pursuant to the applicable tariff, notwithstanding demand for payment.

This proceeding has been assigned to Administrative Law Judge Charles E. Morgan ("Presiding Officer"). Hearing in this matter, if any is held, shall commence within the time limitations prescribed in 46 CFR 502.61. The hearing shall include oral testimony and cross-examination in the discretion of the Presiding Officer only upon proper showing that there are genuine issues of material fact that cannot be resolved on the basis of sworn statements, affidavits, depositions, or other documents or that the nature of the matter in issue is such that an oral hearing and cross-examination are necessary for the development of an adequate record. Pursuant to the further terms of 46 CFR 502.61, the initial decision of the Presiding Officer in this proceeding shall be issued by February 3, 1993, and the final decision of the Commission shall be issued by June 3, 1993.

**Joseph C. Polking,**

*Secretary.*

[FR Doc. 92-2986 Filed 2-6-92; 8:45 am]

BILLING CODE 6730-01-M

## FEDERAL RESERVE SYSTEM

### Carlos Salman, et al.; Change in Bank Control Notice; Acquisition of Shares of Banks or Bank Holding Companies

The notificant listed below has applied under the Change in Bank Control Act (12 U.S.C. 1817(j)) and § 225.41 of the Board's Regulation Y (12 CFR 225.41) to acquire a bank or bank holding company. The factors that are considered in acting on notices are set forth in paragraph 7 of the Act (12 U.S.C. 1817(j)(7)).

The notice is available for immediate inspection at the Federal Reserve Bank indicated. Once the notice has been accepted for processing, it will also be available for inspection at the offices of the Board of Governors. Interested persons may express their views in writing to the Reserve Bank indicated for the notice or to the offices of the Board of Governors. Comments must be received not later than March 3, 1992.

A. Federal Reserve Bank of Atlanta (Robert E. Heck, Vice President) 104 Marietta Street, NW., Atlanta, Georgia 30303:

*1. Carlos Salman*, Miami, Florida; to acquire an additional 11.30 percent of the voting shares of Terrabank Holding Corporation, Miami, Florida, for a total of 20.57 percent, and thereby indirectly acquire Terrabank, N.A., Miami, Florida.

Board of Governors of the Federal Reserve System, February 3, 1992.

**Jennifer J. Johnson,**

*Associate Secretary of the Board.*

[FR Doc. 92-2988 Filed 2-6-92; 8:45 am]

BILLING CODE 6210-01-F

### U.S.B. Holding Co., Inc., et al.; Formations of; Acquisitions by; and Mergers of Bank Holding Companies

The companies listed in this notice have applied for the Board's approval under section 3 of the Bank Holding Company Act (12 U.S.C. 1842) and § 225.14 of the Board's Regulation Y (12 CFR 225.14) to become a bank holding company or to acquire a bank or bank holding company. The factors that are considered in acting on the applications are set forth in section 3(c) of the Act (12 U.S.C. 1842(c)).

Each application is available for immediate inspection at the Federal Reserve Bank indicated. Once the application has been accepted for processing, it will also be available for inspection at the offices of the Board of Governors. Interested persons may express their views in writing to the Reserve Bank or to the offices of the Board of Governors. Any comment on an application that requests a hearing must include a statement of why a written presentation would not suffice in lieu of a hearing, identifying specifically any questions of fact that are in dispute and summarizing the evidence that would be presented at a hearing.

Unless otherwise noted, comments regarding each of these applications must be received not later than March 3, 1992.

A. Federal Reserve Bank of New York (William L. Rutledge, Vice President) 33 Liberty Street, New York, New York 10045:

*1. U.S.B. Holding Company, Inc.*, Nanuet, New York; to acquire 28 percent of the voting shares of New Milford Bank and Trust Company, Inc., New Milford, Connecticut.

B. Federal Reserve Bank of Richmond (Lloyd W. Bostian, Jr., Senior Vice President) 701 East Byrd Street, Richmond, Virginia 23261:

*1. F & M National Corporation*, Winchester, Virginia; to acquire 100 percent of the voting shares of Farmers & Merchants Bank of Keyser, Keyser, West Virginia.

C. Federal Reserve Bank of Atlanta (Robert E. Heck, Vice President) 104 Marietta Street, N.W., Atlanta, Georgia 30303:

*1. Villages Bancorporation, Inc.*, Lady Lake, Florida; to become a bank holding company by acquiring 100 percent of the voting shares of First Bank of the Villages, Lady Lake, Florida.

D. Federal Reserve Bank of Chicago (David S. Epstein, Vice President) 230 South LaSalle Street, Chicago, Illinois 60690:

*1. Fairmount Banking Company*, Fairmount, Indiana; to become a bank holding company by acquiring 100 percent of the voting shares of The Fairmount State Bank, Fairmount, Indiana.

Board of Governors of the Federal Reserve System, February 3, 1992.

**Jennifer J. Johnson,**

*Associate Secretary of the Board.*

[FR Doc. 92-2987 Filed 2-6-92; 8:45 am]

BILLING CODE 6210-01-F

## DEPARTMENT OF HEALTH AND HUMAN SERVICES

### Agency for Toxic Substances and Disease Registry

**[ATSDR-47]**

### Procedure for Conducting Voluntary Research

**AGENCY:** Agency for Toxic Substances and Disease Registry (ATSDR), Public Health Service (PHS), Department of Health and Human Services (HHS).

**ACTION:** Notice.

**SUMMARY:** This notice announces the procedure for volunteering to conduct research as part of the ATSDR Substance-Specific Applied Research Program authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. The voluntary research will be conducted by the private sector to fill priority data needs for hazardous substances that are the subjects of the ATSDR Toxicological Profiles. To date, the priority data needs for 36 hazardous substances have been identified and announced by ATSDR in the Federal Register (56 FR 52178) on October 17, 1991. As part of this procedure for conducting voluntary research, the Agency has developed a model agreement, Memorandum of Understanding (MOU), that will be signed by ATSDR and the interested private sector organization(s) (hereinafter referred to as the Company, although multiple companies or a consortium may be signatories to a single MOU) prior to the initiation of the voluntary research. The public is invited to comment on this procedure for conducting voluntary research, and the model MOU.

**DATES:** The ATSDR considers this voluntary research effort to be of significant importance to the continuing development of the Substance-Specific Applied Research Program. Therefore, public comments concerning this Federal Register notice will be accepted throughout the Agency's involvement with voluntary research.

**ADDRESSES:** Comments on this notice should bear the docket control number ATSDR-47 and should be submitted to the Division of Toxicology, Research Implementation Branch, Agency for Toxic Substances and Disease Registry, Mailstop E-29, 1600 Clifton Road NE., Atlanta, Georgia 30333. Requests for a copy of the model Memorandum of Understanding should be addressed similarly.

Comments on this notice will be available for public inspection at the Agency for Toxic Substances and Disease Registry, Building 33, Executive Park Drive, Atlanta, Georgia (not a mailing address), from 8 a.m. until 4:30 p.m., Monday through Friday, except for legal holidays.

**FOR FURTHER INFORMATION CONTACT:** The Division of Toxicology, Research Implementation Branch, Agency for Toxic Substances and Disease Registry, Mailstop E-29, 1600 Clifton Road NE., Atlanta, Georgia 30333. Telephone: 404-639-6015 or FTS 236-6015.

**SUPPLEMENTARY INFORMATION:**

## Background

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9604(i)), as amended by the Superfund Amendments and Reauthorization Act (SARA) (Pub. L. 99-499), requires that ATSDR: (1) Develop jointly with the Environmental Protection Agency (EPA) a list of hazardous substances found at National Priorities List (NPL) sites, (in order of priority), (2) prepare Toxicological Profiles of these substances, and (3) assure the initiation of a research program to fill identified data needs associated with the substances.

The identification of the priority data needs for 36 priority hazardous substances was described in the Federal Register (October 17, 1991, 56 FR 52178), public comments were invited, and Companies were invited to volunteer to conduct research to fill specific priority data needs during the public comment period for that notice. Future Federal Register notices will announce (1) the final list of priority data needs for the 36 hazardous substances after public comments on these priority data needs have been addressed, (2) a second call for voluntarism to conduct research to fill priority data needs, and (3) the names of Companies that have volunteered to fill specific priority data needs.

The major purpose of this ATSDR Applied Research Program is to supplement the substance-specific informational needs of the public and scientific community; and to supply necessary information for conducting comprehensive public health assessments for populations living in the vicinity of hazardous waste sites. This program will also provide data that can be generalized to other substances or areas of science, including risk assessments of chemicals, thus creating a scientific base for filling a broader range of data needs.

## Procedure for Conducting Voluntary Research

CERCLA, as amended in section 104(i)(5)(D), states that it is the sense of Congress that the costs for conducting this research program be borne by the manufacturers and processors of the hazardous substances under the Toxic Substances Control Act (TSCA) and registrants under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), or by cost recovery from responsible parties under CERCLA. To effectuate this statutory intent, the ATSDR has developed a plan whereby portions of this CERCLA Substance-Specific Applied Research Program will be conducted via regulatory mechanisms (TSCA/FIFRA), private sector voluntarism, and through the direct use of CERCLA funds.

ATSDR intends to enter into voluntary research projects in ways that lead only to high quality scientific work. This necessitates peer review of study protocols and results consistent with CERCLA section 104(i)(13). CERCLA requires the peer review panel to consist of three to seven peer reviewers who (a) are selected by the Administrator of ATSDR, (b) are disinterested scientific experts, (c) have a reputation for scientific objectivity, and (d) who lack institutional ties with any person involved in the conduct of the study or research under review.

The ATSDR is aware of concerns within some segments of the public regarding voluntary research conducted by Companies with vested interests in the research. To this end, the Agency encourages the public to comment on ATSDR's procedure for conducting voluntary research in this notice. Additionally, for each research project conducted voluntarily, the MOU (signed by ATSDR and the interested Company), the ATSDR approved study plan, peer reviewers' comments, and the final research report will be available for public inspection at the location and times indicated in the **ADDRESSES** section of this notice.

The ATSDR encourages Companies to volunteer to conduct research on priority data needs that were announced in the Federal Register notice "Identification of Priority Data Needs for 36 Priority Hazardous Substances" (October 17, 1991, 56 FR 52178) and on priority data needs to be subsequently announced by the Agency. Interested Companies are asked to submit concept proposals (1-2 pages, not detailed protocols) during the October 17, 1991-January 15, 1992 public comment period for the above-mentioned notice, and for subsequent Federal Register notices. The concept proposal should include (1) the name of the interested Company, (2) the specific priority data need(s) to be filled, (3) a summary of the Company's experience in conducting research similar to that in the concept proposal, and (4) a statement about the laboratory and other resource capabilities for conducting the proposed research. Interested Companies may submit concept proposals that address substance-specific data needs or, where appropriate, concept proposals for research that will provide information relevant to classes of chemical substances or which may be generalized to other areas of science.

A tri-agency review committee comprised of scientists from ATSDR, National Toxicology Program (NTP), and the EPA will review these concept proposals. The committee, chaired by the Director of the Division of Toxicology, ATSDR, is charged with coordinating and assuring the appropriate evaluation of research conducted to fill priority data needs of ATSDR's priority hazardous substances relevant to the objectives of CERCLA, as amended. The principal responsibilities of the committee are to (1) provide a forum to discuss substance-specific research activities being carried out via TSCA/FIFRA, private sector voluntarism, or CERCLA funds, (2) coordinate knowledge of research activities to avoid duplication of research being conducted in other programs and under other authorities, and (3) maintain a scheduled forum that provides an overall review of the ATSDR Superfund Applied Research Program. Based on the review committee's recommendations, ATSDR will determine which, and how, specific voluntary research projects will be pursued with volunteering Companies. In instances where volunteered research initiatives are considered by the tri-

agency committee to be more appropriate for EPA response. EPA may negotiate directly with the interested Company.

If ATSDR decides to pursue a specific voluntary research project submitted in a concept proposal by a Company, the Agency will enter into a MOU with the interested Company, or where appropriate, a single MOU will be entered into with multiple Companies. ATSDR recognizes that two or more companies or a consortium of interested firms may elect to enter into collaborative efforts in pursuing one or more concept proposals. Following the signing of the MOU and prior to the initiation of the research, the interested Company will negotiate with ATSDR to agree upon an approved study plan including testing protocols. The content of the MOU is described below.

(1) Identification of the party or parties comprising the Company which enters into the MOU—this section consists of the name and address of each party responsible for the conduct of the research.

(2) Identification of the substance(s) subject to research requirements under the MOU—this section consists of the name and Chemical Abstract Service (CAS) Number of the chemical substance(s) that is the subject of the MOU. The chemical substance(s) to be tested shall be as pure as reasonably can be attained. Alternate language will be substituted when the subject of the research is a human population, as in epidemiologic studies.

(3) Identification of the effects or characteristics for which research is to be conducted—in this section, the health effects, environmental fate or other characteristics for which research is to be conducted under the MOU shall be listed.

(4) Schedule for submission of study plans, initiation of research and submission of interim and final reports—the Company shall submit to ATSDR a study plan for each test six weeks after signing the MOU. The study plan shall include test protocols and a schedule with reasonable timetable and deadlines for initiation and completion of each test and submission of interim and final reports. The test protocols will be reviewed by an ATSDR-appointed peer review panel. If ATSDR disapproves the study plan, it will inform the Company of the deficiencies of the plan. The Company may request reconsideration of the study plan, resubmit a modified study plan, or elect to terminate the MOU with no further obligation of either party under the MOU. In the event that the Company resubmits a modified study plan and ATSDR disapproves it, the Agency may elect to terminate the MOU.

The starting date of the research project may be negotiated depending on the type of research being conducted. However, as a general guideline, the research effort shall be initiated within eight weeks of the approval of the study plan and attendant test protocols. Written notification of the starting date of the test will be submitted to ATSDR by the Company. The completion date of the study will be established from the approved study plan. Interim progress reports shall be submitted to ATSDR within six months after the initiation of testing and thereafter within six months after submission of each previous interim report. The final report on the results of testing shall be submitted to ATSDR no more than 20 weeks following the end of the study. ATSDR acceptance of the final report will be contingent upon approval by ATSDR following the peer reviewers' recommendations, consistent with CERCLA section 104(i)(13) peer review requirements. All results of research conducted pursuant to the MOU and all supporting data associated with the research report will be provided to ATSDR and made available by the Agency to the public as part of its implementation of sections 104(i) (3) and (5) of CERCLA. Final reports will not be accepted if the data is designated Confidential Business Information (CBI) or otherwise restricted from public disclosure.

