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9 May 1983

MIDLAND, MICHIGAN 48640

Dr. Z. G. Bell, Jr., PPG
Dr. W. Clark Cooper
Dr. W. Gaffey, Monsanto
Dr. V. E. Kirkland, Shell
Dr. 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 again supplied an update of the angiosarcoma registry which he has maintained for several years.

As indicated by John, this is his last since he retires August 31. I am sure you share my gratitude to John for his work and are delighted that Dr. Brian Bennett will be assuming responsibility. I trust you will give Dr. Bennett all the cooperation you can.

It is currently our expectation that Dr. Bennett will visit the U.S. this summer, but plans are not yet firm. We would like to have him schedule his visit to coincide with our CMA meeting on the Environmental Health update. Carol Stack and I are hoping to have this meeting in July or August but cannot make definite plans yet. At that time, I would like to turn the vinyl chloride projects over to a new chairman.

Sincerely yours,

T. R. Torkelson, Sc.D.
Toxicology/Medical Liaison
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g

Enclosure

cc: Dr. John Stafford/Dr. B. Bennett, ICI

cc { R.L. Jackson
DR DOCTOR
T. SHEPHERD

RECEIVED

MAY 19 1983

R. W. Laundrie

RECEIVED

MAY 12 1983

R. W. Laundrie

Liver Angiosarcoma Cases

Circulation

Dr K S Williamson
Dr G M Paddle
Mr John York, Everberg
Mr J C Davies, Everberg
Mr P N Anderson, Wilton
Mr H R Jervis, Millbank
Mr Harold Clayton, Norsk Hydro
Dr I W Williams, Norsk Hydro
Dr J T Carter, BP
Dr P Lewis, CIA
Dr J P Laloiné, Solvay
Mr J Jauvert, Chloé Chimie, Paris
Dr Renzo Mattiussi, Montedison
Dr S Paglialunga - Montedison
Mr Lollivier, Solvay
Mr P G Claus, APHE
Dr W Tordoir, Shell
Mr S O Wejdling, Kemanord
Dr David Byren, Kemanord
Dr E Thilo - Evensen, Norsk Hydro
Mr P Rangnes, Norsk Hydro
Dr B Terwiesch, CWI
Mr H Emminger, VKE
Dr J Whiston, Millhouse
Dr Brian Bennett, Millhouse (20 copies - ICIA, AECI, Imperial)
Dr Peter Wright, P & P Wilton
Dr F W Best, Everberg
Mr C Cella, Montepolimeri
Mr C Dupont, APHE
Dr C Bishop, EMAS
Mr J Hodgson, EMAS
Dr R Spirtas - NCI/NIH Bethesda
Dr E W Dacey - NIOSH, Cincinnati
Dr R Owen - TUC
Dr J Stafford (10)
Dr John O'Sullivan, Mond
Dr W A Hogg - Imperial Oil Ltd, Canada
Mr H Munoz Monton - Rio Rodano
Dr James Purdham - Canadian Centre for OHS
Dr Bruce Karrh - Dupont
Dr D A Levison - St Bartholomews Hospital, London
Prof R N M MacSween - Western Infirmary, Glasgow
Prof W K Leibach - University of Bonn
Prof C H Tamburro - University of Louisville

Dr Gilles Theriault - McGill University
Dr T R Torkelann, Dow
Mr J Lawrence, SPI
Dr Carol Stack, CMA Washington
Mr R N Wheeler, HCC
Dr A Ross Adams, 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 Posnerberg, Wacker
Dr J C Aubrun, PCNUK
Dr H P Friedel, Berufsgenossenschaft der chemischen
Industrie, Heidelberg
Dr W Ernst, Berufsgenossenschaft der chemischen
Industrie, Nurnberg
Prof Dr Thies, BASF
Mr Stahlnecker, BASF
Dr D M Ferguson, ICI Americas
Mr David Burgess, 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 Munu, Monsanto, Brussels
Dr W C Barnes Jr, Monsanto USA
Dr R E Gosztonyi Jr, Tenneco Chemicals, Saddle Brook (N.J.)
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 Saracci, Iarc, Lyons
Dr R Montesann, 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 Hokka, Neste Oy
Mr M Chance, VCM Technical Manager, Mond
Dr Rasche, Dynamit Nobel, Troisdorf

JS/JT/MSO-16 PJXS79170920/WPX Wide 11

GENC 008745

PREFACE

ACKNOWLEDGEMENTS, SIGNIFICANT CHANGES AND COMMENTS

- 1 This is the last edition of the ASI register which I shall compile. On 31 August 1983 I shall be retiring from ICI and also severing all my VCM connections. However I am glad to announce that ICI has agreed to keep the register going and the new editor will be DR BRIAN BENNETT, works medical officer at our Hillhouse Works. I am very grateful to you all for all the help, support and encouragement you have given me over the past eight years. Will you please continue to correspond with Dr Bennett about ASI cases and keep him informed so that the unique and I believe useful register will be kept going. A comprehensive register will be of great benefit to the VCM/PVC industry and research workers in the assessments of health hazards and the efficiency of the remedies adopted in 1974.
- 2 Dr Brian Bennett's address, telephone and telex numbers are as follows:

Dr B Bennett
Works Medical Officer
Hillhouse Works
PO Box 3
Cleveleys
Blackpool FY5 4QB
Lancs

