

CONFIDENTIAL

R&S 001117

W O R L D R E G I S T E R
O F C A S E S O F

A N G I O S A R C O M A O F T H E
L I V E R (A S L)

REVIEW DATE

1 JANUARY 1988

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R&S 001119

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R&S 001120

WPX/ASL - ASL ADDRESS,3

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 1988

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

- 1 The 8 new cases in the Register are the following: Canada 11 and 12; France 22; Italy 06; Japan 03; UK 14; US 40 and 41
- 2 There are amendments from the previous Register against the following cases: Japan 01 and 02.
- 3 I would like to thank the following for informing me of new cases: Dr Delorme, Dr Contassot, Dr Chiozzini, Dr Nakamura, Dr Evans, Dr Williams, Dr Dietz, and Professor Tamburro.
- 4 For the case corrections I thank Dr Nakamura.
- 5 It will be noted that there are gaps in our knowledge of several cases, notably Canada 11 and 12 and US 41. Also, so far as we know the following people are still alive: cases Canada 11, France 15 and 22, Germany 31 and 32, UK 14, US 33, 36, 41. Is this correct? This is important information for the industry world-wide and we would appreciate news.
- 6 I should be glad if all recipients of the Register would continue to keep me fully informed of any new cases, or give the name and address of someone who can give 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.
- 7 As a result of the request sent with last year's Register, regarding Co-factors, we received a great deal of information about PVC Plants, which has resulted in many amendments to Tables 8, 9, 10 and 13. Further corrections will be appreciated, bearing in mind that the Tables are confined to PVC.
- 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: In response to the questionnaire enclosed with the 1987 Register, regarding possible co-factors with Vinyl Chloride, I received replies from 26 Companies, covering 61 factories. This material is now being analysed by Professor Carlo Tamburro at the University of Louisville, Kentucky, USA, and we shall report on the results as soon as possible. We are extremely grateful to all who took the trouble to give this information. If any Company has not yet completed the Co-factor questionnaire I should be grateful if it could be completed and sent back to me as soon as possible.
- 9 I would also be glad of help to keep the mailing list correct and up to date, with news of retirements, etc.

FROM: Dr Brian Bennett, Occupational Health Department, ICI Chemicals and Polymers Limited
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February 1988
BB/BGS

R&S 001121

ICI CHEMICALS & POLYMERS

WPX/ASO - LANGIOCASES, 4

LIVER ANGIOSARCOMA CASES (REVIEW DATE - 1 JANUARY 1988)

<u>Index</u>			
<u>Table Sequence</u>	<u>Page</u>		<u>Page</u>
Belgium	1	ASL Case Numbers by year of Death (Table 6)	46
Canada	2-3		
Czechoslovakia	4	ASL Case Numbers by year of first exposure (Table 7)	47
France	5-9	Western Europe PVC Producers - Start-up Dates vs ASL Cases (Table 8)	48-49
Germany	10-15		
Italy	16-17	USA PVC Producers - Start-up Dates vs ASL Cases (Table 9)	50-51
Japan	18	Canadian PVC Producers - Start-up Dates vs ASL Cases (Table 10)	52
Norway	19		
Sweden	20	East European PVC Producers - Start-up Dates vs ASL Cases (Table 11)	53
UK	21-24	Japanese PVC Producers - Start-up Dates vs ASL Cases (Table 12)	54
USA	25-32		
Yugoslavia	33	South & Central American PVC Producers - Start-Up Dates (Table 13)	55
Incidence of Cases per annum (Table 1)	34	Australasian PVC Producers - Start-up Dates (Table 14)	56
Distribution of Cases by Country (Table 2)	35	Middle Eastern PVC Producers - Start-up Dates (Table 15)	57
Pattern of Cases by Factory (Table 3)	36	Blank form for notifying new cases	-
Latency Periods (Table 4A)	37		
Distribution of Latency Periods (Tables 4B-4H)	38-44		
Annual Geographical Incidence (Table 5)	45		

BELGIUM

LIVER Angiosarcoma Cases - (Review Date : 1 January 1988)

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
BELGIUM															
01		12.01.13	Solvay	Jemeppe	00.07.58	00.05.76	63	18	17	29.06.76	Yes	High Autocleaner 14 yrs 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 1975- 50 ppm RETAINED 1 Feb 1975	Autocleaner 14 yrs Polyworker 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 11n, 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 15 yrs 5 mths Operator 13 yrs 9mths.	Fireman since 10 71.	1st wign July 1979: Thoracic pain 07.79. Hepatic tests initiated 10.79. Positive echography 11.79. Hepa- tectomy 02.80. Chemotherapy. Information given in letter 12 Nov 1984 from Dr J. Stuyver.

