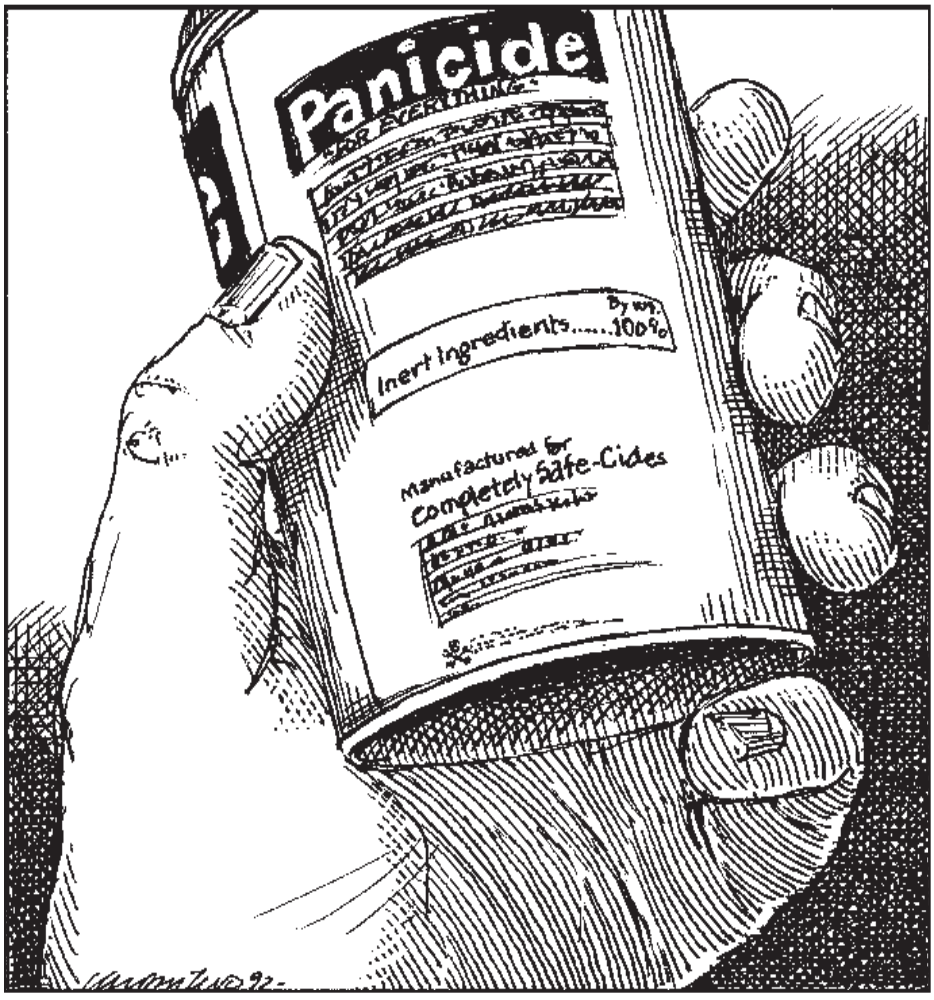
WORST KEPT SECRETS: TOXIC INERT INGREDIENTS IN PESTICIDES



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ABOUT NCAP

This report is published by the Northwest Coalition for Alternatives to Pesticides. NCAP is a nonprofit, five-state regional organization that promotes sustainable resource management, prevention of pest problems, use of alternatives to pesticides, and the right to be free from pesticide exposure. NCAP strives to substantially reduce or eliminate the use of pesticides as a preferred method of pest control in the Northwest and elsewhere.

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DEDICATION

This report could not have been written without the support of Tom Williams. With gratitude.

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EXECUTIVE SUMMARY

Toxic chemicals are used as inert ingredients in pesticide products. Such a statement seems contradictory. How can something be both inert and toxic? Certainly, the *active* ingredients in pesticides are toxic. They are designed specifically to target the pest organism. But how is it that inert ingredients can also be toxic?

Despite the fact that in most contexts the term "inert" is synonymous with benign, such is not the case with pesticides. Simply stated, a pesticidal inert ingredient is any intentionally added substance that is not the active ingredient. In pesticides, "inert" is not meant to connote safety. Rather, it only serves to make a distinction between the active ingredient and everything else in the pesticide product. The consequence of this distinction is that the public is misled into believing that only the active ingredient is of concern. Research conducted by NCAP reveals a different story.

