CHEMICAL MANUFACTURERS ASSOCIATION

DOCUMENTS RELEVANT TO THE ACTIVITIES OF THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) SUPPLEMENT 7 WORK GROUP MEETINGS IN LYON, FRANCE 10-18 MARCH 1987

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IARC SUPPLEMENT 7 WORK GROUP

Lyon, France

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The attached four documents prepared by IARC will be an integral part of the IARC Supplement 7 report due to become available about January, 1988.

1. General Remarks

The "General Remarks" draft describes what was done at the meeting and will become the introduction to Supplement 7. It also includes criteria for using short term test data in the classification of chemicals. It is almost final; there will be a few relatively minor changes prior to publication.

2. Document 6

Document 6 includes the actual classification of about 600 chemicals that will appear in Supplement 7. Compounds showing an "N" before the number in the left-hand column were chemicals with no new human data since publication of the last Supplement. If a date is noted in handwriting, this indicates the date of the Monograph in which the compound was reviewed. In most cases the classification for "N" compounds is based on information in that Monograph (see General Remarks).

3. The Preamble

The new Preamble to the Monograph Series, together with the General Remarks, provide the basis for classification.

4. The List of Participants

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Some general impressions by this observer follow:

1. The IARC staff and participants at the Work Group meeting were very dedicated to doing the best scientific job possible in arriving at the classifications. Some were concerned with the lack of time available for the task, but all will depart convinced they did the best job they could under the circumstances.

2. The criteria (guidelines) in the Preamble and General Remarks were followed very closely. For each compound, three separate evaluations were made with respect to human evidence, animal evidence, and evidence from other relevant data (primarily short term tests).

   For each compound, separate evaluations were made for human evidence and animal evidence (Sufficient, Limited, Inadequate, No Data), and these evaluations provided the basis for a tentative overall evaluation (1, 2A, 2B, 3 or 4).

   A recommendation was made to upgrade the tentative overall evaluation based on results of short term tests (or other relevant data, e.g. metabolism) if supportive mutagenicity data existed. The entire Working Group then integrated the separate assessments (human and animal) with the recommendation of the short term test group, applied their judgment, and came up with an overall classification. In most cases, the overall classifications were arrived at by following the rules for combining levels of evidence spelled out in the Preamble and General Remarks. The recommendations of the short term test group for upgrading were accepted without invoking exceptional circumstances or overriding based on the group's judgment. Consistency was highly valued. In no case did short term test or other relevant data lower the tentative overall evaluation (this was virtually ruled out).

3. The IARC classifications must be viewed as indicating the strength of evidence <u>for</u> carcinogenicity. In general, it is <u>not</u> a weight of the evidence approach.

   (a) For human data, there was a search for consistency across studies. In a sense, this is "weighing the evidence." However, negative studies could not outweigh positive studies.

   (b) The evaluation of animal data included only evidence for carcinogenicity to animals. With one or two possible exceptions, relevance to man was not considered by this group in arriving at a classification. Thus, route of administration, relevance of tumor type to man, pharmacokinetics, mechanism, metabolism, and human exposure levels or patterns were not considered. The only requirement was that there be two positive studies (to show that the results could be reproduced) to classify a chemical as having sufficient evidence for carcinogenicity to animals. Relevance to humans

was assessed by the entire work group, but it was assumed that animal carcinogens present a carcinogenic risk to man.

(c) Short term test evaluations may have taken into account negative studies to a degree (I didn't observe this group), but metabolism information was only used when a known metabolite was carcinogenic. Differences in metabolism across species was not discussed to my knowledge. Short term tests or other relevant data could not lower a classification, only raise it.

4. Categories of chemicals were often lumped together for simplicity, for example chlorophenols or nickel and nickel compounds, and this proved particularly troublesome. It is necessary to read the summaries and probably also the original monographs to really understand how to interpret categories.

5. It was recognized that many manufacturing processes have changed with time, and classifications for these processes may no longer be relevant to the present situation. A case in point is boot and shoe manufacture and repair in which closed systems have replaced earlier open processes. A statement appears in the General Remarks that acknowledges this, but there is no mention of it in the summaries. It will be difficult for manufacturers to communicate this with those not intimately familiar with the Monograph Program.

6. Only published data (including papers in final form accepted for publication) were considered.

7. The participants had much difficulty with Group 4. Only one chemical (caprolactam) made it. Some felt the wording "evidence for lack of carcinogenicity" precluded use of the category.

Recommendations

1. It is clear that the best and most recent scientific data must be developed well in advance (at least one year) of a scheduled IARC meeting. I recommend that all interested parties attempt to:

   (a) Get all important information into published form.
   (b) Make recommendations on experts to participate in the meeting, especially experts on manufacturing processes and mechanisms of toxicity.
   (c) Assist in the preparation of early drafts of the Mohographs, particularly sections where industry could make a unique contribution.

2. Although industry observers have traditionally been invited to IARC meetings, I recommend that scientists from private research organizations be included in the IARC Working Groups. For example, a number of scientists from the Chemical Industry Institute of Toxicology (CIIT) would lend considerable expertise in areas such as chemical carcinogenicity, genotoxicity and epidemiology.

3. Familiarity with much of the information on a chemical, including how it is produced, used, and regulated, its chemistry, and health effects data, often resides with scientists in industries producing or using the chemical. I believe that these industry scientists should be encouraged to share their information and expertise with IARC staff and appropriate working group participants early in the process of monograph development.

4. The appropriate use of IARC classifications in public policy is critical to U.S. industry and the general public. The Preamble states:

   > "The Monographs represent the first step in carcinogenic risk assessment, which involves examination of all relevant information in order to assess the strength of the available evidence that, under certain conditions of exposure, an agent could alter the incidence of cancer in humans."

   CMA should consider development of guidance on how IARC classifications should be used in the regulatory process. It is unlikely that IARC terminology and actual classifications will change in the foreseeable future, and the classifications will often be transmitted in the form of lists and tables separate from the Preamble and the detailed reviews. Misunderstandings will be the rule rather than the exception. CMA's efforts will be most fruitful if they concentrate on how IARC efforts are best utilized, and on communicating with local, state and federal officials on the appropriate utilization of the classifications.

Final, but there will be some additional changes

GENERAL REMARKS

Background and objective

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 data from short-term studies and other relevant biological data on 155 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 of the IARC Monographs, Supplement 7, is an update 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 summerize 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 ... 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 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 ... 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. The second was to make overall evaluations of carcinogenicity to humans for all 617 agents 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.

Evaluations of carcinogenicity to humans sometimes were 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.

Other relevant data, including the results of tests for genetic and related effects (see Supplement 6), 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 was available were made on the combined evidence from animal carcinogenicity data 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 in the most recent monograph on that agent.