R&S 001123

CANADA
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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 year 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 21 No 2 pp105-114 claims this case had both a hepatoma and ASL simultaneously.

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

DAY - MONTH - YEAR
All dates use UK system

WPX/ASL - LANGLOCASES.B

[illegible]

R&S 001125

CZECHOSLOVAKIA

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 88)

[illegible]

ICI CHEMICALS & POLYMERS

WPX/ASL - LANGUOCASES, 10

FRANCE
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 88)

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	M	15.04.24	RP	Roussillon	00.01.46	18.02.67	43	21	19	19.02.67	Yes	High	Autoclave worker and cleaner 19 yrs		Ref. Xavier et al Arch. Mal. Prof. 1 30 n° 13 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" 15 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 13 yrs	VCM production 16 yrs Italian POW Shepherd, Sawyer, Mason	Ref. Kety et al Arch. Mal. Prof. 1 37 n° 16 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 18 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 19th Feb 1976 costal angiosarcoma (2) Scintigraphy found ASL. (3) Haemorrhage from ASL (4) Right Hepatectomy	Ref. P Couderc et al Semaine des hopitaux 10 Septembre 1976 Previously had bone angiosarcoma Also Piliichowski et al "La Nouvelle Presse Medicale" 17th July 1979 Page 2485

R&S 001127

ICI CHEMICALS & POLYMERS

Page 6

WPX/ASL - LANGUAGES, 11

FRANCE
Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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 polymer and works lab?		This man had AOL prior to AS. Ann. de Mal. Prot. 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	16 yrs packer & autoclave clnr 14 yrs autoclave worker		Had been tunnel worker previously
09	RPX	08.10.14	RP	St Pons	10.01.48	26.04.76	63	28	28	25.12.77	Yes	Very High	Polymer- isation 1948-1966 Lesser Exposure 1966-1976	10 yrs in sulphuric acid factory, autocleaner, 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 Maladies Professionales Vol 40 No 6 1979 pages 174-5.

ICI CHEMICALS & POLYMERS

WPX/ASL - LANGUAGES, 12

FRANCE
Sheet 3

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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	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	IL	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 VCM synthesis (HCl & Acetylene) Foreman (agent de maintenance) 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	Tavaux	23.09.63	26.06.79	40	16	13	22.08.79	Yes		Autocleaner 12 yrs, Auto- operator 19 yrs, Copolymer 14 yrs	12 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 All types of maintenance and Intermitt- ently 1975-1979 in VCM Poly Process	1975-1979 maintenance work manufacture & maintenance in VCM Poly Process	

R&S 001129

ICI CHEMICALS & POLYMERS

WPX/ASL - LANGUAGES, 13

FRANCE
Sheet 4

LIVER Angliowarcoma Cases - (Review Date: 1 Jan 1988)

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>France</u>															
15	DEP	03.01.37	Chloe Chimie (formerly RP)	St Fons	07.07.55	28.09.82	45	27	27	Active	Yes	High-20 yr Moderate 17 yrs	Autoclave cleaner 1955-1962 autoclave operator 1962-1982		Left Hepatectomy 1983 J C Contassot Letter of 15 10 1983
16	ICM	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	Polymerlast- Ion Process Man Maintenance Worker Health & Safety Agent		Retired Jan 1979. J C Contassot Letters of 15 10 1983 and 125 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 15 10 1983
18	W	14.07.42	Solvay	Tavaux	09.09.61	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

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

R&S 001131

Page 10

ICI CHEMICALS & POLYMERS

WPX/ASL - LANGUAGES, 15

GERMANY
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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	16	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 VCM 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 132 p 195-203

GERMANY
Sheet 2

LIVER Angliowarcoma Cases - (Review Date: 1 Jan 1988)

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)		ICI 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 13.1.77 and 11.78. 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)	11.11.75	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	?	

