

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&

01120

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
Hillhouse Site, P O Box 4, Thornton-Cleveleys, Blackpool, FY5 4QD, England

February 1988
BB/BGS

ICI CHEMICALS & POLYMERS

WPX/ASO - LANGIOCASES, 4

LIVER ANGIOSARCOMA CASES (REVIEW DATE - 1 JANUARY 1988)

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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	Jeneppe	00.07.58	00.05.76	63	18	17	29.11.76	Yes	High 1958-1968 exposed to 200 ppm for 8 hrs per day and certainly under 500 ppm in 6 to 9m ³ autoclave 1968-1972 exposed to 50-200 ppm 8 hrs per day in 25m ³ autoclave 1972-1974 exposed to 50-200 ppm in auto- clave room 1974-1980 ppm 1975- 50 ppm RETIRED 1 Feb 1975	Autocleaner 14 yrs (foundry (2 yrs) Polyworker (3 yrs) (15 yrs) Work in glass ind. & chemi- cal industry	Driller in a foundry (2 yrs) Farmer (15 yrs) Work in glass ind. & chemi- cal industry	Hepatic tests in Oct 1974 were normal. Retired Feb 1975 Hospitalised May 1976 Complete clinical and career details were 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	Jeneppe	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 (3 yrs 9mths.)	Fireman since 10.71. Hepatic tests in 10.79. Positive echography 11.79. Hepa- tectomy 02.80. Chemotherapy. Information given in letter 12 Nov 1984 from Dr Dr. Stuyver.	

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ICI CHEMICALS & POLYMERS

WPX/ASL - LANGLOCASES,9

CZECHOSLOVAKIA

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
<u>CZECHOSLO-</u> <u>VAKIA</u>															
01		28.06.28	State Co	Novsky	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 Ind Hygiene and Occ diseases.	
02		06.07.27	State Co	Novsky	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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DAY - MONTH - YEAR
All dates use UK system

WPX/ASL - LANG,10CASES.8

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

[illegible]

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MPK/ASL - LANGTOLASES, 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 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 fore- man in polymer- reaction	1972-6 admin reaction in St Auban	Died of septicemia Small liver lesion found after autopsy
08	B	01.04.34	Solvay	Tavaux	23.05.57	03.12.75	42	19	19	30.01.77	Yes	Moderate	6 yrs packer & autoclave clnr 14 yrs autoclave worker		Had been tunnel worker previously
09	RPX	08.10.14	RP	St Fons	10.01.48	26.04.76	63	28	28	25.12.77	Yes	Very High 1948-1966 Leaser Exposure 1966-1976	Polymer- reaction operator, autocleaner, autoclave maintenance	10 yrs in sulphuric acid factory, storkeeper & general services	Operated 4.76 for removal of tumour from liver and died after second surgical operation for bilio bronchial fistula Paper by Dr Remy et al in Archives de Malades Professionales Vol 40 No 6 1979 pages 741-3.

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MPX/ASL - LANGIOLASES, 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	IM	15.04.24	RP	Rouss- illon	00.01.46	18.02.67	43	21	19	19.02.67	Yes	High	Autoclave worker and cleaner 19 yrs		(Ref. Kevlar et al Arch. Mal. Prof. 1 30 n° 13 Nov 75 p 171-177
02	ISM	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. G Bonneton et al "Nouvelle Presse Medicale" 15 Nov 1977 p 735
03	IMV	06.01.20	RP	St Fons	00.00.46	15.01.75	55	29	29	29.06.75	Yes	High	10 yrs as autoclave cleaner 13 yrs compounding	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	IMOR	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 10 yrs		
05	IB	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 4) Right Hepatectomy	(Ref. P. Linder et al Semaine Medicale langue 100 10 Septembre 1976 (Previously had bone "angiosarcoma" Also Pillchowski et al "La Nouvelle Presse Medicale" 17th July 1979 Page 248)