Tel: 0253 856161 Ext 332

Telex No: (Addressed to Hillhouse Works
Via Manchester Switching Centre)
6676230

Please keep in touch with him and notify him promptly of any new ASI cases.
- 3 Prof Carlo Tamburro of Louisville University and Dr M N Johnson of B F Goodrich have been most helpful regarding US 33 and 34. BFG's Louisville Plant found 11 ASI cases up to 1976 and then nothing until those two cases in 1982, both of which are alive.
- 4 The news of the death of US 31 came from Dr Dacey of NIOSH in his letter of 7 March 1983 for which I am grateful.
- 5 In addition, I thank Dr D M J Williams of BP for prompt notification of UK 09. Also for drawing my attention to a curious case described in the British Journal of Industrial Medicine 1983 Vol 40 pp 113-4. This reports an ASI case in a metal scrap merchant who recovered metal by burning inter alia "plastic" covered copper cable. The scrap merchant was almost certainly exposed to arsenic and copper but his exposure to VCM is problematical. I have not included this scrap merchant in the list of cases attributable to VCM because I doubt whether he was ever exposed to VCM. None of the UK PVC producers has any record of supplying PVC to the alleged PVC fabricator next the scrap yard. Indeed this fabricator does mainly injection moulding of polyethylene, polystyrene and polypropylene and very rarely uses PVC.
- 6 Dr S Pagliulunga wrote on 15 February 1983 and gave me a copy of a paper by CHIAPPINO et al in Med Lavoro Vol 6 (1982) pp 55-563 which describes Italian Case 04 in detail. Thank you Dr Pagliulunga for this help.
- 7 I am grateful to Dr Walter Harris of Uniroyal for his letter of 1 September 1982 giving me accurate data about the history of Uniroyal and Allied Chemical PVC plants at Painesville, O. The Uniroyal plant was closed in 1975. The Allied plant was sold to Rhinotech who in turn sold it to Georgia Pacific who seemed to convert the plant to make polystyrene. The changes in ownership of plants and their closures are confusing. There are major pieces of restructuring going on in the PVC industry in many countries and it is now difficult to know how to describe cases, eg ICI has acquired BP's PVC business but BP has shutdown its old Barry & Haglan Bay PVC plants and transferred to ICI only the most modern PVC facility started up at Barry in 1981/2. The newest UK case 09 and all the other BP cases are all men who worked in the old Barry P5 building prior to 1974. I have left these cases as BP Barry cases.
- 8 I have elaborated Table 4 even further in a tedious, mechanical way to highlight some of the peculiarities of latency periods. The IGC South Charleston latencies are uniquely interesting as is shown in Tables 4E and 4F.
- 9 I should like to record my thanks to Prof W K Lelbach, Munn University for useful discussions and for introducing me to the comprehensive monograph on 'Vinyl Chloride Associated Disease' by Lelbach and Marsteller published by Springer-Verlag in 1981.

John Stafford
15 April 1983

GENC 008746

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

LIVER ANGIOSARCOMA CASES (REVIEW DATE - 15 APRIL 1983)

Table Sequence

Belgium	1	ASL Case Numbers by year of Death (Table 6)	39
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LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
KEY AND REFERENCE	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
UM															
31		12.01.13	Solvay	Jemeppe	00.07.58	00.05.76	63	18	17	29.06.76	Yes	High 1958-1968 exposed to 200 ppm for 8 hrs per day and certainly under 500 ppm in 6 to 9m 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 1974-100 ppm 1975- 50 ppm RETIRED 1 Feb 1975	Autocleaner 14 yrs foundry (2 yrs) Polyworker (3 yrs) Farmer (15 yrs) Work in glass Ind. & chemi- cal industry	Driller in a (foundry (2 yrs) Retired (Feb 1975) Hospitalised May 1976 Complete Clinical and career details are given in a paper by Hublet et al in Arch. Belg. Med. Soc., Hyg. Med., Trav. Med. Mag. 1977 pages 601-622	

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LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

* 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
ENTRY 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
ADA			SHAWINIGAN												
01		15.12.13			1944	1955	41	11	11	02.09.55	Yes		Reactor cleaner	Operator polymerisation	Smoker
02		06.03.14			1943	1957	43	14	14	21.12.57	Yes		Maintenance, millwright, pipefitter	Operator	Worked overtime Smoker
03		26.08.19			1941	1962	42	21	20	23.03.62	Yes		Operator, foreman		Worked overtime Non-smoker
04		05.04.19			1945	1967	48	22	22	21.01.68	Yes		Reactor cleaner	Operator, foreman, water cooling unit	Worked overtime Smoker
05		07.05.11			1944	1968	57	24	05	05.07.68	Yes		Reactor cleaner	Water cooling unit	Worked overtime Smoker
06		15.12.19			1947	1971	51	24	23	10.04.71	Yes		Reactor cleaner	Maintenance, millwright	Worked overtime Smoker *
07		09.11.19			1946	1972	53	26	25	24.12.72	Yes		Reactor cleaner	Machine shop operator and poly unit	Worked overtime Smoker
08		13.05.20			1961	1971	53	12	05	12.06.73	Yes		Reactor cleaner	Maintenance machine shop	In plant 25 yrs Smoker
09		19.07.21			1946	1974	53	28	26	04.09.74	Yes		Furnace op. pipefitter maintenance		Worked overtime Smoker

LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

* All dates use UK system

** Data published in Journal of

Occ Med 1978 pages 338-340

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

Canada

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Page 4

LIVER Angiosarcoma Cases - (Review Date: 15 April 1981)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
CZECHOSLO- VAKIA															
01		28.06.28	State Co	Novaky	01.07.57	24.12.71	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 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.	