First, at least 394 inert ingredients have been or are registered for use as active ingredients in pesticides. When any of these 394 chemicals are used as an active ingredient, they must be disclosed on the label and subjected to a battery of tests to determine their toxicity. However, when all but one of these chemicals are used as an inert ingredients, they are subject to neither form of regulation. In short, a chemical with known pesticidal properties can be used as an active ingredient or an inert and it will be regulated according to its designation (as an active or an inert) rather than according to its toxicity. The distinction between active and inert is not only misleading, then. It is also arbitrary and the resultant regulatory distinctions are illogical.

Second, the Environmental Protection Agency (EPA), the agency that implements our national pesticide law, and a number of other agencies have classified many chemicals used as inert ingredients as hazardous. For instance, 209 inerts are considered hazardous air and water pollutants, 14 have been assessed as "extremely hazardous," 84 must be reported to the Toxic Chemical Release Inventory, 21 are known or suspected carcinogens, and 127 are regarded as occupational hazards. Here, the distinction between inert and active ingredients becomes dangerous. Members of the public are exposed to hazardous chemicals without their informed consent. Clearly, in this case, ignorance is not bliss.

The remedies for this ignorance are simple. The pesticide product label must contain a complete ingredient statement, one that lists all active and inert ingredients. Furthermore, the entire pesticide product, which includes active and inert ingredients, must be subjected to all of the toxicological and ecological effects testing required for registration with EPA. The current testing program, which rests mostly on the active ingredient, fosters a climate of willful ignorance, one that we can ill afford to maintain.

INTRODUCTION

In 1987, the Environmental Protection Agency (EPA) announced a new policy for regulating inert ingredients in pesticides. The policy's mission was "to reduce the potential for adverse effects from the use of pesticide products containing toxic inert ingredients."[1] Identifying these toxic inerts and encouraging manufacturers to replace them with "least-toxic" alternatives were proposed as important means to achieve this end. Ten years have passed. It's time to assess the progress thus far. Has EPA adequately informed the public about the toxicity of certain inert ingredients? Are toxic chemicals still posing as inert ingredients in pesticides?

The extent to which the inerts policy has gone off-course is the subject of this report. Warnings of danger on the road ahead are not being heeded and, as a consequence, many hazardous inert ingredients still lurk in pesticide products. Of greatest significance, the presence of these toxic inerts in pesticides is not disclosed on the product label in most cases. As a result, pesticide registrants can use a toxic inert in their product and the general public is none the wiser. Indeed, toxic inert ingredients are the pesticide industry's best kept secret. For environmental and public health, however, undisclosed toxins are secrets of the worst kind.

Providing a map that will help EPA to put the inerts policy back on track is the goal of this report. Full disclosure on the pesticide product label of all ingredients and a more accurate toxicity testing program are the recommended routes. The public has a right to know to what chemicals they are being exposed and EPA has an obligation to identify health and environmental hazards associated with exposure to a particular pesticide.

Active ingredient:
One that will "prevent, destroy, repel, or mitigate any pest."

Inert ingredient:
One that "is not active."

--from the Federal Insecticide, Fungicide, and Rodenticide Act

EPA'S INERTS POLICY

Regulation of pesticide inert ingredients is minimal and contrasts sharply with that of active ingredients. While active ingredients must be registered, inert ingredients are merely cleared for use. The processes of registration and clearance are very different.

Registrants of active ingredients are required to pay a fee and to submit data to EPA regarding toxicity, environmental fate, effects on wildlife and nontarget organisms, and other tests. In addition, the identity of active ingredients must be disclosed on product labels.

Prior to 1987, the only testing required for inert ingredients was acute toxicity tests for inerts in food-use pesticides.[2] In 1987 and 1989, EPA stepped up its oversight of inert ingredients.[1,3] Central to their strategy was the establishment of regulatory priorities, as represented by five toxicity categories:

- List 1: Inerts of Toxicological Concern
- List 2: Potentially Toxic Inerts, High Priority for Testing
- List 3: Inerts of Unknown Toxicity
- List 4A: Minimal Risk Inerts
- List 4B: Inerts for which EPA has sufficient information to conclude that their current use patterns will not adversely affect public health or the environment

List 1 inerts were considered top priority and, as a result, EPA initiated a three-pronged approach to reduce their use. First, EPA encouraged registrants to change their formulations to include only those inerts found on Lists 3 and 4. Second, registrants who elected to keep List 1 inerts in their currently registered products had to amend the label to include the following warning statement: "This product contains the toxic inert ingredient (*name of inert*)." Third, new products could not contain List 1 inerts unless the product closely resembled an existing one. Initially, 57 chemicals were on List 1 and criteria for placement on this list included evidence of carcinogenicity, neurotoxicity, and adverse reproductive or ecological effects.

