

*file. Vinyl Chloride - cancer as
Chronic Toxicity*

CONFIDENTIAL

World Register
of Cases of

ANGIOSARCOMA OF THE
LIVER (ASL)
due to VCM

R&S 004853

REVIEW DATE

1st JANUARY 1990

Collated by:

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R&S 004856

C O N F I D E N T I A L

REGISTER OF CASES OF ANGIOSARCOMA OF THE LIVER DUE TO EXPOSURE TO VINYL CHLORIDE
- REVIEW DATE 1 JANUARY 1990

R&S 004857

P R E F A C E : ACKNOWLEDGEMENTS, SIGNIFICANT CHANGES, COMMENTS AND REQUESTS

- 1 The 14 new cases in this Register are: France 26, 27, 28; Germany 33, 34, 35, 36, 37, 38, 39; Spain 01; UK17, US 42,43. The Spanish case is the first notified from that country.
- 2 The following 2 cases have been deleted from the Register: Germany 26 (Alcoholic Cirrhosis), US24 (Cholangiosarcoma).
- 3 There are amendments from the previous Register against cases: France 22, 23, 24; Germany 31, 32; US33, 34.
- 4 I thank the following for information about new cases: Drs Lagast, Contassot, Friedel, Tenkhoff, Lee, Hamill and Mr Roy N Johnson. For information about other cases I thank Drs Dietz, Fendel, Smith and Williams.
- 5 So far as I know the following are still alive: France 15 and 28; US33 and 36. I am grateful for information on this subject in the past year, and urgently need to be kept up-to-date, please.
- 6 In Table 3 I have now treated a 'cluster' as 3 cases instead of 2, due to the passage of time and the increased number of cases in the world.
- 7 Tables 4E to 4H have been amended, as the number of cases per factory has altered.
- 8 A new Table 16 has been introduced showing the number of PVC factories in the world so far as known to me. Please keep me informed of any alterations in ownership, openings, re-openings or closures (see Tables 8 to 15).
- 9 The initials of case UK05 have been amended to RK (not JK). It will be seen that certain cases have no initials against them. Can anyone please help with this? Some of the countries concerned are Belgium, Czechoslovakia, France, Sweden, the US and Yugoslavia.
- 10 CHOLANGIOSARCOMA As stated above I have deleted US24 which was a Cholangiosarcoma, not an Angiosarcoma. I have heard of another case of Cholangiosarcoma but the significance of these cases is not apparent in connection with VCM. I should be grateful if anyone who knows of any other case where the patient does develop Cholangiosarcoma with VCM exposure, would inform me about it.
- 11 RESEARCH Please keep me informed of all relevant research and if possible send me copies of Reports. Would recipients of the Register please pass on this request.
- 12 Please also notify me of all changes relevant to the Register and especially new cases, for which a blank sheet is provided at the back of the Register.

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February 1990
BB/BGS

LIVER ANGIOSARCOMA CASES (REVIEW DATE - JANUARY 1990)

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01		12.01.13	Solvay	Jemeppe	00.07.58	00.05.76	63	18	17	29.06.76	Yes	High 1958-1968 exposed to 200 ppm for 8 hrs per day and certainly under 500 ppm ln 5 to 9m autoclaves 1968-1972 exposed to 50-200 ppm 8 hrs per day in 25m autoclaves 1972-1974 exposed to 50-200 ppm in auto- clave room 1974-100 ppm 1975- 50 ppm RETIRED 1 Feb 1975	Autocleaner 14 yrs Polyworker 3 yrs Work in glass ind. & chemi- cal industry	Driller in a foundry (2 yrs) Farmer (15 yrs) Work in glass ind. & chemi- cal industry	Hepatic tests in Oct 1974 were normal. Retired Feb 1975 Hospitalised May 1976 Complete Clinical and career details are given in a paper by Hublet et al in Arch. Belg. Med. Soc., Hyg. Med. Trav. Med. Leg. 1977 pages 601-622
02	SR	29 09 40	Solvay	Jemeppe	20 08 62	00.10.79	39	17	9	23 10 83	Yes	08.62-03. 63 01.67 -10.71 > 200 ppm 8h/day 04.63-12. 66 < 200 ppm	Autocleaner 5 yrs 5 mths Operator 3 yrs 9mths.	Fireman since 10 71.	1st sign July 79: Thoracic pain 07.79. Hepatic tests altered 10.79. Positive echography 11.79. Hepa- tectomy 02.80. Chemotherapy. Information given in letter 12 Nov 1984 from Dr De Sluwer.

CANADA

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

Sheet 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
CANADA			SHAWINIGAN												
01		15.12.13			1944	1955	41	11	11	02.09.55	Yes		Reactor cleaner	Operator polymerisation	Smoker
02		06.03.14			1943	1957	43	14	14	21.12.57	Yes		Maintenance, millwright, pipefitter	Operator	Worked overtime Smoker
03		26.08.19			1941	1962	42	21	20	23.03.62	Yes		Operator, foreman		Worked overtime Non-smoker
04		05.04.19			1945	1967	48	22	22	21.01.68	Yes		Reactor cleaner	Operator, foreman, water cooling unit	Worked overtime Smoker
05		07.05.11			1944	1968	57	24	05	05.07.68	Yes		Reactor cleaner	Water cooling unit	Worked overtime Smoker
06		15.12.19			1947	1971	51	24	23	10.04.71	Yes		Reactor cleaner	Maintenance, millwright	Worked overtime Smoker *
07		09.11.19			1946	1972	53	26	25	24.12.72	Yes		Reactor cleaner	Machine shop operator and poly unit	Worked overtime Smoker
08		13.05.20			1961	1973	53	12	05	12.06.73	Yes		Reactor cleaner	Maintenance machine shop	In plant 25 yrs! Smoker
09		19.07.21			1946	1974	53	28	26	04.09.74	Yes		Furnace op. pipefitter maintenance		Worked overtime Smoker

* Paper by Dr F DELORME in Annales d'Anatomie pathologique Paris, 1978 Vol 23 No 2 pp105-114 claims this case had both a hepatoma and ASL simultaneously.

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
<u>CANADA</u>															
10		16.05.15		Shawinigan	1953	1976	61	23	14	00.04.77	Yes		Reactor cleaner	Furnace op. maintenance, packaging	Ex-smoker
11	LG	13.10.25	Gulf	Shawinigan	1943	Nov 85	60	42	5	05.04.86	Yes	High	1943-47 Operator & Supervisor VC Plant	Retired 1972 (Age 47)	Letters from Dr Fernand Delorme, Pathologist & M Bibeau, BFG
12	BC	14.09.20	Gulf	Shawinigan	1945	Mar 82	61	37	27	31.03.82	Yes	High	1945-55 Autoclave Operator, PVC Resins	Retired 1972 (Age 52)	Letters from Dr Fernand Delorme, Pathologist & M Bibeau, BFG
												Low	1955-65 VC Manufacture		
												Medium	1965-72 Autoclave Operator, PVC Resins		
13	SS	10.06.26	BFG	Niagara Welland	1957	1987	60	30	23	26.1.87	Yes	1957-70 High	Poly Cleaner & Operator	Retired 1980 (Age 54)	Information from Dr H W Dietz, BFG, 1988
												1970-80 Low	Supervisor		

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CZECHOSLOVAKIA

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 90)

[illegible]

R&S 004862

FRANCE
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 90)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01	M	15.04.24	RP	Rouss- illon	00.01.46	18.02.67	43	21	19	19.02.67	Yes	High	Autoclave worker and cleaner 19 yrs		Ref. Ravier et al Arch. Mal. Prof. 1 30 n° 3 Nov 75 p 171-177
02	SIM	03.06.11	PCUK	Brignoud	06.07.59	15.01.75	63	16	12	24.01.75	Yes (NIOSH no comment)	High	2 yrs on monomer 10 yrs on polymer- isation	Italian origin	Ref. G Bonneton et al "Nouvelle Presse Medicale" 5 Nov 1977 p 735
03	NAV	06.01.20	RP	St Fons	00.00.46	15.01.75	55	29	29	29.06.75	Yes	High	Polyworker: 10 yrs as autoclave cleaner, Compounding 3 yrs	VCM production 16 yrs. Italian POW. Shepherd, Sawyer, Mason	Ref. Retz et al Arch. Mal. Prof. 1 37 n° 6 June 77 p 551-555
04	MOR	27.01.27	PCUK	Brignoud	19.10.49	16.01.76	49	26	26	04.01.76	Yes	High	Monomer production worker 8 yrs. PVC filtration 18 yrs		
05	B	29.01.38	PCUK	Brignoud	18.01.65	13.05.76	38	11	11	13.05.76	Yes	High	Polyworker 11 yrs	1)Thoracotomy 9th Feb 1976 costal angiosarcoma 2)Scintigraphy found ASL 3)Haemorrhage from ASL 4)Right Hepatectomy	Ref. P Coudere et al "Semaine des hopitaux 10 Septembre 1976 Previously had bone angiosarcoma" Also Pilichowski et al "La Nouvelle Presse Medicale" 7th July 1979 Page 2485.

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
06	Pa	14.04.34	PCUK	Brignoud	01.03.58	12.08.76	42	18	13	11.09.76 (NIOSH says 12.09.76)	Yes	Moderate	(1958-1960) 2 yrs filtration 10-11 yrs polyworker and works lab?		This man had AOL prior to AS. Ann. de Mal. Prof. July '77 p 645 & 6. AOL was found in 1971 five yrs before ASL
07	GIR	26.04.27	RP	St Auban	01.07.50	After death NIOSH says 00.07.76	49	26	22	02.07.76	Yes (NIOSH no comment)	High	Plant fore- man in polymer- isation	1972-6 admin section in St Auban	Died of septicaemia Small liver lesion found after autopsy
08	B	01.04.34	Solvay	Tavaux	23.05.57	03.12.75	42	19	19	30.01.77	Yes	Moderate	6 yrs pecker & autoclave clar 14 yrs autoclave worker		Had been tunnel worker previously
09	RFX	08.10.14	RP	St Fons	10.01.48	26.04.76	63	28	28	25.12.77	Yes	Very High 1948-1966 Lesser Exposure 1966-1976	Polymer- isation operator, autocleaner, autoclave maintenance	10 yrs in sulphuric acid factory, storekeeper & general services	Operated 4.76 for removal of tumour from liver and died after second surgical operation for bilio bronchial fistula Paper by Dr Rety et al in Archives de Malades Professionals Vol 40 No 6 1979 pages 741-3.