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, based upon data presented in the summaries in these 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. For all these compounds with no data in humans, the Working Group also examined the data from short-term tests and other relevant biological data in Monographs Volumes 14-41. Only those compounds for which data were limited or sufficient in animal studies were considered for recategorization based upon the procedures described above.

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 evaluation of the data in experimental animals was prepared (see page...), and these were used in making the overall evaluations.

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 the Monographs, which represents the conclusions of two working groups which met in September/October 1986 and in January 1987 (see p.).

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:

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

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

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

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

One of the reason for not having more agents in this category is the one of the criterion used for the selection of agents to be considered in the Monographs series; i.e., that there is a suspicion for the carcinogenicity of the agents based on either epidemiological or experimental observations. Therefore, the monographs represent a ~~variety of~~ selected ~~groups~~ of agents for which ~~biased towards~~ positive findings have been reported in the literature.

The epidemiological evidence for ~~clofibrate~~, diazepam, fluorides (inorganic, in drinking-water) and prednisone was considered for classification as 'suggesting lack of carcinogenicity' in humans. The reasons why it could not be so described are given in the texts of each compound.

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

ADDITIONAL EVALUATIONS

The Working Group examined the available experimental data on chemicals evaluated by previous Working Groups as having sufficient evidence of carcinogenicity to experimental animals, but for which there were no data on humans. The Working Group confirmed the evaluation of sufficient evidence of carcinogenicity for these 118 chemicals, except in one case (gyromitrin) where the evaluation of carcinogenicity using the present criteria was considered to be limited. A new summary of the data on this chemical was prepared.

The Working Group also reviewed certain chemicals for which there were no data on humans, but which had previously been evaluated as having limited evidence of carcinogenicity in experimental animals. Taking into account new published data, four chemicals (acetamide, para-aminoazobenzene, griseofulvin, and sodium ortho-phenylphenate) were re-evaluated as now having sufficient evidence of carcinogenicity in experimental animals, and new summaries were prepared for these chemicals.

In addition, the Working Group re-evaluated the available experimental data as given in the Monographs on eleven chemicals previously evaluated by IARC Working Groups as having no evidence of carcinogenicity to experimental animals. Using the present criteria for evidence suggesting lack of carcinogenicity as given in the Preamble, two chemicals (caprolactam and methylparathion) were re-evaluated as meeting the criteria to be placed into this category. For the remaining nine chemicals, the evaluation of inadequate evidence was adopted. Summaries of the available

data on the two chemicals evaluated as having evidence suggesting lack of carcinogenicity were prepared.

DRAFT

Document 6

Category 4
Cupulation

IARC Monographs Supplement 7

(ND. no data: I. inadequate: L. limited: S. sufficient)*

		Degree of evidence		Overall evaluation
		Human	Animal	
	A			
N1	A-[4-C(2-Amino-9H-pyrido[2.3 b]indole) 1982	ND	S	2B
1	Acetaldehyde	I	S	2B
N2	Acetamide	ND	S	2B
N3	Acridine orange 1977	ND	I	3
N4	Acriflavinium chloride	ND	I	3
2	Acrolein	I	I	?
N5	Acrylamide 1982	ND	S	2B
N6	Acrylic acid 1979	ND	ND	3

*All degree of evidence evaluations and overall evaluations entries are provisional and subject to change by the Working Group.

		Degree of evidence		Overall evaluation
		Human	Animal	
N7	Acrylic fibres 1979	ND	ND	3
3	Acrylonitrile	L	S	2A
N8	Acrylonitrile-butadiene-styrene copolymers 1979	ND	ND	3
4	Actinomycin D [illegible]	I	L	3
5	Adryamycin	I	S	2B
N9	AF-2 (2-(2-Furyl)-3-(5-nitro-2-furyl)-acrylamide) 1983	I	S	2B
6	Aflatoxins Aflatoxin Aflatoxin B_2 Aflatoxin G_1 Aflatoxin G2 Aflatoxin M_1	S	S	1
N10	Agaritine 1985	ND	I L for 2 meta-lites	3
7	Aldrin	I	L	3
N11	Allyl chloride 1985	ND	I	3
N12	Allyl isothiocyanate 1985	ND	L	3
	Allyl isovalerate 1985	ND	L	3
8	Aluminium production	S	ND	1
N13	Amaranth 1975	ND	I	3

			Degree of evidence		Overall evaluation
			Human	Animal	
N14	5-Aminoacenaphthene	1977	ND	I	3
N15	2-Aminoanthraquinone	1977	ND	L	3
N16	para-Aminoazobenzene		ND	S	2B
N17	ortho-Aminoazotoluene	1975	ND	S	2B
N18	para-Aminobenzoic acid	1978	ND	I	3
9	4-Aminobiphenyl		S	S	1
N19	1-Amino-2-methylanthraquinone	1982	ND	L	3
N20	2-Amino-5-(5-nitro-2-furyl)-1.3.4-thiadiazole	1974	ND	S	2B
N21	4-Amino-2-nitrophenol	1978	ND	I	3
N22	2-Amino-5-nitrothiazole	1975	ND	L	3
N23	11-Aminoundecanoic acid	[illegible]	ND	L	3
10	Amitrole		I	S	2B
11	Anaesthetics, volatile		I		3
	Diethyl ether			ND	
	Nitrous oxide			--	
	Cyclopropane			ND	
	Fluroxene			ND	
	Halothane			?	
	Methoxyflurane				
	Enflurane				
	Isoflurane			I	
	Divyl Ether			ND	

