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World Register
of Cases of

ANGIOSARCOMA OF THE
LIVER (ASL)
due to VCM

REVIEW DATE

1st JANUARY 1989

Collated by

Dr. Brian Bennett

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R&S157876

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LIVER ANGIOSARCOMA CASES

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FEBRUARY 1989

CIRCULATION OF REGISTER

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BARRAT Dr G	AECRP, Commeny, France
BAXTER Dr Peter	University of Cambridge, UK
BAYLAC Dr	Atochem, Chauny, France
BELLE Dr	Rhone Poulenc, Aubervilliers, France
BENECH Dr M	Naphtachimie, Lavera, France
BENNETT Dr B	ICI Hillhouse, UK
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BERTUZZI M	EVC, Brussels, Belgium
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BRAUN Dr C L J	Akzo, Arnhem, The Netherlands
BREWER Dr M D	Imperial Oil, Sarnia, Ontario, Canada
BRYSON Dr D D	ICI Wilton, UK
BYREN Dr David	Nobel Industrier, Sundsvall, Sweden
CARTER Dr J T	EMAS, London, UK
MANZARITI A	EVC, Brussels, Belgium
LA C	EVC, Brussels, Belgium
CHANCE M	ICI Runcorn, UK
CLARKE Dr E A	Ontario Cancer Foundation, Toronto, Canada
CLAYTON H	Norsk Hydro, Newton Aycliffe, UK
CONTASSOT Dr J C	Atochem, Saint-Fons, France
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DELORME Dr F	Quebec, Canada
DEPLAN Dr F	Atochem, Jarrie, France
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FINCHAM Ms Shirley	Alberta Cancer Board, Edmonton, Canada
FOA Prof V	Inst Industrial Medicine, Milan, Italy
FORMAN Dr D	Imperial Cancer Research Fund, Oxford University, UK
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GROISMAN D	Electrochemical Industries, Acre, Israel
HILMAN Dr D W	Diamond Shamrock Corp, Dallas, Texas, USA
HOWARD Dr J K	University of Otago School of Medicine, Wellington, New Zealand
HUMPHRY Dr N F	ICI Australia, Melbourne, Australia

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KLEIN Dr H	Dynamit Nobel, Troisdorf, Germany
LAGAST Dr H	Solvay, Brussels, Belgium
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LELBACH Prof Dr WK	University of Bonn, West Germany
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LEWIS Dr P	Chemical Industries Association, London, UK
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LO MARTIRE Prof N	EniChem, Milan, Italy
LUSS R D	Occidental Chemical, Pottstown, Pennsylvania, USA
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MATTIUSI Dr R	Montedison, Milan, Italy
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MOKKA Mr	Neste Oy, Espoo, Finland
MONTESANO Dr R	IARC, Lyon, France
MONOZ MOUTON Dr M	Duperial SAIC, Buenos Aires, Argentina
MacSWEEN Prof RNM	Rio Rodano, Madrid, Spain
NAKAMURA Dr S	Western Infirmary, Glasgow, Scotland
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PADDLE Dr G M	Health & Safety Executive, Bootle, UK
PAGLIALUNGA Dr S	ICI Central Medical Group, Alderley Park, UK
PAQUET Dr Christiane	Montedison, Novara, Italy
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PIRASTU Dr Roberta	ICI Runcorn, UK
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RAMBAUD Dr J	University of Toronto, Ontario, Canada
RICHARD Dr A	RP Recherches, Antony, France
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SIGRIST Dr J	CMA, Washington DC, USA
SIMONATO Dr L	Shell Chimie, Berre L'Etang, France
SMITH Prof Allan H	IARC, Lyon, France
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SMITH Dr P M	ICI Hillhouse, UK
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TACHECI Dr H	Hoechst AG, Frankfurt, Germany
TAMBURRO Prof CH	University of Louisville, Kentucky, USA
ten BERGE Dr W F	DSM, Geleen, The Netherlands
TENKHOFF Dr N	Huls AG, Marl, Germany
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TERWIESCH Dr B	Huls AG, Marl, Germany
THERIAULT Dr Gilles	McGill University, Montreal, Canada
THIIS-EVENSEN Dr E	Norsk Hydro, Porsgrunn, Norway
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TONER H P	Society of the Plastics Industry, Washington DC, USA
VAN DER MERWE Dr H J	AECI, Sasolburg, South Africa
WALLACE J R	Esso, Sarnia, Ontario, Canada
WALTEMAE H	BF Goodrich, Cleveland, Ohio, USA
WEJDLING S O	Norsk Hydro, Stenungsund, Sweden
WILLIAMS Dr DMJ	BP Chemicals International, Barry, UK
WILSON Prof R	Harvard University, Cambridge, Massachusetts, USA
YORK J	EVC, Brussels, Belgium
YOUNG A E	EVC, Brussels, Belgium
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From: Dr B Bennett, Occupational Health Department, ICI Chemicals & Polymers,
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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 1989

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

- 1 The 7 new cases in the Register are the following: Canada 13; France 23, 24 and 25; Italy 07; UK 15 and 16.
- 2 There are amendments from the previous Register against the following cases: Canada 11 and 12, UK 14 and US 41.
- 3 I would like to thank the following for information about new cases: Dr Dietz, Dr Contassot, Dr Lagast, Dr Benetta, Dr Williams, Dr Smith, Dr Lee.
- 4 For additional information about other cases I thank also Dr Delorme, Monsieur Bibeau, Dr C A Johnson, Mr Roy N Johnson and Professor Leibach.
- 5 So far as I know the following people are still alive: cases France 15, 22, 23 and 24; Germany 31 and 32; US 33 and 36. Is this correct? This is important information for the industry world-wide and I would appreciate news, especially regarding the cases in Germany, please.
- 6 Tables 4G and 4H have been enlarged by the addition of the factories at Tavaux (France) and Hillhouse (UK), as each of these has now had 4 cases.
- 7 I should be glad if all recipients of this Register would continue to keep me fully informed of any new cases, or give the name and address of someone who can send me the necessary details. I have again attached a blank sheet at the back of the Register so that information can be supplied under the appropriate headings, so far as possible. Please also send any other relevant information about earlier cases, or about factory changes.
- 8 RESEARCH: (a) May I again ask that all individuals involved in relevant research keep me informed and if possible send me reports. Perhaps recipients of this Register would pass on my request.

(b) Co-factors - I have recently met Professor Carlo Tamburro at the University of Louisville, USA, to assess the data which many of you kindly sent in response to my questionnaire about possible co-factors with Vinyl Chloride. We found there was no correlation within Europe but among the North American cases there was a suggestion of a co-factor effect on latency. In plants where Di-Ethyl Maleate had been used, the latency period seemed to have been shortened.
- 9 There was an excellent response to the circular I sent in June 1988 about the Register mailing list. Thank you. Please continue to keep me up to date with news of retirements, movements and changes of address.