(5) Modifications of study plans, guidelines, and schedules—if a Company intends to modify a study plan, protocol, or schedule that was approved by ATSDR, it must notify ATSDR in writing of the proposed modifications and reasons therefor. If ATSDR approves of the modifications, the time schedule established for completion of the tests shall be re-negotiated and appended to the existing MOU. If ATSDR disapproves the Company's request and the Company does not accept ATSDR's decision to disapprove the modified study plan, the Company may terminate the MOU.

(6) Observance of Good Laboratory Practices—all research agreed to in the MOU shall be conducted in accordance with the Good Laboratory Practice (GLP) standards codified in 40 CFR 792, to the extent that such GLP standards apply. Should the Company's Good Epidemiology Practices be relevant to a research project, those Practices should be affixed to the study protocol.

(7) Inspections—the Company shall ensure that an authorized employee of ATSDR is permitted, at reasonable times and in a reasonable manner, to (i) inspect any research or testing facility that is conducting research pursuant to the MOU, and (ii) inspect (and in the case of records, copy) any records and specimens required to be maintained in connection with research performed pursuant to the MOU.

(8) Submission and publication of data—all data and reports submitted to ATSDR pursuant to the MOU shall be sent to ATSDR, in duplicate, at the address indicated in the ADDRESSES section. Acceptance of the final report is contingent upon approval by ATSDR following the peer reviewers' recommendations, consistent with CERCLA peer review requirements. The Company maintains all rights to publication of data and results, however all results of research conducted pursuant to the MOU and all supporting date associated with the final research report will be provided to ATSDR and made available by the Agency to the public as part of its implementation of Section 104(i)(5) of CERCLA. The final report will not be accepted by ATSDR if the data is designated Confidential Business Information (CBI) or is otherwise restricted from public disclosure.

(9) Payments of costs and expenses—each company shall agree to pay all costs, direct and indirect, associated with the research programs and which are not considered part of ATSDR's administrative costs.

(10) Events constituting a breach of the MOU—Failure by the Company to:

(a) Submit a study plan that receives ATSDR's approval following the peer reviewers, recommendations:

(b) Initiate any test agreed to in the MOU by the date established pursuant to the MOU;

(c) Adhere to GLP standards, established test procedures or accepted practices of good science to the extent that these standards and practices apply;

(d) Submit any interim report required under the MOU by the date established pursuant to the MOU; or

(e) Submit any final report that receives ATSDR's approval following peer review conducted by the Agency, shall constitute a breach of the MOU. In the event of a breach, ATSDR will not impose any claim to damages, but at the Agency's discretion may terminate the MOU.

(11) Termination—since the MOU is entered into voluntarily by ATSDR and the Company, termination by ATSDR is not considered reviewable agency action pursuant to the Administrative Procedure Act or any other applicable Federal law, and there will be no appeal

process beyond that set out in the MOU. The Company may elect to terminate the MOU at any time.

(12) Statutory compliance—consistent with section 104(i)(12) of CERCLA, as amended (42 U.S.C. 9612), nothing in the MOU shall be construed to delay or otherwise affect or impair the authority of the President, the Administrator of ATSDR or the Administrator of EPA to exercise any of their authority under any other provision of law, including TSCA and FIFRA, or the response and abatement authorities of CERCLA.

The results of the research conducted via this ATSDR Substance-Specific Applied Research Program will be used for public health assessment purposes and to reassess ATSDR's substance-specific priority data needs. It is the intention of the Agency, at this time, to re-evaluate the priority data needs for the listed hazardous substances every three years.

Dated: February 3, 1992.

**Walter R. Dowdle,**

*Acting Administrator, Agency for Toxic Substances and Disease Registry.*

[FR Doc. 92-2978 Filed 2-6-92; 8:45 am]

BILLING CODE 4160-70-M

## Alcohol, Drug Abuse, and Mental Health Administration

### Suspension Lifted; Laboratory Again Meets Minimum Standards To Engage in Urine Drug Testing for Federal Agencies

**AGENCY:** National Institute on Drug Abuse, HHS.

**ACTION:** Notice.

**SUMMARY:** The Department of Health and Human Services notifies Federal Agencies of the laboratories currently certified to meet standards of Subpart C of Mandatory Guidelines for Federal Workplace Drug Testing Programs (53 FR 11986) dated April 11, 1988. The following laboratory's certification to engage in urine drug testing for Federal Agencies was suspended on October 15, 1991 (56 FR 54582, October 22, 1991) and was reinstated effective February 4, 1992.

HealthCare/Preferred Laboratories, 24451 Telegraph Road, Southfield, MI 48034, 800-225-9414 (outside MI), 800-328-4142 (inside MI).

**FOR FURTHER INFORMATION CONTACT:** Mona W. Brown, Press Officer, National Institute on Drug Abuse, room 10-A-39, 5600 Fishers Lane, Rockville, Maryland 20857; Telephone (301)-443-6245.

**Richard A. Millstein,**

*Acting Director, National Institute on Drug Abuse.*

[FR Doc. 92-3085 Filed 2-6-92; 8:45 am]

BILLING CODE 4160-20-M

### National Institute of Mental Health; Meetings

Pursuant to Public Law 92-463, notice is hereby given of the meetings of the advisory committees of the National Institute of Mental Health for February/March 1992.

The initial review groups will be performing review of applications for Federal assistance; therefore, portions of these meetings will be closed to the public as determined by the Administrator, ADAMHA, in accordance with 5 U.S.C. 552b(c)(6) and 5 U.S.C. app. 2 10(d).

Summaries of the meetings and rosters of committee members may be obtained from: Ms. Joanna L. Kieffer, NIMH Committee Management Officer, Alcohol, Drug Abuse, and Mental Health Administration, Parklawn Building, room 9-105, 5600 Fishers Lane, Rockville, MD 20857 (Telephone: 301-443-4333).

Substantive program information may be obtained from the contacts whose names, room numbers, and telephone numbers are listed below.

*Committee Name:* Mental Health Small Business Research Review Committee.
*Meeting Date:* March 2-3, 1992.
*Place:* Washington Marriott, 1221 22nd Street, NW, Washington, DC 20037.
*Open:* March 2, 9-10:30 a.m.
*Closed:* Otherwise.
*Contact:* Gloria Lavin, room 9C-14, Parklawn Building, Telephone (301) 443-1367.

*Committee Name:* Treatment Assessment Review Committee.
*Meeting Date:* March 2-3, 1992.
*Place:* Embassy Suites, 4300 Military Road, NW, Washington, DC 20015.
*Open:* March 2, 6:30-9:30 a.m.
*Closed:* Otherwise.
*Contact:* Barbara Campbell, room 9C-02, Parklawn Building, Telephone (301) 443-4868.

*Committee Name:* Child Psychopathology and Treatment Review Committee.
*Meeting Date:* March 9-11, 1992.
*Place:* Holiday Inn Chevy Chase, 5520 Wisconsin Avenue, Chevy Chase, MD 20815.
*Open:* March 9, 9-10 a.m.
*Closed:* Otherwise.
*Contact:* Doris Lee Robb, room 9C-15, Parklawn Building, Telephone (301) 443-6470.

*Committee Name:* Behavioral, Clinical, and Psychosocial Subcommittee of the Mental Health AIDS and Immunology Review Committee.
*Meeting Date:* March 11-12, 1992.
*Place:* Holiday Inn Chevy Chase, 5520 Wisconsin Avenue, Chevy Chase, MD 20815.
*Open:* March 11, 8:30-9:30 a.m.
*Closed:* Otherwise.
*Contact:* Regina M. Thomas, room 9C-15, Parklawn Building, Telephone (301) 443-6470.

*Committee Name:* Psychobiological, Biological, and Neuroscience Subcommittee of the Mental Health AIDS and Immunology Review Committee.
*Meeting Date:* March 11-12, 1992.
*Place:* Holiday Inn Chevy Chase, 5520 Wisconsin Avenue, Chevy Chase, MD 20815.
*Open:* March 11, 8:30-9:30 a.m.
*Closed:* Otherwise.
*Contact:* Rehana A. Chowdhury, room 9C-15, Parklawn Building, Telephone (301) 443-6470.

*Committee Name:* Clinical Subcommittee, Mental Health Special Project Review Committee.
*Meeting Date:* February 28, 1992.
*Place:* Holiday Inn Crowne Plaza, 66 Hale Avenue, White Plains, NY 10601.
*Open:* February 28, 8:30-9 a.m.
*Closed:* Otherwise.
*Contact:* Gewn Artis, room 9-C18, Parklawn Building, Telephone (301) 443-3944.

Dated: February 4, 1992.

**Peggy W. Cockrill,**

*Committee Management Officer, Alcohol, Drug Abuse, and Mental Health Administration.*

[FR Doc. 91-3024 Filed 2-6-92; 8:45 am]

BILLING CODE 4160-20-M

## Centers for Disease Control

### National Committee on Vital and Health Statistics (NCVHS) Subcommittee on State and Community Health Statistics; Cancellation of Meeting

This notice announces the cancellation of a previously announced meeting.

Federal Register *Citation of Previous Announcement: 57 FR 3056, January 27, 1992.*

*Previously Announced times and Dates:* 1 p.m.-5 p.m., February 20, 1992. 9 a.m.-5 p.m., February 21, 1992.

# RM1 Meeting Summary

**DATE:** March 4, 1992
**SUBJECT:** Screening-Level Testing of TRI Chemicals
**CHAIRMAN:** Charlie Auer
**COODINATOR:** Carol Glasgow
**SUPPORTING DOCS.:** Briefing paper on TRI Testing Proposal

**BACKGROUND:**

The RM1 meeting was held to discuss options for acquiring screening-level testing data on high-production-volume high-release (HP/R) chemicals listed on the Toxics Release Inventory (TRI). The goal of this effort is to identify and acquire a consistent minimum set of screening data on the HP/R TRI chemicals to help set priorities for further testing, assessm nt, and risk reduction activities, as needed, on TRI chemicals.

HP/R TRI chemicals were defined by applying the proposed section 4(a)(1)(B) policy release criteria to the TRI list of chemicals (i.e., production volume over one million pounds, and release over one million pounds or over 10% of production). Th list will be adjusted to reflect any changes in the final published "B policy" criteria.

The original list of 90 HP/R TRI entries, was pared d wn to 73 chemicals at an initial RM1 meeting on April 3, 1991, by excluding the metals categories, inorganic acids and bases, and cyanides category. This list was reviewed to determine th availability of test data of various types. Data gaps for the chemicals were estimated from a matrix, prepared by OPPT's Health and Environmental Review Division, showing the availability of endpoint data on TRI chemicals (attached). This document includes a discussion of the method used to construct the matrix; judgments of data availability and adequacy would need confirmation to support formal section 4 rulemaking.

The list was annotated to indicate high-priority chemicals included on the CAA's Air Toxics list (5 TRI chemicals), the Superfund Amendments and Reauthorization Act §110 (ATSDR) list (10 TRI chemicals), or scheduled for handling under phases 1 to 3 of the Organization for Economic Cooperation and Development's (OECD's) Screening Information Data Set (SIDS) program to obtain screening-level testing on international high production v lume chemicals (9 TRI chemicals). The resulting table (attached) was considered at the March 4, 1992 RM1 meeting.

Decisions/Recommendations

a. The SIDS test set was selected for the TRI screening effort.

b. For the 9 TRI chemicals being handled under the OECD's SIDS program, there is no need for action at this time beyond that which is underway with OECD.

c. Fourteen (14) chemicals are high priority for testing under the Air Toxics and ATSDR efforts. Pending development of the testing needs for these chemicals under those efforts (principally health effects and some fate testing), they should be included within th TRI screening testing effort for those endpoints (m st likely ecotox and possibly some fate testing) not covered by these other programs. The chemicals identified for the TRI screening effort should be added to the Master Testing List.

d. The remaining 64 chemicals will be handled as described in (e) and (f).

e. A SIDS "dossier" (HPV form 1) needs to be prepared for each of the chemicals to summarize the available data and to match data gaps with the SIDS test set. Options for this step are:

1 - Approach industry about voluntarily handling this responsibility, either independently or as an adjunct to the OECD SIDS program.

2 - Use EPA contractor resources to determine the availability and adequacy of the data.

f. Following this step, testing needs to be undertaken to provide a full SIDS set on the HP/R TRI chemicals. This could be realized via voluntary testing link d to the OECD SIDS effort, one or more consent orders, or a test rule. No decision was made at the RMI meeting as to the course of action for obtaining the testing.

g. Following discussion with industry, item (e) (SIDS dossier preparation) should be initiated in som form, after which steps will be taken to ensure the development of the needed SIDS data using one or more of the options noted under (f).