		Degree of evidence		Overall evaluation
		Human	Animal	
12	Analgesic mixtures containing phenacetin	S	L	1
	Phenacetin	L	S	2A
N24	Angelicins 1982			
	Angelicin	ND	I	3
	Angelicin + UVA		L	
	5-Methylangelicin	ND	I	3
	5-Methylangelicin + UVA		L	
	4,4'-Dimethylangelicin	ND	ND	3
	4,4'-Dimethylangelicin + UVA		ND	
	4,5'-Dimethylangelicin	ND	I	3
	4,5'-Dimethylangelicin + UVA		L	
	4,4',6-Trimethylangelicin	ND	ND	3
	4,4',6-Trimethylangelicin + UVA		ND	
13	Aniline	I	L	3
N25	ortho-Anisidine 1982	ND	S	2B
N26	para-Anisidine 1982	ND	I	3
N27	Anthanthrene 1983	ND	L	3
N28	Anthracene	ND	I	3
N29	Anthranilic acid 1978	ND	I	3
N30	Apholate 1975	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
M31	Aramite 1974	ND	S	2B
14	Arsenic and arsenic compounds	S	L	1
	Arsanilic acid			
	Arsenic pentoxide			
	Arsenic sulphide			
	Arsenic trioxide			
	Arsine			
	Calcium arsenate			
	Dimethylarsinic acid			
	Lead arsenate			
	Methanearsonic acid, disodium salt			
	Methanearsonic acid, monosodium salt			
	Potassium arsenate			
	Potassium arsenite			
	Sodium arsenate			
	Sodium arsenite			
	Sodium cacodylate			
15	Asbestos:	S		1
	Actinolite			
	Amosite			
	Anthophyllite			
	Chrysotile			
	Crocidolite			
	Tremolite			
16	Attapulgite [illegible] to be added (-)	I	L	3
17	Auramine (technical grade)	I	S	2B
	Manufacture of auramine	S		1
N32	Aurothioglucose 1977	ND	L	3
N33	5-Azacytidine 1974	ND	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N34	Azaserine 1986	ND	S	2B
18	Azathioprine	S	L	1
N35	Aziridine 1975?	ND	L	3
N36	2-(1-Aziridinyl)ethanol 1975	ND	L	3
N37	Aziridyl benzoquinone 1975	ND	L	3
N38	Azobenzene 1975	ND	L	3
B				
N39	Benz[a]acridine 1983	ND	I	3
N40	Benz[c]acridine [illegible]	ND	L	3
N41	Benz[a]anthracene 1983 [illegible] short term tests	ND	S	2A
19	Benzene	S	S	1
20	Benzidine	S	S	1
21	Benzidine-based dyes			
	Direct Black 38 (technical)		S	2A
	Direct Blue 6 (technical)		S	2A
	Direct Brown 95 (technical)		S	2A
	short term tests			
N42	Benzo[b]fluoranthene 1983	ND	S	2B
N43	Benzo[j]fluoranthene 1983	NS	S	2B
N44	Benzo[k]fluoranthene 1983	ND	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
N45	Benzo[ghi]fluoranthene 1985	ND	I	3
N46	Benzo[a]fluorene 1983	ND	I	3
N47	Benzo[b]fluorene 1983	ND	I	3
N48	Benzo[c]fluorene 1983	ND	I	3
N49	Benzo[ghi]perylene 1983	ND	I	3
N50	Benzo[c]phenanthrene 1983	ND	I	3
N51	Benzo[a]pyrene 1983	ND	S	2A
N52	Benzo[e]pyrene 1983	ND	I	3
N53	para-Benzoquinone dioxime 1982	ND	L	3
N54	Benzoyl peroxide 1985	ND	I	3
N55	Benzyl acetate 1982	ND	L	3
N56	Benzyl violet 4B 1982	ND	S	2B

		Degree of evidence: Human	Degree of evidence: Animal	Overall evaluation
22	Beryllium and beryllium compounds Bertrandite ore Beryllium acetate Beryllium-aluminium alloy Beryllium carbonate Beryllium chloride Beryllium-copper alloy Beryllium-copper-cobalt alloy Beryllium fluoride Beryllium hydroxide Beryllium-nickel alloy Beryllium oxide Beryllium phosphate Beryllium silicate Beryllium sulphate Beryl ore Zinc beryllium silicate	L	S	2A
23	Betel-quid and areca-nut chewing Betel quid + tobacco Betel quid without tobacco	S I	L I.	1 3
N57	Bis(1-aziridinyl)morpholinophosphine sulphide 1975	ND	L	3
N58	Bis(2-chloroethyl)ether 1975	ND	L	3
	~~Bischloroethyl nitrosourea (BCNU)~~	I	S	2
N59	1,2-Bis(chloromethoxy)ethane 1977	ND	L	3
N60	1,4-Bis(chloromethoxymethyl)benzene 1977	ND	L	3
25	Bis(chloromethyl)ether and chloromethyl methyl ether (technical)	S	S	1

		Degree of evidence		Overall evaluation
		Human	Animal	
N61	Bis(2-chloro-1-methylethyl)ether 1976	ND	L	3
26	Bitumens	I (all)	S L L	2B 3 3
27	Bleomycins Short term tests	I	L	2B
N62	Blue VRS 1975	ND	L	3
28	Bracken fern I ? S 2B			
	Ptaquiloside	ND	L	3
	Shikimic acid	ND	I	3
N63	Brilliant blue FCF 1978	ND	L	3
29	1,3-Butadiene	I	S	2B
N64	n-Butyl acrylate 1986	ND	I	3
N65	Butylated hydroxyanisole (BHA) 1986	ND	S	2B
N66	Butylated hydroxytoluene (BHT) 1986	ND	L	3
N67	Butyl benzyl phthalate 1982	ND	I	3
N68	β-Butyrolactone 1987	ND	S	2B
N69	γ-Butyrolactone 1987	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
C				
30	Cadmium and cadmium compounds	L		2A
	Cadmium acetate		S	
	Cadmium chloride			
	Cadmium oxide			
	Cadmium sulphate			
	Cadmium sulphide			
N70	Cantharidin 1976	ND	L	3
N71	Caprolactam	ND	ELC	4
N72	Captan	ND	L	3
N73	Carbaryl 1977	ND	I	3
N74	Carbazole 1973	ND	L	3
N75	3-Carbethoxypsoralen	) ND	I	3
	3-Carbethoxypsoralen + UVA	)		
31	Carbon blacks	I	I	3
		ND	S	2B
32	Carbon tetrachloride	I	S	2B
N76	Carmoisine 1973	ND	I	3
N77	Carrageenan			
	Native	ND	I	3
	Degraded 1973	ND	S	2B
N78	Catechol 1977	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
	MOPP and Other			
33	~~Certain~~ combined chemotherapy, ~~for lymphomas (including MOPP)~~ Includ. alkyl/agent	S	ND	1
34	Chlorambucil	S	S	1
35	Chloramphenicol	L	I	2B
36	Chlordane/Heptachlor	I	L	3
N79	Chlordecone (Kepone) 1979	ND	S	2B
N80	Chlordimeform 1983 (see also N89 - para-chloro-ortho-toluidine - a metabolite)	ND	I	3
N81	Chlorinated dibenzodioxins 1977 other than TCDD	ND	I	3
37	Chlorinated toluenes (production of)	I		2B
	Benzyl chloride		L	
	~~Benzoyl chloride~~		~~I~~	
	Benzal chloride		L	
	Benzotrichloride		S	
37A	Benzyl chloride	I	I	3
38	Chlornaphazine (N,N-Bis(2-chloroethyl)-2-naphthylamine)	S	L	1
N82	Chlorobenzilate 1982	ND	L	3
39	Chlorodifluoromethane	I	L (but very limited)	3
~~40~~	~~1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea~~ (CCNU)	I	S	2A
N83	Chlorofluoromethane 1982	ND	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
41	Chloroform	I	S	2B
42	Chlorophenols (occupational exposures to)	L		2B
	Pentachlorophenol		I	
	2,4,5-Trichlorophenol		I	
	2,4,6-Trichlorophenol		S	
43	Chlorophenoxy herbicides (occupational exposure to)	L		2B
	2,4-D		I	
	2,4,5-T		I	
	MCPA		I	
N84	4-Chloro-ortho-phenylenediamine 1977	ND	S	2B
N85	4-Chloro-meta-phenylenediamine 1982	ND	I	3
44	Chloroprene	I	I	3
N86	Chloropropham 1976	ND	I	3
N87	Chloroquine 1977	ND	I	3
N88	Chlorothalonil 1983	ND	L	3
N89	para-Chloro-ortho-toluidine 1983	ND	S	2B
N90	2-Chloro-1,1,1-trifluoroethane 1986	ND	L	3
45	Cholesterol	I	I	3