R&S 001133

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 11 yr		110/78 Confirmed Average exposure first 19 yrs 150 ppm, 1000 ppm. Next 3 yrs av. 175 ppm. Last. 1 yr av 35 ppm
10 (NIOSH given 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 19 yrs 150 ppm, 1000 ppm. Last yr av 175 ppm. CWH letter of 21.04.78
11 (NIOSH given 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		

GERMANY
Sheet 4

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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 Beut 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				IF W Beut letter of 30th June 1980 enclosing data from Mr 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 is also cases 19, 13, 15, 16 16 17 given in NRW Report for 1978
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 Maratelli 1981 p21.

R&S 001135

GERMANY
Sheet 5

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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>															
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 147-177 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
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		00.00.23	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

GERMANY
Sheet 6

LIVER Angiosarcoma Cases (Rev Date: 1 Jan 1988)

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		100.00.27	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		100.00.28	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		100.00.23	8	8	1960	28.09.81	58	21	13	14.01.83	Yes	High	Polyclave Worker and Autoclave Cleaner		Prof Selmaier (Munich) letter 22.08.83. Friedel letter 19.04.85
26		100.00.22	2	2	1953	14.06.76	54	22	22	22.11.82	Yes	High	Polyworker		Chronic hepatitis, angiosarcoma, sinusoidal ectasia. Friedel letter 23.12.86.
27		100.00.28	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 (area).		Annual VCH 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		100.00.22	2	2	1962	15.02.83	61	21	19	15.02.84	Yes	High	Chemistry worker		Haemangiosarcoma. Friedel letter 23.12.86.
30		100.00.17	4	4	1951	07.01.80	62	29	25	25.05.83	Yes	High	Polyworker Shift leader		Haemangiosarcoma. Friedel letter 23.12.86.
31		100.00.23	8	8	1953	30.06.85	61	32	20	Alive		?	Autoclave cleaner		Haemangiosarcoma. Friedel letter 23.12.86.
32		100.00.30	8	8	1955	00.04.85	55	30	21	Alive		?	Polyworker Autoclave cleaner		Haemangiosarcoma. Friedel letter 23.12.86.

R&S 001137

Page 16

ICI CHEMICALS & POLYMERS

WPA/ASL - LAMIGOCASES, 21

ITALY
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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>ITALY</u>															
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	VG	14.03.20	Solvay	Ferrara	00.01.53	10.07.75	55	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 suspens- ion 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 little alcohol. No AOI.	**
05	IG 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 Paglia- Lunga telex of 12 Aug 1983

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

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

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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	GZ	21.06.36	Montedison	Porto 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 Chiozzini, Venice 22.09.87 and 11.01.88

R&S 001139

Page 18

ICI CHEMICALS & POLYMERS

WPX/ASL - LANGTUCASES, 23

JAPAN

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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
JAPAN															
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- ization 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

* In his letter of 1st April 1982, Dr Montesano of IARC says Japanese Ministry of Labour give

Date of diagnosis - 21-08-74

Age of diagnosis - 52

Years of exposure - 22

NORWAY

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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
NORWAY															
01	AH	23.12.15	Norsk Hydro	Herøya	00.03.50	21.12.71	56	22	21	04.04.72	Yes	High	Foreman & Autoclave supervisor		Confirmed by Dr Thila- Evanen of NH. At APME Mtg of 19 June 1978 Mr P Rangne stated that AH had been a member of a start-up team. VCM & PVC were made in same building. The VCM was made from acetylene

R&S 001141

SWEDEN

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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>SWEDEN</u>															
01	NU	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 1976, liver abnormality and necrosis diagnosed. Data confirmed in Dr D Byren letter 18.8.77 to CEPIC
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 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.