IMPERIAL CHEMICAL INDUSTRIES PLC
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France
Sheet 1

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LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CASE AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01	IM	15.04.24	RP	Roubaix- Illon	00.01.46	18.02.67	43	21	19	19.02.67	Yes	High	Autoclave worker and cleaner 19 yrs		Ref. Xavier et al Arch. Mal. Prof. 1 30 n° 13 Nov 75 p 171-177
02	SLM	03.06.11	PCUK	Arignoud	06.07.59	15.01.75	63	16	12	24.01.75	Yes (NIOSH no comment)	High	2 yrs on monomer 10 yrs on polymer- isation	Italian origin	Ref. G Bonneton et al "Nouvelle Presse Medicale" 15 Nov 1977 p 735
03	NAV	06.01.20	RP	St Fons	00.00.46	15.01.75	55	29	29	29.06.75	Yes	High	Polyworker 10 yrs as autoclave cleaner Compounding 13 yrs	VCM production 16 yrs Italian POW Shepherd, Sawyer, Mason	Ref. Rety et al Arch. Mal. Prof. 1 37 n° 16 June 77 p 551-555
04	MOR	27.01.27	PCUK	Arignoud	19.10.49	16.01.76	49	26	26	04.01.76	Yes	High	Monomer production worker 18 yrs PVC filtration 18 yrs		
05	IR	29.01.38	PCUK	Arignoud	18.01.65	13.05.76	38	11	11	13.05.76	Yes	High	Polyworker 11 yrs	1) Thoracotomy 19th Feb 1976 costal Angiosarcoma 2) Scintigraphy 1976 found ASL 3) Haemorrhage bone from ASL 4) Right Hepatectomy	Ref. P Coudere et al "Semaine des hopitaux" 10 Septembre 1976 Previously had bone Angiosarcoma Also Pilirowski et al "La Nouvelle Presse Medicale" 17th July 1979 Page 2485

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IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

France
Sheet 2

Page 6

LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	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	11	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 IAS. Ann. de Mal. Prof. July '77 p 645 & 6. AOL was found in 1971 five yrs before IASL
07	GIR	26.04.27	RP	St Auban	01.07.50	After death NIOSH says 00.07.76	49	26	22	02.07.76	Yes (NIOSH no comment)	High	Plant fore- man in polymer- isation	1972-6 admin section in St Auban	Died of hepaticaeimia Small liver lesion found after autopsy
08	B	01.04.34	Solvay	Tavern	23.05.57	03.12.75	42	19	19	30.01.77	Yes	Moderate	16 yrs packer & autoclave cler 14 yrs autoclave worker		Had been tunnel worker previously
09	RFX	08.10.14	RP	St Fons	10.01.48	26.04.76	61	28	28	25.12.77	Yes	Very High 1948-1966 lesser Exposure 1966-1976	Polymer- isation operator, autocleaner, autoclave maintenance	10 yrs in sulphuric acid factory, storekeeper & general services	Operated 4.76 for removal of tumour from liver and died after second surgical operation for chilio bronchial fistula Paper by Dr Rety et al in Archives de Malades Professionals Vol 40 No 6 1979 pages 741-3.

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IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

France
Sheet 3

Page 7

LIVER Angioarcoma Cancer - (Review Date: 15 April 1983)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
France 10	VP	24.05.19	RP	St Fons	00.12.56	10.01.78	58	21	21	10.01.78	Yes	High	Autoclave cleaner	10 yrs in mechanical engineering industry 1946-1956	Died of pulmonary embolism 5 days after surgery
11	11	15.02.12	RP	St Fons	00.01.41	12.08.78	66	37	31	13.11.78	Yes	High	1941-1946 polymer- isation general purpose worker 1946-1972 VCM synthesis (HCl & Acetylene) Foreman (agent de maltrise) 1972 retired		
12		16.08.14	PCUK	Brignoud	09.02.49	00.05.79	65	30	27	23.06.79	Yes	High	Monomer production and polymer- isation operator		
13		19.01.11	Solvay	Tavaux	21.09.61	26.06.79	40	16	13	22.08.79	Yes		Autocleaner 12 yrs, Auto- operator 19 yrs, Copolymers 14 yrs	12 yrs as cycle mechanic. 10 yrs as enameller in sanitary ware manufacture	Cigarette smoker until 1974. Ill all of 1977 due to Oesophageal varices. Surgical intervention 25.05.79 (right hepatectomy)
14	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 All types of maintenance and jobs on intermitt- ently 1975-1979 in VCM Poly Process	1975-1979 maintenance work	

GENC 008754

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Germany
Sheet 1

Page 8

LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
GERMANY															
01		00.00.30	Dynamit	Troisdorf	01.10.56	19.09.68	38	12	12	25.01.69	Yes (NIOSH)		Polyworker		
02		00.00.31	Dynamit	Troisdorf	14.10.57	25.09.70	39	13	13	14.12.71	Yes (NIOSH)		Polyworker		
03		00.00.30	Dynamit	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- isation workers in NIOSH list of 31.3.77. This of course is strictly incorrect. However I wonder whether this man had high exposure to VCM in his can filling operation!
04		00.00.30	Wacker	Burg- Hansen	16.04.57	26.11.74	46	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 Vichova Arch A Path 1976 372 p 195-203

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IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Germany
Sheet 2

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LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TRY 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
ANY 05 DSH gives Case 06)		00.00.36	Hoechst	Frankfurt	02.04.60	10.12.73	38	13	05	16.12.74	Yes (NIOSH)		NG Chemie says "chemistry laboratorian in the Techno- logical Research Department" (NIOSH says assistant factory chemist which may be wrong translation)		Confirmed Reported under non-polymer- isation workers in NIOSH list of 31.3.77 and 1.78. I don't think this is a correct classification by NIOSH. The man may have been involved in VCM polymerisation in pilot plant or in main plant.
06 DSH gives Case 05)		00.00.32	Lonze	Waldshut	16.12.62	00.00.75	43	13	12	09.01.75	Yes		PVC - Manu- facture Shift leader		
07		00.00.26	Wacker	Burg- 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 Dev 8 yrs (1967-1975)		
08		00.00.17	Dynamit	Triladorf	19.07.54	06.04.75	58	21	22	25.12.75	Yes	?	Polyworker	?	