Since 2,4,6 is a main component in Mfg Process

		Degree of evidence		Overall evaluation
		Human	Animal	
46	Chromium and chromium compounds			
	Chromium 0	I	I	3
	Chromium carbonyl			
	Cobalt-chromium alloy			
	Ferrochromium			
	Chromium III	I	I	3
	Chromite ore			
	Basic chromic sulphate			
	Chromic acetate			
	Chromic chloride			
	Chromic oxide			
	Chromic phosphate			
	Chromium potassium sulphate			
	Chromium sulphate			
	Chromium VI	S	S	1
	Barium chromate			
	Calcium chromate			
	Chromium trioxide			
	Lead chromate			
	Lead chromate oxide			
	Potassium chromate			
	Potassium dichromate			
	Sodium chromate			
	Sodium dichromate			
	Strontium chromate			
	Zinc chromate			
	Zinc potassium chromate			
	Zinc yellow			
N91	Chrysene	ND	L	3
47	Chrysoidine	I	L	3
N92	C.I. Disperse Yellow 3	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N93	Cinnamyl anthranilate 1993	ND	L	3
48	Cisplatin upgraded - Short Term Tests	I	S	2A
N94	Citrinin 1986	ND	L	3
N95	Citrus Red No. 2 1975	ND	S	2B
49	Clofibrate	I	L	3
50	Coal gasification	S	NL	1
51	Coal-tar pitches	S	S	1
52	Coal-tars	S	S	1
53	Coke production	S	ND	1
N96	Copper 8-hydroxyquinoline 1977	ND	I	3
N97	Coronene 1993	ND	I	3
N98	Coumarin 1976	ND	L	3
54	Creosotes	L	S	2A
N99	meta-Cresidine 1982	ND	I	3
N100	para-Cresidine 1982	ND	S	2B
N101	Cycasin 1976	ND	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
55	Cyclamates Calcium cyclamate Sodium cyclamate Cyclohexylamine Dicyclohexylamine	I	L	3
N102	Cyclochlorotine 1976	ND	I	3
N103	Cyclopenta[cd]pyrene	ND	L	3
56	Cyclophosphamide	S	S	1
D				
57	Dacarbazine	I	S	2B
N104	D and C Red No. 9 1975	ND	I	3
58	Dapsone	I	L	3
N105	Daunomycin 1979	ND	S	2B
59	DDT DDD (TDE) DDE	I	S	2B
N106	Diacetylaminoazotoluene 1975	ND	I	3
N107	N,N'-Diacetylbenzidine 1978	ND	S	2B
N108	Diallate 1973	ND	L	3
N109	2,4-Diaminoanisole 1972	ND	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
N110	4,4'-Diaminodiphenyl ether 1982	ND	S	2B
N111	1,2-Diamino-4-nitrobenzene 1978	ND	I	3
N112	1,4-Diamino-2-nitrobenzene 1978	ND	I	3
N113	2,4-Diaminotoluene (see also Toluene diisocyanate) 1978	ND	S	2B
N114	2,5-Diaminotoluene 197'	ND	I	3
60	Diazepam	I	I	3
N115	Diazomethane 1974	ND	L	3
N116	Dibenz[a,h]acridine 1983	ND	S	2B
N117	Dibenz[a,j]acridine	ND	S	2B
N118	Dibenz[a,c]anthracene	ND	L	3
N119	Dibenz[a,h]anthracene 1983 Short Term Tests	ND	S	2A
N120	Dibenz[a,j]anthracene 1983	ND	L	3
N121	7H-Dibenzo[c,g]carbazole 1983	ND	S	2B
N122	Dibenzo[a,e]fluoranthene 1983	ND	L	3
N123	Dibenzo[h,rst]pentaphene 1973	ND	L	3
N124	Dibenzo[a,e]pyrene	ND	S	2B
N125	Dibenzo[a,h]pyrene 1983	ND	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
N126	Dibenzo[a,i]pyrene 1983	ND	S	2B
N127	Dibenzo[a,l]pyrene 1987	ND	S	2B
61	1,2-Dibromo-3-chloropropane	I	S	2B
N128	Dichloroacetylene 1986	ND	L	3
62	ortho-Dichlorobenzene	I	I	3
	para-Dichlorobenzene	I	S	2B
63	3,3'-Dichlorobenzidine	I	S	2B
N129	trans-1,4-Dichlorobutene 1977	ND	I	3
N130	3,3'-Dichloro-4,4'-diaminodiphenyl ether 1978	ND	S	2B
N131	1,2-Dichloroethane 1979	ND	S	2B
64	Dichloromethane	I	S	2B
N132	2,6-Dichloro-para-phenylenediamine 1982	ND	L	3
N133	1,2-Dichloropropane 1986	ND	L	3
65	1,3-Dichloropropene (Technical grade)	I	S	2B
N134	Dichlorvos	ND	I	3
N135	Dicofol	ND	L	3
66	Dieldrin	I	L	3
N136	Diepoxybutane 1976	ND	S	2B

