



INTER-OFFICE CORRESPONDENCE

Date: September 20, 1982

From: Z. G. Bell

Location: 5 West

Subject: Angiosarcoma Update

To: H. B. Lovejoy, M.D.
C. B. Myers, M.D.

Here is the latest update on angiosarcomas worldwide. I have been copying you as I receive them.

A handwritten signature in cursive script, reading 'Zeb G. Bell, Jr.'.

Zeb G. Bell, Jr.

/jh

Attachment

c: F. C. Dehn (w/o attachment)

SL 028512



DOW CHEMICAL U.S.A.

RECEIVED

1803 Building
23 August 1982

AUG 27 1982

MIDLAND, MICHIGAN 48640

Environmental Affairs

Dr. Z. G. Bell, Jr., PPG
Dr. W. Clark Cooper
Dr. W. Gaffey, Monsanto
Dr. V. E. Kirkland, Shell
Mr. R. W. Laundrie, General Tire

Dr. C. Stack, CMA
Dr. I. Tabershaw
Dr. C. Tamburo, U of Louisville
Dr. O. Wong, EHA

ANGIOSARCOMA REGISTRY

Dr. John Stafford has kindly supplied an August 1982 update of the angiosarcoma registry. Overall the number of cases is little different from the January edition, but as Dr. Stafford points out, this could be due to delayed reporting. It is extremely important that all information be supplied promptly to Dr. Stafford.

John is presenting a seminar at the Vinyl Chloride Safety Conference in Toronto, September 23 or 24.

Sincerely yours,

T. R. Torkelson, Sc.D.
Toxicology/Medical Liaison
Health and Environmental Sciences
517/636-5197

9

Enclosure

cc: Bob Oubre, Dow Oyster Creek
Dr. John Stafford, ICI

Liver Angiosarcoma Cases

Circulation

Dr K S Williamson
Dr G M Paddle
Dr D P Duffield
Dr W G F Adams - (5 copies - ICIA, AECI, Duperial)
Mr John York, Everberg
Mr J G Davies, Everberg
Dr D W Plester
Mr H R Jervis, Millbank
Mr D M Jonas, Vinatex
Mr R H Hards, BIP Vinyls
Dr I W Williams, BIP Vinyls
Dr J T Carter, BP
Dr P Lewis, CIA
Dr J P Tassignon, Solvay
Mr J Jauvert, Chloé Chimie, Paris
Dr Renzo Mattiussi, Montedison
Mr P Lechaude, Solvay
Dr B List, Lonza
Mr P G Claus, APME
Dr J G Kommüller, Shell
Mr S O Wejdling, Kemanord
Dr David Byren, Kemanord
Mr P Rangnes, Norsk Hydro
Dr B Terwiesch, CWI
Mr H Emminger, VKE
Dr E Lloyd-Jones, BP
Mr Owen Jones, Hillhouse
Dr Brian Bennett, Hillhouse
Dr Peter Wright, P & P Wilton
Dr F W Best, Everberg
Mr C Cella, Montepolimeri
Mr G Dupont, APME
Dr C Bishop, EMAS
Mr B Werner, EMAS
Dr R Spirtas - NCI/NIH DETHESDA
Dr E W Dacey - NIOSH, Cincinnati
Dr R Owen - TUC
Dr J Stafford (20)
Dr John O'Sullivan - Castner Kellner Works, Mond
Dr W A Hogg - Imperial Oil Ltd, Canada
Mr M Muñoz Mouton - Rio Rodano

Dr T R Torkelson, Dow
Mr J Lawrence, SPI
Mr J T Seawell, CMA Washington
Mr R N Wheeler, UCC
Dr A Ross Adams, Air Products
Dr Mayo Smith, Air Products
Dr John Barr, Air Products
Dr Walter D Harris, Uniroyal Inc
Dr Robert K Hinderer, BF Goodrich (Cleveland)
Dr R A Krueger, BF Goodrich
Dr M N Johnson, BF Goodrich
Dr J Possberg, Wacker
Dr J C Aubrun, PCUK
Dr H P Friedel, Berufsgenossenschaft der chemischen
Industrie, Heidelberg
Dr E Ernst, Berufsgenossenschaft der chemischen
Industrie, Nürnberg
Prof Dr Thiess, BASF
Mr Stahnecker, BASF
Dr D M Ferguson, ICI Americas
Mr A G Mash, ICI Americas
Dr Gary Ter Haar, Ethyl Corporation
Prof. C Maltoni, Bologna
Dr J William Lloyd, Osha
Dr David Bryson, AG Division
Mr S Nakamura, Japanese PVC Association
Dr Peter Baxter, EMAS
Dr A Munn, Monsanto, Brussels
Dr W C Barnes Jr, Monsanto USA
Dr R E Gosztanyi Jr, Tenneco Chemicals, Saddle Brook (NJ)
Dr Donald W Hillman, Diamond Shamrock
Dr G Kent Hatfield, Diamond Shamrock
Dr Pierre Bertazzi, Milan University
Dr Hans Popper, Mount Sinai Medical Centre
Sir Richard Doll, Warden, Green College, Oxford
Dr R Saracchi, Iarc, Lyons
Dr R Montesano, Iarc, Lyons
Dr Henry Falk, CDC Atlanta
Mr J R Wallace, Esso Chemical, Sarnia, Canada
Dr F I Lee, Victoria Hospital, Blackpool
Dr D M J Williams, BP Barry
Dr Paul M Smith, Llandough Hospital
Mr O Kansanen, Neste Oy
Mr M Chance, VCM Technical Manager, Mond
Dr Besche, Dynamit Nobel, Troisdorf