Toxics Release Inventory (TRI) Chemicals Produced at >10[6] Pounds and Having TRI Releases >10[6] Pounds Annually
(Metals, inorganic acids and bases and cyanides were deleted from the initial list in the first ORT meeting)

| CAS NO. | CHEMICAL | TOTAL RELEASE | ATSDR RATING[a] | CAG[b] | TOXICITY CODE[c] | COMMENT |
|---|---|---|---|---|---|---|
| 000050000 | FORMALDEHYDE | 21,956,640 | 22B | + | DT,RT | Well tested |
| 000056235 | CARBON TETRACHLORIDE | 3,506,563 | 33+ | + | CI,E,I,EE | High-priority ATSDR |
| 000062533 | ANILINE | 3,885,102 | 28A | + | HDT,RT,ET | § 4 chemical |
| 000067561 | METHANOL[d] | 267,745,988 | 29S | + | C,DT,RT,AT,CT,ET | Undergoing EPA evaluation |
| 000067630 | ISOPROPYL ALCOHOL[d] | 5,617,010 | 25D | | HAT,ET | § 4 chemical |
| 000067641 | ACETONE | 205,019,000 | 99 | | HC,DT,AT | Proposed § 4 |
| 000067663 | CHLOROFORM | 25,542,339 | 8+ | + | CI,E | High-priority ATSDR |
| 000071363 | N-BUTYL ALCOHOL | 39,026,305 | | | HAT,ET | Proposed § 4 |
| 000071432 | BENZENE | 25,634,759 | 5+ | + | DT,AT,CI,HT,E | High-priority ATSDR |
| 000071556 | 1,1,1-TRICHLOROETHANE | 168,717,023 | 66 | + | HAT | § 4 chemical |
| 000074839 | BROMOMETHANE | 2,646,105 | - | + | DT,RT | |
| 000074851 | ETHYLENE[d] | 41,431,966 | | | C,HT,RT,AT,HT,ET | SIDS[e] Phase 2 |
| 000074873 | CHLOROMETHANE | 9,165,367 | 19D | + | HAT,HT,ET | § 4 chemical |
| 000075003 | CHLOROETHANE | 4,860,070 | 13D+ | + | HDT,CI,E,H,ET | High-priority ATSDR |
| 000075014 | VINYL CHLORIDE | 1,276,146 | 6+ | + | DT,RT,AT,CI,E,ET | High-priority ATSDR |
| 000075058 | ACETONITRILE | 19,512,589 | | | HHT,ET | SIDS Phase 2 |
| 000075070 | ACETALDEHYDE | 9,541,445 | | | DT,RT,CT,HT | SIDS Phase 2 |
| 000075092 | DICHLOROMETHANE | 110,261,746 | 52+ | + | HDT,AT,CI,ET | High-priority ATSDR |
| 000075150 | CARBON DISULFIDE | 99,844,642 | 12D | ++ | C,AT | High-priority CAA |
| 000075218 | ETHYLENE OXIDE | 3,879,692 | | + | B | § 4 chemical, NOE |
| 000075569 | PROPYLENE OXIDE | 2,876,705 | | + | B | § 4 chemical |
| 000075650 | TERT-BUTYL ALCOHOL | 2,404,636 | | | C,DT,RT,AT,CT,HT,ET | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 000076131 | FREON 113' | 67,837,298 | - | | C,DT,RT,AT,HT,ET | CFC; extensive testing by industry |
| 000078875 | 1,2-DICHLOROPROPANE | 1,244,912 | 237 | + | DAT,CT | § 4 chemical |
| 000078933 | METHYL ETHYL KETONE | 128,062,677 | 137 | + | BC,AT,ET | SIDS Phase 2 |
| 000079016 | TRICHLOROETHYLENE | 44,343,286 | 10+ | + | AT,HT,E,I | High-priority ATSDR |
| 000079061 | ACRYLAMIDE | 6,666,340 | | | DHT | § 4 chemical, regulated |
| 000079107 | ACRYLIC ACID | 19,091,269 | | + | BC,HT | § 4 Consent Order |
| 000080626 | METHYL METHACRYLATE | 3,375,812 | - | ++ | C,AI,HT,ET | High-priority CAR |
| 000088891 | PICRIC ACID | 1,266,212 | 210 | | C,DT,RT,AT,CT,HT | Low environmental release |
| 000091203 | NAPHTHALENE | 3,615,520 | 40 | + | C,DT,AT,HT | |
| 000092524 | BIPHENYL | 1,268,062 | - | + | BC,RT,AT,HT | Limited screening-level testing needed |
| 000095476 | O-XYLENE | 1,885,764 | 197 | + | C,AT,HT | |
| 000095636 | 1,2,4-TRIMETHYLBENZENE | 4,855,251 | | | DHT,AT,HT | § 4 chemical |
| 000098828 | CUMENE | 4,436,527 | | + | BC,RT,AT | § 4 chemical |
| 000100414 | ETHYLBENZENE | 8,706,585 | 66 | + | BC,AT,HT | Limited screening-level testing needed |
| 000100425 | STYRENE | 33,569,285 | 234 | + | RT,AI,HT | Limited screening-level testing needed |
| 000106423 | P-XYLENE | 4,724,374 | 249 | + | C,AT,CT,HT | SIDS Phase 2 |
| 000106467 | 1,4-DICHLOROBENZENE | 1,594,350 | 38 | + | DHT,AT,HT | § 4 chemical |
| 000106990 | 1,3-BUTADIENE | 5,697,286 | 259 | + | AI | Regulated |
| 000107062 | 1,2-DICHLOROETHANE | 5,388,282 | 61 | + | AT,HT,ET | In RMI |
| 000107131 | ACRYLONITRILE | 10,182,750 | 304 | + | HT | Under RMI evaluation |
| 000107211 | ETHYLENE GLYCOL | 26,052,155 | - | + | C,DT,RT,AT,HT,ET | SIDS Phase 2 |
| 000108054 | VINYL ACETATE | 6,722,319 | - | + | C,DT,RT,AT,HT | |
| 000108101 | METHYL ISOBUTYL KETONE | 31,231,111 | 209 | + | BC,DT,RT,AT,ET | SIDS Phase 2 |
| 000108383 | M-XYLENE | 1,175,728 | 247 | + | BC,RT,HT | |
| 000108883 | TOLUENE | 256,633,748 | 35+ | + | DAT,CT,HT,H | High-priority ATSDR |
| 000108907 | CHLOROBENZENE | 4,282,994 | 65 | + | BC,DT,AI,HT | § 4 chemical |

| | | | | | | |
|---|---|---|---|---|---|---|
| 000108952 | PHENOL | 15,361,139 | 85 | ++ | BC | § 4 chemical; high-priority CAA |
| 000109864 | 2-METHOXYETHANOL | 2,735,177 | | + | C,AT,HT,ET | |
| 000110805 | 2-ETHOXYETHANOL | 1,748,485 | | + | BC,AT,ET | |
| 000110827 | CYCLOHEXANE[7] | 17,343,491 | 302 | | BAT | § 4 chemical, final in preparation |
| 000111422 | DIETHANOLAMINE | 1,356,260 | | + | C,DT,RT,AT,CT,HT | SIDS Phase 2 |
| 000115071 | PROPYLENE[7] | 23,538,864 | | | C,DT,RT,AT,CT,HT,ET | |
| 000117817 | DI(2-ETHYLHEXYL) PHTHALATE (DEHP) | 1,108,288 | 56+ | + | BAT,CT,HT,E,R | High-priority ATSDR |
| 000120821 | 1,2,4-TRICHLOROBENZENE | 1,108,686 | 145 | + | BAT,AT,HT | § 4 chemical |
| 000123728 | BUTYRALDEHYDE | 1,552,485 | | | BC,DT,HT,AT,CT,HT | SIDS Phase 2 |
| 000123911 | 1,4-DIOXANE | 1,060,050 | - | + | DT,RT,AT,CT,HT,ET | SIDS Phase 2; CSB review |
| 000126998 | CHLOROPRENE | 1,144,535 | | ++ | C,ET | High priority CAA |
| 000127184 | TETRACHLOROETHYLENE | 25,626,334 | 22+ | ++ | BT,RT,AT,CT,E | High-priority ATSDR and CAA |
| 000463581 | CARBONYL SULFIDE | 17,990,444 | | + | C,DT,RT,AT,HT,ET | |
| 001319773 | CRESOL (MIXED ISOMERS) | 2,973,477 | 283 | + | BC,HT | SIDS Phase 3; § 4 chemical |
| 001330207 | XYLENE (MIXED ISOMERS) | 148,289,981 | 68 | + | BC,AT,HT | |
| 001634044 | METHYL TERT-BUTYL ETHER[7] | 3,040,050 | 231 | + | BAT,ET | § 4 chemical |
| 006484522 | AMMONIUM $NH_4$ (SOLUTION)[7] | 64,618,089 | | | C,DT,RT,AT,HT,ET | CSB document on ammonia |
| 007783202 | AMMONIUM $NH_3$ (SOLUTION)[7] | 545,989,541 | | | C,DT,RT,AT,CT,HT | CSB document on ammonia |
| 010049044 | CHLORINE DIOXIDE | 6,992,636 | | | C,AT,CT,HT,ET | |

[4] Agency for Toxic Substances and Disease Registry chemicals. The numbers given below are the priority ratings of these chemicals, and those with a + after the number are those chosen for first testing. A minus in the column signifies that the chemical was removed from this list.

[5] Clean Air Act chemicals. A plus in the column below indicates whether these are listed in the CAA for testing, and a second plus indicates those that received a priority for testing.

[6] The information presented in this column was taken from the HERD Section 313 Toxicity Matrix List from August 1988, or from the list of ATSDR priority toxics (underlined).

C = Oncogenicity

DT = Developmental Toxicity
RT = Reproductive Toxicity
AT = Acute Toxicity
CT = Chronic Toxicity
NT = Neurotoxicity
ET = Environmental Toxicity
EF = Env. Fate, identified by ATSDR
E = Epidemiology
M = Metabolism/Toxicokinetics
I = Immunotoxicity
B marks information assessment by CTB Section 4 Test Rules review of these chemicals.

* These chemicals were dropped from the list of chemicals to be tested by the workgroup - Freon 113, isopropyl alcohol, methanol and cyclohexane because of extensive testing required or proposed by EPA, and the ammonium compounds because of delisting petitions.

• Scheduled for handling under the indicated phases of the Organization for Economic Cooperation and Development's Screening Information Data Set

# SUPPORT DOCUMENTATION FOR THE SARA TITLE III, SECTIONS 313/322 TOXICITY MATRIX

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August 17, 1988

LEGISLATIVE BACKGROUND

The Toxic Emissions Inventory was established by Congress under Title III, Section 313 of the Superfund Amendments and Reauthorisation Act (SARA). The Inventory is composed of chemicals on the list appearing in Committee Print Number 99-169 of the Senate Committee on Environment and Public Works entitled "Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986." The Inventory includes toxic chemicals originally listed under the authorities of the States of New Jersey and Maryland.

Any person may petition the Administrator of the Environmental Protection Agency (EPA) to add or delete a chemical from the inventory. Chemicals may be added to the Emissions Inventory if the Administrator determines that there is sufficient evidence to establish that the chemical is known to cause or can be reasonably anticipated to cause one of the following:

- Adverse acute human health effects at levels reasonably likely to exist beyond site boundaries as a result of continuous or frequently recurring releases;
- Cancer or developmental toxicity or serious or irreversible
  - -- Reproductive dysfunctions,
  - -- Neurological disorders,
  - -- Heritable genetic mutations and chromosomal mutations, and
  - -- Other chronic health effects; or
- Adverse effects on the environment caused by a chemical's
  - -- [redacted]icity,
  - -- Toxicity and persistence in the environment, and
  - -- Toxicity and bioaccumulation in the environment.

PROJECT PROPOSAL

Section 322 of SARA allows manufacturers and processors to declare chemical identity trade secret and further requires that when a chemical identity is declared trade secret, EPA shall identify the adverse health and environmental effects associated with the toxic chemical. In providing this hazard information, EPA is obligated to provide this information in a manner in which trade secret information can not be revealed. Descriptions of tests, effective dose levels, citations, and certain other information are believed capable of "fingerprinting" chemical identity, and therefore, these types of data can not be provided in fulfillment of Section 322.

In an effort to analyze the few available options possible under Section 322, the Agency utilized the results of an early screening exercise conducted by EPA in October 1986 to capture and describe the rationale used by New Jersey and Maryland in the development of their respective lists and developed an expanded toxicity data matrix for the combined list of 329 toxic chemicals (EPA 1987). The matrix was intended to identify those adverse health and environmental effects that have been reported to be associated with each toxic chemical. For the purposes of analysis, chemicals were separated into the EPA trade secret categories proposed in the Federal Register notice of June 4, 1987 and listed by CAS registry number and name. The health and environmental endpoints in[redacted] in this analysis were limited to those indicated in Section 313: carcin[redacted]city, heritable genetic and chromosomal mutations, developmental toxicity (including teratogenicity), reproductive toxicity, acute and chronic toxicity, neurotoxicity, environmental toxicity, and persistence and bioaccumulation in the environment.

The original toxicity matrix was a summary presentation of information publicly available through a number of accessible databases [Hazardous Substances Databank (HSDB), RTECS, GENETOX, AQUIRE, ENVIROFATE, Log P database, and CHEMTRACK]. Agents for which available data suggested sufficient evidence that exposure to the agent potentially results in or is "reasonably anticipated" to result in one or more health or environmental effect were indicated with an "X" in the appropriate fields on the matrix. The absence of an "X" for a particular health or environmental effect did not suggest that a chemical is not a potential human or environmental toxicant but that either data to support a concern were not available at this time or that the available data did not suggest sufficient evidence of potential toxicity. The sour e(s) of data from which the "X" was determined was documented so that it was possible to alter the list if new data are identified or if it was determined that any particular data source was inappropriate or inadequate. It should be noted that Clement did not validate the data reported in the databases and that some of the databases examined were not peer revisved. An "X" indicated the availability of data relative to an effect; it did not indicate severity or validity of concern. In addition, a prime number program was developed with which an analysis of "uniqueness" within each trade secret category could be conducted. This allowed the Agency to determine whether it would be revealing trade secret [redacted]city by giving requesters a category name and the specific toxicities a[redacted]ated with a specific chemical within that category.

In an effort to provide a useful tool in developing options for meeting the requirements of SARA 322 and in disseminating summary toxicity information of released chemicals, Clement updated the original toxicity matrix to ensure that the information presented in the matrix is confirmed, documented, and

reflects current information and Agency decisions. This entailed assuring the Agency that an "X" is listed when appropriate by examining additional, recent sources of information not previously examined when the original toxicity matrix was prepared. Further, the updated matrix includes a review of toxicity data on chemical compounds within the 21 Section 313 chemical categories defined by EPA (EPA 1987).

PREPARATION OF THE UPDATED TOXICITY MATRIX

The health and environmental concerns examined are those stated in Section 313 of SARA [carcinogenicity, heritable genetic and chromosomal mutation, developmental toxicity (including teratogenicity), reproductive toxicity, acute toxicity, chronic (systemic) toxicity, neurotoxicity, environmental toxicity, tendency to bioaccumulate in the environment, and persistence in the environment]. The updated toxicity matrix is a summary of toxicology information available in a number of recent review documents prepared primarily by EPA and the Agency for Toxic Substances Disease Registry (ATSDR). These documents provided data from which to confirm that an "X" is listed where appropriate and to add an "X" to the matrix if the data suggest that there is a concern. The documents reviewed by Clement include EPA Health Assessment Documents, Drinking Water Criteria Documents, Health and Environmental Effects Documents, Health and Environmental Effects Profiles, Ambient Water Quality Criteria Documents, and Health Effects Assessment Documents and ATSDR Draft Toxicological Profiles. When an "X" was confirmed for a chemical from data available in the review document, the original database reference was replaced with the appropriate document reference. If the original "X" could not be confirmed from data in the review document, the

original database reference was retained. A detailed discussion of the criteria used to list agents for each endpoint and the databases that were originally searched follows.

## HEALTH AND ENVIRONMENTAL ENDPOINTS

For the purposes of generating and updating the toxicity matrix for SARA Sections 313 and 322, thresholds or limitations were established for each of the health and environmental endpoints evaluated. These thresholds or limitations were used to determine if the available data potentially support concern for a given chemical hazard.