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MPX/ASL - LANGUAGES, 11

FRANCE
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
<u>France</u>															
15	DEP	03.01.37	Chloe Chimie (formerly RP)	St Fons	07.07.55	28.09.82	45	27	27	Alive	Yes	High-20 yr Moderate 7 yrs	Autoclave Cleaner 1955-1962 Autoclave operator 1962-1982		Left Hepatectomy (1983) J C Contesaut Letter of 15 10 1983
16	GIM	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	Polymerizat- ion Process Man Maintenance Worker Health & Safety Agent		Retired Jan 1979. J C Contesaut Letter of 15 10 1983 and 23 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 Contesaut Letter of 15 10 1983
18	IR	14.07.42	Solvay	Tavaux	09.09.63	21.03.84	42	21	21	27.12.84	21.03.84	High-12 yrs Low - 9 yrs	Autoclave Cleaner		09.03.84 Right Hepatectomy 05.05.84- 24.09.84 Chemotherapy for lung- metastasis . partial remission, 08.84 - liver transference, 10.84 - lung. evolution of the disease

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MPI/ASL - LANGUAGES, 12

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

FRANCE
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
France															
10	VP	24.05.19	RP	St Pons	00.12.56	10.01.78	58	21	21	10.01.78	Yes	High	Autoclave cleaner	10 yrs in (mechanical engineering industry 1946-1956)	Died of pulmonary embolism 5 days after surgery
11	L	15.02.12	RP	St Pons	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 of materials) 1972 retired		
12		16.08.14	PCUK	Belignoud	09.02.49	00.05.74	65	30	27	23.06.79	Yes	High	Monomer production (and polymer- isation operator		
13		19.01.31	Solvay	Taveux	23.09.63	26.06.79	40	16	13	22.08.79	Yes		Autocleaner (2 yrs, Auto- operator (19 yrs, Copolymers (4 yrs	12 yrs as cycle mechanic. (10 yrs as operator in sanitary ware manufacture	Cigarette smoker until 1974. Ill all of 1977 due to (oesophageal varices. (Surgical (intervention (25.05.79 (light (hepatocarcinoma)
14	MJ	05-04-24	Chloe Ulmir (Formerly RP)	St Pons	1943	00.07.81	57	38	36	29.07.81	Yes	Very High	1943-1975 All types of and intermitt- ently 1975-1979 Process	1943-1975 All types of maintenance work 1975-1979 in VCM Poly	

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MPX/ASL - LANGUOCASES, 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	14	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 11.3.77. 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	18.04.57	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 Cohen et al Virchow Arch A Path 1976 112 p 195-201

FRANCE
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
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	63	34	22	26.12.85	Yes	High	Autoclave operator and cleaner	In other parts of factory since 1946	Portal fibrosis from (26.04.74. The illness was diagnosed as presumably work related on 20.04.74. Letter from Dr Contassot 05.04.86
21	Pa	01.10.40	RP	SEP Montlucon	1959	03.06.86	45	27	4	28.06.86	Yes	High	Autocleaner 4 years	Maintenance worker	(Hepatic test May 84 normal). (Hepatic test May 86 showed abnormalities). Letter from Dr Barlet 18.07.86.
22	AL	13.08.28	Atochem	St Auban	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		Letter from Dr Contassot, Atochem 12.12.87

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 (none) 1 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. CMN letter of 121.04.78
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		

ICI CHEMICALS & POLYMERS

MPX/ASL - LAM.104565,16

GERMANY
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
GERMANY 05 (NIOSH given as Case 06)		00.00.36	11	11	02.04.60	10.12.73	18	13	05	16.12.74	Yes (NIOSH)		MC Chemie says "chemistry laboratories 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 for in main plant.
06 (NIOSH given 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 autu- 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	12.12.75	Yes	?	Polyworker	?	

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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
GERMANY 17 (NIOSH gives as Case 15)		00.00.37	4	4	01.11.61	14.08.78	41	16	11	28.08.78	Yes	High	Autoclave worker	No	Angiosarcoma confirmed. Annual report of the North Rhine Westphalia Medical Inspectorate for 1978 (pages 347-377) gives full details. Vinyl chloride disease diagnosed 02-02-73. Oesophageal varices. Radiologically confirmed across osteolytic.
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 Beeche 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 Beeche 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 syndrome)	66	18	13	19.06.80	Yes Haemangio Endothelioma of liver with Metastases	High	Autoclave Worker and worked in drying shop		Dr Beeche 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 Beeche letter of 13-04-82 to Dr M G F Adams

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		100.00.14	7	7	00.00.60	08.04.78	63	18	14	19.05.78	Yes				IF W Best letter of 130th June 1980 including data from Mr N P Friedel of IG 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 including data from N P Friedel of IG Chemie withdrawing this case
15	(NIOSH gives this as Case 13)	100.00.29	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 109/79. Some detail of this & also cases 19, 13, 15, 16 & 17 given in INRM Report for 1978
16		100.00.23	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 INRM Med Insp Rep for 1978. Different - details given in "VC Associated Disease" by Leibach and Marsteller (1981) (7).

