

OVERALL EVALUATIONS OF CARCINOGENICITY

INTRODUCTION

An international group of experts in cancer research met in Lyon in February 1982 to re-evaluate the epidemiological and experimental carcinogenicity data, as well as other relevant data, on 155 chemicals, groups of chemicals and exposures to complex mixtures that had been evaluated in Volumes 1-29 of the *IARC Monographs*, for which there were some data on carcinogenicity in humans. The background, purpose and overall conclusions of the Working Group and the evidence on which the evaluation for each agent was based were issued as Supplement 4 to the *IARC Monographs* (IARC, 1982).

This volume, Supplement 7, of the *IARC Monographs* is an updating of Supplement 4 to the *IARC Monographs* and represents the conclusions of two IARC Working Groups—one which met in December 1986 and another which met in March 1987.

The aim of the Working Group that met in December 1986 was to summarize and bring up to date the findings from tests for genetic and related effects and from studies of DNA damage, chromosomal effects and mutation in humans for all the agents (chemicals, groups of chemicals, industrial processes, occupational exposures and cultural habits) that had been evaluated in Volumes 1-42 of the *Monographs* and for which some data on carcinogenicity in humans were available. Other data considered particularly relevant to evaluations of carcinogenicity were also included. The conclusions of the December Working Group are presented in full in Supplement 6 of the *IARC Monographs* (IARC, 1987). Summaries of their conclusions are given in the sections on other relevant data for each compound and in Appendix 1 to this volume.

The aim of the Working Group that met in March 1987 was two-fold. The first was to summarize and bring up to date the data on carcinogenicity in humans and in experimental animals for all 189 agents that had been evaluated in Volumes 1-42 of the *Monographs* and for which some data on carcinogenicity in humans were available. The second was to make overall evaluations of carcinogenicity to humans for all 628 agents (comprising more than 700 chemicals, groups of chemicals, industrial processes, occupational exposures and cultural habits) that had been evaluated in Volumes 1-42 of the *Monographs*, on the basis of all the available data, as described below.

METHODS

The data on animal and human carcinogenicity for each of the agents for which information on carcinogenicity in humans was available were reviewed and evaluated before the meeting by members of the Working Group, who prepared draft summaries of the findings. During the meeting of the Working Group, these summaries and evaluations were discussed, modified as appropriate and adopted. Overall evaluations of carcinogenicity to humans for these agents were made by the Working Group on the basis of the combined evidence from: human carcinogenicity data, animal carcinogenicity data, the conclusions of the December 1986 Working Group on studies on genetic and related effects, and other relevant data judged to be of sufficient importance to affect the making of the overall evaluation.

The criteria for evaluating the degree of evidence for carcinogenicity in humans and in experimental animals and for making the overall evaluation of carcinogenicity to humans are those described in the Preamble to this volume (see pp. 29-32), which represents the conclusions of two working groups which met in September/October 1986 and in January 1987.

Some closely-related chemicals were evaluated as groups, as at previous meetings, when such an approach was biologically plausible and when the available evidence did not permit separate evaluation of each individual chemical within the group. For groups of chemicals categorized into Group 1 ('The agent is carcinogenic to humans'), the evaluation was considered to apply to the group as a whole and not necessarily to all chemicals within the group. If and when further evidence is obtained, separate evaluations may be made for individual chemicals, possibly into different categories.

Evaluations of carcinogenicity to humans were sometimes made for a group of human exposures, e.g., industrial processes and therapeutic combinations. Under such circumstances, the composition of different mixtures, and consequently their biological effects, are likely to vary with settings and conditions. Although the degree of evidence for carcinogenicity has been characterized with all possible specificity, it is difficult to be specific for such variable human exposures, which are also likely to change considerably over time, e.g., with the introduction of new processes. The Working Group therefore recognizes that the evaluation of a complex situation may not apply to all constituents or to every combination or to every point in time.

Other relevant data, including the results of tests for genetic and related effects (see Supplement 6 [IARC, 1987]), were used by the Working Group in making the overall evaluation of carcinogenicity to humans of an agent when one of the following sets of information was available:

(1) the agent produces genetic or related effects in exposed humans (i.e., indicative of DNA or chromosomal damage) and also gives positive results in a range of other types of assays;

or

(2) the agent is active in a broad spectrum of assays for genetic and related effects, including those involving mammalian cells, and there is evidence from structure-activity and/or metabolism studies that the agent itself reacts covalently with DNA or is likely to be converted to a reactive form in humans.

This information was used in two ways:

(1) to classify in Group 2A, as a probable human carcinogen, an agent for which there is *sufficient evidence* of carcinogenicity in experimental animals, which would otherwise have been classified in Group 2B as a possible human carcinogen; and

(2) to classify in Group 2B, as a possible human carcinogen, an agent for which there is *limited evidence* of carcinogenicity in experimental animals, which would otherwise have been classified in Group 3.

In using the above information, it was recognized that certain known carcinogens are not detected in currently used assays for genetic and related effects.

Overall evaluations of carcinogenicity to humans for agents for which no data on carcinogenicity in humans were available were made on the basis of the combined evidence from animal carcinogenicity tests and from other relevant data that fell into one of the two categories described above. The overall evaluation was generally based on the summary and evaluation of the most recent monograph on that agent. The same procedure was used in the case of three agents (benzoyl peroxide, polyvinyl chloride and selenium and selenium compounds) for which a previous evaluation of *inadequate evidence* for carcinogenicity in humans had been made.

Prior to Volume 20 of the Monographs, the evaluations of *sufficient, limited, inadequate* and *no evidence* of carcinogenicity were not used. However, an ad-hoc group which was convened in 1978 re-evaluated all chemicals evaluated in Volumes 1-19 of the monographs and listed those for which there was considered to be *sufficient evidence* of carcinogenicity in experimental animals according to the criteria established at that time. All chemicals for which there is *sufficient evidence* of carcinogenicity in experimental animals were re-evaluated by the present group.

For agents for which there were no data on carcinogenicity in humans and which were evaluated in Volumes 1-19 of the *IARC Monographs*, prior to the development of criteria for defining *limited* and *inadequate evidence* of carcinogenicity, no formal re-evaluation was made. However, on the basis of data presented in the summaries in those volumes, an attempt was made in conjunction with the Secretariat to judge whether the available data at that time would have met the present criteria for *limited* and *inadequate evidence*.

With regard to compounds for which there are no data on carcinogenicity in humans, the Working Group also examined data from short-term tests and other relevant biological data in *Monographs* volumes 14-42. Only those compounds for which data were *limited* or *sufficient* in animal studies were considered for recategorization on the basis of the procedures described above for using data on genetic and related effects.

When additional published data of significant importance to affect the evaluation of *sufficient evidence* of carcinogenicity in experimental animals (upgrading to or

downgrading from) were available to the Working Group, new summaries and evaluations of the data in experimental animals were prepared (see p. 389), and these were used in making the overall evaluations.

Only one agent was categorized as probably not carcinogenic to humans (Group 4). More agents did not fall into this category partly because one of the criteria used for selecting agents to be considered in the *Monographs* series is that there be a suspicion for the carcinogenicity of the agents on the basis of either epidemiological or experimental observations. Therefore, the monographs tend to represent a selection of agents for which positive findings have been reported in the literature.

The epidemiological evidence for diazepam, fluorides (inorganic, used in drinking-water) and prednisone appeared to be suitable for classification as 'suggesting lack of carcinogenicity' in humans. The different reasons why it could not be so described are given in the texts on each compound.

For two chemicals, ferric oxide and methyl parathion, there was considered to be 'evidence suggesting lack of carcinogenicity' in experimental animals, but there were insufficient supporting data to allow their classification into Group 4.

References

- IARC (1982) *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans*, Supplement 4, *Chemicals, Industrial Processes and Industries Associated with Cancer in Humans (IARC Monographs, Volumes 1 to 29)*, Lyon
- IARC (1987) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Supplement 6, *Genetic and Related Effects: An Updating of Selected IARC Monographs from Volumes 1 to 42*, Lyon

RESULTS AND CONCLUSIONS

The assessments of degrees of evidence for carcinogenicity in humans and in experimental animals, as well as the overall evaluations of carcinogenicity to humans, are given in Table 1. A summary of the conclusions of the December 1986 Working Group on genetic and related effects is given in Appendix 1.

Group 1. The Working Group concluded that the following agents are carcinogenic to humans:

Aflatoxins
Aluminium production
4-Aminobiphenyl
Analgesic mixtures containing phenacetin

Arsenic and arsenic compounds*
Asbestos
Auramine, manufacture of
Azathioprine
Benzene
Benzidine
Betel quid with tobacco
N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine)
Bis(chloromethyl)ether and chloromethyl methyl ether (technical-grade)
Boot and shoe manufacture and repair
1,4-Butanediol dimethanesulphonate (Myleran)
Chlorambucil
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU)
Chromium compounds, hexavalent*
Coal gasification
Coal-tar pitches
Coal-tars
Coke production
Cyclophosphamide
Diethylstilboestrol
Erionite
Furniture and cabinet making
Haematite mining, underground, with exposure to radon
Iron and steel founding
Isopropyl alcohol manufacture, strong-acid process
Magenta, manufacture of
Melphalan
8-Methoxypsoralen (Methoxsalen) plus ultraviolet radiation
Mineral oils, untreated and mildly-treated
MOPP (combined therapy with nitrogen mustard, vincristine, procarbazine and prednisone) and other combined chemotherapy including alkylating agents
Mustard gas (Sulphur mustard)
2-Naphthylamine
Nickel and nickel compounds*
Oestrogen replacement therapy
Oestrogens, nonsteroidal*
Oestrogens, steroidal*
Oral contraceptives, combined¹
Oral contraceptives, sequential
The rubber industry

*This evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals within the group (see also Methods, p. 38).

