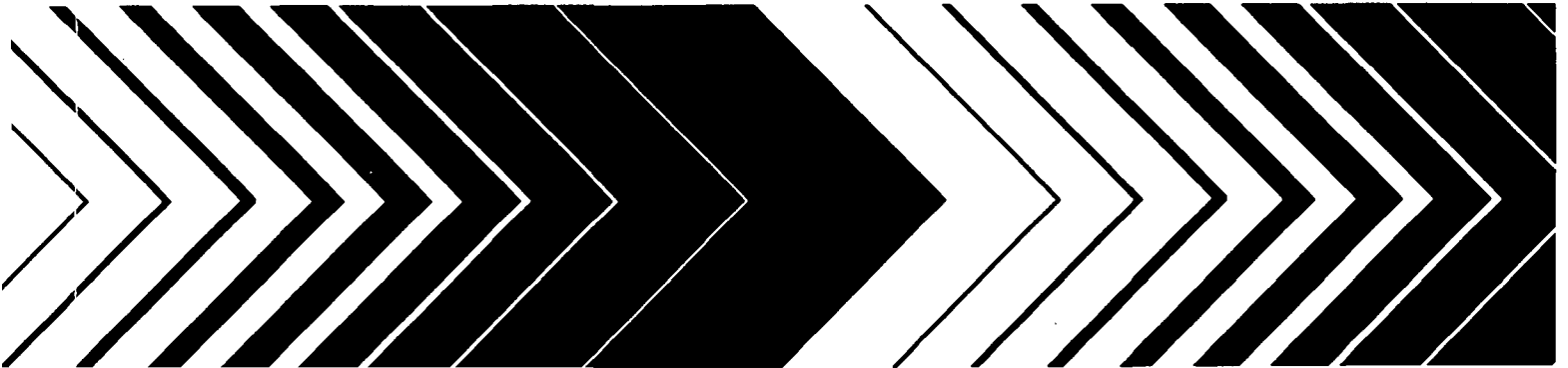




# Selection of Adduct-Forming Chemicals for Human Monitoring Studies



**SELECTION OF ADDUCT-FORMING CHEMICALS  
FOR HUMAN MONITORING STUDIES**

by

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#### NOTICE

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## ABSTRACT

The U.S.EPA, through its Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) and its Health Effects Research Laboratory-Research Triangle Park (HERL-RTP) has been exploring the feasibility of using biological markers to monitor exposure to environmental chemicals. Among the candidate biomarkers of exposure and effect are the adducts formed by reaction of carcinogenic electrophiles with DNA and/or protein.

In 1987, the staffs of HERL-RTP, EMSL-LV, and Oak Ridge National Laboratory (ORNL) conducted a study designed to identify those chemical exposures of interest to the Agency which may be effectively monitored using adduct-based techniques. The participants began by compiling a list of chemicals of interest to the EPA, i.e., chemicals which represent known or suspected health hazard and for which the potential for human exposure exists. The chemicals on this master list were then systematically evaluated for (1) the potential for adduct-formation in vivo, (2) the availability of supportive adduct research data, (3) the identifiability of exposed population(s), and (4) the level of genetic toxicological activity. After considering all the relevant data, the participants selected and prioritized for further study a small group of chemicals considered to have the greatest potential for use in pilot, adduct-based, biological monitoring studies in human populations.

## CONTENTS

Abstract. . . . .	iii
Tables. . . . .	vi
Acknowledgments . . . . .	vii
1. Introduction . . . . .	1
1.1 Objective . . . . .	1
1.2 Background. . . . .	1
2. Chemical Selection - The Initial Process . . . . .	3
2.1 History . . . . .	3
2.2 Methodology for Chemical Selection. . . . .	3
2.2.1 Prioritization of Chemicals of interest to the U.S.EPA. . . . .	4
2.2.2 Adequacy and Quality of Adduct Research Data . . . . .	6
2.2.3 Potentially-exposed Human Populations . . . . .	7
2.2.4 Genetic Toxicological Activity. . . . .	9
2.3 Prioritization of Chemicals Selected for Further Study . . . . .	10
2.3.1 Styrene . . . . .	10
2.3.2 Ethylene Oxide. . . . .	10
2.3.3 4,4'-methylenebis(2-chloroaniline) (MOCA) . . . . .	11
2.3.4 Benzidine . . . . .	11
2.3.5 Vinyl Chloride. . . . .	14
2.3.6 Epichlorohydrin . . . . .	14
2.3.7 Propylene Oxide . . . . .	14
2.3.8 Formaldehyde. . . . .	14
2.3.9 Acrylonitrile . . . . .	15
2.3.10 Pentachlorophenol . . . . .	15
2.3.11 2,4-Toluene Diisocyanate. . . . .	15
2.3.12 Chloroform. . . . .	16
2.3.13 Chlordane . . . . .	16
2.3.14 1-Nitropyrene . . . . .	16
2.3.15 1,3-Dichloropropene . . . . .	16
2.3.16 o-Toluidine . . . . .	16
2.3.17 1,2-Dichloroethane (Ethylene Dichloride). . . . .	17
2.3.18 Benzyl Chloride . . . . .	17
2.3.19 Dimethyl Carbamoyl Chloride . . . . .	17
2.3.20 Mixtures. . . . .	17
2.4 Conclusions and Recommendations . . . . .	20
3. Chemical Selection - Subsequent Reports. . . . .	21
3.1 Further Study on Selected Chemicals - DNA Adducts . . . . .	21
3.2 Further Study on Selected Chemicals - Protein Adducts . . . . .	21
3.3 Chemical Adduct Profiles (Computerized) . . . . .	23

CONTENTS (continued)

References. . . . . 24

Appendices

A. Prioritized Sources of Chemical Lists. . . . . A-1  
B. Prioritized List of Chemicals of Interest to  
the EPA. . . . . B-1  
C. Compounds Known to Form Adducts. . . . . C-1  
D. Prioritized Chemicals of Interest to the EPA  
Known or Suspected to Form Adducts . . . . . D-1  
E. Adduct-Forming Chemicals not on EPA Lists. . . . . E-1  
F. Carcinogenic Chemicals not Known to Form Adducts . . . F-1  
G. Adduct-Forming Carcinogenic Chemicals  
not on EPA List. . . . . G-1  
H. Non-Adduct-Forming Chemicals Scored for Availability  
of an Exposed Population Suitable for Study. . . . . H-1  
I. Chemicals Characterized for Their Potential  
Human Exposure . . . . . I-1

**TABLES**

<u>Number</u>		<u>Page</u>
1	Selected Chemicals for Further Study. . . . .	.12
2	Chemicals that Occur in Mixtures. . . . .	.18
3	Prioritized Protein Adduct-forming Chemicals. . . . .	.22

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## 1. INTRODUCTION

### 1.1 OBJECTIVE

Genotoxic chemicals tend to form adducts with macromolecules such as protein and DNA. These adducts could prove useful as biomarkers of exposure. It was the objective of this project to (a) identify and rank adduct-forming chemicals of interest to the U.S. Environmental Protection Agency (EPA), and (b) to select the most promising of those chemicals for further evaluation as candidates for use in future molecular epidemiological and exposure studies.

### 1.2 BACKGROUND

Historically, risk assessment has been based on exposure as derived by estimation from environmental monitoring data, simulation models, animal studies, and assumptions about actual exposure conditions. More direct and non-invasive methods are needed that will readily detect effects and/or changes in one or more physiological parameters of the human body resulting from environmental exposures.

A definite need exists for more sensitive and reliable human exposure monitoring tools to better evaluate the health risk to humans posed by chemicals in the environment. Improved risk assessment is necessary to help set appropriate priorities for the regulation and control of those chemicals that are of concern. In response to the need to develop such monitoring tools, the U.S. EPA has established a biomarkers/pharmacokinetics research program. This research program, which has received wide acceptance and support, was incorporated into the ORD FY 1988 base program. One of the goals of this program is to develop biological markers that can serve as reliable indicators of human exposure and of early (i.e., subclinical) disease processes.

In the present context, biological markers are subcellular, cellular, and organ-level physiological or biochemical responses that can serve as indicators of chemical exposure and/or exposure-related effects. Biological markers can be used to measure innocuous biological responses to exposure as well as adverse biologic and functional effects that may directly correlate with health effects. Examples of biological markers that may reflect exposure, and in some cases are thought to be related to effect, include DNA and protein adduct formation, micronuclei formation, enzymatic changes, immunological changes, sister chromatid exchange, chromosome aberrations, and other biochemical changes that occur in response to xenobiotics.

The accuracy of risk assessments would be greatly enhanced if external exposure data (i.e., measurements of the amount of xenobiotic in contact with the individual) could be supplemented with internal exposure data (i.e., biomarker measurements taken directly from exposed human populations). The overall goals in this area of study are to monitor exposure more accurately through the use of biological markers and to evaluate the molecular basis of the effects upon physiological processes and the relationship of those effects to risk assessment and ultimate risk management.

The U.S. EPA, through its Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) and its Health Effects Research Laboratory-Research Triangle Park (HERL-RTP) has been exploring the feasibility of using biological markers to monitor exposure to environmental chemicals. Among the candidate biomarkers of exposure and effect are the adducts formed by reaction of carcinogenic electrophiles with DNA and/or protein.

Certain carcinogens form electrophilic species that bind covalently to macromolecules such as DNA, RNA, and protein. New analytical methodologies including monoclonal antibody techniques, <sup>32</sup>P postlabeling, and gas chromatography-mass spectrometry (GC/MS) have been developed to identify these macromolecular adducts. Application of these techniques may permit detection and quantitation of human exposure.

However, before such techniques can be applied in the field with reasonable hope of success, it is first necessary to identify those chemical exposures of interest to the Agency which may be effectively monitored using adduct-based techniques. This selection process is the subject of the next chapter.

## 2. CHEMICAL SELECTION - THE INITIAL PROCESS

### 2.1 HISTORY

A meeting was convened on April 30-May 1, 1987, at HERL-RTP to review information related to the selection of adduct-forming chemicals and exposed human populations and to discuss the utility of macromolecular adducts as molecular biomarkers. (Since DNA adducts were the focus of the discussions at HERL, the word "adducts" in this report will, unless otherwise indicated, refer to "DNA adducts".) Present at the meeting were the staffs of HERL-RTP, EMSL-LV, and Oak Ridge National Laboratory (ORNL). Please see Acknowledgements.

At this meeting, the information on human exposures and adduct-forming chemicals was evaluated in order to identify, select and prioritize those adduct-forming chemicals of interest to the Agency that show promise for use in future molecular epidemiological or other studies. A review of the literature on chemicals known to form adducts, their present level of adduct research, and their corresponding analytical detection methodologies was examined. This information was evaluated in conjunction with each chemical's relative interest to the Agency in terms of its known or suspected health hazard, its potential for human exposure, as well as the availability of identified populations having substantial and well-characterized exposure. This evaluation resulted in the selection of a small group of chemicals for further study based on their potential as candidates for biological monitoring in human populations.

Candidate chemicals were selected for their high expectation of demonstrating a useful exposure-dose relationship using adduct detection methods in a human monitoring study. The following discussion focuses on the methodology used to derive the selected list of candidate chemicals considered to have the greatest potential for a pilot human monitoring study.

### 2.2 METHODOLOGY FOR CHEMICAL SELECTION

The process of chemical selection was divided into four steps based on the following four selection criteria: (1) interest to the Agency, (2) availability of supportive adduct research data, (3) availability of identified exposed population(s), and (4) genetic activity (i.e., genotoxicity). These criteria are discussed below in Sections 2.2.1 - 2.2.4.

### 2.2.1 Prioritization of Chemicals of Interest to EPA -

The first step was to compile a list of prioritized chemicals that are of interest to the Agency in terms of their known or suspected toxicity. From this list were selected chemicals that are known (or may be reasonably expected) to form adducts with biological macromolecules. Subsequent ranking of the latter chemicals led to the development of a candidate list of high priority chemicals that are known to form adducts.

The following procedure was used to generate the list of prioritized chemicals of interest to the Agency. A list of chemicals considered to be of high priority in terms of their potential health hazard was requested from each of the U.S. EPA Program Offices. The sources of these lists can be found in Appendix A. The lists were reviewed in an effort to eliminate those selections not based on potential toxicity hazard. The lists of chemicals from each Program Office were then prioritized, based on the number of times each chemical appeared on the Program Office lists. All the prioritized lists were then combined into a common prioritized list.

The prioritization scheme (Zeighami et al., 1987) used a main prioritization as well as a subprioritization. The main prioritization (P1) was determined by the number of Program Offices which listed that chemical on one or more lists. The subprioritization (P2) was derived by subtracting the main prioritization number from the total number of lists on which the chemical appeared. Formaldehyde, for example, received a rating of 5.(P1) 3.(P2) because it appeared on 8 lists from 5 different Program Offices. This scoring system provided a means of ranking chemicals that were listed by the same number of Program Offices (i.e., had identical P<sub>1</sub> ratings), and reduced the likelihood of bias toward any particular Program Office as a result of multiple listings of chemicals by that office. For example, although 4-aminobiphenyl (4-ABP) and sulfuric acid both appeared on 3 separate lists, 4-ABP received the higher ranking because it was listed by 3 different Program Offices, as compared to only one for sulfuric acid. The final prioritized list (Appendix B) consisted of approximately 1,585 chemicals.

The prioritized list of chemicals of interest to the Agency was then cross referenced with a list of 131 chemicals (Appendix C) that were known to form adducts. The list of chemicals known to form adducts was based on a review of the literature found in the 1987 U.S.EPA report, "Carcinogen-DNA Adducts: Introduction, Summary, and Recommendations" (EPA/600/4-87/005), and updated with newly received information from ORNL, literature sources, conference attendances, and other personal communications.

Sixty three of the chemicals listed in Appendix B had at least some data indicating that they form adducts. The potential candidates for further research and evaluation were, with a few exceptions, selected from this list of 63 compounds (Appendix D).

## Supplemental sources:

It was considered that six chemicals not listed in Appendix D might warrant further study in the future. These chemicals (Pentachlorophenol, 2,4-toluene diisocyanate, chlordane, 1-nitropyrene, 1,3-dichloropropene, and malathion) were brought into the selection procedure at the level of Appendix D chemicals. Most were found on lists of chemicals (see below) which were not known to form DNA adducts and/or were not on the list of chemicals "of interest to the Agency".

Sixty-eight of the chemicals known to form adducts were not on the Agency list; they are found in Appendix E. Although none of these chemicals was initially selected for further study, it was considered that some of them (e.g., nitropyrene) might warrant reconsideration at a later date.

Appendix F lists 167 chemicals which, though not known to form DNA adducts, are classified as known or suspected human carcinogens in the "Fourth Annual Report on Carcinogens" (PB-85-134663), published by the Department of Health and Human Services and the International Agency for Research on Cancer (IARC) and the U.S. Public Health Services National Toxicology Program (NTP). It is probable that many of these chemicals (e.g., solid state carcinogens, hormones, and immunosuppressants) exert their carcinogenic properties via some epigenetic mechanism, i.e., one which does not involve direct interaction with DNA. It is also possible that some of these chemicals do form adducts but that either (1) they had not yet been tested for adduct-formation, or (2) the adducts they form were not yet detectable with the methods then applied. Also, other chemicals such as 2,4-toluene diisocyanate may form protein adducts of potential use in exposure monitoring.

A review of the genetic toxicological activity profiles (see Section 2.2.4.) of these chemicals (and others not initially included in Appendix D) could be useful for identifying high priority chemicals that warrant preliminary research into their adduct-forming potential. For example, such considerations, combined with the potential for human exposure and adverse health effects, lead to the subsequent inclusion of chlordane and 1,3-dichloropropene, even though neither of these chemicals appears on any of the primary lists used in the study (i.e., Appendices B, C, and D).

Appendix G lists adduct-forming, suspect carcinogens that do not appear on the prioritized list (Appendix B). Most of these chemicals are drugs or research chemicals which are not subject to regulation by the EPA. Although none of these chemicals were ultimately selected for further study, they are nevertheless of interest from a research perspective due to the high quality of the related exposure data.

Appendix H (a subset of Appendix I) lists chemicals not known to form DNA adducts but which were scored for the availability of an exposed population for study. Four chemicals from Appendix H - 2,4-TDI, PCP, 1,3-dichloropropene, and malathion - were ultimately selected for further study. The neurotoxicant acrylamide, while not selected for further study at this time, was later included in a study of the potential of protein adduct-forming chemicals for exposure monitoring (see Section 3.2).

### 2.2.2 Adequacy and Quality of Adduct Research Data -

The second step in the chemical selection process was to assess the quality and adequacy of the research data on the adduct-forming chemicals of interest to the Agency (Appendix D). A large amount of preliminary research and a variety of data are included under the research status category. Information on covalent binding, chemical adduct identification, in vitro studies, validation in animal studies, DNA adduct measurement, protein adduct measurement, biological media and species monitored, dose-response data, kinetics of adduct formation and removal, the chemical stability of adducts formed, the chronic or acute nature of the exposure (continuous exposure, single-dose, multiple-dose, etc.), and the corresponding analytical detection methodology all become important in assessing the research data.

The quality and adequacy of available adduct-formation data on the chemicals (research status) is an important criterion in selecting candidates for a pilot study in the imminent future. A substantial research data base, particularly validated animal studies, is necessary before a chemical can be monitored in an epidemiological or other study. Evaluation of the research status also identifies data needs for which research should be designed and initiated. Updating the research status must be a continuing effort.

Initially, the lists of chemicals in Appendix D were screened for chemicals that could be eliminated a priori for one or more of the following reasons: (1) adduct formation by the chemical, though possible, was considered unlikely for structural reasons, (2) the literature contained insufficient adduct information to support the chemical's candidacy, or (3) the adduct formed by the chemical was a small alkylation product (e.g., 7-methyl guanine or 7-ethyl guanine) that lacked sufficient specificity for exposure monitoring (i.e., the same adduct could have endogenous sources and/or be formed by two or more confounding exposures). The Appendix D chemicals so eliminated are marked with a negative sign (-) next to their sequence number. It should be kept in mind, however, that these alkylating agents may still be useful in screening studies to identify exposure to certain classes of chemicals (rather than to individual chemicals). In addition, some of these chemicals

might display a specific adduct-binding pattern that would increase their specificity and sensitivity, thus making them useful for monitoring exposure (Osterman-Golkar, 1983; Svensson and Osterman-Golkar, 1986; Osterman-Golkar and Bergmark, 1988).

Chemicals in Appendix D were marked with a plus sign (+) if (1) they were fairly well represented in the literature on adduct research, or (2) sufficient preliminary data (i.e., ongoing research) existed to support their candidate potential. In general, it was decided that the chemical(s) selected for the initial study should be one(s) that form chemical-specific adducts that can be identified with relative ease. Chemicals that form bulky, chemical-specific adducts were generally preferred over those that form small, non-specific, adducts. Serious consideration was given to choosing those chemicals for which a large part of the information needed was already available. However, chemicals eventually selected for further study (Tables 1 and 2) must also satisfy the requirement for an identifiable, exposed population in which human exposure might be monitored.

### 2.2.3 Potentially Exposed Human Populations -

The third step in the chemical selection process was the identification and characterization of potentially exposed human populations to those chemicals according to the criteria outlined below. The chemical list used in this part of the study was a subset of a combined list of chemicals from two databases: (1) the GENE-TOX database (Waters and Auletta, 1981), and (2) the Genetic Activity Profile (GAP) database (Waters et al., 1988). Project officers at the U.S. EPA determined which chemicals from the combined list would be used in the population study. The selected chemicals tended to be those that were either known or considered likely to form adducts, based on chemical structure and available genotoxicity data. Appendix I lists the 253 chemicals that were subsequently examined and characterized by Zeighami et al. (1987) for the availability of exposed populations for study.

The following criteria were used in scoring the chemicals on their human population exposure potential:

- (1) population availability - An essential element of any epidemiological study is the availability of an exposed population that is accessible, in a practical manner, to the researchers performing that study.
- (2) population size (best estimate) - The size of the population(s) chosen for epidemiological study will affect the practical performance of that study as well as the statistical significance of its results.

- (3) level of exposure - In a population suitable for molecular epidemiological study, the expected level and duration of exposure must be such that the resultant adduct levels will be within analytical detection limits.
- (4) quality of exposure history - The validity of exposure estimates will depend upon the ability to reconstruct past exposures, as well as the ability to validate present exposures using measurements other than the test biomarker.
- (5) degree of confounding multiple exposures - The interpretability of the study results will be affected by the degree to which persons in the study population are (a) exposed to the same chemical in multiple situations, or (b) concurrently exposed to other chemicals in the primary exposure situation.

Each criterion was assigned a score from 0 to 3. The resulting overall score for a chemical was the product of the individual criterion scores which could yield a maximum score of  $3^5$  or 243. Scores were assigned only to those chemicals for which adequate information on exposed populations was found. The categories of anti-neoplastic drugs and other medications were not scored. Summaries were assigned to a total of 58 chemicals for which adequate information was located (Appendix I, pg I-1). Of these, only 33 had a score greater than zero, and only 23 had a score of 36 or higher (of a possible 243). The remaining 195 chemicals (Appendix I, pages I-2 through I-5) received no score due to the absence of sufficient data.

It should be pointed out that the multiplicative scoring scheme used here would have eliminated (i.e., given a score of "0" to) any chemical that received a zero score on any of the 5 criteria, regardless of how high the scores might have been in the remaining criteria. Six chemicals thusly "eliminated" were among those ultimately chosen for further study (Table 1) because their potential in other areas warranted their selection.

The selected adduct-forming chemicals of interest to the Agency (Appendix D) were then re-examined in light of the relevant human population exposure data (Appendix I). Chemicals for which the exposed population was small or nonexistent were marked with an "o" next to their sequence number in Appendix D; those chemicals considered to be ubiquitous in nature were marked with a "U" next to their sequence number. The widespread occurrence of a chemical would complicate efforts to establish a relationship between a source of exposure and adverse health effects.

Chemicals that typically occur as components of mixtures, and for which exposure to the pure compound is rare, were marked with an "M" next to their sequence number. These were reviewed



separately due to the difficulties that arise in ascribing effects on human health to a particular chemical in a mixture. However, chemicals that typically occur in mixtures can still be useful for exposure monitoring studies in which direct correlations with health effects are not always necessary.

Those chemicals in Appendix D considered likely to have well-defined exposed populations are identified by an asterisk (\*) next to their sequence numbers. Those chemicals marked with both an asterisk (\*) and a plus sign (+) are those for which well-defined exposed populations as well as supportive adduct research data were considered to exist.

After the elimination of those chemicals that did not meet the general criteria described above, the remaining chemicals were listed (Table 1) as potential candidates for adduct-based human monitoring studies. These chemicals then became the subject of detailed discussions, on a compound-by-compound basis, centering on the adducts formed, current research status, population availability and genetic toxicological activity.

#### 2.2.4 Genetic Toxicological Activity -

Genetic toxicity was one of the primary criteria considered in ranking the chemicals selected for further study in Table 1. The genetic toxicological activity of a compound, as measured by various bioassays, is relevant to both (1) the potential hazard it poses to human health and, hence, its interest to the EPA, and (2) the likelihood that the chemical will form detectable macromolecular adducts and, thus, be potentially useful in the present study. Genetic activity profiles (Garrett et al., 1984; Waters et al., 1988) were particularly useful in rating those chemicals for which little adduct information was available.

Genetic activity profiles represent the available qualitative and quantitative genotoxicity data from short-term tests in a standardized graphical format. The data for a given chemical is presented in a bar or line graph (the activity "profile") in which test systems (identified by three-letter codes) are displayed along the x-axis in either a phylogenetic or endpoint sequence and values corresponding to the doses employed in the tests are shown on the y-axis (Waters et al., 1988). The logarithmically-transformed values on the y-axis represent either the lowest effective doses or the highest ineffective doses tested. The total data available from short-term tests for a compound are thus presented in a condensed format that allows rapid visualization of the type of genetic (or related) effects induced, and facilitates comparisons among different chemicals.

Genetic activity profiles have been prepared and compared for 24 known or suspected human carcinogens (Garrett et al., 1984), six well-known organic solvents (Vainio et al., 1985),

65 pesticides (Garrett et al., 1986), and six priority compounds found at Superfund Amendments and Reauthorization Act (SARA) sites (Waters et al., 1987).

The International Agency for Research on Cancer (IARC) has employed the genetic activity profile methodology in several of its Monographs on the Evaluation of Carcinogenic Risks to Humans (IARC, 1985a, 1985b, and 1986). Supplement 6 to the IARC Monographs (IARC, 1987) summarizes and updates the findings from genotoxicity tests in experimental systems and humans for 195 compounds that had been previously evaluated in Volumes 1-42 of the Monographs and for which some data on carcinogenicity to humans were available. (Note: The GAP database has since expanded to include data on more than 400 chemicals. It is available on disk through Dr. Michael D. Waters of the U.S. EPA, Health Effects Research Laboratory, Research Triangle Park, N.C. 227711.

### 2.3 PRIORITIZATION OF CHEMICALS SELECTED FOR FURTHER STUDY -

Table 1 lists by assigned priority those chemicals that were not eliminated during the 4 steps of the chemical selection process described previously. The chemicals were assigned a high, medium, or low priority based on adduct data, current research status, population availability, and genetic activity. An unclassified category for reconsideration was established for those chemicals for which the potential for study existed, but for which the information available at the time was insufficient to support any judgment.

Special consideration was given to those few chemicals for which a fair amount of preliminary research existed to support their selection as potential candidates. When all criteria were considered, the 7 chemicals that received the highest (i.e., high or medium) ratings were styrene, ethylene oxide, 4-4'methylene bis(2-chloroaniline) (MOCA), vinyl chloride, epichlorohydrin, propylene oxide, and benzidine. A discussion of the assigned priority of individual chemicals in Table 1 follows.

#### 2.3.1 Styrene -

Styrene ranked high for genetic toxicity evidence, supportive adduct information, and population availability. Also, a large ongoing research effort on Styrene-DNA adducts at the Institute of Occupational Health in Finland existed at the time (Hemminki, 1986), and has continued to generate useful research data since (Vodicka and Hemminki, 1988; Heminki et al., 1988, 1990).

#### 2.3.2 Ethylene Oxide -

Ethylene oxide also ranked high for genotoxicity information, potentially exposed populations, and amount of research effort. It has caused cancer in rats and mice (NTP, 1985) and is a suspected human leukemogen (IARC, 1985a). Ethylene

oxide occurs in urban air and in cigarette smoke and is used in the manufacture of antifreeze and in the sterilization of medical equipment. Hospital sterilization workers and patients using ethylene oxide-sterilized renal dialysis equipment provide an exposed population for study. There is sufficient evidence of carcinogenicity of ethylene oxide in experimental animals, but not in humans (NTP, 1985, IARC, 1985a).

Both ethylene and ethylene oxide cause 2-hydroxyethylations of protein and DNA, and the ratio between protein and DNA alkylation products in various organs is relatively constant (Segeberback, 1983). At the time of the Spring 1987 meeting at HERL-RTP, a substantial amount of research, including human monitoring studies (Calleman et al., 1978; Van Sittert et al., 1985; Farmer et al., 1986; Calleman, 1986; Tornqvist et al., 1986; Wraith et al., 1987; Passingham et al., 1987; Tornqvist et al., 1989), had already been done on ethylene oxide-hemoglobin adducts. Also, both the Columbia University School of Public Health and the National Institute for Occupational Safety and Health (NIOSH) had proposed doing human monitoring studies with ethylene oxide.

Nevertheless, there was some disagreement on the selection of this chemical, primarily because of potential problems posed by multiple sources of exposure and background levels of ethylene oxide adducts. Ethylene (or ethene), the metabolic precursor of ethylene oxide, is a well-known environmental contaminant and it is known to be produced endogenously as well.

#### 2.3.3 4,4'-methylene bis(2-chloroaniline) (MOCA) -

MOCA was ranked medium/high based on the availability of supportive research data and the identification of a well-defined population. Although no data were available on the genotoxicity of MOCA in humans, this arylamine was known to be carcinogenic in mice, rats and dogs (Manis et al., 1984), and was suspected to cause bladder cancer in man. Its mutagenicity has since been demonstrated in the Ames assay (Kuslikis et al., 1988). MOCA is no longer manufactured in the U.S., but it is widely used by numerous small companies in the polyurethane industry.

#### 2.3.4 Benzidine -

Benzidine was ranked medium/high based on genotoxicity data, population availability, and the large amount of supportive adduct research data. The building block of an entire family of widely-used dyes, benzidine is a urinary bladder carcinogen in humans and dogs and a hepatocarcinogen in rodents (Talaska et al., 1987). A fair amount of research has been done on biomarkers of benzidine exposure (Martin and Ekers, 1980; Martin et al., 1982, 1983; Kennelly et al., 1984; Martin and Kennelly, 1985; Beland et al., 1983; Beland and Kadlubar, 1985; Mitchum et al., 1985), including a recent biomonitoring study based on hemoglobin-adduct measurements (Birner et al., 1990).

TABLE 1. PRIORITIZED CHEMICALS SELECTED FOR FURTHER STUDY

Number <sup>a</sup>	Chemical	Rating <sup>b</sup>	Data Summary
1.(11)	Styrene	H	Genetic activity = high. Good population data. Supportive adduct research studies.
2.(4)	Ethylene oxide	H	Genetic activity = high. Available populations: hospital sterilization workers and patients receiving treatment through the sterilized equipment used for cases such as renal dialysis, which provides more consistent dosing than bypass surgery. Numerous human studies using Hb adducts have been conducted.
3.(29)	4,4-Methylene bis (2-chloro-aniline) (MOCA)	M/H	Genetic activity = low. Available population. Active research support.
4.(18)	Benzidine	M/H	Genetic activity = high. Available population. Supportive adduct research data.
5.(2)	Vinyl chloride	M/H	Genetic activity = high. Population available, but numerous confounding exposures include vinyl bromide, acrylonitrile, 1,2-dichloroethane, 1,2 dibromoethane, ethylene halohydrins, and urethane. Also, exposure might be low and it must be determined if adducts would be formed at these levels. Additional research data is necessary for support.
6.(19)	Epichlorohydrin	M/H	Genetic activity = medium. Reasonable population in production workers. Needs further validation from animal studies.
7.(25)	Propylene oxide	M/H	Genetic activity = similar to ethylene oxide profile, although not as much information has been collected. Ubiquity could be a problem. Needs more supportive research data.
8.(3)	Formaldehyde	L/M	Genetic activity = high. Ubiquitous. Changed from H to L/M because it was believed that the separation of endogenous/-exogenous adduct formation would be difficult and some reactivity may be reversible. (CIIT)
9.(15)	Acrylonitrile	L/M	Genetic activity = positive in vitro, questionable in humans. Available population.
10.(N/A)	Pentachloro-phenol	L	Genetic activity = minimal. Availability of unconfounded exposed population is questionable. Indirect adduct formation. Additional data needed.
11.(N/A)	2,4-toluene diisocyanate	U/Ex	Genetic activity = inadequate information. Population available. Need more information, particularly on protein adducts as exposure biomarkers.