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ICI CHEMICALS & POLYMERS

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MPR/ASL - LAMCLOCASES, 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
ITALY															
01 (On NIOSH supple- mentary list)	LG	15.06.14	PANSAC	Mira Venice	00.00.65	19.04.71	36	06	01	16.04.71	Yes		PVC Bag extruder		Primary tumour [may have been pericardium. [Not homo- geneous with other cases. **
02	SE	13.11.29	Montedison	Porto Marghera	00.00.57	13.12.72	43	15	06	27.12.72	Yes		Polyworker		**
03	VG	14.03.20	Solvay	Ferrara	00.01.53	10.07.75	55	22	21	10.07.75	Yes	High	[Autocleaner [8 yrs (1953)- [61) Autoclave [operator [12 yrs (1961- [72)	1972-5 did a variety of jobs including PVC packing.	**
04	FB	20.07.17	AMIC	Ravenna	00.04.59	00.01.81	43	21	21	30.03.81	Yes	12 yrs - Very High 5 yrs - Medium 4 yrs - Low	11 yr - Monomer operator [See paper by [CHIAPPINO et [al Med Lavoro [Vol 6 (1982) [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 [alcohol. No [AOL.	**
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- [1981		[S Paglia- [Lunga (ex of [2 Aug 1983

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

** Also see Milioni and Rondinella In Acta Oncologica Vol 1 1980 pages 35 - 49.

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 Selmer (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, angiomatosis, 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 VCM screening (24.04.85: no complaint, no abnormality detected. 1970 two-thirds resection 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		100.00.21	8	8	1951	30.06.85	61	32	20	Alive		?	Autoclave cleaner		Haemangiosarcoma. Friedel letter 23.12.86.
32		100.00.10	8	8	1951	00.04.88	55	30	21	Alive		?	Polyworker (Autoclave cleaner)		Haemangiosarcoma. Friedel letter 23.12.86.

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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	Tomuji 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 Time indicated on 25.10.75) exposures often at 1000 ppm up to 1974	13 yrs auto- clave cleaner 1964 - assigned to different work since had ill health		Japan Times 25.10.75 & Japanese PVC Assoc letters of 31.03.78 & 30.11.87
02	SC	02.08.39	Kanegafuchi Chemical	Osaka	00.11.58	10.08.76	37	17	13	10.08.76	Yes	Not known	In polymer- isation work (including autoclave cleaning		Japanese PVC Association letters of 31.03.78 & 30.11.87
03	YB	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 Montemano of IARC says Japanese Ministry of Labour give

Date of diagnosis - 21-08-74
Age of diagnosis - 52
Years of exposure - 22

LIVER Angiosarcoma Cases - (Review Date: 1 Jan 1980)

R&S 00439

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	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 28 March 1978 confirms BL was a monomer worker who was heavily exposed, probably even more so than a normal reactor cleaner
03	ME	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 Byren letter 18.8.77 to CEFIC
05		12.07.19	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 driller operator		Letter of 12nd 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 15-05-77 for Case 02.

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	JAH	23.12.15	Norsk Hydro	Heroya	00.03.50	21.12.71	56	22	21	04.01.72	Yes	High	Foreman & Autoclave supervisor		Confirmed by Dr Thilo- Evensen of NH. At APHE Mtg of 19 June 1978 Mr P Rengnes stated that AH had been a start-up team. IVCM & PVC were made in same building. The IVCM was made from acetylene