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10	VP	24.05.19	RP	St Fons	00.12.56	10.01.78	58	21	21	10.01.78	Yes	High	Autoclave cleaner	10 yrs in mechanical engineering industry 1946-1956	Died of pulmonary embolism 5 days after surgery
11	L	15.02.12	RP	St Fons	00.01.41	12.08.78	66	37	31	13.11.78	Yes	High	1941-1946 polymer- isation general purpose worker. 1946-1972 VCN synthesis (HCl & Acetylene) Foreman (agent de maîtrise). 1972 retired		
12		16.08.14	PCUK	Brignoud	09.02.49	00.05.79	65	30	27	23.06.79	Yes	High	Monomer production and polymer- isation operator		
13		19.01.31	Solvay	Taveux	21.09.63	26.06.79	40	16	13	22.08.79	Yes		Autocleaner 2 yrs, Auto- operator 9 yrs, Copolymers 4 yrs	2 yrs as cycle mechanic. 10 yrs as enameller in sanitary ware manufacture	Cigarette smoker until 1974. Ill all of 1977 due to Oesophageal varices. Surgical intervention 25.05.79 (right hepatectomy)
14	MJ	05-04-24	Chloe Chimie (Formerly RP)	St Fons	1943	00.07.81	57	38	36	29.07.81	Yes	Very High 1943-1975 and Intermitt- ently 1975-1979	1943-1975 All types of jobs on manufacture & maintenance in VCN Poly Process	1975-1979 maintenance work	

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

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15	DEP	03.01.37	Chloe Chimie (formerly RP)	St Fons	07.07.55	28.09.82	45	27	27	Alive	Yes	High-20 yr Moderate 7 yrs	Autoclave cleaner 1955-1962 autoclave operator 1962-1982		Left Hepatectomy 1983. J C Contassot Letters of 5 10 83 and 29 7 88.
16	GIN	13.07.22	Chloe Chimie (Formerly RP)	St Fons	17.10.41	05.01.83	61	41	38	03.04.83	Yes	High-33 yrs Moderate- Low - 5 yrs	Polymerisation Process Man Maintenance Worker Health & Safety Agent		Retired Jan 1979. J C Contassot Letters of 5 10 1983 and 25 7 84.
17	HAR	22.02.23	Chloe Chimie (Formerly RP)	St Fons	17.06.48	03.04.83	60	34	28	03.04.83	Yes	High - 23 yrs	Autoclave Cleaner 1948-1971	Other sectors of St Fons Factory 1971- 1978	Retired 01.01.79 J C Contassot Letter of 5 10 1983
18	R	14.07.42	Solvay	Tavaux	09.09.63	21.03.84	42	21	21	27.12.84	21.03.84	High-12 yrs Low - 9 yrs	Autoclave Cleaner		09.03.84 Right Hepatectomy 05.05.84- 24.09.84 chemotherapy for lung- metastasis : partial remission. 08.84 - liver recurrence. 10.84 - lung; evolution of the disease

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FRANCE															
19	MAZ	15.12.32	Atochem	Brignoud	07.04.59	26.10.84	52	25	25	06.11.85	Yes	High	Autoclave operator and cleaner		Myocardial infarction 1980. Coronary bypass 1981. Letter from Dr Contassot 5.4.86
20	BR	02.03.23	Atochem	Brignoud	1951	27.12.85	63	34	22	26.12.85	Yes	High	Autoclave operator and cleaner	In other parts of factory since 1946	Portal fibrosis from 26.04.74. The illness was diagnosed as presumably work related on 20.04.74. Letter from Dr Contassot 05.04.86
21	Pa	01.10.40	RP	SEP Montlucon	1959	03.06.86	45	27	4	28.06.86	Yes	High	Autocleaner 4 years	Maintenance worker	Hepatic test May 84 normal. Hepatic test May 86 showed abnormalities. Letter from Dr Barrat 18.07.86.
22	AL	13.08.28	Atochem	St Auban	01.09.58	05.11.87	59	29	26	08.09.88	Yes	High 1958-70 Low 1970-84	12 years Autoclave worker. 14 years in Control Room		Letters from Dr Contassot, Atochem 2.12.87, 29 7 88, 24.01.89
23	DO	07.02.27	Atochem	St Fons	1944	1988	63	44	28	21.09.89	Yes	High	Autoclave Cleaner & all PVC production jobs		Partial Hepatectomy, Apr 88, Chemotherapy Information from Dr J C Contassot, Atochem, 1988/89

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LIVER Angiosarcoma Cases - (Review Date: 1 January 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
24	MA	08.12.26	Atochem	Brignoud	1943	1988	62	45	35	01.12.88	Yes	High	PVC Production - 2 years MCV Detection - 3 years PVC Production maintenance - 30 years		Liver transplant May 1988. Information from Dr J C Contassot, Atochem, 1988/89
25	BB	02.03.30	Solvay	Tavaux	1962	1988	58	26	23	07.05.88	Yes	11 years) High) - 5 years Polyfloor - 6 years 12 years) Low) - 12 years	Polycleaner - 5 years Polyfloor - 6 years Control Room - 12 years		Primary Liver Tumour Metastases lung, brain, bone, spleen, kidney. Information from Dr H Lagast, Solvay, November 1988
26	MG	29.11.40	Solvay	Tavaux	16.04.63	25.10.88	48	25	15	02.11.88	Yes	High 12 years Low 3 years	Autoclave Cleaner for 15 years		Died by haemorrhagic rupture of the tumour. No surgery. Letter from Dr H Lagast, Solvay, 28.4.89.
27	RC	1929	Atochem	St Pons	1954	1988	59	34	30	00.01.89	Yes	1954-74 High 1974-84 Low	Autoclave Cleaner and all PVC production jobs		Notified by Dr Contassot, Atochem, December 1989
28	JG	1926	Atochem	St Pons	1942	1989	63	47	20	Alive	Yes	20 years High	10 years monomer analysis (labs) 10 years production PVC		Notified by Dr Contassot, Atochem, December 1989

GERMANY
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
<u>GERMANY</u>															
01		00.00.30	4	4	01.10.56	19.09.68	38	12	12	25.01.69	Yes (NIOSH)		Polyworker		
02		00.00.31	4	4	14.10.57	25.09.70	39	13	11	14.12.71	Yes (NIOSH)		Polyworker		
03		00.00.30	12	12	09.06.52	00.03.73	43	21	16	10.10.73	Yes (NIOSH)		Filling pesticide aerosol cans with VC		Reported under non polymer- isation workers in NIOSH list of 31.3.77. This of course is strictly correct. However I wonder whether this man had high exposure to VCN in his can filling operation?
04		00.00.30	8	8	16.04.57	26.11.74	44	17	17	25.11.74	Yes (NIOSH)	200-500 ppm but high during 1 yr autocleaner	Polyworker & temporary autocleaner for 1 yr	1958 was autocleaner for 1 yr	Clinical details in paper by Gokel et al Virchows Arch A Path 1976 372 p 195-203

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GERMANY
Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
GERMANY															Confirmed
05 (NIOSH gives as Case 06)		00.00.36	11	11	02.04.60	10.12.73	38	13	05	16.12.74	Yes (NIOSH)		BG Chemie says "chemistry laboratorian in the Techno- logical Research Department" (NIOSH says assistant factory chemist which may be wrong translation)		Reported under non-polymer- isation workers in NIOSH list of 31.3.77 and 1.78. I don't think this is a correct classification by NIOSH. The man may have been involved in VCH polymerisation in pilot plant or in main plant.
06 (NIOSH gives as Case 05)		00.00.32	7	7	16.12.62	00.00.75	43	13	12	09.01.75	Yes		PVC - Manu- facture Shift Leader		
07		00.00.26	8	8	15.04.54	12.11.75	49	21	21 (NIOSH says 12)	13.11.75	Yes		PVC Manu- facture and all work incl auto- cleaning 12 yrs (1954-66) Foreman Tech Dev 8 yrs (1967-1975)		
08		00.00.17	4	4	19.07.54	06.04.75	58	20	20	25.12.75	Yes	?	Polyworker	?	

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GERMANY
Sheet 3

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
GERMANY															
09		00.00.34	2	2	20.02.61	16.06.76	41	15	13	24.03.78	Yes	High peaks	12 yrs poly- worker incl 17% auto- clave cleaning Control room 1 yr		10/78 Confirmed Average exposure first 9 yrs 150 ppm, occ 1000 ppm. Next 3 yrs av, 75 ppm. Last yr av 35 ppm
10 (NIOSH gives as Case 11)		00.00.36	2	2	01.01.61	00.01.77	40	16	10	07.03.77	Yes	High peaks	10 yrs poly- worker incl 17% auto- clave cleaning		Average exposure first 9 yrs 150 ppm, occ 1000 ppm. Last yr av 75 ppm. CWH letter of 21.04.78
11 (NIOSH gives as Case 10)		00.00.29	8	8	10.10.55	28.06.77	47	21	22	28.06.77	Yes	High	3 yrs auto- clave cleaner 19 yrs filter operator		
12		00.00.38	4	4	00.00.61	00.10.77	39	16	6	07.10.77	Yes	?	PVC Manu- facture Autoclave worker for 6 yrs		

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GERMANY
Sheet 4

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
13		00.00.14	7	7	00.00.60	08.04.78	63	18	14	19.05.78	Yes				P W Best letter of 30th June 1980 enclosing data from Mr H P Friedel of BG Chemie
(14)											Not an Angiosarcoma In his letter of 21 12 81, Mr Friedel said this was a "Plattenepi- thelkarzinom Der Speiserohre" (a carcinoma of the oesophagus) (not attribut- able to VCM & not recognised as an indust- rial disease				P W Best letter of 30th June 1980 enclosing data from H P Friedel of BG Chemie withdrawing this case
15 (NIOSH gives this as Case 13)		00.00.29	8	8	19.10.53	09.10.78	49	25	25	23.10.78	Yes	?	Autoclave cleaner and worker. Drier operator. Later shift leader		Angiosarcoma confirmed 09/79. Some detail of this & also cases 9, 13, 15, 16 & 17 given in NRW Report for 1978

