX)
P2	260	@		I	"
P1	185	0.22		I	"
P2	260	0.05		I	"
P1	189	@		I	"
P2	260	@		I	"
P	465	0.19		O	B1-2954(TX)
A	470	0.04		O	"
P1	215	0.0008		O	A26-3070(TX)
P2	163	0.003	0.001	O	"
P1	210	0.0009		O	"
P2	156	0.001	0.0007	O	"
P					
P	17				

* P=PERSONAL (IF FOLLOWED BY A NUMBER, IE P1-5, THE SERIES OF SEQUENTIALLY NUMBERED SAMPLES WAS TAKEN FOR THE SAME PERSON); A=AREA

**G=GLOVE BAGS; H=HELPER; I=INSIDE; O=OUTSIDE

@ OVERLOADED WITH FIBERS AND DEBRIS

+ THE TWA IS INCLUDED ONLY IF IT WAS GIVEN IN THE REPORT

**G=GLOVE BAGS; H=HELPER; I=INSIDE; O=OUTSIDE

@ OVERLOADED WITH FIBERS AND DEBRIS

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Table 2. (Cont.)

Sample*	Time (min)	Fibers/cc	8 hr TWA+	Comments**	File # (Source)
A	414	0.0009		O	"
A	415	0.0009		O	"
A	414	0.0009		O	"
A	240	0.054		I,G	A32-3069(TX)
A	150	0.018		I,G	"
P1	258	0.076		I	"
P2	115	0.43	0.14	I	"
P	200	0.33	0.33	I	"
A	253	0.028		I	"
A	196	0.027		I	"
A	255	0.014		I	"
A	201	0.009		I	"
P1	103	0.02		O	"
P2	200	0.237	0.1	O	"
P1	105	0.082		O	"
P2	200	0.531	0.24	O	"
P1	107	0.029		O	"
P2	200	0.13	0.06	O	"
A	173	0.001		O	"
A	230	0.007		O	"
A	173	0.001		O	"
A	230	0.01		O	"
P	184	0.57	0.22	I,G	B25-3057(TX)
P	184	0.3	0.12	I,G	"
A	217	0.04		I,G	"
P	418	0.19	0.16	I	"
P	418	0.49	0.43	I	"
A	479	<0.01		I	"
A	486	<0.01		I	"
A	465	<0.01		I	"
A	481	0.03		I	"
P	115	0.04	0.01	O,G	A5-2849P(TX)
P	135	0.52	0.15	O,G	"
P	135	0.46	0.13	O,G	"
P	458	0.19	0.18	I,G	A26-2890A(TX)
P	454	0.12	0.11	I,G	"
A	442	0.04		I,G	"
A	442	0.05		I,G	"
P	370	0.4	0.3	I	"
P	366	0.22	0.17	I	"
A	380	0.1		I	"
A	376	0.16		I	"
P	53	1.26		I	B39-3053(TX)
P	221	0.02	0.01	O	LPM-3130(TX)
P	221	0.01	0.01	H,O	"

* P=PERSONAL (IF FOLLOWED BY A NUMBER, IE P1-5, THE SERIES OF SEQUENTIALLY NUMBERED SAMPLES WAS TAKEN FOR THE SAME PERSON); A=AREA
**G=GLOVE BAGS; H=HELPER; I=INSIDE; O=OUTSIDE
@ OVERLOADED WITH FIBERS AND DEBRIS
+ THE TWA IS INCLUDED ONLY IF IT WAS GIVEN IN THE REPORT

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TABLE 3

Summary of personal and area asbestos monitoring during removal of Transite boards or shingles

Sample*	Time (min)	Fibers/cc	8 hr TWA+	Comments**	File # (Source)
A	460	0.0028		I	A6-3311 (TX)
A	457	0.013		I	"
A	453	0.004		I	"
A	462	0.005		I	"
A	473	0.0008		I	"
A	470	<0.0002		I	"
A	470	<0.12		I	"
A	470	0.008		I	"
P	230	0.04	0.02	O	A7-3048 (TX)
P	270	0.07	0.04	O	"
P	230	0.007	0.003	O	"
P	270	0.02	0.01	O	"
A	230	0.002		O	"
A	270	0.02		O	"
P	400	0.02	0.017	O	B35-2878-P (TX)
P	300	0.07	0.044	O	"
P	300	0.07	0.044	O	"
P	300	0.03	0.019	O	"
P	94	0.01		O	HEH2.1-1-234(2) (MI)
P	62	<0.03		O	"
P1	90	<0.01		O	"
P2	62	<0.02		O	"
P1	88	<0.01		O	"
P2	63	<0.02		O	"