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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	Berry	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	CEP	1931	BP	Berry	1962	09.01.80	48/9	18	12	09.01.80			17 yrs Poly Floor Operator 15 yrs Greaser on Poly Floor		
07	RCB	26.04.20	BP	Berry	1963	00.00.80	60	17	8.2	15.06.80			Polycleaner 1963-5 Recovery 1965-1971		
08	WTH	08.05.24	BP	Berry	19.09.50	27.11.81	57	31	24	25.12.81		1950-1958 1500 ppm 1968-1974 200 ppm	1950-51 Autoclave operator 1951-1957 Chargeman autoclave building 1957-1974 Shift supervisor autoclave building - Hever 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 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	WJ	20.04.01	ICI	Hillhouse	04.04.44	03.12.72 (Fox & Collier paper say) 23.12.72)	71	28	22	03.12.72 (Fox & Collier paper say) 23.12.72)	Yes	500 ppm	1944-7 VCM 1947-8 Driver 1948-61 Autoclave operator 1961-66 Driver		116 and Harry 116 at 129-06074 1316-8
02															116 and Harry 116 at 129-06074 1316-8
03	BJW	02.06.37	BP	Berry	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	154-5 186-6 Plant 155-6 101st Plant 156-58 Autoclave worker 158-61 Chargehand 159-72 161-72 Foreman 162-73 Plant	Pre-war fish pecker 1939-45 army vehicle maintenance 1945-54 fish pecker	

ICI CHEMICALS & POLYMERS

WPX/ASL2 - LANGUOCASES.B

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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 13	MLJ	02.03.48	BP	Barry	1968	Jan 86	37	18	3	02.06.86	Yes	High Low High	Polycleaner (1968-69) (Central (Deput (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 (medium (between (1968-1982		Letters from Dr DMD Evans, (Pathologist, Penarth, Wales (and Dr DMJ Williams, BP, Barry

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	ELGP	107.05.25	BP	Barry	15.02.50	02.03.83	58	33	29	24.02.83	Yes	Medium	Polyworker	12 years on Acrylonitrile Heatin Plant. Also prior to 1950. 4 years RAF maintenance. 13 years motor car paintshop. 12 years in Craving Duck.	
10	GJT	104.04.47	BP	Barry	27.04.66	01.05.84	37	18	4.2	16.05.84	Yes	High - 11 months (500 ppm). Low - 18 months (50 ppm). Medium - 21 months (200 ppm)	Polycleaner (1966-67). Spray-drier bagger 1967- 68. Blow-down stripper operator 1968-70.	Heavy goods vehicle driver until final illness.	Information given in letter 18.06.84 from Dr D M J Williams
11	GLP	108.05.28	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 104.06.85 Dr Paul Smith and letter of 104.06.85 Dr D M J Evans oesophageal haemorrhage due to oesophageal varices due to Angiosarcoma of liver
12	IT	124.01.37	ICI	Hillhouse	16.09.57	01.06.85	48	28	28	06.12.85	Yes	Low 1957-59 High 59-74 Low 74-85	Spare man, bagging flour 1957-59. Autoclave operator 1959-85	-	Letter 126.06.85 Dr F L Lee.

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ICI CHEMICALS & POLYMERS

MPX/ASL_2 - LAMBUCCASES, 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 Cattle- Finger?	08.11.31	BPG	Louis- ville	28.05.45	01.01.74	41	29	24	11.03.75	Yes	2000 ppm			[Ref 1 has wrong figures for first exposure. [Louisville Times [29.10.74, [12.1.75, [10.1.76
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	Pirestone	Pottstown Pa	13.07.49	02.05.69	50	20	19	02.05.69	Yes	High 10 yrs	10 yrs as [reactor op. [Service op. [not cleaner] Bagger [- separate [Dryer op. [crew cleaned [Stripping op. [autoclave]] 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 Saig.
15															[Accountant; [IASI - No evi- [dence of VCM [exposure.

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 Parks	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 Cutting of IOSHA	Rolling Stone Art Ref 1 NY Acad Sci Symp 1974 Also Block JAMA 1.7.76 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 (CE Block)		Ref 1 Also Block JAMA 1.7.76 p 53
03	Edward Dinwiddie	25.05.15	BFG	Louis- ville	28.11.45	19.12.73	58	28	28	19.12.73	Yes		Pot Cleaner (CE 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 (CE 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 (CE 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 (CE 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

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	RFC	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 confirm this is the case described by Dannaher Tamburro & Yao 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 page 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 filter cleaner, thelper, then shift utility man	1937-39 was off and on labourer (1939-41 may have been exposed as reactor cleaner (1943 became shift filter (1946 became shift utility man	IN M Wheeler letter of 28.8.77 to Stafford gives details Rosa Kaminski letter of 26/2/79 R Kaminski (5 Nov 1980) suggests that (NIOSH will retain on register since this neoplasm may be associ- ated with ASL.
(25)															IN M Wheeler letter of 20/2/79 and Rosa Kaminski letters of 26/2/79 and 5/11/80
															Removal from register confirmed in R Kaminski letter of 5 November 1980