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LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
16		00.00.23	4	4	10.01.55	07.08.78 (Leibach suspected ASL at Feb 1975 laparotomy)	55	23	20	07.08.78	Yes ASL and Hepatocellular Carcinoma	High	Autoclave worker till 1964. Leader and master		Angiosarcoma confirmed, full details of illness since March 1973 given in NRW Med Insp Rep for 1978. Different details given in "VC Associated Disease" by Leibach and Marsteller (1981) p71.
17 (NIOSH gives as Case 15)		00.00.37	4	4	01.11.61	14.08.78	41	16	11	28.08.78	Yes	High	Autoclave worker	No	Angiosarcoma confirmed. Annual report of the North Rhine Westphalia Medical Inspectorate for 1978 pages 347-377 gives full details. Vinyl chloride disease diagnosed 02-02-73. Oesophageal varices. Radiologically confirmed acro osteolysis.
18		00.00.13	5	5	00.00.55	25.12.79	66	24	21	25.12.79	Yes		Autoclave Worker		
19		00.00.25	4	4	18.10.54	00.08.79	54	25	18	22.02.80	Yes Metastasing ASL	High	Autoclave Worker		Dr Besche letter of 13-04-82 to Dr W G F Adams

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
20		00.00.15	4	4	14.02.61	00.04.80	65	19	13	19.10.80	Yes Haemangio- Endothelioma of liver with Metastases	High	Autoclave Worker		Dr Besche letter of 13-04-82 to Dr W G F Adams
21		00.00.13	4	4	01.01.62	00.09.79 [pronounced clinical liver symptoms]	66	18	13	19.06.80	Yes Haemangio- Endothelioma of liver with Metastases	High	Autoclave Worker and worked in drying shop		Dr Besche letter of 13-04-82 to Dr W G F Adams
22		00.00.21	4	4	15.10.61	28.08.80	59	19	11	06.12.81	Yes Metastasing ASL	High	Autoclave Worker	Chargehand, subsequently Foreman	Dr Besche letter of 13-04-82 to Dr W G F Adams
23		00.00.27	8	6	1955	26.03.79	52	24	21	29.09.81	Yes	High (>300 ppm)	Chemistry Worker		Primary hepatocellular carcinoma; proliferation of the sinusoidal cells with sinusoidal ectasia. Friedel letter 23.12.86.
24		00.00.28	8	8	1969	11.10.82	54	13	12	28.05.83	Yes	High (>300 ppm)	Autoclave Cleaner		Prof Eder (Munich) letter 22.08.83. Friedel letter 19.04.85.
25		00.00.23	8	8	1960	28.09.81	58	21	13	14.01.83	Yes	High	Polyclave Worker and Autoclave Cleaner		Prof Selmeir (Munich) letter 22.08.83. Friedel letter 19.04.85
(26)											Deleted on advice of Dr Tenkhoff December 1989: Alcoholic Cirrhosis, not VCM associated.				
27		00.00.28	4	4	1955	18.01.83	55	28	18	02.03.84	Yes	High	Autoclave Cleaner till 1972		Leibach. Friedel letter 19.04.85

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
28		21.11.23	7	7	01.10.60	11.08.85	61	25	25	25.08.85	Yes	High	Process worker 1974-84 01.10.60 - 31.03.84 PVC production, agitator area		Annual VCM screening 24.04.85: no complaint, no abnormality detected. 1970 two-thirds gastrectomy for ulcers. 1971 Coronary thrombosis 1983 Femoral implantation 1984 Pulmonary embolism and pleuropneumonia. Landers letters 18.09.85 and 04.02.87.
29		00.00.22	2	2	1962	15.02.83	61	21	19	15.02.84	Yes	High	Chemistry worker		Haemangiosarcoma. Friedel letter 23.12.86.
30		00.00.17	4	4	1951	07.01.80	62	29	25	25.05.83	Yes	High	Polyworker Shift leader		Haemangiosarcoma. Friedel letter 23.12.86.
31		00.00.23	8	8	1953	30.06.85	61	32	20	31.01.86	Yes	High	Autoclave cleaner		Haemangiosarcoma. Friedel letters 23.12.86, 15.11.89 & Fendel 16.2.89.
32		00.00.30	8	8	1955	00.04.85	55	30	21	15.07.86	Yes	High	Polyworker Autoclave cleaner		Haemangiosarcoma. Also Developed Cholangiosarcoma. Friedel letters 23.12.86, 15.11.89 and Fendel 16.2.89.
33		00.00.17	8	8	1953	19.08.83	67	30	21	25.03.85	Yes	High	Autoclave Cleaner, Chemistry Worker		Letter from Dr Friedel 15.11.89
34		00.00.34	4	4	1956	13.05.85	51	29	16	17.09.85	Yes	High	Shift Leader		Letter from Dr Friedel 15.11.89
35		00.00.24	4	4	1968	18.2.73	49	5	4	16.10.84	Yes	High	Autoclave Cleaner		1975 disease of liver parenchyma; at last 80%. Letter from Dr Friedel 15.11.89

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GERMANY
Sheet 8

LIVER Angiosarcoma Cases (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
36		00.00.18	4	4	1953	19.01.76	57	23	23	14.02.86	Yes	High	Autoclave Worker		Letter from Dr Friedel 15.11.89 and information from Dr Tenkhoff Dec 89
37		00.00.25	4	4	1969	09.08.85	59	16	6	05.09.86	Yes		Laboratory Assistant		Letter from Dr Friedel 15.11.89
38		00.00.22	4	4	1954	16.05.88	66	34	19	16.09.86	Yes	High	Shift leader at the autoclaves; later on at the tumbler		Letter from Dr Friedel 15.11.89
39		00.00.42	4	4	1968	00.10.86	44	18	5	03.11.86	Yes	High	Autoclave Cleaner		Pension from 1974-84 80% later on 100%. Letter from Dr Friedel 15.11.89 and information from Dr Tenkhoff Dec 89

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ITALY
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01 (On NIOSH supple- mentary list)	LG	15.06.34	PAMSAC	Mira Venice	00.00.65	19.04.71	36	06	03	16.04.71	Yes		PVC Bag extruder		Primary tumour may have been pericardium. Not homo- geneous with other cases. * **
02	SE	13.11.29	Montedison	Porto Marghera	00.00.57	13.12.72	43	15	06	27.12.72	Yes		Polyworker		* **
03	VG	14.03.20	Solvay	Ferrara	00.01.53	10.07.75	55	22	21	10.07.75	Yes	High	Autocleaner (8 yrs (1953- 61) Autoclave operator 12 yrs (1961- 72)	1972-5 did a variety of jobs including PVC packing.	**
04	FB	20.07.37	AMIC	Ravenna	00.04.59	00.01.81	43	21	21	30.03.81	Yes	12 yrs - Very High 5 yrs - Medium 4 yrs - Low	1 yr - Monomer operator 20 yrs - Autoclave operator & other duties in suspension polymer- isation. Area Foreman in same Dept since 1975.	Never cleaned autoclaves. See paper by CHIAPPINO et al Med Lavoro Vol 6 (1982) pp 555-563	** Non-smoker. Consumed little alcohol. No AOL.
05	G Donesin	19.03.37	PAMSAC	Mira Venice	00.00.67	07.03.83	46	16	8	06.04.83	Yes	Medium-? High	Bag extruder 1967-1975 Commercial Dept 1976- 1983		S Pagliarunga telex of 2 Aug 1983

* See Maltoni Med di Lavoro 65 p445, 1974. Further details in letter from Dr Montesano of IARC on April 1st 1982.

** Also see Maltoni and Rondinella in Acta Oncologica Vol 1 1980 pages 35 - 49.

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LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

[illegible]

JAPAN

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01	Tomoji Mori	01.08.22	Mitsui Toatsu	Nagoya	00.04.53	24.10.75	53	22	13	24.10.75	Yes	PVC Assoc says not known. Japan Times indicated on 25.10.75 exposures often at 3000 ppm up to 1974	13 yrs auto- clave cleaner 1964 - assigned to different work since had ill health		Japan Times 25.10.75 & Japanese PVC Assoc letters of 31.03.78 & 30.11.87
02	SC	02.08.39	Kanegafuchi Chemical	Osaka	00.11.58	10.08.76	37	17	13	10.08.76	Yes	Not known	In polymer- isation work including autoclave cleaning		Japanese PVC Association letters of 31.03.78 & 30.11.87
03	YS	01.09.30	Mitsui Toatsu	Nagoya	00.07.65	26.06.85	54	20	5	14.09.85	Yes	High	5 years Autoclave cleaner		Letter from Dr Nakamura, Japanese PVC Association 30.11.87

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SPAIN

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01	MCG	26.03.40	Hispavic	Torrelavega	01.02.64	10.11.89	49	25	13	09.11.89	Yes	High 12 years Medium 1 year	Autoclave Operator 12 years. Latex 1 year	From 1.1.78 production of hydrogen peroxide	Cause of death: multiple cerebral haemorrhages. No metastasis. Letter from Dr Legast, Solvay, 04.01.90.

SWEDEN

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01	NO	23.06.27	Kemanord	Sundsvall	14.08.51	20.10.70	43	19	18	20.10.70	Yes		Polyworker		
02	BL	27.11.11	Kemanord	Sundsvall	00.01.45	00.08.72*	61	27	27	16.08.72	Yes	High	VCM production		Mr Sjoelin's letter of 28 March 1978 confirms BL was a monomer worker who was heavily exposed, probably even more so than a normal reactor cleaner
03	NE	10.06.10	Kemanord	Sundsvall	00.05.47	18.03.76	65	29	21	19.03.76	Yes	High	Polyworker		
04	AL	16.11.14	Kemanord	Sundsvall	00.00.46	12.05.77	62	31	31	12.05.77	Yes	High	1946-1958 polymer- isation worker (12 yrs) & 1958- 1977 foreman (19 yrs)		In first 12 yrs of employment had been heavily exposed. In 1974, liver abnormality and necrosis diagnosed. Data confirmed in Dr D Byren letter 18.8.77 to CEFIC
05		12.03.19	Kemanord	Sundsvall	11.05.64	22.11.80	61	16	16	22.11.80	Yes	High - 6 Years Low - 10 Years	1964-1970 centrifuge operator 1970-1980 drier operator		Letter of 2nd Nov 1981 from Dr David Byren