UK
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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	MJ	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		Lib and Harry Bancet 29-06074 pages 1316-8
02															Dubious fabrication issue
03	BJM	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 1939-45 army vehicle maintenance 1945-54 fish packer	

R&S 001144

Page

22

ICI CHEMICALS & POLYMERS

WPX/ASL - LANGUAGES, 27

UK

Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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	JK	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 Polyflour 1960-64 Poly Chargehand 1964-70 Charging operator 1970-72 Drier operator		
06	GEP	1931	BP	Barry	1962	09.01.80	48/9	18	12	09.01.80			7 yrs Poly Floor Operator 15 yrs Greaser on Poly Floor Polycleaner 1963-5 Recovery 1965-1971		
07	RCB	26.04.20	BP	Barry	1963	00.00.80	60	17	8.2	13.06.80			Polycleaner 1963-5 Recovery 1965-1971		
08	MTM	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	

UK

Sheet 3

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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	EICP	07.05.25	BP	Barry	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. 13 years motor car paintshop. 12 years in Craving Duck.	
10	ICJT	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 (150 ppm). Medium - 121 months (200 ppm)	Polycleaner 1966-67. Spray-drier operator 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	ICLP	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 1968-69. Poly operator 1969-79. Leading Hand 1979-82.	-	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	IT	24.01.17	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, bugging floor 1957-59. Autoclave operator 1959-85	-	Letter 26.06.85 Dr F I Lee

R&S 001145

ICI CHEMICALS & POLYMERS

WPX/ASL2 - LANGLOCASES,8

Page 24

UK
Sheet 4

LIVEN Angiosarcoma Cases - (Review Date : 1 January 1988)

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 11	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	15.06.42	BP	Barry	07.07.66	27.08.87	45	21	11	Alive	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 DMJ Evans, Pathologist, Penarth, Wales and Dr DMJ Williams, BP, Barry

USA
Sheet 1

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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															
01	Earl Parku	17.10.23	BFG	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 IOSHA	(Rolling Stone Art 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

R&S 001147

Page 26

ICI CHEMICALS & POLYMERS

WPX/ASL 2 - LANGIOCASES, I

USA

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

UK system of dates
DAY - MONTH - YEAR

Sheet 2

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 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 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 Bachman	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 [autoclave]	[Utility & [Service op. [Bagger [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 Salg.
15															[Accountant; [ASI - No evi- [dence of VCM [exposure.

ICI CHEMICALS & POLYMERS

WPX/ASL 2 - LANGUOCASES, 2

USA

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

UK System of dates
DAY - MONTH - YEAR

Sheet 3

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 JH N Johnson ltr 07.08.78
17	Peerenboom	06.05.31	BFG	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 N 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	13 yrs autocleaner 18 yrs on Estol plasticiser & Carboset operation	Navy Tyre Store		Confirmed in JH N Johnson ltr 07.08.78 Also Rolling Stone mag. 15.01.76
19	Virgil Christian	00.00.15	UCC	S Charle- ston	00.00.43	19.06.75	60	32	32	06.04.76	Yes	2000 ppm			Williamsport Sun Gazette 23 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 Hinkle	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 23.2.77

R&S 001149

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															
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 Bella Lane of whom 8 had died by 26.1.76 In his letter of 16.09.81 Dr M N Johnson confirms this is the case described by Dannaher Tamburro & 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	Charles Edward Moore	17.05.17	UCC	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 shift fitter 1946 became shift utility man	R N Wheeler letter of 18.8.77 to J Stafford gives details Rose Kaminski letter of 26/2/79 R Kaminski (5 Nov 1980) suggests that NIOSH will retain on register since employment was terminated may be associ- ated with ASL.
(25)															R N Wheeler letter of 20/2/79 and Rose Kaminski letter of 26/2/79 and 15/11/80
															Removal from register confirmed in R Kaminski letter of 5 November 1980

USA
Sheet 5

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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	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 high paste charging. 111 August 1965. Terminated employment Jan 1966		R Kaminski letter of 26/2/79 and Prof. Tamburro 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 (bulk and dispersion PVC manufacture		R N Wheeler letter 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 16/4/79
29		12.10.07	UCC	S Charle- ston	00.05.42	00.03.80	72	38	16	01.03.80	Yes				R Kaminski letter of 19th June 1980 16 5th Nov 1980
30	WVN	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 16 yrs Elsewhere 11 yrs Boiler house Operator 9 yrs		
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 learned	Chemical Operator in charge reactor From 1959 to 1976 Aliphatic Chemicals operator and From July 1976 to date Foreman Aliphatic Chemical Operation	Dr Dacey letter 16.10.81 and R N Wheeler letter of 19.11.81. Also Dr Dacey letter of 07.03.81 re date of death.	