*P=PERSONAL SAMPLE (IF FOLLOWED BY A NUMBER, IE P1-2, THE SERIES OF SEQUENTIALLY NUMBERED SAMPLES WERE TAKEN ON THE SAME PERSON); A= AREA SAMPLE
**I=INSIDE, O=OUTSIDE
+ THE TWA IS INCLUDED ONLY IF IT WAS GIVEN IN THE REPORT

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TABLE 4

Summary of personal and area asbestos monitoring during the removal, maintenance, or installation of asbestos containing gaskets

Sample*	Time (min)	Fibers/cc	8 hr TWA+	Comments**	File #(SOURCE)
A	485.00	0.01	0.01	S,I	B16-3087A(TX)
A	470.00	0.01	0.01	S,I	"
A	117.00	0.01	0.00	R,N,I	"
A	517.00	0.02	0.02	R,N,I	"
A	514.00	0.01	0.01	R,N,I	"
P	152.00	0.12		R,I	B1-3123P(TX)
P	182.00	0.07		R,I	"
P	192.00	0.15		R,I	"
P1	10.00	0.05		T,I	A24-3066(TX)
P2	204.00	0.05	0.02	R,I	"
P1	10.00	<0.02		T,I	"
P2	204.00	0.04	0.02	R,I	"
P1	10.00	0.13		R,I	"
P2	8.00	0.19	<0.01	R,I	"
P	7.00	0.17	<0.01	R,I	"
P1	17.00	0.08		T,I	"
P2	31.00	0.60	0.04	R,I	"
P1	17.00	0.13		T,I	"
P2	29.00	0.15	0.01	R,I	"
P1	16.00	0.10		T,I	"
P2	31.00	<0.01	<0.01	R,I	"
P1	16.00	0.10		T,I	"
P2	30.00	0.05	<0.01	R,I	"
P	137.00	0.04	0.01	N,I	"
P	136.00	0.03	0.01	N,I	"
P	286.00	0.06	0.04	N,I	"
P	289.00	0.11	0.07	N,I	"
P1	44.00	0.65		C,X,I	"
P2	40.00	0.30		C,X,I	"
P3	40.00	0.20		C,X,I	"
P4	134.00	0.23	0.06	C,X,I	"
P	54.00	2.00	0.22	R,X,H,I	"
P	60.00	0.65	0.08	R,X,F,I	"
P1	40.00	0.11		C,V,I	"
P2	30.00	0.07		C,V,I	"
P3	32.00	0.09	0.02	C,V,I	"
P1	40.00	0.21		C,V,I	"

*P=PERSONAL SAMPLE (IF FOLLOWED BY A NUMBER, IE P1-5, THE SERIES OF SEQUENTIALLY NUMBERED SAMPLES WAS TAKEN FOR THE SAME PERSON); A= AREA SAMPLE

** C=CUTTING OPERATION; F=SURFACTANT USED; G=GLOVE BAGS USED; H=NO SURFACTANT; I=INSIDE; N=GASKET INSTALLATION; O=OUTSIDE; R=REMOVAL; S=GASKET STORAGE AREA; T=GASKET TRANSPORT; V=LOCAL EXHAUST VENTILATION; X=NO LOCAL EXHAUST VENTILATION

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Table 4 (Cont.)

Sample*	Time (min)	Fibers/cc	8 hr TWA+	Comments**	File #(SOURCE)
P2	30.00	0.03		C,V,I	"
P3	32.00	0.13	0.03	C,V,I	"
A	416.00	<0.01		S,I	"
A	429.00	<0.01		S,I	"
A	437.00	<0.01		S,I	"
A	135.00	<0.01		I	
A	102.00	0.07		I	
P1	66.00	0.04		R,N,I	B25-3076(TX)
P2	25.00	0.02		R,N,I	"
P3	14.00	0.03	0.007	R,N,I	"
A	37.00	0.06		I	"
P1	160.00	0.01		R,F,I	A12-3119(TX)
P2	40.00	0.01	<0.01	R,F,I	"
P1	60.00	0.05		R,I	"
P2	30.00	0.37		R,I	"
P3	20.00	0.19	0.04	R,I	"
P	92.00	0.11		R,I	"
P	30.00	0.06	<0.01	R,I	"
P	15.00	<0.01	<0.01	R,I	"
P	30.00	0.09	<0.01	R,I	"
P	15.00	0.08	<0.01	C,I	"
P	8.00	<0.01	<0.01	R,I	"
P	80.00	<0.01	<0.01	R,F,I	B1-3121(TX)
P	27.00	0.02	<0.01	R,G,I	"
P	60.00	0.73	0.09	C,G,I	"
P	30.00	0.05	<0.01	R,G,I	"
P	31.00	0.06	<0.01	R,I	"
P	11.00	<0.01	<0.01	R,I	"
P	50.00	<0.01	<0.01	C,G,I	"
A	472.00	0.05		C,I	HEH2.1-1-76(1)(MI)
A	475.00	0.035		C,I	"
A	455.00	0.04		C,I	"
A	458.00	0.011		C,I	"
A	480.00	0.015		S,I	B4-3157(TX)
A	180.00	0.011		S,I	"
A	480.00	0.005		S,I	"
A	445.00	0.01		S,I	B44-3072(TX)