* In his letter of 1st April 1982, Dr Montesano of IARC says Sweden's National Board of OS Health gives 20-02-70 as date of diagnosis for Case 01 and 15-05-72 for Case 02.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
UK 01	WJ	20.04.01	ICI	Hillhouse	04.04.44	03.12.72 (Fox & Collier paper says 23.12.72)	71	28	22	03.12.72 (Fox & Collier paper says 23.12.72)	Yes	500 ppm	1944-7 VCM 1947-8 Drier 1948-61 Autoclave operator 1961-66 Drier		Lee and Harry Lancet 29-06-74 pages 1316-8
(02)															Dubious fabrication case
03	B.W	02.06.37	BP	Barty	00.02.66	00.12.74	37	09	3.5	24.12.74	Yes	High	Autoclave cleaner		Exposure limited to 2.66 - 9.69
04	JSR	23.06.20	ICI	Hillhouse	26.04.54	00.06.79	59	25	18	12.10.79	Yes	Medium- high	1954-5 Bagging Plant 1955-6 Drier Plant 1956-8 Autoclave worker 1958-61 Chargehand Drier Plant 1961-72 Foreman C 2/3 Plant	Pre-war fish packer 1939-45 army vehicle maintenance 1945-54 fish packer	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
05	RK	30.03.14	BP	Barry	08.01.51	00.10.79	65	28	21	19.11.79	Yes		1951-52 Polycleaner 1952-55 Latex 1955-60 Polyfloor 1960-64 Poly Chargehand 1964-70 Charging operator 1970-72 Drier operator		Further information 1989 from Dr P M Smith and Dr D M J Williams
06	GEP	1931	BP	Barry	1962	09.01.80	48/9	18	12	09.01.80	Yes		7 yrs Poly Floor Operator 5 yrs Greaser on Poly Floor		Further information 1989 from Dr P M Smith and Dr D M J Williams
07	RGB	26.04.20	BP	Barry	1963	00.00.80	60	17	8.2	13.06.80	Yes		Polycleaner 1963-5 Recovery 1965-1971		Further infor- mation 1989 from Dr P M Smith & Dr D M J Williams
08	WTH	08.05.24	BP	Barry	19.09.50	27.11.81	57	31	24	25.12.81	Yes	1950-1958 500 ppm 1968-1974 200 ppm	1950-51 Autoclave operator 1948-1950 Operator on Acetylene autoclave building 1957-1974 Shift supervisor autoclave building - Meyer cleaned autoclaves but supervisor's job entailed entering autoclaves to inspect them	1938-1948 Motor Mechanic 1948-1950 Operator on Acetylene Production Plant	Further information 1989 from Dr P M Smith and Dr D M J Williams

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
09	EIGP	07.05.25	BP	Barry	15.02.50	02.03.83	58	33	29	24.02.83	Yes	Medium	Polyworker	2 years on Acrylonitrile Resin Plant. Also prior to 1950. 4 years RAF maintenance. 3 years motor car paintshop. 2 years in Graving Dock.	
10	GJT	04.04.47	BP	Barry	27.04.66	01 05 84	37	18	4.2	16.05.84	Yes	High - 11 months (500 ppm). Low - 18 months (50 ppm). Medium - 21 months (200 ppm)	Polycleaner 1966-67. Spray-drier bagger 1967- 68. Blow-down stripper operator 1968-70.	Heavy goods vehicle driver until final illness.	Information given in letter 18.06.84 from Dr D M J Williams
11	GLP	08.05.28	BP	Barry	19.12.65	02.06.85	57	19	16	02.06.85	Yes	High 1965-69 Med 69-79 Low 79-82	Polycleaner 1965-68. Service operator 68-69. Poly Operator 69-79. Leading Hand 79-82.		Letter of 04.06.85 Dr Paul Smith and letter of 04.06.85 Dr D M D Evans Oesophageal haemorrhage due to oesophageal varices due to Angiosarcoma of liver
12	JT	24.01.37	ICI	Hillhouse	16.09.57	03.06.85	48	28	28	06.12.85	Yes	Low 1957-59 High 59-74 Low 74-85	Spare man, bagging floor 1957-59. Autoclave Operator 1959-85		Letter 26.06.85 Dr F I Lee

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO- LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
13	MJ	02.03.48	BP	Barry	1968	Jan 86	37	18	3	02.06.86	Yes	High Low High	Polycleaner 1968-69 Central Depot 1969-70 Polyfloor 1970-1971	Moved to Acrylonitrile Plant until left BP 1983. Manager of IC & SS Ltd at Cardiff Airport 1983-86	Remained well, working actively, until Jan 1986
14	GS	15.06.4	BP	Barry	07.07.66	27.08.87	45	21	11	01.12.88	Yes	10 months High 10 years constant Medium but on inter- mittent jobs	Polycleaner 1966-67 Polyfloor worker at times between 1968-1982		Letters from Dr DMD Evans, Pathologist, Penarth, Wales and Dr DMJ Williams, BP, Barry
15	BCP	23.08.2	BP	Barry	1956	1988	66	32	16	01.05.88	Yes	9 years High 5 years Medium 2 years Low	Poly cleaner & Operator Blow & Recovery Operator Utility Operator	Exposure periods intermittent	Information from Dr D M J Williams, BP, and Dr Paul Smith, Pathologist 1988.
16	RT	25.05.2	ICI	Hillhouse	1963	1988	66	25	12	12.11.88	Yes	1 year) Low) 9 years) High) 2 years) Low)	Packer Autoclave Operator		Hepatic fibrosis 1974 Oesophageal varices Porto-caval shunt 1975 Information from Dr B Bennett, ICI, and Dr F I Lee, Blackpool Victoria Hospital 1988.
17	RM	14.01.31	ICI	Hillhouse	08.04.63	1989	58	26	25	17.09.89	Yes	1963-63 Low 1963-74 High (11 years) 1974-88 Low (14 years))	Packer 2 months)) Autoclave) Operator) 25 years) (14 years))		Information from Dr B Bennett ICI, and Dr F I Lee, Blackpool Victoria Hospital, 1989.

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USA

Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

UK system of dates

DAY - MONTH - YEAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01	Earl Parks	17.10.23	BFG	Louis- ville	09.12.48	03.03.73	49	24	21	03.03.73	Yes		Pot Cleaner (Block Jamm 1974) p 53	History given in Annals NY ACAD SCIENCES Vol 329 (1979) page 190 in Paper by B R Cottine of OSHA	Rolling Stone Art Ref 1 NY Acad of Sc Symp 1974 Also Block JAMA 1.7.74 p 53
02		19.08.33	BFG	Louis- ville	15.11.55	00.05.70	37	14	13	27.09.71 (NIOSH says 28.09.71)	Yes		Pot Cleaner (Cf Block)		Ref 1 Also Block JAMA 1.7.74 p 53
03	Edward Dinwiddle	25.05.15	BFG	Louis- ville	28.11.45	19.12.73	58	28	28	19.12.73	Yes		Pot Cleaner (Cf Block)	Louisville Courier Journal 02-09-80	Ref 1 Also Block
04		15.01.24	BFG	Louis- ville	06.07.52	19.08.67	43	15	15	07.01.68	Yes		Pot Cleaner (Cf Block)		Ref 1 Also Block
05		25.01.12	BFG	Louis- ville	19.06.44	09.04.64	52	20	20	09.04.64	Yes		Pot Cleaner (Cf Block)		Ref 1 Also Block
06	Ray Austin Jones?	23.11.28	BFG	Louis- ville	17.01.62	00.02.74	45	12	12	24.07.75	Yes		US Air Force Pot Cleaner (Cf Block)		Ref 1 + Louisville Times 23.7.75 Retired April 1974 Also Block
07	Charles T Smart	03.05.22	UCC	S Charle- ston	27.08.44	00.00.68	45	24	17	23.03.68	Yes				Ref 1
08		06.05.20	Goodyear	Niagara	07.10.46	00.08.61	41	15	15	29.08.61	Yes				Ref 1

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
09	Raymond Gettle- Finger?	08.11.31	BFG	Louis- ville	28.05.45	01.03.74	43	29	24	11.03.75	Yes	2000 ppm			Ref 1 has wrong figures re first exposure. Louisville Times 29.10.74, 12.3.75, 10.3.76
10		16.08.13	Goodyear	Niagara	12.06.51	00.05.68	55	17	17	10.05.68	Yes				Ref 1
11		27.05.09	Goodyear	Niagara	14.10.46	00.03.70	61	23	23	16.03.70	Yes				Ref 1
12	Francis A Beckman	17.11.18	Firestone	Pottstown Pa	13.07.49	02.05.69	50	20	19	02.05.69	Yes	High 10 yrs	10 yrs as reactor op. (not cleaner - separate crew cleaned autoclaves)	Utility & Service op. Bagger Dryer op. Stripping op. 3 yrs prior service in tyre plant	Ref 1 + letter of 26 April 1978 from Russell & Park to J T Seawell of MCA
13	Richard Edward Clendenin	01.12.21	UCC	S Charle- ston	11.12.42	00.05.74	52	32	26	07.04.74	Yes	2000 ppm			Charleston Daily Mail 21.7.75
(14)															Never diag- nosed as ang- iosarcoma of liver. Inform- ation given in letter 22 May 1984 from J A Salg.
(15)															Accountant; ASL - No evi- dence of VCM exposure.