PREFACE

ACKNOWLEDGEMENTS, SIGNIFICANT CHANGES AND COMMENTS

- 1 I should like to thank Dr Walter C Barnes, Jr, the Monsanto Occupational Medicine Physician advisor for the Springfield plant who gave Dr A Munn of the Monsanto Europe full details of US 32 (Dr Barnes letter of 24 February 1982). US 32 was diagnosed in 1979 and died in 1980.
- 2 Dr R Montesano of IARC in his letter of 6 April 1982 gave useful detailed information on some cases already published and notified a suspect case in Rumania. This case is being followed up with Prof Suciu. Dr Montesano mentioned another suspect case in France but the French PVC industry reports no evidence of ASL at the autopsy.
- 3 I am grateful to Dr W G F Adams and Dr Besché (Chief Medical Officer of Dynamit Nobel) for clearing up some of the problems of date of diagnosis and latency periods for cases 20, 21 and 22 in Germany. These cases now fall within a more usual pattern of death following six months or so after diagnosis of ASL. The data on case 19 have also been improved.
- 4 Dr R Spirtas of NCI, NIH Bethesda has asked whether all the ASL cases are white and male. He thought it important to record race and sex of cases. The two Japanese cases are of course male but not white. I would be grateful if recipients would let me know whether any of the other cases were not white males.
- 5 I am grateful to Dr J H Wilson for advice on more precise dates of start-up of the earliest European PVC plants and the amendments shown in Table 8. It is remarkable that BASF started production in 1931 at Ludwigshafen and have not had any ASL cases.
- 6 So far no ASL cases have been notified for 1982 and only 5 cases for 1981 of whom 1 case (an American) is still alive. Once more I am left wondering whether there is a real reduction in numbers of cases per annum or whether we are merely suffering from delays in diagnosis and reporting. Your continued help in keeping this register of ASL cases accurate and completely up to date is requested.

John Stafford
Division Manager
Health and Environment Protection
ICI Petrochemicals and Plastics Division
Bessemer Road
Welwyn Garden City
England

JS/LTE/9 August 1982

SL 028515

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

LIVER ANGIOSARCOMA CASES (REVIEW DATA - 9 AUGUST 1981)

Table Sequence

Belgium	1	ASL Case Numbers by year of Death (Table 6)	32
Canada	2-3	ASL Case Numbers by year of first exposure (Table 7)	33
Czechoslovakia	4	Western Europe PVC Producers - Start-up Dates vs ASL Cases (Table 8)	34
France	5-7	USA PVC Producers - Start-up Dates vs ASL Cases (Table 9)	35
Germany	8-12	Canadian PVC Producers - Start-up Dates vs ASL Cases (Table 10)	36
Italy	13	East European PVC Producers - Start-up Dates vs ASL Cases (Table 11)	37
Japan	14	Japanese PVC Producers - Start-up Dates vs ASL Cases (Table 12)	38
Norway	15	South & Central American PVC Producers - Start-Up Dates (Table 13)	39
Sweden	16		
UK	17-18		
USA	19-24		
Yugoslavia	25		
Incidence of Cases pa (Table 1)	26		
Distribution of Cases by Country (Table 2)	27		
Pattern of Cases by Factory (Table 3)	28		
Latency Periods (Table 4A)	29		
Distribution of Latency Periods (Table 4B)	30		
Annual Geographical Incidence (Table 5)	31		

SL 028516

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Page 1

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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>REFLECTION</u> 01		12.01.13	Solvay	Jemeppe	00.07.58	00.05.76	63	18	17	29.06.76	Yes	High 1958-1968 exposed to 200 ppm for 8 hrs per day and certainly under 500 ppm in 5 to 9m 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 1974-1980 ppm 1975- 50 ppm RETIRED 1 Feb 1975	Autoclaver 14 yrs Polymer 3 yrs Work in glass (ind. & chem- ical industry)	Driller in a foundry (2 yrs) Farmer (15 yrs) Hospitalised (ind. & chem- ical industry)	Hepatic tests in Oct 1974 were normal. Retired Feb 1975 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

SL 028517

IMPERIAL CHEMICAL INDUSTRIES LTD.
PETROCHEMICALS AND PLASTICS DIVISION

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

* All dates use UK system
DAY - MONTH - YEAR

** Data published in Journal of
Occ Med 1978 pages 338-340

*** Many of dates altered to fit NIOSH 31/3/77 list

Canada
Sheet 1

Page 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 NO 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 REMARKS
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	23.07.62	Yes		Operator, foreman		Worked overtime Non-smoker
04		05.04.19			1945	1967	48	22	22	21.01.68	Yes		Reactor cleaner	Operator, foreman, water cooling unit	Worked overtime Smoker
05		07.05.11			1944	1968	57	24	05	05.07.68	Yes		Reactor cleaner	Water cooling unit	Worked overtime Smoker
06		15.12.19			1947	1971	51	24	23	10.04.71	Yes		Reactor cleaner	Maintenance, millwright	Worked overtime Smoker
07		09.11.19			1946	1972	53	26	25	24.12.72	Yes		Reactor cleaner	Machine shop operator and poly unit	Worked overtime Smoker
08		13.05.20			1961	1973	53	12	05	12.06.73	Yes		Reactor cleaner	Maintenance machine shop	In plant 25 yrs Smoker
09		19.07.21			1946	1974	57	28	24	04.09.74	Yes		Furnace op. pipefitter maintenance		Worked overtime Smoker

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

SL 028518

1.1YR Angiosarcoma Cases - (Review Date: 9 August 1982)

- * All dates use UK system
- ** Data published in Journal of Ore Res 1978 pages 338-340
- *** Many of dates altered to fit

Page 1

SL 028519

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

Page 4

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>YUGOSLAVIA</u> 01		28.06.28	State Co	Novaky	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	Novaky	01.11.50	27.11.64	37	14	15	26.11.64	Yes		Autoclave Cleaner	IARC letter of 11-4-82 gave somewhat altered dates for this case. I have intercepted 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.	