### A. Carcinogenicity

This category provides information on the known or potential human carcinogenicity of a chemical. For this endpoint, an "X" indicates that the available data support a concern for a chemical's carcinogenic potential if one or more of the following applied:

(a) A positive result was reported for that chemical in one or more animal species in an NCI or NTP bioassay;

(b) The chemical was classified by NTP as a known carcinogen or as a chemical anticipated to be a carcinogen;

(c) The IARC carcinogen classification for that chemical is 1, 2A, 2B, or 3 (with limited evidence from animal studies) or the IARC carcinogen classification is human positive or human suspected and/or animal positive or animal suspected;

(d) The EPA carcinogen classification for that chemical is A (human carcinogen), B1 or B2 (probable human carcinogen), or C (potential human carcinogen); or

(e) The Gene-Tox carcinogen evaluation of that chemical is sufficient positive or limited positive evidence of carcinogenicity.

The NTP bioassay results, NTP classification, and IARC, EPA, and Gene-Tox classifications for each agent are presented in the toxicity matrix under the appropriate column heads. The carcinogen bioassay results and classifications were obtained from the following sources:

- NTP bioassay results--CHEMTRACK database;
- NTP carcinogen classification--NTP Fourth Annual Report on Carcinogens;
- IARC classification--RTECS database, IARC Degrees of Evidence for Carcinogenicity in Humans and Experimental Animals and Overall Evaluations of Carcinogenicity to Humans for Agents Evaluated in IARC Monographs Volumes 1-42 (IARC Monographs Supplement 7), and List of NTP and IARC Carcinogens Issued as Appendix to OSHA Program Directive CPL 2-2.38A;
- EPA (Carcinogen Assessment Group) classification--CHEMTRACK database, IRIS database, Technical Background Document to Support Rulemaking Pursuant to CERCLA Section 102; and
- Gene-Tox carcinogen evaluation--GENETOX database.

The NTP, EPA, IARC, and Gene-Tox carcinogen classifications are based on weight-of-evidence schemes in which the carcinogenic potential of a chemical is evaluated. The NTP bioassay evaluation is limited to the results of carcinogen bioassays in experimental animals conducted by NTP and reflect whether a chemical was found to be positive or negative in the bioassay.

B. Heritable Genetic and Chromosomal Mutation

For this endpoint, an "X" indicates that the available data support concern that the chemical has the potential to produce heritable mutations in human germ cells. Valid positive results from studies on heritable mutation events (of any kind) in germ cells were sufficient evidence to indicate a potential positive response. In addition, evidence that an agent interacts with germ-cell DNA or other chromatin constituents or that it induces such endpoints such as unscheduled DNA synthesis, sister-chromatid exchange, r

chromosomal aberrations in germinal cells was sufficient evidence to indicate a potential positive response. The criterion used to indicate a positive response for an agent was a positive result in one or more of the following bioassays as reported in the results table for each chemical in the GENETOX database or in the appropriate section of an EPA or ATSDR review document:

(a) Drosophila melanogaster sex-linked recessive lethal test;

(b) Drosophila melanogaster heritable (reciprocal) translocation test;

(c) Mouse heritable translocation test;

(d) Drosophila melanogaster sex chromosome gain/loss (aneuploidy);

(e) Rodent dominant lethal test;

(f) Unscheduled DNA synthesis, sister-chromatid exchange, or chromosomal aberrations in germinal cells; and

(g) Mouse specific locus test (germ cells).

C. Developmental Toxicity

For this endpoint; an "X" indicates that the available data support concern that the chemical is known to cause or can reasonably be anticipated to cause developmental toxicity in humans. Developmental toxicity is any detrimental effect produced by exposures to developing organisms during embryonic stages of development and includes embryotoxicity, fetotoxicity, and teratogenicity. The major manifestations of developmental toxicity include: (1) prenatal or early postnatal death; (2) structural abnormalities; (3) altered growth (usually in the form of growth retardation); and (4) functional deficits which may include reduced pulmonary function, reduced immunological competence, neurobehavioral deficits such as learning disorders or mental retardation, etc. The exposure period may be prior to conception (either parent), during prenatal development, or postnatally to the time of

sexual maturation. Developmental effects, however, may be detected at any time in the lifespan of the organism.

An "X" is indicated for an agent if the available data provide evidence that the agent produces developmental toxicity at body doses of less than or equal to 1 g/kg/day. The HSDB and appropriate sections of the EPA and ATSDR review documents were examined for data on the developmental toxicity of an agent following inhalation, oral, or dermal exposure. When necessary, exposure doses were converted to body doses using the reference values for body weight, inhalation rate, water consumption, and food factors for each species recommended by EPA (1985).

D. Reproductive Toxicity

For this endpoint, an "X" indicates that the available data support concern that the chemical has adverse effects on male or female reproductive performance. Endpoints of concern include, but are not limited to, effects on gonadal function, estrous cycle, mating behavior, conception, parturition, lactation, and weaning.

An "X" is indicated for an agent if the available data provide evidence that the agent causes reproductive dysfunction or reproductive damage at body doses less than or equal to 1 g/kg/day. The HSDB and appropriate sections of the EPA and ATSDR review documents were examined for data on the reproductive toxicity of an agent following inhalation, oral, or dermal exposure. When necessary, exposure doses were converted to body doses using the reference values for body weight, inhalation rate, water consumption, and food factors for each species recommended by EPA (1985).

E. Acute Toxicity

For this endpoint, an "X" indicates that the available data support concern that short-term exposure to the chemical by the inhalation, oral, or dermal route has been determined to cause death.

An "X" is indicated for an agent if the available data provide evidence that the reported median of the lethal concentration ($LC_{50}$) for the agent following inhalation exposure for 8 hours or less was less than or equal to 5 mg/liter (5,000 $mg/m^3$); the reported median of the lethal dose ($LD_{50}$) for the agent following oral exposure was less than or equal to 250 mg/kg; or the $LD_{50}$ for the agent following dermal exposure was less than or equal to 500 mg/kg. The RTECS database and appropriate sections of the EPA and ATSDR review documents were examined for data on the acute toxicity of agents ($LC_{50}$ or $LD_{50}$ values) in mammals following short-term inhalation, oral, or dermal exposure. When necessary, doses expressed in ppm were converted to $mg/m^3$ using the ideal gas law (PV=nRT).

F. Chronic Toxicity

Chronic effects for the purposes of Section 313 (SARA) reporting are any adverse effects other than cancer observed in humans or animals resulting from long-term exposure to a chemical. In chronic toxicity studies, animals are usually exposed to a test chemical by inhalation, dermal, or oral routes for more than three months (90 days). Thus the observed adverse effects are due to continuous or frequently recurring insult of target organs with relatively small doses or low concentrations for a prolonged period of time.

An "X" is indicated for an agent if the available data provide evidence that the chemical produces adverse health effects at body doses of less than or

equal to 1 g/kg/day following inhalation, oral, or dermal exposure for more than 90 days. The HSDB and appropriate sections of the EPA and ATSDR review documents were examined for data on the chronic toxicity of an agent. When necessary, exposure doses were converted to body doses using the reference values for body weight, inhalation rate, water consumption, and food factors for each species recommended by EPA (1985).

G. Neurotoxicity

Neurotoxicity is any adverse effect on the structure or function of the central and/or peripheral nervous system related to exposure to a chemical substance. Neurotoxic effects may be morphological (neuropathological effects, biochemical changes) or functional (behavioral, electrophysiological, or neurochemical effects).

An "X" is indicated for an agent if the available data provide evidence that chronic (at least 90-days) inhalation, oral, or dermal exposure to the chemical is reported to result in morphological or functional neurotoxic effects at body doses of less than or equal to 1 g/kg/day. Reported biochemical changes in the absence of functional or histopathological effects was not considered an adequate basis for listing a chemical. The HSDB and appropriate sections of the EPA and ATSDR review documents were examined for data on the neurotoxicity of an agent following long-term exposure. When necessary, exposure doses were converted to body doses using the reference values for body weight, inhalation rate, water consumption, and food factors for each species recommended by EPA (1985).

H. Environmental Toxicity

Section 313 of SARA allows the Agency to add a chemical to the Emissions Inventory if it is known to cause or can reasonably be anticipated to cause a serious, significant adverse effect on the environment. The judgment may be based on toxicity alone or toxicity and a consideration of either persistence in the environment or tendency to bioaccumulate in the environment. The toxicity matrix contains information on the acute toxicity, bioaccumulation, and persistence of an agent. An $LC_{50}$ value of less than or equal to 100 ppm was considered to suggest sufficient evidence that a chemical is a potential environmental toxicant. For aquatic species, an "X" is indicated for an agent based on environmental toxicity if the available data provide evidence that the reported $LC_{50}$ for an agent for less than or equal to 96 hours is less than or equal to 100 ppm; if the reported $LC_{50}$ for an agent is less than or equal to 100 ppm and the chemical has a half-life of greater than or equal to 4 days; of if the reported $LC_{50}$ for an agent is less than or equal to 100 ppm and the chemical has a log bioconcentration factor greater than or equal to 3, a measured log P of greater than or equal to 4.35, or an estimated log P of greater than or equal to 5.5.

The environmental toxicity column that indicates $LC_{50}$ values of less than or equal to 10 ppm is included in the matrix because chemicals that are reported to have $LC_{50}$ values of less than or equal to 10 ppm are of greater concern as potential toxicants, and this information may be used to set priorities for further review. The data in this column are not included in the algorithm analysis. The data for environmental toxicity were obtained from the following data bases: AQUIRE (acute aquatic toxicity), ENVIROFATE (bioconcentration factors, half-lives) and log P (measured log P values) and

from the appropriate sections of the EPA and ATSDR review documents. The AQUIRE database contains reviews of aquatic toxicity studies and ranks the reliability of each study on a scale of 1 to 4. A study reliability of 1 indicates that the study is reliable, reliability 2 indicates that the study is generally satisfactory, reliability 3 indicates that the study is not reliable, and reliability 4 indicates that the AQUIRE entry is a review of a study abstract or summary from a foreign paper. The reliability of the data obtained from the AQUIRE database used to determine an "X" for an environmental toxicant is documented on the matrices; when possible, the most reliable data were used to determine an "X."

DOCUMENTATION

The sources of the data found in the toxicity matrix are documented (coded) so that it is possible to alter the list if new data are identified or if it is determined that any particular data source is inappropriate or inadequate. A list of notes detailing the sources of data and the NTP, IARC, EPA, and Gene-Tox carcinogen evaluations accompanies the toxicity matrix provided to the Agency.

DATA SOURCES

For the preparation of the initial matrix, a number of databases were searched for data that met the appropriate criteria to indicate a positive response on the matrix for an agent. The search strategy for each database is presented below. Hard copy of each of the database searches and the appropriate sections of each EPA or ATSDR review document were manually reviewed for health or environmental data that met the EPA-proposed criteria

for a positive response.

RTECS SEARCHING SYSTEM (VERSION 6.5/14.2 JANUARY 1986)

The RTECS database was accessed and searched for IARC carcinogen classification and acute toxicity data (oral or dermal $LD_{50}$ or inhalation $LC_{50}$).

GENETOX (VERSION 1.3/2.0 AUGUST 1984)

GENETOX was accessed and searched for the results of bioassays indicative of heritable genetic or chromosomal mutations. The results table is a summary of genetic assays conducted on each chemical and the reported results. In addition, the table provided the Gene-Tox carcinogen evaluation.

AQUIRE DATABASE (VERSION 1.6/3.0 APRIL 1985)

The AQUIRE database was accessed for acute aquatic toxicity. The number of entries was limited to those entries that reported lethal concentrations ($LC_{50}$ values). Study reliability and exposure regimen were also reported.

ENVIROFATE (VERSION 1.3/1.0 APRIL 1984)

The ENVIROFATE database was accessed and searched for bioaccumulation (bioconcentration factor) and persistence in the environment (half-life).

HAZARDOUS SUBSTANCES DATABANK

HSDB was searched for reported information on developmental toxicity, reproductive toxicity, chronic toxicity, and neurotoxicity for each chemical. The toxicity excerpts and toxicity values fields reported descriptions of

studies in which the toxicity of each chemical was examined.

LOG P DATABASE (POMONA COLLEGE AND TECHNICAL DATABASE SERVICE, INC.)

For each chemical on the Emissions Inventory for which a bioconcentration factor that met the acceptable criterion was not found, the log P database was searched. The log P is the log of the octanol/water partition coefficient which has been correlated with bioconcentration.

CHEMTRACK (TESTING STATUS OF CHEMICALS ON THE SARA 313 LIST FROM THE TESTING PRIORITY COMMITTEE DATABASE)

The CHEMTRACK database for the Emissions Inventory chemicals was supplied by the task manager, Mark Townsend of EPA. The database was manually searched for each chemical for the EPA (CAG) carcinogen classification and NTP bioassay results.

MATRIX ANALYSES

The number of chemicals listed under each endpoint is summed and presented on the last line of the table. If the Lotus spreadsheet is accessed with automatic recalculation (a feature of the Lotus program), the sum of the chemicals under each endpoint will be automatically recalculated to reflect the addition or deletion of a positive response or the listing or delisting of chemicals. An analysis of "uniqueness" was also conducted for the matrix to determine unique patterns of toxicity. Each endpoint except for environmental toxicity based on an $LC_{50}$ value of less than or equal to 10 ppm (environmental toxicity column 1) was assigned a prime number other than 1. For each chemical, the algorithm assigns the appropriate prime numbers for each recorded positive response and multiplies the series of prime numbers. Where no

positive response was recorded, the number one (1) was assigned for that endpoint. Similar patterns result in identical values; unique patterns result in unique numbers. The results of this analysis are presented in tabular format in a column at the far right of each table. If the Lotus spreadsheet is accessed with automatic recalculation, the product of prime numbers will be automatically recalculated to reflect the addition or deletion of a positive response.

## CONCLUSIONS

It should be noted that there are inherent limitations in the use of the information provided in the toxicity matrix. Existing databases were used to complete the original matrix. Some of the information contained in the databases is not peer-reviewed. Toxicity data in the matrix indicate that a particular endpoint was reported following exposure to given chemical under certain conditions. However, no information is provided regarding the severity of the effect, the number of species in which the effect was observed, the appropriateness of the study method, or whether there are conflicting results. Determination of overall hazard potential will require review of available information and the development of chemical-specific hazard assessments.