GENC 008756

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Germany
Sheet 3

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LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
GERMANY															
09		00.00.34	CWI	Marl	20.02.61	16.06.76	41	15	13	24.03.78	Yes	High peaks	12 yrs poly- worker incl 17% auto- clave cleaning Control room 11 yr		10/78 Confirmed Average exposure first 9 yrs 150 ppm, 10cc 1000 ppm, Next 3 yrs av. 175 ppm. Last. 1 yr av 35 ppm
10 (NIOSH gives as Case 11)		00.00.36	CWI	Marl	01.01.61	00.01.77	40	16	10	07.07.77	Yes	High peaks	10 yrs poly- worker incl 17% auto- clave cleaning		Average exposure first 9 yrs 150 ppm, 10cc 1000 ppm, Last yr av 175 ppm. CWI letter of 21.04.78
11 (NIOSH gives as Case 10)		00.00.29	Wacker	Burg- hausen	10.10.55	28.06.77	47	22	22	28.06.77	Yes	High	13 yrs auto- clave cleaner 19 yrs filter operator		
12		00.00.38	Dynawit	Troisdorf	00.00.61	00.10.77	39	16	6	07.10.77	Yes	?	PVC Manu- facture Autoclave worker for 16 yrs		

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IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

Germany
Sheet 4

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LIVER Angiosarcoma Cases - (Review Date: 15 April 1981)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TRY AND ERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
13		00.00.14	Lonza	Waldehut	00.00.60	08.04.78	63	18	14	19.05.78	Yes				P W Rest letter of 30th June 1980 enclosing data from Mr H 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				P W Rest letter of 30th June 1980 enclosing data from H P Friedel of IG Chemie withdrawing this case
15	MSI gives as 13)	00.00.29	Wacker	Burghausen	19.10.53	09.10.78	49	25	25	23.10.78	Yes	1	Autoclave cleaner and worker. Drier operator. Later shift leader		Angiosarcoma confirmed 09/79. Some detail of this & also cases 19, 17, 15, 16 & 17 given in INRW Report for 1978
16		00.00.23	Dynamic	Troisdorf	10.01.55	07.08.78 (Leibach suspected ASL at Feb 1975 laparotomy)	55	21	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 INRW Med Insp Rep for 1978. Different details given in "VC Associated Disease" by Leibach and Marsteller (1981) p71.

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
ERMANY 17 NIOSH gives " Case 15)		00.00.37	Dynalit	Troisdorf	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. probably acro osteolysis.
18		00.00.13	Hoechst	Wendorf	00.00.55	25.12.79	66	24	21	25.12.79	Yes		Autoclave Worker		
19		00.00.25	Dynalit	Troisdorf	18.10.54	00.08.79	54	25	18	22.02.80	Yes (Metastasing ASL)	High	Autoclave Worker		Dr Resche letter of 11-04-82 to Dr W G F Adams
20		00.00.15	Dynalit	Troisdorf	14.02.61	00.04.80	65	19	11	19.10.80	Yes Haemangioma Endothelioma of liver with Metastases	High	Autoclave Worker		Dr Resche letter of 11-04-82 to Dr W G F Adams
21		00.00.13	Dynalit	Troisdorf	01.01.62	00.09.79 (pronounced clinical liver symptoms)	66	17	11	19.06.80	Yes Haemangioma Endothelioma of liver with Metastases	High	Autoclave Worker and worked in drying shop		Dr Resche letter of 11-04-82 to Dr W G F Adams
22		00.00.21	Dynalit	Troisdorf	15.10.61	17-09-80	59	18	11	06.12.81	Yes (Metastasing ASL)	High	Autoclave Worker	Chargehand, subsequently Foreman	Dr Resche letter of 11-04-82 to Dr W G F Adams

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IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

LIVER Anglioharcoma Cases - (Review Date: 15 April 1983)

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

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JS L/R/77

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
CASE AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS	
01 NIOSH ple- stary ic)	LG	15.06.34	PANSAC		00.00.65	19.04.71	36	06	03	16.04.71	Yes		PVC Bag extruder		* [Primary tumour may have been pericardium. [Not homo- genous 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	IVG	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	ANIC	Ravenna	00.04.59	00.01.81	43	21	21	30.03.81	Yes	12 yrs - Very High 5 yrs - Medium 4 yrs - Low	11 yr - Monomer operator 20 yrs - Autoclave operator & other duties in suspen- sion polymer- isation. Area Foreman in same Dept since 1975.	Never cleaned autoclaves. See paper by CHIAPPINO et al Med Lavro Vol 6 (1982) pp 555-563	Non-smoker. Consumed little alcohol. No AOL.	***

See Maltoni Med di Lavro 63 p445, 1974. Further details in letter from Dr Montedison of IARC on April 1st 1982.