FROM: Dr Brian Bennett, Occupational Health, ICI Chemicals & Polymers Limited
Hillhouse Site, P O Box 4, Thornton-Cleveleys, Blackpool, FY5 4QD, England

February 1989
BB/BGS

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LIVER ANGIOSARCOMA CASES (REVIEW DATE - 1 JANUARY 1989)

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BELGIUM

LIVER Angiosarcoma Cases - (Review Date : 1 January 1989)

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>BELGIUM</u>															
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 in 6 to 9m ³ autoclaves 1968-1972 exposed to 50-200 ppm 8 hrs per day in 25m ³ autoclaves 1972-1974 exposed to 50-200 ppm in auto- clave room 1974-1975 ppm 1975- 50 ppm RETIRED 1 Feb 1975	Autocleaner 114 yrs (foundry (2 yrs) Polymarker (15 yrs) 13 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 Hospitalized May 1976 Complete Clinical and career details are given in a paper by Hublet et al in Arch. Belg. Med. Soc., Hyg. Med., Toxic. 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 15 yrs 5 mths Operator 13 yrs 9 mths	Pireman 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 Sluiter.

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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
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	03.07.68	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 125 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 DELORNE in Annales d'Anatomie pathologique Paris, 1978 Vol 23 No 2 pp105-114 claims this case had both a hepatoma and ASL simultaneously.

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CANADA
Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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															
10		16.05.15			1953	1976	61	23	14	00.04.77	Yes		Reactor cleaner	Furnace op. maintenance, packaging	Ex-smoker
11	LC	13.10.25	Gulf	Shawinigan	1943	Nov 85	60	42	5	05.04.86	Yes	High	1943-47 Operator & Supervisor PVC Plant	Retired 1972 (Age 47)	Letters from Dr Fernand Delorme, Pathologist & M Bibau, BPC
12	BC	14.09.20	Gulf	Shawinigan	1943	Mar 82	61	37	27	31.03.82	Yes	High	1943-55 Autoclave Operator, PVC Resins	Retired 1972 (Age 52)	Letters from Dr Fernand Delorme, Pathologist & M Bibau, BPC
												Low	1955-65 PVC Manufacture		
												Medium	1965-72 Autoclave Operator, PVC Resins		
13	SS	10.06.26	BPC	Niagara Niagara	1957	1987	60	30	23	26.1.87	Yes	1957-70 High 1970-80 Low	1957-70 Poly Cleaner Operator 1970-80 Supervisor	Retired 1980 (Age 54)	Information from Dr N M Dietz, BPC, 1988

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WPI/ASL - LANGLOCASES.9

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 89)

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
CZECHOSLO- VAKIA															
01		28.06.28	State Co	Novaký	01.07.57	24.12.73	45	16	16	24.12.73	Yes		Autoclave Cleaner	IARC letter of 1-4-82 (giving details from Prof A David of Centre for Hygiene and Diet Diseases.	
02		06.07.27	State Co	Novaký	01.11.50	27.11.64	37	14	15	26.11.64	Yes		Autoclave Cleaner	IARC letter of 1-4-82 gave somewhat altered dates for this case. I have accepted the changes since the dates come from Prof A David of the Centre of Industrial Hygiene and Occupational Diseases. My dates come originally from NIOSH.	

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FRANCE
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 89)

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
FRANCE															
01	IN	15.04.24	RP	Rouen- tillon	00.01.46	18.02.67	43	21	19	19.02.67	Yes	High	Autoclave worker and cleaner 19 yrs		(Ref. Rivier et al Arch. Mal. Prof. 1 30 n° 13 Nov 75 p 171-177
02	SIN	03.06.11	PCUK	Brignoud	06.07.59	15.01.75	63	16	12	24.01.75	Yes (NIOSH no comment)	High	12 yrs on monomer 10 yrs on polymer- ization	Italian origin	(Ref. IC Bonneton et al "Nouvelle Medicale" 15 Nov 1977 p 735
03	NAV	04.01.20	RP	St Fons	00.00.46	15.01.75	55	29	29	29.06.75	Yes	High	Polyworker 10 yrs as autoclave cleaner 13 yrs Compounding	VCM production 16 yrs Italian FOU Shepherd, Ravay, Mason	(Ref. Rety et al Arch. Mal. Prof. 1 37 n° 16 June 77 p 551-555
04	MOE	27.01.27	PCUK	Brignoud	19.10.49	16.01.76	49	26	26	04.01.76	Yes	High	Monomer production worker 18 yrs PVC filtration 18 yrs		
05	19	29.01.38	PCUK	Brignoud	18.01.65	13.05.76	38	11	11	13.05.76	Yes	High	Polyworker 11 yrs	1) Thoracotomy 19th Feb 1976 2) Scintigraphy 1976 3) Haemorrhage from ASL 4) Right Hepatectomy	(Ref. P. Couderc et al "Semaine des hopitaux" 10 Septembre 1976 Previously had bone "angiosarcoma" Also Pillchowski et al "La Nouvelle Medicale" 17th July 1979 Page 268)

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LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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
FRANCE															
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) 12 yrs filtration 10-11 yrs polyworker and works lab?		This man had AOL prior to AS. Ann. de Med. 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 for- 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	Tevann	23.05.57	03.12.75	42	19	19	30.01.77	Yes	Moderate	16 yrs packer 16 autoclave cler 16 yrs autoclave worker		Had been tunnel worker previously
09	RFX	08.10.14	RP	St Fome	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, starcheaper & 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 4 1979 pages 741-3.

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FRANCE
Sheet 3

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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
France															
10	VP	24.05.19	BP	St Fons	00.12.54	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	BP	St Fons	00.01.41	12.08.78	64	37	31	13.11.78	Yes	High	1941-1946 polymer- ization general purpose worker 1946-1972 VCH synthesis (HCl & Acetylene) Foreman (agent de matries) 1972 retired		
12		14.04.14	PCUR	Brignod	09.02.49	00.05.79	65	30	27	23.06.79	Yes	High	Monomer production and polymer- ization operator		
13		19.01.31	Solvay	Tavaux	23.09.63	26.06.79	40	16	13	22.08.79	Yes		Autocleaner 12 yrs, (Auto- operator 19 yrs, (Copolymers 14 yrs	12 yrs as cycle mechanic, 110 yrs as mechanic in sanitary ware manufacture	Cigarette smoker until 1974, ill all of 1977 due to (Oesophageal varices, Surgical intervention 25.05.79 (right hepatectomy)
14	HJ	05-04-24	Chloe Olefin (Formerly BP)	St Fons	1943	00.07.81	37	38	34	29.07.81	Yes	Very High	1943-1975 All types of maintenance and internal- manufacture entirely 1975-1979 in VCH poly Process	1975-1979 All types of maintenance work	