R&S 001151

Page 30

ICI CHEMICALS & POLYMERS

USA
Sheet 6

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

UK system of dates
DAY - MONTH - YEAR

WPX/ASL_2 - LANGIOCASES,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
US 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 autoclaves industry".	1940-1951 Various jobs in polymer manufacture BUTVAR LUSTREX 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.
US 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 Tamburro letter of 12 Aug 1982 + Dr M N Johnson letter of 28 Feb 1983.
US 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 M N Johnson letter of 13 Nov 1982, 28 Feb 1983 and 9 Aug 1984.
US 35		09-03-12	UCC	St Charles- Iston	23-07-44	18-07-83	71	39	14	18-07-83	Yes	High from 1944 to 1955. Medium from 1955-1958			Dr Daley letter of 5 Sept 1983.
US 36		27-08-32	The General Tire and Rubber Co	Ashtab Ohio	11-06-56	21-08-83	50	27	27	Alive	Yes	Moderate	1956-56 labourer 1956-57 prod helper 1957-70 operator 1970-75 electrical 1975-present operation		Dr W Landrie letter of 12 Sept 1983: reported at medical May 1985. Testing commenced May 1981

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	BFG	Louise- 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	Normal 1963-1982 (progression) (from helper to senior operator, cleaned reactors, stripping and recovery areas as well as charging operator.		Thrombocytopenia and leukopenia since 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.
39	J Hewice	27.06.18	Pantacote	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 Revin Operator (Inc Jul 66) 1- Sep 67 Reactor Operator (Sep 70-82) Monomer Operator 1982-83 Mill Operator, Celenday Shop, until retirement	Worked before 1960 with US Air Force, United Wool Dyers and Okonite	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 Pantacote with letter of 24.02.86 from Dr Auerbach, Pathologist.

R&S 001153

Page 32

ICE CHEMICALS & POLYMERS

WPX/ASL2 - LAMCLOCASES.

USA
Sheet 8

LIVER Angiosarcoma Cases - (Review Date: 1 January 1988)

UK system of dates
DAY - MONTH - YEAR

1	2	3	4	5	6	7	8	9	10	11		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 40	P P Gilmer	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	? 1915	Goodyear	Niagara	? late 1940's	1987	72	? 40+	? 30 approx	Alive	? Yes				Letter from Prof Tamburro University of Louisville

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1988)

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 Spirteno of INIUSH changed the status of Case 02 to VCM production employee. Dr Spirteno also identified a new Case 03 also a VCM production worker.
04		11.06.30	Jugo Vinil	Split	15.12.58	03.09.78	48	20	18	03.09.78	Yes				Rose Kaminaki letter of 19 June 1980 and IARC letter of 1 April 1982

R&S 001155

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	.....	3
7	.....	1
Total		<u>129</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: e, so far as known: Can11, Fr15 & 22, G31 & 32, HK14, S33, 35 & 41

Distribution of ASL Cases by Country

USA	38 ***
W Germany	31 ** ***
France	22 ***
UK	13 ***
Canada	12 ***
Sweden	5 ****
Italy	5 *
Yugoslavia	4 *****
Japan	3
Czechoslovakia	2
Belgium	2
Norway	1
Total	138

* Omit It01 - atypical case of PVC bag extruder.

** Includes G03 aerosol can filler.

*** Includes case US 24 which was diagnosed as Cholangiosarcoma; & Can11, Fr15 & 22, G31 & 32, UK14, US33, 36 & 41, who are still alive, so far as known.