SL 028520

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

France
Sheet 1

Page 3

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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	HN	15.04.24	RP	Rouss- illon	00.01.46	18.02.67	43	21	19	19.02.67	Yes	High	Autoclave worker and cleaner 19 yrs		Ref. Ravier et al Arch. Biol. Prof. 1 30 n° 11 Nov 75 p 171-177
02	SHH	03.04.11	PCUR	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- isation	Italian origin	Ref. G Bonnet et al "Nouvelle Presse Medicale" 15 Nov 1977 p 735
03	NAV	06.01.20	RP	St Pons	00.00.46	15.01.75	55	29	29	29.06.75	Yes	High	Polymer 10 yrs as autoclave cleaner Compounding 3 yrs	VCI production 16 yrs Italian POW Shepherd, Sawyer, Mann	Ref. Rety et al Arch. Biol. Prof. 1 37 n° 14 June 77 p 551-555
04	IKR	27.01.27	PCUR	Brignoud	19.10.49	16.01.76	49	26	26	04.01.76	Yes	High	Monomer production worker 18 yrs PVC filtration 16 yrs		
05	HN	29.01.38	PCUR	Brignoud	18.01.65	13.05.76	38	11	11	13.05.76	Yes	High	Polyworker 11 yrs	(1)Thoracotomy 19th Feb 1976 1st Al "Scannet" Angiosarcoma (2)Reintigraphy 1976 found ASI (3)Haemorrhage from ASI (4)Right Hepatectomy	Ref. P Gaudere 1st Al "Scannet" 1st Al "Scannet" Angiosarcoma (1)09 Septembre (2)Previously had bone Angiosarcoma" Alain (3)Pillechunki et al "La Nouvelle Presse Medical" 17th July 1979 Page 2485

SL 028521

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

France
Sheet 2

Page 6

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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	PCUX	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 work lab)		(This man had IAM prior to IAS. Ann. de Mal. Prof. July '77 p 643 & 6. IAM was found in 1971 five yrs before IAS).
07	GIR	26.04.27	RP	St Auban	01.07.50	After death NIOSH says 08.07.76	48	24	22	02.07.76	Yes (NIOSH no comment)	High	Plant fore- man in polymer- isation	1972-6 admin section in St Auban	Died of hepaticoma (Small liver lesion found after autopsy)
08	R	01.04.34	Solvay	Tavaun	23.03.57	03.12.75	42	19	19	10.01.77	Yes	Moderate	16 yrs packer & autoclave ciner 14 yrs autoclave worker		Had been tunnel worker previously
09	IRFX	08.10.14	RP	St Fane	10.01.48	26.04.76	63	28	28	25.12.77	Yes	Very High 1948-1966 Lesser Exposures 1966-1976	Polymer- isation operator, autocleaner, autoclave maintenance	110 yrs in sulphuric acid factory, storekeeper & general services	Operated 4.76 (for removal of) tumour from liver and died after second surgical operation for bilio bronchial fistula (Paper by Dr Rely et al in Archives de Malades Professionals (Vol 40 No 6 1979 pages 741-3).

SL 028522

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

France
Sheet 3

Page 7

LIVER Angiosarcoma Cancer - (Review Date: 9 August 1982)

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	Med of pulmonary embolism 5 days after surgery
11	EL	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 VCH synthesis (HCl & Acetylone) Foreman (agent for maltrine) 1972 retired		
12		16.04.14	PCUK	Brignoud	09.02.49	00.05.79	65	30	27	23.04.79	Yes	High	Shower 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	2 yrs as cycle mechanic. 10 yrs as canneller in sanitary ware manufacture	Cigarette smoker until 1974, till all of 1977 due to oesophageal varices. Surgical intervention 25.05.79 (right hepatectomy)
14	MI	05-04-24	Chloe Chimie (Formerly RP)	St Fons	1943	00.07.81	57	38	36	29.07.81	Yes	Very High	1943-1975 1943-1975 and intermittent only 1975-1979 Process	1943-1975 All types of maintenance work manufacture in VCH Poly Process	

SL 028523

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Germany
Sheet 1

Page 8

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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	Dynalit	Troisdorf	01.10.56	19.09.68	38	12	12	25.01.69	Yes (NIOSH)		Polyworker		
02		00.00.31	Dynalit	Troisdorf	14.10.57	25.09.70	39	13	11	14.12.71	Yes (NIOSH)		Polyworker		
03		00.00.30	Dynalit	Rheinfel- den	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 incorrect. (However I wonder whether this man had high exposure to VC in his (can filling operation)
04		00.00.30	Wacker	Burg- hausen	16.04.57	26.11.76	44	17	17	25.11.74	Yes (NIOSH)	200-500 ppm (but high (during 1 yr) (autocleaner)	Polyworker & temporary autocleaner (for 1 yr)	1958 was autocleaner (for 1 yr)	Clinical details in paper by Gokel et al Virchows Arch A Path 1976 222 p 195-203

SL 028524

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICAL AND PLASTICS DIVISION

Germany
Sheet 2

Page 9

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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 CANCER HIGHLIGHTS	OTHER COMMENTS
GERMANY 05 (NIOSH given as Case 04)		00.00.36	Rochet	Frankfurt	02.04.60	10.12.73	30	13	05	16.12.74	Yes (NIOSH)		RD Chemie (says "chemistry laboratory in the Technical Research Department" (NIOSH says "assistant factory chemist which may be wrong translation))		Confirmed Reported under (non-polymer- ization workers in NIOSH list of 31,3,77 and 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 given as Case 03)		00.00.32	Lenze	Malinshut	16.12.62	00.00.75	43	13	12	09.01.75	Yes		PVC - Manu- facture Shift Leader		
07		00.10.26	Wacker	Berg- hausen	15.04.54	12.11.75	49	21	21 (NIOSH says 12)	13.11.75	Yes		PVC Manu- facture and all work incl auto- cleaning 12 yrs (1954-66) (Foreman Tech 10y 8 yrs (1967-1975))		
08		00.00.17	Dynacit	Teufelsdorf	19.07.54	04.04.75	50	21	22	25.12.75	Yes	?	Polymworker	?	

SL 028525

BIOPHARMACEUTICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Germany
Sheet 3

Page 10

LIVER Angiomas Cases - (Review Date: 9 August 1982)

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	CNH	Merl	20.02.61	16.06.76	41	15	13	24.03.78	Yes	High peaks	12 yrs poly- worker incl 173 auto- clave cleaning (Control room) 1 yr		10/78 Confirmed Average exposure first 9 yrs 150 ppm, last 1000 ppm, last 3 yrs av. 175 ppm. Last 1 yr av 35 ppm
10 (NIOSH given as Case 11)		00.00.34	CNH	Merl	01.01.61	00.01.77	40	16	10	07.03.77	Yes	High peaks	10 yrs poly- worker incl 173 auto- clave cleaning		Average exposure first 9 yrs 150 ppm, last 1000 ppm, last yr av 175 ppm. CNH letter of 21.04.78
11 (NIOSH given as Case 10)		00.00.29	Mackay	Hirg- hausen	10.10.55	28.06.77	47	22	22	28.06.77	Yes	High	13 yrs auto- clave cleaner 19 yrs filler operator		
12		00.00.30	Dynalitt	Troisdorf	00.00.61	00.10.77	39	16	6	07.10.77	Yes	1	PVC manu- facture Autoclave worker for 16 yrs		