*P=PERSONAL SAMPLE (IF FOLLOWED BY A NUMBER, IE P1-5, THE SERIES OF SEQUENTIALLY NUMBERED SAMPLES WAS TAKEN FOR THE SAME PERSON); A= AREA SAMPLE

** C=CUTTING OPERATION; F=SURFACTANT USED; G=GLOVE BAGS USED; H=NO SURFACTANT; I=INSIDE; N=GASKET INSTALLATION; O=OUTSIDE; R=REMOVAL; S=GASKET STORAGE AREA; T=GASKET TRANSPORT; V=LOCAL EXHAUST VENTILATION; X=NO LOCAL EXHAUST VENTILATION

+ THE TWA IS INCLUDED ONLY IF IT WAS GIVEN IN THE REPORT

ST0070716

377683

TABLE 5

Summary of personal and area asbestos monitoring during Chlor-Alkali plant activities

Sample*	Time (min)	Fibers/cc	Comments**	File #(Source)
A	419	<0.002	C,O	HEH2.1-39-1(2)(CA)
A	423	<0.002	C,O	"
A	423	<0.002	C,O	"
A	441	0.004	C,O	"
A	439	0.005	C,O	"
A	379	<0.003	C,O	"
A	373	0.005	C,O	"
A	372	<0.002	C,O	"
A	373	<0.002	C,O	"
A	394	<0.002	S1	"
A	393	<0.002	S1	"
A	365	0.007	S1	"
A	305	<0.002	S1	"
A	414	<0.002	S1	"
A	336	<0.002	S1	"
A	350	<0.002	S1	"
A	351	<0.002	S1	"
P	435	<0.003	C,O	"
P	432	<0.003	C,O	"
P	428	<0.003	C,O	"
P	447	0.006	C,O	"
P	443	0.015	C,O	"
P	439	0.029	C,O	"
P	424	0.006	T,O	"
P	426	0.007	T,O	"
P	434	0.007	T,O	"
P	425	0.003	T,O	"
P	433	<0.003	T,O	"
P	437	0.022	T,O	"
A	409	<0.002	S2,O	"
A	409	<0.002	S2,O	"
P	106	0.003	P	"
P	294	0.039	P	"
P	435	3.08	L1,I	LAD-CS-86.01(LA)
P	490	0.19	L2,I	"
P	480	0.01	L1,I	"

* P=PERSONAL SAMPLE, A=AREA SAMPLE
** B=STITCHING UP BAGS TO ENCLOSE A PAIR OF CATHODES; C=CELL SEALING OPERATION; I=INSIDE; L1=HAND BRUSHING COPPER ON CATHODE TO REMOVE ASBESTOS, CLEANING OUT WASHER SUMP; L2=DEBAGGING, MIXING PULP, HOOKING UP CATHODES, LOADING AND UNLOADING OVEN, LOADING AND UNLOADING ASBESTOS, REMOVING CATHODES; L3=WASHING CATHODES, DRAWING CATHODES; L4=BANDING ANODES, DROPPING DIAPHRAGMS IN CELLS AND BUCKLING DOWN, DROPPING IN CATHODES/ANODES; L5=TURNAROUND TRAILER SKIN GROUNDING, STOCK ROOM, INSPECTION, SUPERVISOR; P=PULPING OPERATION; S1=UNSEALED CELL BODY STORAGE AREA; S2=CATHODE STORAGE AREA; S3=ASBESTOS STORAGE ROOM; T=TRANSPORT OF CELL BODIES OR CELL COMPONENTS

S100/0111

377684

Table 5 (Cont.)