¹There is also conclusive evidence that these agents have a protective effect against cancers of the ovary and endometrium (see summary, p. 297).

Shale-oils
Soots
Talc containing asbestiform fibres
Tobacco products, smokeless
Tobacco smoke
Trosulphan
Vinyl chloride

Group 2A. The Working Group concluded that the following agents are probably carcinogenic to humans:

Acrylonitrile
Adriamycin
Androgenic (anabolic) steroids
Benz[*a*]anthracene
Benzidine-based dyes
Benzo[*a*]pyrene
Beryllium and beryllium compounds
Bischloroethyl nitrosourea (BCNU)
Cadmium and cadmium compounds
1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (CCNU)
Cisplatin
Creosotes
Dibenz[*a,h*]anthracene
Diethyl sulphate
Dimethylcarbamoyl chloride
Dimethyl sulphate
Epichlorohydrin
Ethylene dibromide
Ethylene oxide
N-Ethyl-*N*-nitrosourea
Formaldehyde
5-Methoxypsoralen
4,4'-Methylene bis(2-chloroaniline) (MOCA)
N-Methyl-*N'*-nitro-*N*-nitrosoguanidine (MNNG)
N-Methyl-*N*-nitrosourea
Nitrogen mustard
N-Nitrosodiethylamine
N-Nitrosodimethylamine
Phenacetin
Polychlorinated biphenyls
Procarbazine hydrochloride
Propylene oxide
Silica, crystalline

Styrene oxide
Tris(1-aziridinyl)phosphine sulphide (Thiotepa)
Tris(2,3-dibromopropyl) phosphate
Vinyl bromide

Group 2B. The Working Group concluded that the following agents are possibly carcinogenic to humans:

A- α -C (2-Amino-9*H*-pyrido[2,3-*b*]indole)
Acetaldehyde
Acetamide
Acrylamide
AF-2 [2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide]
para-Aminoazobenzene
ortho-Aminoazotoluene
2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole
Amitrole
ortho-Anisidine
Aramite®
Auramine, technical-grade
Azaserine
Benzo[*b*]fluoranthene
Benzo[*j*]fluoranthene
Benzo[*k*]fluoranthene
Benzyl violet 4B
Bitumens, extracts of steam-refined and air-refined
Bleomycins
Bracken fern
1,3-Butadiene
Butylated hydroxyanisole (BHA)
 β -Butyrolactone
Carbon-black extracts
Carbon tetrachloride
Carpentry and joinery
Carrageenan, degraded
Chloramphenicol
Chlordecone (Kepone)
 α -Chlorinated toluenes
Chloroform
Chlorophenols
Chlorophenoxy herbicides
4-Chloro-*ortho*-phenylenediamine

para-Chloro-*ortho*-toluidine
Citrus Red No. 2
para-Cresidine
Cycasin
Dacarbazine
Daunomycin
DDT
N,N'-Diacetylbenzidine
2,4-Diaminoanisole
4,4'-Diaminodiphenyl ether
2,4-Diaminotoluene
Dibenz[*a,h*]acridine
Dibenz[*a,j*]acridine
7*H*-Dibenzo[*c,g*]carbazole
Dibenzo[*a,e*]pyrene
Dibenzo[*a,h*]pyrene
Dibenzo[*a,i*]pyrene
Dibenzo[*a,l*]pyrene
1,2-Dibromo-3-chloropropane
para-Dichlorobenzene
3,3'-Dichlorobenzidine
3,3'-Dichloro-4,4'-diaminodiphenyl ether
1,2-Dichloroethane
Dichloromethane
1,3-Dichloropropene (technical-grade)
Diepoxybutane
Di(2-ethylhexyl)phthalate
1,2-Diethylhydrazine
Diglycidyl resorcinol ether
Dihydrosafrole
3,3'-Dimethoxybenzidine (*ortho*-Dianisidine)
para-Dimethylaminoazobenzene
trans-2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl]-1,3,4-oxadiazole
3,3'-Dimethylbenzidine (*ortho*-Tolidine)
1,1-Dimethylhydrazine
1,2-Dimethylhydrazine
1,4-Dioxane
Ethyl acrylate
Ethylene thiourea
Ethyl methanesulphonate
2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole
Glu-P-1 (2-Amino-6-methyldipyrido[1,2-*a:3'*,2'-*d'*]imidazole)
Glu-P-2 (2-Aminodipyrido[1,2-*a:3'*,2'-*d'*]imidazole)

Glycidaldehyde
Griseofulvin
Hexachlorobenzene
Hexachlorocyclohexanes
Hexamethylphosphoramide
Hydrazine
Indeno[1,2,3-*cd*]pyrene
IQ (2-Amino-3-methylimidazo[4,5-*f*]quinoline)
Iron-dextran complex
Lasiocarpine
Lead and lead compounds, inorganic
MeA- α -C (2-Amino-3-methyl-9*H*-pyrido[2,3-*b*]indole)
Medroxyprogesterone acetate
Merphalan
2-Methylaziridine
Methylazoxymethanol and its acetate
5-Methylchrysene
4,4'-Methylene bis(2-methylaniline)
4,4'-Methylenedianiline
Methyl methanesulphonate
2-Methyl-1-nitroanthraquinone (uncertain purity)
N-Methyl-*N*-nitrosourethane
Methylthiouracil
Metronidazole
Mirex
Mitomycin C
Monocrotaline
5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene)amino]-2-oxazolidinone
Nafenopin
Niridazole
5-Nitroacenaphthene
Nitrofen (technical-grade)
1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone
N-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide
Nitrogen mustard *N*-oxide
2-Nitropropane
N-Nitrosodi-*n*-butylamine
N-Nitrosodiethanolamine
N-Nitrosodi-*n*-propylamine
3-(*N*-Nitrosomethylamino)propionitrile
4-(*N*-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK)
N-Nitrosomethylethylamine
N-Nitrosomethylvinylamine

N-Nitrosomorpholine
N'-Nitrosornicotine
N-Nitrosopiperidine
N-Nitrosopyrrolidine
N-Nitrososarcosine
Oil Orange SS
Panfuran S (containing dihydroxymethylfuratrizine)
Phenazopyridine hydrochloride
Phenobarbital
Phenoxybenzamine hydrochloride
Phenytoin
Polybrominated biphenyls
Ponceau MX
Ponceau 3R
Potassium bromate
Progestins
1,3-Propane sultone
 β -Propiolactone
Propylthiouracil
Saccharin
Safrole
Sodium *ortho*-phenylphenate
Sterigmatocystin
Streptozotocin
Styrene
Sulfallate
2,3,7,8-Tetrachlorodibenzo-*para*-dioxin (TCDD)
Tetrachloroethylene
Thioacetamide
4,4'-Thiodianiline
Thiourea
Toluene diisocyanates
ortho-Toluidine
Toxaphene (Polychlorinated camphenes)
Trp-P-1 (3-Amino-1,4-dimethyl-5*H*-pyrido[4,3-*b*]indole)
Trp-P-2 (3-Amino-1-methyl-5*H*-pyrido[4,3-*b*]indole)
Trypan blue
Uracil mustard
Urethane

Group 3. The Working Group concluded that the following agents are not classifiable as to their carcinogenicity to humans:

Acridine orange
Acriflavinium chloride
Acrolein
Acrylic acid
Acrylic fibres
Acrylonitrile-butadiene-styrene copolymers
Actinomycin D
Agaricine
Aldrin
Allyl chloride
Allyl isothiocyanate
Allyl isovalerate
Amaranth
5-Aminoacenaphthene
2-Aminoanthraquinone
para-Aminobenzoic acid
1-Amino-2-methylantraquinone
4-Amino-2-nitrophenol
2-Amino-5-nitrothiazole
11-Aminoundecanoic acid
Anaesthetics, volatile
Angelicin plus ultraviolet A radiation
Aniline
para-Anisidine
Anthanthrene
Anthracene
Anthranilic acid
Apholate
Attapulgit
Aurothioglucose
5-Azacytidine
Aziridine
2-(1-Aziridiny)ethanol
Aziridyl benzoquinone
Azobenzene
Benz[*a*]acridine
Benz[*c*]acridine
Benzo[*ghi*]fluoranthene
Benzo[*a*]fluorene
Benzo[*b*]fluorene
Benzo[*c*]fluorene