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FRANCE
Sheet 4

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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
France 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 17 yrs	Autoclave cleaner 1955-1962 Autoclave operator 1962-1982		Left Hepatectomy 1983 J C Contassot (letters of 15 10 1983 and 29 7 86.
16	CIN	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	Polymerization Process Worker Maintenance Worker Health & Safety Agent		Retired Jan 1979. J C Contassot (letters of 15 10 1983 and 25 7 86.
17	NAR	22.02.23	Chloe Chimie (Formerly RP)	St Fons	17.06.48	03.04.83	60	34	26	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 15 10 1983)
18	IR	14.07.42	Solvay	Taverny	09.09.63	21.03.84	42	21	21	27.12.84	21.03.84	High-12 yrs Low - 9 yrs	Autoclave Cleaner		109.03.84 Right Hepatectomy 05.05.84- 24.09.84 chemotherapy for lung- metastasis ; partial remission. 108.84 - liver recurrence. 110.84 - lung; evolution of the disease

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R&S157889

LIVER Angiosarcoma Cases - (Review Date: 1 Jan

FRANCE
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
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 15.4.86
20	BR	02.03.23	Atochem	Brignoud	1951	27.12.85	43	34	22	26.12.85	Yes	High	Autoclave operator and cleaner	In other parts of factory since 1946	(Partial) 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 14 years	Maintenance worker	Hepatic test May 84 normal. Hepatic test May 86 showed abnormalities. Letter from Dr Berrat 18.07.86.
22	AL	15.08.28	Atochem	St Auben	01.09.58	05.11.87	59	29	26	Alive	Yes	High 1958-70 Low 1970-84	12 years Autoclave worker. 14 years in Control Room		Letters from Dr Contassot, Atochem 12.12.87 and 29.7.88.
23	HA	07.02.27	Atochem	St Fons	1944	1988	63	44	28	Alive	Yes	High	Autoclave Cleaner & all PVC production jobs		Liver transplant May 1988. Information from Dr J C Contassot Atochem, 1988
24	DO	08.12.26	Atochem	Brignoud	1943	1988	62	45	35	Alive	Yes	High	PVC Production 1- 2 years MCV Detection 1- 3 years PVC Production maintenance 1- 30 years		(Partial) Hepatectomy, Apr 88, Chemotherapy Information from Dr Contassot, Atochem, 1988
25	BB	02.03.30	Solvay	Taverny	1962	1988	58	26	23	07.05.88	Yes	High (11 years) Polycleaner High 1- 5 years Polyfloor 1- 6 years (12 years) Control Room Low 1- 12 years		Primary Liver Tumor Metastases (lung, brain, bone, spleen, kidney. Information from Dr H Legast, Solvay, November 1988	

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R&S157890

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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															
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	14	10.10.73	Yes (NIOSH)		Filling pesticide aerosol cans with VC		Reported under (non polymer- ization 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	Clinical details in paper by Cokel et al (Virchows Arch A Path 1976 372 p 195-203)

GERMANY
Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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 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)		IG Chemie (says chemistry laboratorian in the Techno- logical Research Department" (NIOSH says assistant factory chemist which may be wrong translation)		Confirmed (Reported under non-polymer- ization workers in NIOSH list of 31.3.77 and 31.78. I don't think this is a correct classification by NIOSH. The man may have been involved in VCM polymerization 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	†	

* In his letter of 1st April 1982, Dr Montanaro of IARC says in Sweden's National Board of Health gives 20-02-70 as date of diagnosis for Case 05 and 12-02-72 for Case 06.

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GERMANY
Sheet 3

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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 19 yrs 150 ppm, last 1000 ppm. Next 3 yrs av. 175 ppm. Last. 1 yr av 35 ppm
10 (NIOSH gives as Case 11)		00.00.34	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 19 yrs 150 ppm, last 1000 ppm. Last yr av 175 ppm. CNH 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	13 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 16 yrs		

* In his letter of 1st April 1982, Dr Montanaro of IARC says in 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.

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GERMANY
Sheet 4

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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 13		00.00.14	7	7	00.00.60	08.04.78	63	18	14	19.05.78	Yes				IF W Best letter of 130th June 1980 enclosing data from Mr N 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				IF W Best letter of 130th June 1980 enclosing data from Mr N 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	1	Autoclave cleaner and worker. Drier operator. Later shift leader		Angiosarcoma confirmed 09/79. Some detail of this & also cases 19, 13, 15, 16 & 17 given in INRW Report for 1978
16		00.00.23	4	4	10.01.55	07.08.78 (Lalbach suspected ASL at Feb 1975 (laparotomy)	55	23	20	07.08.78	Yes (ASL and (Hepatocellular) (Carcinoma	High	Autoclave worker till 1984. Leader and master		Angiosarcoma confirmed, full details of illness since March 1973 given in INRW Med Insp Rep for 1978. Different details given in "VC Associated Disease" by Lalbach and Maruceller (1981) p71.

* In his letter of 1st April 1982, Dr Montesano of IARC says in Sweden's National Board of OS Health given 20-02-70 as date of diagnosis for Case 01 and 10-05-72 for Case 02.

GERMANY
Sheet 5

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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 17 (NIOSH given 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 given full details. Vinyl chloride disease diagnosed 02-02-73. Oesophageal varices. (Radiologically confirmed aortic 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 M G F Adams
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 M 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 M 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 M G F Adams

* In his letter of 1st April 1982, Dr Montesano of IARC says in 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.

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GERMANY
Sheet 6

LIVER Angiosarcoma Cases (Rev Date: 1 Jan 1989)

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
GERMANY 23		00.00.27	8	8	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	1949	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 Seimair (Munich) letter 22.08.83. Friedel letter 19.04.85
26		00.00.22	2	2	1953	14.06.76	54	22	22	22.11.82	Yes	High	Polyworker		(Chronic hepatitis, angiomasia, sinusoidal ectasia. Friedel letter 23.12.86.
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
28		21.11.23	7	7	01.10.60	11.08.85	61	25	25	25.08.85	Yes	High	Process worker 1947- 84 (01.10.60) -31.03.84 (PVC product- ion, agitator tower).		(Annual VCM screening 24.04.85; no complaint, no abnormality detected. 1970 two-thirds gastric resection 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	Alive?		†	Autoclave cleaner		(Haemangiosarcoma. Friedel letter 23.12.86.
32		00.00.30	8	8	1955	00.04.85	55	30	21	Alive?		†	Polyworker Autoclave cleaner		(Haemangiosarcoma. Friedel letter 23.12.86.