Also see Maltoni and Rondinella in Acta Oncologica Vol 1 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).

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
APAN															
01	Tomoji Mori	01.08.22	Mitsui Toatsu (no comment by Jap PVC Assoc)	Nagoya	00.04.53	24.10.75 ^a	51 ^a	22 ^a	13	24.10.75	Yes	PVC Assoc says not known. * Japan Times indicated on 25.10.75 exposures often at 3000 ppm up to 1974	13 yrs auto- clave cleaner 1964 - assigned to different work since had ill health		Japan Times 25.10.75 & Japanese PVC Assoc letter of 11.03.78
02	SO	02.08.39			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 letter of 11.03.78

^a In his letter of 1st April 1982, Dr Montesaun of IARC says Japanese Ministry of Labour give

Date of diagnosis - 21-08-74

Age of diagnosis - 52

Years of exposure - 22

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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
01	AH	23.12.15	Norsk Hydro	Noroya	00.03.50	21.12.71	56	22	21	04.01.72	Yes	High	Foreman & Autoclave supervisor		(Confirmed by (Dr Thila- (Evansen of MI. (At APHE Mtg on (19 June 1978 (Mr P Rangnes (stated that A (had been a (member of a (start-up team (VCM & PVC were (made in same (building. The (VCM was made (from acetylene

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
<u>SWEDEN</u>															
01	NU	23.06.27	Kemanord	Sundsvall	14.08.51	20.10.70*	43	19	18	20.10.70	Yes		Polyworker		
02	BL	27.11.11	Kemanord	Sundsvall	00.01.45	00.08.72*	61	27	27	16.08.72	Yes	High	VCM production		Mr Sjoeelin's letter of 12th March 1978 confirms BL was a monomer worker who was heavily exposed, probably even more so than a normal reactor cleaner
03	NE	10.06.10	Kemanord	Sundsvall	00.05.47	18.03.76	65	29	21	19.03.76	Yes	High	Polyworker		
04	AL	16.11.14	Kemanord	Sundsvall	00.00.46	12.05.77	62	31	31	12.05.77	Yes	High	1946-1958 polymer- isation worker (12 yrs) & 1958- 1977 foreman (19 yrs)		In first 12 yrs of employment had been heavily exposed. In 1974, liver abnormality and necrosis diagnosed. Data confirmed in Dr D Byren letter 16.8.77 to CRPIC
05		12.01.19	Kemanord	Sundsvall	11.05.64	22.11.80	61	16	16	22.11.80	Yes	High - 6 Years Low - 10 Years	1964-1970 centrifuge operator 1970-1980 drier operator		Letter of 2nd Nov 1981 from Dr David Byre

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

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
01	WJ	20.04.01	ICI	Hillhouse	04.04.44	03.12.72 (Fox & Collier paper says 23.12.72)	71	28	22	03.12.72 (Fox & Collier paper says 23.12.72)	Yes	500 ppm	1944-7 VCM 1947-8 Drier 1948-61 Autoclave operator 1961-66 Drier		Lee and Harry Lancet 129-06074 pages 1716-8
02															Dubious fabrication case
03	BJW	02.06.37	BP	Barry	00.02.66	00.12.74	37	09	3.5	24.12.74	Yes	High	Autoclave cleaner		Exposure limited to 2.66 - 9.69
04	JSK	23.06.20	ICI	Hillhouse	26.04.54	00.06.79	59	25	18	12.10.79	Yes	Medium- high	54-5 Bagging Plant 55-6 Drier Plant 56-58 Autoclave worker 58-61 Chargeland Drier Plant 61-72 Foreman C 2/1 Plant	Pre-war fish packer 1939-45 army vehicle maintenance 1945-54 fish packer	

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
05	JJK	30.03.14	BP	Barry	08.01.51	00.10.79	65	28	21	19.11.79			1951-52 Polycleaner 1952-55 Latex 1955-60 Polyfloor 1960-64 Poly Chargehand 1964-70 Charging operator 1970-72 Drier operator		
06	CEP	1931	BP	Barry	1962	09.01.80	48/9	18	12	09.01.80			17 yrs Poly Floor Operator 15 yrs Greaser on Poly Floor		
07	RCB	26.04.20	BP	Barry	1963	00.00.80	60	17	82	13.06.80			Polycleaner 1963-5 Recovery 1965-1971		
08	WTH	08.05.24	BP	Barry	19.09.50	27.11.81	57	31	24	25.12.81		1950-1958 500 ppm 1968-1974 200 ppm	1950-51 Autoclave operator 1951-1957 Chargeman autoclave building 1957-1974 Shift supervisor autoclave building - Never cleaned autoclaves but supervisor's job entailed entering autoclaves to inspect them	1938-1948 Motor Mechanic 1948-1950 Operator on Acetylene Production Plant	

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ENTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
09	ELGP	07.05.25	BP	Berry	15.02.50	02.07.83	58	33	29	24.02.83	Yes	Medium	Polyworker	12 years on Acrylonitrile Resin Plant. Also prior to 1950, 4 years RAP maintenance. 13 years motor car paintshop. 12 years in Graving Dock.	