Benzo[*ghi*]perylene
Benzo[*c*]phenanthrene
Benzo[*e*]pyrene
para-Benzoquinone dioxime
Benzoyl chloride
Benzoyl peroxide
Benzyl acetate
Betel quid without tobacco
Bis(1-aziridinyl)morpholinophosphine sulphide
Bis(2-chloroethyl)ether
1,2-Bis(chloromethoxy)ethane
1,4-Bis(chloromethoxymethyl)benzene
Bis(2-chloro-1-methylethyl)ether
Bitumens
Blue VRS
Brilliant Blue FCF
n-Butyl acrylate
Butylated hydroxytoluene (BHT)
Butyl benzyl phthalate
 γ -Butyrolactone
Cantharidin
Captan
Carbaryl
Carbazole
3-Carbethoxypsoralen
Carbon blacks
Carmoisine
Carrageenan, native
Catechol
Chlordane/ Heptachlor
Chlordimeform
Chlorinated dibenzodioxins (other than TCDD)
Chlorobenzilate
Chlorodifluoromethane
Chlorofluoromethane
4-Chloro-*meta*-phenylenediamine
Chloroprene
Chloroprotham
Chloroquine
Chlorothalonil
2-Chloro-1,1,1-trifluoroethane
Cholesterol
Chromium compounds, trivalent

Chromium metal
Chrysene
Chrysoidine
CI Disperse Yellow 3
Cinnamyl anthranilate
Citrinin
Clofibrate
Clomiphene citrate
Copper 8-hydroxyquinoline
Coronene
Coumarin
meta-Cresidine
Cyclamates
Cyclochlorotine
Cyclopenta[*cd*]pyrene
D & C Red No. 9
Dapsone
Diacetylaminoazotoluene
Diallate
1,2-Diamino-4-nitrobenzene
1,4-Diamino-2-nitrobenzene
2,5-Diaminotoluene
Diazepam
Diazomethane
Dibenz[*a,c*]anthracene
Dibenz[*a,j*]anthracene
Dibenzo[*a,e*]fluoranthene
Dibenzo[*h,rst*]pentaphene
Dichloroacetylene
ortho-Dichlorobenzene
trans-1,4-Dichlorobutene
2,6-Dichloro-*para*-phenylenediamine
1,2-Dichloropropane
Dichlorvos
Dicofol
Dieldrin
Di(2-ethylhexyl)adipate
Dihydroxymethylfuratrizine
Dimethoxane
3,3'-Dimethoxybenzidine-4,4'-diisocyanate
para-Dimethylaminoazobenzene diazo sodium sulphonate
4,4'-Dimethylangelicin plus ultraviolet A radiation
4,5'-Dimethylangelicin plus ultraviolet A radiation

1,4-Dimethylphenanthrene
1,8-Dinitropyrene
Dinitrosopentamethylenetetramine
2,4'-Diphenyldiamine
Disulfiram
Dithranol
Dulcin
Endrin
Eosin
1-Epoxyethyl-3,4-epoxycyclohexane
3,4-Epoxy-6-methylcyclohexylmethyl-3,4-epoxy-6-methylcyclohexane carboxylate
cis-9,10-Epoxystearic acid
Ethionamide
Ethylene
Ethylene sulphide
Ethyl selenac
Ethyl tellurac
Eugenol
Evans blue
Fast Green FCF
Ferbam
Ferric oxide
Fluometuron
Fluoranthene
Fluorene
Fluorides (inorganic, used in drinking-water)
5-Fluorouracil
Furazolidone
Fusarenon-X
Glycidyl oleate
Glycidyl stearate
Guinea Green B
Gyromitrin
Haematite
Hexachlorobutadiene
Hexachloroethane
Hexachlorophene
Hycanthone mesylate
Hydralazine
Hydrogen peroxide
Hydroquinone
4-Hydroxyazobenzene
8-Hydroxyquinoline

Hydroxysenkirkine
Iron-dextrin complex
Iron sorbitol-citric acid complex
Isatidine
Isonicotinic acid hydrazide (Isoniazid)
Isophosphamide
Isopropyl alcohol
Isopropyl oils
Isosafrole
Jacobine
Kaempferol
Lauroyl peroxide
Lead compounds, organolead
Leather goods manufacture
Leather tanning and processing
Light Green SF
Lumber and sawmill industries (including logging)
Luteoskyrin
Magenta
Malathion
Maleic hydrazide
Malonaldehyde
Maneb
Mannomustine
Medphalan
MeIQ (2-Amino-3,4-dimethylimidazo[4,5-f]quinoline)
MeIQx (2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline)
Melamine
6-Mercaptopurine
Methotrexate
Methoxychlor
Methyl acrylate
5-Methylangelicin plus ultraviolet A radiation
Methyl bromide
Methyl carbamate
Methyl chloride
1-Methylchrysene
2-Methylchrysene
3-Methylchrysene
4-Methylchrysene
6-Methylchrysene
N-Methyl-*N*,4-dinitrosoaniline
4,4'-Methylenebis(*N,N*-dimethyl)benzenamine

4,4'-Methylenediphenyl diisocyanate
2-Methylfluoranthene
3-Methylfluoranthene
Methyl iodide
Methyl methacrylate
Methyl parathion
1-Methylphenanthrene
7-Methylpyrido[3,4-*c*]psoralen
Methyl red
Methyl selenac
Mineral oils, highly-refined
Modacrylic fibres
Monuron
1,5-Naphthalenediamine
1,5-Naphthalene diisocyanate
1-Naphthylamine
1-Naphthylthiourea (ANTU)
Nithiazide
5-Nitro-*ortho*-anisidine
9-Nitroanthracene
6-Nitrobenzo[*a*]pyrene
4-Nitrobiphenyl
6-Nitrochrysene
3-Nitrofluoranthene
5-Nitro-2-furaldehyde semicarbazone
1-Nitropyrene
N'-Nitrosoanabasine
N'-Nitrosoanatabine
N-Nitrosodiphenylamine
para-Nitrosodiphenylamine
N-Nitrosofolic acid
N-Nitrosoguvacine
N-Nitrosoguvacoline
N-Nitrosohydroxyproline
3-(*N*-Nitrosomethylamino)propionaldehyde
4-(*N*-Nitrosomethylamino)-4-(3-pyridyl)-1-butanal (NNA)
N-Nitrosoproline
Nitrovin
Nylon 6
Ochratoxin A
Oestradiol mustard
Oestrogen-progestin replacement therapy
Orange I

Orange G
Oxazepam
Oxyphenbutazone
Parasorbic acid
Parathion
Patulin
Penicillic acid
Pentachloroethane
Perylene
Petasitenine
Phenanthrene
Phenelzine sulphate
Phenicarbazide
Phenylbutazone
meta-Phenylenediamine
para-Phenylenediamine
N-Phenyl-2-naphthylamine
ortho-Phenylphenol
Piperonyl butoxide
Polyacrylic acid
Polychloroprene
Polyethylene
Polymethylene polyphenyl isocyanate
Polymethyl methacrylate
Polypropylene
Polystyrene
Polytetrafluoroethylene
Polyurethane foams
Polyvinyl acetate
Polyvinyl alcohol
Polyvinyl chloride
Polyvinyl pyrrolidone
Ponceau SX
Potassium bis(2-hydroxyethyl)dithiocarbamate
Prednisone
Proflavine salts
Pronetalol hydrochloride
Propham
n-Propyl carbamate
Propylene
Ptaquiloside
Pulp and paper manufacture
Pyrene
Pyrido[3,4-*c*]psoralen

Pyrimethamine
Quercetin
para-Quinone
Quintozene (Pentachloronitrobenzene)
Reserpine
Resorcinol
Retrorsine
Rhodamine B
Rhodamine 6G
Riddelliine
Rifampicin
Rugulosin
Saccharated iron oxide
Scarlet Red
Selenium and selenium compounds
Semicarbazide hydrochloride
Seneciophylline
Senkirkine
Sepiolite
Shikimic acid
Silica, amorphous
Sodium diethyldithiocarbamate
Spironolactone
Styrene-acrylonitrile copolymers
Styrene-butadiene copolymers
Succinic anhydride
Sudan I
Sudan II
Sudan III
Sudan Brown RR
Sudan Red 7B
Sulfafurazole (Sulphisoxazole)
Sulfamethoxazole
Sunset Yellow FCF
Symphytine
Talc not containing asbestiform fibres
Tannic acid and tannins
Terpene polychlorinates (Strobane®)
2,2',5,5'-Tetrachlorobenzidine
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachlorvinphos
Tetrafluoroethylene

Thiouracil
Thiram
Trichlorfon
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorotriethylamine hydrochloride
T₂-Trichothecene
Triethylene glycol diglycidyl ether
4,4',6-Trimethylangelicin plus ultraviolet A radiation
2,4,5-Trimethylaniline
2,4,6-Trimethylaniline
4,5',8-Trimethylpsoralen
Triphenylene
Tris(aziridinyl)-*para*-benzoquinone (Triaziqune)
Tris(1-aziridinyl)phosphine oxide
2,4,6-Tris(1-aziridinyl)-*s*-triazine
1,2,3-Tris(chloromethoxy)propane
Tris(2-methyl-1-aziridinyl)phosphine oxide
Vinblastine sulphate
Vincristine sulphate
Vinyl acetate
Vinyl chloride-vinyl acetate copolymers
4-Vinylcyclohexene
Vinyl fluoride
Vinylidene chloride
Vinylidene chloride-vinyl chloride copolymers
Vinylidene fluoride
N-Vinyl-2-pyrrolidone
Wollastonite
2,4-Xylidine
2,5-Xylidine
Yellow AB
Yellow OB
Zearalenone
Zectran
Zineb
Ziram