## REFERENCES

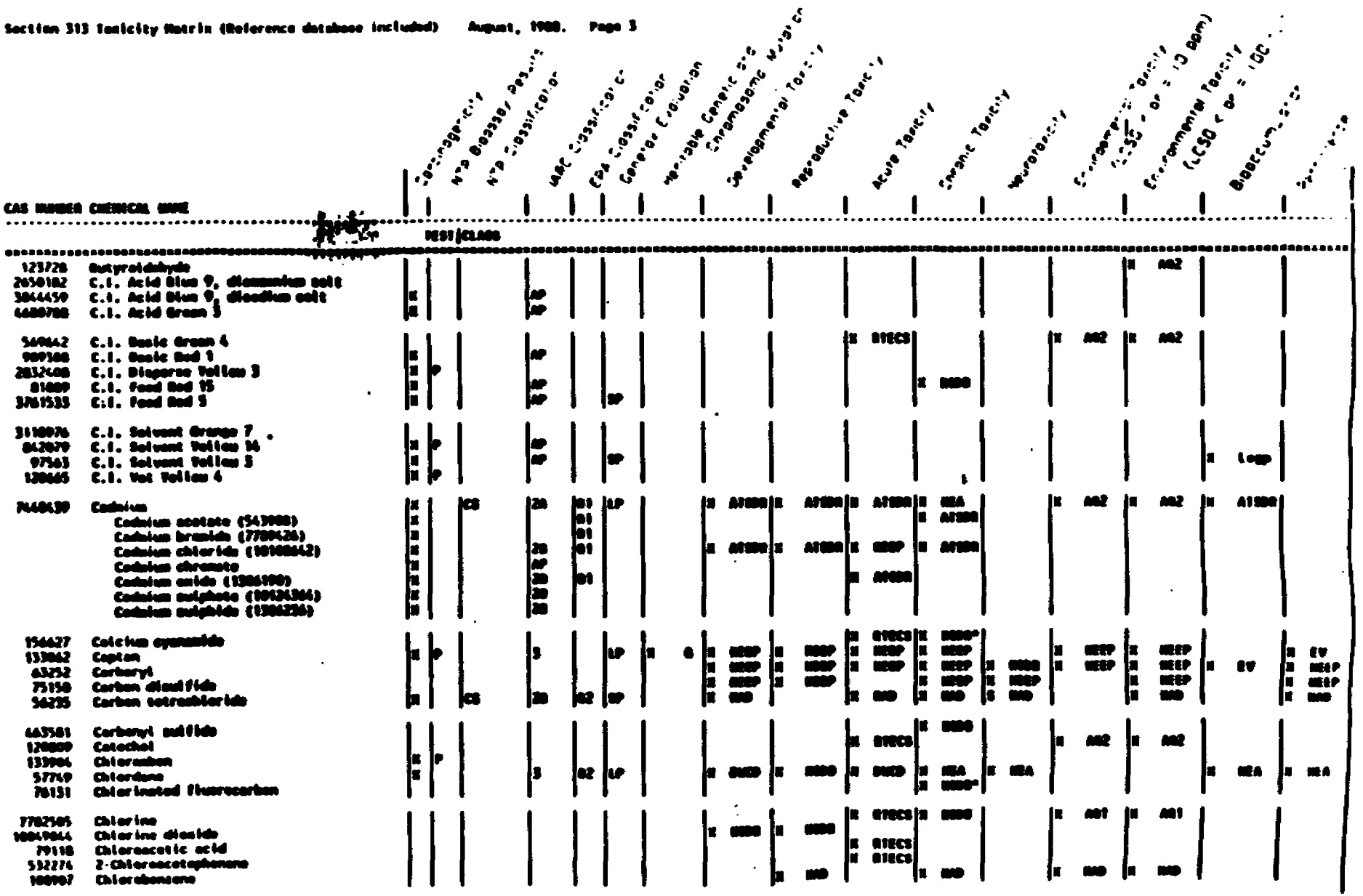
ENVIRONMENTAL PROTECTION AGENCY (EPA). 1985. Reference Values for Risk Assessment. Environmental Criteria and Assessment Office, Cincinnati, Ohio. September 1985. ECAO-CIN-477

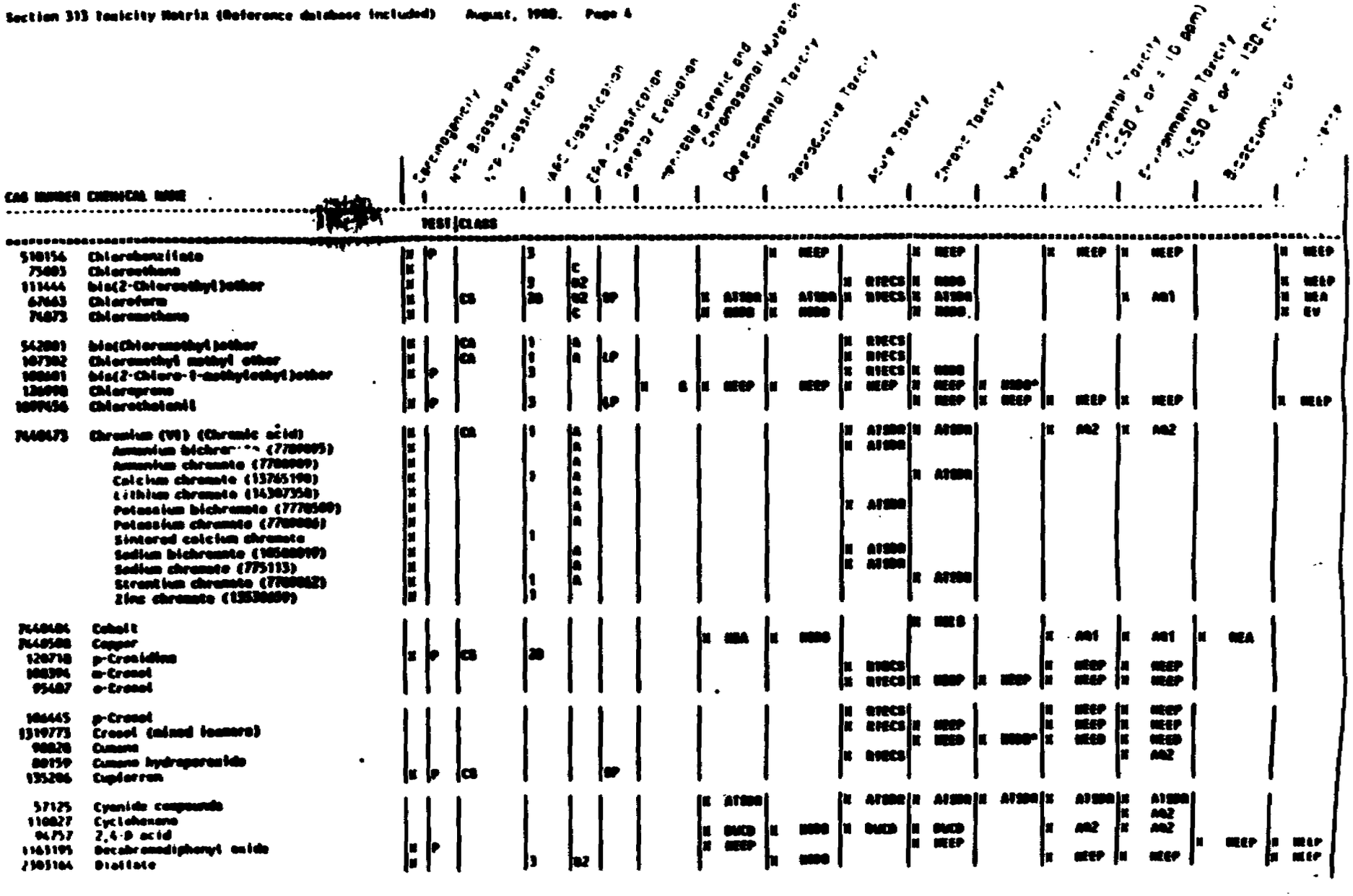
ENVIRONMENTAL PROTECTION AGENCY (EPA). 1987. Toxic chemical release reporting; community right-to-know. Fed. Reg. 52:21152-21208 (June 4, 1987)

## TOXICITY MATRIX

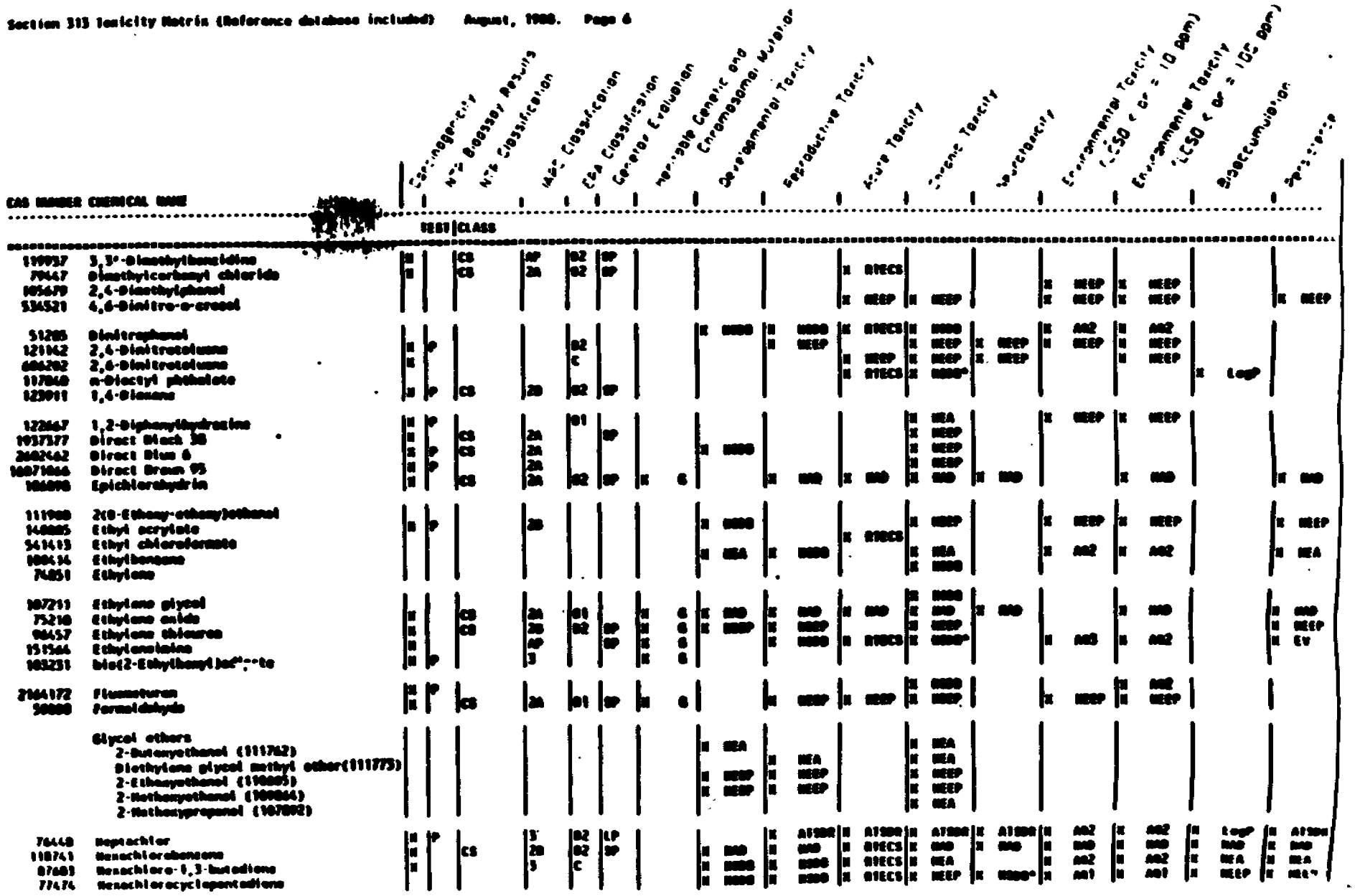
| CAS NUMBER | CHEMICAL NAME | Carcinogenicity | NTP Bioassay Results | NTP Classification | IARC Classification | EPA Classification | Genetic Evaluation | Heritable Genetic and Chromosomal Mutation | Developmental Toxicity | Reproductive Toxicity | Acute Toxicity | Chronic Toxicity | Neurotoxicity | Environmental Toxicity (LC50 < or = 10 ppm) | Environmental Toxicity (LC50 < or = 100 ppm) | Bioaccumulation | Persistence |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TEST CLASS | | | | | | | | | | | | | | | |
| 75070 | Acetaldehyde | X | | | 2B | | | | | | X DTECS | | | | X AA2 | | X EV |
| 60355 | Acetamide | X | | | 2B | B2 | NP | | | | | X HEA | | X AA2 | X AA2 | | X HEA |
| 67641 | Acetone | | | | | | | | X HEEP | X HEEP | X HEEP | X HEEP | | | | | X HEEP |
| 75058 | Acetonitrile | | | CS | | B2 | NP | | | | | | | | | | |
| 53963 | 2-Acetylaminofluorene | X | | | | | | | | | | | | | | | |
| 107028 | Acrolein | | | | | | | | | | X HHD | X HA) | | X HHD | X HHD | X HHD | |
| 79061 | Acrylamide | X | | | 2B | | | X G | | X HEEP | X HEEP | X HEEP | X HEEP | X AA2 | X AA2 | | |
| 79107 | Acrylic acid | | | | | | | | | | X HEEP | X HEEP | | | X HEEP | | |
| 107131 | Acrylonitrile | X | | CS | 2A | B1 | NP | X HHD | X HHD | | X HHD | X HHD | | X HHD | X HHD | | X HHD |
| 309002 | Aldrin | X | P | | 3 | B2 | LP | X ATSDR | X ATSDR | X ATSDR | X ATSDR | X ATSDR | X ATSDR | X HEEP | X HEEP | X LogP | |
| 107051 | Allyl Chloride | X | | | | B2 | | X HEEP | | | X DTECS | X HEEP | X HEEP | X HEEP | X HEEP | | |
| 1344281 | Aluminum oxide | | | | | | | | | | | X HHDW* | | | | | |
| 7429905 | Aluminum (fume or dust) | X | | | 1* | | | | | | | | | | | | |
| 117793 | 2-Aminoanthraquinone | X | P | | 3 | | | | | | | X HHD | | | | | |
| 60093 | 4-Aminoazobenzene | X | | | 2B | | LP | | | | | | | | | | |
| 92671 | 4-Aminobiphenyl | X | | CA | 1 | | NP | | | | | | | | | | |
| 82280 | 1-Amino-2-methylanthraquinone | X | P | CS | 3 | | | | | | X DTECS | X HHD | | X AA2 | X AA2 | | |
| 7664417 | Ammonia | | | | | | | | | | | X HHDW* | | | | | |
| 6484522 | Ammonium nitrate (solution) | | | | | | | | | | | | | X AA1 | X AA1 | | |
| 7783202 | Ammonium sulfate (solution) | | | | | | | | | | | | | X AA1 | X AA1 | | |
| 62533 | Aniline | X | | | 3 | | LP | | | | X HHDP | X HEEP | | X HEEP | X HEEP | | X HEA |
| 90040 | o-Anisidine | X | | CS | 2B | | | | | | | X HHDW | X HHDW | | | | |
| 104949 | p-Anisidine | | | | | | | | | | | | | | | | |
| 134292 | o-Anisidine hydrochloride | X | P | CS | NP | | | | | | | X HHDW | X HHDW | | | | |
| 120127 | Anthracene | | | | | | | | | | | X HHDW | | X HEEP | X HEEP | X HEEP | X HEEP |
| 7440360 | Antimony | | | | | | | | | X HEEP | | X HEEP | | | | X HEEP | |
| 7440382 | Arsenic | X | | CA | 1 | A | | | X ATSDR | | X ATSDR | X ATSDR | X ATSDR | X HEEP | X HEEP | X HEEP | X HEA |
| | Arsenic acid (7778394) | X | | | | A | | | | | | X HEA | | | | | |
| | Arsenic disulfide (12044700) | X | | | | A | | | | | | | | | | | |
| | Arsenic pentoxide (1303282) | X | | | | A | | | | | | | | | | | |
| | Arsenic trichloride (7784352) | X | | | | A | | | | | X ATSDR | | | | | | |
| | Arsenic trioxide (1327533) | X | | | | A | | | | | | | | | | | |
| | Arsenic trisulfide (1303339) | X | | | | A | | | | | | | | | | | |
| | Calcium arsenate (7778441) | X | | | | A | | | | | | | | | | | |
| | Calcium arsenite (27152574) | X | | | | A | | | | | | | | | | | |
| | Cupric acetoarsenite (12002038) | X | | | | A | | | | | | | | | | | |
| | Lead arsenate (7784409) | X | | | | A | | | | | | X HEA | | | | | |
| | Potassium arsenate (7784410) | X | | | | A | | | | | | | | | | | |