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LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

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

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AUK system of dates
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RY AND RENCE O	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
09	Raymond Gettle- Finger?	08.11.31	BFG	Louis- ville	28.05.45	01.03.74	43	29	24	11.03.75	Yes	2000 ppm			Ref 1 has wrong figures for first exposure. Louisville Times 29.10.74, 12.1.75, 10.3.76
10		16.08.13	Goodyear	Niagara	12.06.51	00.05.68	55	17	17	10.05.68	Yes				Ref 1
11		27.05.09	Goodyear	Niagara	14.10.46	00.03.70	61	23	23	16.03.70	Yes				Ref 1
12	Francis A Bachman	17.11.18	Firestone	Pottstown Pa	13.07.49	02.05.69	50	20	19	02.05.69	Yes	High 10 yrs	10 yrs as reactor op. (not cleaner) - separate crew cleaned autoclaves)	Utility & Service op. Rigger Dryer op. Stripping op. 3 yrs prior service in tyre plant	Ref 1 + letter of 26 April 1978 from Russell A Park to J T Seawell of MCA
13	Richard Edward Glendenin	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															Dubious fabrication case
15															Dubious fabrication case

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

GENC 008769

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LIVER Angliocarcinoma Cases - (Review Date: 15 April 1983)

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
22		02.10.23	BFG	Louis- ville	11.07.47	00.01.76	52	29	28	04.12.76	Yes				Louisville Times 26.1.76 said he was the 10th AS victim at Nella Lane of whom 8 had died by 26.1.76 In his letter of 16.09.81 Dr M M Johnson confirms this is the case described by Dannaher Tambrro & Yee 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	HCC	8 Charles- ton	1939	27.05.77	60	38	24 (NIOSH says 26)	27.05.77	Cholangio- sarcoma (R Kaminski 26/2/79)	Medium to high for 24 yrs	1941-65 non- solvent vinyl resin unit and dispersion vinyl resins unit first as fitter helper, then shift fitter utility man	1937-39 was off and on labourer 1939-41 way have been exposed as reactor cleaner 1943 became shift fitter 1946 became shift utility man	N M Wheeler letter of 18.8.77 to J Stafford gives details Rose Kaminski letter of 26/2/79 R Kaminski (5 Nov 1980) suggests that NIOSH will retain on register since this neoplasm may be associ- ated with ASI.
(25)															Removal from register confirmed in R Kaminski letter of 5 November 1980 R N Wheeler letter of 20/2/79 and Rose Kaminski letters of 26/2/79 and 5/11/80

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COUNTRY AND REFERENCE NO	NAME OR INITIALS	DATE OF BIRTH	COMPANY	FACTORY	FIRST VC EXPOSURE	DATE OF DIAGNOSIS	AGE AT DIAGNOSIS	YEARS OF EXPOSURE TO DIAGNOSIS	YEARS OF EXPOSURE	DATE OF DEATH	HISTOLOGICAL CONFIRMATION	ESTIMATED EXPOSURE LEVEL	OCCUPATION	OTHER CAREER HIGHLIGHTS	OTHER COMMENTS
USA															
26	John Berry	07.07.23	BYG	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 cold room to paste recovery to PVC charging operator to paste charging. 111 August 1965. Terminated employment Jan 1966		Dr Kaminski letter of 126/2/79 and Prof. Tamhuro letter of 19/1/79
27	J L Forrest	11.05.16	UCC	St Charles- ton	01.07.41	30.11.78	62	37	20 (NIOSH says 27 and C Daily Mail 25)	25.11.78	Yes	High	Operator to 10.10.76 bulk and dispersion PVC manufacture	Exposure in letter of 4 Jan 1979 and Charleston Daily Mail 30.11.78 and Dr Kaminski 126/2/79	
28		11.04.17	UCC	St Charles- ton	00.08.44	03.11.78	61	34	33	03.11.78	Yes				Dr Kaminski letter of 16/4/79
29		12.10.07	UCC	St Charles- ton	00.05.42	00.05.80	72	18	16	01.05.80	Yes				Dr Kaminski letters of 19th June 1980 16 5th Nov 1980
30	WYN	22.07.22	Tenneco Chemicals	Flemington	11.06.64	30.12.80	58	17	15	30.12.80	Yes	16 - Unknown 19 - Minimal	Maintenance Mechanic 16 yrs Elsewhere 11 yrs Roller house Operator 19 yrs		
31		08.11.23	UCC	St Charles- ton	12.05.46	01.08.81	57	35	13	02.04.82	Yes	High (but not as high as reactor cleaner would experience) Worked as labourer from June 1941 to May 1946 and may have cleaned reactors in that time	Chemical Operator in charge reactor From 1959 to 1976 Aliphatic Chemicals operator and from July 1976 to date Foreman Aliphatic Chemical Operation	Dr Dacey letter 116.10.81 and Dr N Wheeler letter of 19.11.81. Also Dr Dacey letter of 07.03.81 re date of death.	

GENC 008771

IMPERIAL CHEMICAL INDUSTRIES LIMITED
PLASTICS DIVISION

USA Sheet 6

Page 25

LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

ANK 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
US 32	IC 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 and "chemicals industry".	1940-1951 Various jobs in polymer manufacture BUTVAR LHSTREX 1951-1964 Various jobs in and around PVC autoclaves 1964-1973 Various clerical jobs in PVC polymerisation facility/ Retired 01-03-73.		Information given in letter of 24 February 1982 from Dr Walter C Barnes of Monsanto Springfield to Dr A Munn of Monsanto Europe.
US 33	IS Ferguson Jnr	08-10-27	BFG	Louisville	09-09-54	11-05-82	54	28	28	Alive	Yes		Multiple jobs including Poly Operator + Polycleaner.		Prof Tamburro letter of 12 Aug 1982 + Dr M H Johnson letter of 28 Feb 1983.
US 34	Mr Byrum	29-01-34	BFG	Louisville	1955	03-11-82	48	27	10	Alive	Yes + Leiomysarcoma		Poly Operator + Autoclave Cleaner 1955-65.	1965 left BFG to become a Clergyman.	Dr M H Johnson letter of 13 Nov 1982 and 28 Feb 1983.