Group 4. The Working Group concluded that the following agent is probably not carcinogenic to humans:

Caprolactam

Table 1. Degrees of evidence for carcinogenicity in humans and in experimental animals, and overall evaluations of carcinogenicity to humans for agents evaluated in *IARC Monographs* volumes 1-42

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
A- α -C (2-Amino-9H-pyrido[2,3-b]indole) ^b [40, 1986]	ND	S	2B
Acetaldehyde	I	S	2B
Acetamide ^c	ND	S	2B
Acridine orange ^d [16, 1978]	ND	I	3
Acriflavium chloride ^d [13, 1977]	ND	I	3
Acrolein	I	I	3
Acrylamide ^b [39, 1986]	ND	S	2B
Acrylic acid ^d [19, 1979]	ND	ND	3
Acrylic fibres ^d [19, 1979]	ND	ND	3
Acrylonitrile	L	S	2A
Acrylonitrile-butadiene-styrene copolymers ^d [19, 1979]	ND	ND	3
Actinomycin D	I	L	3
Adriamycin ^e	I	S	2A
AF-2 [2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide] ^b [31, 1983]	ND	S	2B
Aflatoxins	S	S	1
Agaricine ^b [31, 1983]	ND	I	3
Aldrin	I	L	3
Allyl chloride ^b [36, 1985]	ND	I	3
Allyl isothiocyanate ^b [36, 1985]	ND	L	3
Allyl isovalerate ^b [36, 1985]	ND	L	3
Aluminium production	S		1
Amaranth ^d [8, 1975]	ND	I	3
5-Aminoacenaphthene ^d [16, 1978]	ND	I	3
2-Aminoanthraquinone ^b [27, 1982]	ND	L	3
<i>para</i> -Aminoazobenzene ^c	ND	S	2B
<i>ortho</i> -Aminoazotoluene ^b [8, 1975]	ND	S	2B
<i>para</i> -Aminobenzoic acid ^d [16, 1978]	ND	I	3

^aND, no adequate data; ESL, evidence suggesting lack of carcinogenicity; I, inadequate evidence; L, limited evidence; S, sufficient evidence. For definitions of terms and overall evaluations, see Preamble, pp. 30-32.

^bOverall evaluation based only on evidence of carcinogenicity in monograph [volume, year] (see Methods, p. 39) or in Supplement 4

^cDegree of evidence in animals revised on the basis of data that appeared after the most recent monograph and/or on the basis of present criteria (see Methods, pp. 39-40)

^dDegree of evidence not previously categorized; evaluation made according to present criteria on the basis of data in monograph [volume, year] (see Methods, p. 39)

^eOther relevant data, as given in the summaries here or in monograph [volume, year], influenced the making of the overall evaluation (see Methods, pp. 38-39)

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
4-Aminobiphenyl	S	S	1
1-Amino-2-methylantraquinone ^b [27, 1982]	ND	L	3
2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole ^b [7, 1974]	ND	S	2B
4-Amino-2-nitrophenol ^d [16, 1978]	ND	I	3
2-Amino-5-nitrothiazole ^b [31, 1983]	ND	L	3
11-Aminoundecanoic acid ^b [39, 1986]	ND	L	3
Amitrole	I	S	2B
Anaesthetics, volatile	I		3
Cyclopropane		ND	
Diethyl ether		ND	
Divinyl ether		ND	
Enflurane		I	
Fluroxene		ND	
Halothane		I	
Isoflurane		I	
Methoxyflurane		I	
Nitrous oxide		I	
Androgenic (anabolic) steroids	L		2A
Oxymetholone		ND	
Testosterone		S	
Angelics ^b [40, 1986]			
Angelicin plus ultraviolet A radiation	ND	L	3
5-Methylangelicin plus ultraviolet A radiation	ND	L	3
4,4'-Dimethylangelicin plus ultraviolet A radiation	ND	ND	3
4,5'-Dimethylangelicin plus ultraviolet A radiation	ND	L	3
4,4',6-Trimethylangelicin plus ultraviolet A radiation	ND	ND	3
Aniline	I	L	3
<i>ortho</i> -Anisidine ^b [27, 1982]	ND	S	2B
<i>para</i> -Anisidine ^b [27, 1982]	ND	I	3
Anthanthrene ^b [32, 1982]	ND	L	3
Anthracene ^c	ND	I	3
Anthranilic acid ^d [16, 1978]	ND	I	3
Apholate ^d [9, 1975]	ND	I	3
Aramite ^{®b} [5, 1974]	ND	S	2B
Arsenic and arsenic compounds	S	L	1*
Asbestos	S	S	1
Attapulgit	I	L	3
Auramine (technical-grade)	I	S	2B
Manufacture of auramine	S		1
Aurothioglucose ^d [13, 1977]	ND	L	3
5-Azacytidine ^b [26, 1981]	ND	L	3
Azaserine ^b [10, 1976]	ND	S	2B

*This evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals within the group (see also Methods, p. 38).

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Azathioprine	S	L	1
Aziridine ^d [9, 1975]	ND	L	3
2-(1-Aziridinyl)ethanol ^d [9, 1975]	ND	L	3
Aziridyl benzoquinone ^d [9, 1975]	ND	L	3
Azobenzene ^d [8, 1975]	ND	L	3
Benz[<i>a</i>]acridine ^b [32, 1983]	ND	I	3
Benz[<i>c</i>]acridine ^b [32, 1983]	ND	L	3
Benz[<i>a</i>]anthracene ^{b,e} [32, 1983]	ND	S	2A
Benzene	S	S	1
Benzidine	S	S	1
Benzidine-based dyes ^e	I		2A
Direct Black 38 (technical-grade)		S	
Direct Blue 6 (technical-grade)		S	
Direct Brown 95 (technical-grade)		S	
Benzo[<i>b</i>]fluoranthene ^b [32, 1983]	ND	S	2B
Benzo[<i>j</i>]fluoranthene ^b [32, 1983]	ND	S	2B
Benzo[<i>k</i>]fluoranthene ^b [32, 1983]	ND	S	2B
Benzo[<i>ghi</i>]fluoranthene ^b [32, 1983]	ND	I	3
Benzo[<i>a</i>]fluorene ^b [32, 1983]	ND	I	3
Benzo[<i>b</i>]fluorene ^b [32, 1983]	ND	I	3
Benzo[<i>c</i>]fluorene ^b [32, 1983]	ND	I	3
Benzo[<i>ghi</i>]perylene ^b [32, 1983]	ND	I	3
Benzo[<i>c</i>]phenanthrene ^b [32, 1983]	ND	I	3
Benzo[<i>a</i>]pyrene ^{b,e} [32, 1983]	ND	S	2A
Benzo[<i>e</i>]pyrene ^b [32, 1983]	ND	I	3
<i>para</i> -Benzoquinone dioxime ^b [29, 1982]	ND	L	3
Benzoyl chloride	I	I	3
Benzoyl peroxide ^b [36, 1985]	I	I	3
Benzyl acetate ^b [40, 1986]	ND	L	3
Benzyl violet 4B ^b [16, 1978]	ND	S	2B
Beryllium and beryllium compounds	L	S	2A
Betel quid			
With tobacco	S	L	1
Without tobacco	I	L	3
Bis(1-aziridinyl)morpholinophosphine sulphide ^d [9, 1975]	ND	L	3
Bis(2-chloroethyl)ether ^d [9, 1975]	ND	L	3
<i>N,N</i> -Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine)	S	L	1
1,2-Bis(chloromethoxy)ethane ^d [15, 1977]	ND	L	3
1,4-Bis(chloromethoxymethyl)benzene ^d [15, 1977]	ND	L	3
Bis(chloromethyl)ether and chloromethyl methyl ether (technical-grade)	S	S	1