| CAS NUMBER | CHEMICAL NAME | IEDI | CLASS | Carcinogenicity | NTP Bioassay Results | NTP Classification | IARC Classification | EPA Classification | Genetic Evaluation | Mammalian Genetic and Chromosomal Mutagen | Developmental Toxicity | Reproductive Toxicity | Acute Toxicity | Chronic Toxicity | Neurotoxicity | Environmental Toxicity (LC50 < or = 10 ppm) | Environmental Toxicity (LC50 < or = 100 ppm) | Bioaccumulation | Persistence |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Potassium arsenite (10124502) | | | X | | | | A | | | | | | X | | | | | |
| | Sodium arsenate (7778438) | | | X | | | | A | | | | | X A1B0 | | | X | | | |
| | Sodium arsenite (7784465) | | | X | | | | A | | | | | X A1B0 | | | X | | | |
| 1332214 | Asbestos | | | X | | CA | 1 | A | SP | | | | | X | | | | | |
| 492808 | Auramine | | | X | | CA* | 2B, 1* | A2 | | | | | | | | | | | |
| 7440393 | Barium | | | | | | | | | | | | X HEA | X | | X | | | |
| | Barium carbonate dust (513779) | | | | | | | | | | | | X HEA | X | | X | | | |
| | Barium chloride (10361372) | | | | | | | | | | | | | X | | X | | | |
| 98873 | Benzal chloride | | | X | | | 3* | | | | | | X BIOCS | | | | | | |
| 55210 | Benzamide | | | | | | | | | | | | | | | | | | |
| 71432 | Benzene | | P | X | | CA | 1 | A | SP | | | | X A1B0 | X A1B0 | | X A02 | X A02 | | X HEA |
| 92875 | Benzidine | | | X | | CA | 1 | A | SP | | | | X HEP | X | | X HEP | X HEP | | |
| 98077 | Benzoic trichloride | | | X | | CS | 2B* | A2 | SP | | | | X HEP | X | | | | | |
| 98884 | Benzoyl chloride | | | | | | | | | | | | X HEP | X HEP | | X HEP | X HEP | | |
| 94360 | Benzoyl peroxide | | | | | | | | | | | | | | | | | | |
| 100447 | Benzyl chloride | | | X | | | 3* | C | SP | | | | X HEP | X HEP | X HEP* | X HEP | X HEP | | |
| 7440417 | Beryllium | | | X | | CS | 2A | A1 | | | | | X A1B0 | X A1B0 | | | | | |
| | Beryllium chloride (7787475) | | | X | | | | A2 | | | | | X A1B0 | | | | | | |
| | Beryllium fluoride (7787497) | | | X | | | | A2 | | | | | X A1B0 | | | | | | |
| | Beryllium hydroxide (13327327) | | | | | | | | | | | | | | | | | | |
| | Beryllium nitrate (7787555) | | | X | | | | A2 | | | | | | | | | | | |
| | Beryllium oxide (1304569) | | | X | | | 2A | | | | | | | | | | | | |
| | Beryllium phosphate (13598372) | | | | | | | | | | | | X A1B0 | | | | | | |
| | Beryllium sulfate (13510491) | | | X | | | 2A | A2 | | | | | X A1B0 | X A1B0 | | | | | |
| | Zinc beryllium silicate (39413473) | | | X | | | 2A | | | | | | | | | | | | |
| 92524 | Biphenyl | | | | | | | | | | | | X HEP | X | | X HEP | X HEP | | |
| 75252 | Bromoform | | | | | | | | | | | | | X HEP* | X HEP* | | X HEP | | |
| 74839 | Bromomethane | | | X | | | 3 | | | | | | X HEP | X HEP | X HEP | | X HEP | | X HEP |
| 106990 | 1,3-Butadiene | | P | X | | | 2B | A2 | | | | | X HEP | X HEP | X HEP | | X HEP | | |
| 112345 | 2(2-Butoxy-ethoxy)ethanol | | | | | | | | | | | | | | | | | | |
| 141322 | Butyl acrylate | | | | | | | | | | | | | | | X A03 | X A03 | | |
| 71363 | n-Butyl alcohol | | | | | | | | | | | | | X HEP | | | | | |
| 78922 | sec-Butyl alcohol | | | | | | | | | | | | | | | | | | |
| 75650 | tert-Butyl alcohol | | | | | | | | | | | | | | | | | | |
| 85687 | Butyl benzylphthalate | | | | | | | | | | | | | X HEP | | X A02 | X A02 | | |
| 106887 | 1,2-Butylene oxide | | | | | | | | | | | | | | | | | | |

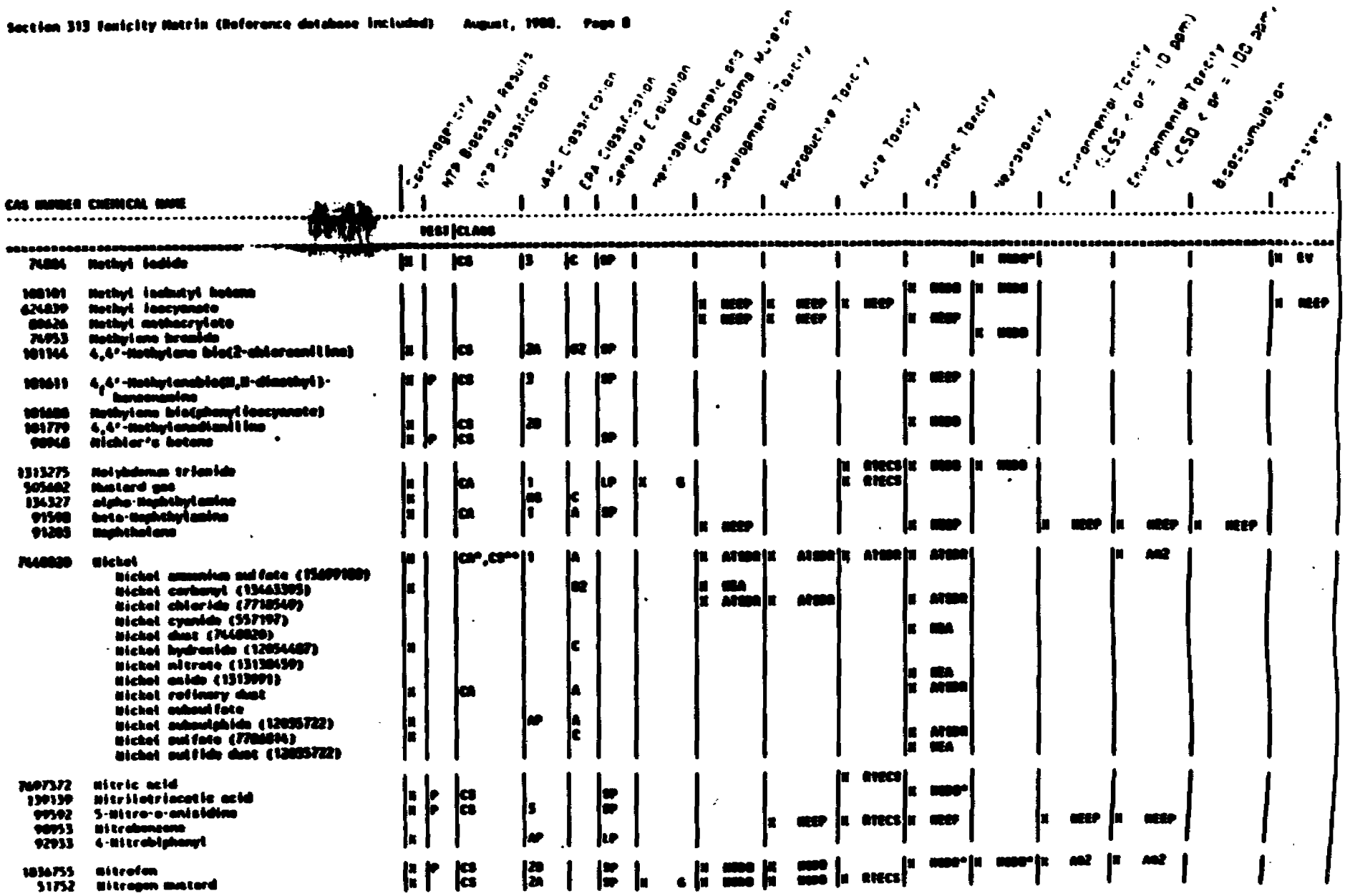

CAS NUMBER CHEMICAL NAME
TEST/CLASS
Carcinogenicity
NTP Bioassay/ Possible
NTP Classification
IARC Classification
EPA Classification
General Evaluation
Reportable Genetic Effects
Mutagenic Mutagenic
Developmental Toxicity
Reproductive Toxicity
Acute Toxicity
Chronic Toxicity
Neurotoxicity
Ecotoxicity (LC50 < or = 10 ppm)
Environmental Toxicity (LC50 < or = 100
Bioaccumulation
Persistence
123728 Butyraldehyde
2650182 C.I. Acid Blue 9, diammonium salt
3844459 C.I. Acid Blue 9, disodium salt
4680788 C.I. Acid Green 3
569642 C.I. Basic Green 4
989388 C.I. Basic Red 1
2832408 C.I. Disperse Yellow 3
81889 C.I. Food Red 15
3761535 C.I. Food Red 5
3118976 C.I. Solvent Orange 7
842079 C.I. Solvent Yellow 14
97563 C.I. Solvent Yellow 3
128665 C.I. Vat Yellow 4
7440439 Cadmium
Cadmium acetate (543908)
Cadmium bromide (7789426)
Cadmium chloride (10108642)
Cadmium chromate
Cadmium oxide (1306190)
Cadmium sulphate (10124364)
Cadmium sulphide (1306236)
156627 Calcium cyanamide
133062 Captan
63252 Carbaryl
75150 Carbon disulfide
56235 Carbon tetrachloride
463581 Carbonyl sulfide
120809 Catechol
133904 Chloramben
57749 Chlordane
76151 Chlorinated fluorocarbon
7782505 Chlorine
10049044 Chlorine dioxide
79118 Chloroacetic acid
532274 2-Chloroacetophenone
108907 Chlorobenzene