**** Includes one monomer worker.

***** Includes two monomer workers.

i.e Western Europe	79
North America	50
Rest of World	9

Total 138

R&S 001157

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

Of the 79 cases in W Europe, 68 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	10
Wacker, Burghausen, Germany	9
Atochem (formerly Chloé Chimie, formerly RP), St Fons, France	8
PCUK, Brignoud, France	7
Kemanord, Sundsvall, Sweden	5
CWH, Marl, Germany	4
ICI, Hillhouse, UK	3
Solvay, Tavaux, France	3
Lonza, Waldshut, Germany	3
Solvay, Jemeppe, Belgium	2
Atochem, St Auban, France	2
	<u>68</u>

NB: There are 32 pre 1962 PVC plants in W Europe; 18 of these have had ASL cases (Ref Table 8)

(b) N America

Of the 50 cases in N America, 42 have occurred at four factories out of a total of 55 factories. In N America 43 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; 12 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 1988)

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	17.5	
	France	22	574	26.09 *	
	Germany	31	632	20.38 *	
	Italy	5	99	19.8	
	Norway	1	22	22	
	Sweden	5	122	24.5	
	UK	<u>13</u>	<u>293</u>	22.53 *	
		<u>79</u>	<u>1777</u>	<u>22.49</u>	W Europe Average
<u>N America</u>	US	37	955	25.81 *	
	Canada	<u>10</u>	<u>205</u>	20.5 *	
		<u>47</u>	<u>1160</u>	<u>24.68</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>	21.2	
		<u>9</u>	<u>174</u>	<u>19.33</u>	Rest of World Average
<u>Summary</u>	W Europe	79	1777	22.49	
	N America	47	1160	24.68	
	Rest of World	<u>9</u>	<u>174</u>	19.33	
		<u>135</u>	<u>3111</u>	<u>23.04</u> *	World Average

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

NB: Does not include Can11 or 12, or US41: details not known.

R&S 001159

(Review Date - 1 Jan 1988)

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			10	20.5
Czechoslovakia		1	1					2	15.0
France		1	4	3	8	3	3	22	26.09
Germany		5	9	10*	5	2		31	20.38
Italy			2	2	1			5	19.8
Japan			1	2				3	19.66
Norway				1				1	22
Sweden			2		2	1		5	24.5
UK	1		5	1	4	2		13	22.53
USA **		2	7	9	8	5	6	37	25.81
Yugoslavia				4				4	21.2
TOTAL **	1	12	33	37	30	13	9	135	23.04

* Includes G 03 aerosol can filler

** Does not include Can11 or 12, or US41: details not known

TABLE 4C

LATENCY PERIOD OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE

R&S 00161

MAX POSSIBLE LATENCY PERIOD	YEAR OF FIRST EXPOSURE	LATENCY PERIOD (NO OF YEARS)	ARITHMETIC MEAN OF LATENCY PERIODS	
48	1939	38*		
47	1940		$\frac{289}{8} = 36.12$	
46	1	37,21,37,41		
45	2	32,38,45		
44	3	38,14,32		
	4	28,11,24,20,24,34,39	$\frac{718}{27} = 26.59$	
	5	27,22,28,29		
	6	21,29,31,26,28,15,23, 30,35		
40	7	29,24,29,28		
39	8	28,24,34		
	9	30,26,20	$\frac{521}{21} = 24.80$	
	1950	26,22,31,19,23,14,33		
	1	19,28,17,28,34,29		
35	2	21**, 15		
34	3	25,22,23,22,20,31,22, 32***		
	4	21,21,25,25,21,28***, 22	$\frac{787}{35} = 22.48$	
	5	22,23,24,14,19,21,27 27*** 24,28,30***		
	6	21,12,27***		
30	7	19,17,15,13,16,28		
29	8	18,18,15,17,20,29***		
	9	16,21,25,27	$\frac{544}{29} = 18.75$	
	1960	13,18,21,25,24,25		
	1	15,16,16,16,19,19,12		
25	2	13,18,17,12,18,21		
24	3	16,17,20,21		
	4	16,17	$\frac{221}{13} = 17.0$	
	5	11,19,20		
	6	9,18,21***		
20	7	16		
19	8	18		
	9	13	$\frac{31}{2} = 15.5$	
	1970			VIOLA
	1			
15	2			
14	3			MALTONI
	4			GOODRICH
	TOTAL	135 CASES	$\frac{3111}{135} = 23.04$	