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Bis(2-chloro-1-methylethyl)ether ^b [41, 1986]	ND	L	3
Bitumens	I		3
Steam-refined and cracking-residue bitumens		L	
Air-refined bitumens		I	
Extracts of steam-refined and air-refined bitumens		S	2B
Bleomycins ^e	I	L	2B
Blue VRS ^d [16, 1978]	ND	L	3
Bracken fern	I	S	2B
Brilliant Blue FCF ^d [16, 1978]	ND	L	3
1,3-Butadiene	I	S	2B
1,4-Butanediol dimethanesulphonate (Myleran)	S	L	1
<i>n</i> -Butyl acrylate ^b [39, 1986]	ND	I	3
Butylated hydroxyanisole (BHA) ^b [40, 1986]	ND	S	2B
Butylated hydroxytoluene (BHT) ^b [40, 1986]	ND	L	3
Butyl benzyl phthalate ^b [29, 1982]	ND	I	3
β -Butyrolactone ^b [11, 1976]	ND	S	2B
γ -Butyrolactone ^{b,c} [11, 1976]	ND	I	3
Cadmium and cadmium compounds	L	S	2A
Cantharidin ^d [10, 1976]	ND	L	3
Caprolactam ^c	ND	ESL	4
Captan ^b [30, 1983]	ND	L	3
Carbaryl ^d [12, 1976]	ND	I	3
Carbazole ^b [32, 1983]	ND	L	3
3-Carbethoxypsoralen ^{b,c} [40, 1986]	ND	I	3
Carbon blacks	I	I	3
Carbon-black extracts		S	2B
Carbon tetrachloride	I	S	2B
Carmoisine ^d [8, 1975]	ND	I	3
Carrageenan			
Native ^{b,c} [31, 1983]	ND	I	3
Degraded ^b [31, 1983]	ND	S	2B
Catechol ^d [15, 1977]	ND	I	3
Chlorambucil	S	S	1
Chloramphenicol	L	I	2B
Chlordane/Heptachlor	I	L	3
Chlordecone (Kepone) ^b [20, 1979]	ND	S	2B
Chlordimeform ^b [30, 1983]	ND	I	3
Chlorinated dibenzodioxins (other than TCDD) ^d [15, 1977]	ND	I	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
α -Chlorinated toluenes	I		2B
Benzyl chloride		L	
Benzal chloride		L	
Benzotrichloride		S	
Chlorobenzilate ^b [30, 1983]	ND	L	3
Chlorodifluoromethane	I	L	3
Chloroethyl nitrosoureas			
Bischloroethyl nitrosourea (BCNU)	L	S	2A
1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (CCNU) ^e	I	S	2A
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU)	S	L	1
Chlorofluoromethane ^b [41, 1986]	ND	L	3
Chloroform	I	S	2B
Chlorophenols	L		2B
Pentachlorophenol		I	
2,4,5-Trichlorophenol		I	
2,4,6-Trichlorophenol		S	
Chlorophenoxy herbicides	L		2B
2,4-D		I	
2,4,5-T		I	
MCPA		ND	
4-Chloro- <i>ortho</i> -phenylenediamine ^b [27, 1982]	ND	S	2B
4-Chloro- <i>meta</i> -phenylenediamine ^b [27, 1982]	ND	I	3
Chloroprene	I	I	3
Chloropropham ^d [12, 1976]	ND	I	3
Chloroquine ^d [13, 1977]	ND	I	3
Chlorothalonil ^b [30, 1983]	ND	L	3
<i>para</i> -Chloro- <i>ortho</i> -toluidine ^b [30, 1983]	ND	S	2B
2-Chloro-1,1,1-trifluoroethane ^b [41, 1986]	ND	L	3
Cholesterol	I	I	3
Chromium and chromium compounds			
Chromium metal	I	I	3
Trivalent chromium compounds	I	I	3
Hexavalent chromium compounds	S	S	1*
Chrysene ^b [32, 1983]	ND	L	3
Chrysoidine	I	L	3
CI Disperse Yellow 3 ^d [8, 1975]	ND	I	3
Cinnamyl anthranilate ^b [31, 1983]	ND	L	3
Cisplatin ^e	I	S	2A
Citrinin ^b [40, 1986]	ND	L	3
Citrus Red No. 2 ^b [8, 1975]	ND	S	2B

*This evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals within the group (see also Methods, p. 38).