List 2 contained approximately 60 chemicals that EPA believed to be potentially toxic because they were structurally similar to a List 1 toxic inert or because some had data that suggested a basis for concerns about toxicity. Most had been designated for further testing by the National Toxicology Program (NTP) and other agencies, but EPA did not announce any specific testing requirements in 1987.

List 3: Inerts of Unknown Toxicity was the largest list with approximately 800 chemicals. An inert of unknown toxicity was one for which "there was no basis for listing it on any of the other three lists."[1] List 3 (and List 4) inerts were considered low priorities and no regulatory actions were announced.

Lists 4A and 4B have a somewhat complicated history. In 1987, only one list, Inerts of Minimal Concern, existed and it contained approximately 300 chemicals. In 1989, EPA moved all the chemicals that had been on List 4 to a new list, List 4A, and also created List 4B. The identities of chemicals on Lists 4A and 4B were not published until the mid-1990s.[4,5]

It appears that mandating label disclosure of toxic inerts has caused pesticide product registrants to discontinue use of many toxic inerts. List 1 has shrunk from 57 chemicals to eight, meaning that EPA believes 49 former List 1 inerts are no longer used in pesticide products. Unfortunately, other lists have not experienced similar diminishment in number. In fact, the entire list of chemicals used as inerts has grown from approximately 1,200 in 1987 to over 2,500 in 1995.[6] For instance, List 2 has nearly doubled from 67 to 101 chemicals. Forty of them have been on this list since 1987.

Even more significantly, List 3 has more than doubled in size, from approximately 800 to 1,981 chemicals. Clearly, the existence of this many inert ingredients of unknown toxicity that do not have to be disclosed on the label, and for which testing requirements have not been established, constitutes a major loophole for pesticide registrants.

INERTS OF IGNORED TOXICITY

Consider the following: EPA's own Scientific Advisory Panel has classified chlorothalonil as a probable human carcinogen.[7] According to the International Agency for Research on Cancer, coal tar is a known human carcinogen.[8] Under the Clean Air and Clean Water Acts, naphthalene is classified as a hazardous pollutant.[9] Chloropicrin is a severe respiratory tract irritant[10,11] and a restricted use pesticide.[12] 1,1,2,2-Tetrachloroethane must be reported under the Toxic Chemical Release Inventory (TRI).[9] Besides being toxic, these chemicals have three other characteristics in common. They are all:

- Registered for use as active ingredients
- Cleared for use as inert ingredients
- Included on List 3: Inerts of Unknown Toxicity

Obviously, a wide gap exists between knowledge of toxicity and action to protect and inform the public. Unfortunately, there are hundreds of other inerts of ignored toxicity, the subject of the following discussion. Our research shows that 664 of the over 2,500 chemicals used as inerts have been classified as toxic by EPA or other government agencies.

Active Inerts

NCAP has coined the term "active inerts" to refer to those inert ingredients that also have been or are registered for use in pesticide products as active ingredients. In order to find the exact number of active inerts, we compared the 1995 list of inert ingredients[6] with EPA's chemical ingredient database on the World Wide Web[13] and EPA's Register of Lists (RoL) database.[9] Both of these databases provide information about chemicals that are or were registered for use as active ingredients.

As a result of this search, we found 394 active inerts, a number which constitutes 16% of the total number of chemicals used as inerts. (See the appendix for a complete listing of these chemicals.) By definition, active ingredients are designed to have pesticidal activity. Because they are or once were registered as active ingredients, EPA is likely to have toxicity information for many of them. However, the way in which active inerts have been divided among EPA's five lists illustrates just how far off-course the inerts policy has gone.

Two active inerts, phenol and formaldehyde, are on List 1. They are the only two active inerts that must be disclosed on the label as toxic when they are used as inerts. Thirty active inerts are on List 2, among them toluene and xylene, two chemicals whose toxicity has been well documented by the Agency for Toxic Substances and Disease Registry (ATSDR).[14,15] A total of 86 active inerts are spread across Lists 4A and 4B. Inexplicably, 276 active inerts, 70% of the total, are secreted away on List 3: Inerts of Unknown Toxicity. (See Figure 1.)

Eleven of the active inerts on List 3 have also been classified as restricted use pesticides, among them chloropicrin, chlorothalonil, and coal tar.[12] (See appendix.) The number of active inerts and restricted use pesticides buried in List 3 undermines public confidence in pesticide labels and in EPA's ability to assess the toxicity of inerts in a timely manner.