SL 028526

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Germany
Sheet 4

Page 11

LIVER Angiosarcoma Cases - (Review Date: 8 August 1982)

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	Louise	Waldshut	00.00.60	05.04.78	43	18	14	19.05.78	Yes				IF W Bent letter of (30th June 1980) inclosing data from Dr W P Friedel of BG Chemie
14											Not an Angiosarcoma in his letter of 21.12.81. Dr Friedel said this was a "Plattenepi- thelkarzinom" (carcinoma of the oesophagus) not attribut- able to VCM & not recognised as an industri- al disease				IF W Bent letter of (30th June 1980) inclosing data from Dr P Friedel of BG Chemie withdrawing this case
15	(NHSN gives this as Case 13)	00.00.29	Wacker	Burghausen	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 & 17 given in NHSN Report for 1978
16		00.00.23	Dynmit	Trolsdorf	10.01.55	07.08.78	55	23	20	07.08.78	Yes (ABL and Hepatocellular Carcinoma)	High	Autoclave worker till 1964. Glender and master		Angiosarcoma confirmed, full details of illness (since March 1977) given in NHSN Med Insp Rep for 1978.

SL 028527

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICAL AND PLASTICS DIVISION

Germany
Sheet 5

Page 12

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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 [WIOSH gives as Case 15]		00.00.37	Dynalut	Trolsdorf	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 367-377 given full details. Vinyl chloride disease diagnosed 02-02-73. Gastrophageal varices. (probably acro- matocytosis).
18		00.00.13	Hoechst	Genderf	00.00.55	25.12.79	64	24	21	25.12.79	Yes		Autoclave Worker		
19		00.00.15	Dynalut	Trolsdorf	18.10.54	00.08.79	54	25	18	22.03.80	Yes Metastasing [ASL]	High	Autoclave Worker		Dr Beuche letter of 13-04-82 to Dr M G F Adams
20		00.00.15	Dynalut	Trolsdorf	14.02.61	00.04.80	65	19	13	19.10.80	Yes Haemangioma (endothelioma of liver with metastases)	High	Autoclave Worker		Dr Beuche letter of 13-04-82 to Dr M G F Adams
21		00.00.13	Dynalut	Trolsdorf	01.01.62	00.09.79	64	17	13	19.08.80	Yes Haemangioma (endothelioma of liver with metastases)	High	Autoclave Worker and worked in drying shop		Dr Beuche letter of 13-04-82 to Dr M G F Adams
22		00.00.31	Dynalut	Trolsdorf	15.10.61	17-09-80	59	18	11	06.12.81	Yes Metastasing [ASL]	High	Autoclave Worker	Chergeland, subsequently Foreman	Dr Beuche letter of 13-04-82 to Dr M G F Adams

SL 028528

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

* Should this case be removed from
the list? HUSH have it on their
supplementary list relating to
non-polymerisation workers exposed to VCM.

Page 13

JB 1/8/77

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 DIATRISTS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
ITALY															
01 (On HUSH supple- mentary list)	LS	13.06.34	PANAC		00.00.63	19.04.71	36	06	03	16.04.71	Yes		PVC Bag operator		1 ^a Primary tumour may have been pericardium. Not immo- genous with other cases. ** ***
02	SR	13.11.29	Montedison	Porto Marghera	00.00.57	13.12.72	43	15	06	27.12.72	Yes		Polyworker		** ***
03	VB	14.01.20	Solvay	Ferrara	00.01.53	10.07.75	55	22	21	10.07.75	Yes	High	Autoclave operator (8 yrs (1953)- 1961) Autoclave operator (12 yrs (1961- 72))	1972-5 did a variety of jobs including PVC packing.	***
04	FR	20.07.37	AMIC	Ravenna	00.04.59	00.01.81	41	21	21	30.03.81	Yes	12 yrs - Very High 5 yrs - Medium 4 yrs - Low	1 yr - Hammer operator 20 yrs - Autoclave operator & other duties (in suspension (in polymer- isation. (Area Foreman (in same Dept since 1975.		***

** See Maitoni and de Lorenza 65 p445, 1974. Further details in letter from Dr Montanaro of IARC on April 14 1982.

*** Also see Maitoni and Roncalinella in Acta Oncologica Vol 3 1980 pages 35 - 49. (ICI has made a translation of this paper into English and copies of the translation can be made available on request).

SL 028529

INFENTAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Page 14

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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	NEUROLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
<u>JAPAN</u>															
01	Yama (M)	01.08.22	Mitsui Tosatsu (no comment by Jap PVC Assoc)	Nagoya	00.04.53	24.10.75 ^a	53 ^a	22 ^a	13	24.10.75	Yes	PVC Assoc says not known. * Japan Times indicated on 25.10.75 exposures often at 1000 ppm up to 1974	13 yrs auto- clave cleaner 1964 - assigned to different work since had ill health		Japan Times 25.10.75 & Japanese PVC Assoc letter of 31.03.78
02	ISO	02.08.39			00.11.58	10.08.76	37	17	11	10.08.76	Yes	Not known	In polymer- isation work including autoclave cleaning		Japanese PVC Association letter of 31.03.78

^a 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

SL 028530

Page 15

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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
INFORMAT 01	IAN	23.12.15	Harsh Hydro	Meroya	00.03.50	21.12.74	56	22	21	04.01.72	Yes	High	Foreman & Assistant supervisor		Confirmed by Dr Thila- Evans of MII at APLE Mg on 19 June 1978 Mr P Rangan stated that AN had been a member of a start-up team when 5 PVC were made in same building. The VCN was made from acetylene

SL 028531

INDUSTRIAL CHEMICAL INDUSTRIES PLUS
PETROCHEMICALS AND PLASTICS DIVISION

Page 16

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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
SMITH															
01	MI	23.06.27	Kemnord	Sundavall	14.06.51	20.10.70	43	19	18	20.10.70	Yes		Polymaker		
02	MI	27.11.11	Kemnord	Sundavall	00.01.45	00.08.72	61	27	27	16.08.72	Yes	High	PCH production		In Sjodin's letter of 28 March 1978 confirms Al. was a summer worker who was heavily exposed, probably even more so than a normal reactor cleaner
03	ME	10.06.10	Kemnord	Sundavall	00.05.47	18.03.76	65	29	21	19.03.76	Yes	High	Polymaker		
04	AL	16.11.14	Kemnord	Sundavall	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 B Byren letter 18.8.77 to CHIC
05		12.03.19	Kemnord	Sundavall	11.05.44	22.11.80	61	16	16	22.11.80	Yes	High - 5 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 Health given 20-02-70 as date of diagnosis for Case 01 and 15-05-72 for Case 02.