USA - Sheet 3

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

UK System of dates
DAY - MONTH - YEAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
16	James Howard	04.11.27	BPG	Louis- ville	08.05.50	00.00.69	41	19	04	27.03.69	Yes		1951-4 VCM polymer- isation	From 1954 onwards in Army and other service. 46-50 Army	Table 4 in Wagoner Testimony to US Senate Confirmed in M M Johnson ltr 07.08.78
17	Peerenboom	06.05.31	BPG	Louis- ville	23.06.55	11.10.74	43	19	19	16.10.80	Yes on 11.10.74 but no post-mortem 16.10.80				Dr M M Johnson letter of 24.2.81 con- firmed death 6 years after diagnosis
18	Charlie Arthur	22.04.28	BPG	Avon Lake	15.09.54	00.00.75	46	21	13	02.11.75	Yes	13 yrs autocleaner 8 yrs on Estol plasticiser & Carboset operation	Navy Tyre Store		Confirmed in M M Johnson ltr 07.08.78 Also Rolling Stones mag. 15.01.76
19	Virgil Christian	00.00.15	OCC	S Charle- ston	00.00.43	19.06.75	60	32	32	06.04.76	Yes	2000 ppm			Williamsport Sun Gazette 21 June 1975 Charleston Daily Mail 21.7.75
20		31.08.17	Goodyear	Niagara	00.00.55	30.01.76	58	21	18	30.01.76	Yes				MOISH letter of 25.10.79
21	Chester Hinkle	02.09.09	OCC	S Charle- ston	00.12.46	Early 77	67	30	22	02.01.77	Yes				28 yrs with OCC at SC Retired News release 23.2.77

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
22		02.10.23	BFG	Louis- ville	11.07.47	00.01.76	52	29	28	04.12.76	Yes				Louisville Times 26.1.76 said he was the 10th AS victim at Bells Lane of whom 8 had died by 26.1.76 In his letter of 16.09.81 Dr H N Johnson confirms this is the case described by Dannaber Tomburo & Yan in Feb 1980 Am J Medicine Vol 70 p280
23		00.00.23	Great American Chemical Company	Fitchburg Mass.	08.09.58	06.04.73	50	15	14	06.04.73	Yes				
(24)		Deleted 1990 by B Bennett: Not angiosarcoma, but confirmed Cholangiosarcoma													
(25)		Removal from register confirmed in R Kowinski letter of 5 November 1980													
															R N Wheeler letter of 20/2/79 and Rose Kowinski letters of 26/2/79 and 5/11/80

USA - Sheet 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
26	John Berry	07.07.23	BFG	Louis- ville	03.10.47	00.00.77 (up to 2 years after death)	52 (death)	28 (death)	18	11.02.75	Yes	Exposed in some degree to 22 chemicals but main exposure was to VCM, probably high	Various jobs in PVC plants from cold room to paste recovery to PVC charging operator to paste charging. Ill August 1965. Terminated employment Jan 1966		R Kaminski letter of 26/2/79 and Prof. Tamburro letter of 9/1/79
27	J L Forrest	11.05.16	DCC	S Charle- ston	01.07.41	30.11.78	62	37	20 (NIOSH says 27 and C Daily Mail 25)	25.11.78	Yes	High	Operator to 10.10.76	Exposure in bulk and dispersion PVC manufacture	R N Wheeler ltr of 4 Jan 1979 and Charleston Daily Mail 30.11.78 and R Kaminski 26/2/79
28		11.04.17	UCC	S Charle- ston	00.08.44	03.11.78	61	34	33	03.11.78	Yes				R Kaminski letter of 6/4/79
29		12.10.07	UCC	S Charle- ston	00.05.42	00.03.80	72	38	16	01.03.80	Yes				R Kaminski Letters of 19th June 1980 & 5th Nov 1980
30	WVM	22.07.22	Tenneco Chemicals	Flemington	11.06.64	30.12.80	58	17	15	30.12.80	Yes	6 - Unknown 9 - Minimal	Maintenance Mechanic 6 yrs Elsewhere 1½ yrs Boiler house Operator 9 yrs		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
31		08.11.23	DCC	S Charle- ston	12.05.46	01.08.81	57	35	13	02.04.82	Yes	High (But not as high as reactor cleaner would experience) Worked as labourer from June 1941 to May 1946 and may have cleaned reactors in that time	Chemical Operator in charge reactor from July 1976 to date Foreman Aliphatic. Chemical Operation	From 1959 to 1976 Aliphatic Chemicals operator and letter of 9.11.81. Also Dr Dacey letter of 07.03.83 re date of death.	
32	C W Giroux	22-02-08	Monsanto	Springfield Mass	15-10-51	00-07-79	71	28	14 (in PVC autoclave area)	17-05-80	An autopsy was done and immediate cause of death given as "Angiosarcoma"	The death certificate gave Mr Giroux' usual occupation as "kettle operator" in "chemicals industry".	1940-1951 Various jobs in polymer manufacture BUTVAR LOSTREX 1951-1964 Various jobs in and around PVC autoclaves 1964-1973 Various clerical jobs in PVC polymerisation facility/ Retired 01-03-73.		Information given in letter of 24 February 1982 from Dr Walter C Barnes of Monsanto Springfield to Dr A Munn of Monsanto Europe.
33	S Ferguson Jnr	08-10-27	BFG	Louisville	09-09-54	11-05-82	54	28	28	Alive	Yes	1954-74 High 1975-82 Low	Multiple jobs including Poly Operator + Polycleaner.		Prof Tamburro letter of 12 Aug 1982 + Dr M N Johnson letter of 28 Feb 1983.

LIVER Angiosarcoma Cases - (Review Date: 1 January 1990)

UK system of dates - DAY - MONTH - YEAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO- LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
34	Mr Byrum	29-01-34	BPG	Louisville	1955	03-11-82	48	27	10	04.08.83	Yes	1955-74 High 1975-82 Low	Poly Operator + Autoclave Cleaner 1955-65	1965 left BPG to become a Clergyman.	Dr M N Johnson letter of 3 Nov 1982, 28 Feb 1983 and 9 August 1984.
35		09-03-12	UCC	S Charle- ston	23-07-44	18-07-83	71	39	14	18-07-83	Yes	High from 1944 to 1955. Med from 1955-1958			Dr Dacey letter of 5 September 1983.
36		27-08-32	The General Tire and Rubber Co	Ashtabula	11-06-56	21-08-03	50	27	27	Alive	Yes	Moderate	1956-56 labourer 1956-57 prod helper 1957-70 operator 1970-75 electrician 1975-present operator		R W Laundrie letter of 12 Sept 1983: spotted at medical May 1983. Testing commenced May 1983
37	J Payton	29.08.29	BPG	Louis- ville	1953	06.08.84	54	31	22	06.08.84	Yes	High	Worked regularly in PVC area in the early days was a reactor cleaner 1953-75.		Information given in letter 09.08.84 from Dr M N Johnson
38	JWB	28.08.22	Air Products	Calvert City	00.02.63	19.01.84	61	20	20	28.10.83	Yes	High 1963-1982	Normal progression from helper to senior operator, cleaned reactors, stripping & recovery areas as well as charging operator.		Thrombo cytopenia and leukopenia since 1978. Gold treatment for arthritis 1976. Under Dr's care about 6 months before death, had passed standard physical examination 3 months earlier. J Barr letters of 22.10.84 and 23.01.85.

LIVER Angiosarcoma Cases - (Review Date: 1 January 1990)

UK system of dates
DAY - MONTH - YEAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO- LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
39	J Memice	27.06.18	Pantasote	Passaic	1960	March 1984	65	24	23	29.06.84	Yes	Low	29.09.60 - May 66 Vinyl Fabrication Plant May 66 - Aug 70 Utility Resin Operator (inc Jul 66 - Sep 67 Reactor Operator) Sep 70-82 Monomer Operator 1982-83 Mill Operator, Calendar Shop, until retirement	Worked before 1960 with US Air Force, United Wool Dyers and Okanite	Never in hospital for any chronic or acute medical problems. Death certificate states cause of death cardio-pulmonary arrest secondary to angiosarcoma of liver. Letter of 15.07.86 from John E Ertel of Pantasote with letter of 24.02.86 from Dr Auerbach, Pathologist.
40	P P Gillmer	26.10.14	BFG	Louis- ville	22.05.42	1987	72	45	34	03.01.87	Yes	High 1942-1974 Low 1975-1976	Chemical Worker 1942-45 Foreman 1945-76		Letter from Dr Dietz, BFG, 10.3.87
41	R Buckley	2.02.15	Goodyear	Niagara Falls	1949	1987	72	38	27	20.08.87	Yes	High Medium	1949-65 Chemical Op/ Shift Sup/ Foreman, PVC Resin Production 1965-77 NY Plant [Left PVC area for 6 months in 1965]	Retired 1977 (Age 62)	Letters from Prof Tamburro University of Louisville, 1987 and Dr C A Johnson, Goodyear, 1988

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USA
Sheet 9

LIVER Angiosarcoma Cases - (Review Date: 1 January 1990)

UK system of dates
DAY - MONTH - YEAR

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO- LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
42	McMullen	02.05.41	Olin	Assonet	00.04.68	00.04.82	41	14	6	09.07.82	Yes	High	Labourer in Pot area: pot cleanout regularly		Letter from Dr Peter Hamill 13.04.89
43	J R Succi	08.09.21	GenCorp (formerly General Tire)	Ashtabula Ohio	14.04.55	26.11.88	67	33	28	10.01.89	Yes	High Medium Low	PVC Resin Plant: Maintenance Cleaner 1.6 years Shift Mechanic 2 years Plant Electrician 24.10 years	Retired 01.01.84	Letters from Roy N Johnson, GenCorp 08.05.89 and 30.05.89

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YUGOSLAVIA

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1990)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTO- LOGICAL CONFIRM- ATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
<u>YUGOSLAVIA</u>															
01		05.04.14	Jugo Vinil	Split	00.00.53	08.04.73	59	20	20	08.04.73	Yes				SARIC et al paper Env Health Perspective Vol 17. pp 189-192 1976
02		15.11.31	Jugo Vinil	Split	00.00.50	12.07.73	42	23	18	12.07.73	Yes*		VCM Production		*In his letter of 3 Oct 1978, Dr Spirtas of NIOSH changed the status of Case 02 to VCM production employee. Dr Spirtas also notified a new Case 03 also a VCM production worker.
03		21.12.31	Jugo Vinil	Split	04.06.54	11.01.76	45	22	22	11.01.76	Yes*		VCM Production		
04		11.06.30	Jugo Vinil	Split	15.12.58	03.09.78	48	20	18	03.09.78	Yes				Rose Kaminski letter of 19 June 1980 and IARC letter of 1 April 1982

Incidence of ASL Cases Per Annum - By Date of Death

1955	1
6	0
7	1
8	0
9	0
1960	0
1	1
2	1
3	0
4	2
5	0
6	0
7	1
8	5
9	3
1970	2
1	3
2	5
3	8
4	5
5	11
6	11
7	8
8	10
9	5
1980	10
1	5
2	3
3	10
4	8
5	8
6	11
7	3
8	7
9	5
Total	153

NOTES

- 1 Does not include Italian 01.
- 2 The 1977 total now excludes US24, Cholangiosarcoma: deleted.
- 3 The 1982 total now excludes G26 Alcoholic Cirrhosis: deleted.
- 4 Does not include the following who are still alive, so far as known: Fr15 and 28, US33 and 36.

TABLE 2

(Review Date - 1 January 1990)

Distribution of ASL Cases by Country

USA	39 ** *****
W Germany	37 *****
France	28 **
UK	16
Canada	13
Sweden	5 ***
Italy	6 *
Yugoslavia	4 ****
Japan	3
Czechoslovakia	2
Belgium	2
Norway	1
Spain	1
Total	<u>157</u>

ie	Western Europe	96
	North America	52
	Rest of World	9
		—
	Total	157
		—

* Omit It01 - atypical case of PVC bag extruder.