GENC 008772

IMPERIAL CHEMICAL INDUSTRIES PLC
PETROCHEMICALS AND PLASTICS DIVISION

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LIVER Angiosarcoma Cases - (Review Date: 15 April 1983)

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

GENC 008773

TABLE 1Incidence of ASL Cases Per Annum

	<u>By date of death</u>
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	1
3	1
Total	<u>100</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 1982 total does not include US 33 and 34 who are alive.

GENC 008774

TABLE 2Distribution of ASL Cases by Country

USA	31 ***
W Germany	21 **
France	14
Canada	10
UK	8
Sweden	5 *****
Yugoslavia	4 *****
Italy	3 *
Czechoslovakia	2
Japan	2
Belgium	1
Norway	1
	—
Total	102
	—

* Omit It01 - atypical case of PVC bag extruder.

** Includes GE03 aerosol can filler.

*** Includes case US 24 which was diagnosed as Cholangiosarcoma & US 33 and 34 who are ALIVE.

**** Includes one monomer worker.

***** Includes two monomer workers.

i.e Western Europe	53
North America	41
Rest of World	8
	—

Total 102

GENC 008775

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

Of the 53 cases in W Europe, 43 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	6
Solvay, Tavaux	2
Lonza, Waldshut	2
	<u>43</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 41 cases in N America, 36 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	13
UCC, S Charleston	9
Goodyear, Niagara	4
	<u>36</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>8</u>	<u>189</u>	<u>23.62</u>
		<u>53</u>	<u>1130</u>	<u>21.32</u>
<u>N America</u>				
	US	31	769	24.80 *
	Canada	<u>10</u>	<u>204</u>	<u>20.4 *</u>
		<u>41</u>	<u>973</u>	<u>23.73</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	53	1130	21.32
	N America	41	973	23.73
	Rest of World	<u>8</u>	<u>154</u>	<u>19.2</u>
		<u>102</u>	<u>2257</u>	<u>22.12</u>

GENC 008777

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

DISTRIBUTION OF LATENCY PERIODS

TABLE 4B

(Review Date - 15 April 1983)

Page 31

	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	2		8	23.62
USA		2	7	7	7	4	4	31	24.80
Yugoslavia				4				4	21.2
TOTAL	1	11	28	28	20	8	6	102	22.12

* Includes G 03 aerosol can filler

GENC 008778

TABLE 4C

LATENCY PERIOD OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE

MAX POSSIBLE LATENCY PERIOD	YEAR OF FIRST EXPOSURE	LATENCY PERIOD	ARITHMETIC MEAN OF LATENCY PERIODS	
43	1939	38*		
42	1940		$\frac{203}{6} = 33.83$	
41	1	37,21,37		
40	2	32,38		
39	3	38,14,32		
	4	28,11,24,20,24,34	$\frac{679}{26} = 26.12$	
	5	27,22,28,29		
	6	21,29,31,26,28,15,23, 30,35***		
35	7	29,24,29,28		
34	8	28,24		
	9	30,26,20	$\frac{424}{18} = 23.56$	
	1950	26,22,31,19,23,14,33		
	1	19,28,17,28		
30	2	21**,15		
29	3	25,22,23,22,20		
	4	21,21,25,25,21,28***, 22	$\frac{538}{26} = 20.69$	
	5	22,23,24,14,19,21, 27***		
	6	21,12		
25	7	19,17,15,13,16		
24	8	18,18,15,17,20		
	9	16,21	$\frac{328}{20} = 16.4$	
	1960	13,18		
	1	15,16,16,16,19,18,12		
20	2	13,18,17,12		
19	3	16,17		
	4	16,17	$\frac{86}{6} = 14.33$	
	5	11		
	6	9		
15	7			
14	8			
	9			
	1970			VIOLA
	1			
10	2			
9	3			MALTONI
	4			GOODRICH
	TOTAL	102	$\frac{2258}{102} = 22.13$	

* Cholangiosarcoma

** Aerosol can filler

*** US33 and 34 still ALIVE

PJST80061400,11/WPX7-2

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
43	1939		38*	
42	1940			
41	1	37	21,37	
40	2		32,38	
39	3	38	14,32	
	4	28	11,24,20,24,34	
	5	27	22,28,29	
	6	21,29,31,33	26,28,15,23,30,35***	
35	7	29	24,29,28	
34	8	28	24	
	9	30,26	20	
	1950	26,22,31	19	23,14
	1	19,28	17,28	
30	2	21**	15	
29	3	25,22	23	22,20
	4	21,21,25,25	21,28***	22
	5	22,23,24	14,19,21,27***	
	6	21,12		
25	7	19,17,15,13		16
24	8	18,18	15	17,20
	9	16,21		
	1960	13,18		
	1	15,16,16,16,19,18	12	
20	2	13,18,17	12	
19	3	16,17		
	4	16	17	
	5	11		
	6	9		
15	7			
14	8			
	9			
	VIOLA 1970			
	1			
	2			
	MALTONI 3			
	TOTAL	53	41	8