Sample*	Time (min)	Fibers/cc	Comments**	File #(Source)
P	480	0.35	L2,I	"
P	490	0.22	L1,I	"
P	442	0.04	L3,I	"
P	465	0.15	L3,I	"
P	390	0.1	L1,I	"
P	470	0.03	L2,I	"
P	435	0.05	L1,I	"
A	445	<0.01	I	"
A	460	<0.01	I	"
P	450	<0.01	L3,I	"
P	460	0.03	L2,I	"
P	475	0.01	L2,I	"
P	460	<0.01	L3,I	"
A	490	<0.01	I	"
A	420	<0.01	I	"
P	390	0.02	L3,I	"
P	390	<0.01	L1,I	"
P	460	0.01	L2,I	"
A	460	0.01	I	"
P	470	0.01	L4,I	"
A	430	<0.01	I	"
P	455	<0.01	L4,I	"
A	420	<0.01	I	"
P	390	0.06	L3,I	"
A	435	0.01	I	"
A	390	0.03	I	"
P	30	0.02	L2,I	"
P	120	2.24	L2,I	"
P	480	0.03	L2,I	"
P	450	0.02	L1,I	"
P	430	0.02	L2,I	"
A	445	0.03	I	"
A	445	0.01	I	"
P	60	0.94	L2,I	"
A	445	0.06	I	"
P	275	0.86	L2,I	"
P	490	0.01	L5,I	"
P	485	0.03	L5,I	"
P	390	0.02	L5,I	"
P	525	0.01	L5,I	"
P	460	0.01	L4,I	"
P	500	0.01	L4,I	"

* P=PERSONAL SAMPLE, A=AREA SAMPLE
** B=STITCHING UP BAGS TO ENCLOSE A PAIR OF CATHODES; C=CELL SEALING OPERATION; I=INSIDE; L1=HAND BRUSHING COPPER ON CATHODE TO REMOVE ASBESTOS, CLEANING OUT WASHER SUMP; L2=DEBAGGING, MIXING PULP, HOOKING UP CATHODES, LOADING AND UNLOADING OVEN, LOADING AND UNLOADING ASBESTOS, REMOVING CATHODES; L3=WASHING CATHODES, DRAWING CATHODES; L4=BANDING ANODES, DROPPING DIAPHRAGMS IN CELLS AND BUCKLING DOWN, DROPPING IN CATHODES/ANODES; L5=TURNAROUND TRAILER SKIN GROUNDING, STOCK ROOM, INSPECTION, SUPERVISOR; P=PULPING OPERATION; S1=UNSEALED CELL BODY STORAGE AREA; S2=CATHODE STORAGE AREA; S3=ASBESTOS STORAGE ROOM; T=TRANSPORT OF CELL BODIES OR CELL COMPONENTS

ST0070718

377685

Sample*	Time (min)	Fibers/cc	Comments**	File #(Source)
P	475	0.01	L4,I	"
P	470	<0.01	T,I	"
P	460	0.01	T,I	"
P	435	0.08	L2,I	"
P	470	<0.01	L4,I	"
P	485	0.01	L2,I	"
P	475	<0.01	L5,I	"
P	480	<0.01	L5,I	"
P	435	0.01	L4,I	"
P	435	0.03	L4,I	"
P	435	0.02	L4,I	"
P	410	0.01	L5,I	"
P	410	<0.01	L5,I	"
P	410	<0.01	L5,I	"
P	470	<0.01	L2,I	"
P	470	0.02	L5,I	"
P	470	<0.01	L4,I	"
P	470	0.01	L4,I	"
P	470	0.03	L3,I	"
P	490	0.01	L5,I	"
P	493	0.01	L5,I	"
P	491	<0.01	L5,I	"
P	500	0.01	L5,I	"
P	489	0.01	L3,I	"
P	435	<0.01	L5,I	"
P	450	<0.01	L4,I	"
P	450	<0.01	L4,I	"
P	465	<0.01	L5,I	"
P	480	<0.01	L4,I	"
P	480	<0.01	L3,I	"
P	480	<0.01	L3,I	"
P	480	0.02	L2,I	"
P	465	0.01	L4,I	"
P	465	<0.01	L3,I	"
P	465	<0.01	L5,I	"
P	465	<0.01	L4,I	"
P	465	<0.01	L5,I	"
P	440	0.07	L3,I	"
P	440	0.01	L2,I	"
P	440	<0.01	L3,I	"
P	440	0.01	L2,I	"
P	420	0.01	L5,I	"
P	465	<0.01	L3,I	"
P	465	<0.01	L5,I	"