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Clofibrate	I	L	3
Clomiphene citrate	I	I	3
Coal gasification	S		1
Coal-tar pitches	S	S	1
Coal-tars	S	S	1
Coke production	S		1
Copper 8-hydroxyquinoline ^d [15, 1977]	ND	I	3
Coronene ^b [32, 1983]	ND	I	3
Coumarin ^d [10, 1976]	ND	L	3
Creosotes	L	S	2A
<i>meta</i> -Cresidine ^b [27, 1982]	ND	I	3
<i>para</i> -Cresidine ^b [27, 1982]	ND	S	2B
Cycasin ^b [10, 1976] (<i>see also</i> Methylazoxymethanol and its acetate)	ND	S	2B
Cyclamates	I	L	3
Cyclochlorotine ^d [10, 1976]	ND	I	3
Cyclopenta[<i>cd</i>]pyrene ^b [32, 1983]	ND	L	3
Cyclophosphamide	S	S	1
Dacarbazine	I	S	2B
D & C Red No. 9 ^d [8, 1975]	ND	I	3
Dapsone	I	L	3
Daunomycin ^b [10, 1976]	ND	S	2B
DDT	I	S	2B
Diacetylaminoazotoluene ^d [8, 1975]	ND	I	3
<i>N,N'</i> -Diacetylbenzidine ^b [16, 1978]	ND	S	2B
Diallate ^b [30, 1983]	ND	L	3
2,4-Diaminoanisole ^b [27, 1982]	ND	S	2B
4,4'-Diaminodiphenyl ether ^b [29, 1982]	ND	S	2B
1,2-Diamino-4-nitrobenzene ^d [16, 1978]	ND	I	3
1,4-Diamino-2-nitrobenzene ^d [16, 1978]	ND	I	3
2,4-Diaminotoluene ^b [16, 1978]	ND	S	2B
2,5-Diaminotoluene ^d [16, 1978]	ND	I	3
Diazepam	I	I	3
Diazomethane ^d [7, 1974]	ND	L	3
Dibenz[<i>a,h</i>]acridine ^b [32, 1983]	ND	S	2B
Dibenz[<i>a,j</i>]acridine ^b [32, 1983]	ND	S	2B
Dibenz[<i>a,c</i>]anthracene ^b [32, 1983]	ND	L	3
Dibenz[<i>a,h</i>]anthracene ^{b,e} [32, 1983]	ND	S	2A
Dibenz[<i>a,j</i>]anthracene ^b [32, 1983]	ND	L	3
7 <i>H</i> -Dibenzo[<i>c,g</i>]carbazole ^b [32, 1983]	ND	S	2B
Dibenzo[<i>a,e</i>]fluoranthene ^b [32, 1983]	ND	L	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Dibenzo[<i>h,rst</i>]pentaphene ^d [3, 1973]	ND	L	3
Dibenzo[<i>a,e</i>]pyrene ^b [32, 1983]	ND	S	2B
Dibenzo[<i>a,h</i>]pyrene ^b [32, 1983]	ND	S	2B
Dibenzo[<i>a,i</i>]pyrene ^b [32, 1983]	ND	S	2B
Dibenzo[<i>a,l</i>]pyrene ^b [32, 1983]	ND	S	2B
1,2-Dibromo-3-chloropropane	I	S	2B
Dichloroacetylene ^b [39, 1986]	ND	L	3
<i>ortho</i> -Dichlorobenzene	I	I	3
<i>para</i> -Dichlorobenzene	I	S	2B
3,3'-Dichlorobenzidine	I	S	2B
<i>trans</i> -1,4-Dichlorobutene ^d [15, 1977]	ND	I	3
3,3'-Dichloro-4,4'-diaminodiphenyl ether ^b [16, 1978]	ND	S	2B
1,2-Dichloroethane ^b [20, 1979]	ND	S	2B
Dichloromethane	I	S	2B
2,6-Dichloro- <i>para</i> -phenylenediamine ^b [39, 1986]	ND	L	3
1,2-Dichloropropane ^b [41, 1986]	ND	L	3
1,3-Dichloropropene (technical-grade)	I	S	2B
Dichlorvos ^b [20, 1979]	ND	I	3
Dicofol ^b [30, 1983]	ND	L	3
Dieldrin	I	L	3
Diepoxybutane ^b [11, 1976]	ND	S	2B
Di(2-ethylhexyl)adipate ^b [29, 1982]	ND	L	3
Di(2-ethylhexyl)phthalate ^b [29, 1982]	ND	S	2B
1,2-Diethylhydrazine ^b [4, 1974]	ND	S	2B
Diethyl sulphate	L	S	2A
Diglycidyl resorcinol ether ^b [36, 1985]	ND	S	2B
Dihydrosafrole ^b [10, 1976]	ND	S	2B
Dihydroxymethylfuratrizine ^b [24, 1980] (<i>see also</i> Panfuran S)	ND	I	3
Dimethoxane ^d [15, 1977]	ND	L	3
3,3'-Dimethoxybenzidine (<i>ortho</i> -Dianisidine)	I	S	2B
3,3'-Dimethoxybenzidine-4,4'-diisocyanate ^b [39, 1986]	ND	L	3
<i>para</i> -Dimethylaminoazobenzene ^b [8, 1975]	ND	S	2B
<i>para</i> -Dimethylaminoazobenzene diazo sodium sulphonate ^d [8, 1975]	ND	I	3
<i>trans</i> -2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl]-1,3,4-oxadiazole ^b [7, 1974]	ND	S	2B
3,3'-Dimethylbenzidine (<i>ortho</i> -Tolidine) ^b [1, 1972]	ND	S	2B
Dimethylcarbonyl chloride ^e	I	S	2A
1,1-Dimethylhydrazine ^b [4, 1974]	ND	S	2B
1,2-Dimethylhydrazine ^b [4, 1974]	ND	S	2B
1,4-Dimethylphenanthrene ^b [32, 1983]	ND	I	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Dimethyl sulphate ^e	I	S	2A
1,8-Dinitropyrene ^b [33, 1984]	ND	I	3
Dinitrosopentamethylenetetramine ^d [11, 1976]	ND	I	3
1,4-Dioxane	I	S	2B
2,4'-Diphenyldiamine ^d [16, 1978]	ND	I	3
Disulfiram ^d [12, 1976]	ND	I	3
Dithranol ^d [13, 1977]	ND	I	3
Dulcin ^d [12, 1976]	ND	I	3
Endrin ^d [5, 1974]	ND	I	3
Eosin ^d [15, 1977]	ND	I	3
Epichlorohydrin ^e	I	S	2A
1-Epoxyethyl-3,4-epoxycyclohexane ^d [11, 1976]	ND	L	3
3,4-Epoxy-6-methylcyclohexylmethyl-3,4-epoxy-6-methylcyclohexane carboxylate ^d [11, 1976]	ND	L	3
<i>cis</i> -9,10-Epoxystearic acid ^d [11, 1976]	ND	I	3
Erionite	S	S	1
Ethionamide ^d [13, 1977]	ND	L	3
Ethyl acrylate ^b [39, 1986]	ND	S	2B
Ethylene ^d [19, 1979]	ND	ND	3
Ethylene dibromide ^e	I	S	2A
Ethylene oxide	L	S	2A
Ethylene sulphide ^d [11, 1976]	ND	L	3
Ethylene thiourea	I	S	2B
Ethyl methanesulphonate ^b [7, 1974]	ND	S	2B
<i>N</i> -Ethyl- <i>N</i> -nitrosoourea ^{b,e} [17, 1978]	ND	S	2A
Ethyl selenac ^d [12, 1976]	ND	I	3
Ethyl tellurac ^d [12, 1976]	ND	I	3
Eugenol ^b [36, 1985]	ND	L	3
Evans blue ^d [8, 1975]	ND	L	3
Fast Green FCF ^d [16, 1978]	ND	L	3
Ferbam ^d [12, 1976]	ND	I	3
Fluometuron ^b [30, 1983]	ND	I	3
Fluoranthene ^{b,c} [32, 1983]	ND	I	3
Fluorene ^b [32, 1983]	ND	I	3
Fluorides (inorganic, used in drinking-water)	I	I	3
5-Fluorouracil	I	I	3
Formaldehyde	L	S	2A
2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole ^b [7, 1974]	ND	S	2B
Furazolidone ^b [31, 1983]	ND	I	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Fusarenon-X ^b [31, 1983]	ND	I	3
Glu-P-1 (2-Amino-6-methyldipyrido[1,2- <i>a</i> :3',2'- <i>d</i>]imidazole) ^b [40, 1986]	ND	S	2B
Glu-P-2 (2-Aminodipyrido[1,2- <i>a</i> :3',2'- <i>d</i>]imidazole) ^b [40, 1986]	ND	S	2B
Glycidaldehyde ^b [11, 1976]	ND	S	2B
Glycidyl oleate ^d [11, 1976]	ND	I	3
Glycidyl stearate ^d [11, 1976]	ND	I	3
Griseofulvin ^c	ND	S	2B
Guinea Green B ^d [16, 1978]	ND	L	3
Gyromitrin ^c	ND	L	3
Haematite and ferric oxide			
Ferric oxide	I	ESL	3
Haematite	I	I	3
Underground haematite mining with exposure to radon	S		1
Hexachlorobenzene	I	S	2B
Hexachlorobutadiene ^b (20, 1979)	ND	L	3
Hexachlorocyclohexanes (HCH)	I		2B
Technical-grade HCH		S	
α -HCH		S	
β -HCH		L	
γ -HCH (Lindane)		L	
Hexachloroethane ^b [20, 1979]	ND	L	3
Hexachlorophene ^b [20, 1979]	ND	I	3
Hexamethylphosphoramide ^b [15, 1977]	ND	S	2B
Hycanthone mesylate ^d [13, 1977]	ND	I	3
Hydralazine	I	L	3
Hydrazine	I	S	2B
Hydrogen peroxide ^b [36, 1985]	ND	L	3
Hydroquinone ^d [15, 1977]	ND	I	3
4-Hydroxyazobenzene ^d [8, 1975]	ND	I	3
8-Hydroxyquinoline ^d [13, 1977]	ND	I	3
Hydroxysenkirkine ^d [10, 1976]	ND	I	3
Indeno[1,2,3- <i>cd</i>]pyrene ^b [32, 1983]	ND	S	2B
IQ (2-Amino-3-methylimidazo[4,5- <i>f</i>]quinoline) ^b [40, 1986]	ND	S	2B
Iron and steel founding	S		1
Iron-dextran complex	I	S	2B
Iron-dextrin complex ^d [2, 1973]	ND	L	3
Iron sorbitol-citric acid complex ^d [2, 1973]	ND	I	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Isatidine ^d [10, 1976]	ND	L	3
Isonicotinic acid hydrazide (Isoniazid)	I	L	3
Isophosphamide ^b [26, 1981]	ND	L	3
Isopropyl alcohol manufacture (strong-acid process)	S		1
Isopropyl alcohol	I	I	3
Isopropyl oils	I	I	3
Isosafrole ^d [10, 1976]	ND	L	3
Jacobine ^d [10, 1976]	ND	I	3
Kaempferol ^b [31, 1983]	ND	I	3
Lasiocarpine ^b [10, 1976]	ND	S	2B
Lauroyl peroxide ^b [36, 1985]	ND	I	3
Lead and lead compounds			
Inorganic	I	S	2B
Organolead	I	I	3
Leather industries			
Boot and shoe manufacture and repair	S		1
Leather goods manufacture	I		3
Leather tanning and processing	I		3
Light Green SF ^d [16, 1978]	ND	L	3
Luteoskyrin ^d [10, 1976]	ND	L	3
Magenta	I	I	3
Manufacture of magenta	S		1
Malathion ^{b,c} [30, 1983]	ND	I	3
Maleic hydrazide ^d [4, 1974]	ND	I	3
Malonaldehyde ^b [36, 1985]	ND	I	3
Maneb ^d [12, 1976]	ND	I	3
Mannomustine ^d [9, 1975]	ND	L	3
MeA- α -C (2-Amino-3-methyl-9H-pyrido[2,3-b]indole) ^b [40, 1986]	ND	S	2B
Medphalan ^d [9, 1975]	ND	I	3
MeIQ (2-Amino-3,4-dimethylimidazo[4,5-f]quinoline) ^b [40, 1986]	ND	I	3
MeIQx (2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline) ^b [40, 1986]	ND	I	3
Melamine ^b [39, 1986]	ND	I	3
Melphalan	S	S	1
6-Mercaptopurine	I	I	3
Merphalan ^b [9, 1975]	ND	S	2B
Methotrexate	I	I	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Methoxychlor ^{b,c} [20, 1979]	ND	I	3
5-Methoxypsoralen ^e	I	S	2A
8-Methoxypsoralen (Methoxsalen) plus ultraviolet radiation	S	S	1
Methyl acrylate ^b [39, 1986]	ND	I	3
2-Methylaziridine ^b [9, 1975]	ND	S	2B
Methylazoxymethanol and its acetate ^b [10, 1976]	ND	S	2B
Methyl bromide	I	L	3
Methyl carbamate ^d [12, 1976]	ND	I	3
Methyl chloride	I	I	3
1-Methylchrysene ^b [32, 1983]	ND	I	3
2-Methylchrysene ^b [32, 1983]	ND	L	3
3-Methylchrysene ^b [32, 1983]	ND	L	3
4-Methylchrysene ^b [32, 1983]	ND	L	3
5-Methylchrysene ^b [32, 1983]	ND	S	2B
6-Methylchrysene ^b [32, 1983]	ND	L	3
<i>N</i> -Methyl- <i>N</i> ,4-dinitrosoaniline ^d [1, 1972]	ND	L	3
4,4'-Methylene bis(2-chloroaniline) (MOCA) ^e	I	S	2A
4,4'-Methylenebis(<i>N,N</i> -dimethyl)benzenamine ^b [27, 1982]	ND	L	3
4,4'-Methylene bis(2-methylaniline)	I	S	2B
4,4'-Methylenedianiline ^b [39, 1986]	ND	S	2B
4,4'-Methylenediphenyl diisocyanate ^d [19, 1979]	ND	ND	3
2-Methylfluoranthene ^b [32, 1983]	ND	L	3
3-Methylfluoranthene ^b [32, 1983]	ND	I	3
Methyl iodide ^b [41, 1986]	ND	L	3
Methyl methacrylate ^d [19, 1979]	ND	I	3
Methyl methanesulphonate ^b [7, 1974]	ND	S	2B
2-Methyl-1-nitroanthraquinone (uncertain purity) ^b [27, 1982]	ND	S	2B
<i>N</i> -Methyl- <i>N'</i> -nitro- <i>N</i> -nitrosoguanidine (MNNG) ^e	I	S	2A
<i>N</i> -Methyl- <i>N</i> -nitrosourea ^{b,e} [17, 1978]	ND	S	2A
<i>N</i> -Methyl- <i>N</i> -nitrosourethane ^b [4, 1974]	ND	S	2B
Methyl parathion ^c	ND	ESL	3
1-Methylphenanthrene ^b [32, 1983]	ND	I	3
Methyl red ^d [8, 1975]	ND	I	3
Methyl selenac ^d [12, 1976]	ND	I	3
Methylthiouracil ^b [7, 1974]	ND	S	2B
Metronidazole	I	S	2B
Mineral oils			
Untreated and mildly-treated oils	S	S	1
Highly-refined oils	I	I	3
Mirex ^b [20, 1979]	ND	S	2B