SL 028532

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

UK
Sheet 1

Page 17

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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	Millhouse	04.04.44	03.12.72 (Fox & Collier paper says 23.12.72)	71	28	22	03.12.72 (Fox & Collier paper says 23.12.72)	Yes	500 ppm	1944-7 VCM 1947-8 Drier 1948-61 Autoclave operator 1961-66 Drier		Lee and Harry Lancet 29-06074 (pages 13)6-8
02															Thelton (fabrication case)
03	B.M.	02.06.17	BP	Barry	00.02.66	00.12.74	37	09	3.3	24.12.74	Yes	High	Autoclave cleaner		Exposure limited to 2.66 - 9.69
04	JSR	23.06.20	ICI	Millhouse	24.04.34	00.06.79	59	25	18	12.10.79	Yes	Medium- high	54-5 Bagging Plant 55-6 Drier Plant 56-58 Autoclave worker 58-61 Chargehand Drier Plant 61-72 Foreman C 3/3 Plant	Pre-war fish packer 1939-45 army vehicle maintenance 1945-54 fish packer	

SL 028533

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICAL AND PLASTICS DIVISION

UK Page 18
Sheet 2

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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	IP	Barry	08.01.51	00.10.79	65	20	21	19.11.79			(1951-52) (Polycleaner) (1952-55) (Laser) (1955-60) (Polyfloor) (1960-64) (Poly) (Chargehand) (1964-70) (Charging operator) (1970-72) (Drier operator)		
06	ICP	1911	IP	Barry	1962	09.01.80	48/9	18	12	09.01.80			(7 yrs (Poly Floor operator) (5 yrs (Greaser on (Poly Floor		
07	IGA	26.04.20	IP	Barry	1963	00.00.80	60	17		11.06.80			(Polycleaner (1963-5 (Recovery (1965-1971		
08	ICI	08.05.24	IP	Barry	19.09.50	24.12.81	57	31	24	25.12.81			(1950-51) (Autoclave operator) (1951-1957) (Chargeman (autoclave building - (1957-1974) (Shift supervisor (autoclave building - (Haver (cleaned autoclaves (but (superior's) (job entitled) (entering (autoclaves (to inspect them		

SL 028534

USA Page 19
Sheet 1

4UK 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	CIVILIAN	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	RPG	Louisville	09.12.48	03.03.73	49	24	21	03.03.73	Yes		Pat Cleaner (Black Book 1974) p 53	History given in Annals NY (ACAC SCIENCES) Vol 329 (1979) page 190 in (Also Black Book by JAMA 1.7.74) p 53 ;	Rolling Stone (Ref 1 NY Acad 1974)
02		19.08.33	RPO	Louisville	15.11.55	00.05.70	37	14	13	27.09.71 (RHOSE says (28.09.71))	Yes		Pat Cleaner (CF Block)		Ref 1 (Also Black Book JAMA 1.7.74) p 53
03	Edward Dinwiddie	25.05.15	RPG	Louisville	28.11.45	19.12.73	58	28	28	19.12.73	Yes		Pat Cleaner (CF Block)	Louisville Courier (Journal) 02-09-80	Ref 1 (Also Black Book)
04		15.01.24	RPM	Louisville	06.07.52	19.08.67	43	15	15	07.01.68	Yes		Pat Cleaner (CF Block)		Ref 1 (Also Black Book)
05		25.01.12	RPU	Louisville	19.06.44	09.04.64	52	20	20	09.04.64	Yes		Pat Cleaner (CF Block)		Ref 1 (Also Black Book)
06	Ray Austin (sonnet)	23.11.28	RPG	Louisville	17.01.62	00.02.74	45	32	12	24.07.75	Yes		US Air Force (Pat Cleaner (CF Block)		Ref 1 + (Louisville Times 23.7.75) (Retired April 1974) (Also Black Book)
07	Shirley T Smart	03.05.22	MCC	S Charleston	27.08.44	00.00.68	45	24	17	21.03.68	Yes				Ref 1
08		06.05.20	Goodyear	Michigan	07.10.46	00.08.61	41	15	15	29.08.61	Yes				Ref 1

SL 028535

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

LIVER Angliantream Cases - (Review Date: 9 August 1982)

USA
Sheet 2

Page 20

PK 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 09	Raymond (Geller- Finger)	08.11.31	BPC	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 129.10.74, 123.3.75, 100.3.76
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 (Ackman)	17.11.18	Firestone	Poststown 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 (outclaves)) 3 yrs prior (service in (tyre plant	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 Russell (of ICA
13	Richard (Edward (Glendon)	01.12.21	HCC	8 Charle- ston	11.12.42	00.05.74	52	32	26	07.04.74	Yes	2000 ppm			(Charleston (Daily Mail (21.7.75
14															(Dubious (fabrication (case
15															(Dubious (fabrication (case

SL 028536

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION
LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