* Cholangiosarcoma

** Aerosol can filler

*** The following are still alive, so far as known Fri5 and 22, G31 and 32,
UK14, US33 and 36

NB: Does not include Can11 or 12, US41: details not known

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		
48	1939		38*		
47	1940				
46	1	37,41	21,37		
45	2		32,38,45		
44	3	38	14,32		
	4	28	11,24,20,24,34,39		
	5	27	22,28,29		
	6	21,29,31,33	26,28,15,23,30,35		
40	7	29	24,29,28		
39	8	28,34	24		
	9	30,26	20		
	1950	26,22,31	19		23,14
	1	19,28,34,29,	17,28		
35	2	21**	15		
34	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	27***		
30	7	19,17,15,13,28			16
29	8	18,18,29***	15		17,20
	9	16,21,25,27,			
	1960	13,18,21,25,25	24		
	1	15,16,16,16,19,19	12		
25	2	13,18,17,18,21	12		
24	3	16,17,21	20		
	4	16	17		
	5	11,19			20
	6	9,18,21***			
20	7	16			
19	8	18			
	9	13			
	VIOLA 1970				
	1				
	2				
	MALTONI 3				
	TOTAL CASES	79	47		9

* Cholangiosarcoma

** Aerosol can filler

*** The following are still alive, so far as known Fr15 and 22, G31 and 32, UK14, US33 and 36

NB: Does not include Can11 or 12, or US41: details not known

(Review date 1 January 1988)

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 year
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	10	20.5
S CHARLESTON USA	1939?	24,30,32,32,34,35,37,38,38,39,	10	33.99
BARRY UK	1948	9,17,18,28,31,33,18,19,18,21	10	21.20

NB: Does not include cases Can11 and 12 at Shawinigan: details not known

R&S 001163

(Review date 1 January 1988)

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	S CHARLESTON USA	BARRY UK
1939				38	
1940					
1			21	37	
2				32,38	
3			14	32	
4	20		11,24	24,34,39	
5	28,29,27		22		
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			
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					

NB: Does not include cases Can11 and 12 at Shawinigan: details not known

R&S 001164

WPX/ASL2 - LANGIOCASES,17

(Review date 1 January 1988)

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	8	31.88
BRIGNOUD FRANCE	1950	11,16,18,26,30,25,34	7	22.85
SUNDSVALL SWEDEN	1945	16,19,27,29,31	5	24.4
NIAGARA USA	1947	15,17,21,23	4	19
SPLIT YUGOSLAVIA	1950	20,20,22,23	4	21.25
MARL W GERMANY	1948	15,16,22,21	4	18.5

NB: Does not include US41 (Niagara): details not known

(Review date 1 January 1988)

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 USA	SPLIT YUGO-SLAVIA	MARL W GERMANY
1939							
1940							
1		37,41					
2							
3		38					
4							
5				27*			
6		29		31	15,23		
7				29			
8		28,34					
9			26,30				
1950						23*	
1			34	19	17		
2							
3	25,32					20	22
4	21					22*	
5	22,24,30	27			21		
6		21					
7	17						
8			18			20	
9			16,25				
1960	21						
1							15,16
2							21
3							
4				16			
5			11				
6							
7							
8							
9	13						
1970							
1							
2							

*Monomer worker

NB: Does not include US41 (Niagara): details not known

WPX/ASL2 - LANGIOCASES,19

R&S 001166

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	3			3	128	
1987		1		1	129	
TOTAL	74* **	46**	9	129		

* Includes G03 aerosol can filler but omits It 01 bag extruder .

** Does not include the following who are still alive, so far as known: Can11, Fr15 and 22, G31 & 32, UK14, US33, 36 & 41

(Review date 1 January 1988)

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, G21 US	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		
	7		US40	
	Total	74***	46***	9

* Cholangiosarcoma

** Aerosol can filler

*** Does not include the following who are still alive, so far as known: Can11, Fri5 & 22, G31 & 32, UK14, US33, 36 & 41

(Review date 1 January 1988)