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Mitomycin C ^b [10, 1976]	ND	S	2B
Modacrylic fibres ^d [19, 1979]	ND	ND	3
Monocrotaline ^b [10, 1976]	ND	S	2B
Monuron ^d [12, 1976]	ND	L	3
MOPP ¹ and other combined chemotherapy including alkylating agents	S	I	1
5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene)amino]-2-oxazolidinone ^b [7, 1974]	ND	S	2B
Mustard gas (Sulphur mustard)	S	L	1
Nafenopin ^b [24, 1980]	ND	S	2B
1,5-Naphthalenediamine ^b [27, 1982]	ND	L	3
1,5-Naphthalene diisocyanate ^d [19, 1979]	ND	ND	3
1-Naphthylamine	I	I	3
2-Naphthylamine	S	S	1
1-Naphthylthiourea (ANTU)	I	I	3
Nickel and nickel compounds	S	S	1*
Niridazole ^b [13, 1977]	ND	S	2B
Nithiazide ^b [31, 1983]	ND	L	3
5-Nitroacenaphthene ^b [16, 1978]	ND	S	2B
5-Nitro-ortho-anisidine ^b [27, 1982]	ND	L	3
9-Nitroanthracene ^b [33, 1984]	ND	ND	3
6-Nitrobenzo[<i>a</i>]pyrene ^b [33, 1984]	ND	I	3
4-Nitrobiphenyl ^d [4, 1974]	ND	I	3
6-Nitrochrysene ^b [33, 1984]	ND	I	3
Nitrofen (technical-grade) ^b [30, 1983]	ND	S	2B
3-Nitrofluoranthene ^b [33, 1984]	ND	I	3
5-Nitro-2-furaldehyde semicarbazone ^d [7, 1974]	ND	I	3
1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone ^b [7, 1974]	ND	S	2B
<i>N</i> -[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide ^b [7, 1974]	ND	S	2B
Nitrogen mustard	L	S	2A
Nitrogen mustard <i>N</i> -oxide ^b [9, 1975]	ND	S	2B
2-Nitropropane ^b [29, 1982]	ND	S	2B
1-Nitropyrene ^b [33, 1984]	ND	L	3
<i>N</i> '-Nitrosoanabasine ^b [37, 1985]	ND	L	3
<i>N</i> '-Nitrosoanatabine ^b [37, 1985]	ND	I	3
<i>N</i> -Nitrosodi- <i>n</i> -butylamine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrosodiethanolamine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrosodiethylamine ^{b,e} [17, 1978]	ND	S	2A
<i>N</i> -Nitrosodimethylamine ^{b,e} [17, 1978]	ND	S	2A
<i>N</i> -Nitrosodiphenylamine ^b [27, 1982]	ND	L	3

¹Combined therapy with nitrogen mustard, vincristine, procarbazine and prednisone

*This evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals within the group (see also Methods, p. 38).

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
<i>para</i> -Nitrosodiphenylamine ^b [27, 1982]	ND	I	3
<i>N</i> -Nitrosodi- <i>n</i> -propylamine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrosofolic acid ^d [17, 1978]	ND	I	3
<i>N</i> -Nitrosoguvacine ^b [37, 1985]	ND	ND	3
<i>N</i> -Nitrosoguvacoline ^b [37, 1985]	ND	I	3
<i>N</i> -Nitrosohydroxyproline ^d [17, 1978]	ND	I	3
3-(<i>N</i> -Nitrosomethylamino)propionaldehyde ^b [37, 1985]	ND	ND	3
3-(<i>N</i> -Nitrosomethylamino)propionitrile ^b [37, 1985]	ND	S	2B
4-(<i>N</i> -Nitrosomethylamino)-4-(3-pyridyl)-1-butanal (NNA) ^b [37, 1985]	ND	I	3
4-(<i>N</i> -Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK) ^b [37, 1985]	ND	S	2B
<i>N</i> -Nitrosomethylethylamine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrosomethylvinylamine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrosomorpholine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrosornicotine ^b [37, 1985]	ND	S	2B
<i>N</i> -Nitrosopiperidine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrosoproline ^d [17, 1978]	ND	I	3
<i>N</i> -Nitrosopyrrolidine ^b [17, 1978]	ND	S	2B
<i>N</i> -Nitrososarcosine ^b [17, 1978]	ND	S	2B
Nitrovin ^b [31, 1983]	ND	I	3
Nylon 6 ^d [19, 1979]	ND	I	3
Ochratoxin A	I	L	3
Oestradiol mustard ^d [9, 1975]	ND	L	3
Oestrogens, progestins and combinations			
Oestrogens			
Nonsteroidal oestrogens	S		1*
Diethylstilboestrol	S	S	1
Dienoestrol		L	
Hexoestrol		S	
Chlorotrianisene		I	
Steroidal oestrogens	S		1*
Oestrogen replacement therapy	S		1
Conjugated oestrogens		L	
Oestradiol-17 β and esters		S	
Oestriol		L	
Oestrone		S	
Ethinylloestradiol		S	
Mestranol		S	

^aThis evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals within the group (see also Methods, p. 38).

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Progestins	I		2B
Medroxyprogesterone acetate	I	S	2B
Chlormadinone acetate		L	
Dimethisterone		I	
Ethinodiol diacetate		L	
17 α -Hydroxyprogesterone caproate		I	
Lynoestrenol		I	
Megestrol acetate		L	
Norethisterone		S	
Norethynodrel		L	
Norgestrel		I	
Progesterone		S	
Oestrogen-progestin combinations			
Sequential oral contraceptives	S		1
Dimethisterone and oestrogens		I	
Combined oral contraceptives	S		1 ¹
Chlormadinone acetate and oestrogens		L	
Ethinodiol diacetate and oestrogens		L	
Lynoestrenol and oestrogens		I	
Megestrol acetate and oestrogens		L	
Norethisterone and oestrogens		L	
Norethynodrel and oestrogens		S	
Norgestrel and oestrogens		I	
Progesterone and oestrogens		L	
Investigational oral contraceptives		L	
Oestrogen-progestin replacement therapy	I		3
Oil Orange SS ^b [8, 1975]	ND	S	2B
Orange I ^d [8, 1975]	ND	I	3
Orange G ^d [8, 1975]	ND	I	3
Oxazepam ^d [13, 1977]	ND	L	3
Oxyphenbutazone ^d [13, 1977]	ND	ND	3
Panfuran S (containing dihydroxymethylfuratrizine) ^b [24, 1980]	ND	S	2B
Parasorbic acid ^d [10, 1976]	ND	L	3
Parathion ^b [30, 1983]	ND	I	3
Patulin ^b [40, 1986]	ND	I	3
Penicillic acid ^d [10, 1976]	ND	L	3
Pentachloroethane ^b [41, 1986]	ND	L	3
Perylene ^b [32, 1983]	ND	I	3
Petasitenine ^b [31, 1983]	ND	L	3
Phenacetin	L	S	2A
Analgesic mixtures containing phenacetin	S	L	1
Phenanthrene ^b [32, 1983]	ND	I	3

¹There is also conclusive evidence that these agents have a protective effect against cancers of the ovary and endometrium (see summary, p. 297).