* UK System of dates
DAY - MONTH - YEAR

USA
Sheet 3

Page 21

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	RPM	Louis- ville	08.05.50	00.00.69	44	19	04	27.03.69	Yes		1951-4 VCH polymer- isation	From 1954 onwards in Army and other service. 14-50 Army	Table 4 in Magnum Testimony to US Senate Confirmed in IN H Johnson 11r 07.08.78
17	Peerenboom	06.05.31	RPM	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 H H Johnson letter of 24.2.81 con- firmed death 16 years after diagnosis
18	Charles Arthur	22.04.28	RPM	Avon Lake	15.09.54	00.00.75	46	21	13	02.11.75	Yes	11 yrs insulation 18 yrs on Kotel plasticiser 18 Carbosol operation	Navy Tyro Store		Confirmed in IN H Johnson 11r 07.08.78 Also Rolling Stone mag. 15.01.76
19	Virgil Christian	09.00.15	BCC	S Charle- ston	00.00.43	19.06.75	60	32	32	06.04.76	Yes	2000 ppm			Millionsport Sun Gazette 21 June 1975 Charleston Daily Mail 21.7.75
20		11.08.17	Goodyear	Nagars	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	BCC	S Charle- ston	00.12.46	Early 77	67	30	22	02.01.77	Yes				28 yrs with BCC at SC Retired News release 21.2.77

SL 028537

LIVER Angiosarcoma Case - (Review Date: 9 August 1982)

ISA
Sheet 4

Page 22

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	HISTORICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
USA															
22		02.10.23	BFC	Louisville	11.07.47	00.01.76	52	29	28	04.12.76	Yes				Louisville Times 26.1.76 said he was the 14th AS victim at Delta Lane of whom I had filed by 26.1.76 in his letter of 16.09.81 Dr H N Jones confirmed this in the letter described by Dunbar 11m Aug 80 11m Feb 1980 1Am J Medicine Vol 10 p280
23		00.00.23	Great American Chemical Company	Pittsburg Mo.	08.09.38	06.04.73	50	15	14	06.04.73	Yes				
24	Charles Edward Munro	17.05.17	UCC	8 Charleston	1938	27.05.77	40	38	241 (HIOSH 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 reactor gas fitter cleaner helper, then shift fitter 1946 became shift utility man 26.04.65 employment terminated	1937-38 was off and on in 1939-41 may have been exposed as reactor cleaner 1941 became shift fitter 1946 became shift utility man 26.04.65 employment terminated	11 H Wheeler letter of 18.8.77 to 1J Stafford given details Rose Kaminski letter of 26/2/79 (R Kaminski) (5 Nov 1980) suggests that HIOSH will retain as register along with his menpinas (may be associated with ASI, 11 H Wheeler letter of 20/2/79 and Rose Kaminski letters of 26/2/79 and 15/1/80)
(25)															

Removal from register confirmed in R Kaminski letter of 5 November 1980

SL 028538

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

USA Sheet 5 Page 23

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

*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	07.07.25	BFG	Louisville	07.10.47	00.00.72 (up to 2 years after death)	52 (death)	28 (death)	18	11.02.75	Yes	Exposed in some degree to 22 chemicals cold room in but main exposure recovery to was to VCH, PVC charging probably operator to paste charging. 111 August 1965. Terminated employment Jan 1966	Various jobs in PVC plants from cold room to 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 19/1/79
27	J L Forrest	11.05.16	UCC	Charleston	01.07.41	30.11.78	62	37	20 (MORR says 27 and C Daily Mail (25)	25.11.78	Yes	High	Operator to bulk and dispersion PVC manufacture	Exposure in bulk and dispersion PVC manufacture	R H Wheeler letter of 4 Jan 1979 and Charleston Daily Mail 30.11.78 and R Kaminski 26/2/79
28		11.04.17	UCC	Charleston	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	Charleston	00.05.42	00.03.81	72	38	16	01.03.81	Yes				R Kaminski letters of 19th June 1980 6 5th Nov 1980
30	WVH	22.07.22	Tamara Chemicals	Flemington	11.06.64	30.12.80	58	17	15	30.12.80	Yes	16 - Unknown 19 - Minimal	Maintenance chemical 15 yrs elsewhere 11 yrs Miller house Operator 12 yrs		
31		08.11.23	UCC	Charleston	12.05.46	01.08.81	57	35	13	Alive	Yes	High (but not as high) in reactor cleaner reactor would experience; worked as labourer from June 1941 to May 1946 and may have cleaned reactors in other time	From 1958 to 1976 Aliphatic Operator in charge reactor operator and from July 1976 letter of 19.11.81	Dr Harey letter 15.10.81 and R H Wheeler letter of 19.11.81	

SL 028539

IMPERIAL CHEMICAL INDUSTRIES LIMITED
PLASTICS DIVISION

USA Sheet 6

Page 24

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

AKR system of date
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
UK 32	C W Giroux	22-02-08	Monsanto	Springfield Mass	15-10-51	00-07-79	71	28	14 (in PVC autoclave area)	17-05-80	An autopsy was done and immediate cause of death given as "Angiosarcoma"	The death (certificate) gave "Mr Giroux" usual occupation as "kettle operator" in "chemicals industry".	1940-1951 Various jobs in polymer manufacture BUNYAN LOSTREX 1951-1964 Various jobs in and around PVC autoclaves 1964-1973 Various clerical jobs in PVC polymerization facility/ Retired 01-03-73.		Information given in letter of 24 February 1982 from Dr Walter C Barnes of Monsanto Springfield to Dr A Mann of Monsanto Europe.

SL 028540

INTERNATIONAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Page 23

LIVER Angiosarcoma Cases - (Review Date: 9 August 1982)

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>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 ^a		[VCH [Production		[^a In his letter [of 3 Oct 1978, [Dr Spiras of [WHO changed [the status of [Case 02 to VCH [production [employee. [Dr Spiras [also notified [a new Case 03 [also a VCH [production [worker
03		21.12.31	Jugo Vinil	Split	04.06.54	11.01.76	41	22	22	11.01.76	Yes ^a		[VCH [Production		
04		11.06.30	Jugo Vinil	Split	15.12.58	03.09.78	48	20	18	03.09.78	Yes				[Rene Kaminski [letter of [19th June 1980 [and IARC [letter of [1 April 1982

SL 028541

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	1
5	0
6	1
7	1
8	5
9	3
1970	2
1	3
2	5
3	7
4	6
5	11
6	11
7	9
8	10
9	5
1980	10
1	4
2	0
Total	<u>98</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 The 1981 total does not include US 31 who is alive.

SL 028542

Distribution of ASL Cases by Country

USA	29 ***
W Germany	21 **
France	14
Canada	10
UK	7
Sweden	5 ****
Yugoslavia	4 *****
Italy	3 *
Czechoslovakia	2
Japan	2
Belgium	1
Norway	1
	—
Total	99
	—

* Omit It01 - atypical case of PVC bag extruder.