USA
Sheet 3

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															
16	James Howard	04.11.27	BFG	Louisville	08.05.50	00.00.69	41	19	04	27.03.69	Yes		1951-4 VCM polymerisation	from 1954 onwards in Army and other service, 146-50 Army	Table 4 in Wagener Testimony to US Senate Confirmed in M N Johnson 11/07.08.78
17	Peerenboom	06.05.31	BFG	Louisville	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 124.2.81 confirmed 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 leucocleaner 18 yrs on Estol plasticiser 16 Carboest operation	Navy Tyre Store		Confirmed in M N Johnson 11/07.08.78 Also Rolling Stone mag. 115.01.76
19	Virgil Christian	00.00.15	UCC	8 Charleston	00.00.43	19.06.75	60	32	32	06.04.76	Yes	2000 ppm			Williamport Sun Gazette 21 June 1975 Charleston Daily Mail 21.7.75
20		31.08.17	Goulyear	Niagara	00.00.55	30.01.76	58	21	18	30.01.76	Yes				INUSA letter of 25.10.79
21	Chester Hinkle	02.09.09	UCC	15 Charleston	00.12.46	Early 77	67	30	22	02.01.77	Yes				28 yrs with UCC at St. (Retired) News release 123.2.77

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UK system of dates
DAY - MONTH - YEAR

WPX/ASL 2 - LANGUAGES, 5

USA
Sheet 5

LIVER Angliovroma 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
US 32	C W Ciroux	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 "Angioma... and"	The death certificate gave "Mr Ciroux" (usual occupation as "kettle operator" in and "chemicals autoclaves industry". 1964-1973 (Various clerical jobs in PVC polymerisation facility/ Retired 01-03-73).	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 Bernas 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 H M 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 H M Johnson letter of 13 Nov 1982, 28 Feb 1983 and 9 Aug 1984.
US 35		09-03-12	UCC	S Charle- ston	23-07-44	18-07-83	71	39	14	18-07-83	Yes	High from 1944 to 1955. Medium from 1955-1958			(Dr Dacey letter of 15 Sept 1981).
US 36		27-08-32	The General Tire and Rubber Co	Ashtab ula	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		(H M Johnson letter of 12 Sept 1983; reported at medical May 1983. Testing commenced May 1983)

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	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 (cold room to (but main (exposure (was to VCM, (probably (high	Various jobs in PVC plants from paste recovery to PVC charging operator to paste charging. 111 August 1965. Terminated employment Jan 1966		R Kaminski letter of 26/2/79 and Prof. Tamburro letter of 9/1/79
27	J L Forrest	11.05.16	UCC	S Charleston	01.07.41	30.11.78	62	37	20 (NIOSH says 27 and C Daily Mail 125)	25.11.78	Yes	High	Operator to 10.10.76	Exposure in 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 Charleston	00.08.44	05.11.78	61	34	33	03.11.78	Yes				R Kaminski letter of 16/4/79
29		12.10.07	UCC	S Charleston	00.05.42	00.03.80	72	38	16	01.03.80	Yes				R Kaminski letter of 19th June 1980
30	MMW	22.07.22	Tenneco Chemicals	Flemington	11.06.64	30.12.80	58	17	15	30.12.80	Yes	6 - Unknown 19 - Minimal	Maintenance Mechanic 6 yrs Elsewhere 11 yrs Boiler house Operator 9 yrs		6 5th Nov 1980
31		08.11.23	UCC	S Charleston	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	Chemical Operator in charge reactor foreman Aliphatic Chemical operation	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.