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377686

Sample*	Time (min)	Fibers/cc	Comments**	File #(Source)
P	490	<0.01	L5,I	"
P	495	<0.01	L5,I	"
P	475	<0.01	L5,I	"
P	420	0.01	L4,I	"
P	420	<0.01	L4,I	"
P	435	<0.01	L4,I	"
P	420	<0.01	L4,I	"
P	420	0.01	L4,I	"
P	480	0.01	L3,I	"
P	450	<0.01	L4,I	"
P	450	<0.01	L4,I	"
P	480	<0.01	L3,I	"
P	450	<0.01	L5,I	"
P	480	<0.01	L5,I	"
P	450	0.02	L2,I	"
P	450	<0.01	L4,I	"
P	465	<0.01	L5,I	"
P	465	<0.01	L5,I	"
P	660	0.03	L5,I	"
P	660	0.01	L5,I	"
P	660	0.01	L5,I	"
P	465	<0.01	L5,I	"
P	465	0.01	L5,I	"
P	450	0.01	L5,I	"
P	480	0.01	L5,I	"
P	480	0.01	L5,I	"
P	465	0.01	L5,I	"
P	465	0.01	L5,I	"
P	480	0.02	L5,I	"
P	455	0.01	L5,I	"
P	495	0.01	L2,I	"
A	680	0.01	I	"
A	680	0.03	I	"
P	510	0.01	L2,I	"
P	480	0.01	L4,I	"
P	360	<0.01	L4,I	"
P	360	<0.01	L4,I	"
P	480	<0.01	L5,I	"

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CELL BODY STORAGE AREA; S2=CATHODE STORAGE AREA; S3=ASBESTOS

377687

Sample*	Time (min)	Fibers/cc	Comments**	File #(Source)
P	480	0.03	L5,I	"
P	480	0.01	L5,I	"
A	615	0.01	I	"
A	615	<0.01	I	"
P	470	<0.01	L5,I	"
P	470	<0.01	L5,I	"
P	450	<0.01	L5,I	"
P	480	<0.01	L5,I	"
P	405	<0.01	L5,I	"
A	465	<0.01	S3,I	"
A	480	<0.01	S3,I	"
A	480	<0.01	S3,I	"
A	480	<0.01	S3,I	"
P	480	0.01	L4,I	"
P	480	0.01	L4,I	"
A	480	0.01	S3,I	"
A	480	0.02	S3,I	"
A	480	0.09	S3,I	"
P	450	0.03	L1,I	"
P	450	0.11	L1,I	"
P	480	0.01	L4,I	"
P	500	0.03	L4,I	"
P	485	0.02	L4,I	"
P	480	0.01	L2,I	"
P	480	0.03	L4,I	"
P	75	0.03	P	CL2-86.01(LA)
P	60	0.02	P	"
P	70	0.01	P	"
P	65	<0.01	P	"
P	41	0.01	P	"
P	25	0.07	P	"
P	48	0.04	P	"
P	25	0.02	P	"
P	48	0.04	P	"
P	55	0.04	P	"
P	420	0.01	P	"
P	405	0.01	P	"
P	555	<0.01	P	"

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Sample*	Time (min)	Fibers/cc	Comments**	File #(Source)
P	480	<0.01	P	"
P	480	<0.01	P	"
P	480	0.01	P	"
P	540	<0.01	P	"
P	495	<0.01	P	"
P	510	<0.01	P	"
P	330	0.02	P	"
P	90	0.01	P	"
P	390	<0.01	P	"
P	480	<0.01	P	"
P	60	0.05	P	"
P	30	<0.02	P	"
P	115	0.03	P	"
P	115	0.02	P	"
P	52	0.1	P	"
P	60	0.05	P	"
P	100	0.01	P	"
P	100	0.03	P	"
P	45	0.02	P	"
P	45	<0.01	P	"
P	30	0.03	P	"
P	80	0.02	P	"
P	90	<0.01	P	"
P	105	<0.01	P	"
P	30	0.05	P	"
P	410	<0.03	T	HEH34.21-21-5(9)(MI)
P	410	0.04	T	"
P	420	<0.03	B	"
P	420	<0.03	L2	"
P	420	0.03	T	"
P	395	0.14	L2	"
P	395	0.06	T	"

* P=PERSONAL SAMPLE, A=AREA SAMPLE
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ST0070722