** Includes Fr15 and 28, US33 & 36, who are still alive, so far as known.

*** Includes one monomer worker.

**** Includes two monomer workers.

***** Excludes G26 and US 24: deleted.

TABLE 3Pattern of ASL Cases by Factory(a) W Europe

Of the 96 cases in W Europe, 79 have occurred in clusters at 10 factories. Of the 37 German cases, 34 have occurred in clusters at 4 factories.

	<u>ASL Cases</u>
Dynamit (now Huls), Troisdorf, Germany	18
BP, Barry, UK	11
Atochem (formerly Chloe Chimie, formerly RP), St Fons, France	11
Wacker, Burghausen, Germany	10
Atochem (formerly PCUK) Brignoud, France	8
Kemanord, Sundsvall, Sweden	5
ICI, Hillhouse, UK	5
Solvay, Tavaux, France	5
CWH/Huls, Marl, Germany	3
Lonza, Waldshut, Germany	3
	79

NB: There are 32 pre 1962 PVC plants in W Europe; 20 of these have had ASL cases (Ref Table 8)

(b) N America

Of the 52 cases in N America, 41 have occurred at four factories out of a total of 55 factories. In N America 41 plants have not had ASL cases.

	<u>ASL Cases</u>
BFG, Louisville, US	15
BFG, Shawinigan, Canada	12
UCC, S Charleston, US	9
Goodyear, Niagara Falls, US	5
	41

NB: There are 29 pre 1962 PVC plants in N America; 13 of these have had ASL cases (Ref Tables 9 & 10)

(c) Rest of World

The 9 ASL cases are believed to be in one cluster of 4 and two clusters of 2 cases.

TABLE 4A

Latency Periods (Years from first Exposure to Diagnosis)

	<u>Country</u>	<u>No of Cases</u>	<u>Total Years</u>	<u>Average</u>	
<u>W Europe</u>	Belgium	2	35	17.50	
	France	28	795	28.39 *	
	Germany	37	765	20.67 *	
	Italy	6	127	21.16	
	Norway	1	22	22.00	
	Spain	1	25	25.00	
	Sweden	5	122	24.50	
	UK	<u>16</u>	<u>376</u>	23.50 *	
		<u>96</u>	<u>2267</u>	<u>23.61</u>	W Europe Average
<u>N America</u>	US	39	1002	25.69 *	
	Canada	<u>13</u>	<u>314</u>	24.15 *	
		<u>52</u>	<u>1316</u>	<u>25.30</u>	N America Average
<u>Rest of World</u>	Czechoslovakia	2	30	15.00	
	Japan	3	59	19.66	
	Yugoslavia	<u>4</u>	<u>85</u>	21.20	
		<u>9</u>	<u>174</u>	<u>19.33</u>	Rest of World Average
<u>Summary</u>	W Europe	96	2267	23.61	
	N America	52	1316	25.30	
	Rest of World	<u>9</u>	<u>174</u>	19.33	
		<u>157</u>	<u>3757</u>	<u>23.92</u> *	World Average

* Of the countries with > 10 cases, France, USA & Canada have an average latency period above world average; Germany & UK below world average.

(Review Date - 1 Jan 1990)

DISTRIBUTION OF LATENCY PERIODSTABLE 4B

	0-9 yrs	10-14 yrs	15-19 yrs	20-24 yrs	25-29 yrs	30-34 yrs	35+ yrs	Total	Average Latency Period (Table 4A)
Belgium			2					2	17.50
Canada		3		5	2	1	2	13	24.15
Czechoslovakia		1	1					2	15.00
France		1	4	3	10	4	6	28	28.39
Germany	1	5	11	10	6	4		37	20.67
Italy			2	2	2			6	21.16
Japan			1	2				3	19.66
Norway				1				1	22.00
Spain					1			1	25.00
Sweden			2		2	1		5	24.50
UK	1		5	1	6	3		16	23.50
USA		3	7	9	8	6	6	39	26.10
Yugoslavia				4				4	21.20
TOTAL	2	13	35	37	37	19	14	157	24.03

R&S 004901

TABLE 4C

LATENCY PERIOD OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE

MAX POSSIBLE LATENCY PERIOD	YEAR OF FIRST EXPOSURE	LATENCY PERIOD (NO OF YEARS)	ARITHMETIC MEAN OF LATENCY PERIODS	
50 49 48 47	1939 1940 1 2	37,21,37,41 32,38,45,47**	$\frac{298}{8} = 37.25$	
46 42	3 4 5 6 7	38,14,32,42,45 28,11,24,20,24,34,39, 44 27,22,28,29,37 21,29,31,26,28,15,23, 30,35 29,24,29,28	$\frac{886}{31} = 28.58$	
41 37	8 9 1950 1 2	28,24,34 30,26,20,38 26,22,31,19,23,14,33 19,28,17,28,34,29 21*,15	$\frac{559}{22} = 25.41$	
36 32	3 4 5 6 7	25,23,22,20,31,22, 32,30,23 21,21,25,25,21,28**, 22,34,34 22,23,24,14,19,21,27 27** 24,28,30,33 21,12,27** 32,29 19,17,15,13,16,28,30	$\frac{1010}{42} = 24.04$	
31 27	8 9 1960 1 2	18,18,15,17,20,29,28 16,21,25,27 13,18,21,25,24,25 15,16,16,16,19,19,12 13,18,17,12,18,21,26	$\frac{598}{31} = 19.29$	
26 22	3 4 5 6 7	16,17,20,21,25,25,26 16,17,25 11,19,20 9,18,21 16	$\frac{322}{17} = 18.94$	
21 17	8 9 1970 1 2	18,5,18,14 13,16	$\frac{84}{6} = 14.00$	VIOLA
16	3 4 TOTAL	157 CASES	$\frac{3757}{157} = 23.92$	MALTONI GOODRICH

R&S 004902

* Aerosol can filler G 03.

** The following are still alive, so far as known Fr15 and 28, US33 and 36.

TABLE 4D

LATENCY PERIODS OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE AND GEOGRAPHICAL LOCATION

MAX POSSIBLE LATENCY PERIOD	YEAR OF FIRST EXPOSURE	LATENCY PERIODS IN		
		WESTERN EUROPE	NORTH AMERICA	ROW
50	1939			
49	1940			
48	1	37,41	21,37	
47	2	47**	32,38,45	
46	3	38,45	14,32,42	
	4	28,44	11,24,20,24,34,39	
	5	27	22,28,29,37	
	6	21,29,31,33	26,28,15,23,30,35	
42	7	29	24,29,28	
41	8	28,34	24	
	9	30,26	20,38	
	1950	26,22,31	19	23,14
	1	19,28,34,29,	17,28	
37	2	21*	15	
36	3	25,22,32,30,23	23,31	22,20
	4	21,21,25,25,34,34	21,28**	22
	5	22,23,24,27**24,28 30	14,19,21,27,33	
	6	21,12,32,29	27**	
32	7	19,17,15,13,28	30	16
31	8	18,18,29,28	15	17,20
	9	16,21,25,27,		
	1960	13,18,21,25,25	24	
	1	15,16,16,16,19,19	12	
27	2	13,18,17,18,21,26	12	
26	3	16,17,21,25,25,26	20	
	4	16,25	17	
	5	11,19		20
	6	9,18,21		
22	7	16		
21	8	18,5,18	14	
	9	13,16		
	VIOLA 1970			
	1			
	2			
	MALTONI 3			
	TOTAL CASES	96	52	9

* Aerosol can filler G 03.

** The following are still alive, so far as known Fr15 and 28, US33 and 36.

R&S 004903

(Review date 1 January 1990)

TABLE 4E

PLANT	START UP DATE	LATENCY PERIODS OF ASL CASES IN SPECIFIC PLANTS (10 OR MORE CASES)	NO OF CASES	AVERAGE LATENCY PERIOD
TROISDORF W GERMANY	1954	12,13,16,16,18,19,19,21,23,25,28,29,29, 5,23,16,34,18	18	20.22
LOUISVILLE USA	1940?	12,14,15,19,19,20,24,27,28,28,28,29,29, 31,45	15	24.53
SHAWINIGAN CANADA	1943 (1941?)	11,12,14,21,22,23,24,24,26,28,42,37	12	23.66
BARRY UK	1948	9,17,18,28,31,33,18,19,18,21,32	11	22.18
ST FONS FRANCE	1939	21,28,29,37,38,27,41,34,44,34,47	11	34.54
BURGHAUSEN W GERMANY	1933	17,21,22,25,24,13,21,32,30,30	10	23.50

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(Review date 1 January 1990)

R&S 004905

TABLE 4F

LATENCY PERIOD OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE
AND SPECIFIC PLANT (10 OR MORE CASES)

YEAR OF FIRST EXPOSURE	TROISDORF W GERMANY	LOUISVILLE USA	SHAWINIGAN CANADA	BARRY UK	ST FONS FRANCE	BURGHAUSEN W GERMANY
1939						
1940						
1			21		37,41	
2					47	
3			14,42		38	
4		20	11,24		44	
5		28,29,27	22,37			
6			26,28		29	
7		29,28	24			
8		24			28,34	
9						
1950		19		31,33		
1	29			28		
2		15				
3	23	31	23			25,32,30
4	21,25,34	28			34	21
5	23,28	14,19			27	22,24,30
6	12,29			32	21	
7	13					17
8						
9						
1960						21
1	16,16,19,19		12			
2	18	12		18		
3				17		
4						
5				19		
6				9,18,21		
7						
8	5,18			18		
9	16					
1970						13
1						
2						

(Review date 1 January 1990)

TABLE 4G

PLANT	START-UP DATE	LATENCY PERIOD OF ASL CASES IN SPECIFIC PLANTS(4-9 CASES)	NO OF CASES	AVERAGE PERIOD
S CHARLESTON USA	1939?	24,30,32,32,34,35,37,38,39	9	33.44
BRIGNOUD FRANCE	1950	11,16,18,26,30,25,34,45	8	25.62
SUNDSVALL SWEDEN	1945	16,19,27,29,31	5	24.40
NIAGARA FALLS USA	1947	15,17,21,23,38	5	22.80
TAVAUX FRANCE	1953	19,16,21,26,25	5	21.40
HILLHOUSE UK	1940	28,25,28,25,26	5	26.40
SPLIT YUGOSLAVIA	1950	20,20,22,23	4	21.25

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TABLE 4H

LATENCY PERIOD OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE AND SPECIFIC PLANT
(4-9 CASES)