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Phenazopyridine hydrochloride	I	S	2B
Phenelzine sulphate	I	L	3
Phenicarbazide ^d [12, 1976]	ND	L	3
Phenobarbital	I	S	2B
Phenoxybenzamine hydrochloride ^b [24, 1980]	ND	S	2B
Phenylbutazone	I	ND	3
<i>meta</i> -Phenylenediamine ^d [16, 1978]	ND	I	3
<i>para</i> -Phenylenediamine ^d [16, 1978]	ND	I	3
<i>N</i> -Phenyl-2-naphthylamine	I	L	3
<i>ortho</i> -Phenylphenol ^b [30, 1983]	ND	I	3
Phenytoin	L	L	2B
Piperonyl butoxide ^{b,c} [30, 1983]	ND	I	3
Polyacrylic acid ^d [19, 1979]	ND	ND	3
Polybrominated biphenyls	I	S	2B
Polychlorinated biphenyls	L	S	2A
Polychloroprene ^d [19, 1979]	ND	ND	3
Polyethylene ^d [19, 1979]	ND	I	3
Polymethylene polyphenyl isocyanate ^d [19, 1979]	ND	ND	3
Polymethyl methacrylate ^d [19, 1979]	ND	I	3
Polypropylene ^d [19, 1979]	ND	I	3
Polystyrene ^d [19, 1979]	ND	I	3
Polytetrafluoroethylene ^d [19, 1979]	ND	I	3
Polyurethane foams ^d [19, 1979]	ND	I	3
Polyvinyl acetate ^d [19, 1979]	ND	I	3
Polyvinyl alcohol ^d [19, 1979]	ND	I	3
Polyvinyl chloride ^d [19, 1979]	I	I	3
Polyvinyl pyrrolidone ^d [19, 1979]	ND	L	3
Ponceau MX ^b [8, 1975]	ND	S	2B
Ponceau 3R ^b [8, 1975]	ND	S	2B
Ponceau SX ^d [8, 1975]	ND	I	3
Potassium bis(2-hydroxyethyl)dithiocarbamate ^d [12, 1976]	ND	L	3
Potassium bromate ^b [40, 1986]	ND	S	2B
Prednisone	I	I	3
Procarbazine hydrochloride ^e	I	S	2A
Proflavine salts ^b [24, 1980]	ND	I	3
Pronetalol hydrochloride ^d [13, 1977]	ND	L	3
1,3-Propane sultone ^b [4, 1974]	ND	S	2B
Propham ^d [12, 1976]	ND	I	3
β -Propiolactone ^b [4, 1974]	ND	S	2B
<i>n</i> -Propyl carbamate ^d [12, 1976]	ND	L	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Propylene ^d [19, 1979]	ND	ND	3
Propylene oxide ^e	I	S	2A
Propylthiouracil	I	S	2B
Ptaquiloside ^b [40, 1986]	ND	L	3
Pyrene ^{b,c} [32, 1983]	ND	I	3
Pyrido[3,4- <i>c</i>]psoralen ^b [40, 1986]	ND	I	3
7-Methylpyrido[3,4- <i>c</i>]psoralen ^b [40, 1986]	ND	I	3
Pyrimethamine ^d [13, 1977]	ND	L	3
Quercetin ^b [31, 1983]	ND	L	3
<i>para</i> -Quinone ^d [15, 1977]	ND	I	3
Quintozene (Pentachloronitrobenzene) ^d [5, 1974]	ND	L	3
Reserpine	I	L	3
Resorcinol ^d [15, 1977]	ND	I	3
Retrorsine ^d [10, 1976]	ND	L	3
Rhodamine B ^d [16, 1978]	ND	L	3
Rhodamine 6G ^d [16, 1978]	ND	L	3
Riddelliine ^d [10, 1976]	ND	I	3
Rifampicin ^b [24, 1980]	ND	L	3
Rubber industry	S	I	1
Rugulosin ^b [40, 1986]	ND	I	3
Saccharated iron oxide ^d [2, 1973]	ND	L	3
Saccharin	I	S	2B
Safrole ^b [10, 1976]	ND	S	2B
Scarlet Red ^d [8, 1975]	ND	I	3
Selenium and selenium compounds ^d [9, 1975]	I	I	3
Semicarbazide hydrochloride ^d [12, 1976]	ND	L	3
Seneciophylline ^d [10, 1976]	ND	ND	3
Senkirkine ^b [31, 1983]	ND	L	3
Sepiolite ^b [42, 1987]	ND	I	3
Shale-oils	S	S	1
Shikimic acid ^b [40, 1986]	ND	I	3
Silica			
Crystalline silica	L	S	2A
Amorphous silica	I	I	3
Sodium diethyldithiocarbamate ^d [12, 1976]	ND	I	3
Sodium <i>ortho</i> -phenylphenate ^c	ND	S	2B
Soots	S	I	1
Spirolactone	I	L	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Sterigmatocystin ^b [10, 1976]	ND	S	2B
Streptozotocin ^b [17, 1978]	ND	S	2B
Styrene ^e	I	L	2B
Styrene-acrylonitrile copolymers ^d [19, 1979]	ND	ND	3
Styrene-butadiene copolymers ^d [19, 1979]	ND	ND	3
Styrene oxide ^{b,e} [36, 1985]	ND	S	2A
Succinic anhydride ^d [15, 1977]	ND	L	3
Sudan I ^d [8, 1975]	ND	L	3
Sudan II ^d [8, 1975]	ND	L	3
Sudan III ^d [8, 1975]	ND	I	3
Sudan Brown RR ^d [8, 1975]	ND	I	3
Sudan Red 7B ^d [8, 1975]	ND	I	3
Sulfafurazole (Sulphisoxazole)	I	I	3
Sulfallate ^b [30, 1983]	ND	S	2B
Sulfamethoxazole	I	L	3
Sunset Yellow FCF ^d [8, 1975]	ND	I	3
Symphytine ^b [31, 1983]	ND	I	3
Talc			
Not containing asbestiform fibres	I	I	3
Containing asbestiform fibres	S	I	1
Tannic acid and tannins ^d [10, 1976]	ND	L	3
Terpene polychlorinates (Strobane®) ^d [5, 1974]	ND	L	3
2,2',5,5'-Tetrachlorobenzidine ^b [27, 1982]	ND	I	3
2,3,7,8-Tetrachlorodibenzo- <i>para</i> -dioxin (TCDD)	I	S	2B
1,1,1,2-Tetrachloroethane ^b [41, 1986]	ND	L	3
1,1,2,2-Tetrachloroethane	I	L	3
Tetrachloroethylene	I	S	2B
Tetrachlorvinphos ^b [30, 1983]	ND	L	3
Tetrafluoroethylene ^d [19, 1979]	ND	ND	3
Thioacetamide ^b [7, 1974]	ND	S	2B
4,4'-Thiodianiline ^b [27, 1982]	ND	S	2B
Thiouracil ^d [7, 1974]	ND	L	3
Thiourea ^b [7, 1974]	ND	S	2B
Thiram ^d [12, 1976]	ND	I	3
Tobacco products, smokeless	S	I	1
Tobacco smoke	S	S	1
Toluene diisocyanates ^b [39, 1986]	ND	S	2B
<i>ortho</i> -Toluidine	I	S	2B
Toxaphene (Polychlorinated camphenes) ^b [20, 1979]	ND	S	2B

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Treosulphan	S	ND	1
Trichlorfon ^b [30, 1983]	ND	I	3
1,1,1-Trichloroethane ^b [20, 1979]	ND	I	3
1,1,2-Trichloroethane ^b [20, 1979]	ND	L	3
Trichloroethylene	I	L	3
Trichlorotriethylamine hydrochloride ^d [9, 1975]	ND	I	3
T ₂ -Trichothecene ^b [31, 1983]	ND	I	3
Triethylene glycol diglycidyl ether ^d [11, 1976]	ND	L	3
2,4,5-Trimethylaniline ^b [27, 1982]	ND	L	3
2,4,6-Trimethylaniline ^b [27, 1982]	ND	I	3
4,5',8-Trimethylpsoralen	I	I	3
Triphenylene ^b [32, 1983]	ND	I	3
Tris(aziridinyl)- <i>para</i> -benzoquinone (Triaziquone)	I	L	3
Tris(1-aziridinyl)phosphine oxide ^d [9, 1975]	ND	I	3
Tris(1-aziridinyl)phosphine sulphide (Thiotepa) ^e	I	S	2A
2,4,6-Tris(1-aziridinyl)- <i>s</i> -triazine ^d [9, 1975]	ND	L	3
1,2,3-Tris(chloromethoxy)propane ^d [15, 1977]	ND	L	3
Tris(2,3-dibromopropyl) phosphate ^e	I	S	2A
Tris(2-methyl-1-aziridinyl)phosphine oxide ^d [9, 1975]	ND	I	3
Trp-P-1 (3-Amino-1,4-dimethyl-5 <i>H</i> -pyrido[4,3- <i>b</i>]indole) ^b [31, 1983]	ND	S	2B
Trp-P-2 (3-Amino-1-methyl-5 <i>H</i> -pyrido[4,3- <i>b</i>]indole) ^b [31, 1983]	ND	S	2B
Trypan blue ^b [8, 1975]	ND	S	2B
Uracil mustard	I	S	2B
Urethane ^b [7, 1974]	ND	S	2B
Vinblastine sulphate	I	I	3
Vincristine sulphate	I	I	3
Vinyl acetate ^b [39, 1986]	ND	I	3
Vinyl bromide ^{b,e} [39, 1986]	ND	S	2A
Vinyl chloride	S	S	1
Vinyl chloride-vinyl acetate copolymers ^d [19, 1979]	ND	I	3
4-Vinylcyclohexene ^b [39, 1986]	ND	L	3
Vinyl fluoride ^b [39, 1986]	ND	ND	3
Vinylidene chloride	I	L	3
Vinylidene chloride-vinyl chloride copolymers ^d [19, 1979]	ND	ND	3
Vinylidene fluoride ^b [39, 1986]	ND	I	3
<i>N</i> -Vinyl-2-pyrrolidone ^d [19, 1979]	ND	ND	3

Table 1. (contd)

Agent	Degree of evidence for carcinogenicity ^a		Overall evaluation ^a
	Human	Animal	
Wollastonite	I	L	3
Wood industries			
Carpentry and joinery	L		2B
Furniture and cabinet making	S	I	1
Lumber and sawmill industries (including logging)	I		3
Pulp and paper manufacture	I		3
2,4-Xylidine ^d [16, 1978]	ND	I	3
2,5-Xylidine ^d [16, 1978]	ND	I	3
Yellow AB ^d [8, 1975]	ND	I	3
Yellow OB ^d [8, 1975]	ND	L	3
Zearalenone ^b [31, 1983]	ND	L	3
Zectran ^d [12, 1976]	ND	I	3
Zineb ^d [12, 1976]	ND	I	3
Ziram ^d [12, 1976]	ND	I	3