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

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R&S157896

ITALY
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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
ITALY															
01 (On NIOSH supple- mentary list)	LG	15.06.34	PANSAC	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	VC	14.03.20	Solvay	Ferrara	00.01.53	10.07.75	35	22	21	10.07.75	Yes	High	Autocleaner 18 yrs (1953- 61) Autoclave operator 12 yrs (1961- 72)	1972-5 did a variety of jobs including PVC packing.	"
04	FB	20.07.37	ANIC	Ravenna	00.04.59	00.01.81	43	21	21	30.03.81	Yes	12 yrs - Very High 5 yrs - Medium 4 yrs - Low	11 yr - Monomer operator 20 yrs - Autoclave operator & other duties [in suspen- sion polymer- ization. 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 Danesi	19.03.37	PANSAC	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 Englielunga told of 2 Aug 1983

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

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

The review of the case by the National Board of Health in Sweden's National Board of Health gives 20-02-70 as date of diagnosis for Case 01 and 15-05-72 for Case 02.

R&S157897

ITALY
Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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
ITALY															
06	CZ	21.06.36	Montedison	Porte Marghera, Venice	01.10.60	06.12.85	49	25	25	13.02.86	Yes	High 1960-71 Medium 1971-74 Low 1975-85	PVC manufacture 11 years as Autoclave cleaner 1960-71. 14 years in Control Room 1971-85		Letters from Dr Chiossini, Venice, 22.09.87 and 11.01.88
07	AP	09.02.25	Moplefan	Torini	1958	21.01.86	60	28	22	05.04.86	Yes	1958-74 High 1974-80 Medium	Maintained VC Machinery (not operating for cleaning autoclaves) VC levels reduced from 1973/74		Information from La medicina del lavoro, Italy, Vol 79 No.1 Jan-Feb 88, and Dr Benetta, EniChem.

... says in 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.

R&S157898

CONFIDENTIAL - S 000071

JAPAN

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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>JAPAN</u>															
01	Tsueji 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 1000 ppm up to 1974	13 yrs auto- clave cleaner 1964 - assigned to different work since shed ill health		Japan Times (25.10.75 & Japanese PVC Assoc letters of 31.03.78 & 30.11.87
02	SC	02.06.39	Kanegafuchi Chemical	Osaka	00.11.58	10.08.76	37	17	13	10.08.76	Yes	Not known	In polymer- ization work including autoclave cleaning		Japanese PVC Association letters of 31.03.78 & 30.11.87
03	TS	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

... says in Sweden's National Board of Health gives 20-02-70 as date of diagnosis for Case 01 and 15-05-72 for Case 02.

R&S157899

CONFIDENTIAL - S 000072

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

CONFIDENTIAL - S 000074

R&S 157901

SWEDEN

LIVER Angiosarcoma Cases - (Review Dates 1 Jan 1989)

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
SWEDEN															
01	HU	23.06.27	Kemanord	Sundevall	14.08.51	20.10.70	43	19	18	20.10.70	Yes		Polyworker		
02	BL	27.11.11	Kemanord	Sundevall	00.01.45	00.08.72	61	27	27	16.08.72	Yes	High	VCM production		Mr Sjoellin's letter of 128 March 1978 confirms BL was a monomer worker who was heavily exposed, probably even more so than is normal reactor cleaner
03	HE	10.06.10	Kemanord	Sundevall	00.05.47	18.03.76	65	29	21	19.03.76	Yes	High	Polyworker		
04	AL	16.11.14	Kemanord	Sundevall	00.00.46	12.05.77	62	31	31	12.05.77	Yes	High	1946-1958 polymer- ization 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 Byron letter 18.8.77 to CEPIC
05		12.03.19	Kemanord	Sundevall	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 12nd Nov 1981 from Dr David Byron

* In his letter of 1st April 1982, Dr Montecano of IARC says in 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.

CONFIDENTIAL - S 000075

R&S157902

ICI CHEMICALS & POLYMERS

VPX/ASL - LANGUOCASES, 26

84 21

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

cat 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
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	BJW	02.06.37	BP	Barry	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	54-5 Bagging Plant 55-6 vehicle Drier Plant 56-58 Autoclave worker 58-61 Chargehand Drier Plant 61-72 Foreman C 2/3 Plant	Pre-war fish packer 1938-45 army maintenance 1945-54 fish packer	

CONFIDENTIAL - S 000076

R&S157903

UK

Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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 05	JR	30.03.14	BP	Barry	08.01.51	00.10.79	65	28	21	19.11.79			1951-52 Polycleaner 1952-55 Latex 1955-60 Polyfloor 1960-64 Poly Chargehand 1964-70 Charging operator 1970-72 Drier operator		
06	CEP	1931	BP	Barry	1962	09.01.80	48/9	18	12	09.01.80			7 yrs Poly Floor Operator 5 yrs Crewman on Poly Floor		
07	ACB	26.04.20	BP	Barry	1963	00.00.80	60	17	8.2	13.06.80			Polycleaner 1963-5 Recovery 1965-1971		
08	WTH	08.05.24	BP	Barry	19.09.50	27.11.81	57	31	24	25.12.81		1950-1958 500 ppm 1968-1974 200 ppm	1950-51 Autoclave operator 1951-1957 Chargeman autoclave building 1957-1974 Shift supervisor autoclave building - Never cleaned autoclaves but supervisor's job entailed entering autoclaves to inspect them	1938-1948 Motor Mechanic 1948-1950 Operator on Acetylene Production Plant	

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UK
Sheet 3
LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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 09	EGP	07.05.25	BP	Berry	15.02.50	02.03.83	58	33	29	24.02.83	Yes	Medium	Polyworker	12 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	Berry	27.04.66	01.05.84	37	18	4.2	16.05.84	Yes	High - 11 (months (300 (ppm). Low - (18 months (50 ppm). (Medium - (21 months (200 ppm)	Polycleaner (1966-67, (Sprey-drier (bugger 1967- (1968. (Blow-down (stripper (operator (1968-70.	Heavy goods (vehicle driver (until final (illness, (18.06.84 from (Dr D M J (Williams	Information (given in (letter (18.06.84 from (Dr D M J (Williams
11	GLP	08.05.28	BP	Berry	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 (60-69, (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	Millhouse	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 P I Lee

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
UK 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	CS	15.06.42	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	23.08.21	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	25.05.22	ICI	Millhouse	1963	1988	66	25	12	12.11.88	Yes	1 year Low 9 years High 2 years Low	Packet Operator Autoclave Operator		Hepatic fibrosis 1974 Oesophageal varices Porta-caval shunt 1975 Information from Dr R Bennett, ICI, and Dr F I Lee, Blackpool Victoria Hospital 1988.