YEAR OF FIRST EXPOSURE	S CHARLESTON USA	BRIGNOUD FRANCE	SUNDSVALL SWEDEN	NIAGARA FALLS USA	TAVAU FRANCE	HILLHOUSE UK	SPLIT YUGOSLAVIA
1939 1940 1 2 3 4 5 6 7	37 32,38 32 24,34,39 30,35	45	27* 31 29	15,23		28	
8 9 1950 1 2		26,30 34	19	38 17			23*
3 4 5 6 7				21	19	25 28	20 22*
8 9 1960 1 2		18 16,25			26		20
3 4 5 6 7		11	16		16,21,25	25,26	
8 9 1970 1 2							

*Monomer worker

R&S 004907

TABLE 5

Annual Incidence of ASL Cases (Date of Death) by Geographical Area

	Western Europe	North America	Rest of World	Annual Total	Cumulative Total	Key Events
1955		1		1	1	
7		1		1	2	
1961		1		1	3	
2		1		1	4	
4		1	1	2	6	
7	1			1	7	
8		5		5	12	
9	1	2		3	15	
1970	1	1		2	17	Viola
1	1	2		3	20	
2	4	1		5	25	
3	1	4	3	8	33	Maltoni
4	3	2		5	38	Goodrich
5	6	4	1	11	49	
6	6	3	2	11	60	
7	6	2		8	68	
8	7	2	1	10	78	
9	5			5	83	
1980	6	4		10	93	
1	5			5	98	
2		3		3	101	
3	7	3		10	111	
4	6	2		8	119	
5	7		1	8	127	
6	10	1		11	138	
7		3		3	141	
8	7			7	148	
9	4	1		5	153	
TOTAL	94* **	50**	9	153		

* Omits It 01 bag extruder

** Does not include the following who are still alive, so far as known: Fr15 and 28, US33 & 36

NOTE: G26 and US24 deleted.

(Review date 1 January 1990)

TABLE 6

ASL CASE NUMBERS BY YEAR OF DEATH AND GEOGRAPHICAL LOCATIONS (EXCLUDING It.01)

KEY EVENTS		WESTERN EUROPE	NORTH AMERICA	REST OF WORLD
	1955		C1	
	6			
	7		C2	
	8			
	9			
	1960			
	1		US8	
	2		C3	
	3			
	4		US5	Cz2
	5			
	6			
	7	F1		
	8		C4,C5,US4,US7,US10	
	9	G1	US12,US16	
Viola	1970	Sw1	US11	
	1	G2	C6,US2	
	2	N1,Sw2,UK1,It2	C7	
Maltoni	3	G3*	C8,US1,US3,US23	Y1,Y2,Cz1
Goodrich	4	G4,G5,UK3	C9,US13	
	5	F2,F3,G6,G7,G8,It3	US6,US9,US18,US26	Jap1
	6	B1,F4,F5,F6,F7,Sw3	US19,US20,US22,	Jap2,Y3
	7	F8,F9,G10,G11,G12,Sw4	C10,US21,	
	8	F10,F11,G9,G13,G15	US27,US28	Y4
		G16,G17		
	9	F12,F13,UK4,UK5,G18		
	1980	UK6, UK7,G19,Sw5,G20,G21US	US17, US29, US30,US32	
	1	It4,F14,UK8,G22,G23		
	2		US31,US42,C12	
	3	UK09,It5,F17,B2,G24,G25,G30	US35, US34, US38	
	4	UK10,F16,F18,G27,G29,G35	US37,US39	
	5	UK11,UK12,F19,F20,G28,G33,G34		Jap3
	6	F21,UK13,It6,It7,G31,G32,G36,G37,G38,G39	C11	
	7		US40,US41,C13	
	8	F25,F26,UK14,UK15,UK16		
	9	F22,F23,F24,F27,Sp1,UK17	US43	
	TOTAL	94**	50**	9

* Aerosol can filler (G3)

** Does not include the following who are still alive, so far as known:
F15 and 28, US33 and 36

NOTE: G26 and US24 deleted.

R&S 004909

(Review date 1 January 1990)

TABLE 7

ASL CASE NUMBERS BY YEAR OF FIRST EXPOSURE AND GEOGRAPHICAL LOCATION
(EXCLUDING It.01)

KEY EVENTS		WESTERN EUROPE	NORTH AMERICA	REST OF WORLD
	1939			
	40			
	1	Fr11,Fr16	C3,US27	
	2	Fr28**	US13, US29,US40	
	3	Fr14,Fr24	C2,US19,C11	
	4	UK1,Fr23	C1,C5,US5,US7,US28,US35	
	5	Sw2	C4,US3,US9,C12	
	6	Fr1,Fr3,Sw4	C7,C9,US8,US11,US21,US31	
	7	Sw3	C6,US22,US26	
	8	Fr9, Fr17	US1	
	9	Fr12,Fr4	US12,US41	
	50	Fr7,N1,UK8,UK9	US16	Y2, Cz2
	1	Sw1,UK5,Fr20,G30	US10, US32	
	2	G3*	US4	
	3	G15,It3,G31,G33,G36	C10, US37	Jap1,Y1
	4	G7,G8,G19,G38,Fr27,UK4	US18,US33**	Y3
	5	G11,G16,G18,G23,G28, G32,Fr15**	US2,US17,US20,US34,US43	
	6	FR10,G1,G34,UK15	US36**	
	7	Fr8,G4,It2,G2,UK12	C13	Cz1
	8	Fr6,B1,Fr22,It7	US23	Jap2,Y4
	9	Fr2,It4,Fr19,Fr21		
	60	G5,G13,G25,G28,It6	US39	
	1	G9,G10,G12,G17,G20,G22	C8	
	2	G6,UK6,G21,B2,G29,Fr25	US6	
	3	Fr13,Fr18,Fr26,UK7, UK16,UK17	US38	
	4	Sw5,Sp1	US30	
	5	Fr5,UK11		Jap3
	6	UK3, UK10,UK14		
	7	It5		
	8	UK13,G35,G39	US42	
	9	G24,G37		
Viola	70			
	1			
	2			
Maltoni	3			
	Total	96	52	9

* Aerosol can filler (G3)

** Fr15, Fr28, US33 & 36 are still alive, so far as known

NOTE: G26 and US24 deleted.

R&S 004910

TABLE 3
WESTERN EUROPE PVC PRODUCERS - START-UP DATES vs ASL CASES (OMITTING G03 & It.01)

START-UP YEAR	COUNTRY NAME	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st Exposure
1931	West Germany	BASF	Ludwigshafen		
1933	West Germany	Wacker	Burghausen	04,07,11,15,23,24	57,54,55,53,55,63,60,53
				25,31,32,33	55,53
1938	Italy	Montecatini	Acna		
1939	France	Rhone-Poulenc/ Chloe/Atochem	St Fons	03,09,10,11,14	46,48,56,41,43,
				15,16,17,23,27,28	55,41,48,44,54,42
1940	United Kingdom	ICI/EVC	Runcorn (Closed 1948)		
	United Kingdom	ICI/EVC	Hillhouse	01,04,12,16,17	44,54,57,53,63
1945	Sweden	Kemanord/Nobel	Sundsvall (Stockvik)	01,02,03,04,05	51,45,47,46,64
1946	France	Rhone-Poulenc	Roussillon	01	46
1948	United Kingdom	BP Chem/ICI/EVC	Barry	03,05,06,07,08,09	66,51,62,63,50,50
				10,11,13,14,15	66,55,68,66,56
	West Germany	CWH/Huls	Marl	09,10,29	61,61,62,
1949	Belgium	Solvay	Jemeppe	01,02	58,62
1950	France	PCUK/Atochem	Brignoud	02,04,05,06,12,19	59,49,65,58,49,59,
				20,24	51,43
	France	Rhone-Poulenc/ Chloe/Atochem	St Auban	07,22	50,58
	Holland	Shell	Pernis, Rotterdam		
	Norway	Norsk	Heroya, Porsgrunn	01	50
1951	Switzerland	Lonza/ICI/EVC	Sins		
1952	Italy	Montedison/ Moplefan	Terni	07	58
	Italy	Montedison/EVC	Porto Marghera	02,06	57,60
1953	Austria	Halvic/Solvay	Hallein		
	France	Solvay	Tavaux	08,13,18,25,26	57,63,63,62,63
	Italy	Solvay	Ferrara	03	53
	Spain	Rio Rodano	Hernani		
	United Kingdom	BXL/BIP/NORSK	Aycliffe		
	West Germany	Hoechst	Gendorf	18	55
1954	West Germany	Dynamit/Huls (since 1.1.89)	Troisdorf	01,02,08,12,16,17	56,57,54,61,55,61,
				19,20,21,22,27,30	54,61,62,61,55,51
				34,35,36,37,38,39	56,68,53,69,54,68
1955	Spain	Monsanto Iberia	Monzon		
1956	Spain	Caigsa			
		Hispanic/Solvay	Torrejavega	01	64
1958	West Germany	Solvay	Rheinberg		
1960	Italy	ANIC/SC Ravenna /EVC	Ravenna	04	59
	West Germany	Lonza/ICI/EVC	Waldshut	06,13,28	62,60,60
1961	Italy	Montedison/EVC	Brindisi		
1962	Portugal	Cires	Oporto		
1965	France	Rhone-Poulenc	Montlucon	21	59
	Italy	Pozzi	Ferrandina		
	Italy	Pensac	Mira, Venice	05	67
	West Germany	Wacker	Cologne		
1966	West Germany	Hoechst	Knapsack (Frankfurt)	05*	60
1967	France	Atochem	Balan		
	Spain	Rio Rodano	Miranda de Ebro		
	Greece	Esso Pappas	Diavata Salonika		
1968	Belgium	Badiphil	Antwerp		
1969	United Kingdom	Vinatex/Norsk	Staveley		
	Italy	Rumanica/EVC	Cagliari Sardinia		

Continued

Table 8 - Continued

WESTERN EUROPE PVC PRODUCERS - START UP DATES vs ASL CASES (OMITTING GO3 & It.01)

START-UP YEAR	COUNTRY NAME	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st Exposure
1970	Italy	SIR	Porto Torres Sar		
	United Kingdom	ICI/EVC	Runcorn		
1971	Spain	Hispavic/Solvay	Martorell		
	Sweden	Kemanord/Norsk	Stenungsund		
	United Kingdom	BP Chem	Baglan Bay		
1972	Finland	Pekema	Svartback		
	Holland	DSM	Beek Limburg		
1976	France	Soc Art D'vinyl (CDF)	Mazingarbe		
1977	Spain	Monsanto Iberia	Tarragona		
1982	West Germany	ICI/EVC	Voslapp		
			Wilhelmshaven		