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	C2, US19	
	4	UK1	C1, C5, US5, US7, US28, US35	
	5	Sw2	C4, US3, US9	
	6	Fr1, Fr3, Sw4	C7, C9, US8, US11, US21, US31	
	7	Sw3	C6, US22, US26	
	8	Fr9, Fr17	US1	
	9	Fr12, Fr4	US12	
	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	US36***	
	7	Fr8, G4, It2, G2, UK12		Cz1
	8	Fr6, B1, Fr22***	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	US6	
	3	Fr13, UK7, Fr18	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	79	47****	9

* Cholangiosarcoma (US24)

** Aerosol can filler (G3)

*** Fr15 & 22, G31 & 32, UK14, US33 & 36 are still alive, so far as known

**** Does not include Can11 or 12, or US41: details not known

WPX/ASL2 - LANGIOCASES, 22

R&S 001169

TABLE 8
WESTERN EUROPE PVC PRODUCERS - START-UP DATES vs ASL CASES (OMITTING CO3 & 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	57,54,55,53,55,69,60,53
				25,31,32	55
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	55,41,48
1940	United Kingdom	ICI/EVC	Runcorn (Closed 1948)		
	United Kingdom	ICI/EVC	Hillhouse	01,04,12	44,54,57
1945	Sweden	Kemnord/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	66,65,68,66
	West Germany	CWH/Huls	Marl	09,10,26,29	61,61,53,62
1949	Belgium	Solvay	Jeneppe	01,02	58,62
1950	France	PCUK/Atochem	Brignoud	02,04,05,06,12,19	59,49,65,58,49,59,51
				20	
	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	Terni		
	Italy	Montedison/EVC	Porto Marghera	02,06	57,60
1953	Austria	Halvic/Solvay	Hallein		
	France	Solvay	Tavaux	08,13,18	57,63,63
	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	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
1955	Spain	Monsanto Iberia	Monzon		
1956	Spain	Caigsa	Sabinanigo		
		Hispavic/Solvay	Torrelavega		
1958	West Germany	Solvay	Rheinberg		
1960	Italy	S C 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	Rumantica/EVC	Cagliari Sardinia		

Continued

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	SIR	Porto Torres Sar		
	United Kingdom	ICI/EVC	Runcorn		
1971	Spain	Hispanic/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

(Review date 1 January 1988)

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	144,42,43,46,39, 41,44,42,46,44
	Dow	Midland (made Saran copolymer)		
1940?	*BFG	Louisville	101,02,03,04,05, 106,09,16,17,22, 126,33,34,37,40	148,55,45,52,44, 162,45,50,55,47, 147,54,55,53,42
1946	*UCC/Dow	Texas City (Partially closed 1977)		
1947	Goodyear	Niagara Falls	108,10,11,20,41	146,51,46,55,?
1948	Firestone/ Occidental	Pottstown	12	149
	Uniroyal	Painesville (closed 1975)		
1950	Monsanto	Springfield (Closed 1975)	32	151
1952	Dow	Midland (No PVC since c 1975)		
	BFG	Avon Lake	18	154
1953	Diamond/BFG	Deer Park		
1954	General Tire/ ** DiversiTech	Ashtabula (Closed 1984. Reopened 1986 by Vygen)	36	156
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	158
	Hooker	Hicksville (Closed 1980-81)		
	Pantasote	Passaic (Closed 1984)	39	160
1957	Atlantic Tubing	Cranston (Closed 1967)		
	Tenneco/ Occidental	Flemington NJ (Closed 1985)	30	159
1958	Keysor Century	Saugus, Cal		
	Air Products	Calvert City (Paducah) (Closed March 1982 Re-opened October 1983)	38	163
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 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)		

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 001173

(Review date 1 January 1988)

TABLE 10CANADIAN 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)	Shawinigan	01,02,03,04,05 06,07,08,09,10, 11,12	44,43,41,45,44, 47,46,61,46,53 ?,?
1951	Monsanto	La Salle (Closed 1975)		
1957	Goodrich	Welland (? Niagara)		
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	53,50,54,48
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		

(Review date 1 January 198

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		

(Review date 1 January 1988)

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)		

R&S 001177

(Review date 1 January 1988)

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		

R&S 001178

(Review date 1 January 1988)

TABLE 15
MIDDLE EASTERN PVC PRODUCERS
START-UP DATES

<u>START-UP</u> <u>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

[illegible]