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MPK/ASL2 - LANGUAGES, /

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 Gliner	26.10.14	BFG	Louise- 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, StG, . 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

USA
Sheet 7

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	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	Louis- ville	1953	06.08.84	54	31	22	06.08.84	Yes	High	Worked (regularly (in PVC area) (in the (early days (was a (reactor (cleaner (1953-75.		Information given in letter 09.08.84 from Dr M N Johnson
38	JWB	28.08.22	Air Products	Calvert City	00.02.63	19.01.84	61	20	20	28.10.83	Yes	High (1963-1982)	Normal (progression) (from helper (to senior (operator, (cleaned (reactors, (stripping (and (recovery (areas as (well as (charging (operator.		Thrombo cytopenia 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 Hemick	27.06.18	Pantasote	Pasosic	1960	March 1984	65	24	23	29.06.84	Yes	Low High Low Low	29.09.60 - (May 66 (Viny (Fabrication (Plant (May 66 - (Aug 70 (Utility (Hevin (Operator (11th Jul 66) (- Sep 67 (Reactor (Operator) (Sep 70-82 (Monomer (Operator (1982-83 (Mill (Operator, (Calender (Shop, mill (retirement	Worked (before (1960 (with US (Air (Force, (United (Wool (Dyers (and (Okanite	Never in hospital for any chronic or (acute medical problems. Death certificate (states cause of death cardio-pulmonary (arrest secondary to angiosarcoma of (liver. (Letter of 15.07.86 from John E Eitel (of Pantasote with letter of 24.02.86 (from Dr Auerbach, Pathologist.

R&S 001153

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 alive, so far as known: Can11, Fr15 & 22, G31 & 32, UK14, US13, 15 & 41.

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

[illegible]

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 Chloe 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.

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

(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 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>N America</u>		<u>79</u>	<u>1777</u>	<u>22.49</u>	W Europe Average
	US	37	955	25.81 *	
	Canada	<u>10</u>	<u>205</u>	20.5 *	
<u>Rest of World</u>		<u>47</u>	<u>1160</u>	<u>24.68</u>	N America Average
	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: Do not include Can11 or 12, or 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		
		WESTERN EUROPE	NORTH AMERICA	ROW
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

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	
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 Fr15 and 22, G31 and 32,
 UK14, US33 and 36

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

WPX/ASL2 - LANGIOCASES,14

001161

(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 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	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 28
1		29			
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 - LANGIOCAS,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

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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, BK14, 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, F15 & 22, G31 & 32, UK14, US33, 36 & 41

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(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****	19

* 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

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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	104,07,11,15,23,24 125,31,32	57,54,55,53,55,69,60,53 155
1938	Italy	Montecatini	Acna		
1939	France	Rhone-Poulenc/ Chloe/Atochem	St Fons	103,09,10,11,14 115,16,17	146,48,56,41,43, 155,41,48
1940	United Kingdom	ICI/EVC	Runcorn (Closed 1948)		
	United Kingdom	ICI/EVC	Hillhouse	101,04,12	144,54,57
1945	Sweden	Kemnor/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	103,05,06,07,08,09 110,11,13,14	166,51,62,63,50,50 166,65,68,66
	West Germany	CW/Huls	Marl	109,10,26,29	161,61,53,62
1949	Belgium	Solvay	Jemeppe	101,02	158,62
1950	France	PCUK/Atochem	Brignoud	102,04,05,06,12,19 120	59,49,65,58,49,59,51 120
	France	Rhone-Poulenc/ Chloe/Atochem	St Auban	107,22	50,58
	Holland	Shell	Pernis, Rotterdam		
	Norway	Norsk	Heroya, Porsgrunn	101	150
1951	Switzerland	Lonza/ICI/EVC	Sirs		
1952	Italy	Montedison	Terni		
	Italy	Montedison/EVC	Porto Marghera	102,06	157,60
1953	Austria	Halvic/Solvay	Hallein		
	France	Solvay	Tavaux	108,13,18	157,63,63
	Italy	Solvay	Ferrara	103	153
	Spain	Rio Rodano	Hernani		
	United Kingdom	BXL/BIP/NORSK	Aycliffe		
	West Germany	Hoechst	Gendorf	118	155
1954	West Germany	Dynamit	Troisdorf	101,02,08,12,16,17 119,20,21,22,27,30	156,57,54,61,55,61, 54,61,62,61,55,51
1955	Spain	Monsanto Iberia	Monzon		
1956	Spain	Calqsa	Sabinanigo		
		Hispanvic/Solvay	Torrelavega		
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, Verice	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	Bediphill	Antwerp		
1969	United Kingdom	Vinatex/Norsk	Staveley		
	Italy	Rumica/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	Hispavic/Solvay	Martorell		
	Sweden	Kemabord/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	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	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,?
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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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 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 Vinil	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		

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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		

(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)		

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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 15MIDDLE EASTERN PVC PRODUCERSSTART-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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