* Cholangiosarcoma

** Aerosol can filler

*** US33 and 34 still ALIVE

PJST80061400,12/WPX7-2

TABLE 4E

PLANT	START UP DATE	LATENCY PERIODS OF ASL CASES	NO OF CASES	AVERAGE LATENCY PERIOD
LOUISVILLE	1940?	12,14,15,19,19,20,24,27,28,28,28,29,29	13	22.46
SHAWINIGAN	1941?	11,12,14,21,22,23,24,24,26,28	10	20.5
S CHARLESTON	1939?	24,30,32,32,34,35,37,38,38	9	33.33
TROISDORF	1954	12,13,16,16,17,18,19,21,23,25	10	18

PJST80061400,13/WPX7-2

TABLE 4FLATENCY PERIOD OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE
AND SPECIFIC PLANT

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

PJST80061400,14/WPX7-2

TABLE 4G

PLANT	START-UP DATE	LATENCY PERIOD OF ASL CASES	NO OF CASES	AVERAGE PERIOD
SUNDSVALL	1945	16,19,27,29,31	5	24.4 years
BRIGNOUD	1950	11,16,18,26,30	5	20.2
ST FONS	1939	21,28,29,37,38	5	30.6
BARRY	1948	9,17,18,28,31,33	6	22.66
BURGHAUSEN	1933	17,21,22,25	4	21.25
NIAGARA	1947	15,17,21,23	4	19
SPLIT	1941	20,20,22,23	4	21.25

PJST80061400,15/WPX7-2

TABLE 4H

LATENCY PERIOD OF ASL CASES TABULATED BY YEAR OF FIRST EXPOSURE AND SPECIFIC PLANT

YEAR OF FIRST EXPOSURE	SUNDSVALL	BRIGNOUD	ST FONS	BARRY	BURGHAUSEN	NIAGARA	SPLIT
1939							
1940							
1			37				
2							
3			38				
4							
5	27*						
6	31		29			15,23	
7	29						
8			28				
9		26,30					
1950				31,33			23*
1	19			28		17	
2							
3					25		20
4					21		22*
5					22	21	
6			21				
7					17		
8		18					20
9		16					
1960							
1							
2				18			
3				17			
4	16						
5		11					
6				9			

* Monomer workers

JS/DJS/DSO 16
 12 April 1983
 PJST80061400,16/WPX7-2

(Review Date - 15 April 1983)

TABLE 5

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Annual Incidence of ASI 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	0	-	4	98	
2	0	1	nil to date	1	99	
1983	1	nil to date	nil to date	1	100	
TOTAL	53*	39**	8	100		

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

** Does not include US33 and 34 still alive.

GENC 008785

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		US31	
	3	UK09		
	Total	53	39***	8

* Cholangiosarcoma

** Aerosol can filler

*** Does not include US33 and 34 still ALIVE

PJST80061400,1/WPX7-2

TABLE 7

ASL CASE NUMBERS BY YEAR OF FIRST EXPOSURE AND GEOGRAPHICAL LOCATION
(EXCLUDING IT01)

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,UK8,UK9	US16	Y2, Cz2
	1	Sw1,UK5	US10, US32	
	2	G3**	US4	
	3	G15,It3	C10	Jap1,Y1
	4	G7,G8,UK4,G19	US18,US33***	Y3
	5	G11,G16,G18	US2,US17,US20,US34***	
	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	53	41	8

* Cholangiosarcoma

** Aerosol can filler

*** US33 and 34 are still ALIVE

PJST80061400,2/WPX7-2

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	Sins		
1946	France	Rhone-Poulenc	Rousillon	01	46
1947	Italy	Montedison	Porto Marghera	02	57
1948	United Kingdom	BP Chem	Barry	03,05,06,07,08,09	66,51,62,63,50,50
	West Germany	Huls	Marl	09,10	61,61
1949	Belgium	Solvic	Jenepe	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
1960	West Germany	Lonza	Waldshut	06,13	62,60
1962	Portugal	Cires	Oporto		
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	Svarthack		
	Holland	DSM	Beek Limburg		
1976	France	Soc Art D'vinyl	Mazingarbe		
1977	Spain	Monsanto Iberia	Tarragona		

* Laboratory worker in Research Department

GENC 008788

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, 26,33,34	48,55,45,52,44, 62,45,50,55,47, 47,54,55
1946?	*UCC	Texas City		
1947	Goodyear	Niagara Falls	08,10,11,20	46,51,46,55
1948	Firestone	Pottstown	12	49
	Uniroyal	Painesville (closed 1975)		
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 (closed March 1982)		
	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 (sold to Robintech)		
	Hooker	Burlington NJ		
1968	Firestone	Perryville		
1969	BFG	Pedrickton NJ		
	Goodyear	Plaquemine		
	Olin	Assonet, Mass		
	(Formerly Conoco)			
1971	Conoco	Oklahoma City		

USA PVC PRODUCERS - START-UP DATES vs ASL CASES

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1972	Nat Starch	Meredosia, Ill		
1973	Borden	Springfield		
	Robintech	Painesville, O (sold to Georgia Pacific who converted to polystyrene)		
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

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TABLE 10

CANADIAN PVC PRODUCERS - START-UP DATES vs ASL CASES

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1943 (1941?)	Goodrich	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

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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 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		

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TABLE 13

SOUTH AND CENTRAL AMERICAN PVC PRODUCERS

START-UP YEAR	COMPANY NAME	LOCATION	ASL CASE NUMBER	YEAR OF 1st EXPOSURE
1953	Monsanto Mexica	Lecheria (Mexico)		
1954	Policyd	Mexico City (Mexico)		
1955	Geon Do Brazil	Sao Paulo (Brazil)		
1956	Elchlor	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)		

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