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		Degree of evidence		Overall evaluation
		Human	Animal	
N137	Di-(2-ethylhexyl)adipate 82	ND	L	3
N138	Di-(2-ethylhexyl)phthalate 82	ND	S	2B
N139	1,2-Diethylhydrazine 74	ND	S	2B
67	Diethyl sulphate	L	S	2A
N140	Diglycidyl resorcinol ether 83	ND	S	2B
N141	Dihydrosafrole 76	ND	S	2B
N142	Dihydroxymethylfuratrizine 80 see Panfuran S)	ND	I	3
N143	Dimethoxane 77	ND	L	3
68	3,3 -Dimethoxybenzidine (ortho-Dianisidine)	I	S	2B
N144	3,3'-Dimethoxybenzidine-4,4'-diisocyanate 76	ND	L	3
N145	para-Dimethylaminoazobenzene 75	ND	S	2B
N146	para-Dimethylaminoazobenzenediazo sodium sulphonate 75	ND	I	3
N147	trans-2[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl]-1,3,4-oxadiazole 74	ND	L	3
N148	3,3'-Dimethylbenzidine (ortho-Tolidine) 72	ND	S	2B
69	Dimethylcarbamoyl chloride Upgraded based on recent new tests	I	S (Gal. ...)	2A
N149	1,1-Dimethylhydrazine 74	ND	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
N150	1,2-Dimethylhydrazine 74	ND	S	2B
N151	1,4-Dimethylphenanthrene 83	ND	I	3
70	Dimethyl sulphate	I	S	2B
N152	1,8-Dinitropyrene 84	ND	I	3
N153	Dinitrosopentamethylenetetramine 76	ND	I	3
71	1,4-Dioxane	I	S	2B
N154	2,4'-Diphenyldiamine 72	ND	I	3
N155	Disulfiram 76	ND	I	3
N156	Dithranol 77	ND	I	3
N157	Dulcin 76	ND	I	3
E				
N158	Endrin 74	ND	I	3
N159	Eosin 77	ND	I	3
72	Epichlorohydrin	I	S	2A
N160	1-Epoxyethyl-3,4-epoxycyclohexane 76	ND	L	3
N161	3,4-Epoxy-6-methylcyclohexylmethyl-3,4-epoxy-6-methylcyclohexane carboxylate 76	ND	L	3
N162	cis-9,10-Epoxystearic acid 76	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
73	Erionite	S	S	1
N163	Ethionamide 77	ND	L	3
N164	Ethyl acrylate 85	ND	S	2B
N165	Ethylene 79	ND	NB	3
74	Ethylene dibromide	I	S	2A
75	Ethylene oxide	L	S	2A
N166	Ethylene sulphide 76	ND	L	3
76	Ethylene thiourea	I	S	2B
N167	Ethyl methanesulphonate 74	ND	S	2B
N168	Ethyl selenac 76	ND	I	3
N169	Ethyl tellurac 76	ND	I	3
N170	Eugenol	ND	L	3
N171	Evans blue 75	ND	L	3
F				
N172	Fast green FCF 78	ND	L	3
N173	Ferbam 76	ND	I	3
N174	Fluometuron 83	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N175	Fluoranthene	ND	I	3
N176	Fluorene	ND	I	3
77	Fluorides (inorganic used in drinking-water ~~and dental preparations~~) Fluorspar Fluosilicic acid Sodium fluoride Sodium monofluorophosphate Sodium silicofluoride Stannous fluoride	I	I	3
78	5-Fluorouracil	I	I	3
79	Formaldehyde	L	S	2A
N177	2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole	ND	S	2B
N178	Furazolidone	ND	I	3
N179	Fusarenon-X	ND	I	3
G				
N180	Glu-P-1 (2-Amino-6-methyl imidazo-[4,5-f]quinoline)	ND	S	2B
N181	Glu-P-2 (Aminodipyrido[1,2-a:3',2'-d]-imidazole	ND	S	2B
N182	Glycidaldehyde	ND	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
N183	Glycidyl oleate 76	ND	I	3
N184	Glycidyl stearate 76	ND	I	3
N185	Grisecfulvin	ND	S	2B
N186	Guinea green B 78	ND	L	3
N187	Gyromitrin	ND	L	3
H				
80	Haematite Underground mining of (with exposures to radon)	I S	I ELC	3 1 3
81	Hexachlorobenzene	I	S	2B
N188	Hexachlorobutadiene 79	ND	L	3
82	Hexachlorocyclohexane α-, β-, Technical grade HCH Lindane δ-, ε-HCH	I I	 S L L	2B
N189	Hexachloroethane 79	ND	L	3
N190	Hexachlorophene 79	ND	I	3
N191	Hexamethylphosphoramide 77	ND	S	2B
N192	Hycanthone and its mesylate 77	ND	I	3
83	Hydralazine	I	L	3

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		Degree of evidence		Overall evaluation
		Human	Animal	
84	Hydrazine	I	S	2B
N193	Hydrogen peroxide 85	ND	L	3
N194	Hydroquinone 77	ND	I	3
N195	4-Hydroxyazobenzene 75	ND	I	3
N196	8-Hydroxyquinoline 77	ND	I	3
N197	Hydroxysenkirkine 76	ND	I	3
I				
N198	Indeno[1,2,3-cd]pyrene 83	ND	S	2B
N199	IQ (2-Amino-3-methylimidazo[4.5-f]quinoline 86	ND	S	2B
85	Iron and steel founding	S	I/L	1
86	Iron-dextran complex	I	S	2B
N200	Iron-dextrin complex 73	ND	L	3
N201	Iron sorbitol-citric acid complex 72	ND	I	3
N202	Isatidine 76	ND	L	3
87	Isonicotinic acid hydrazide	I	L	3
N203	Isophosphamide 81	ND	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
88	Isopropyl alcohol manufacture (strong acid process)	S		1
	Isopropyl alcohol	I	I	3
	Isopropyl oils	I	I	3
N204	Isosafrole 76	ND	L	3
J				
N205	Jacobine 76	ND	I	3
K				
N206	Kaempferol (see also bracken fern) 53	ND	I	3
L				
N207	Lasiocarpine 76	ND	S	2B
N208	Lauroyl peroxide 85	ND	I	3

			Degree of evidence		Overall evaluation
			Human	Animal	
89	Lead and lead compounds	Inorganic	I	S	2B
	Lead acetate	Positive in these compounds			
	Lead carbonate				
	Lead chloride				
	Lead naphthenate				
	Lead nitrate				
	Lead oxide				
	Lead phosphate				
	Lead subacetate				
	Lead tetroxide				
	Tetraethyllead	Organic	I	I	3
	Tetramethyllead				
	Ledate				
90	Leather				
	Boot and shoe manufacture and repair		S	ND	1
	Leather dusts Defined				
	Leather goods manufacture		I	ND	3
	Leather tanning and processing		I	ND	3
N209	Methylazoxymethanol and its acetate 76 See N 131		ND	S	2B
N210	Light green SF 75		ND	L	3
N211	Luteoskyrin 76		ND	L	3
M					
91	Magenta (technical grade)		I	I	3
	Manufacture of magenta		S		1
N212	Malathion		ND	I	3
N213	Maleic hydrazide 74		ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N214	Malonaldehyde 85	ND	I	3
N215	Maneb 76	ND	I	3
N216	Mannomustine 75	ND	L	3
N217	MeA-α-C(2-Amino-3-methyl-9H-pyrido[2,3-b]-indole) 8C	ND	S	2B
N218	Medphalan 75	ND	I	3
N219	MeIQ (2-Amino-3,4-dimethylimidazo[4,5-f]-quinoline) 8C	ND	I	3
N220	MeIQx (2-Amino-3,8-dimethylimidazo[4,5-f]-quinoxaline) 8C	ND	I	3
N221	Melamine 8C	ND	I	3
92	Melphalan	S	S	1
93	6-Mercaptopurine	I	I	3
N222	Merphalan 75	ND	S	2B
94	Methotrexate	I	I	3
95	5-Methoxypsoralen 5-Methoxypsoralen (Bergapten) 5-Methoxypsoralen + UVA	I	S	2A
96	8-Methoxypsoralen + UVA (more than ambient sunlight) 8-Methoxypsoralen without UVA	S	S	1
N223	Methoxychlor	ND	I	3