TABLE 1. (continued)

Number <sup>a</sup>	Chemical	Rating <sup>b</sup>	Data Summary
12.(6)	Chloroform	U/Ex	Genetic activity = low. Exposed populations require further study. Investigate potential of protein adducts.
13.(N/A)	Chlordane	U/Ex	Review all criteria.
14.(N/A)	Nitropyrene	U	Review all criteria.
15.(N/A)	1,3-dichloro-propene	U	Review all criteria.
16.(55)	Toluidine, O-	U/L	Genetic activity = low. Population questionable. Minimal adduct information. Investigate protein adduct formation.
17.(5)	Ethylene dichloride	U	More information is needed on all criteria. Could demonstrate a unique adduct.
18.(41)	Benzyl chloride	L/M U/Ex	Genetic activity needs to be determined. Additional information is needed.
19.(40)	Dimethyl carbamoyl chloride	U/L	Genetic activity needs to be determined. Population data were questionable. Minimal supportive research data.
20.(N/A)	Malathion	U/L	Investigate protein adduct formation.
21.(33)	Mephalan		Put aside for possible use in other studies.
22.(57)	Mitomycin C	"	"
23.(38)	Thioacetamide	"	"

The chemicals in Table 1 were rated on their genetic activity, adduct formation, exposed population availability, and research status. Definitions of the notation used are as follows:

<sup>a</sup> (#) The number in parentheses is the sequential number as it appeared in Appendix D.

(N/A) Indicates that the chemical is not listed in Appendix D.

<sup>b</sup>

- L Indicates a low priority ranking.
- M Indicates a medium priority ranking.
- H Indicates a high priority ranking.
- U Indicates an unclassified rating. Assigned to chemicals for which the potential for study existed, but for which the information available at the time was inadequate to support any judgement.
- Ex Indicates that further information is desired on exposure monitoring of protein adducts.

### 2.3.5 Vinyl Chloride -

Vinyl Chloride was ranked medium/high based on its high genotoxic activity and the potential to find a well-defined, exposed population. However, additional research data is required to support the candidacy of this chemical. Current exposure to vinyl chloride, a known human carcinogen, is likely to be quite low. Thus, it will be necessary to establish a dose-response relationship at low levels of exposure, provided that detectable levels of adducts are even formed at low exposure levels. In addition, a vinyl chloride-exposed population must be selected in such a way as to minimize confounding exposures such as vinyl bromide, 1,2-dihaloethanes, ethylene halohydrins, urethane, and acrylonitrile. The toxicology of vinyl chloride has recently been reviewed (ATSDR, 1989b).

### 2.3.6 Epichlorohydrin -

Epichlorohydrin was ranked medium/high based on genotoxicity data and population availability. Although this compound is mutagenic in bacteria and carcinogenic in animals, adequate evidence of carcinogenicity in humans does not yet exist. More adduct research data is needed to support the candidacy of epichlorohydrin.

### 2.3.7 Propylene Oxide -

Propylene oxide received a medium/high rating and displayed genetic activity data very similar to the ethylene oxide profile. Due to its mutagenicity in bacteria and its known carcinogenicity in experimental animals, propylene oxide is regarded as a probable carcinogenic risk to humans (IARC, 1985a). It was rated high for the availability of populations with relatively high exposure levels and medium for supportive adduct research information. The background levels of adducts of propylene oxide are lower than those of ethylene oxide, but much less research has been done on propylene oxide.

### 2.3.8 Formaldehyde -

Formaldehyde is a chemical of high interest to the Agency due to the recent evidence of animal carcinogenicity, i.e. the induction of nasal neoplasms in rats reported by Swenberg et al., 1985. The potential for human exposure is great since formaldehyde occurs in urea-formaldehyde foam insulation, in resins used to manufacture pressed-wood construction materials and durable-press fabrics for clothing, and in cigarette smoke.

However, formaldehyde also occurs naturally in all biological tissues, and it may be difficult to separate the induced N-7 methyl guanine adduct from the endogenous DNA adduct. In addition, some DNA adduct-formation may be reversible

(Swenberg et al., 1985). Consequently, formaldehyde was given a low/medium ranking. More research is needed to support the candidacy of this chemical.

#### 2.3.9 Acrylonitrile -

Acrylonitrile also received a low/medium ranking and appeared to lack the necessary supportive research data to warrant further study. Genotoxicity data were equivocal or negative and insufficient data were available on adduct formation in vivo. However, population availability and exposure characteristics were rated adequate to high. The primary hazard of acrylonitrile is acute toxicity following the metabolic release of cyanide, but this chemical has also caused cancer in experimental animals and is a possible human carcinogen (NTP, 1985). Protein adducts may have more potential than DNA adducts as biomarkers of exposure to acrylonitrile. The epoxide metabolite, but not the parent compound, forms adducts with DNA, whereas both can bind to proteins (Hogy and Guengerich, 1986).

The remaining candidates for further consideration due to their potential for human population exposure were pentachlorophenol, 2,4-toluene diisocyanate, chloroform, 1,3-dichloropropene. Most of these chemicals were categorized as unclassified because they required additional information before any valid judgement could be made. Chlordane and nitropyrene were also included as important chemicals requiring further information in all selection criteria areas. Additional unclassified chemicals which remained on the adduct-forming list of chemicals of interest to the Agency (Appendix D) that might have potential for further study but lacked adequate information were o-toluidine, ethylene dichloride, benzyl chloride and dimethyl carbamoyl chloride. These chemicals were included in Table 1, and prioritized as follows:

#### 2.3.10 Pentachlorophenol -

Pentachlorophenol received a low rating due to minimal genetic toxicity data and weak adduct-formation by metabolites. Wood-treatment workers provide an adequate human population for human study, but high concomitant exposures to other chemicals were projected. The toxicology of pentachlorophenol has recently been reviewed (ATSDR, 1989c). More research in all areas is needed to support pentachlorophenol as a potential candidate.

#### 2.3.11 2,4-toluene diisocyanate -

2,4-toluene diisocyanate (TDI) was placed in the unclassified category to be reconsidered after additional information became available. A potent respiratory allergen, TDI is widely used in the manufacture of polyurethanes. This chemical ranked adequate to good from the human population standpoint, but adequate genetic toxicology data were lacking.

Although TDI is carcinogenic in rats and female (but not male) mice (NTP, 1985), the literature contains no reference to TDI-DNA adducts or other genetic damage in animals.

#### 2.3.12 Chloroform -

Chloroform had a high population score, but DNA adduct information was inadequate. Although chloroform has caused cancer in rodents (NTP, 1985), it is not mutagenic, and there is no evidence as yet that it is a human carcinogen. Protein adducts may have some potential for monitoring exposure to chloroform (Pereira and Chang, 1982), but here, too, information was inadequate. Additional research data is needed to justify reconsideration of this chemical. The toxicology of chloroform has recently been reviewed (ATSDR, 1988a).

#### 2.3.13 Chlordane -

This chlorinated hydrocarbon insecticide may be an appropriate candidate, but information in all areas of evaluation was inadequate. Although it has induced liver tumors in at least one test species (IARC, 1983), chlordane is not genotoxic and is classified as an epigenetic carcinogen of the promoter type.

#### 2.3.14 1-Nitropyrene -

This chemical was placed in the unclassified category to be reconsidered after more adduct information became available. A widespread environmental contaminant found in diesel exhaust, 1-nitropyrene is mutagenic and has caused cancer in rats (IARC, 1989). However, in at least one study, efforts to detect DNA-nitropyrene adducts in exposed rats were unsuccessful (Jackson et al., 1985). Also, human exposure levels are probably quite low. The development of an immunoassay for nitropyrene or its adducts in exposed humans may be possible in the future (Groopman, 1987).

#### 2.3.15 1,3-dichloropropene -

1,3-dichloropropene could not be classified at this time; more information on all evaluation criteria was required. This chemical is used as a soil fumigant and human exposure is expected to occur. Although 1,3-dichloropropene is mutagenic, the absence of adduct data and the unpredictability of exposure made this chemical less appropriate for study than others.

Additional chemicals that were reconsidered, although they were initially felt to have poor population availability, were ranked as follows:

#### 2.3.16 o-Toluidine -

This arylamine was ranked low because of insufficient data on genotoxicity, and adduct formation, and because human population exposures may no longer be prevalent. Like a number



of substituted anilines, o-toluidine is weakly carcinogenic in rodents at high doses. However, the evidence of the carcinogenicity of o-toluidine is inadequate in humans (NTP, 1985). More research is needed to support the candidacy of o-toluidine.

#### 2.3.17 1,2-Dichloroethane (ethylene dichloride) -

This chemical received a low population score because of an apparent lack of appropriate human populations for study. Ethylene dichloride (1,2-dichloroethane) could have potential based on its high genotoxicity and the unique episulfonium ion-glutathione adduct that occurs with the dihaloethanes (Guengerich et al., 1987). Studies in the mouse indicate that hemoglobin adducts (i.e., 2-hydroxyethylations of cysteine, histidine and valine) are also formed in vivo (Svensson and Osterman-Golkar, 1986). This chemical was placed in the unclassified category to be reconsidered in the event that additional research data became available. The toxicology of 1,2-dichloroethane has recently been reviewed (ATSDR, 1989d).

#### 2.3.18 Benzyl Chloride -

This chemical was placed in the low to medium rating group because the available information was inadequate in all areas under consideration. Nevertheless, benzyl chloride is both mutagenic and carcinogenic, and apparently binds to both DNA and hemoglobin (Wallis, 1981). In addition, the potential for some human exposure does exist. Future additions to its meager research database may justify reconsideration of benzyl chloride.

#### 2.3.19 Dimethyl carbamoyl chloride -

Dimethyl carbamoyl chloride received a low ranking due to questionable population data and minimal supportive research data. More research data is needed to support the candidacy of this chemical.

#### 2.3.20 Mixtures -

Chemicals listed in Table 2 were classified as mixtures since exposure to the pure compound rarely occurs. While there was considerable interest in the potential for monitoring exposure to some of these chemicals, it was also recognized that (1) it would be difficult, due to the presence of confounding exposures, to attribute health effects to any specific component of a mixture (e.g., N-nitrosornicotine in tobacco smoke), and (2) that potentially high background levels of adducts to ubiquitous chemicals such as benzene, benzo(a)pyrene, and 4-aminobiphenyl might preclude detection of all but the highest exposures. Two compounds, 3-Methylcholanthrene and 7, 12-dimethyl benzanthracene, were eliminated because they are rarely used except in research situations. Benzidine and nitropyrene were also listed in Table 1 and were described above.

TABLE 2. CHEMICALS THAT OCCUR IN MIXTURES

Number <sup>a</sup>	Chemical	Rating <sup>b</sup>	Data Summary
1.(18)	Benzidine	H/Ex	Population thought to be available in the dye industry. Supportive research data on protein as well as DNA adducts.
2.(1)	Benzene	H/Ex	Ubiquitous in the environment. Cohort population identified in China. Ongoing research activity.
3.(17)	Benzo(a)pyrene	M	Need highly exposed population such as coke oven workers due to the high background levels of adducts. Extensive research, including human monitoring studies.
4.(32)	4-Aminobiphenyl	M/Ex	Ubiquitous in the environment. Several studies on 4-aminobiphenyl hemoglobin adducts in smokers.
5.(50)	Nitrosonor-nicotine, N-	M/Ex	Population may be available in smokeless tobacco users. NNN-DNA adduct can be easily identified. Fair amount of preliminary research, including protein adducts.
6.(N/A)	1-Nitropyrene	M	Identified population in China. Active research.
7.(23)	3-Methylchol-anthrene	N	Rarely used except in research setting.
8.(24)	Benzanthracene, 7,12-Dimethyl	N	Rarely used except in research setting.

The chemicals in Table 2 were rated on their genetic activity, adduct formation, exposed population availability, and research status. Definitions of the notation used are as follows:

<sup>a</sup> (#) The number in parentheses is the sequential number as it appeared in Appendix D.

(N/A) Indicates that the chemical is not listed in Appendix D.

<sup>b</sup> L Indicates a low priority ranking.

M Indicates a medium priority ranking.

H Indicates a high priority ranking.

U Indicates an unclassified rating. Assigned to chemicals for which the potential for study existed, but for which the information available at the time was inadequate to support any judgement.

Ex Indicates that further information is desired on exposure monitoring of protein adducts.

Benzo(a)pyrene adducts have been extensively researched in both animals and humans. However, in human monitoring studies to date, benzo(a)pyrene adduct levels have exhibited extreme individual variability and been statistically different from controls only in groups with high exposure (Harris et al., 1985; Phillips et al., 1988; Lee and Santella, 1988; Weston et al., 1989). Protein (especially serum albumin) adducts may have more potential than DNA adducts as biomarkers of exposure to benz(a)pyrene. This is certainly the case with another ubiquitous, carcinogenic, environmental contaminant, 4-aminobiphenyl.

Recent human monitoring studies of cigarette smokers and nonsmokers have demonstrated consistently higher levels of 4-aminobiphenyl-hemoglobin adducts in smokers (Tannenbaum et al., 1986; Bryant et al., 1987; Perera et al., 1987; Bryant et al., 1988; Maclure et al., 1990). These adducts are also elevated in passive smokers, i.e., non-smokers exposed to environmental tobacco smoke (Maclure et al., 1989). Furthermore, levels of 4-aminobiphenyl-hemoglobin adducts have been found to be proportional to risk for bladder cancer (Vineis et al., 1990). Simultaneous measurements of the serum albumin adduct, if they could be made in humans, might even clarify the link between cancer risk and interindividual variation in acetylation activity (Skipper et al., 1985).

Benzene is of considerable interest to the U.S. EPA from the standpoint of exposure monitoring. Although little adduct data was available for benzene, it was ranked high for potential exposure and health effects. A human leukemogen (NTP, 1985), benzene occurs naturally in the environment and is produced in vast quantities for use as a chemical intermediate in the synthetics industry. More information on the potential of hemoglobin- and DNA-benzene adducts for exposure monitoring should become available as ongoing research programs progress at Rutgers, Berkely, and the Lovelace Inhalation Toxicology Research Institute. In light of its potential health hazard and its growing research database, benzene may warrant reconsideration in the near future. The toxicology of benzene has recently been reviewed (ATSDR, 1988b).

N-Nitrosornicotine (NNN) forms a unique adduct and is found in cigarette smoke and smokeless tobacco. This chemical could be a good choice in terms of exposure monitoring since the NNN-DNA adduct can easily be attributed to tobacco. It is not a suitable candidate in terms of health effects due to the presence of other carcinogens. Smokeless tobacco, however, does not contain such pyrolysis-produced carcinogens as benzo(a)pyrene, 5-methylchrysene, and dibenz(a,h)anthracene. Ongoing protein adduct research at the American Health Foundation (Carmella et al., 1987; Carmella and Hecht, 1987; Hecht et al., 1988) may, at some future date, justify reconsideration of this chemical.

## 2.4 CONCLUSIONS AND RECOMMENDATIONS -

It was concluded by the Working Group in 1987 that the information on the chemicals in Tables 1 and 2 should be periodically updated by via reviews of the current literature and other mechanisms such as conferences and personal communication. Particular emphasis was to be put on the following 13 chemicals: styrene, ethylene oxide, 4-4'methylene bis(2-chloroaniline) (MOCA), benzidine, vinyl chloride, epichlorohydrin, propylene oxide, benzyl chloride, formaldehyde, chlordane, nitropyrene, 1,3-dichloropropene, and ethylene dichloride. Any additional information that might substantiate the selection of acrylonitrile, pentachlorophenol or other chemicals that had been eliminated or not considered would also be welcomed.

It was considered that certain low priority chemicals (e.g., chloroform, 2,4,-toluene diisocyanate, benzyl chloride, o-toluidine, and malathion) might be useful in exposure monitoring studies based on measurement of protein adducts, but more research data were needed. Benzene, benzo(a)pyrene, 4-amino-biphenyl, and N-nitrososornicotine also required a summary of ongoing research and an assessment of exposed populations.

It was recommended that any adduct research on pesticides such as aldrin, amitrole, avadex, aramite, captan, chloramben, chlordimeform, chlorothalonil, diallate, diaminazide, dicofol, chlorbenzilate, p,p'-DDT, dieldrin, mirex, strobane, heptachlor, and toxaphene be reviewed.

Finally, it was suggested that the chemical-adduct research data for each chemical could be entered into the computer to form an updated informational system very similar to the computer-generated genetic activity profiles. Aside from its value as a compact informational chemical adduct library, it would be extremely valuable to visually analyze complex data in terms of adduct structure-activity relationships. An analysis of such a database could further our understanding of the relationship between chemical structures and properties, chemically similar structures, adducts formed, and the associated health effects. It could thus assist in identifying those adducts of probable importance in the mechanisms of carcinogenesis.

The efforts of the 1987 workgroup represented the first step in the development of the Biomarkers Program of the U.S. EPA. Additional program development studies have, in the intervening three years, followed up on the workgroup's initial conclusions and recommendations. The reports on these projects, which represent subsequent updates and refinements of the chemical selection process, are briefly described in the next section.

### 3. CHEMICAL SELECTION - SUBSEQUENT REPORTS

The original list of chemicals selected for further study in 1987 continues to evolve as more research data become available and new methodologies are developed. The projects briefly described below represent the continuing refinement of the chemical selection process.

#### 3.1 FURTHER STUDY ON SELECTED CHEMICALS - DNA ADDUCTS:

The selected chemicals for further study have become the subject of a report prepared by Oak Ridge National Laboratory (Uziel et al., 1989). In this report, the research database is reviewed and summarized for nine of the highest priority chemicals listed in Table 1, as well as for 3 benzidine-based dyes.

In the case of in vitro and validated animal studies, the Oak Ridge report provides information relating to biological media, species, the chronic or acute nature of the exposure (i.e., continuous exposure, single dose, multiple dose, etc.) and dose response data. In addition, specific attention is directed towards applicability for use in a human monitoring study. Potentially exposed populations are identified and the expected routes, levels, and duration of exposure are estimated.

#### 3.2 FURTHER STUDY OF SELECTED CHEMICALS - PROTEIN ADDUCTS:

In the 1987 report entitled "Carcinogen-DNA Adducts: Introduction, Literature Summary and Recommendations" (Soileau, 1987), it was recognized that hemoglobin and serum albumin adducts may be more advantageous than DNA adducts as biological markers of exposure, because the protein adducts are more stable and are accessible from humans in much larger quantities. As indicated in the previous chapter, several of the candidate chemicals listed in Tables 1 and 2 were not known to form DNA adducts, but were included in consideration of their potential to form protein adducts.

In 1988, an internal U.S.EPA report entitled "Protein Adduct-Forming Chemicals For Exposure Monitoring: Literature Summary and Recommendations" summarized the literature regarding adducts formed by xenobiotics with proteins, particularly hemoglobin and serum albumin, and examined the feasibility of their use as dosimeters of exposure. Conclusions were drawn and proposals made with respect to those compounds, protein adducts and detection methods best suited to monitoring human exposure to toxic chemicals, particularly those occurring at Superfund sites and others of interest to the EPA. This report was updated and upgraded to an EPA project report in the following year (Schnell, 1990). The recommended chemicals were ranked by their potential for exposure monitoring using protein adduct-based methods (Table 3).

Table 3. PRIORITIZED LIST OF PROTEIN ADDUCT-FORMING  
COMPOUNDS OF INTEREST TO THE EPA

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Group I - Simple alkylating and arylating agents  
that form N-terminal valine adducts

- 1) Ethylene Oxide
- 2) Propylene Oxide
- 3) Styrene

Group II - Aromatic amines that form hydrolyzable  
cysteine adducts

- 1) 4-Aminobiphenyl
- 2) Benzidine
- 3) MOCA
- 4) o-Toluidine

Group III - Chemicals that form hydrolyzable, but  
less well-characterized adducts

- 1) N-Nitrosornicotine
- 2) Benzo[a]pyrene
- 3) 1-Nitropyrene

Group IV - Chemicals that form characterized,  
but nonhydrolyzable adducts

- 1) Vinyl Chloride
- 2) Ethylene Dichloride
- 3) Acrylonitrile
- 4) Acrylamide
- 5) Chloroform

Group V - Chemicals that form poorly  
characterized adducts

- 1) Benzene
  - 2) Formaldehyde
  - 3) 2,4-Toluene Diisocyanate
  - 4) 7,12-Dimethylbenzanthracene
  - 5) Epichlorhydrin
  - 6) Benzyl Chloride
  - 7) Pentachlorophenol
- 
-

In 1989, an expanded treatment of those chemicals recommended for further study in the 1988 protein adducts report was prepared as an EPA project report (Schnell, 1989). The topics covered for each individual chemical were: manufacture and use, sources and levels of exposure, known health effects, metabolic detoxification and activation, host factors, adduct characterization, rates of adduct formation (i.e., second order rate constants), dose-response relationships, background adduct levels, methods of adduct detection, and research needs.

### 3.3 COMPUTERIZED PROTEIN ADDUCT PROFILES -

In 1990, a Computerized Protein Adducts Database (CPAD) was created to provide an efficient means of updating and disseminating information on protein adducts as regards their utility as dosimeters of exposure to environmental contaminants, especially genotoxic and/or carcinogenic compounds. The structure of the database as well as its initial contents were derived primarily from the document, "Protein Adduct-Forming Chemicals for Exposure Monitoring: Chemicals for Further Study" (EPA/600/4-89/035). The programs that enable the user to search, modify, or update the database and display its contents were originally written in the DBASE III PLUS programming language, then converted, compiled and linked by DBASE IV. The final product is a user-friendly, menu-driven, stand-alone DBASE application that can be accessed by anyone with virtually no previous training. For information on the availability of this database, contact Charles H. Nauman at the following address: United States Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Exposure assessment Research Division, P.O. Box 93478, Las Vegas, Nv., 89193-3478.

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APPENDIX A  
PRIORITIZED SOURCES OF CHEMICAL LISTS

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1. Office of Toxic Substances List (OTS)

This list was obtained from the Existing Chemicals Division of the OTS. It is comprised of three sublists obtained from each of the following branches: Test Rules Development, Chemical Screening, and Risk Analyses. The combined list is abbreviated as "OTS".

2. Office of Air Quality Planning and Standards List (AIR)

This list contains those compounds of toxicological concern to the above office. This list is abbreviated as "AIR".

3. Resource Conservation and Recovery Act (RCRA) Appendix VIII - Hazardous Constituents (RR1)

This list of hazardous chemicals was taken from the 1986 Code of Federal Regulations, Volume 40, Part 261. Note that the CRF is published yearly, so additions to the list or deletions (Appendix IX) can be noted. This list is abbreviated as "RR1".

Refinery Waste List (RWL)

This list is from the Office of Solid Waste dated April 1986 and is a subset of the Appendix VIII list that contains potential hazardous chemicals that may be present in refinery waste. This list is abbreviated as "RWL".

Office of Solid Waste List (OSW)

This list was from the Office of Solid Waste and is abbreviated as "OSW".

4. Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Hazardous Substance List (HSL)

This list of hazardous chemicals was taken from the 1986 Code of Federal Regulations, Volume 40, Part 302.4. (See note in 3). This list is abbreviated as "HSL".

Acutely Toxic Chemicals List (ACUTE)

The list of chemicals was located under Title III of the Superfund Amendments and Reauthorization Act of 1986, as described in the Federal Register, Volume 51, Number 221, pages 41582-41587. This list is known as the list of extremely hazardous substances. This list of chemicals is abbreviated as "ACUTE".

New Jersey List of Chemicals (NJ)

This list of chemicals was found in section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986. This list is abbreviated as "NJ".

Clean Water Act Chemicals List (SF)

This list of chemicals and approved methods for analysis of waste water was located in the Federal Register, Volume 49, pages 23-25. This list is abbreviated as "SF".

Superfund Amendments and Reauthorization Act List (SARA)

This list of chemicals was found in the Federal Register, Volume 52, No. 74, April 17, 1987, pages 12866-12874. This list consists of at least 100 hazardous substances which are most commonly found at National Priorities List facilities and thought to pose the most significant potential threat to human health. This list is abbreviated as "SAR".

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5. Ground Water List (GWL)

This list is the RCRA Appendix IV Ground Water Monitoring List. This list is abbreviated as "GWL".

Office of Solid Waste List for Water (H2O)

This list was obtained from Dave Friedman of the Office of Solid Waste in June of 1986. The list contains chemicals found in water for which no suitable method of analysis exists. This list is abbreviated as "H2O".

6. Joint Office of Drinking H2O and Office of Pesticide Programs List (OPP)

This is a list of compounds that will be tested in ground water in a project jointly sponsored by the aforementioned program offices. This list is abbreviated as "OPP".



## APPENDIX B

## PRIORITIZED LIST OF CHEMICALS OF INTEREST TO THE EPA

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1 BENZENE	00071-43-2	AIR, GWL, HSL, NJ, OPP, OTS, RR1, RWL, SF, SAR	6	4
2 METHYLENE CHLORIDE	00075-09-2	AIR, GWL, HSL, NJ, OPP, OTS, RR1, RWL, SF, SAR	6	4
3 VINYL CHLORIDE	00075-01-4	AIR, GWL, HSL, NJ, OPP, OTS, RR1, SF, SAR	6	3
4 1,1-DICHLOROETHENE	00075-35-4	GWL, HSL, NJ, OPP, OTS, RR1, RWL, SF, SAR	5	4
5 1,3-DICHLOROBENZENE	00541-73-1	GWL, HSL, NJ, OPP, OTS, OWS, RR1, SF, SAR	5	4
6 1,4-DICHLOROBENZENE	00106-46-7	GWL, H2O, NJ, OPP, OTS, OWS, RR1, SF, SAR	5	4
7 ETHYLENE DICHLORIDE	00107-06-2	AIR, GWL, HSL, NJ, OPP, RR1, RWL, SF, SAR	5	4
8 ETHYLENE OXIDE	00075-21-8	AC, AIR, GWL, HSL, NJ, OTS, RR1, RWL, SAR	5	4
9 FORMALDEHYDE	00050-00-0	AC, AIR, H2O, HSL, NJ, OTS, RR1, RWL, SAR	5	4
10 HEXACHLOROBENZENE	00118-74-1	H2O, GWL, HSL, NJ, OPP, OTS, RR1, SF, SAR	5	4
11 HEXACHLOROBUTADIENE	00087-68-3	GWL, H2O, HSL, NJ, OPP, OTS, RR1, SF, SAR	5	4
12 NAPHTHALENE	00091-20-3	GWL, H2O, NJ, OPP, OTS, OWS, RR1, SF, SAR	5	4
13 TETRACHLOROETHENE	00127-18-4	AIR, GWL, HSL, NJ, OPP, RR1, RWL, SF, SAR	5	4
14 TOLUENE	00108-88-3	GWL, HSL, NJ, OPP, OTS, RR1, RWL, SF, SAR	5	4
15 BROMOMETHANE	00074-83-9	AC, GWL, HSL, OPP, OTS, RR1, SF, SAR	5	3
16 CARBON TETRACHLORIDE	00056-23-5	AIR, GWL, HSL, NJ, OPP, RR1, SF, SAR	5	3
17 CHLOROBENZENE	00108-90-7	GWL, HSL, NJ, OPP, OTS, RWL, SF, SAR	5	3
18 TRICHLOROETHANE	00071-55-6	GWL, HSL, NJ, OPP, OTS, RR1, SF, SAR	5	3
19 TRICHLOROETHYLENE	00079-01-6	AIR, GWL, HSL, NJ, OPP, RR1, SF, SAR	5	3
20 1,2,4-TRICHLOROBENZENE	00120-82-1	GWL, HSL, NJ, OPP, OTS, RR1, SF	5	2
21 DI-N-BUTYL PHTHALATE	00084-74-2	AC, GWL, HSL, NJ, OTS, OWS, RR1, RWL, SF, SAR	4	6
22 DIMETHYL PHTHALATE	00131-11-3	AC, GWL, HSL, NJ, OTS, OWS, RR1, RWL, SF, SAR	4	6
23 NITROBENZENE	00098-95-3	AC, GWL, H2O, HSL, NJ, OTS, RR1, RWL, SF, SAR	4	6
24 PENTACHLOROPHENOL	00087-86-5	AC, GWL, H2O, HSL, NJ, OPP, RR1, RWL, SF, SAR	4	6
25 1,2-DICHLOROBENZENE	00095-50-1	H2O, GWL, HSL, NJ, OPP, OWS, RR1, SF, SAR	4	5
26 2,4-DICHLOROPHENOXYACETIC ACID	00094-75-7	GWL, H2O, HSL, NJ, OPP, OWS, RR1, SF, SAR	4	5
27 4-NITROPHENOL	00100-02-7	GWL, HSL, NJ, OPP, OWS, RR1, RWL, SAR	4	5
28 CHLOROFORM	00067-66-3	AC, AIR, GWL, HSL, NJ, RR1, RWL, SF, SAR	4	5
29 ENDRIN	00072-20-8	AC, GWL, H2O, HSL, OPP, OWS, RR1, SF, SAR	4	5
30 ANILINE	00062-53-3	AC, GWL, HSL, NJ, OTS, RR1, RWL, SAR	4	4
31 BIS(2-ETHYLHEXYL)PHTHALATE	00117-81-7	GWL, HSL, NJ, OTS, RR1, RWL, SF, SAR	4	4
32 CHLOROMETHANE	00074-87-3	GWL, HSL, NJ, OTS, RR1, RWL, SF, SAR	4	4
33 HEXACHLOROETHANE	00067-72-1	GWL, H2O, HSL, NJ, OTS, RR1, SF, SAR	4	4
34 METHOXYCHLOR	00072-43-5	GWL, H2O, HSL, NJ, OPP, RR1, SF, SAR	4	4
35 TRIBROMOMETHANE	00075-25-2	GWL, HSL, NJ, OPP, OWS, RR1, SF, SAR	4	4
36 1,1,2,2-TETRACHLOROETHANE	00079-34-5	GWL, HSL, NJ, OPP, RR1, SF, SAR	4	3
37 1,1,2-TRICHLOROETHANE	00079-00-5	HSL, GWL, NJ, OPP, RR1, SF, SAR	4	3
38 1,1-DICHLOROETHANE	00075-34-3	GWL, HSL, OPP, OWS, RR1, SF, SAR	4	3
39 1,2-DIBROMOETHANE	00106-93-4	GWL, HSL, NJ, OPP, RR1, RWL, SAR	4	3
40 ALDRIN	00309-00-2	AC, GWL, NJ, OPP, RR1, SF, SAR	4	3
41 ANTIMONY	07440-36-0	GWL, HSL, NJ, OTS, RR1, RWL, SAR	4	3
42 ARSENIC	07440-38-2	AIR, GWL, HSL, NJ, RR1, RWL, SAR	4	3
43 BERYLLIUM	07440-41-7	AIR, GWL, HSL, NJ, RR1, RWL, SAR	4	3
44 CADMIUM	07440-43-9	AIR, GWL, HSL, NJ, RR1, RWL, SAR	4	3
45 CHLOROETHANE	00075-00-3	AIR, GWL, HSL, NJ, OPP, SF, SAR	4	3
46 CHROMIUM	07440-47-3	AIR, GWL, HSL, NJ, RR1, RWL, SAR	4	3
47 DICHLOROPROPANE	00078-87-5	GWL, HSL, NJ, OTS, RR1, SF, SAR	4	3
48 DIETHYL PHTHALATE	00084-66-2	GWL, HSL, NJ, OTS, RR1, RWL, SAR	4	3
49 DISULFOTON	00298-04-4	AC, GWL, HSL, OPP, RR1, SF, SAR	4	3
50 HEPTACHLOR	00076-44-8	GWL, HSL, NJ, OPP, RR1, SF, SAR	4	3
51 HEPTACHLOR EPOXIDE	01024-57-3	GWL, H2O, HSL, OPP, RR1, SF, SAR	4	3
52 METHYL ETHYL KETONE	00078-93-3	GWL, HSL, NJ, OTS, RR1, RWL, SF, SAR	4	3
53 N-NITROSODIMETHYLAMINE	00062-75-9	AC, GWL, HSL, NJ, OTS, RR1, SAR	4	3
54 P-NITROANILINE	00100-01-6	GWL, HSL, OTS, OWS, RR1, RWL, SF	4	3
55 PYRIDINE	00110-86-1	GWL, H2O, HSL, NJ, OTS, RR1, RWL	4	3
56 SELENIUM AND COMPOUNDS	07782-49-2	AIR, GWL, HSL, NJ, RR1, RWL, SAR	4	3
57 1,2-DIBROMO-3-CHLOROPROPANE	00096-12-8	GWL, HSL, NJ, OPP, RR1, SAR	4	2
58 2,4,5-T	00093-76-5	GWL, HSL, OPP, RR1, SF, SAR	4	2
59 4,4'-DDE	00072-55-9	GWL, HSL, OPP, RR1, SF, SAR	4	2