CAS NUMBER CHEMICAL NAME
TEST|CLASS
Carcinogenicity
Acute Toxicity
Chronic Toxicity
Reproductivity
Bioaccumulation
5180156 Chlorobenzilate
75003 Chloroethane
111444 bis(2-Chloroethyl)ether
67663 Chloroform
74873 Chloromethane
542881 bis(Chloromethyl)ether
107302 Chloromethyl methyl ether
108601 bis(2-Chloro-1-methylethyl)ether
126998 Chloroprene
1897456 Chlorothalonil
7440473 Chromium (VI) (Chromic acid)
Ammonium bichromate (7789095)
Ammonium chromate (7788989)
Calcium chromate (13765190)
Lithium chromate (14307358)
Potassium bichromate (7778509)
Potassium chromate (7789006)
Sintered calcium chromate
Sodium bichromate (10588019)
Sodium chromate (7775113)
Strontium chromate (7789062)
Zinc chromate (13530659)
7440484 Cobalt
7440508 Copper
120718 p-Cresidine
108394 m-Cresol
95487 o-Cresol
106445 p-Cresol
1319773 Cresol (mixed isomers)
98828 Cumene
80159 Cumene hydroperoxide
135206 Cupferron
57125 Cyanide compounds
110827 Cyclohexane
94757 2,4-D acid
1163195 Decabromodiphenyl oxide
2303164 Diallate

| CAS NUMBER | CHEMICAL NAME | RCRA CLASS | Carcinogenicity | NTP Bioassay Results | IARC Classification | EPA Classification | Genetic Evaluation | Heritable Genetic and Chromosomal Mutation | Developmental Toxicity | Reproductive Toxicity | Acute Toxicity | Chronic Toxicity | Neurotoxicity | Environmental Toxicity (LC50 < or = 10 ppm) | Environmental Toxicity (LC50 < or = 100 ppm) | Bioaccumulation | Persistence |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 615054 | 2,4-Diaminoanisole | | X | | | 2B | | | | | | | | | | | |
| 39156417 | 2,4-Diaminoanisole sulfate | | X | P | CS | 2B | | SP | | | | | | | | | | |
| 101804 | 4,4'-Diaminodiphenyl ether | | X | | | 2B | | | | | | | X | HUMAN* | | | | |
| 95807 | 2,4-Diaminotoluene | | X | P | CS | 2B | | SP | X | G | | | | | | | | |
| 25376458 | Diaminotoluene (mixed isomers) | | X | P | | 2B | G2 | SP | X | G | | | X | HUMAN* | | | | |
| 334883 | Diazomethane | | X | | | 3 | | SP | | | | | | | | | | |
| 132649 | Dibenzofuran | | X | | | 3 | | | | | | | | | | | | |
| 96128 | 1,2-Dibromo-3-chloropropane | | X | P | CS | 2B | G2 | SP | X | DNED | X | DNED | X | DNED | X | ANS | | X | DNED |
| 106934 | 1,2-Dibromoethane | | X | P | CS | 2A | G2 | SP | X | HEEP | X | HEEP | X | BIECS | X | HEEP | | X | HEEP |
| 126727 | tris(2,3-Dibromopropyl)phosphate | | X | P | CO | 2B | G2 | SP | X | HUMN | X | HUMN | | | | | | | |
| 84742 | Dibutyl phthalate | | | | | | | | X | HUMN | X | HUMN | X | HEEP | X | HEEP | X | HEEP | |
| 95501 | 1,2-Dichlorobenzene | | | | | | | | | | X | HUM | X | HUM | X | HUM | X | HUM | |
| 541731 | 1,3-Dichlorobenzene | | | | | | | | | | | | X | HUM | X | HUM | | | |
| 106467 | 1,4-Dichlorobenzene | | X | P | | 2B | | | | | | | X | ATHUM | X | ANS | X | HUM | X HUM |
| 25321226 | Dichlorobenzene (mixed isomers) | | X | P | | | | | | | | | X | HUM | X | HUM | X | HUM | |
| 91941 | 3,3'-Dichlorobenzidine | | X | | CS | 2B | G2 | SP | | | | | | | | | | | |
| 75274 | Dichlorobromomethane | | | | | | | | | | | | | | | | | X | EV |
| 107062 | 1,2-Dichloroethane | | X | P | CS | 2B | G2 | SP | X | G | X | HEEP | X | HEEP | | | | X | HEEP |
| 540590 | 1,2-Dichloroethylene | | X | P | | 2B | G2 | | | | | | X | ATHUM | | | | X | HEA |
| 75092 | Dichloromethane | | | | | | | | | | | | | | | | | | |
| 120832 | 2,4-Dichlorophenol | | X | P | | 3 | | | | | | | | | X | HEEP | X | HEEP | |
| 78875 | 1,2-Dichloropropane | | X | P | | 3 | | | | | | | | | X | ANS | X | ANS | |
| 542756 | 1,3-Dichloropropylene | | X | P | | 2B | G2 | | | | X | HEEP | X | HEEP | X | HEEP | X | HEEP | X HEEP |
| 62737 | Dichlorvos | | X | P | | 3 | | | X | HUMN | X | HUMN | X | BIECS | X | ANS | X | ANS | X EV |
| 115322 | Dicofol | | X | P | | 3 | | | | | | | X | BIECS | X | ANS | X | ANS | |
| 1464535 | Diepoxybutane | | X | | CS | 2B | G2 | SP | X | G | | | X | BIECS | | | | | |
| 111422 | Diethanolamine | | | | | | | | | | | | | | X | ANS | | | |
| 64675 | Diethyl sulfate | | X | | CS | 2A | | SP | X | G | | | | | | | | | |
| 117817 | Di(2-ethylhexyl)phthalate | | X | P | CS | 2B | G2 | SP | X | G | X | ATHUM | X | ATHUM | X | ATHUM | X | ANS | X EV |
| 84662 | Diethylphthalate | | | | | | | | | | | | | | X | HEEP | X | HEEP | |
| 119904 | 3,3'-Dimethoxybenzidine | | X | | CS | 2B | G2 | SP | | | | | X | HEEP | X | HEEP | | | |
| 57147 | 1,1-Dimethyl hydrazine | | X | | CS | 2B | G2 | SP | | | | | X | HEEP | X | HEEP | | | |
| 131113 | Dimethyl phthalate | | | | | | | | | | | | X | BIECS | X | HEEP | | | |
| 77781 | Dimethyl sulfate | | X | | CS | 2A | G2 | SP | X | G | | | X | HEEP | X | HEEP | X | HEEP | X HEEP |
| 60117 | 4-Dimethylaminoazobenzene | | X | | CS | 2B | G2 | SP | | | | | X | BIECS | X | | | X | LogP |
| 121697 | N,N-Dimethylaniline | | | | | | | | | | | | X | HUMN | X | HUMN | | | |


Carcinogenicity
NTP Bioassay Results
NTP Classification
IARC Classification
EPA Classification
Genetic Evaluation
Reversible Genetic and Chromosomal Mutation
Developmental Toxicity
Reproductive Toxicity
Acute Toxicity
Chronic Toxicity
Neurotoxicity
Environmental Toxicity (LC50 < or = 10 ppm)
Environmental Toxicity (LC50 < or = 100 ppm)
Bioaccumulation
Persistence
CAS NUMBER CHEMICAL NAME
TEST CLASS
199937 3,3'-Dimethylbenzidine
79447 Dimethylcarbamyl chloride
105679 2,4-Dimethylphenol
534521 4,6-Dinitro-o-cresol
51285 Dinitrophenol
121142 2,4-Dinitrotoluene
606202 2,6-Dinitrotoluene
117840 n-Dioctyl phthalate
123911 1,4-Dioxane
122667 1,2-Diphenylhydrazine
1937377 Direct Black 38
2602462 Direct Blue 6
16071866 Direct Brown 95
106898 Epichlorohydrin
111900 2(2-Ethoxy-ethoxy)ethanol
140885 Ethyl acrylate
541413 Ethyl chloroformate
100414 Ethylbenzene
74851 Ethylene
107211 Ethylene glycol
75218 Ethylene oxide
96457 Ethylene thiourea
151564 Ethylenimine
103231 bis(2-Ethylhexyl)adipate
2164172 Fluometuron
50000 Formaldehyde
Glycol ethers
2-Butoxyethanol (111762)
Diethylene glycol methyl ether(111775)
2-Ethoxyethanol (110805)
2-Methoxyethanol (109864)
2-Methoxypropanol (107982)
76448 Heptachlor
118741 Hexachlorobenzene
87683 Hexachloro-1,3-butadiene
77474 Hexachlorocyclopentadiene

| CAS NUMBER | CHEMICAL NAME | Carcinogenicity | Mutagenicity | Teratogenicity | EPA Classification | IARC Classification | RCRA Classification | Genetic Evidence | Reproductive Toxicity | Developmental Toxicity | Chromosomal Toxicity | Acute Toxicity | Chronic Toxicity | Mutagenicity | Environmental Toxicity (LC50 < or = 10 ppm) | Environmental Toxicity (LC50 < or = 100 ppm) | Bioaccumulation | Persistence |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DEHI CLASS | | | | | | | | | | | | | | | | |
| 67721 | Hexachloroethane | H | LP | | 3 | C | LP | | H | HUMAN | H | HUMAN | | H | HUMAN | | H | HEEP | H | HEEP | | | |
| 1335871 | Hexachloronaphthalene | | | | | | | | | | | | | | | | | |
| 680319 | Hexamethylphosphoramide | H | | CS | 2B | | GP | H | G | | | | | H | HUMAN | | | |
| 302012 | Hydrazine | H | | CS | 2B | A2 | GP | | | | | | H | RTECS | H | HEEP | H | HEEP | H | HEEP | | | |
| 10034932 | Hydrazine sulfate | H | | CS | 2B | | GP | | | | | | H | RTECS | H | HEEP | H | HEEP | H | HEEP | | | |
| 7647010 | Hydrochloric acid | | | | | | | | | | | | H | RTECS | H | HUMAN | | | | | | | |
| 74908 | Hydrogen cyanide | | | | | | | | | | | | H | AIHAG | H | AIHAG | | | H | AA2 | H | AA2 | | |
| 7664393 | Hydrogen fluoride | | | | | | | H | G | H | HUMAN | H | HUMAN | H | RTECS | H | HUMAN | | | | | | | |
| 123319 | Hydroquinone | | | | | | | | | | | | H | HEEP | | H | HEEP | | H | HEEP | H | HEEP | | |
| 78842 | Isobutyraldehyde | | | | | | | | | | | | | | H | HUMAN | | | | | | | |
| 67630 | Isopropyl alcohol | H | | CS* | 3* | | | | | | | | | | H | HUMAN | H | HUMAN | | | | | |
| 80057 | 4,4'-Isopropylidenediphenol | | | | | | | | | | | | | | | | | | | | | | |
| 7439921 | Lead | H | | | 2B | | | | | H | AIHAG | H | AIHAG | | H | AIHAG | H | AIHAG | H | HEEP | H | HEEP | H | HEA | H | HEA |
| | Lead acetate (301042) | H | | CS | 3 | A2 | | | | H | AIHAG | | | | H | AIHAG | H | AIHAG | | | | | | | |
| | Lead chloride (7758954) | | | | | | | | | H | AIHAG | | | | | | | | | | | | | |
| | Lead chromate (7758976) | H | | | 3 | | | | | | | | | | | | | | | | | | | |
| | Lead nitrate (10099748) | | | | | | | | | H | AIHAG | | | | H | HEA | | | | | | | | |
| | Lead phosphate (7446277) | H | | CS | 3 | A2 | | | | | | | | | | | | | | | | | | |
| | Lead subacetate (1335326) | H | | | 3 | A2 | | | | | | | | | | | | | | | | | | |
| 58899 | Lindane | H | | CS | 3 | C | | | | H | HEA | H | HEA | H | RTECS | H | HEA | | H | ANT | H | ANT | H | LogP | H | HEA |
| 108316 | Maleic anhydride | | | | | | | | | H | HEEP | H | HEEP | H | HEEP | | | | | | H | HEEP | | | | |
| 12427382 | Maneb | | | | | | | | | H | HEEP | H | HEEP | | | H | HEEP | H | HEEP | H | HEEP | H | HEEP | | | H | HEEP |
| 7439965 | Manganese | | | | | | | | | | | H | HEA | H | HUM | H | HEA | H | HUM | | | | | | | H | HEA |
| | Manganese chloride (7773015) | | | | | | | | | | | | | | | H | HEA | H | HEA | | | | | | | | |
| | Manganese dioxide (MnO2) (1313139) | | | | | | | | | | | | | | | H | HEA | H | HEA | | | | | | | | |
| | Manganese tetroxide (1317357) | | | | | | | | | | | H | HEA | | | | | | | | | | | | | | |
| 108781 | Melamine | H | LP | | | | | | | | | H | HUMAN | | | | | | | | | | | | | | |
| 7439976 | Mercury | | | | | | | | | H | HEA | H | HEA | H | DHEW | H | DHEW | H | DHEW | H | AHEW | H | AHEW | H | AHEW | H | HEEW |
| | Mercury acetate (1600277) | | | | | | | | | | | | | | | H | HEA | | | | | | | | | | |
| 67561 | Methanol | | | | | | | | | | | | | | | | | H | HUMAN* | | | | | | | | |
| 72435 | Methoxychlor | | | | | | | | | H | HEEP | H | HEEP | | | H | HEEP | H | HEEP | H | HEEP | H | HEEP | H | HEEP | H | HEEP |
| 111773 | 2(2-Methoxy)ethanol | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96333 | Methyl acrylate | | | | | | | | | | | H | HEEP | H | HEEP | | | H | HEEP | H | HEEP | | | | | | |
| 1634044 | Methyl tert-butyl ether | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78933 | Methyl ethyl ketone | | | | | | | | | H | HEEP | H | HEEP | H | HEEP | H | HEA | | | H | HEEP | H | HEEP | | | H | HEEP |
| 60344 | Methyl hydrazine | H | | | | | LP | | | | | H | HEEP | H | HEEP | | | | | H | HEEP | H | HEEP | | | H | HEA |