** Includes GEO3 aerosol' can filler.

*** Includes case US 24 which was diagnosed as Cholangiosarcoma & US 31 who is ALIVE.

**** Includes one monomer worker.

***** Includes two monomer workers.

i.e Western Europe	52
North America	39
Rest of World	8
	—
Total	99
	—

SL 028543

TABLE 3

Pattern of ASL Cases by Factory(a) W Europe

Of the 52 cases in W Europe, 42 have occurred in clusters at 10 factories. Of the 21 German cases, 18 have occurred in clusters at 4 factories.

	<u>ASL Cases</u>
Kemanord, Sundsvall	5
PCUK, Brignoud	5
Dynamit, Troisdorf	10
Chloe Chimie (Formerly RP), St Fons	5
Wacker, Burghausen	4
CWH, Marl	2
ICI, Hillhouse	2
BP, Barry	5
Solvay, Tavaux	2
Lonza, Waldshut	2
	<u>42</u>

NB: There are 31 pre 1962 PVC plants in W Europe; 18 of these have had ASL cases (Ref Table 8)

(b) N America

Of the 39 cases in N America, 34 have occurred at four factories out of a total of 49 factories - in N America 40 plants have not had ASL cases.

	<u>ASL Cases</u>
BFG, Shawinigan	10
BFG, Louisville	11
UCC, S Charleston	9
Goodyear, Niagara	4
	<u>34</u>

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

(c) Rest of World

The 8 ASL cases are believed to be in 1 cluster of 4 and 2 clusters of 2 cases.

TABLE 4A

Latency Periods (Years from first Exposure to Diagnosis)

	<u>W Europe</u>	<u>No of Cases</u>	<u>Total Years</u>	<u>Average</u>
	Belgium	1	18	18
	France	14	336	24 *
	Germany	21	385	18.3 *
	Italy	3	58	19.3
	Norway	1	22	22
	Sweden	5	122	24.5
	UK	<u>7</u>	<u>156</u>	<u>22.3</u>
		<u>52</u>	<u>1097</u>	<u>21.1</u>
<u>N America</u>				
	US	29	714	24.6 *
	Canada	<u>10</u>	<u>204</u>	<u>20.4</u> *
		<u>39</u>	<u>918</u>	<u>23.5</u>
<u>Rest of World</u>				
	Czechoslovakia	2	30	15.0
	Japan	2	39	19.5
	Yugoslavia	<u>4</u>	<u>85</u>	<u>21.2</u>
		<u>8</u>	<u>154</u>	<u>19.2</u>
<u>Summary</u>				
	W Europe	52	1097	21.1
	N America	39	918	23.5
	Rest of World	<u>8</u>	<u>154</u>	<u>19.2</u>
		<u>99</u>	<u>2169</u>	<u>21.9</u>

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

	0-9 yrs	10-14 yrs	15-19 yrs	20-24 yrs	25-29 yrs	30-34 yrs	35+ yrs	Total	Average Latency Period
Belgium			1					1	18
Canada		3		5	2			10	20.4
Czechoslovakia		1	1					2	15.0
France		1	4	2	4	1	2	14	24
Germany		4	9	6*	2			21	18.3
Italy			1	2				3	19.3
Japan			1	1				2	19.5
Norway				1				1	22
Sweden			2		2	1		5	24.5
UK	1		2		3	1		7	22.3
USA		2	7	7	5	4	4	29	24.6
Yugoslavia				4				4	21.2
TOTAL	1	11	28	28	18	7	6	99	21.9

* Includes G 03 aerosol can filler

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	4	-**	-	4	98	
2	nil to date	nil to date	nil to date	nil to date		
Total	52 *	38**	8	98**		

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

** Does not include US31 still alive.

TABLE 6

ASL CASE NUMBERS BY YEAR OF DEATH AND GEOGRAPHICAL LOCATIONS (EXCLUDING IT01)

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	US17, US29, US30, US32	
	1	It4,F14,UK8,G22		
	2			
	Total	52	38***	8

* Cholangiosarcoma

** Aerosol Can Filler

*** Does not include US31 still ALIVE

PJST80061400,1/WPX7-2

TABLE 7

ASL CASE NUMBERS BY YEAR OF FIRST EXPOSURE AND GEOGRAPHICAL LOCATION
(EXCLUDING ITOI)

KEY EVENTS		WESTERN EUROPE	NORTH AMERICA	REST OF WORLD
	1939		US24*	
	40			
	1	Fr11	C3,US27	
	2		US13, US29	
	3	Fr14	C2,US19	
	4	UK1	C1,C5,US5,US7,US28	
	5	Sw2	C4,US3,US9	
	6	Fr1,Fr3,Sw4	C7,C9,US8,US11,US21,US31***	
	7	Sw3	C6,US22,US26	
	8	Fr9	US1	
	9	Fr12,Fr4	US12	
	50	Fr7,N1,UK81	US16	Y2, Cz2
	1	Sw1,UK5	US10, US32	
	2	G3**	US4	
	3	G15,It3	C10	Jap1,Y1
	4	G7,G8,UK4,G19	US18	Y3
	5	G11,G16,G18	US2,US17,US20	
	6	FR10,G1		
	7	Fr8,G4,It2,G2		Cz1
	8	Fr6,B1	US23	Jap2,Y4
	9	Fr2,It4		
	60	G5,G13		
	1	G9,G10,G12,G17,G20,G22	C8	
	2	G6,UK6,G21	US6	
	3	Fr13, UK7		
	4	Sw5	US30	
	5	Fr5		
	6	UK3		
	7			
	8			
	9			
Viola	70			
	1			
	2			
Maltoni	3			
	Total	52	39	8

* Cholangiosarcoma

** Aerosol Can Filler

*** US31 is still ALIVE

PJST80061400,2/WPX7-2

SL 028549

TABLE 8

WESTERN EUROPE PVC PRODUCERS - START-UP DATES vs ASL CASES (OMITTING G03)