* Laboratory worker in Research Department

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TABLE 9

USA PVC PRODUCERS - START-UP DATES vs ASL CASES

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1939?	*UCC	S Charleston	07,13,19,21,27 28,29,31,35	44,42,43,46,41 44,42,46,44
	Dow	Midland (made Saran copolymer)		
1940?	*BFG	Louisville	01,02,03,04,05, 06,09,16,17,22, 26,33,34,37,40	48,55,45,52,44, 62,45,50,55,47, 47,54,55,53,42
	*UCC/Dow	Texas City (Partially closed 1977)		
1947	Goodyear	Niagara Falls	08,10,11,20,41	46,51,46,55,49
1948	Firestone/ Occidental	Pottstown	12	49
	Uniroyal	Painesville (closed 1975)		
1950	Monsanto	Springfield (Closed 1975)	32	51
	Dow	Midland (No PVC since c 1975)		
1952	BFG	Avon Lake	18	54
	Diamond/BFG	Deer Park		
1953	Diamond/BFG	Deer Park		
1954	General Tire/ ** DiversiTech	Ashtabula (Closed 1983. Reopened 1986 by Vygen)	36,43	56,55
	Air Products	Pensacola (Pace)		
1956	Atlantic Refining	Brooklyn (Closed late 1960s)		
	Borden	Leominster (Closed 1984)		
	Conoco	Hebronville (Closed 1975)		
	BFG	Niagara		
	Great American Plastics	Fitchburg (Closed 1983)	23	58
	Hooker	Hicksville (Closed 1980-81)		
	Pantasote	Passaic (Closed 1984)	39	60
1957	Atlantic Tubing	Cranston (Closed 1967)		
	Tenneco/ Occidental	Flemington NJ (Closed 1985)	30	59
1958	Keysor Century	Saugus, Cal		
	Air Products	Calvert City (Paducah) (Closed March 1982 Re-opened October 1983)	38	63
1960	BFG	Long Beach, Cal (No PVC now. Formerly shown as Watson)		
	Borden	Illioopolis		
1962	Tenneco/Occidental	Burlington NJ		
1963	Conoco/Vista	Aberdeen, Miss		
	Stauffer	Long Beach, Cal (Closed 1982)		
1965	Conoco/Olin	Assonet, Mass (Closed by Olin 1975)	42	68
	Ethyl	Baton Rouge (Closed 1984)		
1966	Diamond/Georgia Gulf	Delaware City		
	Gen Tire/Pantasote	Mt Pleasant W Va (Closed 1982)		
	BFG	Henry, Ill		
	Stauffer/Formosa	Delaware City (Sold to Formosa 1981)		
1967	Allied/Robintech/ Georgia Pacific	Painesville, O. (No PVC made by Robintech. GP converted to polystyrene)		
	Hooker/Occidental	Burlington NJ		
1968	Firestone/Occidental	Perryville (Closed 1982)		

Continued

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TABLE 9 (Continued)

USA PVC PRODUCERS - START-UP DATES vs ASL CASES

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1969	BFG	Pedricktown NJ		
	Goodyear/BFG	Plaquemine		
1971	Conoco/Vista	Oklahoma City		
1972	Nat Starch	Meredosia, Ill		
1973	Borden	Springfield		
1974	Atlantic Tubing/ Tallyrand	Cranston RI (Closed 1982)		
	Shintech	Freeport, Tex		
1975	Certain-teed	Lake Charles		
	Georgia Pacific/ Georgia Gulf	Plaquemine, La		
	Tenneco/Occidental	Pasadena, Tex		
1979	Firestone/ Occidental	Addis (formerly shown as Plaquemine)		
1983	Formosa	Point Comfort, Tex		
1986	Vygen **	Ashtabula, Ohio		

* My databank has no information on UCC before 1946 or BFG before 1950

** Refer to same plant at Ashtabula, bought by Vygen from DiversiTech.

NB Some of the plants in this list were closed down, some have changed ownership over the years, some have changed their product.

R&S 004914

(Review date 1 January 1990)

TABLE 10

CANADIAN PVC PRODUCERS - START-UP DATES vs ASL CASES

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1943 (1941?)	Goodrich (Formerly Gulf) (Formerly Shawinigan Chemicals) (Formerly Canadian Resins & Chemicals)	Shawinigan	01,02,03,04,05 06,07,08,09,10, 11,12	44,43,41,45,44, 47,46,61,46,53 43,45
1951	Monsanto	La Salle (Closed 1975)		
1957	Goodrich	Welland (Niagara)	13	57
1966	Esso (Imperial Oil)	Sarnia		
1979	Diamond Shamrock Alb/ BF Goodrich	Fort Saskatchewan		

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(Review date 1 January 1990)

TABLE 11

EASTERN BLOC PVC FACTORIES - START-UP DATES vs ASL CASES

START-UP YEAR	COUNTRY NAME	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st Exposure
Pre 1939	East Germany	State Company	Schopau		
1941	Russia	State Comps	Vladimir et al		
1950	Yugoslavia	Jugo Vinil	Split	01,02,03,04	53,50,54,58
1951	Czechoslovakia	State Comps	Novaky	01,02	57,50
1955	East Germany	State Comps	Bitterfeldt		
1956	Rumania	State Comps	Icechim		
1957	Poland	State Comps	Osweicim (Dwory)		
	Rumania	State Comps	Tirnaveni		
			Turda		
1958	Rumania	State Comps	Risnov		
1959	Hungary	State Comps	Berente Borsod		
1961	Rumania	State Comps	Borzesti		
1963	Yugoslavia	Ohis	Skopie		
1965	Bulgaria	State Comps	Varna		
1967	Poland	State Comps	Tarnow		
1969	Russia	State Comps	Djerjinsk		
1970	Rumania	State Comps	Rimnicu Vilcea		
	Russia	State Comps	Volgograd		
1972	Yugoslavia	Vinilplastika	Zadar		
1975	Czechoslovakia	State Comps	Neratovice		
	Russia	State Comps	Kalush Area		
1976	Yugoslavia	Hip	Pancevo		
1977	Rumania	State Comps	Rimnicu Vilcea		

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(Review date 1 January 1990)

TABLE 12

JAPANESE PVC PRODUCERS - START-UP DATES vs ASL CASES

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1950	Chisso Corp Kanegafuchi Kag Tekkosha	Minamata Osaka Sakata	02	58
1951	Mitsui Toatsu	Nagoya	01, 03	53, 65
1952	Mitsubishi Mon Sumitomo Kag	Yokkaichi Kikumoto		
1951	Denki Kagaku Nippon Zeon Toa Gosei	Shibukawa Kambara Tckushima		
1955	Ryo-Nichi	Uozu		
1956	Nippon Zeon Nisshin Kagaku	Takoaka Takeo		
1957	Kureha Kasei Shinetsu Kag	Nishiki Naoetsu		
1960	Denki Kagaku Kanegafuchi Kag	Ohmi Takasago		
1964	Chisso Corp	Chiba		
1966	Tokuyama Seksui	Tokuyama		
1967	San Arrow Kagak Sumitomo Kag	Tokuyama Chiba		
1968	Ryo-Nichi Shinetsu Kag	Mizushima Tokuyama		
1970	Chisso Corp Denki Kagaku Kanegafuchi Kag Kawasaki Yuki Mitsui Toatsu Nissan Kagaku Shinetsu Kag	Mizushima Goi (Chiba) Kashima Kawasaki Sakai Chiba Kashima		
1971	Tekkosha	Yokkaichi		
1973	Asahi Glass	Hayatsuki		
1974	Toyo Soda	Sakata Yokkaishi		
1975	Central Kagaku Toyo Soda	Kawasaki Yokkaichi		
1977	Unknown	Kashima		

R&S 004917

(Review date 1 January 1990)

TABLE 13

SOUTH AND CENTRAL AMERICAN PVC PRODUCERS

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1953	Monsanto Mexica	Lecheria (Mexico)		
1954	Policyd	Mexico City (Mexico)		
1955	Geon Do Brazil	Sao Paulo (Brazil)		
1956	Elchlor/Solvay	Sao Caetano (Brazil)		
1960	Electrochlor Vioplastic	Capitan Bermudez (Argentina) Mendoza (Argentina)		
1961	Indupa	Cinco Saltos (Argentina)		
1965	PET Columbiana	Cartagena (Colombia)		
1966	Carburo De Col	Medellin (Colombia)		
1967	Plasticos Omega SOC Paramonga	Mexico Paramonga (Peru)		
1968	Primex	Puebla (Mexico)		
1970	Policasa Petro Dow	Managua (Nicaragua) Conception (Chile)		
1971	Polimeros Mex	St Martin Puebla (Mexico)		
1975	Rico Chemicals	Guyanilla (Puerto Rico)		
1976	Petroplas	EL Tablazo (Venezuela)		
1977	Indust Resistoc	Tlaxcala (Mexico)		
1978	Huls Brasil Polychem Policyd	Cubato (Brazil) El Salvador Coatzacoalcos (Mexico)		
1979	PET Camacari	Camacari Bahia (Brazil)		

R&S 004918

(Review date 1 January 1990)

TABLE 14AUSTRALASIAN PVC PRODUCERSSTART-UP DATES

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
Mid 1950s	ICI Australia	Botany, Sydney		
1960s	B F Goodrich	Melbourne		
Late 1970s	ICI Australia	Laverton Melbourne		

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(Review date 1 January 1990)

TABLE 15
MIDDLE EASTERN PVC PRODUCERS
START-UP DATES

START-UP DATE	COUNTRY NAME	COMPANY NAME	LOCATION
Sept 1986	Saudi Arabia	National Plastic Company (Ibn Hayan)	Arabian Petrochemical Company Madiant Al-Jubail Al-Sinahyah

R&S 004920

TABLE 16NUMBER OF FACTORIES IN THE WORLD PRODUCING PVC
So far as known at 1 January 1990

(See Tables 8-15 of this ASL Register)

	CLOSED	OPEN
Western Europe	1	53
USA	20	30
Canada	1	4
Eastern Bloc	-	23
Japan	-	36
South and Central America	-	22
Australasia	-	3
Middle East	-	1
	22	172
	—	—

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due to VCN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS

R&S 004922