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

UK system of dates
DAY - MONTH - YEARUSA
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
USA															
01	Earl Perks	17.10.23	BPG	Louis- ville	09.12.48	03.03.73	49	24	21	03.03.73	Yes		Pot Cleaner (Block JAMA 1974) p 53	History given in Annals NY ACAD SCIENCES Vol 329 (1979) page 190 in Paper by B R Cottine of JAMA 1.7.74 p 53	Rolling Stone Art Ref 1 NY Acad of Sc Symp 1974 Also Block
02		19.08.33	BPG	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 Dinwiddie	25.05.15	BPG	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	BPG	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	BPG	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	BPG	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	07.10.44	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
USA															
09	Raymond (Gattle- 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 for 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 (Buchan)	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. (bugger (Dryer op. (stripping op. (3 yrs prior (service in (tyre plant	(Ref 1 + letter (of 26 April (1978 from (Russell A 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 Selg.
15															(Accountant; (ASL - No evi- (dence of VCM (exposure.

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
USA															
16	James Howard	04.11.27	BFG	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. (146-50 Army	(Table 4 in (Wagoner (Testimony to (US Senate (Confirmed in (M H Johnson (ltr 07.08.78
17	Peerenboom	06.05.31	RPC	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 H Johnson letter of 24.2.81 con- firmed death 16 years after diagnosis
18	Charlie Arthur	22.04.28	BFG	Avon Lake	15.09.54	00.00.75	46	21	13	02.11.75	Yes	113 yrs (autocleaner (18 yrs on (Estel (plasticiser (6 Carbonyl (operation	Navy Type Store	(Confirmed in (M H Johnson (ltr 07.08.78 (Alan Rolling (Stone mng. (15.01.76	
19	Virgil Christian	00.00.15	UCC	S Charle- ston	00.00.43	19.04.73	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				(NIOSH letter of 25.10.79
21	Chester Minkie	02.09.09	UCC	S Charle- ston	00.12.46	Early 77	67	30	22	02.01.77	Yes				(28 yrs with (UCC at SC (Retired (News release (21.2.77

ICI CHEMICALS & POLYMERS

MPX/ASL 2 - LANGUOCASES,3

age 28

SA
heet 4

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

UK system of dates
DAY - MONTH - YEAR

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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
USA															
22		102.10.23	BFG	Louis- ville	11.07.47	00.01.76	32	29	28	04.12.76	Yes				Louisville Times 26.1.76 said he was the 10th AS victim at Bella Lane of whom 8 had died by 26.1.76 in his letter of 16.09.81 Dr M N Johnson confirm this is the case described by Dannaher Tambarro & Tam in Feb 1980 Am J Medicine Vol 70 p280
23		100.00.23	Great American Chemical Company	Fitchburg Mass.	08.09.38	06.04.73	30	13	14	06.04.73	Yes				
24	Charles Edward Moore	17.05.17	DCC	3 Charle- ston	1939	27.05.77	60	38	24 (NIOSH says 26)	27.05.77	Cholangio- sarcoma (R Kaminski 26/2/79)	Medium to high for 24 yrs	1941-65 non- solvent vinyl resin unit and dispersion vinyl resins unit first as fitter helper, then shift utility man	1937-39 was off and on labourer 1939-41 may have been exposed as reactor cleaner 1943 became fitter 1946 became utility man	IR H Wheeler letter of 18.8.77 to J Stafford gives details Rose Kaminski letter of 26/2/79 IR Kaminski (5 Nov 1980) suggests that NIOSH will retain on 26.04.65 employment was terminated may be associ- ated with ASL.
(25)															IR H Wheeler letter of 20/2/79 and Rose Kaminski letters of 26/2/79 and 15/11/80
															Removal from register confirmed in R Kaminski letter of 5 November 1980

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USA
Sheet 5

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 19

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
USA															
26	John Berry	07.07.23	BFG	Louisville	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. 1111 August 1965. Terminated employment Jan 1966		Dr Kaminski letter of 26/2/79 and Prof. Yamburro letter of 19/1/79
27	J L Forrest	11.05.16	UCC	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	Dr H Wheeler letter of 4 Jan 1979 and (Charleston (Daily Mail 30.11.78 and Dr 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				Dr Kaminski letter of 16/4/79
29		12.10.07	UCC	S Charle- ston	00.05.42	00.03.80	72	38	16	01.03.80	Yes				Dr Kaminski letter of 19th June 1980
30	WVH	22.07.22	Tenneco Chemicals	Flemington	11.06.64	30.12.80	58	17	15	30.12.80	Yes	16 - Unknown 19 - Minimal	Maintenance Mechanic 16 yrs Elsewhere 11 yrs Boiler house Operator 19 yrs		16 5th Nov 1980
31		08.11.23	UCC	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 (the 1940s)	(Chemical Operator in (charge (reactor (from July 1976 (to date (Foreman (Aliphatic (Chemical (Operation	(From 1959 to 1976 Aliphatic (Chemicals (operator and (from July 1976 (to date (Also Dr Dacey letter of 16.10.81 and Dr H Wheeler letter of 19.11.81. (Also Dr Dacey letter of (07.03.83 re (date of death.	

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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
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's usual occupation as "kettle" operator" in and "chemicals industry".	(1940-1951 Various jobs (in polymer manufacture (BUTVAR (LUSTREX (1951-1964 Various jobs (around PVC (autoclaves (1964-1973 Various (chemical (jobs in PVC (polymerization (facility/ (Retired (01-03-73.		Information given in letter of 24 February 1982 from Dr (Walter C (Barnes of (Monsanto (Springfield to (Dr A Mann of (Monsanto (Europe.
33	S Ferguson Jnr	08-10-27	BFG	Louisville	09-09-54	11-05-82	54	28	28	Alive	Yes		Multiple jobs (including Poly Operator + Polycleaner.		(Prof Yamburro letter of 12 Aug 1982 + Dr W N Johnson letter of 28 Feb 1983).
34	Mr Byrum	29-01-34	BFG	Louisville	1955	03-11-82	48	27	10	04.08.83	Yes		(Poly Operator + (Autoclave (Cleaner (1955-65.	(1965 left BFG (to become a (Clergyman.	(Dr W N Johnson letter of 13 Nov 1982, (28 Feb 1983 (and 9 Aug (1984.
35		09-03-12	UCC	S Charles- ton	23-07-44	18-07-83	71	39	14	18-07-83	Yes	High from (1944 to (1955. (Medium from (1955-1958			(Dr Dacey letter of (5 Sept 1983).
36		27-06-32	(The General Tire and Rubber Co	(Amhtabula)	11-06-56	21-08-83	50	27	27	Alive	Yes	Moderate	(1956-56 (Labourer (1956-57 (prod helper (1957-70 (operator (1970-75 (electrician (1975-present (operator		(R W Landrie letter of (12 Sept 1983) (reported as (medical (May 1983). (Testing (commenced (May 1983)