CAS NUMBER CHEMICAL NAME
VERSION CLASS
Carcinogenicity
NTP Bioassay Results
NTP Classification
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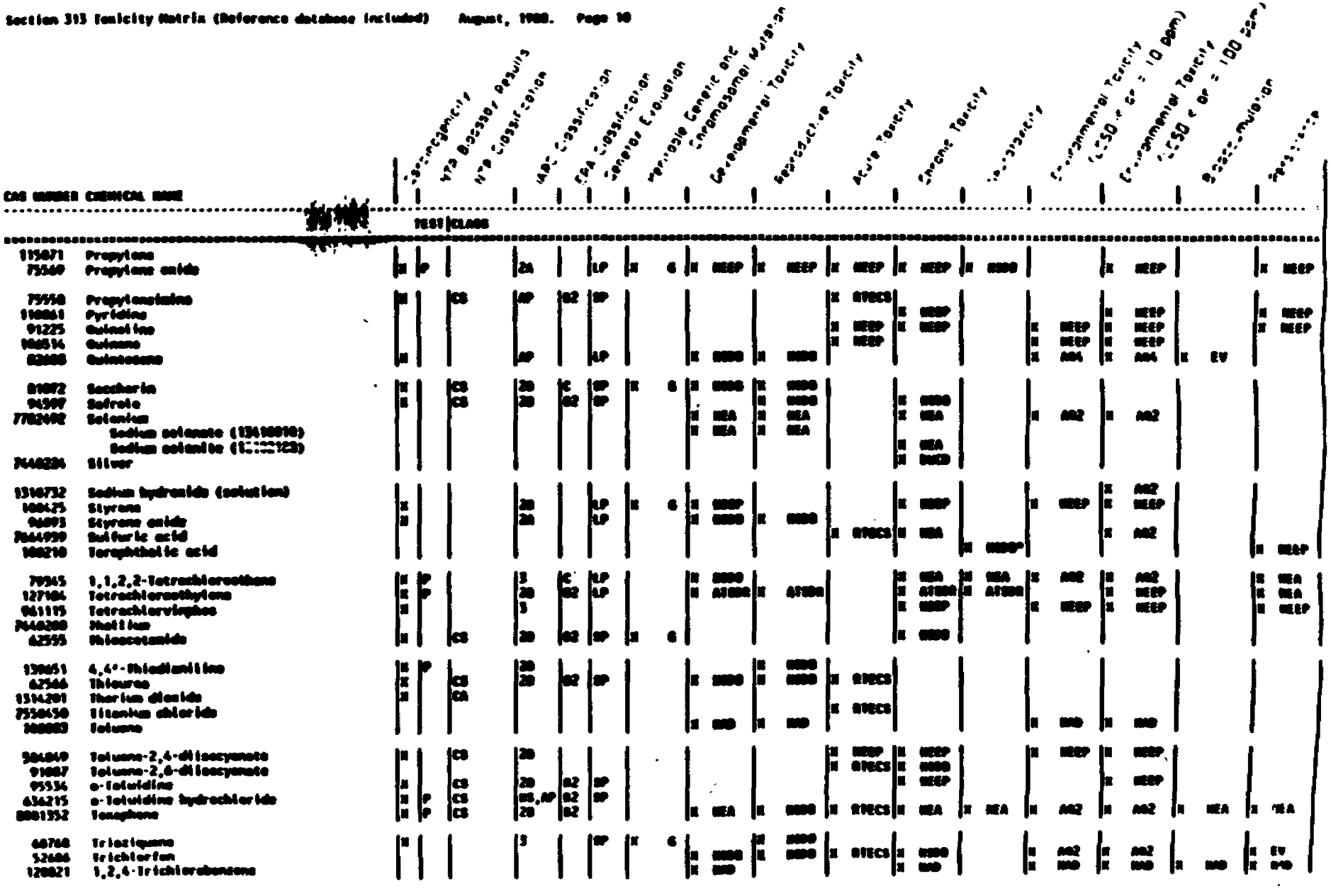
Genetic Evaluation
Mutagenic Genetic and Chromosome Mutation
Developmental Toxicity
Reproductive Toxicity
Acute Toxicity
Chronic Toxicity
Neurotoxicity
Environmental Toxicity (LC50 < or = 10 ppm)
Environmental Toxicity (LC50 < or = 100 ppm)
Bioaccumulation
Persistence
74884 Methyl iodide
108101 Methyl isobutyl ketone
624839 Methyl isocyanate
80626 Methyl methacrylate
74953 Methylene bromide
101144 4,4'-Methylene bis(2-chloroaniline)
101611 4,4'-Methylenebis(N,N-dimethyl)-benzenamine
101688 Methylene bis(phenylisocyanate)
101779 4,4'-Methylenedianiline
90948 Michler's ketone
1313275 Molybdenum trioxide
505602 Mustard gas
134327 alpha-Naphthylamine
91598 beta-Naphthylamine
91203 Naphthalene
7440020 Nickel
Nickel ammonium sulfate (15699180)
Nickel carbonyl (13463393)
Nickel chloride (7718540)
Nickel cyanide (557197)
Nickel dust (7440020)
Nickel hydroxide (12054487)
Nickel nitrate (13138459)
Nickel oxide (1313991)
Nickel refinery dust
Nickel subsulfide
Nickel subsulphide (12035722)
Nickel sulfate (7786814)
Nickel sulfide dust (12035722)
7697372 Nitric acid
139139 Nitrilotriacetic acid
99592 5-Nitro-o-anisidine
98953 Nitrobenzene
92933 4-Nitrobiphenyl
1836755 Nitrofen
51752 Nitrogen mustard

| CAS NUMBER | CHEMICAL NAME | HESI CLASS | Carcinogenicity | NTP Classification | NTP Classification | IARC Classification | EPA Classification | Genetic Evaluation | Mammalian Genetic and Chromosomal Mutagen | Developmental Toxicity | Reproductive Toxicity | Acute Toxicity | Chronic Toxicity | Neurotoxicity | Environmental Toxicity (LC50 < or = 10 ppm) | Environmental Toxicity (LC50 < or = 100 ppm) | Bioaccumulation | Persistence |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 55630 | Nitroglycerin | | | | | | | | | | | | | | | | | |
| 88755 | 2-Nitrophenol | | | | | | | | | | | | | | | | | |
| 554847 | 3-Nitrophenol | | | | | | | | | | | | | | | | | |
| 100027 | 4-Nitrophenol | | | | | | | | | | | | | | | | | |
| 79469 | 2-Nitropropane | | | | | | | | | | | | | | | | | |
| 924163 | N-Nitrosodi-n-butylamine | | | | | | | | | | | | | | | | | |
| 55185 | N-Nitrosodiethylamine | | | | | | | | | | | | | | | | | |
| 62759 | N-Nitrosodimethylamine | | | | | | | | | | | | | | | | | |
| 86306 | N-Nitrosodiphenylamine | | | | | | | | | | | | | | | | | |
| 156105 | p-Nitrosodiphenylamine | | | | | | | | | | | | | | | | | |
| 621647 | N-Nitrosodi-n-propylamine | | | | | | | | | | | | | | | | | |
| 759739 | N-Nitroso-N-ethylurea | | | | | | | | | | | | | | | | | |
| 684935 | N-Nitroso-N-methylurea | | | | | | | | | | | | | | | | | |
| 4549400 | N-Nitrosomethylvinylamine | | | | | | | | | | | | | | | | | |
| 59892 | N-Nitrosomorpholine | | | | | | | | | | | | | | | | | |
| 16543558 | N-Nitrosonornicotine | | | | | | | | | | | | | | | | | |
| 100754 | N-Nitrosopiperidine | | | | | | | | | | | | | | | | | |
| 2234131 | Octachloronaphthalene | | | | | | | | | | | | | | | | | |
| 28816120 | Osmium tetroxide | | | | | | | | | | | | | | | | | |
| 56382 | Parathion | | | | | | | | | | | | | | | | | |
| 87865 | Pentachlorophenol | | | | | | | | | | | | | | | | | |
| 79210 | Peracetic acid | | | | | | | | | | | | | | | | | |
| 108952 | Phenol | | | | | | | | | | | | | | | | | |
| 122986 | 2-Phenoxyethanol | | | | | | | | | | | | | | | | | |
| 106503 | p-Phenylenediamine | | | | | | | | | | | | | | | | | |
| 90437 | 2-Phenylphenol | | | | | | | | | | | | | | | | | |
| 75445 | Phosgene | | | | | | | | | | | | | | | | | |
| 7664382 | Phosphoric acid | | | | | | | | | | | | | | | | | |
| 7723140 | Phosphorous (yellow or white) | | | | | | | | | | | | | | | | | |
| 85449 | Phthalic anhydride | | | | | | | | | | | | | | | | | |
| 88891 | Picric acid | | | | | | | | | | | | | | | | | |
| 1336363 | Polychlorinated biphenyls (PCB's) | | | | | | | | | | | | | | | | | |
| 1120714 | Propane sultone | | | | | | | | | | | | | | | | | |
| 57578 | Beta-Propiolactone | | | | | | | | | | | | | | | | | |
| 123386 | Propionaldehyde | | | | | | | | | | | | | | | | | |
| 114261 | Propoxur | | | | | | | | | | | | | | | | | |


CAS NUMBER CHEMICAL NAME
TEST CLASS
Carcinogenicity
NTP Bioassay Results
NTP Classification
IARC Classification
EPA Classification
Genetic Evaluation
Mammalian Genetic and Chromosomal Mutation
Developmental Toxicity
Reproductive Toxicity
Acute Toxicity
Chronic Toxicity
Irritation
Environmental Toxicity (LC50 < or = 10 ppm)
Environmental Toxicity (LC50 < or = 100 ppm)
Bioaccumulation
Persistence
115071 Propylene
75569 Propylene oxide
75558 Propyleneimine
110861 Pyridine
91225 Quinoline
106514 Quinone
82688 Quintozene
81072 Saccharin
94597 Safrole
7782492 Selenium
Sodium selenate (13410010)
Sodium selenite (1:::::123)
7440224 Silver
1310732 Sodium hydroxide (solution)
100425 Styrene
96093 Styrene oxide
7664939 Sulfuric acid
100210 Terephthalic acid
79345 1,1,2,2-Tetrachloroethane
127184 Tetrachloroethylene
961115 Tetrachlorvinphos
7440280 Thallium
62555 Thioacetamide
139651 4,4'-Thiodianiline
62566 Thiourea
13314201 Thorium dioxide
7550450 Titanium chloride
108883 Toluene
584849 Toluene-2,4-diisocyanate
91087 Toluene-2,6-diisocyanate
95534 o-Toluidine
636215 o-Toluidine hydrochloride
8001352 Toxaphene
68768 Triazinamine
52686 Trichlorfon
120821 1,2,4-Trichlorobenzene

| CAS NUMBER | CHEMICAL NAME | Carcinogenicity | NTP Bioassay Results | NTP Classification | IARC Classification | EPA Classification | Genetic Evaluation | Heritable Genetic and Chromosomal Mutation | Developmental Toxicity | Reproductive Toxicity | Acute Toxicity | Chronic Toxicity | Mutagenicity | Environmental Toxicity (LC50 < or = 10 ppm) | Environmental Toxicity (LC50 < or = 100 ppm) | Bioaccumulation | Persistence |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TEST/CLASS | | | | | | | | | | | | | | | |
| 71556 | 1,1,1-Trichloroethane | | | | 3 | C | | | | | | | | | | | |
| 79005 | 1,1,2-Trichloroethane | | | | | | | | | | | | | | | | |
| 79016 | Trichloroethylene | | | | 3 | B2 | LP | | | | | | | | | | |
| 95954 | 2,4,5-Trichlorophenol | | | | | | | | | | | | | | | | |
| 88062 | 2,4,6-Trichlorophenol | | | CO | 2B | B2 | SP | | | | | | | | | | |
| 1582098 | Trifluralin | | | | | | LP | | | | | | | | | | |
| 95636 | 1,2,4-Trimethylbenzene | | | | | | | | | | | | | | | | |
| 51796 | Urethane | | | CO | 2B | B2 | SP | | | | | | | | | | |
| 7440622 | Vanadium (fume or dust) | | | | | | | | | | | | | | | | |
| 108054 | Vinyl acetate | | | | | | | | | | | | | | | | |
| 593602 | Vinyl bromide | | | | 2A | | | | | | | | | | | | |
| 75014 | Vinyl chloride | | | CA | 1 | A | SP | | | | | | | | | | |
| 75354 | Vinylidene chloride | | | | 3 | C | LP | | | | | | | | | | |
| 108383 | m-Xylene | | | | | | | | | | | | | | | | |
| 95476 | o-Xylene | | | | | | | | | | | | | | | | |
| 106423 | p-Xylene | | | | | | | | | | | | | | | | |
| 1330207 | Xylene (mixed isomers) | | | | | | | | | | | | | | | | |
| 87627 | 2,6-Xylidine | | | CO | | | | | | | | | | | | | |
| 7440666 | Zinc (fume or dust) | | | | | | | | | | | | | | | | |
| | Zinc oxide (1314132) | | | | | | | | | | | | | | | | |
| | Zinc sulfate (7733020) | | | | | | | | | | | | | | | | |
| 12122677 | Zineb | | | | | | | | | | | | | | | | |

* In the HHP/IARC categories, listing is based on manufacture or refining of this chemical.
** In the HHP/IARC categories, listing is for all other compounds of this chemical.

## FOOTNOTES TO REVISED TOXICITY MATRIX

| | |
|---|---|
| 1 | IARC classification. Sufficient evidence to establish a causal relationship between the agent and human cancer; sufficient human evidence and/or no data, inadequate data, or limited data of carcinogenicity in animals. |
| 2A | IARC classification. Probable evidence of carcinogenicity to humans; at least limited evidence of carcinogenicity in humans. |
| 2B | IARC classification. Probable evidence of carcinogenicity to humans; sufficient evidence in animals and inadequate data in humans. |
| 3 | IARC classification. Chemical could not be classified as to its carcinogenicity in humans; chemicals were listed for carcinogenicity if there was limited evidence of carcinogenicity in animals. |
| A | EPA classification--Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer. |
| AP | Animal, positive. |
| AQ1 | AQUIRE database (Version 1.6/3.0 April 1985, Chemical Information System). Reliability 1 - reliable study. |
| AQ2 | AQUIRE database (Version 1.6/3.0 April 1985, Chemical Information System). Reliability 2 - generally satisfactory study. |
| AQ3 | AQUIRE database (Version 1.6/3.0 April 1985, Chemical Information System). Reliability 3 - not reliable study. |
| AQ4 | AQUIRE database (Version 1.6/3.0 April 1985, Chemical Information System). Reliability 4 - abstract of a study or summary of a foreign paper. |
| AS | Animal, suspected. |
| ATSDR | Agency for Toxic Substances Draft Toxicological Profile. |
| AWQC | EPA Ambient Water Quality Criteria Document. |
| B1 | EPA classification--Probable Human Carcinogen. Limited evidence of carcinogenicity in humans from epidemiologi. studies. |
| B2 | EPA classification--Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals, inadequate evidence of carcinogenicity in humans. |
| C | EPA classification--Possible Human Carcinogen. Limited evidence of carcinogenicity in animals. |

| | |
|---|---|
| CA | Chemical considered by NTP to be a known carcinogen. |
| CS | Chemical considered by NTP to be a suspect carcinogen, i.e., may reasonably be anticipated to be a carcinogen. |
| DWCD | EPA Drinking Water Criteria Document. |
| EV | ENVIROFATE (Version 1.3/2.0 April 1984, Chemical Information System). |
| G | GENETOX (Version 1.3/2.0 August 1984, Chemical Information System). |
| HAD | EPA Health Effects Assessment Document. |
| HEA | EPA Health Effects Assessment Document. |
| HEED | EPA Health and Environmental Effects Document. |
| HEEP | EPA Health and Environmental Effects Profile. |
| HP | Human, positive. |
| HS | Human, suspected. |
| HSDB | Hazardous Substances Databank (Available through TOXNET of the National Library of Medicine). |
| HSDB* | Hazardous Substances Databank (Available through TOXNET of the National Library of Medicine). Effective dose not specified. |
| LP | Limited positive: indicates results obtained in Gene-Tox carcinogenicity panel tests show indication of tumor induction but that tests were too limited to be conclusive. |
| logP | log P Data base (Available through Pomona College and Technical Database Service Inc. 1983, 1985). |
| P | Indicates a positive response in at least one animal species in an NTP or NCI bioassay. |
| RTECS | [redacted] data base (Version 6.5/14.2, Chemical Information System). |
| SP | Sufficient positive; indicates results obtained in Gene-Tox carcinogenicity panel tests show indication of tumor induction and that sufficient tests have been performed to be conclusive. |