			Degree of evidence		Overall evaluation
			Human	Animal	
N224	Methyl acrylate	86	ND	I	3
N225	2-Methylaziridine	75	ND	S	2B
97	Methyl bromide		I	L	3
N226	Methyl carbamate	76	ND	I	3
98	Methyl chloride		I	I	3
N227	1-Methylchrysene	83	ND	I	3
N228	2-Methylchrysene	83	ND	L	3
N229	3-Methylchrysene	82	ND	L	3
N230	4-Methylchrysene	83	ND	L	3
N231	5-Methylchrysene	83	ND	S	2B
N232	6-Methylchrysene	83	ND	L	3
N233	N-Methyl-N,4-dinitrosoaniline	72	ND	L	3
99	4,4'-Methylene bis(2-chloroaniline)		I	S	2A
N234	4,4'-Methylene bis (N,N-dimethyl)benzenamine	82	ND	L	3
100	4,4'-Methylene bis (2-methylaniline)		I	S	2B
N235	4,4'-Methylenedianiline	86	ND	S	2B
N236	4,4'-Methylenediphenyl diisocyanate	79	ND	ND	3
N237	2-Methylfluoranthene	83	ND	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N238	3-Methylfluoranthene 83	ND	I	3
N239	Methyl iodide 8C	ND	L	3
N240	Methyl methacrylate 79	ND	I	3
N241	Methyl methanesulphonate 74	ND	S	2B
N242	2-Methyl-1-nitroanthraquinone (uncertain purity) 82	ND	S	2B
101	N-Methyl-N'-nitro-N-nitrosoguanidine Bcwd in short term tests	I	S	2A
N243	3-Methylnitrosaminopropionaldehyde EJ	ND	ND	3
N244	3-Methylnitrosaminopropionitrile EJ	ND	S	2B
N245	4-(Methylnitrosamino)-4-(3-pyridyl)butanal (NNA) EJ	ND	I	3
N246	4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) EJ	ND	S	2B
N247	Methyl parathion	ND	ELC	3
N248	1-Methylphenanthrene	ND	I	3
N249	Methyl red	ND	I	3
N250	Methyl selenac 7C	ND	I	3
N251	Methylthiouracil 74	ND	S	2B
102	Metronidazole	I	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
103	Mineral oils Untreated + mildly Treated Highly Refined	S I	S I	1 3
N252	Mirex	ND	S	2B
N253	Mitomycin C 76	ND	S	2B
N254	Modacrylic fibres 79	ND	ND	3
N255	Monocrotaline 76	ND	S	2B
N256	Monuron 76 Carcinogenic solvent in epidemiology of control	ND	L	3
N257	5-(Morpholinomethyl)-3-[(5-nitro-furfurylidene)-amino]-2-oxazolidinone 74	ND	S	2B
104	Mustard gas	S	L	1
105	Myleran (1,4-Butanediol dimethanesulphonate)	S	L	1
N				
N258	Nafenopin 79	ND	S	2B
N259	1,5-Naphthalenediamine 72	ND	L	3
N260	1,5-Naphthalene diisocyanate 79	ND	ND	3
106	1-Naphthylamine	I	I	3
107	2-Naphthylamine	S	S	1
108	1-Naphthylthiourea (ANTU)	I	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
109	Nickel and nickel compounds Nickel acetate Nickel ammonium sulphate Nickel carbonate Nickel carbonyl Nickel chloride Nickel-gallium alloy Nickel hydroxide Nickelocene Nickel oxide Nickel subsulphide Nickel sulphate Nickel refining	S	S	1
N261	Niridazole 77	ND	S	2B
N262	Nithiazide 83	ND	L	3
N263	5-Nitroacenaphthene 78	ND	S	2B
N264	5-Nitro-ortho-anisidine 82	ND	L	3
N265	9-Nitroanthracene 84	ND	ND	3
N266	6-Nitrobenzo[a]pyrene 84	ND	I	3
N267	4-Nitrobiphenyl 74	ND	I ~~(metabolized to 4-amino biphenyl)~~	3
N268	6-Nitrochrysene 84	ND	I	3
N269	Nitrofen (technical grade) 83	ND	S	2B
N270	3-Nitrofluoranthene 84	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N271	5-Nitro-2-furaldehyde semicarbazone 74	ND	I	3
N272	1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone	ND	S	2B
N273	N-[4-(5-Nitro-2-furyl)-2-thiazolyl]-acetamide	ND	S	2B
110	Nitrogen mustard Short Term Test	L	S	2A
N274	Nitrogen mustard N-oxide	ND	S	2B
N275	2-Nitropropane 82	ND	S	2B
N276	1-Nitropyrene 84	ND	L	3
N277	N'-Nitrosoanabasine 85	ND	L	3
N278	N'-Nitrosoanatabine 85	ND	I	3
N279	N-Nitrosodi-n-butylamine 75	ND	S	2B
N280	N-Nitrosodiethanolamine 75	ND	S	2B
N281	N-Nitrosodiethylamine Short term Tests	ND	S	2B
N282	N-Nitrosodimethylamine Short term tests	ND	S	2B
N283	N-Nitrosodiphenylamine 82	ND	L	3
N284	para-Nitrosodiphenylamine 82	ND	I	3
N285	N-Nitrosodi-n-propylamine 78	ND	S	2B
N286	N-Nitroso-N-ethylurea 78 Short term Tests	ND	S	2A

			Degree of evidence		Overall evaluatic
			Human	Animal	
N287	N-Nitrosofolic acid	75	ND	I	3
N288	N-Nitrosoguvacine	77	ND	ND	3
N289	N-Nitrosoguvacoline	76	ND	I	3
N290	N-Nitroshydroxyproline	72	ND	I	3
N291	N-Nitrosomethylethylamine	78	ND	S	2B
N292	N-Nitroso-N-methylurea	78	ND	S	2A
N293	N-Nitroso-N-methylurethane	74	ND	S	2B
N294	N-Nitrosomethylvinylamine	73	ND	S	2B
N295	N-Nitrosomorpholine	75	ND	S	2B
N296	N'-Nitrosonornicotine	76	ND	S	2B
N297	N-Nitrosopiperidine	77	ND	S	2B
N298	N-Nitrosoproline	[illegible]	ND	I	3
N299	N-Nitrosopyrrolidine	[illegible]	ND	S	2B
N300	N-Nitrososarcosine	[illegible]	ND	S	2B
N301	Nitrovin	83	ND	I	3
N302	Nylon 6	79	ND	I	3