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
USA 37	Mr J Payton	29.08.29	BPC	Louis- ville	1953	06.08.84	54	31	22	06.08.84	Yes	High	Worked irregularly in PVC area in the early days was a reactor cleaner 1953-75.		Information given in letter 09.08.84 from Dr M W 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 and recovery areas as well as charging operator.		Thrombocytopenia and leukopenia since since 1978. Cold 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.
39	J Menice	27.06.18	Pantacote	Pasensic	1960	March 1984	65	24	23	29.06.84	Yes	Low High Low Low	29.09.60 - May 66 - Vinyl Fabrication Plant May 66 - Aug 70 Utility Resin Operator (inc Jul 66) Sep 67 Operator (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 Kanite	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 Briel of Pantacote with letter of 24.02.86 from Dr Auerbach, Pathologist.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE	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
40	P P Gilmer	26.10.14	BPC	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 Diets, BPC, 10.3.87
41	A Buckley	2.02.15	Goodyear	Niagara Falls	1949	1987	72	38	27	20.08.87	Yes	High 1949-65 Medium 1965-77 Left PVC area for 6 months in 1965	Chemical Op/ Shift Sup/ Foreman, PVC Resin Production 1965-77 NY Plant	Retired 1977 (Age 62)	Letters from Prof Yamburro University of Louisville, 1987 and Dr C A Johnson, Goodyear, 1988

YUGOSLAVIA

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1989)

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
YUGOSLAVIA															
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*		VCH Production		*In his letter of 3 Oct 1978, Dr Spirtas of NIOSH changed the status of Case 02 to VCH production employee. Dr Spirtas also notified a new Case 03 also a VCH production worker.
03		21.12.31	Jugo Vinil	Split	04.06.54	11.01.76	45	22	22	11.01.76	Yes*		VCH 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 AnnumBy 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	.....	9
8	.....	10
9	.....	5
1980	.....	10
1	.....	5
2	.....	3
3	.....	10
4	.....	7
5	.....	6
6	.....	5
7	.....	3
8	.....	4
Total		<u>137</u>

N.B. 1 Does not include Italian 01 but does include German 03.

2 The 1977 total includes US case 24 which is a Cholangiosarcoma.

3 Does not include the following who are still alive, so far as known: Fr15, 22, 23 & 24, G31 & 32, US33 & 36.

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TABLE 2

Distribution of ASL Cases by Country

USA	38 ***
W Germany	31 ** ***
France	25 ***
UK	15
Canada	13
Sweden	5 ****
Italy	6 *
Yugoslavia	4 *****
Japan	3
Czechoslovakia	2
Belgium	2
Norway	1
Total	145

* Omit It01 - atypical case of PVC bag extruder.

** Includes G03 aerosol can filler.

*** Includes case US 24 which was diagnosed as Cholangiosarcoma; & Fri15, 22, 23 & 24, G31 & 32, US33 & 36, who are still alive, so far as known.

**** Includes one monomer worker.

***** Includes two monomer workers.

i.e	Western Europe	85
	North America	51
	Rest of World	9

Total 145

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

Of the 85 cases in W Europe, 73 have occurred in clusters at 12 factories. Of the 31 German cases, 28 have occurred in clusters at 4 factories.

	<u>ASL Cases</u>
Dynamit, Troisdorf, Germany	12
BP, Barry, UK	11
Wacker, Burghausen, Germany	9
Atochem (formerly Chloé Chimie, formerly RP), St Fons, France	9
Atochem (formerly PCUK) Brignoud, France	8
Kemanord, Sundsvall, Sweden	5
CWH, Marl, Germany	4
ICI, Hillhouse, UK	4
Solvay, Tavaux, France	4
Lonza, Waldshut, Germany	3
Solvay, Jemeppe, Belgium	2
Atochem, St Auban, France	2
	<u>73</u>

NB: There are 32 pre 1962 PVC plants in W Europe; 19 of these have had ASL cases (Ref Table 8)

(b) N America

Of the 51 cases in N America, 42 have occurred at four factories out of a total of 55 factories. In N America 42 plants have not had ASL cases.

	<u>ASL Cases</u>
BFG, Louisville, US	15
BFG, Shawinigan, Canada	12
UCC, S Charleston, US	10
Goodyear, Niagara Falls, US	5
	<u>42</u>

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.

(Review Date - 1 Jan 1989)

TABLE 4A

<u>Latency Periods (Years from first Exposure to Diagnosis)</u>				
	<u>Country</u>	<u>No of Cases</u>	<u>Total Years</u>	<u>Average</u>
<u>W Europe</u>	Belgium	2	35	17.5
	France	25	689	27.56 *
	Germany	31	632	20.38 *
	Italy	6	127	21.16
	Norway	1	22	22
	Sweden	5	122	24.5
	UK	<u>15</u>	<u>350</u>	<u>23.33 *</u>
		<u>85</u>	<u>1977</u>	<u>23.25</u> W Europe Average
<u>N America</u>	US	38	993	26.13 *
	Canada	<u>13</u>	<u>314</u>	<u>24.15 *</u>
		<u>51</u>	<u>1307</u>	<u>25.62</u> N America Average
<u>Rest of World</u>	Czechoslovakia	2	30	15.0
	Japan	3	59	19.66
	Yugoslavia	<u>4</u>	<u>85</u>	<u>21.2</u>
		<u>9</u>	<u>174</u>	<u>19.33</u> Rest of World Average
		<u>2</u>		
<u>Summary</u>	W Europe	85	1977	23.25
	N America	51	1307	25.62
	Rest of World	<u>9</u>	<u>174</u>	<u>19.33</u>
		<u>145</u>	<u>3458</u>	<u>23.84</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 1989)

DISTRIBUTION OF LATENCY PERIODS TABLE 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	17.5
Canada		3		5	2	1	2	13	24.15
Czechoslovakia		1	1					2	15.0
France		1	4	3	9	3	5	25	27.56
Germany		5	9	10*	5	2		31	20.38
Italy			2	2	2			6	21.16
Japan			1	2				3	19.66
Norway				1				1	22
Sweden			2		2	1		5	24.5
UK	1		5	1	5	3		15	23.33
USA		2	7	9	8	5	7	38	26.13
Yugoslavia				4				4	21.2
TOTAL	1	12	33	37	33	15	14	145	23.84