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	57,54,55,53
1938	Italy	Montecatini	Acna		
1939	France	Rhone Poulenc	St Fons	03,09,10,11,14	46,48,56,41,43
1940	United Kingdom	ICI	Runcorn		
1940	United Kingdom	ICI	Hillhouse	01,04	44,54
1945	Sweden	Kemanord	Sundsvall(Stockvik)	01,02,03,04,05	51,45,47,46,64
	Switzerland	Lonza	Lalden (Visp)		
1946	France	Rhone-Poulenc	Rousillon	01	46
1947	Italy	Montedison	Porto Marghera	02	57
1948	United Kingdom	BP Chem	Barry	03,05,06,07,08	66,51,62,63,50
	West Germany	Huls	Marl	09,10	61,61
1949	Belgium	Solvic	Jemeppe	01	58
1950	France	Puk	Brignoud	02,04,05,06,12	59,49,65,58,49
	France	Rhone-Poulenc	St Auban	07	50
	Holland	Shell	Pernis		
	Norway	Norsk	Heroya	01	50
1951	Italy	Montedison	Brindisi		
1952	Italy	Montedison	Terni		
1953	Austria	Halvic	Hallein		
	France	Solvic	Tavaux	08,13	57,63
	Italy	Solvic	Ferrara	03	53
	Spain	Rio Rodano	Hernani		
	United Kingdom	BIP	Aycliffe		
	West Germany	Hoechst	Gendorf	18	55
1954	West Germany	Dynamit	Troisdorf	01,02,08,12,16, 17,19,20,21,22	56,57,54,61,55, 61,54,61,62,61
1955	Spain	Monsanto Iberia	Monzon		
1956	Spain	Caiqsa	Sabinanigo		
		Hispanic	Torrelavega		
1958	West Germany	Solvay	Rheinberg		
1960	Italy	S C Ravenna	Ravenna	04	59
1962	Portugal	Cires	Oporto		
	West Germany	Lonza	Waldshut	06,13	62,60
1965	France	Rhone-Poulenc	Montlucon		
	Italy	Pozzi	Ferrandina		
	West Germany	Wacker	Cologne		
1966	West Germany	Hoechst	Knapsack(Frankfurt)	05*	60
1967	France	ATO Chimie	Balan		
	Spain	Rio Rodano	Miranda de Ebro		
	Greece	Esso Pappas	Diavata Salonika		
1968	Belgium	Badiphil	Antwerp		
1969	United Kingdom	Vinatex	Staveley		
	Italy	Rumianca	Cagliari Sardina		
1970	Italy	SIR	Porto Torres Sar		
	United Kingdom	ICI	Runcorn		
1971	Italy	S C Ravenna	Ravenna		
	Spain	Hispanic	Martorell		
	Sweden	Kemanord	Stenungsund		
	United Kingdom	BP Chem	Baglan Bay		
1972	Finland	Pekema	Svartback		
	Holland	DSM	Beek Limburg		
1976	France	Soc Art D'vinyl	Mazingarbe		
1977	Spain	Monsanto Iberia	Tarragona		

* Laboratory worker in Research Department

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	44,42,43,46 39,41,44,42,46
1940?	*BFG	Louisville	01,02,03,04,05, 06,09,16,17,22, 26	48,55,45,52,44, 62,45,50,55,47, 47
1946?	*UCC	Texas City		
1947	Goodyear	Niagara Falls	08,10,11,20	46,51,46,55
1948	Firestone	Pottstown	12	49
	Uniroyal	Painesville		
1950	Monsanto	Springfield	32	51
1952	Dow	Midland		
	BFG	Avon Lake	18	54
1953	Diamond	Deer Park		
1954	General Tire	Ashtabula		
1956	Air Products	Pensacola		
	Atlantic Refining	Brooklyn		
	Borden	Leominster		
	Conoco	Hebronville		
	BFG	Niagara		
	Great American Plastics	Fitchburg	23	58
	Hooker	Hicksville		
	Pantasote	Passaic		
1957	Atlantic Tubing	Cranston		
	Tenneco	Flemington NJ	30	59
1958	Keysor Century	Saugus, Cal		
1960	BFG	Watson, Cal		
	Air Products	Calvert City		
	Borden	Illioopolis		
1962	Tenneco	Burlington NJ		
1963	Conoco	Aberdeen, Miss		
	Stauffer	Long Beach, Cal		
1965	Conoco	Assonet, Mass		
	Ethyl	Baton Rouge		
1966	Diamond	Delaware City		
	General Tire/Pantas	Mt Pleasant W Va		
	BFG	Henry, Ill		
	Stauffer	Delaware City		
1967	Allied	Painesville, O		
	Hooker	Burlington NJ		
1968	Firestone	Perryville		
1969	BFG	Pedrickton NJ		
	Goodyear	Plaquemine		
	Olin	Assonet, Mass		
	(Formerly Conoco)			
1971	Conoco	Oklahoma City		
1972	Nat Starch	Meredosia, Ill		
1973	Borden	Springfield		
	Robintech	Painesville, O		
	(Formerly Allied?)			
1974	Atlantic Tubing	Cranston RI		
	Shintech	Freeport, Tex		
1975	Certain-teed	Lake Charles		
	Georgia Pacific	Plaquemine, La		
	Tenneco	Pasadena, Tex		
1979	Firestone	Plaquemine		

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

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

SL 028551

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	Shawinigan	01,02,03,04,05 06,07,08,09,10	44,43,41,45,44, 47,46,61,46,53
1951	Monsanto*	La Salle		
1957	Goodrich	Welland		
1966	Esso	Sarnia		
1979	Diamond Shamrock Alb	Fort Saskatchewan		

* Terminated 1975

PJST80061400,5/WPX7-2

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		

PJST80061400,6/WPX7-2

SL 028553

TABLE 12

JAPANESE PVC PRODUCERS - START-UP DATES vs ASL CASES

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

PJST80061400,7/WPX7-2

SL 028554

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	Sao Caetano (Brazil)		
1960	Electrochlor	Capitan Bermudez (Argentina)		
	Viplastic	Mendoz (Argentina)		
1961	Indupa	Cinco Saltos (Argentina)		
1965	SOC Paramanga	Paramonga (Peru)		
	PET Columbiana	Cartagena (Colombia)		
1966	Carburo De Col	Medellin (Colombia)		
1967	Plasticos Omega	Mexico		
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)		

JS/DJS/DSO 16
 2 August 1982
 PJST80061400,8/WPX7-2

SL 028555