			Degree of evidence		Overall evaluation
			Human	Animal	
O					
111	Ochratoxin A		I	L	3
N303	Oestradiol mustard	75	ND	L	3
N304	Oil Orange SS	75	ND	S	2B
N305	Orange I	75	ND	I	3
N306	Orange G	75	ND	I	3
N307	Oxazepam		ND	L	3
112	~~Oxymetholone~~	Androgenic steroid	L	S	2A
N308	Oxyphenbutazone	77	ND	ND	3
P					
N309	Panfuran S (Dihydroxymethylfuratrizine)	80	ND	S	2B
N310	Parasorbic acid	76	ND	L	3
N311	Parathion	83	ND	I	3
N312	Patulin	86	ND	I	3
N313	Penicillic acid	76	ND	L	3
N314	Pentachloroethane	86	ND	L	3
N315	Perylene	83	ND	I	3

[illegible] based on Human data?

		Degree of evidence		Overall evaluation
		Human	Animal	
N316	Petasitenine	ND	L	3
N317	Phenanthrene 83	ND	I	3
113	Phenazopyridine[2,6-Diamino-3-(phenylazo)-pyridine]	I	S	2B
114	Phenelzine and its sulphate	I	L	3
N318	Phenicarbazide 76	ND	L	3
115	Phenobarbital and its sodium salt	I	S	2B
N319	Phenoxybenzamine and its hydrochloride 80	ND	L	3
116	Phenylbutazone	I	ND	3
N320	meta-Phenylenediamine 78	ND	I	3
N321	para-Phenylenediamine 75	ND	I	3
117	N-Phenyl-2-naphthylamine	I	L	3
N322	ortho-Phenylphenol 53	ND	I	3
	sodium ortho phenylphenate	ND	L S	L 3
118	Phenytoin	L	L	2B
N323	Piperonyl butoxide	ND	I	3
N324	Polyacrylic acid 79	ND	ND	3
119	Polybrominated biphenyls	I	S	2B
120	Polychlorinated biphenyls	L	S	2A

		Degree of evidence		Overall evaluation
		Human	Animal	
N325	Polychloropropene 79	ND	ND	3
N326	Polyethylene 79	ND	I	3
N327	Polymethylene polyphenyl isocyanate 79	ND	ND	3
N328	Polymethyl methacrylate 79	ND	I	3
N329	Polypropylene 79	ND	I	3
N330	Polystyrene 79	ND	I	3
N331	Polytetrafluoroethylene 79	ND	I	3
N332	Polyurethane foams 79	ND	I	3
N333	Polyvinyl acetate 79	ND	I	3
N334	Polyvinyl alcohol 79	ND	I	3
N335	Polyvinyl chloride 79	ND	I	3
N336	Polyvinyl pyrrolidone 79	ND	L	3
N337	Ponceau MX 75	ND	S	2B
N338	Ponceau 3R	ND	S	2B
N339	Ponceau SX	ND	I	3
N340	Potassium bis(2-hydroxyethyl)dithiocarbamate 76	ND	L	3
N341	Potassium bromate	ND	S	2B
121	Prednisone	I	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
122	Procarbazine and its hydrochloride Criterion 2 of Short Term Tests.	I	S	2A
N342	Proflavine and its salts 80	ND	I	3
N343	Pronetalol hydrochloride 77	ND	L	3
N344	1,3-Propane sultone 74	ND	S	2B
N345	Propham 76	ND	I	3
N346	β-Propiolactone 74	ND	S	2B
N347	n-Propyl carbamate 76	ND	L	3
N348	Propylene 79	ND	I	3
123	Propylene oxide Short Term test data : ...	I	S	2A
124	Propylthiouracil	I	S	2B
N349	Pyrene	ND	I	3
N350	Pyrido[3,4-c]psoralen 80			
	Pyrido[3,4-c]psoralen	) ND	ND	)
	Pyrido[3,4-c]psoralen + UVA	)	I	)
				) 3
	7-Methylpyrido[3,4-c]psoralen	) ND	ND	)
	7-Methylpyrido[3,4-c]psoralen + UVA	)	I	)
N351	Pyrimethamine 77	ND	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
Q				
N352	Quercetin (see also bracken fern) 83	ND	L	3
N353	para-Quinone 77	ND	I	3
N354	Quintozene (Pentachloronitrobenzene) 74	ND	L	3
R				
125	Reserpine	I	L	3
N355	Resorcinol 77	ND	I	3
N356	Retrorsine 76	ND	L	3
N357	Rhodamine B 78	ND	L	3
N358	Rhodamine 6G 78	ND	L	3
N359	Riddelliine 76	ND	I	3
N360	Rifampicin 80	ND	L	3
126	Rubber industry	S	I	1
N361	Rugulosin 80	ND	I	3
S				
N362	Saccharated iron oxide 73	ND	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
127	Saccharin Sodium saccharin ortho-Toluene sulphonamide	I	S	2B
N363	Safrole 76	ND	S	2B
N364	Scarlet red 75	ND	I	3
N365	Selenium and selenium compounds 75	ND	I	3
N366	Semicarbazide hydrochloride 76	ND	L	3
N367	Seneciphylline 76	ND	ND	3
N368	Senkirkine 75	ND	L	3
N369	Sepiolite 77	ND	I	3
	Sex hormones			
	Oestrogens, progestins and combinations		See write up	
128A	Combined oral contraceptives			
128B	Sequential oral contraceptives			
128C	Other oestrogen-progestin combinations			
	Androgens			
129	Testosterone and esters testosterone oenanthate testosterone propionate		S	2B
	Oestrogens			
130A	Chlorotrianisene			