* Includes G 03 aerosol can filler

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	
49	1939	38*		
48	1940		$\frac{289}{8} = 36.12$	
47	1	37, 21, 37, 41		
46	2	32, 38, 45		
45	3	38, 14, 32, 42, 45***		
	4	28, 11, 24, 20, 24, 34, 39, 44***	$\frac{886}{31} = 28.58$	
	5	27, 22, 28, 29, 37		
	6	21, 29, 31, 26, 28, 15, 23, 30, 35		
41	7	29, 24, 29, 28		
40	8	28, 24, 34		
	9	30, 26, 20, 38	$\frac{559}{22} = 25.41$	
	1950	26, 22, 31, 19, 23, 14, 33		
	1	19, 28, 17, 28, 34, 29		
36	2	21**, 15		
35	3	25, 22, 23, 22, 20, 31, 22, 32***		
	4	21, 21, 25, 25, 21, 28***, 22	$\frac{849}{37} = 22.94$	
	5	22, 23, 24, 14, 19, 21, 27		
	6	27*** 24, 28, 30***		
	7	21, 12, 27***, 32		
31	8	19, 17, 15, 13, 16, 28, 30		
30	9	18, 18, 15, 17, 20, 29***28		
	1960	16, 21, 25, 27	$\frac{598}{31} = 19.29$	
	1	13, 18, 21, 25, 24, 25		
	2	15, 16, 16, 16, 19, 19, 12		
26	3	13, 18, 17, 12, 18, 21, 26		
25	4	16, 17, 20, 21, 25		
	5	16, 17	$\frac{246}{14} = 17.57$	
	6	11, 19, 20		
	7	9, 18, 21		
21	8	16		
20	9	18		
	1970	13	$\frac{31}{2} = 15.5$	
	1			VIOLA
16	2			
15	3			HALTON
	4			GOODRIE
	TOTAL	145 CASES	$\frac{3458}{145} = 23.84$	

* Cholangiosarcoma

** Aerosol can filler

*** The following are still alive, so far as known Fr15, 22, 23 & 24, G31 and 32, US33 and 36

WPX/ASL2 - LANGIOCASES, 14

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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		ROW
		WESTERN EUROPE	NORTH AMERICA	
49	1939		38*	
48	1940			
47	1	37,41	21,37	
46	2		32,38,45	
45	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	
41	7	29	24,29,28	
40	8	28,34	24	
	9	30,26	20,38	
	1950	26,22,31	19	23,14
	1	19,28,34,29,	17,28	
36	2	21**	15	
35	3	25,22,22,32***	23,31	22,20
	4	21,21,25,25	21,28***	22
	5	22,23,24,27***24,28	14,19,21,27	
		30***		
	6	21,12,32	27***	
31	7	19,17,15,13,28	30	16
30	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	
26	2	13,18,17,18,21,26	12	
25	3	16,17,21,25	20	
	4	16	17	
	5	11,19		20
	6	9,18,21		
21	7	16		
20	8	18		
	9	13		
	VIOLA 1970			
	1			
	2			
	MALTONI 3			
	TOTAL CASES	85	51	9

* Cholangiosarcoma

** Aerosol can filler

*** The following are still alive, so far as known Fri 22, 23 & 24, G31 and 32, US33 and 36

WPX/ASL2 - LANGIOCASES,15

R&S157922

(Review date 1 January 1989)

TABLE 4E

PLANT	START UP DATE	LATENCY PERIODS OF ASL CASES IN SPECIFIC PLANTS (10 OR MORE CASES)	NO OF CASES	AVERAGE LATENCY PERIOD
LOUISVILLE USA	1940?	12,14,15,19,19,20,24,27,28,28,28,29,29 31,45	15	24.53 years
TROISDORF W GERMANY	1954	12,13,16,16,18,19,19,21,23,25,28,29	12	19.91
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
S CHARLESTON USA	1939?	24,30,32,32,34,35,37,38,38,39,	10	33.99

WPX/ASL2 - LANGIOCASES,16

R&S157923

(Review date 1 January 1989)

TABLE 4F

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

YEAR OF FIRST EXPOSURE	LOUISVILLE USA	TROISDORF W GERMANY	SHAWINIGAN CANADA	BARRY UK	S CHARLESTON USA
1939					38
1940					
1			21		37
2					32,38
3			14,42		32
4	20		11,24		24,34,39
5	28,29,27		22,37		
6			26,28		30,35
7	29,28		24		
8	24				
9					
1950	19			31,33	
1		29		28	
2	15				
3	31		23		
4	28	21,25			
5	14,19	23,28			
6		12		32	
7		13			
8					
9					
1960					
1		16,16,19,19,	12		
2	12	18		18	
3				17	
4					
5				19	
6				9,18,21	
7					
8				18	
9					
1970					
1					
2					

WPX/ASL2 - LANGIOCASES,17

R&S157924

(Review date 1 January 1989)

TABLE 4G

PLANT	START-UP DATE	LATENCY PERIOD OF ASL CASES (IN SPECIFIC PLANTS(4-9 CASES))	NO OF CASES	AVERAGE PERIOD
BURGHAUSEN W GERMANY	1933	17,21,22,25,24,13,21,32,30	9	22.77 years
ST FONS FRANCE	1939	21,28,29,37,38,27,41,34,44	9	33.22
BRIGNOUD FRANCE	1950	11,16,18,26,30,25,34,45	8	25.62
SUNDSVALL SWEDEN	1945	16,19,27,29,31	5	24.4
NIAGARA FALLS USA	1947	15,17,21,23,38	5	22.8
SPLIT YUGOSLAVIA	1950	20,20,22,23	4	21.25
MARL W GERMANY	1948	15,16,22,21	4	18.5
TAVAU FRANCE	1953	19,16,21,26	4	20.5
HILLHOUSE UK	1940	28,25,28,25	4	26.5

WPX/ASL2 - LANGIOCASES,18

R&S157925

(Review date 1 January 1989)

TABLE 4H

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

YEAR OF FIRST EXPOSURE	BURGHAUSEN W GERMANY	ST FONS FRANCE	BRIGNOUD FRANCE	SUNDSVALL SWEDEN	NIAGARA FALLS USA	SPLIT YUGO-SLAVIA	MARL W GERMANY	TAVAU FRANCE	HILLHOUSE UK
1939									
1940									
1		37,41							
2									
3		38	45						
4		44							28
5				27*					
6		29		31	15,23				
7				29					
8		28,34							
9			26,30		38				
1950						23*			
1			34	19	17				
2									
3	25,32					20	22		
4	21					22*			25
5	22,24,30	27			21				
6		21							
7	17							19	28
8			18			20			
9			16,25						
1960	21								
1							15,16		
2							21	26	
3								16,21	25
4				16					
5			11						
6									
7									
8									
9	113								
1970									
1									
2									

*Monomer worker

(Review Date - 1 Jan 1989)

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	3		9	69	
8	7	2	1	10	79	
9	5	-	-	5	84	
1980	6	4	-	10	94	
1	5	0	-	5	99	
2	1	2		3	102	
1983	7	3		10	112	
1984	5	2		7	119	
1985	5		1	6	125	
1986	4	1		5	130	
1987		3		3	133	
1988	4			4	137	
TOTAL	79* **	49**	9	137		