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
60 ACETONITRILE	00075-05-8	GWL, HSL, NJ, OTS, RR1, RWL	4	2
61 ACRYLAMIDE	00079-06-1	AC, AIR, HSL, NJ, OTS, RR1	4	2
62 BENZ(A)ANTHRACENE	00056-55-3	GWL, HSL, RR1, RWL, SF, SAR	4	2
63 DIBROMOMETHANE	00074-95-3	GWL, HSL, NJ, OPP, OWS, RR1	4	2
64 DIELDRIN	00060-57-1	GWL, HSL, OPP, RR1, SF, SAR	4	2
65 MERCURY	07439-97-6	AIR, GWL, HSL, NJ, RR1, SAR	4	2
66 METHYL ISOCYANATE	00624-83-9	AC, AIR, HSL, NJ, OTS, RR1	4	2
67 METHYL METHACRYLATE	00080-62-6	AIR, GWL, HSL, NJ, RR1, SAR	4	2
68 P-BENZOQUINONE	00106-51-4	GWL, HSL, NJ, OTS, OWS, RR1	4	2
69 P-CHLOROANILINE	00106-47-8	GWL, HSL, OTS, RR1, SF, SAR	4	2
70 PENTACHLOROETHANE	00076-01-7	AC, GWL, HSL, OTS, OWS, RR1	4	2
71 STYRENE	00100-42-5	AIR, GWL, HSL, NJ, OPP, SF	4	2
72 4,4'-DDD	00072-54-8	GWL, OPP, RR1, SF, SAR	4	1
73 ASBESTOS	01332-21-4	AIR, GWL, HSL, NJ, OTS, SAR	4	1
74 CHLOROBENZILATE	00510-15-6	GWL, HSL, NJ, OPP, RR1	4	1
75 DICHLOROFLUOROMETHANE	00075-71-8	GWL, HSL, OPP, RR1, SAR	4	1
76 DINOSEB	00088-85-7	AC, GWL, HSL, OPP, RR1	4	1
77 GLYCIDALDEHYDE	00765-34-4	H2O, HSL, OTS, OWS, RR1	4	1
78 MALEIC ANHYDRIDE	00108-31-6	AIR, NJ, OTS, OWS, RR1	4	1
79 N-NITROSODI-N-BUTYLAMINE	00924-16-3	GWL, HSL, NJ, OTS, RR1	4	1
80 N-NITROSODIETHYLAMINE	00055-18-5	GWL, HSL, NJ, OTS, RR1	4	1
81 SILVEX	00093-22-1	GWL, H2O, OPP, RR1	4	1
82 TRANS-1,2-DICHLOROETHENE	00156-60-5	GWL, HSL, OPP, RR1, RWL	4	1
83 TRICHLOROMONOFLUOROMETHANE	00075-69-4	GWL, HSL, OPP, RR1, SAR	4	1
84 1,1,1,2-TETRACHLOROETHANE	00630-20-6	GWL, HSL, OPP, RR1	4	0
85 1,2,3-TRICHLOROPROPANE	00096-18-4	GWL, OPP, RR1, SAR	4	0
86 1,2,4,5-TETRACHLOROBENZENE	00095-94-3	GWL, HSL, OTS, RR1	4	0
87 2-CHLORO-1,3-BUTADIENE	00126-99-8	GWL, NJ, OTS, RR1	4	0
88 N-NITROSOMORPHOLINE	00059-89-2	GWL, NJ, OTS, RR1	4	0
89 PRONAMIDE	23950-58-5	GWL, HSL, OPP, RR1	4	0
90 TRANS-1,4-DICHLOROBUTENE	00110-57-6	AC, GWL, OTS, RR1	4	0
91 PHENOL	00108-95-2	AC, GWL, H2O, HSL, NJ, RR1, RWL, SF, SAR	3	6
92 O-CRESOL	00095-48-7	AC, GWL, H2O, HSL, NJ, OTS, SF, SAR	3	5
93 ACRYLONITRILE	00107-13-1	AC, GWL, HSL, NJ, OTS, RR1, RWL, SAR	3	5
94 CARBON DISULFIDE	00075-15-0	AC, GWL, HSL, NJ, RR1, RWL, SF, SAR	3	5
95 DICHLOROETHYL ETHER	00111-44-4	AC, GWL, HSL, NJ, RR1, RWL, SF, SAR	3	5
96 DINITROTOLUENE	00121-14-2	GWL, H2O, HSL, NJ, RR1, RWL, SF, SAR	3	5
97 DIOCTYL PHTHALATE	00117-84-0	AC, GWL, HSL, NJ, RRA, RWL, SF, SAR	3	5
98 LINDANE	00058-89-9	AC, GWL, H2O, HSL, NJ, OPP, SF, SAR	3	5
99 TOXAPHENE	08001-35-2	AC, GWL, H2O, HSL, NJ, RR1, SF, SAR	3	5
100 2,4,5-TRICHLOROPHENOL	00095-95-4	GWL, H2O, HSL, NJ, RR1, SF, SAR	3	4
101 2,4,6-TRICHLOROPHENOL	00088-06-2	GWL, H2O, HSL, NJ, RR1, SF, SAR	3	4
102 2,4-DIMETHYLPHENOL	00105-67-9	GWL, HSL, NJ, RR1, RWL, SF, SAR	3	4
103 2,4-DINITROPHENOL	00051-28-5	GWL, HSL, NJ, RR1, RWL, SF, SAR	3	4
104 ACROLEIN	00107-02-8	AC, GWL, HSL, NJ, RR1, RWL, SAR	3	4
105 CHLORDANE	00057-74-9	AC, GWL, H2O, HSL, NJ, RR1, SAR	3	4
106 HEXACHLOROCYCLOPENTADIENE	00077-47-4	AC, GWL, HSL, NJ, OTS, SF, SAR	3	4
107 NICKEL	07440-02-0	AC, GWL, HSL, NJ, RR1, RWL, SAR	3	4
108 P-CRESOL	00106-44-5	GWL, H2O, HSL, NJ, OTS, SF, SAR	3	4
109 PARATHION	00056-38-2	AC, GWL, HSL, NJ, RR1, SF, SAR	3	4
110 PHOSGENE	00075-44-5	AC, AIR, HSL, NJ, OWS, RR1, SAR	3	4
111 VINYL ACETATE MONOMER	00108-05-4	AC, GWL, HSL, NJ, OTS, SF, SAR	3	4
112 1,2-DIPHENYL HYDRAZINE	00122-66-7	GWL, HSL, NJ, RR1, RWL, SAR	3	3
113 1,4 DIOXANE	00123-91-1	GWL, HSL, NJ, RR1, RWL, SAR	3	3
114 2,4-DICHLOROPHENOL	00120-83-2	GWL, HSL, NJ, RR1, SF, SAR	3	3
115 2-CHLORONAPHTHALENE	00091-58-7	GWL, HSL, RR1, RWL, SF	3	3
116 2-CHLOROPHENOL	00095-57-8	GWL, HSL, RR1, RWL, SF, SAR	3	3
117 3,3'-DICHLOROBENZIDINE	00091-94-1	GWL, HSL, NJ, RR1, SF, SAR	3	3
118 4-BROMOPHENYL PHENYL ETHER	00101-55-3	GWL, HSL, OWS, RR1, SF, SAR	3	3
119 4-METHYL-2-PENTANONE	00108-10-1	GWL, HSL, NJ, OTS, SF, SAR	3	3
120 BENZIDINE	00092-87-5	GWL, HSL, NJ, RR1, RWL, SAR	3	3
121 BENZO(A)PYRENE	00050-32-8	GWL, HSL, RR1, RWL, SF, SAR	3	3

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
122	BENZO(B)FLUORANTHENE	00205-99-2	GWL, HSL, RR1, RWL, SF, SAR	3 3
123	BIS(2)CHLOROISOPROPYL ETHER	00108-60-1	GWL, HSL, NJ, OWS, RR1, RWL	3 3
124	BIS(2-CHLOROETHOXY)METHANE	00111-91-1	GWL, HSL, OWS, RR1, SF, SAR	3 3
125	BROMODICHLOROMETHANE	00075-27-4	GWL, HSL, NJ, OPP, SF, SAR	3 3
126	CHRYSENE	00218-01-9	GWL, HSL, RR1, RWL, SF, SAR	3 3
127	CYANIDE	00057-12-5	GWL, HSL, NJ, RR1, RWL, SAR	3 3
128	DDT	00050-29-3	GWL, HSL, RR1, SF, SAR	3 3
129	DI-N-PROPYLNITROSAMINE	00621-64-7	GWL, HSL, NJ, RR1, SF, SAR	3 3
130	DIBENZ(A,H)ANTHRACENE	00053-70-3	GWL, HSL, RR1, RWL, SF, SAR	3 3
131	ETHYL BENZENE	00100-41-4	GWL, HSL, NJ, OPP, SF, SAR	3 3
132	FLUORANTHENE	00206-44-0	GWL, HSL, RR1, RWL, SF, SAR	3 3
133	HYDRAZINE	00302-01-2	AC, H2O, HSL, NJ, RR1, SAR	3 3
134	HYDROGEN SULFIDE	07783-06-4	AC, AIR, HSL, RR1, RWL, SAR	3 3
135	INDENO(1,2,3)PYRENE	00193-39-5	GWL, HSL, RR1, RWL, SF, SAR	3 3
136	LEAD	07439-92-1	GWL, HSL, NJ, RR1, RWL, SAR	3 3
137	METHYL MERCAPTAN	00074-93-1	AC, H2O, HSL, OWS, RR1, RWL	3 3
138	P-CHLORO-M-CRESOL	00059-50-7	GWL, HSL, RR1, RWL, SF, SAR	3 3
139	1-NAPHTHYLAMINE	00134-32-7	GWL, HSL, NJ, OWS, RR1	3 2
140	2,6-DINITROTOLUENE	00606-20-2	GWL, NJ, OWS, RR1, SF, SAR	3 2
141	2-CHLOROETHYL VINYL ETHER	00110-75-8	GWL, HSL, OWS, RR1, SAR	3 2
142	3-CHLORO-PROPIONITRILE	00542-76-7	AC, GWL, HSL, OWS, RR1	3 2
143	4,4METHYLENEBIS(2CHLOROANILINE	00101-14-4	GWL, HSL, NJ, RR1, SAR	3 2
144	ACETONE CYANOHYDRIN	00075-86-5	AC, H2O, HSL, RR1, SAR	3 2
145	ALPHA-BHC	00319-84-6	GWL, HSL, OPP, SF, SAR	3 2
146	BARIUM	07440-39-3	GWL, NJ, RR1, RWL, SAR	3 2
147	BETA-BHC	00319-85-7	GWL, HSL, OPP, SF, SAR	3 2
148	CHLORO-DIBROMOMETHANE	00124-48-1	GWL, HSL, OPP, SF, SAR	3 2
149	DELTA-BHC	00319-86-8	GWL, HSL, OPP, SF, SAR	3 2
150	DIBENZOFURAN	00132-64-9	AIR, GWL, NJ, SF, SAR	3 2
151	DIMETHYLHYDRIZINE	00057-14-7	AC, H2O, HSL, NJ, RR1	3 2
152	ENDRIN ALDEHYDE	07421-93-4	GWL, HSL, OPP, SF, SAR	3 2
153	EPICHLOROHYDRIN	00106-89-8	AC, HSL, NJ, OTS, RR1	3 2
154	HYDROCYANIC ACID	00074-90-8	AC, AIR, HSL, NJ, RR1	3 2
155	HYDROGEN FLUORIDE	07664-39-3	AC, AIR, HSL, NJ, RR1	3 2
156	ISODRIN	00465-73-6	AC, GWL, HSL, RR1, SF	3 2
157	ISOPHORONE	00078-59-1	GWL, HSL, OTS, SF, SAR	3 2
158	M-XYLENE	00108-38-3	HSL, NJ, OPP, OTS, SAR	3 2
159	MALONONITRILE	00109-77-3	AC, GWL, HSL, OWS, RR1	3 2
160	METHACRYLONITRILE	00126-98-7	AC, GWL, HSL, OWS, RR1	3 2
161	METHYL PARATHION	00298-00-0	AC, GWL, HSL, RR1, SF	3 2
162	METHYLHYDRAZINE	00060-34-4	AC, H2O, HSL, NJ, RR1	3 2
163	MUSTARD GAS	00505-60-2	AC, H2O, NJ, RR1, SAR	3 2
164	O-XYLENE	00095-47-6	HSL, NJ, OPP, OTS, SAR	3 2
165	P-XYLENE	00106-42-3	HSL, NJ, OPP, OTS, SAR	3 2
166	PENTACHLOROBENZENE	00608-93-5	GWL, HSL, OWS, RR1, SAR	3 2
167	PENTACHLORONITROBENZENE	00082-68-8	GWL, HSL, NJ, RR1, SF	3 2
168	PHTHALIC ANHYDRIDE	00085-44-9	AIR, HSL, NJ, OWS, RR1	3 2
169	SACCHARIN	00081-0702	H2O, HSL, NJ, OWS, RR1	3 2
170	SILVER	07440-22-4	GWL, HSL, RR1, NJ, SAR	3 2
171	SULFOTEP	03689-24-5	AC, GWL, HSL, OWS, RR1	3 2
172	THALLIUM	07440-28-0	GWL, HSL, NJ, RR1, SAR	3 2
173	THIOPHENOL	00108-98-5	AC, GWL, HSL, RR1, RWL	3 2
174	TOLUIDINE-O HCL	00636-21-5	H2O, HSL, NJ, OWS, RR1	3 2
175	1,2,4-TRIMETHYL BENZENE	00095-63-6	AC, NJ, OPP, OTS	3 1
176	1,3,5-TRINITROBENZENE	00099-35-4	H2O, HSL, RR1, SAR	3 1
177	1-ENDOSULFAN	00959-28-8	GWL, HSL, OPP, SF	3 1
178	11-ENDOSULFAN	22313-65-9	GWL, HSL, OPP, SF	3 1
179	2,3,4,6-TETRACHLOROPHENOL	00058-90-2	GWL, H2O, HSL, RR1	3 1
180	2,3,7,8-TETRACHLORODIBENZO-P-	01746-01-6	GWL, HSL, RR1, SAR	3 1
181	2-NAPHTHYLAMINE	00091-59-8	GWL, HSL, NJ, RR1	3 1
182	2-NITROANILINE	00088-74-4	GWL, OTS, SF, SAR	3 1

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
183	2-PICOLINE	00109-06-8	GWL, HSL, OWS, RR1	3 1
184	3,3'-DIMETHOXYBENZIDINE	00119-90-4	GWL, HSL, NJ, RR1	3 1
185	3-CHLOROPROPENE	00107-05-1	GWL, HSL, NJ, RR1	3 1
186	3-METHYLCHLORANTHRENE	00056-49-5	GWL, HSL, RR1, RWL	3 1
187	3-NITROANILE	00099-09-2	GWL, OTS, SF, SAR	3 1
188	7,12-DIMETHYLBENZ(A)ANTHRACENE	00057-97-6	GWL, HSL, RR1, RWL	3 1
189	A,A-DIMETHYLPHENETHYLAMINE	00122-09-8	GWL, HSL, OWS, RR1	3 1
190	ACETALDEHYDE	00075-07-0	GWL, HSL, NJ, RR1	3 1
191	ACETOPHENONE	00098-86-2	GWL, HSL, OWS, RR1	3 1
192	ALDICARB	00116-06-3	AC, HSL, OPP, RR1	3 1
193	BROMOACETONE	00598-31-2	H2O, HSL, OWS, RR1	3 1
194	BUTADIENE	00106-99-0	AC, AIR, NJ, OTS	3 1
195	CHLORAL	00075-87-6	RR1, H2O, HSL, OWS	3 1
196	CROTONALDEHYDE	04170-30-3	AC, H2O, RR1, RWL	3 1
197	CUMENE	00098-82-8	HSL, NJ, OPP, OTS	3 1
198	DIHYDROSAFROLE	00094-58-6	HSL, OTS, OWS, RR1	3 1
199	HEXACHLOROPHENE	00070-30-4	GWL, HSL, OWS, RR1	3 1
200	IODOMETHANE	00074-88-4	GWL, HSL, NJ, RR1	3 1
201	ISOSAFROLE	00120-58-1	GWL, HSL, OWS, RR1	3 1
202	MERCURY FULMONATE	00628-86-4	H2O, HSL, RR1, RWL	3 1
203	METHOMYL	16752-77-5	AC, HSL, OPP, RR1	3 1
204	N-9H-FLUOREN-2-YL-ACETAMIDE	00053-96-3	GWL, HSL, NJ, RR1	3 1
205	N-NITROSOPIPERIDINE	00100-75-4	GWL, HSL, NJ, RR1	3 1
206	NICKEL CARBONYL	13463-39-3	AC, H2O, HSL, RR1	3 1
207	P-DIMETHYLAMINOAZOBENZENE	00060-11-7	GWL, HSL, NJ, RR1	3 1
208	PHENACETIN	00062-44-2	GWL, HSL, OWS, RR1	3 1
209	PHENYL DICHLOROARSINE	00696-28-6	AC, H2O, HSL, RR1	3 1
210	PHENYLMERCURY ACETATE	00062-38-4	AC, H2O, HSL, RR1	3 1
211	PHORATE	00298-02-2	AC, GWL, HSL, RR1	3 1
212	PHOSPHINE	07803-51-2	AC, H2O, HSL, RR1	3 1
213	PHOSPHORUS	07723-14-0	AC, AIR, HSL, NJ	3 1
214	PROPYLENE OXIDE	00075-56-9	AC, AIR, NJ, OTS	3 1
215	PSEUDOCUMENE	00095-63-6	AC, NJ, OPP, OTS	3 1
216	SAFROLE	00094-59-7	GWL, HSL, NJ, RR1	3 1
217	TETRAETHYL LEAD	00078-00-2	AC, H2O, HSL, RR1	3 1
218	TOLUENE DIISOCYANATE	00584-84-9	AIR, HSL, NJ, RR1	3 1
219	TRIS(2,3DIBROMOPROPYL)PHOSPHA	00126-72-7	GWL, HSL, NJ, RR1	3 1
220	TRYPAN BLUE	00072-57-1	HSL, OTS, OWS, RR1	3 1
221	VANADIUM	07440-62-2	GWL, NJ, RWL, SAR	3 1
222	0,0-DIETHYLO-2-PYRAZINYL	00297-97-2	GWL, HSL, RR1	3 0
223	1,2-DIMETHYLHYDRAZINE	00540-73-8	H2O, HSL, RR1	3 0
224	1,4-NAPHTHOQUINONE	00130-15-4	GWL, HSL, RR1	3 0
225	2,6-DICHLOROPHENOL	00087-65-0	GWL, HSL, RR1	3 0
226	2-PROPYN-1-OL	00107-19-7	GWL, HSL, RR1	3 0
227	4-AMINOBIPHENYL	00092-67-1	GWL, NJ, RR1	3 0
228	ALLYL ALCOHOL	00107-18-6	AC, GWL, RR1	3 0
229	CACODYLIC ACID	00075-60-5	H2O, HSL, OPP, SF	3 0
230	CARBONYL FLUORIDE	00353-50-4	HSL, OWS, RR1	3 0
231	DIBENZO(A,I)PYRENE	00189-55-9	GWL, HSL, RWL	3 0
232	DIETHYLARSINE	00692-42-2	H2O, HSL, RR1	3 0
233	ETHYL CYANIDE	00107-12-0	GWL, HSL, OWS	3 0
234	HEXACHLOROPROPENE	01888-71-7	GWL, HSL, RR1	3 0
235	ISOBUTYL ALCOHOL	00078-83-1	GWL, HSL, RR1	3 0
236	KEPONE	00143-50-0	GWL, HSL, RR1	3 0
237	LEAD SUBACETATE	01335-32-6	H2O, HSL, RR1	3 0
238	MELPHALAN	00148-82-3	H2O, HSL, RR1	3 0
239	METHAPYRILENE	00091-80-5	GWL, HSL, RR1	3 0
240	N-NITROSPYRROLIDINE	00930-55-2	GWL, HSL, RR1	3 0
241	RESORCINOL	00108-46-3	GWL, HSL, RR1	3 0
242	SELENUREA	00630-10-4	H2O, HSL, RR1	3 0
243	THIURAM	00137-26-8	H2O, HSL, RR1	3 0
244	CHLOROMETHYL ETHER	00542-88-1	AC, HSL, NJ, RR1, RWL, SAR	2 4

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
245	DINITROCRESOL	00534-52-1	AC, GWL, HSL, NJ, SF, SAR	2 4
246	2-NITROPHENOL	00088-75-5	GWL, HSL, NJ, SF, SAR	2 3
247	AMMONIA	07664-41-7	AC, AIR, HSL, NJ, SAR	2 3
248	ANTHRACENE	00120-12-7	GWL, HSL, NJ, SF, SARA	2 3
249	BENZAL CHLORIDE	00098-87-3	AC, HSL, NJ, OWS, RR1	2 3
250	CARBARYL	00063-25-2	HSL, NJ, OPP, SF, SAR	2 3
251	DIEPOXYBUTANE	01464-53-5	AC, HSL, NJ, OWS, RR1	2 3
252	ETHYLENEIMINE	00151-56-4	AC, HSL, NJ, RR1, RWL	2 3
253	FLUORENE	00086-73-7	GWL, H2O, HSL, SF, SAR	2 3
254	N-NITROSODIPHENYLAMINE	00086-30-6	GWL, HSL, NJ, SF, SAR	2 3
255	PYRENE	00129-00-0	AC, GWL, HSL, SF, SAR	2 3
256	XYLENES	01330-20-7	AIR, GWL, HSL, NJ, SAR	2 3
257	2-CHLOROPHENYL THIOUREA	05344-82-1	AC, HSL, OWS, RR1	2 2
258	2-METHYLAZIRIDINE	00075-55-8	AC, HSL, NJ, RR1	2 2
259	ACENAPHTHYLENE	00208-96-8	GWL, HSL, SF, SAR	2 2
260	ACETONE	00067-64-1	GWL, HSL, NJ, SF	2 2
261	BENZO(GHI)PERYLENE	00191-24-2	GWL, HSL, SF, SAR	2 2
262	BENZO(K)FLUORANTHENE	00207-08-9	GWL, HSL, SF, SAR	2 2
263	BENZOIC ACID	00065-85-0	GWL, HSL, SF, SAR	2 2
264	CHLOROMETHYL METHYL ETHER	00107-30-2	AC, HSL, NJ, RR1	2 2
265	CHLOROPHENYL PHENYL ETHER	07005-72-3	GWL, HSL, SF, SARA	2 2
266	COBALT	07440-48-4	AC, GWL, NJ, SAR	2 2
267	COPPER	07440-50-8	GWL, HSL, NJ, SAR	2 2
268	CRESOLS	01319-77-3	HSL, NJ, OTS, SAR	2 2
269	CYANOGEN BROMIDE	00506-68-3	AC, HSL, RR1, OWS	2 2
270	DIMETHYL SULFATE	00077-78-1	AC, HSL, NJ, RR1	2 2
271	ENDOSULFAN	00115-29-7	AC, HSL, RR1, SAR	2 2
272	FLUOROACETAMIDE	00640-19-7	AC, HSL, OWS, RR1	2 2
273	MECHLORETHAMINE	00051-75-2	AC, NJ, RR1, SAR	2 2
274	METHANOL	00067-56-1	AIR, HSL, NJ, SAR	2 2
275	METHIOCARB	02032-65-7	AC, HSL, OPP, SF	2 2
276	METHYL CHLOROCARBONATE	00079-22-1	AC, HSL, OWS, RR1	2 2
277	NICOTINE	00054-11-5	AC, HSL, OWS, RR1	2 2
278	OSMIUM TETROXIDE	20816-12-0	AC, HSL, NJ, RR1	2 2
279	PHENANTHRENE	00085-01-8	GWL, HSL, SF, SAR	2 2
280	PHENYLTHIOUREA	00103-85-5	AC, HSL, OWS, RR1	2 2
281	THIOSEMICARBAZIDE	00079-19-6	AC, HSL, OWS, RR1	2 2
282	WARFARIN	00081-81-2	AC, HSL, RR1, RWL	2 2
283	ZINC	07440-66-6	GWL, HSL, NJ, SAR	2 2
284	1,3-PROPANE SULTONE	01120-71-4	HSL, NJ, RR1	2 1
285	1-PROPYLAMINE	00107-10-8	HSL, OWS, RR1	2 1
286	2,4-DIAMINOTOLUENE	00095-80-7	HSL, OTS, NJ	2 1
287	2-HEXANONE	00591-78-6	GWL, SF, SAR	2 1
288	2-METHYLNAPHITHALENE	00091-57-6	GWL, SF, SAR	2 1
289	2-NITROPROPANE	00079-46-9	HSL, NJ, OTS	2 1
290	3-3'DIMETHYLBENZIDINE	00119-93-7	HSL, NJ, RR1	2 1
291	4,6-DINITRO-O-CYCLOHEXYLPHENOL	00131-89-5	HSL, OWS, RR1	2 1
292	ACRYLIC ACID	00079-10-7	HSL, NJ, OTS	2 1
293	ALUMINUM PHOSPHIDE	20859-73-8	AC, HSL, RR1	2 1
294	ANTU	00086-88-4	AC, HSL, RR1	2 1
295	ARAMITE	00140-57-8	GWL, RR1, SAR	2 1
296	AROCLOR 1016	12674-11-2	GWL, HSL, SF	2 1
297	AROCLOR 1221	11104-28-2	GWL, HSL, SF	2 1
298	AROCLOR 1232	11141-16-5	GWL, HSL, SF	2 1
299	AROCLOR 1242	53469-21-9	GWL, HSL, SF	2 1
300	AROCLOR 1248	12672-29-6	GWL, HSL, SF	2 1
301	AROCLOR 1254	11097-69-1	GWL, HSL, SF	2 1
302	AROCLOR 1260	11096-82-5	GWL, HSL, SF	2 1
303	ARSENIC PENTOXIDE	01303-28-2	AC, HSL, RR1	2 1
304	ARSENIOUS OXIDE	01327-53-3	AC, HSL, RR1	2 1
305	ATRAZINE	01912-24-9	OPP, SF, SAR	2 1
306	AURAMINE	00492-80-8	HSL, NJ, RR1	2 1