		Degree of evidence		Overall evaluation
		Human	Animal	
130B	Conjugated oestrogens piperazine oestrone sulphate sodium equilin sulphate sodium oestrone sulphate	S	L	
130C	Dienoestrol			
130D	Diethylstilbostrol and its dipropionate			
130E	Ethinyl oestradiol			
130F	Hexoestrol			
130G	Mestranol			
130H	Oestradiol-17 and esters oestradiol 3-benzoate oestradiol dipropionate oestradiol-17 valerate polyoestradiol phosphate			
130I	Oestriol			
130J	Oestrone and its benzoate			
	Progestins			
131A	Chlormadinone acetate	ND	L	3
131B	Dimethisterone	ND	I	3
131C	Ethynodiol diacetate	ND	L	3
131D	17 -Hydroxyprogesterone caproate	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
131E	Lynoestrenol	ND	I	3
131F	Medroxyprogesterone acetate	I	L	3
131G	Megestrol acetate	ND	L	
131H	Norethisterone and its acetate			
131I	Norethynodrel			
131J	Norgestrel	ND	I	3
131K	Progesterone	ND	S	2B
	Other sex hormones			
132	Clomiphene citrate	I	I	3
133	Shale oils	S		1
	Raw oil shale		L	
	Spent oil shale		L	
	Residue of shale oil distillation	S	S	
134	Silica			
	crystalline	L	S	2A
	amorphous	I	I	3
135	Smokeless tobacco products	S	I	1
N370	Sodium diethyldithiocarbamate	ND	I	3
136	Soots	S	I	1
			S	
137	Spironolactone	I	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N371	Sterigmatocystin 76	ND	S	2B
N372	Streptozotocin 78	ND	S	2B
138	Styrene Upgrade : short term tests also limited data of styrene oxide metabolite in humans	I	L	2B
N373	Styrene-acrylonitrile copolymers 79	ND	ND	3
N374	Styrene-butadiene copolymers 79	ND	ND	3
N375	Styrene oxide 85 Based on short term tests	ND	S	2A
N376	Succinic anhydride 77	ND	L	3
N377	Sudan I 75	ND	L	3
N378	Sudan II 75	ND	L	3
N379	Sudan III 75	ND	I	3
N380	Sudan brown RR 75	ND	I	3
N381	Sudan red 7B 75	ND	I	3
139	Sulfafurazole (Sulphisoxazole)	I	I	3
N382	Sulfallate 83	ND	S	2B
140	Sulfamethoxazole	I	L	3
N383	Sunset yellow FCF 75	ND	I	3
N384	Symphytine 83	ND	I ~~S (for plant material)~~	3

		Degree of evidence		Overall evaluation
		Human	Animal	
T				
141	Talc			
	Talc not containing asbestiform fibres	I	I	3
	Talc containing asbestiform fibres	S	I	1
N385	Tannic acid and tannins 76	ND	L	3
N386	Terpene polychlorinates (Strobane) 74	ND	L	3
N387	2,2',5,5'-Tetrachlorobenzidine 82	ND	I	3
142	Tetrachlorodibenzo-para-dioxin (TCDD)	I	S	2B
N388	1,1,1,2-Tetrachloroethane 86	ND	L	3
143	1,1,2,2-Tetrachloroethane	I	L	3
144	Tetrachloroethylene	I	S	2B
N389	Tetrachlorvinphos 83	ND	L	3
N390	Tetrafluoroethylene 79	ND	ND	3
N391	Thioacetamide 74	ND	S	2B
N392	4,4'-Thiodianiline 82	ND	S	2B
N393	Thiouracil 74	ND	L	3
N394	Thiourea 74	ND	S	2B
N395	Thiram 76	ND	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
145	Tobacco smoking (tobacco smoke)	S	S	1
146	Toluene diisocyanate (see also 2,4-diamino-toluene) 2,4-toluene diisocyanate 2,6-toluene diisocyanate	ND	S	2B
* 147	ortho-Toluidine	I	S	2B
N396	Toxaphene (Polychlorinated camphenes) 79	ND	S	2B
148	Treosulphan	S	ND	1
N397	Trichlorfon 83	ND	I	3
N398	1,1,1-Trichloroethane 79	ND	I	3
N399	1,1,2-Trichloroethane 79	ND	L	3
149	Trichloroethylene	I	L	3
N400	Trichlorotriethylamine hydrochloride 75	ND	I	3
N401	T_2-Trichothecene 83	ND	I	3
N402	Triethylene glycol diglycidyl ether 76	ND	L	3
N403	2,4,5-Trimethylaniline 82	ND	L	3
N404	2,4,6-Trimethylaniline 82	ND	I	3
150	4,5',8-Trimethylpsoralen 4,5',8-Trimethylpsoralen 4,5',8-Trimethylpsoralen + UVA	I	I	3

		Degree of evidence		Overall evaluation
		Human	Animal	
N405	Triphenylene 83	ND	I	3
* 151	Tris(aziridinyl)-para-benzoquinone (Triaziquone) Carcin in 2, Short Term Tests vote of group resulted in 3	I	L	3
N406	Tris(1-aziridinyl)phosphine oxide 75	ND	I	3
152	Tris(1-aziridinyl)phosphine sulphide (Thiotepa) Short Term Tests	I	S	2A
N407	2,4,6-Tris(1-aziridinyl)-s-triazine 75	ND	L	3
N408	1,2,3-Tris(chloromethoxy)propane 77	ND	L	3
(5)	Tris(2,3-dibromopropyl)phosphate Short Term Tests	I	S	2A
N409	Tris(2-methyl-1-aziridinyl)phosphine oxide 75	ND	I	3
N410	Trp-P-1 [3-Amino-1,4-dimethyl-5H-pyrido-[4,3-b]indole) 83	ND	S	2B
N411	Trp-P-2 [3-Amino-1-methyl-5H-pyrido-[4,3-b]indole) 83	ND	S	2B
N412	Trypan blue 75	ND	S	2B
U				
154	Uracil mustard Short Term Tests	I	S	2B
N413	Urethane 74	ND	S	2B

		Degree of evidence		Overall evaluation
		Human	Animal	
V				
155	Vinblastine sulphate	I	I	3
156	Vincristine sulphate	I	I	3
N414	Vinyl acetate 8C	N D	I	3
N415	Vinyl bromide 8C Unclassified SAR, Short Term: Human metabolite	ND	S	2A
157	Vinyl chloride	S	S	1
N416	Vinyl chloride-vinyl acetate copolymers	ND	I	3
N417	4-Vinylcyclohexene	ND	L	3
N418	Vinyl fluoride	ND	Nd	3
158	Vinylidene chloride	I	L	3
N419	Vinylidene chloride-vinyl chloride copolymers	ND	ND	3
N420	Vinylidene fluoride	ND	I	3
N421	N-Vinyl-2-pyrrolidine	ND	ND	3
W				
159	Wollastonite	I	L	3

		Degree of evidence		Overall evaluation
		Human	Animal	
160	Wood	L	ND	2B
	Carpentry and joinery	S	I	1
	Furniture and cabinet making	I	ND	3
	Lumber and saw mill industries	I	ND	3
	Pulp and paper manufacture			
	Wood dusts	C		
X				
N422	2,4-Xylidine and its hydrochloride	ND	I	3
N423	2,5-Xylidine and its hydrochloride	ND	I	3
Y				
N424	Yellow AB	ND	I	3
N425	Yellow OB	ND	L	3
Z				
N426	Zearalenone	ND	L	3
N427	Zectran	ND	L	3
N428	Zineb	ND	I	3
N429	Ziram	ND	I	3
	Chloroethyl Nitrosourea			
	BCNU	L	S	2A
	CCNU	L	I	2A
	MeCCNU	S		1