* Includes G03 aerosol can filler but omits 1t 01 bag extruder

** Does not include the following who are still alive, so far as known: Fr15 22, 23 & 24, G31 & 32, US33 & 36

(Review date 1 January 1989)

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,US24*	
	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	G26	US31,C12	
	3	UK09,It5,F17,B2,G24,G25,G30	US35, US34, US38	
	4	UK10, F16, F18, G27,G29	US37,US39	
	5	UK11, UK12,F19,F20,G28		Jap3
	6	F21,UK13,It6,It7	C11	
	7		US40,US41,C13	
	8	F25,UK14,UK15,UK16		
	Total	79***	49***	9

* Cholangiosarcoma

** Aerosol can filler

*** Does not include the following who are still alive, so far as known:
Fr15, 22, 23 & 24, G31 & 32, US33 & 36

WPX/ASL2 - LANGIOCASES,21

R&S157928

(Review date 1 January 1989)

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		US24*	
	40			
	1	Fr11, Fr16	C3, US27	
	2		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, G26, G31***	C10, US37	Jap1, Y1
	4	G7, G8, UK4, G19	US18, US33***	Y3
	5	G11, G16, G18, Fr15***	US2, US17, US20, US34	
		G23, G28, G32***		
	6	FR10, G1, 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, UK7, Fr18, UK16	US38	
	4	Sw5	US30	
	5	Fr5, UK11		Jap3
	6	UK3, UK10, UK14		
	7	It5		
	8	UK13		
	9	G24		
Viola	70			
	1			
	2			
Maltoni	3			
	Total	85	51	9

* Cholangiosarcoma (US24)

** Aerosol can filler (G3)

*** Fr15, 22, 23 & 24, G31 & 32, US33 & 36 are still alive, so far as known

WPX/ASL2 - LANGIOCASES, 22

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TABLE 8
WESTERN EUROPE PVC PRODUCERS - START-UP DATES vs ASL CASES (OMITTING 003 & 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	104,07,11,15,23,24	157,54,55,53,55,69,60,53
				125,31,32	155
1938	Italy	Montecatini	Acna		
1939	France	Rhone-Poulenc/ Chloe/Atochem	St Fons	103,09,10,11,14 115,16,17,23	146,48,56,41,43, 155,41,48,44
1940	United Kingdom	ICI/EVC	Runcorn (Closed 1948)		
	United Kingdom	ICI/EVC	Hillhouse	101,04,12,16	144,54,57,63
1945	Sweden	Kemanord/Nobel	Sundsvall (Stockvik)	101,02,03,04,05	151,45,47,46,64
1946	France	Rhone-Poulenc	Roussillon	101	146
1948	United Kingdom	BP Chem/ICI/EVC	Barry	103,05,06,07,08,09	166,51,62,63,50,50
				110,11,13,14,15	166,65,68,66,56
	West Germany	OWH/Huls	Harl	109,10,26,29	161,61,53,62
1949	Belgium	Solvay	Jeneppe	101,02	158,62
1950	France	PCUK/Atochem	Brignoud	102,04,05,06,12,19	159,49,65,58,49,59,
				120,24	151,43
	France	Rhone-Poulenc/ Chloe/Atochem	St Auban	107,22	150,58
	Holland	Shell	Pernis, Rotterdam		
	Norway	Norsk	Heroya, Forsgrum	101	150
1951	Switzerland	Lonza/ICI/EVC	Sins		
1952	Italy	Montedison/ Moplefan	Termi	107	158
	Italy	Montedison/EVC	Porto Marghera	102,06	157,60
1953	Austria	Halvic/Solvay	Hallein		
	France	Solvay	Tavaux	106,13,18,25	157,63,63,62
	Italy	Solvay	Ferrara	103	153
	Spain	Rio Rodano	Hernani		
	United Kingdom	EXL/BIP/NORSK	Aycliffe		
	West Germany	Hoechst	Gendorf	118	155
1954	West Germany	Dynamit	Troisdorf	101,02,08,12,16,17	156,57,54,61,55,61,
				119,20,21,22,27,30	154,61,62,61,55,51
1955	Spain	Monsanto Iberia	Monzon		
1956	Spain	Calqsa	Sabinanigo		
		Hispanic/Solvay	Torre Lavaga		
1958	West Germany	Solvay	Rheinberg		
1960	Italy	S C Ravenna/EVC	Ravenna	104	159
	West Germany	Lonza/ICI/EVC	Waldshut	106,13,28	162,60,60
1961	Italy	Montedison/EVC	Brindisi		
1962	Portugal	Cires	Oporto		
1965	France	Rhone-Poulenc	Montlucon	121	159
	Italy	Pozzi	Ferrandina		
	Italy	Pensac	Mira, Venice	105	167
	West Germany	Wacker	Cologne		
1966	West Germany	Hoechst	Knapsack (Frankfurt)	105*	160
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	Rumica/EVC	Cagliari Sardinia		

Continued

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Table 8 - Continued

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
1970	Italy	ISIR	Porto Torres Sar		
	United Kingdom	ICL/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	Mazingarbe		
		((CDF))			
1977	Spain	Monsanto Iberia	Tarragona		
1982	West Germany	ICL/EVC	Voslapp		
			Wilhelmshaven		

* Laboratory worker in Research Department

WPX/ASL2 - LANGIOCASES,24

R&S157931

(Review date 1 January 1989)

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	07,13,19,21,24,27,28,29,31,35	44,42,43,46,39,41,44,42,46,44
	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
1946	*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
1952	Dow	Midland (No PVC since c 1975)		
	BFG	Avon Lake	18	54
1953	Diamond/BFG	Deer Park		
1954	General Tire/ ** DiversiTech	Ashtabula (Closed 1984. Reopened 1986 by Vygen)	36	56
1956	Air Products	Pensacola (Pace)		
	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)		
	Ethyl	Baton Rouge (Closed 1984)		
1966	Diamond/Georgia	Delaware City		
	Gulf			
	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)		

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Continued

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.

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

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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	Capitan Bermudez (Argentina)		
	Viplastic	Mendoz (Argentina)		
1961	Indupa	Cinco Saltos (Argentina)		
1965	PET Columbiana	Cartagena (Colombia)		
1966	Carburo De Col	Medellin (Colombia)		
1967	Plasticos Omega	Mexico		
	SOC Paramonga	Paramonga (Peru)		
1968	Primex	Puebla (Mexico)		
1970	Policasa	Managua (Nicaragua)		
	Petro Dow	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	Cubato (Brazil)		
	Polychem	El Salvador		
	Policyd	Coatzacoalcos (Mexico)		
1979	PET Camacari	Camacari Bahia (Brazil)		

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TABLE 14
AUSTRALASIAN PVC PRODUCERS
START-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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TABLE 15
MIDDLE EASTERN PVC PRODUCERS
START-UP DATES

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

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