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
307	BENZ(C)ACRIDINE	00225-51-4	HSL, RR1, RWL	2 1
308	BENZYL ALCOHOL	00100-51-6	GWL, SF, SAR	2 1
309	BENZYL CHLORIDE	00100-44-7	AC, HSL, RR1	2 1
310	CARBOFURAN	01563-66-2	AC, HSL, OPP	2 1
311	CHLORNAPHAZINE	00494-03-1	HSL, OWS, RR1	2 1
312	CHLOROACETALDEHYDE	00107-20-0	AC, HSL, RR1	2 1
313	CHLOROACETIC ACID	00079-11-8	AC, NJ, OTS	2 1
314	CYCLOHEXANE	00110-82-7	HSL, NJ, OTS	2 1
315	CYCLOHEXANONE	00108-94-1	HSL, OTS, SAR	2 1
316	DAUNOMYCIN	20830-81-3	HSL, OWS, RR1	2 1
317	DIALLATE	02303-16-4	HSL, NJ, RR1	2 1
318	DIBENZO(A,E)PYRENE	00192-65-4	GWL, RR1, RWL	2 1
319	DIBENZO(A,H)PYRENE	00189-64-0	GWL, OTS, RWL	2 1
320	DICAMBA	01918-00-9	HSL, OPP, SF	2 1
321	DICHLOROPROPENE, CIS-1,3-	10061-01-5	GWL, SF, SAR	2 1
322	DICHLORVOS	00062-73-7	AC, HSL, OPP	2 1
323	DIETHYL S-METHYL DITHIOPHOS	03288-58-2	HSL, OWS, RR1	2 1
324	DIMETHOATE	00060-51-5	AC, HSL, RR1	2 1
325	DIMETHYCARBAMOYL CHLORIDE	00079-44-7	HSL, NJ, RR1	2 1
326	DIPHOSPHORAMIDE, OCTAMETHYL	00152-16-9	AC, HSL, RR1	2 1
327	DITHIOBIURET	00541-53-7	AC, HSL, RR1	2 1
328	DIURON	00330-54-1	HSL, OPP, SF	2 1
329	ENDOSULFAN SULFATE	01031-07-8	HSL, OPP, SF	2 1
330	ETHYL METHACRYLATE	00097-63-2	GWL, OWS, RR1	2 1
331	ETHYLENETHIOUREA	00096-45-7	HSL, NJ, RR1	2 1
332	FAMPHUR	00052-85-7	GWL, HSL, RR1	2 1
333	FLUORINE	07782-41-4	AC, HSL, RR1	2 1
334	FREON 113	00076-13-1	NJ, OTS, SAR	2 1
335	HAXAETHYL TETRAPHOSPHATE	00757-58-4	HSL, OWS, RR1	2 1
336	HEXACHLORONAPHTHALENE	01335-87-1	AC, NJ, OTS	2 1
337	HYDROQUINONE	00123-31-9	AC, NJ, OTS	2 1
338	ISOFLUORPHATE	00055-91-4	AC, HSL, RR1	2 1
339	M-CRESOL	00108-39-4	H2O, HSL, NJ	2 1
340	MALEIC HYDRAZIDE	00123-33-1	HSL, OWS, RR1	2 1
341	MANGANESE	07439-96-5	GWL, NJ, SAR	2 1
342	MEVINPHOS	07786-34-7	AC, HSL, OPP	2 1
343	MITOMYCIN C	00050-07-7	AC	2 1
344	MUSIMOL	02763-96-4	AC, HSL, RR1	2 1
345	N-AMINOTHIOXOMETHYL ACETAMIDE	00591-08-2	HSL	2 1
346	N-NITROSO-N-ETHYLUREA	00759-73-9	HSL, NJ, RR1	2 1
347	N-NITROSOMETHYLVINYLAMINE	04549-40-0	HSL, NJ, RR1	2 1
348	NITRIC OXIDE	10102-43-9	AC, HSL, RR1	2 1
349	NITROGEN DIOXIDE	10102-44-0	AC, HSL, RR1	2 1
350	NITROGLYCERINE	00055-63-0	HSL, NJ, RR1	2 1
351	PARALDEHYDE	00123-63-7	HSL, OWS, RR1	2 1
352	PERCHLOROMETHYLMERCAPTAN	00594-42-3	AC, HSL, OWS	2 1
353	POTASSIUM CYANIDE	00151-50-8	AC, HSL, RR1	2 1
354	POTASSIUM SILVER CYANIDE	00506-61-6	AC, HSL, RR1	2 1
355	SODIUM CYANIDE (NA(CN))	00143-33-9	AC, HSL, RR1	2 1
356	SODIUM FLUOROACETATE	00062-74-8	AC, HSL, RR1	2 1
357	SODIUM HYDROXIDE	01310-73-2	AIR, HSL, NJ	2 1
358	STRYCHNINE	00057-24-9	AC, HSL, RR1	2 1
359	TEPP	00107-49-3	AC, HSL, RR1	2 1
360	TETRANITROMETHANE	00509-14-8	AC, HSL, RR1	2 1
361	THALLIC OXIDE	01314-32-5	AC, HSL, RR1	2 1
362	THALLOUS CHLORIDE	07791-12-0	AC, HSL, RR1	2 1
363	THALLOUS SULFATE	07446-18-6	AC, HSL, RR1	2 1
364	THIOACETAMIDE	00062-55-5	HSL, NJ, RR1	2 1
365	THIOUREA	00062-56-6	HSL, NJ, RR1	2 1
366	TOLUENE DIISOCYANATE	26471-62-5	HSL, OTS, SAR	2 1
367	TRANS-1,3-DICHLOROPROPENE	10061-02-6	GWL, SF, SAR	2 1
368	TRIFLURALIN	01582-09-8	NJ, OPP, SF	2 1

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
369	VANADIUM PENTOXIDE	01314-62-1	AC,HSL,RR1	2 1
370	ZINC PHOSPHIDE	01314-84-7	AC,HSL,RR1	2 1
371	1,2-BUTYLENE OXIDE	00106-88-7	NJ,OTS	2 0
372	1,3-DICHLOROPROPANE	00142-28-9	HSL,OPP	2 0
373	1,4-DICHLORO-2-BUTENE	00764-41-0	HSL,OTS	2 0
374	2,4-DIAMINO ANISOL SULFATE	39156-41-7	NJ,OTS	2 0
375	2,4-DIAMINOANISOL	00615-05-4	NJ,OTS	2 0
376	2,4-DIBROMOANILINE	00615-57-6	OTS	2 0
377	2-CHLOROTOLUENE	00095-49-8	OPP,OTS	2 0
378	2-ETHOXY ETHANOL	00110-80-5	NJ,OTS	2 0
379	2,3-EPOXYBUTANE	00099-30-9	OTS,SF	2 0
380	4,4'-ISOPROPYLIDENIPHENOL	00080-05-7	NJ,OTS	2 0
381	4,4'-METHYLENE DIANILINE	00101-77-9	NJ,OTS	2 0
382	5-NITRO-O-TOLUIDINE	00099-55-8	HSL,RR1	2 0
383	ACETIC ACID, THALLIUM(I) SALT	00563-66-8	HSL,RR1	2 0
384	ACETIC ACID,LEAD SALT	00301-04-2	HSL,RR1	2 0
385	ACETYL CHLORIDE	00075-36-5	HSL,RR1	2 0
386	ALUMINUM	07429-90-5	GWL,NJ	2 0
387	AMETRYN	00834-12-8	OPP,SF	2 0
388	AMITROLE	00061-82-5	HSL,RR1	2 0
389	AMMONIUM VANADATE	07803-55-6	HSL,OWS	2 0
390	ANTIMONY TRIOXIDE	01309-64-4	HSL,OTS	2 0
391	ARSENIC ACID	07778-39-4	HSL,RR1	2 0
392	ATRATON	01610-17-9	OPP,SF	2 0
393	AZASERINE	00115-02-6	HSL,RR1	2 0
394	BARBAN	00101-27-9	OPP,SF	2 0
395	BARIUM CYANIDE	00542-62-1	HSL,RR1	2 0
396	BENZENE, 1,4-DINITRO-	00100-25-4	AC,GWL	2 0
397	BENZENEARSONIC ACID	00098-05-5	AC,RR1	2 0
398	BIPHENYL	00092-52-4	NJ,OTS	2 0
399	BROMINE	07726-95-6	AC,AIR	2 0
400	BROMOCHLOROMETHANE	00074-97-5	OPP,SAR	2 0
401	BRUCINE	00357-57-3	HSL,RR1	2 0
402	C.I DISPERSE YELLOW 3	02832-40-8	NJ,OTS	2 0
403	CADMIUM CHLORIDE	10108-64-2	HSL,OTS	2 0
404	CADMIUM OXIDE	01306-19-0	AC,OTS	2 0
405	CALCIUM CHROMATE	13765-19-0	HSL,RR1	2 0
406	CALCIUM CYANIDE	00592-01-8	HSL,RR1	2 0
407	CARBAMIC ACID, METHYLNITROSO-	00615-53-2	HSL,RR1,H2O	2 0
408	CHLORAMBEN	00133-90-4	NJ,OPP	2 0
409	CHLORAMBUCIL	00305-03-3	HSL,RR1	2 0
410	CHLORDANE,ALPHA	05103-71-9	OPP,SF	2 0
411	CHLORDANE,GAMMA	05103-74-2	OPP,SF	2 0
412	CHLOROTHALONIL	01897-45-6	NJ,OPP	2 0
413	CHLORPROPHAM	00101-21-3	OPP,SF	2 0
414	CREOSOTE	08001-58-9	HSL,SAR	2 0
415	CYANOGEN CHLORIDE	00506-77-4	HSL,RR1	2 0
416	CYCLOPHOSPHAMIDE	00050-18-0	HSL,RR1	2 0
417	DALAPON	00075-99-0	OPP,HSL	2 0
418	DIAMINOTOLUENE(MIXED ISOMERS)	25376-45-8	NJ,OTS	2 0
419	DIAZINON	00313-41-5	OPP,SF	2 0
420	DIETHYL-P-NITROPHENYLPHOSPHATE	00311-45-5	HSL,RR1	2 0
421	DIETHYLSTILBESTROL	00056-53-1	HSL,RR1	2 0
422	DIGLYCIDYL ETHER	02238-07-5	AC,OTS	2 0
423	DIOXOLANE	00646-06-0	AC,OTS	2 0
424	DIRECT BLACK 38	01937-37-7	NJ,OTS	2 0
425	DIRECT BLUE 6	02602-46-2	NJ,OTS	2 0
426	DIRECT BROWN 95	16071-86-6	NJ,OTS	2 0
427	ENDOTHALL	00145-73-3	HSL,RR1	2 0
428	ETHOPROPHOS	13194-48-4	AC,OPP	2 0
429	ETHYL METHANESULFONATE	00062-50-0	HSL,RR1	2 0
430	ETHYLENEBIS(DITHIOCARBAMICACID	00111-54-6	HSL,OWS	2 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
431 FERRIC DEXTRAN	09004-66-4	HSL,RR1	2	0
432 FLUORIDE	16984-48-8	GWL,SAR	2	0
433 FLUORMETURON	02164-17-2	NJ,OPP	2	0
434 FLUOROACETIC ACID	00144-49-0	AC,H2O	2	0
435 FORMAMIDE,N,N-DIMETHYL-	00068-12-2	OTS,SAR	2	0
436 FORMIC ACID	00064-18-6	HSL,RR1	2	0
437 HEXAMETHYLPHORAMIDE	00680-31-9	NJ,OTS	2	0
438 HEXANE	00110-54-3	OTS,SAR	2	0
439 LASIOCARPINE	00303-34-4	HSL,RR1	2	0
440 LEAD PHOSPHATE	07446-27-7	HSL,RR1	2	0
441 LINURON	00330-55-2	OPP,SF	2	0
442 MERCURIC CHLORIDE	07487-94-7	AC,AIR	2	0
443 METHYL ACRYLATE	00096-33-3	NJ,OTS	2	0
444 METHYL ETHYL KETONE PEROXIDE	01338-23-4	HSL,RR1	2	0
445 METHYL METHANESULFONATE	00066-27-3	GWL,RR1	2	0
446 METHYL TERT-BUTYL ETHER	01634-04-4	NJ,OTS	2	0
447 METHYL-N'-NITRO-N-NITROSOGUAN	00070-25-7	HSL,RR1	2	0
448 METHYLENEBISPHENYLISOCYANATE	00101-68-8	NJ,OTS	2	0
449 METHYLTHIOURACIL	00056-04-2	HSL,RR1	2	0
450 MISITYLENE	00108-67-8	AC,OPP	2	0
451 N-NITROSOMETHYLETHYLENEAMINE	10595-95-6	GWL,RR1	2	0
452 NEBURON	00555-37-3	OPP,SF	2	0
453 NICKEL CYANIDE	00557-19-7	HSL,RR1	2	0
454 NITROSORNICOTINE,N-	16543-55-8	NJ,RR1	2	0
455 OCTACHLORONAPHTHALENE	02234-13-1	NJ,OTS	2	0
456 OXAMYL	23135-22-0	AC,OPP	2	0
457 OXYDISULFOTON	02497-07-6	AC,OPP	2	0
458 PERACETIC ACID	00079-21-0	AC,NJ	2	0
459 PHENYLENEDIAMINE,P-	00106-50-3	NJ,OTS	2	0
460 PROMETON	01610-18-0	OPP,SF	2	0
461 PROMETRYN	07287-19-6	OPP,SF	2	0
462 PROPAGINE	00139-40-2	OPP,SF	2	0
463 PROPHAM	00122-42-9	OPP,SF	2	0
464 PROPOXUR	00114-26-1	NJ,OPP,SF	2	0
465 PROPYLENE	00115-07-1	AIR,NJ	2	0
466 RESERPINE	00050-55-5	HSL,RR1	2	0
467 SILVER CYANIDE	00506-64-9	HSL,RR1	2	0
468 SIMAZINE	00122-34-9	OPP,SF	2	0
469 SODIUM	07440-23-5	GWL,HSL	2	0
470 STREPTOZOTOCIN	18883-66-4	HSL,RR1	2	0
471 STRONTIUM SULFIDE	01314-96-1	HSL,RR1	2	0
472 SULFUR DIOXIDE	07446-09-5	AC,SAR	2	0
473 SWEP	01918-18-9	OPP,SF	2	0
474 TERBUFOS	13071-79-9	AC,OPP	2	0
475 THALLIUM(I) NITRATE	10102-45-1	HSL,RR1	2	0
476 TIN	07440-31-5	GWL,SAR	2	0
477 TRICHLOROMETHANETHIOL	00075-70-7	GWL,RR1	2	0
478 URACIL MUSTARD	00066-75-1	HSL,RR1	2	0
479 ZINC CYANIDE	00557-21-1	HSL,RR1	2	0
480 BENZOTRICHLORIDE	00098-07-7	AC,HSL,NJ,RR1	1	3
481 SULFURIC ACID	07664-93-9	AC,HSL,NJ,SAR	1	3
482 AZINPHOS-METHYL	00086-50-0	AC,HSL,SF	1	2
483 CAPTAN	00133-06-2	HSL,NJ,SF	1	2
484 CARBAMIC ACID, ETHYL ESTER	00051-79-6	HSL,NJ,RR1	1	2
485 CARBAMIDE,N-METHYL-N-NITROSO	00684-93-5	HSL,NJ,RR1	1	2
486 CHLORINE	07782-50-5	AC,HSL,NJ	1	2
487 DICHLOROETHYLENE(1,2)	00540-59-0	NJ,SF,SAR	1	2
488 DITHIAZANINE IOOIDE	00514-73-8	AC	1	2
489 ETHION	00563-12-2	AC,HSL,SF	1	2
490 HYDROGEN CHLORIDE	07647-01-0	AC,HSL,NJ	1	2
491 KELTHANE	00115-32-2	HSL,NJ,SF	1	2
492 MALATHION	00121-75-5	HSL,SF,SAR	1	2



## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
493	MEXACARBATE	00315-18-4	AC, HSL, SF	1 2
494	NITRIC ACID	07697-37-2	AC, HSL, NJ	1 2
495	TOLUENE 2,6-DIISOCYANATE	00091-08-7	AC, HSL, NJ	1 2
496	TRICLOROPHON	00052-68-6	AC, HSL, NJ	1 2
497	1,3-DICHLOROPROPENE	00542-75-6	HSL, NJ	1 1
498	1-BUTANOL	00071-36-3	HSL, NJ	1 1
499	ARSENOUS TRICHLORIDE	07784-34-1	AC, HSL	1 1
500	BENZENESULFONYL CHLORIDE	00098-09-9	AC, HSL	1 1
501	BENZO(J)FLUORANTHENE	00205-82-3	RR1, RWL	1 1
502	BENZOYL CHLORIDE	00098-88-4	HSL, NJ	1 1
503	CALCIUM ARSENATE	07778-44-1	AC, HSL	1 1
504	CARBOPHENOTHION	00786-19-6	AC, SF	1 1
505	CITRUS RED NO.2	06358-53-8	RR1, RWL	1 1
506	COUMAPHOS	00056-72-4	AC, HSL	1 1
507	CROTONALDEHYDE, (E)-	00123-73-9	AC, HSL	1 1
508	CUMENE HYDROPEROXIDE	00080-15-9	NJ, HSL	1 1
509	DIBENZ(A,H)ACRIDINE	00226-36-8	RR1, RWL	1 1
510	DIBENZ(A,J)ACRIDINE	00224-42-0	RR1, RWL	1 1
511	DIBENZO(C,G)CARBAZOLE(7H)	00194-59-2	RR1, RWL	1 1
512	DICHLOROBENZENE, MIXED	25321-22-6	HSL, NJ	1 1
513	DIOXATHION	00078-34-2	AC, SF	1 1
514	ETHYL ACRYLATE	00140-88-5	HSL, NJ	1 1
515	ETHYLENE GLYCOL	00107-21-1	NJ, SAR	1 1
516	ETHYLENEDIAMINE	00107-15-3	AC, HSL	1 1
517	FURAN	00110-00-9	AC, HSL	1 1
518	MIREX	02385-85-5	SF, SAR	1 1
519	NITROPHENOL, MIXED	25154-55-6	HSL, SAR	1 1
520	PARIS GREEN	12002-03-8	AC, HSL	1 1
521	PCBS	01336-36-3	NJ, SAR	1 1
522	PHOSPHORIC ACID	07664-38-2	HSL, NJ	1 1
523	PHOSPHOROUS OXYCHLORIDE	10025-87-3	AC, HSL	1 1
524	PHOSPHORUS TRICHLORIDE	07719-12-2	AC, HSL	1 1
525	POTASSIUM ARSENITE	10124-50-2	AC, HSL	1 1
526	PROPIOLACTONE, BETA	00057-57-8	AC, NJ	1 1
527	PYRIDINE, 4-AMINO-	00504-24-5	AC, HSL	1 1
528	QUINOLINE	00091-22-5	HSL, NJ	1 1
529	SODIUM ARSENATE	07631-89-2	AC, HSL	1 1
530	SODIUM ARSENITE	07784-46-5	AC, HSL	1 1
531	SODIUM AZIDE (NA(N3))	26628-22-8	AC, HSL	1 1
532	SODIUM SELENITE	10102-18-8	AC, HSL	1 1
533	TETRAHYDROFURAN	00109-99-9	HSL, SAR	1 1
534	THALLOUS CARBONATE	06533-73-9	AC, HSL	1 1
535	TITANIUM TETRACHLORIDE	07550-45-0	AC, NJ	1 1
536	TOLUIDINE, O-	00095-53-4	NJ, RR1	1 1
537	(ETHOXYMETHYL)BUTANEDIOIC ACID	00529-64-0	OTS	1 0
538	OPENTACHLOROANILINE(2,3,4,5,6-	00527-20-8	OTS	1 0
539	1-EPOXY-4,4,4-TRICHLOROBUTANE	03083-25-8	OTS	1 0
540	2,4,5-TP ACID (SILVEX)	00093-72-1	SAR	1 0
541	2,4,6-TRINITROTOLUENE	00118-96-7	SAR	1 0
542	2-(2-BUTOXYETHOXY)ETHYLACETATE	00124-17-4	OTS	1 0
543	3,3-TRICHLORO-1,2-EPOXYPROPANE	03083-23-6	OTS	1 0
544	3,5-DICHLOROBENZOIC ACID	00051-36-5	OPP	1 0
545	3-(2-XENYLOXY)1,2-EPOXYPROPANE	07144-65-2	OTS	1 0
546	4-AMINOAZOBENZENE	00060-09-3	NJ	1 0
547	ACEFLUOREFEN	50594-66-6	OPP	1 0
548	ACENAPHTHENE	00083-32-9	SAR	1 0
549	ACETAMIDE	00060-35-5	NJ	1 0
550	ACETIC ACID	00064-19-7	HSL	1 0
551	ACETIC ACID, ETHYL ESTER	00141-78-6	HSL	1 0
552	ACETIC ANHYDRIDE	00108-24-7	HSL	1 0
553	ACETONE THIOSEMICARBAZIDE	01752-30-3	AC	1 0
554	ACETYL BROMIDE	00506-96-7	HSL	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
555	ACRYLYL CHLORIDE	00814-68-6	AC	1 0
556	ADIPIC ACID	00124-04-9	HSL	1 0
557	ADIPONITRILE	00111-69-3	AC	1 0
558	AFLATOXIN B1	01162-65-8	RR1	1 0
559	ALACHLOR	15972-60-8	OPP	1 0
560	ALDICARB SULFONE	01646-88-4	OPP	1 0
561	ALDICARB SULFOXIDE	01646-87-3	OPP	1 0
562	ALKYL TINS	00077-58-7	OTS	1 0
563	ALKYL TINS	26636-01-1	OTS	1 0
564	ALKYL TINS	25168-24-5	OTS	1 0
565	ALKYL TINS	25168-21-2	OTS	1 0
566	ALKYL TINS	25852-70-4	OTS	1 0
567	ALKYL TINS	54849-38-6	OTS	1 0
568	ALKYL TINS	01185-81-5	OTS	1 0
569	ALLYLAMINE	00107-11-9	AC	1 0
570	ALPHA-METHYLSTYRENE	00093-83-9	OTS	1 0
571	ALUMINUM OXIDE	01344-28-1	NJ	1 0
572	ALUMINUM SULFATE	10043-01-3	HSL	1 0
573	AMINO-2-METHYLANTHRAQUINONE,1-	00082-28-0	NJ	1 0
574	AMINOANTHRAQUINONE, 2-	00117-79-3	NJ	1 0
575	AMINOCARB	02032-59-9	SF	1 0
576	AMINOPTERIN	00054-62-6	AC	1 0
577	AMINOUNDECANOIC 11	02432-99-7	OTS	1 0
578	AMITON	00078-53-5	AC	1 0
579	AMITON OXALATE	03734-97-2	AC	1 0
580	AMMONIUM ACETATE	00631-61-8	HSL	1 0
581	AMMONIUM BENZOATE	01863-63-4	HSL	1 0
582	AMMONIUM BICARBONATE	01066-33-7	HSL	1 0
583	AMMONIUM BICHROMATE	07789-09-5	HSL	1 0
584	AMMONIUM BIFLUORIDE	01341-49-7	HSL	1 0
585	AMMONIUM BISULFITE	10192-30-0	HSL	1 0
586	AMMONIUM CARBAMATE	01111-78-0	HSL	1 0
587	AMMONIUM CARBONATE	00506-87-6	HSL	1 0
588	AMMONIUM CHLORIDE	12125-02-9	HSL	1 0
589	AMMONIUM CHROMATE	07788-98-9	HSL	1 0
590	AMMONIUM CITRATE (DIBASIC)	03012-65-5	HSL	1 0
591	AMMONIUM FLUOBORATE	13826-83-0	HSL	1 0
592	AMMONIUM FLUORIDE	12125-01-8	HSL	1 0
593	AMMONIUM HYDROXIDE	01336-21-6	HSL	1 0
594	AMMONIUM NITRATE (SOLUTION)	06484-52-2	NJ	1 0
595	AMMONIUM OXALATE	05972-73-6	HSL	1 0
596	AMMONIUM OXALATE	14258-49-2	HSL	1 0
597	AMMONIUM OXALATE	06009-70-7	HSL	1 0
598	AMMONIUM PICRATE	00131-74-8	HSL	1 0
599	AMMONIUM SILICOFLUORIDE	16919-19-0	HSL	1 0
600	AMMONIUM SULFAMATE	07773-06-0	HSL	1 0
601	AMMONIUM SULFATE (SOLUTION)	07783-20-2	NJ	1 0
602	AMMONIUM SULFIDE	12135-76-1	HSL	1 0
603	AMMONIUM SULFITE	10196-04-0	HSL	1 0
604	AMMONIUM TARTRATE	14307-43-8	HSL	1 0
605	AMMONIUM TARTRATE	03164-29-2	HSL	1 0
606	AMMONIUM THIOCYANATE	01762-95-4	HSL	1 0
607	AMMONIUM THIOSULFATE	07783-18-8	HSL	1 0
608	AMMONIUMCHLOROPLATINATE	16919-58-7	AC	1 0
609	AMPHETAMINE	00300-62-9	AC	1 0
610	AMYL ACETATE	00628-63-7	HSL	1 0
611	AMYL ISOACETATE	00123-92-2	HSL	1 0
612	AMYL SECACETATE	00626-38-0	HSL	1 0
613	AMYL TERTACETATE	00625-16-1	HSL	1 0
614	ANILINE HYDROBROMIDE	00542-11-0	OTS	1 0
615	ANILINE HYDROCHLORIDE	00142-04-1	OTS	1 0
616	ANILINE, 2,4,6-TRIMETHYL	00088-05-1	AC	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
617 ANISIDINE HYDROCHLORIDE, O-	00134-29-2	NJ	1	0
618 ANISIDINE, P-	00104-94-9	NJ	1	0
619 ANSIDINE, O-	00090-04-0	NJ	1	0
620 ANTIMONY COMPOUNDS	01345-04-6	OTS	1	0
621 ANTIMONY PENTACHLORIDE	07647-18-9	HSL	1	0
622 ANTIMONY PENTAFLUORIDE	07783-70-2	AC	1	0
623 ANTIMONY POTASSIUM TARTRATE	28300-74-5	HSL	1	0
624 ANTIMONY TRIBROMIDE	07789-61-9	HSL	1	0
625 ANTIMONY TRICHLORIDE	10025-91-9	HSL	1	0
626 ANTIMONY TRIFLUORIDE	07783-56-4	HSL	1	0
627 ANTIMYCIN A	01397-94-0	AC	1	0
628 ANTRHAQUINONE	00084-65-1	OTS	1	0
629 ARESNIC TRISULFIDE	01303-33-9	HSL	1	0
630 ARSENIC ACID	01327-52-2	HSL	1	0
631 ARSENIC DISULFIDE	01303-32-8	HSL	1	0
632 ARSINE	07784-42-1	AC	1	0
633 ATRAZINE, DEALKYLATED	03397-62-4	OPP	1	0
634 AZINPHOS-ETHYL	02642-71-9	AC	1	0
635 AZIRIDINIPROPANOIC ACID(1-),2-	57116-45-7	OTS	1	0
636 BACITRACIN	01405-87-4	AC	1	0
637 BENTAZON	25057-89-0	OPP	1	0
638 BENZAMIDE	00055-21-0	NJ	1	0
639 BENZENAMINE	00101-61-1	NJ	1	0
640 BENZENAMINE, 3-(TRIFLUOROMETHY	00098-16-8	AC	1	0
641 BENZENE, 1-(CHLOROMETHYL)-4-NI	00100-14-1	AC	1	0
642 BENZENEDIAMINE(1,2-),4-CHLOROS	68459-98-3	OTS	1	0
643 BENZENEDIAMINE(1,2-),4-NITROSU	68239-82-7	OTS	1	0
644 BENZENEDIAMINE(1,3-)	00108-45-2	OTS	1	0
645 BENZENEDIAMINE(1,3-),2,4-DIETH	02095-02-5	OTS	1	0
646 BENZENEDIAMINE(1,3-),4,6-DIETH	02095-01-4	OTS	1	0
647 BENZENEDIAMINE(1,3-),4-ETHOXY	67801-06-3	OTS	1	0
648 BENZENEDIAMINE(1,3-),ARETHYL-A	68966-84-7	OTS	1	0
649 BENZENEDIAMINE(1,4-),2-NITROSU	68239-83-8	OTS	1	0
650 BENZENEDIAMINE(1,4-),ETHANEDIO	62654-17-5	OTS	1	0
651 BENZENEDIAMINE, 2-METHYLDIHYDR	00615-45-2	OTS	1	0
652 BENZENEDIAMINE,2-METHYLDIHYDRO	06369-59-1	OTS	1	0
653 BENZENEDIAMINE,AR,AR-DIETHYL-A	68479-98-1	OTS	1	0
654 BENZENEDIAMINE(1,2),5-CHLORO-	42389-30-0	OTS	1	0
655 BENZENEDIOL(1,2), 4-[1-HYDROXY	06912-68-1	RR1	1	0
656 BENZONITRILE	00100-47-0	HSL	1	0
657 BENZYL CYANIDE	00140-29-4	AC	1	0
658 BERNOLATE	01929-77-7	OPP	1	0
659 BERYLLIUM CHLORIDE	07787-47-5	HSL	1	0
660 BERYLLIUM FLUORIDE	07787-49-7	HSL	1	0
661 BERYLLIUM NITRATE	07787-55-5	HSL	1	0
662 BERYLLIUM NITRATE	13597-99-4	HSL	1	0
663 BICYCLO(2.2.1)HEPTANE-2-CARBON	15271-41-7	AC	1	0
664 BIS(2,3-EPOXYPROPOXY)-1,4-DIOX	10043-09-1	OTS	1	0
665 BIS(2,3-EPOXYPROPOXY)-1,4-DIOX	07487-28-7	OTS	1	0
666 BIS(2-CHLOROETHYLISOPROPYL)ETH	39363-32-9	SF	1	0
667 BIS(2-ETHYLHEXYL)TEREPHTHALATE	06422-86-2	OTS	1	0
668 BIS(2-ETHYLHEXYL)ADIPATE	00103-23-1	NJ	1	0
669 BIS(2-METHYL-2,3-EPOXYPROPANE)	03775-85-7	OTS	1	0
670 BIS(CHLOROMETHYL)KETONE	00534-07-6	AC	1	0
671 BIS(P-TERT-BUTYLPHENYL)PHENYL	00115-87-7	OTS	1	0
672 BISPHENOL A GLYCIDYL ETHER	01675-54-3	OTS	1	0
673 BISPHENYL A DIGLYCIDYLETHER	25085-99-8	OTS	1	0
674 BITOSCANATE	04044-65-9	AC	1	0
675 BORON AND COMPOUNDS	07440-42-8	SAR	1	0
676 BORON TRIFLUORIDE	07637-07-2	AC	1	0
677 BORON TRICHLORIDE	10294-34-5	AC	1	0
678 BORON TRIFLURIDE WITH METHYL	00353-42-4	AC	1	0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
679	BROMACIL	00314-40-9	OPP	1 0
680	BROMADIOLONE	28772-56-7	AC	1 0
681	BROMO(1-),2-CHLOROETHANE	00107-04-0	OTS	1 0
682	BROMO-2,4-DICHLOROANILINE(6-)	00697-86-9	OTS	1 0
683	BROMO-3,5-DICHLOROANILINE(4-)	01940-29-0	OTS	1 0
684	BROMO-4,6-DINITROANILINE(2-)	01817-73-8	OTS	1 0
685	BROMO-4-NITROANILINE(2-)	13296-94-1	OTS	1 0
686	BROMO-4-NITROANILINE(2-)	10401-50-0	OTS	1 0
687	BROMO-6-CHLORO-4-NITROANILINE	00099-29-6	OTS	1 0
688	BROMOANILINE HYDROCHLORIDE(4-)	00624-19-1	OTS	1 0
689	BROMOANILINE(3-)	00591-19-5	OTS	1 0
690	BROMOANILINE(4-)	00106-40-1	OTS	1 0
691	BROMOANININE, 2-	00615-36-1	OTS	1 0
692	BROMOBENZENE	00108-86-1	OPP	1 0
693	BROMOBENZYL CYANIDE(4-)	16532-79-9	ONS	1 0
694	BUTACHLOR	23184-66-9	OPP	1 0
695	BUTANEDIOIC ACID,(ETHOXYMETHYLE	55130-39-7	OTS	1 0
696	BUTENAL(2)	00123-73-9	HSL	1 0
697	BUTENAL(2)	04170-30-0	HSL	1 0
698	BUTOXYETHANOL(2-)	00111-76-2	OTS	1 0
699	BUTYL 2-ETHYLHEXHL PHTHALATE	00085-69-8	OTS	1 0
700	BUTYL ACRYLATE	00141-32-2	NJ	1 0
701	BUTYL ALCOHOL, SEC-	00078-92-2	NJ	1 0
702	BUTYL GLYCIDYL ETHER, N-	02426-08-6	OTS	1 0
703	BUTYL GLYCOL BUTYL PHTHALATE	00085-70-1	OTS	1 0
704	BUTYL ISOVALERATE	00109-19-3	AC	1 0
705	BUTYL VINYL ETHER	00111-34-5	AC	1 0
706	BUTYLAMINE	00109-73-9	HSL	1 0
707	BUTYLAMINE, TERT-	00075-64-9	HSL	1 0
708	BUTYLATE	01008-41-5	OPP	1 0
709	BUTYLBENZYL PHTHALATE	00085-68-7	SAR	1 0
710	BUTYLPHENYL DIPHENYL PHOSPHATE	56803-37-3	OTS	1 0
711	BUTYRALDEHYDE	00123-72-8	NJ	1 0
712	BUTYRIC ACID	00107-92-6	HSL	1 0
713	C.I. 22375	06507-81-9	OTS	1 0
714	C.I. ACID BLUE 9, DIAMMONIUM	02650-18-2	NJ	1 0
715	C.I. ACID BLUE 9, DISODIUM SAL	03864-45-9	NJ	1 0
716	C.I. ACID GREEN 3	04680-78-8	NJ	1 0
717	C.I. AZIIOC DIAZOCOPONYL	20282-70-6	OTS	1 0
718	C.I. BASIC GREEN 1	00633-03-4	AC	1 0
719	C.I. BASIC GREEN 4	00569-64-2	NJ	1 0
720	C.I. BASIC RED 1	00989-38-8	NJ	1 0
721	C.I. BASIC RED 9 MONO HCL	00479-73-2	OTS	1 0
722	C.I. BASIC RED 9 MONO HCL	00569-61-9	OTS	1 0
723	C.I. DIREC RED 3,7	03530-19-6	OTS	1 0
724	C.I. DIRECT BLACK 21	06739-62-4	OTS	1 0
725	C.I. DIRECT BLACKI 4	02429-83-6	OTS	1 0
726	C.I. DIRECT BLUE 1	02610-05-1	OTS	1 0
727	C.I. DIRECT BLUE 15	02429-74-5	OTS	1 0
728	C.I. DIRECT BLUE 151	06449-35-0	OTS	1 0
729	C.I. DIRECT BLUE 2	02429-73-4	OTS	1 0
730	C.I. DIRECT BLUE 22	02586-57-4	OTS	1 0
731	C.I. DIRECT BLUE 25	02150-54-1	OTS	1 0
732	C.I. DIRECT BLUE 26	07082-31-7	OTS	1 0
733	C.I. DIRECT BLUE 76	16143-79-6	OTS	1 0
734	C.I. DIRECT BLUE 8	02429-71-2	OTS	1 0
735	C.I. DIRECT BLUE 98	06656-03-7	OTS	1 0
736	C.I. DIRECT BROWN 1,5,4	06360-54-9	OTS	1 0
737	C.I. DIRECT BROWN 1A	02586-58-5	OTS	1 0
738	C.I. DIRECT BROWN 2	02429-82-5	OTS	1 0
739	C.I. DIRECT BROWN 3	02429-81-4	OTS	1 0
740	C.I. DIRECT BROWN 59	03476-90-2	OTS	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
741	C.I. DIRECT BROWN 6	02893-80-3	OTS	1 0
742	C.I. DIRECT BROWN 74	08014-91-3	OTS	1 0
743	C.I. DIRECT GREEN 6	04335-09-5	OTS	1 0
744	C.I. DIRECT GREEN 7	03626-28-6	OTS	1 0
745	C.I. DIRECT GREEN 8	05422-17-3	OTS	1 0
746	C.I. DIRECT ORANGE 6	06637-88-3	OTS	1 0
747	C.I. DIRECT ORANGE 8, C8 CI	02429-79-0	OTS	1 0
748	C.I. DIRECT RED 1	02429-84-7	OTS	1 0
749	C.I. DIRECT RED 28	00578-58-0	OTS	1 0
750	C.I. DIRECT RED 39	06358-29-8	OTS	1 0
751	C.I. DIRECT RED 85	03567-65-5	OTS	1 0
752	C.I. DIRECT VIOLET 1	02586-60-9	OTS	1 0
753	C.I. DIRECT VIOLET 22	06426-67-1	OTS	1 0
754	C.I. DIRECT YELLOW 28	08005-72-9	OTS	1 0
755	C.I. DISPERSE BLUE 79	99999-99-9	OTS	1 0
756	C.I. FOOD RED 15	00081-88-9	NJ	1 0
757	C.I. FOOD RED 5	03761-53-3	NJ	1 0
758	C.I. SOLVENT ORANGE 7	03118-97-6	NJ	1 0
759	C.I. SOLVENT YELLOW 14	00842-07-9	NJ	1 0
760	C.I. SOLVENT YELLOW 3	00097-56-3	NJ	1 0
761	C.I.; VAT YELLOW 4	00128-66-5	NJ	1 0
762	CADMIUM ACETATE	00543-90-8	HSL	1 0
763	CADMIUM BROMIDE	07789-42-6	HSL	1 0
764	CADMIUM STEARATE	02223-93-0	AC	1 0
765	CADMIUM SULFIDE	01306-23-6	OTS	1 0
766	CALCIUM	07440-70-2	GWL	1 0
767	CALCIUM	61789-36-4	OTS	1 0
768	CALCIUM ARSENITE	52740-16-6	HSL	1 0
769	CALCIUM CARBIDE	00075-20-7	HSL	1 0
770	CALCIUM CYANAMIDE	00156-62-7	NJ	1 0
771	CALCIUM DODECYLBENZENE SULFONA	26264-06-2	HSL	1 0
772	CALCIUM HYPOCHLORITE	07778-54-3	HSL	1 0
773	CANTHARIDIN	00056-25-7	AC	1 0
774	CARBAMIC ACID, METHYL-O-((2,4-	26419-73-8	AC	1 0
775	CARBOFURAN INTERMEDIATE	68298-46-4	OTS	1 0
776	CARBOFURAN INTERMEDIATE	13414-54-5	OTS	1 0
777	CARBOFURAN INTERMEDIATE	13414-55-6	OTS	1 0
778	CARBOFURAN PHENOL	01563-38-8	OPP	1 0
779	CARBOFURAN PHENOL 3KET	17781-16-7	OPP	1 0
780	CARBOFURAN, 3-HYDROXY	16655-82-6	OPP	1 0
781	CARBONYL SULFIDE	00463-58-1	NJ	1 0
782	CARBOXIM	05234-68-4	OPP	1 0
783	CARBOXIM SULFOXIDE	01775-70-9	OPP	1 0
784	CAREBECHOL CHLORIDE	00051-83-2	AC	1 0
785	CARVONE	02244-16-8	AC	1 0
786	CATECHOL	00120-80-9	NJ	1 0
787	CHLORACETOPHENONE, 2-	00532-27-4	NJ	1 0
788	CHLORENDIC ACID	00115-28-6	OTS	1 0
789	CHLORENDIC ANHYDRIDE	00115-28-5	OTS	1 0
790	CHLORFENVINFOS	00407-90-6	AC	1 0
791	CHLORINATED BENZENES	00608-95-3	OTS	1 0
792	CHLORINATED BENZENES	00634-90-2	OTS	1 0
793	CHLORINATED BENZENES	00634-66-2	OTS	1 0
794	CHLORINATED NAPHTHALENES	01321-64-8	OTS	1 0
795	CHLORINATED NAPHTHALENES	01321-65-9	OTS	1 0
796	CHLORINATED NAPHTHALENES	28699-88-9	OTS	1 0
797	CHLORINATED NAPHTHALENES	01335-88-2	OTS	1 0
798	CHLORINATED PARAFFINS	61788-76-9	OTS	1 0
799	CHLORINATED PARAFFINS	38920-70-7	OTS	1 0
800	CHLORINATED PARAFFINS	63449-39-8	OTS	1 0
801	CHLORINE DIOXIDE	10049-04-4	NJ	1 0
802	CHLORMEPHOS	24934-91-6	AC	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
803	CHLORMEQUAT CHLORIDE	00999-81-5	AC	1 0
804	CHLORNEB	02675-77-6	OPP	1 0
805	CHLORO-0-TOLUIDINE HYDROCHLORI	03156-93-3	HSL	1 0
806	CHLORO-2,6-DINITROANILINE(3-)	10250-71-2	OTS	1 0
807	CHLORO-2-NITROANILINE (4-)	00089-63-4	OTS	1 0
808	CHLORO-3-NITROANILINE(4-)	00635-22-3	OTS	1 0
809	CHLORO-4-NITROANILINE(2-)	00121-87-9	OTS	1 0
810	CHLORO-4-NITROANILINE(2-)	00769-11-9	OTS	1 0
811	CHLORO-4-NITROANILINE(3-)	00825-41-2	OTS	1 0
812	CHLORO-5-NITROANILINE(3-)	05344-44-5	OTS	1 0
813	CHLOROANILINE (2-)	00095-51-2	OTS	1 0
814	CHLOROANILINE HYDROCHLORIDE(3	00141-85-5	OTS	1 0
815	CHLOROANILINE HYDROCHLORIDE(2-	00137-04-2	OTS	1 0
816	CHLOROANILINE HYDROCHLORIDE(2-	00563-04-2	OTS	1 0
817	CHLOROANILINE HYDROCHLORIDE(4-	20265-96-7	OTS	1 0
818	CHLOROANILINE(3-)	00108-42-9	OTS	1 0
819	CHLOROBENZOTRICHLORIDE	02136-89-2	OWS	1 0
820	CHLOROBENZOTRICHLORIDE(4-)	05216-25-1	OSW	1 0
821	CHLOROBENZOTRIFLUORIDE, 4-	00098-56-6	OTS	1 0
822	CHLORODIBENZODIOXINS	0000000000	SAR	1 0
823	CHLORODIBENZOFURANS	0000000000	SAR	1 0
824	CHLORODIFLUOROMETHANE	00075-45-6	SAR	1 0
825	CHLOROETHANOL	00107-07-3	AC	1 0
826	CHLOROETHYL CHLOROFORMATE	00627-11-2	AC	1 0
827	CHLOROL-4,6-DINITROANILINE(2-)	03531-19-9	OTS	1 0
828	CHLOROMETHYLPROPENE	00563-47-5	OTS	1 0
829	CHLOROPHACINONE	03691-35-8	AC	1 0
830	CHLOROSULFONIC ACID	07790-94-5	HSL	1 0
831	CHLOROTOLUENE(4-)	00106-43-4	OPP	1 0
832	CHLOROXYURON	01982-47-4	AC	1 0
833	CHLORPYRIFOS	02921-88-2	HSL	1 0
834	CHLORTHIOPHOS	21923-23-9	AC	1 0
835	CHORMIC ACID	07738-94-5	HSL	1 0
836	CHROMIC ACETATE	01066-30-4	HSL	1 0
837	CHROMIC ACID	11115-74-5	HSL	1 0
838	CHROMIC CHLORIDE	10025-73-7	AC	1 0
839	CHROMIC SULFATE	10101-53-8	HSL	1 0
840	CHROMOUS CHLORIDE	10049-05-5	HSL	1 0
841	CIS-1,2-DICHLOROETHYLENE	00156-59-2	SAR	1 0
842	CIS-HEPTACHLOROSTYRENE	29086-39-3	OTS	1 0
843	CIS-PERMETHRIN	54774-45-7	OPP	1 0
844	COBALT	61789-14-5	OTS	1 0
845	COBALT CARBONYL	10210-68-1	AC	1 0
846	COBALT, ((2,2'-ETHANEDIYLBIS(NI	62207-76-5	AC	1 0
847	COBALTOUS BROMIDE	07789-43-7	HSL	1 0
848	COBALTOUS FORMATE	00544-18-3	HSL	1 0
849	COBALTOUS SULFAMATE	14017-41-5	HSL	1 0
850	COLCHICINE	00064-86-8	AC	1 0
851	COPPER CYANIDE	00544-92-3	HSL	1 0
852	COPPER CYANIDE	14763-77-0	RR1	1 0
853	COPPER, BIS(DIMETHYL CARBAMOITH	00137-29-1	OTS	1 0
854	COUMAFURYL	00117-52-2	AC	1 0
855	COUMATETRALYL	05836-29-3	AC	1 0
856	CRESIDINE, P-	00102-71-8	NJ	1 0
857	CRESYL DIPHENYL PHOSPHATE	26444-49-5	OTS	1 0
858	CRESYLDIPHENYL PHOSPHATE	00078-31-9	OTS	1 0
859	CRIMIDINE	00535-89-7	AC	1 0
860	CUPFERRON	00135-20-6	NJ	1 0
861	CUPRIC ACETATE	00142-71-2	HSL	1 0
862	CUPRIC CHLORIDE	07447-39-4	HSL	1 0
863	CUPRIC NITRATE	03251-23-8	HSL	1 0
864	CUPRIC OXALATE	05893-66-3	HSL	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
865 CUPRIC SULFATE	07758-98-7	HSL	1	0
866 CUPRIC SULFATE, AMMONIATED	10380-29-7	HSL	1	0
867 CUPRIC TARTRATE	00815-82-7	HSL	1	0
868 CYANAZINE	21725-46-2	OPP	1	0
869 CYANOGEN	00460-19-5	HSL	1	0
870 CYANOGEN	02074-87-5	RR1	1	0
871 CYANOGEN IODIDE	00506-78-5	AC	1	0
872 CYANOPHOS	02636-26-2	AC	1	0
873 CYANURIC FLUORIDE	00675-14-9	AC	1	0
874 CYCASIN	14901-08-7	RR1	1	0
875 CYCLOATE	01134-23-2	OPP	1	0
876 CYCLOHEXANEDIONE 1,3-,5-(2-(ET	99422-01-2	OTS	1	0
877 CYCLOHEXANONE	00108-04-1	OTS	1	0
878 CYCLOHEXIMIDE	00066-81-9	AC	1	0
879 CYCLOHEXLAMINE	00108-91-8	AC	1	0
880 CYCLOPENTANE	00287-92-3	AC	1	0
881 D ESTERS, 2,4-	00094-11-1	HSL	1	0
882 D&C RED NO. 9	05160-02-1	OTS	1	0
883 D-CRESYL GLYCIDYL ETHER	02425-79-8	OTS	1	0
884 DB(2,4-)	00094-82-6	OPP	1	0
885 DBENZENAMINE, 4-CHLORO-2-METHY	00095-69-2	OTS	1	0
886 DCPA	01861-32-1	OPP	1	0
887 DECBORANE	17702-41-9	AC	1	0
888 DEECBROMODIPHENYL OXIDE	01163-19-5	NJ	1	0
889 DEMENTON-8	00126-75-0	SF	1	0
890 DEMETON	08065-48-3	AC	1	0
891 DEMETON-0	00298-03-3	SF	1	0
892 DEMETON-S-METHYL	00919-86-8	AC	1	0
893 DI(HEPTYL,NONYL,UNDECYL)PHTHAL	39393-37-8	OTS	1	0
894 DI(HEXYL, OCTYL, DECYL)PHTHALA	27554-26-3	OTS	1	0
895 DI-ALPHA-DPICHLOLROHYDRIN	13403-37-7	OTS	1	0
896 DI-TERT-BUTYL-PHENOL, 2,6-	00128-39-2	OTS	1	0
897 DIALIFOS	10311-84-9	AC	1	0
898 DIAMINO-1-METHYLBENZENE(1,2-)	02687-25-4	OTS	1	0
899 DIAMINO-1-METHYLBENZENE(2,6-)	00823-40-5	OTS	1	0
900 DIAMINO-2-METHYLPHENOL(4,6-)		OTS	1	0
901 DIAMINO-4-METHYLBENZENE	00496-72-0	OTS	1	0
902 DIAMINO-O-CRESOL(4,6)	15872-73-8	OTS	1	0
903 DIAMINOANISOLE(P-)	05307-02-8	OTS	1	0
904 DIAMINOAZOIBENZENE(2,4-) AND	00532-82-1	OTS	1	0
905 DIAMINO BENZENE	00095-54-5	OTS	1	0
906 DIAMINODIPHENYL ETHER, 4,4'	00101-80-4	NJ	1	0
907 DIAMINOPHENOL DIHYDROCHLORIDE	00137-09-7	OTS	1	0
908 DIAMINOTOLUENE(2,5) SULFATE	00615-50-9	OTS	1	0
909 DIAMINOTOLUENE(3,5-)	00108-71-4	OTS	1	0
910 DIAZIMONO	05333-41-5	HSL	1	0
911 DIAZOMETHANE	00334-88-3	NJ	1	0
912 DIBORANE	19287-45-7	AC	1	0
913 DIBROMO-4-(1,2-DIBROMOETHYL)CY	03322-93-8	OTS	1	0
914 DIBROMO-4-NITROANILINE(2,6-)	00827-94-1	OTS	1	0
915 DIBUTYL PHENYL PHOSPHATE	02528-36-1	OTS	1	0
916 DICAMBA, 5-HYDROXY	07600-50-2	OPP	1	0
917 DICHLOBENIL	01914-65-6	HSL	1	0
918 DICHLOFENTHION	00097-17-6	SF	1	0
919 DICHLONE	00117-80-6	HSL	1	0
920 DICHLORO-2,3-EPOXYBUTANE(1,4-)	03583-47-9	OTS	1	0
921 DICHLORO-2-BUTENE	01476-11-5	OTS	1	0
922 DICHLOROANILINE (2,4-)	00095-76-1	OTS	1	0
923 DICHLOROANILINE (2,5-)	00095-82-9	OTS	1	0
924 DICHLOROANILINE(2,4-)	00554-00-7	OTS	1	0
925 DICHLOROANILINE(3,5-)	00626-43-7	OTS	1	0
926 DICHLOROBENZALKONIUM CHLORIDE	08023-53-8	AC	1	0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
927	DICHLOROBENZENE(1,4-)	00110-46-7	HSL	1 0
928	DICHLOROBENZOTRIFLORIDE, 3,4-	00328-84-7	OTS	1 0
929	DICHLOROMETHYLPHENYLSILANE	00149-74-6	AC	1 0
930	DICHLOROPROPANE-DICHLOROPROPEN	08003-19-8	HSL	1 0
931	DICHLOROPROP	00120-36-5	OPP	1 0
932	DICHLOROPROPANE	26638-19-7	HSL	1 0
933	DICHLOROPROPANE, 1,1-	00078-99-9	HSL	1 0
934	DICHLOROPROPANOL (1,3-)	00096-23-1	OSW	1 0
935	DICHLOROPROPANOL(2,3-)	00616-23-9	OSW	1 0
936	DICHLOROPROPENE (1,1-)	00090-99-9	OPP	1 0
937	DICHLOROPROPENE (1,3)	00542-75-6	RR1	1 0
938	DICHLOROPROPENE 2,3-	26952-23-8	HSL	1 0
939	DICHLORVOS	00622-73-7	NJ	1 0
940	DICROTOPHOS	00141-66-2	AC	1 0
941	DICYANAMIDI-DIETHYLENETRIAMINE	67753-54-2	OTS	1 0
942	DIEPOXYBUTENE(1,2,3,4)	00564-00-1	H2O	1 0
943	DIETHANOLAMINE	00111-42-2	NJ	1 0
944	DIETHYL CHLOROPHOSPHATE	00814-49-3	AC	1 0
945	DIETHYL SULFATE	00064-67-5	NJ	1 0
946	DIETHYL-P-PHENYLENEDIAMINE	00093-05-5	AC	1 0
947	DIETHYLAMINE	00109-89-7	HSL	1 0
948	DIETHYLCARBAMKAZINE CITRATE	01642-54-2	AC	1 0
949	DIETHYLENE GLYCOL	04206-61-5	OTS	1 0
950	DIETHYLENE GLYCOL ETHER (DGBE)	00110-34-5	OTS	1 0
951	DIETHYLENETRIAMINE	00111-40-0	OTS	1 0
952	DIETHYLHYDRAZINE(N,N)	00616-40-0	RR1	1 0
953	DIETHYLHYDRAZINE, 1,2-	01615-80-1	HSL	1 0
954	DIGITOXIN	00071-63-6	AC	1 0
955	DIGOXIN	20830-75-5	AC	1 0
956	DIISODECYL PHENYL PHOSPHITE	25550-98-5	OTS	1 0
957	DIISODECYL PHTHALATE	26761-40-0	OTS	1 0
958	DIISODECYLPHENYLPHOSPHATE	51363-64-5	OTS	1 0
959	DIISOHEXYL PHTALATE	00146-50-9	OTS	1 0
960	DIISONONYL PHTHALATE	28553-12-0	OTS	1 0
961	DIISOPROPYL BIPHENYL	69009-90-1	OTS	1 0
962	DIISOPROPYL SULFATE	02973-10-6	OTS	1 0
963	DIISOPROPYLPHENYLGLYCIDIC ACID	01334-99-2	OTS	1 0
964	DIISOPROPYLPHENYLPHOSPHATE	51496-03-8	OTS	1 0
965	DIMEFOX	00115-26-4	AC	1 0
966	DIMETHYL METHYLPHOSPHONATE	00756-79-6	OTS	1 0
967	DIMETHOXYETHYL PHTALATE	00117-82-8	OTS	1 0
968	DIMETHYL ADIPATE	00627-93-0	OTS	1 0
969	DIMETHYL GLUTARATE	01119-40-0	OTS	1 0
970	DIMETHYL HYDROGEN PHOSPHATE	00868-85-9	OTS	1 0
971	DIMETHYL PHOSPHOROCHLORODITHIO	02524-03-0	AC	1 0
972	DIMETHYL SUCCINATE	00106-65-0	OTS	1 0
973	DIMETHYL SULFIDE	0075-18-3	AC	1 0
974	DIMETHYL-P-PHENYLENEDIAMINE	00099-98-9	AC	1 0
975	DIMETHYLAMINE	00109-89-7	AIR	1 0
976	DIMETHYLAMINE	00124-40-3	HSL	1 0
977	DIMETHYLANILINE, N,N-	00121-69-7	NJ	1 0
978	DIMETHYLDCHLOROSILANE	00075-78-5	AC	1 0
979	DIMETILAN	00644-64-4	AC	1 0
980	DINITRO(4,6)-O-CRESOL AND SALT	00534-52-1	RR1	1 0
981	DINITRO-4-CHLOROANILINE(2,6-)	05388-62-5	OTS	1 0
982	DINITROANILINE (2,4-)	00097-02-9	OTS	1 0
983	DINITROANILINE(2,6-)	00606-22-4	OTS	1 0
984	DINITROANILINE(3,5-)	00618-87-1	OTS	1 0
985	DINITROBENZENE, 0-	00528-29-0	HSL	1 0
986	DINITROBENZENE, MIXED	25154-54-5	HSL	1 0
987	DINITROPHENOL	25550-58-7	HSL	1 0
988	DINITROPHENOL, 2,5-	00329-71-5	HSL	1 0



## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
989	DINITROPHENOL, 2,6-	00573-56-8	HSL	1 0
990	DINITROTOLUENE	25321-14-6	HSL	1 0
991	DINITROTOLUENE, 3,4-	00610-39-9	HSL	1 0
992	DINOTERB	01420-07-1	AC	1 0
993	DIPHACINONE	00082-66-6	AC	1 0
994	DIPHENAMID	00957-51-7	OPP	1 0
995	DIPHENYLAMINE	00122-39-4	OWL	1 0
996	DIPHENYLHYDRAZINE	00530-50-7	HSL	1 0
997	DIPROPYLAMINE	00142-84-7	HSL	1 0
998	DIQUAT	00085-00-7	HSL	1 0
999	DIQUAT	02764-72-9	HSL	1 0
1000	DISULFOTON SULFONE	02497-06-5	OPP	1 0
1001	DIUNDECYL PHTHALATE	03648-20-2	OTS	1 0
1002	DODECYL BENZENESULFONIC ACID	27176-87-0	HSL	1 0
1003	DOMOTRPBEMZEME. M-	00099-65-0	HSL	1 0
1004	DVINTLCYCLOHEXENE (4-)	00100-40-3	OTS	1 0
1005	EDTA	00060-00-4	HSL	1 0
1006	EMETINE, DIHYDROCHLORIDE	00316-42-7	AC	1 0
1007	ENDOTHION	02778-04-3	AC	1 0
1008	ENDRIN KETONE	53494-70-5	SF	1 0
1009	EPIC	00759-94-4	OPP	1 0
1010	EPINEPHRINE	00051-43-4	HSL	1 0
1011	EPN	02104-64-5	AC	1 0
1012	EPOXY-1-PROPANOL STEARATE, 2,3	07460-84-6	OTS	1 0
1013	EPOXY-2-ETHYLHEXANOL, 2,3-	00078-72-8	OTS	1 0
1014	EPOXY-3-ALLYLOXYPROPANE, 1,2-	00106-92-3	OTS	1 0
1015	EPOXY-3-BROMOPROPANE(1,2-)	03132-64-7	OTS	1 0
1016	EPOXY-3-PROPOXYPROPANE, 1,2-	03126-95-2	OTS	1 0
1017	EPOXYBUTYRIC ACID, BUTYL ESTER,	10140-87-1	AC	1 0
1018	EPOXYDECANE	02404-44-6	OTS	1 0
1019	EPOXYDODECANE(1,2-)	02855-19-8	OTS	1 0
1020	EPOXYHEPTADECANE	22092-38-2	OTS	1 0
1021	EPOXYHEXADECANE(1,2-)	07320-37-8	OTS	1 0
1022	EPOXYNONADECANE(1,2-)	67860-04-2	OTS	1 0
1023	EPOXYOCTADECANE(1,2-)	07390-81-0	OTS	1 0
1024	EPOXPENTADECANE(1,2-)	18833-25-5	OTS	1 0
1025	EPOXYPROPANAL OLEATE, 2,3-	05431-33-4	OTS	1 0
1026	EPOXYTETRADECANE(1,2-)	03234-28-4	OTS	1 0
1027	ERGOCALCIFEROL	00050-14-6	AC	1 0
1028	ERGOTAMINE TARTRATE	00379-79-3	AC	1 0
1029	ETHANEXULFONYL CHLORIDE, 2-CHL	01622-32-8	AC	1 0
1030	ETHANOL, 1,2-DICHLORO-, ACETA	10140-87-1	AC	1 0
1031	ETHANOL-2-O(2,4-DIAMINOPHENOXY	66422-95-5	OTS	1 0
1032	ETHOXY-M-PHENYLENEDIAMINE SULF	68015-98-5	OTS	1 0
1033	ETHOXYMETHYL BUTANEDIAC ACID	5-130-49-9	OTS	1 0
1034	ETHYL CHLOROFORMATE	00541-41-3	NJ	1 0
1035	ETHYL ETHER	00060-29-7	HSL	1 0
1036	ETHYL GLYCIDATE	04660-80-4	OTS	1 0
1037	ETHYL GLYCIDYL ETHER	04016-11-9	OTS	1 0
1038	ETHYL THOCYANATE	00542-90-5	AC	1 0
1039	ETHYLBIS(2-CHLOROETHYL)AMINE	00538-07-8	AC	1 0
1040	ETHYLENE	00074-85-1	NJ	1 0
1041	ETHYLENE BIS(OXYETHYLENE) DIAC	00011-21-7	OTS	1 0
1042	ETHYLENE FLUOROXYDRIN	00371-62-0	AC	1 0
1043	ETHYLENEDIAMINETETRA(METHYLENE	01429-50-1	OTS	1 0
1044	ETHYLENEDIAMINETETRA(METHYLENE	68188-96-5	OTS	1 0
1045	ETHYLENEDIAMINETETRA(PHOSPHONI	15142-96-8	OTS	1 0
1046	ETHYLHEXANOIC ACID	00149-57-5	OTS	1 0
1047	ETHYLHEXANOL, 2-	00104-76-7	OTS	1 0
1048	ETHYLHEXYL DIPHENYL PHOSPHATE	01241-94-7	OTS	1 0
1049	ETHYLMERCURIC PHOSPHATE	02335-25-8	AC	1 0
1050	ETHYLTOLUENE (MIXED ISOMERS)	25550-14-5	OTS	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1051	ETRIDIAZOLE	02593-15-9	OPP	1 0
1052	FENAMINPHOS	22224-92-6	AC	1 0
1053	FENARIMOL	60168-88-9	OPP	1 0
1054	FENITROTHION	00122-14-5	AC	1 0
1055	FENSULFOTHION	00115-90-2	AC	1 0
1056	FENURON	00101-42-8	SF	1 0
1057	FENURON TCA	04482-55-7	SF	1 0
1058	FERRIC AMMONIUM CITRATE	01185-57-5	HSL	1 0
1059	FERRIC AMMONIUM OXALATE	02944-67-4	HSL	1 0
1060	FERRIC AMMONIUM OXALATE	55488-87-4	HSL	1 0
1061	FERRIC CHLORIDE	07705-08-0	HSL	1 0
1062	FERRIC FLUORIDE	07783-50-8	HSL	1 0
1063	FERRIC NITRATE	10421-48-4	HSL	1 0
1064	FERRIC SULFATE	10028-22-5	HSL	1 0
1065	FERROCENE, ACETYL	01271-55-2	OTS	1 0
1066	FEROUS AMMONIUM SULFATE	10045-89-3	HSL	1 0
1067	FEROUS CHLORIDE	07758-94-3	NJ	1 0
1068	FEROUS SULFATE	07782-63-0	HSL	1 0
1069	FLUENETIL	04301-50-2	AC	1 0
1070	FLUOROACETYL CHLORIDE	00359-06-8	AC	1 0
1071	FLUOROALKENES	00075-02-5	OTS	1 0
1072	FLUOROALKENES	00116-14-3	OTS	1 0
1073	FLUOROALKENES	00818-92-8	OTS	1 0
1074	FLUOROALKENES	01691-13-0	OTS	1 0
1075	FLUOROALKENES	01184-60-7	OTS	1 0
1076	FLUOROALKENES	01630-78-0	OTS	1 0
1077	FLUOROALKENES	00359-11-5	OTS	1 0
1078	FLUOROALKENES	01630-77-9	OTS	1 0
1079	FLUOROURACIL	00051-21-8	AC	1 0
1080	FLURIDONE	59756-60-4	OPP	1 0
1081	FONOFOS	00944-22-9	AC	1 0
1082	FORMALDEHYDE CYANOHYDRIN	00107-16-4	AC	1 0
1083	FORMAMIDE	00075-12-7	OTS	1 0
1084	FORMETANATE	23422-53-9	AC	1 0
1085	FORMOTHION	02540-82-1	AC	1 0
1086	FORMPARANATE	17702-57-7	AC	1 0
1087	FOSTHIETAN	21548-32-3	AC	1 0
1088	FUBERIDAZOLE	03878-19-1	AC	1 0
1089	FUMARIC ACID	00110-17-8	HSL	1 0
1090	FURFURAL	00098-01-1	HSL	1 0
1091	GALLIUM TRICHLORIDE	13450-90-3	AC	1 0
1092	GLYCIDIC ACID, 3-METHYL-3-PHEN	00077-83-8	OTS	1 0
1093	GLYCIDOL	00556-52-5	OTS	1 0
1094	GLYCIDYHLDODECANOIC ACID	63978-73-4	OTS	1 0
1095	GLYCIDYL ACETATE	06387-89-9	OTS	1 0
1096	GLYCIDYL ACRYLATE	00106-90-1	OTS	1 0
1097	GLYCIDYL LAURATE	01984-77-6	OTS	1 0
1098	GLYCIDYL METHACRYLATE	00106-91-2	OTS	1 0
1099	GLYCOL ETHERS	00111-15-9	OTS	1 0
1100	HEAVY CATALYTIC CRACKED NAPHTH	64741-54-4	OTS	1 0
1101	HEAVY NAPHTHENIC DISTILLATE	64742-52-5	OTS	1 0
1102	HEPTACHLOROSTYRENE	61593-44-0	OTS	1 0
1103	HEPTANE	00142-82-5	SAR	1 0
1104	HEXACHLOROCYCLOHEXANE ISOMERS	00608-73-1	HSL	1 0
1105	HEXACHLOROCYCLOPENTANTENE	00074-47-4	RR1	1 0
1106	HEXACHLORONORBORNADIENE	03389-71-7	OTS	1 0
1107	HEXAFLUOROISOBUTYLENE	00382-10-5	OTS	1 0
1108	HEXAFLUOROPROPYLENE OXIDE	00428-59-1	OTS	1 0
1109	HEXAMETHYLENEDIAMINE, N,N-DIBU	04835-11-4	AC	1 0
1110	HEXANE	28182-81-2	OTS	1 0
1111	HEXAZINONE	51235-04-2	OPP	1 0
1112	HYDRAZINE SULFATE	10034-93-2	NJ	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1113 HYDROBROMIDE	00133-57-3	OTS	1	0
1114 HYDRODESULFURIZED KEROSENE	64742-81-0	OTS	1	0
1115 HYDROGEN PEROXIDE (>52%)	07722-84-1	AC	1	0
1116 HYDROGEN SELENIDE	07783-07-5	AC	1	0
1117 HYDRODESULFURIZED MIDDLE DIST	64742-80-9	OTS	1	0
1118 HYDROXYLAMINE AND ITS SALT	05470-11-1	OTS	1	0
1119 HYDROXYLAMINE AND ITS SALT	10046-00-1	OTS	1	0
1120 HYDROXYLAMINE AND ITS SALT	10039-54-0	OTS	1	0
1121 HYDROXYLAMINE AND ITS SALT	07803-49-8	OTS	1	0
1122 HYDROXYLAMINE,0-(3-CHLORO-2-PR	82244-86-8	OTS	1	0
1123 INDOMETHACIN	00053-86-1	AC	1	0
1124 IRGACURE	71868-10-5	OTS	1	0
1125 IRGANOX 1920	80387-97-9	OTS	1	0
1126 IRIIDIUM TETRACHLORIDE	10025-97-5	AC	1	0
1127 IRON	07439-89-6	GWL	1	0
1128 IRON, PENTACARBONYL	13463-40-6	AC	1	0
1129 ISOBENZAN	00297-78-9	AC	1	0
1130 ISOBUTYL ACETATE	00110-19-0	HSL	1	0
1131 ISOBUTYRALDEHYDE	00078-84-2	NJ	1	0
1132 ISOBUTYRIC ACID	00079-31-2	HSL	1	0
1133 ISOBUTYRONITRILE	00078-82-0	OTS	1	0
1134 ISOCYANIC ACID, 3,4-DICHLOROPH	00102-36-3	AC	1	0
1135 ISODECYL DIPHENYL PHOSPHATE	29761-21-5	OTS	1	0
1136 ISOOCTYL ISODECYL PHTALATE	00119-06-2	OTS	1	0
1137 ISOPHORONE DIISOCYANATE	04098-71-9	AC	1	0
1138 ISOPRENE	00078-79-5	HSL	1	0
1139 ISOPROPANOL BIPHENYL	25640-78-2	OTS	1	0
1140 ISOPROPANOLAMINEDODECYLBENZENE	42504-46-1	HSL	1	0
1141 ISOPROPYL ALCOHOL	00067-73-0	NJ	1	0
1142 ISOPROPYL CHLOROFORMATE	00108-23-6	AC	1	0
1143 ISOPROPYL FORMATE	00625-55-8	AC	1	0
1144 ISOPROPYL GLYCIDYL ETHER	04016-14-2	OTS	1	0
1145 ISOPROPYLMETHYLPRAZOLYL DIMETH	00119-38-0	AC	1	0
1146 ISOPROPYLPHENYLDIPHENYL PHOSPH	28108-99-8	OTS	1	0
1147 ISOPROPYLTOLUENE (P-)	00099-87-6	OPP	1	0
1148 KANEB	12427-38-2	NJ	1	0
1149 KEROSENE	08008-20-6	OTS	1	0
1150 LACTONITRILE	00078-97-7	AC	1	0
1151 LAURYL GLYCIDYL ETHER	02461-18-9	OTS	1	0
1152 LEAD	61789-51-3	OTS	1	0
1153 LEAD ARSEDNATE	07784-40-9	HSL	1	0
1154 LEAD ARSENATE	07645-25-2	HSL	1	0
1155 LEAD ARSENATE	10102-48-4	HSL	1	0
1156 LEAD CHLORIDE	07758-95-4	HSL	1	0
1157 LEAD FLUORIDE	07783-46-2	HSL	1	0
1158 LEAD FLUOROBORATE	13814-96-5	HSL	1	0
1159 LEAD IODIDE	10101-63-0	HSL	1	0
1160 LEAD NITRATE	10099-74-8	HSL	1	0
1161 LEAD STEARATE	56189-09-4	HSL	1	0
1162 LEAD STEARATE	52652-59-2	HSL	1	0
1163 LEAD STEARATE	07428-48-0	HSL	1	0
1164 LEAD STEARATE	01072-35-1	HSL	1	0
1165 LEAD SULFATE	07446-14-2	HSL	1	0
1166 LEAD SULFATE	15739-80-7	HSL	1	0
1167 LEAD SULFIDE	01314-87-0	HSL	1	0
1168 LEAD THIOCYANATE	00592-87-0	HSL	1	0
1169 LEPTOPHOS	21609-90-5	AC	1	0
1170 LEWISITE	00541-25-3	AC	1	0
1171 LIGHT NAPATHENIC DISTILLATE	64742-53-6	OTS	1	0
1172 LIGHT PARAFFINIC DISTILLATE SO	64742-05-8	OTS	1	0
1173 LIGHT PARAFFINIC DISTILLATES	64741-50-0	OTS	1	0
1174 LITHIUM CHROMATE	14307-35-8	HSL	1	0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1175 LITHIUM HYDRIDE	07580-67-8	AC	1	0
1176 MAGNESIUM	07439-95-4	GWL	1	0
1177 MALEIC ACID	00110-16-7	HSL	1	0
1178 MALEIC ANHYDRIDE	0018-31-6	HSL	1	0
1179 MANGANESE, TRICARBONYL METHYCY	12108-13-3	AC	1	0
1180 MELAMINE	00108-78-1	NJ	1	0
1181 MEPHOSFOLAN	00950-10-7	AC	1	0
1182 MERCAPTOBENZOTHAZOLE	00149-30-4	OTS	1	0
1183 MERCAPTOBENZOTHAZOLE(2-) DISU	00120-78-5	OTS	1	0
1184 MERCURIC ACETATE	01600-27-7	AC	1	0
1185 MERCURIC NITRATE	10045-94-0	HSL	1	0
1186 MERCURIC OXIDE	21908-53-2	AC	1	0
1187 MERCURIC SULFATE	07783-35-9	HSL	1	0
1188 MERCURIC THIOCYANATE	00592-85-8	HSL	1	0
1189 MERCURIN CYANIDE	00592-04-1	HSL	1	0
1190 MERCUROUS NITRATE	10415-75-5	HSL	1	0
1191 MERCUROUS NITRATE	07782-86-7	HSL	1	0
1192 MERPHOS	00150-50-5	OPP	1	0
1193 MESITYL OXIDE	00191-79-7	OTS	1	0
1194 METHACROLEIN DIACETATE	10476-95-6	AC	1	0
1195 METHACRYLIC ANHYDRIDE	00760-93-0	AC	1	0
1196 METHACRYLOYL CHLORIDE	00920-46-7	AC	1	0
1197 METHACRYLOYLOXYETHYL ISOCYANAT	30674-80-7	AC	1	0
1198 METHAMIDOHPOS	10265-92-6	AC	1	0
1199 METHANESULFONYL FLUORIDE	00558-25-8	AC	1	0
1200 METHIDATHION	00950-37-8	AC	1	0
1201 METHOXYETHANOL, 2-	00109-86-4	NJ	1	0
1202 METHOXYETHYLMERCURIC ACETATE	00151-38-2	AC	1	0
1203 METHYL 2-CHLOROACRYLATE	00080-63-7	AC	1	0
1204 METHYL CARBAMATE	00598-55-0	OTS	1	0
1205 METHYL CHLORIDE	00075-87-3	OWS	1	0
1206 METHYL DISULFIDE	00624-92-0	AC	1	0
1207 METHYL ETHYL KETOXIME	00096-29-7	OTS	1	0
1208 METHYL GLYCIDOL ETHER	00930-37-0	OTS	1	0
1209 METHYL ISOTHIOCYANATE	00556-61-6	AC	1	0
1210 METHYL N-BUTYL KETONE	00591-76-6	OTS	1	0
1211 METHYL PARAXON	00950-35-6	OPP	1	0
1212 METHYL PHENAKAPTON	03735-23-7	AC	1	0
1213 METHYL PHOSPHONIC DICHLORIDE	00676-97-1	AC	1	0
1214 METHYL THIOCYANATE	00556-64-9	AC	1	0
1215 METHYL VINYL KETONE	00078-94-4	AC	1	0
1216 METHYL-PHENYLGLYCIDIC ACID, 3-	05669-15-8	OTS	1	0
1217 METHYLACETONITRILE, 2-	00075-86-5	H2O	1	0
1218 METHYLCYCLOPENTANE	00096-37-7	OTS	1	0
1219 METHYLDIPHENYL PHOSPHATE	00115-89-9	OTS	1	0
1220 METHYLMERCURIC DICYANAMIDE	00502-39-6	AC	1	0
1221 METHYLOLUREA	01000-82-4	OTS	1	0
1222 METHYLTRICHLOROSILANE	00075-79-6	AC	1	0
1223 METOLACHLOR	51218-45-2	OPP	1	0
1224 METOLCARB	01129-41-5	AC	1	0
1225 METRIBUZIN	21087-64-9	OPP	1	0
1226 METRIBUZIN DA	35045-02-4	OPP	1	0
1227 METRIBUZIN DADK	56507-37-0	OPP	1	0
1228 METRIBUZIN DK	52236-30-3	OPP	1	0
1229 MGK 264	00113-48-4	OPP	1	0
1230 MICHLER'S KEYTONE	00090-94-8	NJ	1	0
1231 MOLINATE	02212-67-1	OPP	1	0
1232 MOLYBDENUM	07439-98-7	SAR	1	0
1233 MOLYBDENUM TRIOXIDE	01313-27-5	NJ	1	0
1234 MONOBUTYL ETHER	09038-95-3	OTS	1	0
1235 MONOCROTOPHOS	06923-22-4	AC	1	0
1236 MONOETHYLAMINE	00075-04-7	HSL	1	0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1237 MONOMETHYLAMINE	00074-89-5	HSL	1	0
1238 MONURON	00150-68-5	SF	1	0
1239 MONURON TCA	00140-41-0	SF	1	0
1240 MORPHOLINE	00110-91-8	OTS	1	0
1241 MOTRO;PTROACETOC ACID	00139-13-9	NJ	1	0
1242 N-BUTYLBENZENE	00104-51-8	OPP	1	0
1243 N-DECYL, N-HEXYL PHTHALATE	25724-58-7	OTS	1	0
1244 N-NITROSODIETHANOLAMINE	01116-54-7	H2O	1	0
1245 N-NITROSOSARCOSINE	13256-22-9	RR1	1	0
1246 N-PENTANE	00109-66-0	SAR	1	0
1247 NALCO 7811	42262-66-8	OTS	1	0
1248 NALED	00300-76-5	HSL	1	0
1249 NAPHTHENIC ACID	01338-24-5	HSL	1	0
1250 NAPROPAMIDE	15299-99-7	OPP	1	0
1251 NICKEL AMMONIUM SULFATE	15699-18-0	HSL	1	0
1252 NICKEL CHLORIDE	07718-54-9	HSL	1	0
1253 NICKEL CHLORIDE	37211-05-5	HSL	1	0
1254 NICKEL HYDROXIDE	12054-13-3	AC	1	0
1255 NICKEL NITRATE	14216-75-2	HSL	1	0
1256 NICKEL OXIDE	01313-99-1	OTS	1	0
1257 NICKEL SULFATE	07786-81-4	HSL	1	0
1258 NITRATES/NITRITES	14797-55-8	SAR	1	0
1259 NITRO-O-ANISIDINE, 5-	00099-59-2	NJ	1	0
1260 NITRO-4-BROMOANILINE(2-)	00875-51-4	OTS	1	0
1261 NITRO-5-CHLOROANILINE(2-)	01635-61-6	OTS	1	0
1262 NITROANILINE HYDROCHLORIDE(4-)	15873-51-5	OTS	1	0
1263 NITROBIPHENYL, 4-	00092-93-3	NJ	1	0
1264 NITROCYCLOHEXANE	01122-60-7	AC	1	0
1265 NITROFEN	01836-75-5	NJ	1	0
1266 NITROGEN DIOXIDE	10544-72-6	HSL	1	0
1267 NITROGEN MUSTARD N-OXIDE AND	00302-70-5	RR1	1	0
1268 NITROGEN OXIDE	10024-97-2	OTS	1	0
1269 NITROPHENOL, M-	00554-84-7	HSL	1	0
1270 NITROQUINOLINE-1-OXIDE 4	00056-57-5	RR1	1	0
1271 NITROSODIPHENYLAMINE, P-	00156-10-5	NJ	1	0
1272 NITROTLUENE, M-	00099-08-1	HSL	1	0
1273 NITROTOLUENE	01321-12-6	HSL	1	0
1274 NITROTOLUENE, O-	00088-72-2	HSL	1	0
1275 NITROTOLUENE, P-	00099-99-0	HSL	1	0
1276 NONYLPHENOL	00104-40-5	OTS	1	0
1277 NONYLPHENOL	25154-52-3	OTS	1	0
1278 NONYLPHENOL(4-)	00136-83-4	OTS	1	0
1279 NORBORMIDE	00991-42-4	AC	1	0
1280 NORFLURAZON	27314-13-2	OPP	1	0
1281 OCTAMETHYLCYCLOTETRASILOXANE	00556-67-2	OTS	1	0
1282 OCTANE	00111-65-9	SAR	1	0
1283 OCTYL DIPHENYL PHOSPHATE	00115-88-8	OTS	1	0
1284 OLEYLAMINE	00112-90-3	OTS	1	0
1285 OROTIC ACID	00065-86-1	AC	1	0
1286 OSMIUM	07440-04-2	GWL	1	0
1287 OUABAIN	00630-60-4	AC	1	0
1288 OXETANE, 3,3,-BIS(CHLOROMETHYL	00078-71-7	AC	1	0
1289 OZONE	10028-15-6	AC	1	0
1290 Octachlorostyrene	29082-74-4	OTS	1	0
1291 P-TERT-BUTYLPHENOL PHOSPHATE	00078-33-1	OTS	1	0
1292 PARAFORMALDEHYDE	30525-89-4	HSL	1	0
1293 PARAQUAT	01910-42-5	AC	1	0
1294 PARAQUAT METHOSULFATE	02074-50-2	AC	1	0
1295 PEBULATE	01114-71-2	OPP	1	0
1296 PENTABORANE	19624-22-7	AC	1	0
1297 PENTABROMOETHYLBENZENE	00085-22-3	OTS	1	0
1298 PENTADECYLAMINE	02570-26-5	AC	1	0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1299	PENTADIENE, 1,3-	00504-60-9	HSL	1 0
1300	PENTANEDIONE(2,4-)	00123-54-6	OTS	1 0
1301	PEPERDINYOX(1-),2,2,6,6-TETRA	02564-83-2	OTS	1 0
1302	PETROLEUM DISTILLATES	64741-44-2	OTS	1 0
1303	PETROLEUM NAPHTHA	64741-66-8	OTS	1 0
1304	PHENOL, 2,2'-THIOBIS (4-DICHO	00097-18-7	AC	1 0
1305	PHENOL, 2,2'-THIOBIS[4-CHLORO	04418-66-0	AC	1 0
1306	PHENOL,3-(1-METHYLETHYL)-METHY	00064-00-6	AC	1 0
1307	PHENOXARSINE, 10,10'-OXYDI-	00058-36-6	AC	1 0
1308	PHENOXYETHANOL(2-)	00122-99-6	OTS	1 0
1309	PHENYL GLYCIDOL EHTER	00122-60-1	OTS	1 0
1310	PHENYLACETATE	00103-45-7	OTS	1 0
1311	PHENYLENEDIAMINE SULFATE(M-)	00541-70-8	OTS	1 0
1312	PHENYLENEDIAMINE	25265-76-3	RR1	1 0
1313	PHENYLENEDIAMINE 2,5-DICHLORO	20103-09-7	OTS	1 0
1314	PHENYLENEDIAMINE DIHYDROCDHLOR	00624-18-0	OTS	1 0
1315	PHENYLENEDIAMINE DIHYDROCHLORI	00615-28-1	OTS	1 0
1316	PHENYLENEDIAMINE HYDROCHLORIDE	00541-69-5	OTS	1 0
1317	PHENYLENEDIAMINE SULFATE(P-)	16245-77-5	OTS	1 0
1318	PHENYLENEDIAMINE(M-),4-CHLORSU	68239-80-5	OTS	1 0
1319	PHENYLENEDIAMINE, 2-CHLORODIHY	00615-46-3	OTS	1 0
1320	PHENYLENEDIAMINE, 2-NITRO(P-)	06219-71-2	OTS	1 0
1321	PHENYLENEDIAMINE, 2-NITRO-(P-)	05307-14-2	OTS	1 0
1322	PHENYLENEDIAMINE, 4-BUTYL-(O-)	03663-23-8	OTS	1 0
1323	PHENYLENEDIAMINE, 4-CHLORO	00095-83-0	OTS	1 0
1324	PHENYLENEDIAMINE, 4-CHLORO-(M-	05131-60-2	OTS	1 0
1325	PHENYLENEDIAMINE, 4-ETHOXY-(O-	01197-37-1	OTS	1 0
1326	PHENYLENEDIAMINE, 4-METHOXYL-	00614-94-8	OTS	1 0
1327	PHENYLENEDIAMINE, 4-NITRO	00099-56-9	OTS	1 0
1328	PHENYLENEDIAMINE, 4-NITRO	00992-59-6	OTS	1 0
1329	PHENYLENEDIAMINE, 4-NITRO-(M-)	05131-58-8	OTS	1 0
1330	PHENYLENEDIAMINE, 5-NITRO-(M-)	05042-55-7	OTS	1 0
1331	PHENYLENEDIAMINE,2-NITRO(M-)	06219-67-6	OTS	1 0
1332	PHENYLENEDIAMINE,2-NITRODIHYDR	18266-52-9	OTS	1 0
1333	PHENYLENEDIAMINE,4-NITROSULFAT	06219-77-8	OTS	1 0
1334	PHENYLETHANOL	00060-12-8	OTS	1 0
1335	PHENYLGLYCIDIC ACID, 3-, ETHYL	00121-39-1	OTS	1 0
1336	PHENYLHYDRAZIN HYDROCHLORIDE	00059-68-1	AC	1 0
1337	PHENYLPHENOL, 2-	00090-43-7	NJ	1 0
1338	PHENYLSILATRANE	02097-19-0	AC	1 0
1339	PHOSACETIM	04104-14-7	AC	1 0
1340	PHOSFOLAM	00947-02-4	AC	1 0
1341	PHOSMET	00732-11-6	AC	1 0
1342	PHOSPHAMIDON	13171-21-6	AC	1 0
1343	PHOSPHONOTHIOIC ACID, METHYL-	50782-69-9	AC	1 0
1344	PHOSPHONOTHIOIC ACID, METHYL	02665-30-7	AC	1 0
1345	PHOSPHONOTHIOIC ACID, METHYL-,	02703-13-1	AC	1 0
1346	PHOSPHORIC ACID, DIMETYL 4-MET	03254-63-5	AC	1 0
1347	PHOSPHORIC ACID,1-METHYL-ETHYL	60763-39-5	OTS	1 0
1348	PHOSPHORUS PENTACHLORIDE	10026-13-8	AC	1 0
1349	PHOSPHORUS PENTASULFIDE	01314-80-3	HSL	1 0
1350	PHOSPHORUS PENTOXIDE	01314-56-3	AC	1 0
1351	PHTHALIMIDE	00085-41-6	OTS	1 0
1352	PHTHALIMIDE	00055-41-6	OTS	1 0
1353	PHYLLUQUINONE	00084-80-0	AC	1 0
1354	PHYSOSTIGMINE	00057-47-6	AC	1 0
1355	PHYSOSTIGMINE,SALICYLATEW(1:1)	00057-64-7	AC	1 0
1356	PICLORAM	01918-02-1	OPP	1 0
1357	PICRIC ACID	00088-89-1	NJ	1 0
1358	PICROTOXIN	00124-87-8	AC	1 0
1359	PIPERIDINE	00110-89-4	AC	1 0
1360	PIPOTAL	05281-13-0	OTS	1 0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1361 PLATINOUS CHLORIDE	10025-65-7	AC	1	0
1362 PLATINUM TETRACHLORIDE	13454-96-1	AC	1	0
1363 PLUTONIUM	07440-07-5	SAR	1	0
1364 POLYBROMINATEDBIPHENYLS	0000000000	SAR	1	0
1365 POTASSIUM	07440-09-7	GWL	1	0
1366 POTASSIUM ARSENATE	07784-41-0	HSL	1	0
1367 POTASSIUM BICHROMATE	07778-50-9	HSL	1	0
1368 POTASSIUM CHROMATE	07789-00-6	HSL	1	0
1369 POTASSIUM HYDROXIDE	01310-58-3	HSL	1	0
1370 POTASSIUM PERMANGANATE	07722-64-7	HSL	1	0
1371 PRIIMIFOS-ETHYL	23505-41-1	AC	1	0
1372 PROMECARB	02631-37-0	AC	1	0
1373 PROPACHLOR	01918-16-7	OPP	1	0
1374 PROPANAL,3,3,3-TRIFLUORO-	00460-40-2	OTS	1	0
1375 PROPANETRIOL(1,2,3-)	25038-04-4	OTS	1	0
1376 PROPANIL	00709-98-8	OPP	1	0
1377 PROPARGITE	02312-35-8	HSL	1	0
1378 PROPARGYL BROMIDE	00106-96-7	AC	1	0
1379 PROPIOM-LDEHYDE	00123-37-6	NJ	1	0
1380 PROPIONIC ACID	00079-09-4	HSL	1	0
1381 PROPIONIC ANHYDRIDE	00123-62-6	HSL	1	0
1382 PROPIONITRILE	00107-12-0	AC	1	0
1383 PROPYL CHLOROFORMATE	00109-61-5	AC	1	0
1384 PROPYLBENZENE(N-)	00103-65-1	OPP	1	0
1385 PROPYLENEL GLYCOL, ALLYL EHTER	01331-17-5	AC	1	0
1386 PROPYLTHIOURACIL	00051-52-5	RR1	1	0
1387 PROTHOATE	02275-18-5	AC	1	0
1388 PYRETHRINS	00121-21-1	HSL	1	0
1389 PYRETHRINS	00121-29-9	HSL	1	0
1390 PYRETHRINS	08003-34-7	HSL	1	0
1391 PYRIDINE, 2-METYHL-5-VINYL-	00140-76-1	AC	1	0
1392 PYRIDINE, 4-NITRO, 1-OXIDE	01124-33-0	AC	1	0
1393 PYRIMINIL	53558-25-1	AC	1	0
1394 PYRROLIDINONE (2-), 1-ETHENYL	00088-12-0	OTS	1	0
1395 RADIUM AND COMPOUNDS	07440-14-4	SAR	1	0
1396 RADON AND COMPOUNDS	10043-92-2	SAR	1	0
1397 RDX (CYCLONITE)	00121-82-4	SAR	1	0
1398 RESORCINOL DIGLYCIDYL ETHER	00101-90-6	OTS	1	0
1399 RHODIUM TRICHLORIDE	10049-07-7	AC	1	0
1400 SALCOMINE	14167-18-1	AC	1	0
1401 SARIN	00107-44-8	AC	1	0
1402 SEBUTYLAMINE	13952-84-6	HSL	1	0
1403 SEBUTYLAMINE	00512-49-5	HSL	1	0
1404 SEC-BUTYLBENZENE	00135-20-6	NJ	1	0
1405 SECBUMETON	00000-00-0	SF	1	0
1406 SECBUTYL ACETATE	00105-46-4	HSL	1	0
1407 SELENIOS ACID	07783-00-8	HSL	1	0
1408 SELENIUM DIOXIDE	07446-08-4	HSL	1	0
1409 SELENIUM DISULFIDE	07488-56-4	HSL	1	0
1410 SELENIUM OXYCHLORIDE	07791-23-3	AC	1	0
1411 SELENIUM SULFIDE	56093-45-9	RR1	1	0
1412 SELENOUS ACID	07738-00-8	AC	1	0
1413 SEMICARBAZIDE HYDROCHLORIDE,4-	00563-41-7	AC	1	0
1414 SIDURON	01982-49-6	SF	1	0
1415 SILANE A-1100	00919-30-2	OTS	1	0
1416 SILANE, (4-AMINOBTYL)DIETHYLO	03037-72-7	AC	1	0
1417 SILANE, A-187	02530-83-8	OTS	1	0
1418 SILANE, METHYLOXIMINO-	22984-54-9	OTS	1	0
1419 SILANE, TETRAOXIMINO-	34206-40-1	OTS	1	0
1420 SILICATE, MICA	12001-26-2	OTS	1	0
1421 SILVER NITRATE	07661-88-8	HSL	1	0
1422 SIMETRYN	01014-70-6	OPP	1	0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1423 SLIVEX ESTERS	32534-95-5	HSL	1	0
1424 SODIUM ANTHRAQUINONE-1-SULFONA	00128-56-3	AC	1	0
1425 SODIUM BICHROMATE	10588-01-9	HSL	1	0
1426 SODIUM BIFLUORIDE	01333-83-1	HSL	1	0
1427 SODIUM BISULFITE	07631-90-5	HSL	1	0
1428 SODIUM CACODYLATE	00124-65-2	AC	1	0
1429 SODIUM CHROMATE	07775-11-3	HSL	1	0
1430 SODIUM DODECYLBENZENE SULFONAT	25155-31-0	HSL	1	0
1431 SODIUM FLUORIDE	07681-49-4	HSL	1	0
1432 SODIUM HYDROSULFIDE	16721-80-5	HSL	1	0
1433 SODIUM HYPOCHLORITE	10022-70-5	HSL	1	0
1434 SODIUM HYPOCHLORITE	07681-52-9	HSL	1	0
1435 SODIUM METHYLATE	00124-41-4	HSL	1	0
1436 SODIUM N-METHYL-N-OLEYLTAURINE	00137-20-2	OTS	1	0
1437 SODIUM NITRITE	07632-00-0	HSL	1	0
1438 SODIUM PENTACHLORPHENATE	00131-52-2	AC	1	0
1439 SODIUM PHOSPHATE, DIBASIC	07558-79-4	HSL	1	0
1440 SODIUM PHOSPHATE, TRIBASIC	07601-54-9	HSL	1	0
1441 SODIUM SELENATE	13410-01-0	AC	1	0
1442 SODIUM SELENITE	07782-82-3	HSL	1	0
1443 SODIUM SULFATE	07757-82-6	NJ	1	0
1444 SODIUM TELLURITE	10102-20-2	AC	1	0
1445 STIROFOS	22248-79-9	OPP	1	0
1446 STROBANE	08001-50-1	SF	1	0
1447 STRONTIUM	07440-24-6	SAR	1	0
1448 STRONTIUM CHROMATE	07789-06-2	HSL	1	0
1449 STRYCHNINE, SULFATE	00060-41-3	AC	1	0
1450 STYRENE OXIDE	00096-09-3	NJ	1	0
1451 SULFIDE	18496-25-8	GWL	1	0
1452 SULFOXIDE, 3-CHLOROPROPYL OCTY	03569-57-1	AC	1	0
1453 SULFUR MONOCHLORIDE	12771-08-3	HSL	1	0
1454 SULFUR TETRAFLUORIDE	07783-60-0	AC	1	0
1455 SULFUR TRIOXIDE	07446-11-9	AC	1	0
1456 SULFURIC ACID, CADMIUM SALT	10124-36-4	OTS	1	0
1457 T AMINES, 2,4,5-	02008-46-0	HSL	1	0
1458 T ESTERS. 2,4,5-	00093-79-8	HSL	1	0
1459 T SALTS, 2,4,5-	13560-99-1	HSL	1	0
1460 TABUN	00077-81-6	AC	1	0
1461 TEBUTHIURON	34014-18-1	OPP	1	0
1462 TELLURIUM	13494-80-9	AC	1	0
1463 TELLURIUM HEXAFLUORIDE	07783-80-4	AC	1	0
1464 TERBACIL	05902-51-2	OPP	1	0
1465 TERBUTHYLAZINE	05915-41-3	SF	1	0
1466 TERBUTRYN	00886-50-0	OPP	1	0
1467 TEREPHTHALIC ACID	00100-21-0	NJ	1	0
1468 TERT-BUTYLBENZENE	00098-06-6	OPP	1	0
1469 TERTBUTYL ACETATE	00540-88-5	HSL	1	0
1470 TETRABROMOBISPHENOL A	00079-94-7	OTS	1	0
1471 TETRACHLOROANILINE(2,3,5,6-)	03481-20-7	OTS	1	0
1472 TETRACHLOROBENZENAMINE(2,3,4,5	00634-83-3	OTS	1	0
1473 TETRACHLOROPROPENES	20559-85-9	OTS	1	0
1474 TETRACHLOROPROPENES	10436-39-2	OTS	1	0
1475 TETRACHLORVINPHOS	00961-11-5	NJ	1	0
1476 TETRAETHYLIN	00597-64-8	AC	1	0
1477 TETRAMETHYL LEAD	00075-74-1	AC	1	0
1478 TETRANITROANILINE(2,3,4,6-)	03698-54-2	OTS	1	0
1479 THALLIUM (1) CARBONATE	29809-42-5	RR1	1	0
1480 THALLIUM SELENITE	12039-52-0	RR1	1	0
1481 THALLIUM SULFATE	10031-59-1	AC	1	0
1482 THALLOUS MALONATE	02757-18-8	AC	1	0
1483 THIOCARBAZIDE	02231-57-4	AC	1	0
1484 THIOCYANIC ACID, 2-(BENZOTHAZ	21564-17-0	AC	1	0



## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1485 THIODIANILINE 4,4'-	00139-65-1	NJ	1	0
1486 THIOMETON	00640-15-3	AC	1	0
1487 THIONAZIN	00297-97-2	AC	1	0
1488 THIOUREA, (2-METHYLPHENYL)	00614-78-8	AC	1	0
1489 THORIUM AND COMPOUNDS	07440-29-1	SAR	1	0
1490 THORIUM DIOXIDE	01314-20-1	NJ	1	0
1491 TITANIUM DIOXIDE	13463-67-7	NJ	1	0
1492 TMBP(1,1,3,3-)	00140-66-9	OTS	1	0
1493 TOLUENE 2,4-DIISOCYANATE	00548-84-9	AC	1	0
1494 TRANS-HEPTACHLOROSTYRENE	29086-38-2	OTS	1	0
1495 TRANS-PERMETHRIN	51877-74-8	OPP	1	0
1496 TRI-P-CRESYL PHOSPHATE	00078-32-0	OTS	1	0
1497 TRIADEMEFON	43121-43-3	OPP	1	0
1498 TRIAMINPHOS	01031-47-6	AC	1	0
1499 TRIAZIQUINONE	00068-76-8	NJ	1	0
1500 TRIAZOPHOS	24017-47-8	AC	1	0
1501 TRIBROMOANILINE(2,4,6-)	00147-82-0	OTS	1	0
1502 TRIBUTYL PHOSPHATE	00126-73-8	OTS	1	0
1503 TRICHLOROPHENOL, 3,4,5-	00609-19-6	HSL	1	0
1504 TRICHLORO(CHLOROMETHYL)SILANE	01558-21-4	AC	1	0
1505 TRICHLORO(DICHLOROPHENYL)SILAN	27137-85-5	AC	1	0
1506 TRICHLOROACETYL CHLORIDE	00076-02-8	AC	1	0
1507 TRICHLOROANILINE(2,3,4-)	00634-67-3	OTS	1	0
1508 TRICHLOROANILINE(2,4,5-)	00636-30-6	OTS	1	0
1509 TRICHLOROANILINE(2,4,6-)	00634-93-5	OTS	1	0
1510 TRICHLOROBENZEN (1,2,3-)	00087-61-6	OPP	1	0
1511 TRICHLOROETHYLSILANE	00115-21-9	AC	1	0
1512 TRICHLOROFRIFLUOROETHANE	00000-00-0	OTS	1	0
1513 TRICHLORONATE	00327-98-0	AC	1	0
1514 TRICHLOROPHENOL	25167-82-2	HSL	1	0
1515 TRICHLOROPHENOL, 2,3,4-	15950-66-0	HSL	1	0
1516 TRICHLOROPHENOL, 2,3,5-	00933-78-8	HSL	1	0
1517 TRICHLOROPHENOL, 2,3,6-	00933-75-5	HSL	1	0
1518 TRICHLOROPHENYLSILANE	00098-13-5	AC	1	0
1519 TRICRESYL PHOSPHATE (0-)	00078-30-8	OTS	1	0
1520 TRICRESYL PHOSPHATE PHTHALENE	01330-78-5	OTS	1	0
1521 TRICYCLAZOLE	41814-78-2	OPP	1	0
1522 TRIESTER WITH GLYCEROL	00106-81-0	OTS	1	0
1523 TRIETHANOLAMINE DODECYLBENZENE	27323-14-7	HSL	1	0
1524 TRIETHOXYSILANE	00998-30-1	AC	1	0
1525 TRIETHYL PHOSPHATE	00078-40-0	OTS	1	0
1526 TRIETHYL PHOSPHOROTHIOATE (0,0	00126-68-1	RR1	1	0
1527 TRIETHYLAMINE	00121-44-8	HSL	1	0
1528 TRIETHYLENE GLYCOL DIGLYCIDYL	01954-28-5	OTS	1	0
1529 TRIETHYLENE GLYCOL MONOBUTYL	00143-22-6	OTS	1	0
1530 TRIETHYLENE GLYCOL, MONOETHYL	00112-50-5	OTS	1	0
1531 TRIETHYLENE GLYCOL, MONOMETHYL	00112-35-6	OTS	1	0
1532 TRIMETHYLAMINE	00075-50-3	HSL	1	0
1533 TRIMETHYLCHLOROSILANE	00075-77-4	AC	1	0
1534 TRIMETHYLOLPROPANE PHOSPHITE	00824-11-3	AC	1	0
1535 TRIMETHYLTIN CHLORIDE	01066-45-1	AC	1	0
1536 TRINITROANILINE(2,4,6-)	00489-98-5	OTS	1	0
1537 TRINITROPHENYLMETHYLNITRAMINE	00479-45-8	SAR	1	0
1538 TRIPHENYL PHOSPHATE	00115-86-6	OTS	1	0
1539 TRIPHENYL PHOSPHITE	00101-02-0	OTS	1	0
1540 TRIPHENYLTIN CHLORIDE	00639-58-7	AC	1	0
1541 TRIS(1-AZIRIDINYL)PHOSPHINE SU	00052-24-4	RR1	1	0
1542 TRIS(2-CHLOROETHYL)AMINE	00555-77-1	AC	1	0
1543 TRIS(2-CHLOROETHYL)PHOSPHITE	00140-08-9	OTS	1	0
1544 TRIS(2-ETHYLHEXYL)TRIMELLITATE	03319-31-1	OTS	1	0
1545 TRIS(ISOPROPYLPHENYL)	26967-76-0	OTS	1	0
1546 TRIS(P-(2,3-EPOXY PROPOXY)PHEN	06130-72-9	OTS	1	0

## Appendix B (continued)

REC # / CHEMICAL	CASNUM	SOURCE	P1*	P2*
1547 TRITIUM	10028-17-8	SAR	1	0
1548 TRIX(2,6-XYLENYL) PHOSPHATE	00121-06-2	OTS	1	0
1549 UF RESINS	68611-64-3	OTS	1	0
1550 UF RESINS	09011-05-6	OTS	1	0
1551 URANIUM AND COMPOUNDS	07440-61-1	SAR	1	0
1552 URANYL ACETATE	00541-09-3	HSL	1	0
1553 URANYL NITRATE	36478-76-9	HSL	1	0
1554 URANYL NITRATE	10102-06-4	HSL	1	0
1555 VALINOMYCIN	02001-95-8	AC	1	0
1556 VANADIC ACID, AMMONIUM SALT	13718-26-8	RR1	1	0
1557 VANADYL SULFATE	27774-13-6	HSL	1	0
1558 VINYL BROMIDE	00593-60-2	NJ	1	0
1559 VINYL NORBORNENE	03048-64-4	AC	1	0
1560 WARFARIN SODIUM	00129-06-6	AC	1	0
1561 XYLENE DICHLORIDE	28347-13-9	AC	1	0
1562 XYLENES (TOTAL)	00133-02-7	SF	1	0
1563 XYLENOL	01300-71-6	HSL	1	0
1564 XYLIDINE, 2,6	00087-62-7	NJ	1	0
1565 ZINC ACETATE	00557-34-6	HSL	1	0
1566 ZINC AMMONIUM CHLORIDE	52628-25-8	HSL	1	0
1567 ZINC AMMONIUM CHLORIDE	14639-97-5	HSL	1	0
1568 ZINC AMMONIUM CHLORIDE	14639-98-6	HSL	1	0
1569 ZINC BORATE	01332-07-6	HSL	1	0
1570 ZINC BROMIDE	07699-45-8	HSL	1	0
1571 ZINC CARBONATE	03486-35-9	HSL	1	0
1572 ZINC CHLORIDE	07646-85-7	HSL	1	0
1573 ZINC FLUORIDE	07783-49-5	HSL	1	0
1574 ZINC FORMATE	00557-41-5	HSL	1	0
1575 ZINC HYDROSULFITE	07779-86-4	HSL	1	0
1576 ZINC NITRATE	07779-88-6	HSL	1	0
1577 ZINC OXIDE	01314-13-2	OTS	1	0
1578 ZINC PHENOLSULFATE	00127-82-2	HSL	1	0
1579 ZINC SILICOFLUORIDE	16871-71-9	HSL	1	0
1580 ZINC SULFATE	07733-02-0	HSL	1	0
1581 ZINC, DICHLORO(4,4-DIMETHYLAM	58270-08-9	AC	1	0
1582 ZIRCONIUM NITRATE	13746-89-9	HSL	1	0
1583 ZIRCONIUM POTASSIUM FLUORIDE	16923-95-8	HSL	1	0
1584 ZIRCONIUM SULFATE	14644-61-2	HSL	1	0
1585 ZIRCONIUM TETRACHLORIDE	10026-11-6	HSL	1	0

\* The chemicals are ranked using a main prioritization as well as a subprioritization. The main prioritization (P1) was determined by the number of Program Offices which listed that chemical on one or more lists. The subprioritization (P2) was derived by subtracting the main prioritization number from the total number of lists on which the chemical appeared. Thus, formaldehyde, for example, received a rating of 5.(P1) 3.(P2) because it appeared on 8 lists from 5 different Program Offices. This scoring system provided a means of ranking chemicals that were listed by the same number of Program Offices (i.e., had identical P1 ratings), and reduced the likelihood of bias toward any particular Program Office as a result of multiple listings of chemicals by that office.

## APPENDIX C

## COMPOUNDS KNOWN TO FORM ADDUCTS

RECNO	COMPOUND	CAS NUMBER
1	FORMALDEHYDE	00050-00-0
2	MITOMYCIN C	00050-07-7
3	17-BETA ESTRADIOL	00050-28-2
4	BENZO(A)PYRENE	00050-32-8
5	CHLORPROMAZINE	00050-53-3
6	ACTINOMYCIN D	00050-76-0
7	METRIFONATE	00052-68-6
8	ACETYLAMINOFLUORENE, 2-	00053-96-3
9	DIETHYLNITROSAMINE	00055-18-5
10	METHYLCHOLANTHRENE, 3-	00056-49-5
11	DIETHYLSTILBESTROL	00056-53-1
12	NITROQUINOLINE-1-OXIDE, 4-	00056-57-5
13	BETA-PROPIOLACTONE	00057-57-8
14	DIMETHYLBENZANTHRACENE, 7,12-	00057-97-6
15	AMINOAZOBENZENE, 4-	00060-09-3
16	PROMETHAZINE	00060-87-7
17	ETHYLMETHANESULFONATE	00062-50-0
18	THIOACETAMIDE	00062-55-5
19	DICHLORVOS	00062-73-7
20	DIMETHYLNITROSAMINE	00062-75-9
21	DIETHYLSULFATE	00064-67-5
22	METHYLMETHANESULFONATE	00066-27-3
23	CHLOROFORM	00067-66-3
24	N-NITROSO-N-METHYL-N'-NITROGUANIDINE	00070-25-7
25	BENZENE	00071-43-2
26	CHLOROMETHANE	00074-87-3
27	VINYL CHLORIDE	00075-01-4
28	ETHYLENE OXIDE	00075-21-8
29	BROMOFORM	00075-25-2
30	1,1-DICHLOROETHANE	00075-34-3
31	PROPYLENE OXIDE	00075-56-9
32	DIMETHYL SULFATE	00077-78-1
33	DIMETHYLCARBAMYL CHLORIDE	00079-44-7
34	DIETHYLCARBAMYL CHLORIDE	00081-10-8
35	NAPHTHALENE, 2-	00091-59-8
36	AMINOBIIPHENYL, 4-	00092-67-1
37	BENZIDINE	00092-87-5
38	METHYLEUGENOL	00093-15-2
39	SAFROLE	00094-59-7
40	TOLUDINE, O-	00095-53-4
41	STYRENE	00100-42-5
42	BENZYL CHLORIDE	00100-44-7
43	NITROSOPIPERADINE	00100-75-4
44	METHYLENEBIS(O-CHLOROANILINE)	00101-14-4
45	ANETHOLE	00104-46-1
46	EPICHLOROHYDRIN	00106-89-8
47	DIBROMOETHANE, 1,2-	00106-93-4

## APPENDIX C (Continued)

RECNO	COMPOUND	CAS NUMBER
48	BROMO-2-CHLOROETHANE, 1-	00107-04-0
49	DICHLOROETHANE, 1,2-	00107-06-2
50	ACRYLONITRILE	00107-13-1
51	DICHLORODIETHYLEETHER, 2,2'-	00111-44-4
52	PROPENE	00115-07-1
53	ISOSAFROLE	00120-58-1
54	TRIS(2,3-DIBROMOPROPYL)PHOSPHAT	00126-72-7
55	ESTRAGOLE	00140-67-0
56	DINITROSOPIPERAZINE	00140-79-4
57	MELPHALAN	00148-82-3
58	ALLYL BENZENE	00300-57-2
59	HYDRAZINE	00302-01-2
60	MONOCROTALINE	00315-22-0
61	ACETYLAMINO-4'-FLUOROBIPHENYL,4-	00398-32-3
62	ELEMICIN	00487-11-6
63	ANGELICIN	00523-50-2
64	DILL APIOL	00523-80-8
65	PARSLEY APIOL	00523-80-8
66	DIMETHYLHYDRAZINE, 1,2-	00540-73-8
67	VINYL BROMIDE	00593-60-2
68	MYRISTICIN	00607-91-0
69	N-NITROSO-N-METHYLURETHANE	00615-53-2
70	N-NITROSO-DI-N-N-PROPYLAMINE	00621-64-7
71	N-METHYL-4-AMINOAZOBENZENE	00621-90-9
72	N-METHYL-N-NITROSOUREA	00684-93-5
73	ETHYLNITROSOUREA	00759-73-9
74	GLYCIDALDEHYDE	00765-34-4
75	1-N-PROPYL-1-NITROSOUREA	00816-57-9
76	TRANS-4-ACETYLAMINOSTILBENE	00841-18-9
77	N,N-BUTYL-N-NITROSOUREA	00869-01-2
78	DIHYDRO-11-METHYLCYCLOPENTA- (A)PHENANTHRENE-17-ONE,	00892-17-1
79	NITROSOPIRROLINE	00930-55-2
80	N-NITROSOMETHYLBENZYLAMINE	00937-40-6
81	PROPANE SULTONE, 1,3-	01120-71-4
82	AFLATOXIN B1	01162-65-8
83	NITROSO-2,6-DIMETHYLMORPHOLINE	01456-28-6
84	N-BUTYLMETHANESULFONATE	01912-32-9
85	1-(2-CHLOROETHYL)-1-NITROSOUREA	02365-30-2
86	METHYLCHRYSENE, 5-	03697-24-3
87	TRIMETHYLPSORALEN	03902-71-4
88	ACETYLAMINOBIIPHENYL, 4-	04075-79-0
89	ACETYLAMINOPHENANTHRENE, 2-	04120-77-8
90	ANTHRAMYCIN	04803-27-4
91	DIBENZO(A,E)FLUORANTHENE	05385-75-1
92	NITROPYRENE, 1-	05522-43-0
93	HYDROXYLAMINE	07803-49-8
94	STERIGMATOCYSTIN	10048-13-2

## APPENDIX C (Continued)

RECNO	COMPOUND	CAS.NUMBER
95	NITROSOMETHYLMETHYLAMINE	10595-95-6
96	SIBIROMYCIN	12684-33-2
97	1-CHLOROETHYL-3-CYCLOHEXYL-1-NITROSOUREA	13010-47-4
98	ETHIONINE	13073-35-3
99	DIMETHYL-4-AMINOBIHENYL, 3,2'	13394-86-0
100	1-(2-FLUOROETHYL)-3-CYCLOHEXYL-1-NITROSOUREA	13908-93-5
101	TRANS-DIAMMINEDICHLOROPLATINUM	14913-33-8
102	CISPLATIN	15663-27-1
103	N-NITROSONORNICOTINE	16543-55-8
104	GYROMITRIN	16568-02-8
105	1-NITROSO-5,6-DIHYDROURACIL	16813-36-8
106	STREPTOZOTOCINE	18883-66-4
107	N-BENZYL-2-NITRO-1-IMIDAZOLEACETAMIDE	22994-85-0
108	ADRIAMYCIN	23214-92-8
109	BROMOMETHYLBENZANTHRACENE, 7-	24961-39-5
110	Z-ETHYL ONN AZOXYMETHANE	25843-45-2
111	ETHYLNITROSOGUANIDINE	29169-14-0
112	TOMAMYCIN	35050-55-6
113	N-NITROSO-2-OXOPROPYLAMINE	39603-54-8
114	DINITROPYRENE, 1,8-	42397-65-9
115	NITROSOBIS(2-HYDROXYPROPYL)AMINE	53609-64-6
116	N-NITROSOBIS(2-OXOPROPYL)AMINE	60599-38-4
117	NITROSO(2-HYDROXYPROPYL)(2-OXOPROPYL)-AMINE	61499-28-3
118	ANTHROYLOXIRANE, 9-	61695-73-6
119	AMINO-1-METHYL-5H-PYRIDO(4,3-B)INDOLE, 3-	62450-07-1
120	N-NITROSOMETHYL(4-METHYLBENZYL)AMINE	62783-50-0
121	4-(METHYLNITROSAMINO)-1-(3-PYRIDYL)-1-BUTANONE	64091-91-4
122	1-(2-CHLOROETHYL)-3-(CIS-2-HYDROXY)CYCLOHEXYL-1-NI	66052-62-8
123	AMINO-6-METHYLDIPYRIDO(1,2-A:3')IMIDAZOLE, 2-	67730-11-4
124	AZABENZO(A)PYRENE-4,5-OXIDE, 10-	67977-01-9
125	CC-106569866-21-3	
126	METHYLISOPSORALEN, 5-	73459-03-7
127	2-AMINO-3-METHYLIMIDAZO(4,5-F)QUINOLINE	76180-96-6
128	MITOZOLAMIDE	85622-95-3
129	1-CHLOROETHYL(METYLSULFONYL)ETHANESULFONATE	88343-72-0
130	N-(2-OXOPROPYL)-N-NITROSOUREA	89837-93-4
131	N-NITROSO-N-ACETOXY-N-2-OXOPROPYLAMINE	89837-94-5

## APPENDIX D

## PRIORITIZED CHEMICALS OF INTEREST TO THE EPA KNOWN OR SUSPECTED TO FORM ADDUCTS

REC #	COMPOUND	CAS NUMBER	SOURCE <sup>1</sup>	P1	P2	
M U	1	BENZENE	00071-43-2	AIR, GWL, HSL, NJ, OPP, OTS, RR1, RWL, SF	6.	3.
+ *	2	VINYL CHLORIDE	00075-01-4	AIR, GWL, HSL, NJ, OPP, OTS, RR1, SF	6.	2.
+ *	3	FORMALDEHYDE	00050-00-0	ACUTE, AIR, H2O, HSL, NJ, OTS, RR1, RWL	5.	3.
+ *	4	ETHYLENE OXIDE	00075-21-8	ACUTE, AIR, GWL, HSL, NJ, OTS, RR1, RWL	5.	3.
+ *	5	ETHYLENE DICHLORIDE	00107-06-2	AIR, GWL, HSL, NJ, OPP, RR1, RWL, SF	5.	3.
+ *	6	CHLOROFORM	00067-66-3	ACUTE, AIR, GWL, HSL, NJ, RR1, RWL, SF	4.	4.
-	7	CHLOROMETHANE	00074-87-3	GWL, HSL, NJ, OTS, RR1, RWL, SF	4.	3.
*	8	TRIBROMOMETHANE	00075-25-2	GWL, HSL, NJ, OPP, OSW, RR1, SF	4.	3.
-	9	NITROSODIMETHYLAMINE, N-	00062-75-9	ACUTE, GWL, HSL, NJ, OTS, RR1	4.	2.
*	10	1,1-DICHLOROETHANE	00075-34-3	GWL, HSL, OPP, OSW, RR1, SF	4.	2.
+ *	11	STYRENE	00100-42-5	AIR, GWL, HSL, NJ, OPP, SF	4.	2.
•	12	DIBROMOETHANE, 1,2-	00106-93-4	GWL, HSL, NJ, OPP, RR1, RWL	4.	2.
-	13	N-NITROSODIETHYLAMINE	00055-18-5	GWL, HSL, NJ, OTS, RR1	4.	1.
-	14	GLYCIDALDEHYDE	00765-34-4	H2O, HSL, OTS, OSW, RR1	4.	1.
*	15	ACRYLONITRILE	00107-13-1	ACUTE, GWL, HSL, NJ, OTS, RR1, RWL	3.	4.
*	16	DICHLOROETHYL ETHER	00111-44-4	ACUTE, GWL, HSL, NJ, RR1, RWL, SF	3.	4.
M U	17	BENZO(A)PYRENE	00050-32-8	GWL, HSL, RR1, RWL, SF	3.	2.
M *	18	BENZIDINE	00092-87-5	GWL, HSL, NJ, RR1, RWL	3.	2.
+ *	19	EPICHLOROHYDRIN	00106-89-8	ACUTE, HSL, NJ, OTS, RR1	3.	2.
-	20	HYDRAZINE	00302-01-2	ACUTE, H2O, HSL, NJ, RR1	3.	2.
-	21	PROPYLNITROSAMINE, DI-N-	00621-64-7	GWL, HSL, NJ, RR1, SF	3.	2.
•	22	ACETAMIDE, N-9H-FLUOREN-2-YL	00053-96-3	GWL, HSL, NJ, RR1	3.	1.
M •	23	METHYLCHOLANTHRENE, 3-	00056-49-5	GWL, HSL, RR1, RWL	3.	1.
M •	24	BENZ(A)ANTHRACENE, 7,12-DIMETHYL	00057-97-6	GWL, HSL, RR1, RWL	3.	1.
*	25	PROPYLENE OXIDE	00075-56-9	ACUTE, AIR, NJ, OTS	3.	1.
•	26	NAPHTHYLAMINE, 2-	00091-59-8	GWL, HSL, NJ, RR1	3.	1.
U	27	SAFROLE	00094-59-7	GWL, HSL, NJ, RR1	3.	1.
U •	28	NITROSOPIPERIDINE, N-	00100-75-4	GWL, HSL, NJ, RR1	3.	1.
+ *	29	METHYLENEBIS (2-CHLOROANILINE) 4,4'	00101-14-4	GWL, HSL, NJ, RR1	3.	1.
U	30	ISOSAFROLE	00120-58-1	GWL, HSL, OSW, RR1	3.	1.
•	31	TRIS(2,3-DIBROMOPROPYL) PHOSPHATE	00126-72-7	GWL, HSL, NJ, RR1	3.	1.
M *	32	AMINOBIPHENYL, 4-	00092-67-1	GWL, NJ, RR1	3.	0.
T	33	3 MELPHALAN	00148-82-3	H2O, HSL, RR1	3.	0.
•	34	DIMETHYLHYDRAZINE, 1,2-	00540-73-8	H2O, HSL, RR1	3.	0.
U	35	NITROSOPYRROLIDINE, N-	00930-55-2	GWL, HSL, RR1	3.	0.
-	36	CARBAMIC ACID, METHYLNITROSO-, ETHYL ESTER	00615-53-2	H2O, HSL, RR1,	3.	0.
-	37	DIMETHYL SULFATE	00077-78-1	ACUTE, HSL, NJ, RR1	2.	2.
T	38	THIOACETAMIDE	00062-55-5	HSL, NJ, RR1	2.	1.
-	39	DICHLORVOS	00062-73-7	ACUTE, HSL, OPP	2.	1.

## APPENDIX D. (Continued)

REC #	COMPOUND	CAS.NUMBER	SOURCE <sup>1</sup>	P1	P2
+ *	40	DIMETHYLCARBAMOYL CHLORIDE	00079-44-7 HSL,NJ,RR1	2.	1.
*	41	BENZYL CHLORIDE	00100-44-7 ACUTE,HSL,RR1	2.	1.
-	42	N-NITROSO-N-ETHYLUREA	00759-73-9 HSL,NJ,RR1	2.	1.
-	43	PROPANE SULTONE, 1,3-	01120-71-4 HSL,NJ,RR1	2.	1.
•	44	DIETHYLSTILBESTROL	00056-53-1 HSL,RR1	2.	0.
-	45	ETHYLMETHANESULFONATE	00062-50-0 HSL,RR1	2.	0.
-	46	METHYLMETHANESULFONATE	00066-27-3 GWL,RR1	2.	0.
-	47	METHYL-N'-NITRO-N- NITROSOGUANIDINE, N	00070-25-7 HSL,RR1	2.	0.
U	48	PROPYLENE	00115-07-1 AIR,NJ	2.	0.
	49	N-NITROSOMETHYL- ETHYLEAMINE	10595-95-6 GWL,RR1	2.	0.
M *	50	N-NITROSONORNICOTINE	16543-55-8 NJ,RR1	2.	0.
-	51	STREPTOZOTOCIN	18883-66-4 HSL,RR1	2.	0.
-	52	TRICLOROPHON	00052-68-6 ACUTE,HSL,NJ	1.	2.
-	53	CARBAMIDE, N-METHYL- N-NITROSO	00684-93-5 HSL,NJ,RR1	1.	2.
-	54	BETA-PROPIOLACTONE	00057-57-8 ACUTE,NJ	1.	1.
*	55	TOLUIDINE, O-	00095-53-4 NJ,RR1	1.	1.
•	56	NITROQUINOLINE-1-OXIDE, 4-	00056-57-5 RR1	1.	0.
T	57	MITOMYCIN C	00050-07-7 ACUTE	1.	0.
•	58	AMINOAZOBENZENE, 4-	00060-09-3 NJ	1.	0.
-	59	DIETHYL SULFATE	00064-67-5 NJ	1.	0.
	60	BROMO(1-),2-CHLOROETHANE	00107-04-0 OTS	1.	0.
	61	VINYL BROMIDE	00593-60-2 NJ	1.	0.
+ *	62	AFLATOXIN B1	01162-65-8 RR1	1.	0.
-	63	HYDROXYLAMINE AND ITS SALT	07803-49-8 OTS	1.	0.

<sup>1</sup> See Appendix A for complete definition of sources.

+ Indicates those chemicals that have a fair amount of adduct research established to support their selection as potential candidates.

\* Indicates those chemicals that were thought to have good probability of finding well-defined exposed populations.

+ \* Represents candidate chemicals with supportive adduct research data as well as a good probability of finding well-defined exposed populations.

- Represents chemicals that were initially eliminated due to difficulty in analysis identification resulting from chemicals that alkylate DNA or proteins via methyl or ethyl groups, induce methylation by other mechanisms, or form small adducts. Some of these chemicals were reconsidered later.

• Refers to those chemicals eliminated due to a nonexistent or relatively small exposed population or no available clear population data.

U Indicates those chemicals that were considered to be so ubiquitous in nature as to confound any useful relationship between exposure source and health effects.

M Refers to chemicals that typically occur as a component of mixtures, and for which exposure to the individual agent by itself is rare.

T Designates those chemicals that have been tabled for an alternate study.

## APPENDIX E

## ADDUCT-FORMING CHEMICALS NOT ON EPA LIST

REC #	COMPOUND	CAS NUMBER
1	17-BETA ESTRADIOL	00050-28-2
2	CHLORPROMAZINE	00050-53-3
3	ACTINOMYCIN D	00050-76-0
4	PROMETHAZINE	00060-87-7
5	DIETHYLCARBAMYL CHLORIDE	00081-10-8
6	METHYLEUGENOL	00093-15-2
7	ANETHOLE	00104-46-1
8	ESTRAGOLE	00140-67-0
9	DINITROSOPIPERAZINE	00140-79-4
10	ALLYL BENZENE	00300-57-2
11	MONOCROTALINE	00315-22-0
12	ACETYLAMINO-4'-FLUOROBIPHENYL, 4-	00398-32-3
13	ELEMICIN	00487-11-6
14	ANGELICIN	00523-50-2
15	DILL APIOL	00523-80-8
16	PARSLEY APIOL	00523-80-8
17	MYRISTICIN	00607-91-0
18	N-METHYL-4-AMINOAZOBENZENE	00621-90-9
19	1-N-PROPYL-1-NITROSOUREA	00816-57-9
20	TRANS-4-ACETYLAMINOSTILBENE	00841-18-9
21	N,N-BUTYL-N-NITROSOUREA	00869-01-2
22	DIHYDRO-11-METHYLCYCLOPENTA(A) PHENANTHRENE-17-ONE,	00892-17-1
23	N-NITROSOMETHYLBENZYLAMINE	00937-40-6
24	NITROSO-2,6-DIMETHYLMORPHOLINE	01456-28-6
25	N-BUTYLMETHANESULFONATE	01912-32-9
26	1-(2-CHLOROETHYL)-1-NITROSOUREA	02365-30-2
27	METHYLCHRYSENE, 5-	03697-24-3
28	TRIMETHYLPSORALEN	03902-71-4
29	ACETYLAMINOBIIPHENYL, 4-	04075-79-0
30	ACETYLAMINOPHENANTHRENE, 2-	04120-77-8
31	ANTHRAMYCIN	04803-27-4
32	DIBENZO(A,E)FLUORANTHENE	05385-75-1
33	NITROPYRENE, 1-	05522-43-0
34	STERIGMATOCYSTIN	10048-13-2
35	SIBIROMYCIN	12684-33-2
36	1-CHLOROETHYL-3-CYCLOHEXYLL-1-NITROSOUREA	13010-47-4
37	ETHIONINE	13073-35-3
38	DIMETHYL-4-AMINOBIIPHENYL, 3,2'-	13394-86-0
39	1-(2-FLUOROETHYL)-3-CYCLOHEXYLL-1-NITROSOUREA	13908-93-5
40	TRANS-DIAMMINEDICHLOROPLATINUM	14913-33-8
41	CISPLATIN	15663-27-1
42	GYROMITRIN	16568-02-8
43	1-NITROSO-5,6-DIHYDROURACIL	16813-36-8
44	N-BENZYL-2-NITRO-1-IMIDAZOLEACETAMIDE	22994-85-0
45	ADRIAMYCIN	23214-92-8
46	BROMOMETHYLBENZANTHRACENE, 7-	24961-39-5
47	Z-ETHYL OWN AZOXYMETHANE	25843-45-2
48	ETHYLNITROSOGUANIDINE	29169-14-0
49	TOMAMYCIN	35050-55-6
50	N-NITROSO-2-OXOPROPYLAMINE	39603-54-8
51	DINITROPYRENE, 1,8-	42397-65-9
52	NITROSOBIS(2-HYDROXYPROPYL)AMINE	53609-64-6
53	N-NITROSOBIS(2-OXOPROPYL)AMINE	60599-38-4
54	NITROSO(2-HYDROXYPROPYL)(2-OXOPROPYL)-AMINE	61499-28-3
55	ANTHROYLOXIRANE, 9-	61695-73-6
56	AMINO-1-METHYL-5H-PYRIDO(4,3-B)INDOLE, 3-	62450-07-1
57	N-NITROSOMETHYL(4-METHYLBENZYL)AMINE	62783-50-0
58	4-(METHYLNITROSAMINO)-1-(3-PYRIDYL)-1-BUTANONE	64091-91-4
59	1-(2-CHLOROETHYL)-3-(CIS-2-HYDROXY) CYCLOHEXYL-1-NI	66052-62-8
60	AMINO-6-METHYL DIPYRIDO(1,2-A:3')IMIDAZONE, 2-	67730-11-4



## APPENDIX E (Continued)

REC #	COMPOUND	CAS NUMBER
61	AZABENZO(A)PYRENE-4,5-OXIDE, 10-	67977-01-9
62	CC-1065	69866-21-3
63	METHYLISOPSORALEN, 5-	73459-03-7
64	2-AMINO-3-METHYL IMIDAZO(4,5-F)QUINOLINE	76180-96-6
65	MITOZOLAMIDE	85622-95-3
66	1-CHLOROETHYL (METHYLSULFONYL)METHANESULFONATE	88343-72-0
67	N-(2-OXOPROPYL)-N-NITROUREA	89837-93-4
68	N-NITROSO-N-ACETOXY-N-2-OXOPROPYLAMINE	89837-94-5

## APPENDIX F

## CARCINOGENIC CHEMICALS NOT KNOWN TO FORM ADDUCTS

REC.NO.	COMPOUND	CAS NUMBER
1	COKE OVEN EMISSIONS	*****-***.*
2	CONJUGATED ESTROGENS	*****-***.*
3	SOOTS, TARS AND MINERAL OILS	*****-***.*
4	BERYL ORE	*****-***.*
5	CARRAGEENAN	*****-***.*
6	CYCLOPHOSPHAMIDE	00050-18-0
7	DDTd	00050-29-3
8	RESERPINE	00050-55-5
9	PROPYLTHIOURACIL	00051-52-5
10	MECHLORETHAMINE	00051-75-2
11	URETHANE	00051-79-6
12	THIOTEPA	00052-24-4
13	ESTRONE	00053-16-7
14	DIBENZ(A,H)ANTHRACENE	00053-70-3
15	MYLERAN	00055-98-1
16	METHYLTHIOURACIL	00056-04-2
17	CARBON TETRACHLORIDE	00056-23-5
18	BENZ(A)ANTHRACENE	00056-55-3
19	DIMETHYL HYDRAZINE, 1,1-	00057-14-7
20	PHENYTOIN AND SODIUM SALT OF PHENYTOIN	00057-41-0
21	ETHYENYL ESTRADIOL	00057-63-6
22	PROGESTERONE	00057-83-0
23	TESTOSTERONE AND ITS ESTERS	00058-22-0
24	LINDANE AND OTHER ISOMERS OF HEXACHLOROCYCLOHEXANE	00058-8-9
25	PHENOXYBENZAMINE AND ITS HYDRO- CHLORIDE	00059-86-1
26	N-NITROSOMORPHOLINE	00059-89-2
27	DIMETHYLAMINOAZOBENZENE, 4-	00060-11-7
28	NIRIDAZOLE	00061-57-4
29	AMITROLE	00061-82-5
30	PHENACETIN	00062-44-2
31	THIOUREA	00062-56-6
32	URACIL MUSTARD	00066-75-1
33	MESTRANOL	00072-33-3
34	TRYPAN BLUE (COMMERCIAL GRADE)	00072-57-1
35	METHYL IODIDE	00074-88-4
36	PROPYLENEIMINE	00075-55-8
37	SACCHARIN	00081-07-2
38	AMINO-2-METHYLANTHRAQUINONE,1-	00082-28-0
39	TRICHLOROPHENOL, 2,4,6-	00088-06-2
40	ANISIDINE, O- AND O-ANISIDINE.HCL	00090-04-0
41	MICHLER'S KETONE	00090-94-8
42	DICHLOROBENZIDINE, 3,3'-	00091-94-1
43	NITROBIPHENYL 4-	00092-93-3
44	DIHYDROSAFROLE	00094-58-6
45	SULFALLATE	00095-06-7
46	DIAMINOTOLUENE, 2,4-	00095-80-7
47	CHLORO-O-PHENYLENEDIAMINE, 4-	00095-83-0
48	DIBROMO-3-CHLOROPROPANE, 1,2-	00096-12-8
49	ETHYLENE THIOUREA	00096-45-7
50	AMINOAZOTOLUENE, O-	00097-56-3
51	BENZOTRICHLORIDE	00098-07-7
52	NITRO-O-ANISIDINE 5-	00099-59-2
53	METHYLENEDIANILINE 4,4'	00101-77-9
54	DIAMINODIPHENYL ETHER, 4,4'-	00101-81-4
55	CHLOROMETHYL METHYL ETHER (TECH GRADE)	00107-30-2
56	NITROPROPANE, 2-	00108-03-2

## APPENDIX F. (continued)

REC.NO.	COMPOUND	CAS.NUMBER
57	AZASERINE	00115-02-6
58	N-NITROSODIETHANOLAMINE	00116-54-7
59	AMINOANTHRAQUINONE, 2-	00117-79-3
60	DI(2-ETHYLHEXYL)PHTHALATE	00117-81-7
61	HEXACHLOROBENZENE	00118-74-4
62	DIMETHOXYBENZIDINE, 3,3'-	00119-90-4
63	DIMETHYL BENZIDINE, 3,3'-	00119-93-7
64	CRESIDINE, P-	00120-71-8
65	HYDRAZOBENZENE	00122-66-7
66	DIOXANE, 1,4-	00123-91-1
67	METHYL-1-NITROANTHRAQUINONE 2-	00129-15-7
68	CUPFERRON	00135-20-6
69	PHENAZOPYRIDINE AND ITS HYDRO- CHLORIDE	00136-40-3
70	NITRILOTRIACETIC ACID	00139-13-9
71	THIODIANILINE, 4,4'-	00139-65-1
72	5-(MORPHOLINOMETHYL)-3-((5-NITRO- FURFURYLIDENE)-AM	00139-91-3
73	ARAMITE	00140-57-8
74	CHLORDECONE	00143-50-0
75	ETHYLENEIMINE	00151-56-4
76	NITROSODIPHENYLAMINE P-	00156-10-5
77	DIBENZO(A,I)PYRENE	00189-55-9
78	DIBENZO(A,H)PYRENE	00189-64-0
79	DIBENZO(A,L)PYRENE	00191-30-0
80	DIBENZO(A,E)PYRENE	00192-65-4
81	INDENO(1,2,3-CD)PYRENE	00193-39-5
82	DIBENZO(C,G)CARBAZOLE, 7H-	00194-59-2
83	BENZO(J)FLUORANTHENE	00205-82-3
84	BENZO(B)FLUORANTHENE	00205-99-2
85	BENZO(K)FLUORANTHENE	00207-08-9
86	DIBENZ(A,J)ACRIDINE	00224-42-0
87	DIBENZ(A,H)ACRIDINE	00226-36-8
88	METHOXASALEN WITH ULTRAVIOLET A THERAPY (PUVA)	00298-81-7
89	TREOSULFAN	00299-75-2
90	LEAD ACETATE	00301-04-2
91	NITROGEN MUSTARD N-OXIDE	00302-70-5
92	LASIOCARPINE	00303-34-4
93	CHLORAMBUCIL	00305-03-3
94	PROCARBAZINE	00366-70-1
95	OXYMETHOLONE	00434-07-1
96	METRONIDAZOLE	00443-48-1
97	AZATHIOPRINE	00446-86-6
98	AURAMINE	00492-80-8
99	CHLORNAPAZINE	00494-03-1
100	MUSTARD GAS	00505-60-2
101	MERPHALEN	00531-76-0
102	N-(4-(5-NITRO-2-FURYL)-2- THIAZOLYL)ACETAMIDE	00531-82-8
103	BIS(CHLOROMETHYL)ETHER	00542-88-1
104	IDAZOLIDINONE, 1- (5-NITROFURFURYLIDENE)AMINO, 1-	00555-84-0
105	PANFAN S	00556-12-7
106	TOLUENE 2,4-DIISOCYANATE	00584-84-9
107	METHAZOXYMETHANOL	00592-62-1
108	NITRCENAPHTHENE 5-	00602-87-9
109	DIACYL BENZIDINE, N,N'-	00613-35-4
110	HEXATHYLPHOSPHORAMIDE	00680-31-9
111	AMINS-(5-NITRO-2-FURYL)-1,3, 4-THIADIAZOLE, 2-	00712-68-5

## APPENDIX F. (continued)

REC.NO.	COMPOUND	CAS.NUMBER
112	METHLENE BIS(2-METHYLANILINE) 4,4'	00838-88-0
113	N-NITROSODI-N-BUTYLAMINE	00924-16-3
114	BERYLLIUM OXIDE	01304-56-9
115	CADMIUM OXIDE	01306-19-0
116	CADMIUM SULFIDE	01306-23-6
117	THORIUM DIOXIDE	01314-20-1
118	ASBESTOS	01332-21-4
119	LEAD SUBACETATE	01335-32-6
120	DIEPOXYBUTANE	01464-53-5
121	DIETHYL HYDRAZINE, 1,2-	01615-80-1
122	BENZYL VIOLET 4B	01694-09-3
123	2,3,7,8-TCDD	01746-01-6
124	NITROFEN	01836-75-5
125	DIRECT BLACK 38	01937-37-7
126	MIREX	02385-85-5
127	DIRECT BLUE 6	02602-46-2
128	ORANGE OIL SS	02646-17-5
129	BUTYROLACTONE, BETA-	03068-88-0
130	NICKEL CARBONATE	03333-67-3
131	PONCEAU 3R	03564-09-8
132	FORMYLHYDRAZINO-4(5-NITRO- 2FURYL)THIAZOLE	03570-75-0
133	AF-2	03688-53-7
134	PONCEAU MX	03761-53-3
135	NAFENOPIIN	03771-19-5
136	DACARBAZINE	04342-03-4
137	N-NITROSOMETHYLVINYLAMINE	04549-40-0
138	CITRUS RED NO. 2	06358-53-8
139	LEAD	07439-92-1
140	NICKEL	07440-02-0
141	ARSENIC AND COMPOUNDS	07440-38-2
142	BERYLLIUM	07440-41-7
143	CADMIUM	07440-43-9
144	CHROMIUM AND COMPOUNDS	07440-47-3
145	LEAD PHOSPHATE	07446-27-7
146	SELENIUM SULFIDE	07488-56-4
147	BERYLLIUM CHLORIDE	07787-47-5
148	BERYLLIUM FLUORIDE	07787-49-7
149	TOXAPHENE	08001-35-2
150	IRON DEXTRAN COMPLEX	09004-66-4
151	CADMIUM CHLORIDE	10108-64-2
152	CADMIUM SULFATE	10124-36-4
153	NICKEL SUBSULFIDE	12035-72-2
154	NICKEL HYDROXIDE	12054-48-7
155	BERYLLIUM ALUMINUM ALLOY	12770-50-2
156	N-NITROSOSARCOSINE	13256-22-9
157	BERYLLIUM HYDROXIDE	13327-32-7
158	NICKEL CARBONYL	13463-39-3
159	BERYLLIUM SULFATE	13510-49-1
160	BERYLLIUM PHOSPHATE	13598-15-7
161	CYCASIN	14901-08-7
162	ZINC BERYLLIUM SILICATE	15191-85-2
163	DAUNOMYCIN	20830-81-3
164	DICHLORO-4,4'-DIAMINODIPHENYL ETHER, 3,3'-	28434-86-8
165	DIAMINOANISOLE SULFATE, 2,4-	39156-41-7
166	TRANS-2-(DIMETHYLAMINOMETHYLIMINO)5- (2-5-NITRO-2-	55738-54-0
167	TRP-P-1	62450-06-0

## APPENDIX G

## ADDUCT-FORMING CARCINOGENIC CHEMICALS NOT ON EPA LIST

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RECORD	COMPOUND	CAS.NUMBER
1	17-BETA ESTRADIOL	00050-28-
2	ACTINOMYCIN D	00050-76-
3	MONOCROTALINE	00315-22-0
4	METHYLCHRYSENE, 5-	03697-24-
5	STERIGMATOCYSTIN	10048-13-2
6	1-CHLOROETHYL-3-CYCLOHEXYL- 1-NITROSOUREA	13010-47-4
7	GYROMITRIN	16568-02-8
8	ADRIAMYCIN	23214-92-8
9	AMINO-1-METHYL-5H-PYRIDO- (4,3-B)INDOLE, 3-	62450-07-1

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APPENDIX H

NON-ADDUCT-FORMING CHEMICALS SCORED FOR  
AVAILABILITY OF AN EXPOSED POPULATION SUITABLE FOR STUDY.

CHEMICAL	SCORE
NITROUS OXIDE	108
METHYLENE CHLORIDE	72
METHYL BROMIDE	54
2,4-TOLUENE DIISOCYANATE	54
TRICHLOROETHYLENE	54
PERCHLOROETHYLENE	54
PENTACHLOROPHENOL	54
POLYCHLORINATED BIPHENYLS	54
HALOGENATED ANESTHETICS	36
2,4-DICHLOROPHENOXY A	36
ACRYLAMIDE	36
MCPA	24
1,1,1-TRICHLOROETHANE	24
N-NITROSODIPHENYLAMINE	24
ETHYLENE THIOUREA	16
1,3-DICHLOROPROPENE	12
PARA-CRESOL	12
MALATHION	2

## APPENDIX I

## CHEMICALS CHARACTERIZED FOR THEIR POTENTIAL HUMAN EXPOSURE

CAS NUMBER	CHEMICAL	SCORE*
107-13-1	acrylonitrile	108
75-21-8	ethylene oxide	108
-----	nitrous oxide	108
100-42-5	styrene	108
75-01-4	vinyl chloride	108
74-87-3	methyl chloride	72
75-097-2	methylene chloride	72
50-00-0	formaldehyde	54
74-83-94	methyl bromide	54
86-87-5	pentachlorophenol	54
127-18-4	perchloroethylene	54
-----	polychlorinated byphenyls	54
4891-66-1	2,4-toluene diisocyanate	54
79-01-6	trichloroethylene	54
75-35-4	vinylidene chloride	54
106-89-8	epichlorohydrin	48
79-06-1	acrylamide	36
100-44-7	benzyl chloride	36
94-75-7	2,4-D	36
77-78-1	dimethyl sulfate	36
-----	halogenated anesthetics (iso- flurane, enflurane, halothane)	36
301-01-2	hydrazine	36
75-56-9	propylene oxide	36
67-66-3	chloroform	24
86-30-6	N-nitrosodiphenylamine	24
94-74-6	MCPA	24
101-14-4	4,4'-methylenebis(2-chloro- aniline) (MOCA)	24
71-55-6	1,1,1-trichloroethane	24
96-45-7	n,n'-ethylene thiourea	16
542-75-6	1,3-dichloropropene	12
106-44-5	para-cresol	12
95-53-4	o-toluidine	6
121-75-5	malathion	2
107-02-8	acrolein (2-propenal)	0
92-67-1	4-amino-1,1'-biphenyl	0
1162-65-8	aflatoxin b1	0
542-88-1	bis(chloromethyl) ether	0
56-55-3	benz(a)anthracene	0
71-43-2	benzene	0
92-87-5	benzidine	0
50-32-8	benzo(a)pyrene	0
57-57-8	beta-propiolactone	0
1333-86-4	carbon black	0
56-23-57	carbon tetrachloride	0
54-74-9	chlordane	0
53-70-3	dibenz(a,h)anthracene	0
96-12-8	dibromochloropropane (DBCP)	0
79-44-7	dimethylcarbamoyl chloride	0
57-14-7	1,1-dimethylhydrazine	0
106-93-4	ethylene dibromide	0
118-74-1	hexachlorobenzene	0
505-60-2	mustard gas	0
1836-75-5	nitrofen	0
76-01-7	pentachloroethane	0
-----	polybrominated biphenyls	0
96-09-3	styrene oxide	0
93-76-5	2,4,5-T	0
126-72-7	tris(2,3-dibromopropyl)phosphate	0

## Appendix I (continued)

CAS.NUMBER	CHEMICAL	SCORE*
10034-93-2	hydrazine sulfate	N/A
10048-13-2	sterigmatocystin	N/A
101-25-7	dinitrosopentamethylene tetramine	N/A
102-71-6	triethanolamine	N/A
103-23-1	octyl adipate	N/A
106-34-3	quinhydrone	N/A
11006-33-0	phleomycin	N/A
11056-06-7	bleomycin	N/A
11-92-2	dibutylamine	N/A
1120-71-4	propane sultone	N/A
117-81-7	bis(2-ethylhexyl) phthalate	N/A
119-34-6	c.i. oxidation base 25	N/A
119-93-7	tolidine (c.i. azoic diazo component 113)	N/A
1195-67-1	p-(1-aziridiny)-n,n,n',n'- tetramethylphosponic diamide	N/A
1195-69-3	p,p-bis(1-aziridiny)-n,n- dimethylphosphinic amide	N/A
123-33-1	maleic hydrazide	N/A
126-07-8	griseofulvin	N/A
127-07-1	hydroxyurea	N/A
128-44-9	saccharin sodium	N/A
129-49-7	methysergide hydrogen maleate	N/A
13010-47-4	1-(2-chloroethyl)-3-cyclohexyl- 1-nitrosourea	N/A
13056-98-9	1-phenyl-3,3-diethyltriazene	N/A
1306-23-6	c.i. pigment yellow (cadmium sulfide)	N/A
13073-35-3	L-ethionine	N/A
133-06-2	captan	N/A
133-07-3	folpet	N/A
13416-48-3	2-(1-aziridiny)-4,6-dimethoxy- 1,3,5-triazine	N/A
135-20-6	cupferron	N/A
135-49-9	acridine yellow	N/A
136-35-6	diazoaminobenzene	N/A
137-26-8	thiram	N/A
139-13-9	nitriлотriacetic acid	N/A
140-79-4	1,4-dinitrosopiperazine	N/A
1402-68-2	aflatoxins	N/A
14073-00-8	3-methyl-4-nitroquinoline 1-oxide	N/A
141-28-6	ethyl adipate	N/A
142-04-1	aniline hydrochloride	N/A
146-54-3	triflupromazine	N/A
146-59-8	acridine mustard	N/A
1464-53-5	1,2:3,4-diepoxybutane	N/A
147-84-2	diethyldithiocarbamic acid	N/A
147-94-4	cytarabine (cytosine arabinoside)	N/A
148-82-3	melphalan	N/A
151-56-4	ethylenimine	N/A
153-78-6	2-aminofluorene	N/A
15663-27-1	cis-diamine-dichloro- platinum(II)	N/A
1582-09-8	trifluralin	N/A
16427-45-5	diethyl 1,3-propanedisulfonate	N/A
16543-55-8	N-nitrosornicotine	N/A
16672-87-0	(2-chloroethyl)phosphonic acid	N/A



## Appendix I (continued)

CAS NUMBER	CHEMICAL	SCORE*
1836-75-5	2,4-dichlorophenyl-	
	4-nitrophenyl ether	N/A
1897-45-6	tetrachloroisophthalonitrile	N/A
19992-69-9	1-(3-pyridinyl)-3,3-dimethyl-	
	triazene	N/A
205-99-2	benzo(b)fluoranthene	N/A
20830-81-3	daunomycin	N/A
2126-70-7	sodium(z)-3-bromo-4-(4-methoxy-	
	phenyl)-4-oxo-2-butenoic acid	N/A
21739-91-3	cytembena	N/A
21794-01-4	rubratoxin b	N/A
21884-44-6	(-)-luteoskyrin	N/A
22089-22-1	trofosfamide	N/A
2275-81-2	p,p-bis(1-aziridinyl)-n-propyl-	
	phosphinic amide	N/A
23214-92-8	adriamycin (doxorubicin)	N/A
23255-93-8	hycanthone methanesulfonate	N/A
23527-02-5	thuringiensin a	N/A
2425-06-1	captafol	N/A
24280-93-1	mycophenolic acid	N/A
24632-47-1	nifurprazine	N/A
25013-16-5	butylated hydroxyanisole	N/A
2507-27-9	lycurim	N/A
2541-69-7	7-methylbenz(a)anthracene	N/A
25535-16-4	propidium iodide	N/A
2581-34-2	4-nitro-m-cresol	N/A
286-20-4	1,2-epoxycyclohexane	N/A
298-81-7	methoxalen (8-methoxypsoralen)	N/A
302-48-7	p,p-bis(1-aziridinyl)-n-ethyl-	
	phosphinic amide	N/A
302-70-5	nitrogen mustard oxide	
	hydrochloride	N/A
303-34-4	lasiocarpine	N/A
305-03-3	chlorambucil	N/A
3105-97-3	hycanthone	N/A
315-22-0	monocrotaline	N/A
33447-90-4	meso-dimethylbusulfan	N/A
3347-91-5	(+/-)-dimethylbusulfan	N/A
33868-17-6	methylnitrolocyanamide	N/A
3590-07-6	n,n-bis(2-chloroethyl)	
	ethylamine hydrochloride	N/A
366-70-1	procarbazine	N/A
3688-53-7	furylfuramide	N/A
37132-72-3	fotrin	N/A
3778-73-2	ifosfamide	N/A
3817-11-6	n-butyl-n-(4-hydroxybutyl)	
	nitrosamine	N/A
3902-71-4	trioxalene---4,5',8-trimethyl	
	psoralen	N/A
39156-41-7	2,4-diaminoanisole sulfate	N/A
3930-19-6	streptonigrin	N/A
4213-45-0	quinacrine mustard	N/A
4238-92-0	p,p-bis(1-aziridinyl)-n-butyl-	
	phosphinic amide	N/A
443-48-1	metronidazole	N/A
446-86-6	azathioprine	N/A
4685-14-7	paraquat	N/A
477-30-5	demecolcine (colcemid)	N/A
495-48-7	azoxybenzene	N/A
50-07-7	mitomycin c	N/A
50-18-0	cyclophosphamide	N/A

## Appendix I (continued)

CAS. NUMBER	CHEMICAL	SCORE*
50-29-3	p,p'-DDT	N/A
50-53-1	chlorpromazine	N/A
50-76-0	actinomycin D	N/A
500-66-3	olivetol	N/A
50355-74-3	3,3-dimethyl-1-(2,4,6-tri- chlorophenyl)triazene	N/A
50924-49-7	bredinin	N/A
51-18-3	triethylenemelamine	N/A
51-75-2	nitrogen mustard	N/A
51-79-6	urethane	N/A
512-56-1	trimethyl phosphate	N/A
52-24-4	thio-tepa (thiophosphamide)	N/A
523-50-2	angelicin	N/A
53-19-0	mitotane	N/A
53-96-3	2-acetylaminofluorene	N/A
5307-14-2	2-nitro-p-phenylenediamine (c.i. oxidation base 22)	N/A
54-05-7	chloroquine	N/A
54-85-3	isoniazid	N/A
54-88-6	n-methyl-4-(dimethylamino) azobenzene	N/A
540-73-8	1,2-dimethylhydrazine	N/A
54350-48-0	retinoid	N/A
545-55-1	triethylenephosphoramide	N/A
54827-17-7	3,3',5,5'-tetramethyl- benzidine	N/A
55-18-5	diethylnitrosamine	N/A
5522-43-0	1-nitropyrene	N/A
55-86-7	nitrogen mustard hydrochloride	N/A
55-98-1	busulfan	N/A
56-49-5	3-methylcholanthrene	N/A
56-53-1	diethylstilbestrol	N/A
56-75-7	chloramphenicol	N/A
57-13-6	urea	N/A
57-22-7	vincristine	N/A
57-39-6	metepa	N/A
57-44-3	barbital	N/A
577-66-2	8-ethoxycaffeine	N/A
5774-35-6	p,p-bis(1-aziridinyl)-n- isopropyl phosphinic amide	N/A
5781-91-9	o,o-diethyl-2-bis(2-chloroethyl) aminoethylphosphonate	N/A
57-97-6	7,12-dimethylbenzanthracene	N/A
58-40-2	promazine	N/A
58-89-9	gamma-lindane	N/A
589-41-3	hydroxyurethane	N/A
59-05-2	methotrexate	N/A
59-87-0	nitrofurazone	N/A
59-89-2	n-nitrosomorpholine	N/A
592-31-4	butylurea	N/A
592-62-1	methylazoxymethanol acetate	N/A
5957-75-5	delta(8)-trans-tetrahydro- cannabinol	N/A
5977-35-5	3-bis(2-chloroethyl)amino- 4-methylbenzoic acid	N/A
60-11-7	4-dimethylaminoazobenzene	N/A
61-73-4	methylene blue	N/A
614-00-6	n-methyl-n-nitrosoaniline	N/A
615-53-2	methylnitrosourethane	N/A
62-53-3	psoralen	N/A

## Appendix I (continued)

CAS.NUMBER	CHEMICAL	SCORE*
62-75-9	dimethylnitrosamine	N/A
62-55-5	thioacetamide	N/A
6287-61-2	9-allyl-1,3,7-trimethyl uric acid	N/A
6369-59-1	toluene-2,5-diamine sulfate (c.i. oxidation base)	N/A
64-67-5	diethyl sulfate	N/A
64-86-8	colchicine	N/A
65-61-2	acridine orange	N/A
6558-78-7	n-nitrosobutylurethane	N/A
66-81-9	cyclohexamide	N/A
67-20-9	nitrofurantoin	N/A
68-76-8	triaziquone	N/A
680-31-9	hexametapol	N/A
684-93-5	1-methyl-1-nitrosoarea	N/A
69-05-6	quinacrine dihydrochloride	N/A
72-54-8	p,p'-DDD	N/A
72-55-9	p,p'-DDE	N/A
7203-90-9	1-(4-chlorophenyl)-3,3- dimethyltriazene	N/A
7227-91-0	3,3-dimethyl-1-phenyl- triazene	N/A
7239-21-6	1-(4-bromophenyl)-3,3-dimethyl triazene	N/A
75-07-0	acetaldehyde	N/A
759-73-9	1-ethyl-1-nitrosoarea	N/A
7803-49-8	hydroxylamine	N/A
7803-57-8	hydrazine hydrate	N/A
789-02-6	o,p'-DDT	N/A
79-46-9	2-nitropropane	N/A
8048-52-0	acriflavine	N/A
8063-14-7	marihuana	N/A
817-09-4	trimustine	N/A
865-21-4	vinblastine	N/A
869-01-2	1-butyl-1-nitrosoarea	N/A
869-24-9	n-(2-chloroethyl)-n,n- diethylamine	N/A
91-59-8	2-naphthaleneamine	N/A
92-48-8	6-methylcoumarin	N/A
92-52-4	biphenyl	N/A
92-62-6	proflavine	N/A
924-16-3	dibutylnitrosamine	N/A
94-20-2	chlorpropamide	N/A
96-48-0	gamma-butyrolactone	N/A
97-56-3	o-aminoazotoluene (c.i.solvent yellow)	N/A
99-30-9	botran	N/A
99-56-9	4-nitro-o-phenylenediamine	N/A
999-81-5	(2-chloroethyl)trimethyl ammonium chloride	N/A

\* "N/A" indicates chemicals that received no score due to lack of sufficient data.