Figure 1
EPA's Classification of Inerts Also Used as Active Ingredients

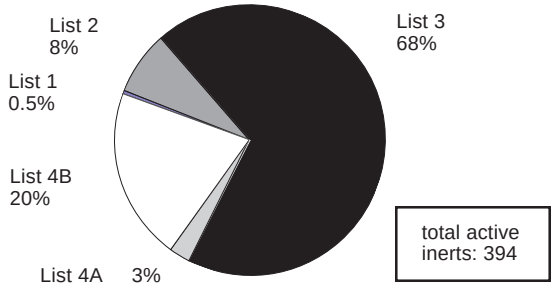
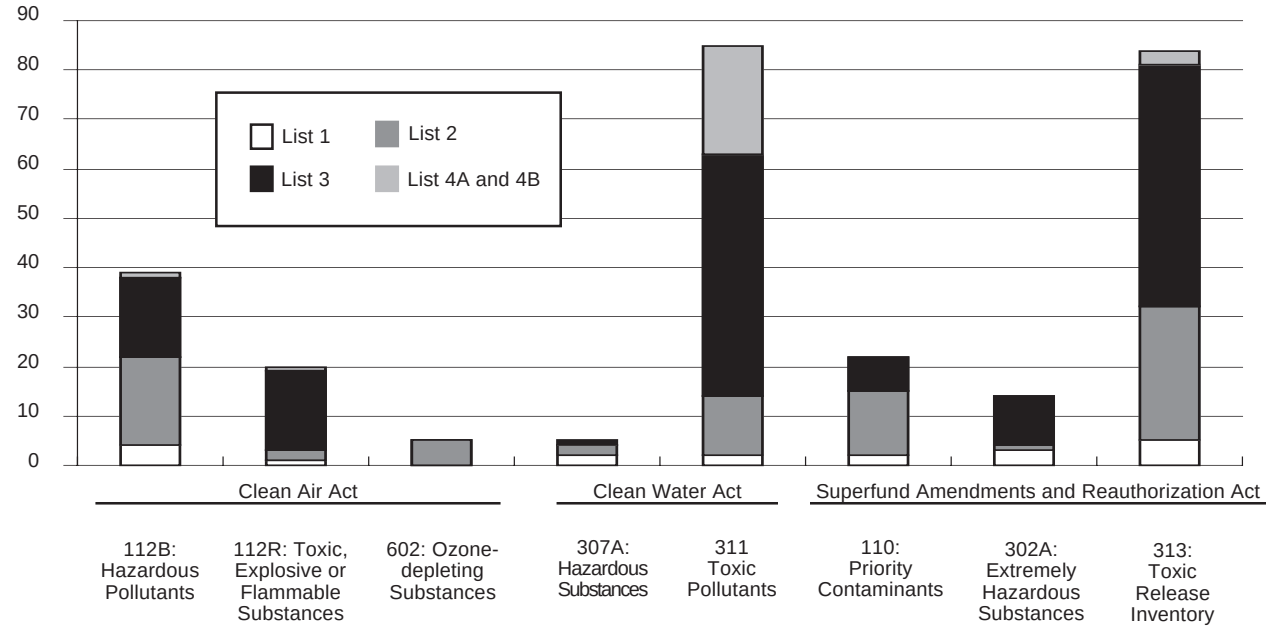


Figure 2
Numbers of Inert Ingredients Classified as Hazardous by Major Environmental Laws



The number of chemicals on Lists 3 (and 4) that have been classified as hazardous by major environmental laws is startling. Inerts should not be classified as of unknown toxicity or minimum risk if they are also on lists of hazardous pollutants.

Hazardous Inerts

EPA implements the major environmental laws that regulate hazardous substances. Because there are a number of such laws, each of which regulate a different set of hazardous substances, EPA has created the RoL, which is a database of lists of chemicals that they regulate.[9] This database is not comprehensive, however. For instance, the list of chemicals that deplete stratospheric ozone is not included. As a result, NCAP combined information from the RoL with other lists of chemicals regulated by EPA in order to form a more complete picture of the number of chemicals used as inerts that are regulated by one or more of these laws.[9,16] Alarmingly, 485 of the over 2,500 inerts (i.e. 19%) fall under this category.

Air and Water Pollutants. The Clean Air and Clean Water Acts, as well as the Safe Drinking Water Act, regulate toxic, explosive, flammable, or otherwise hazardous pollutants. A total of 209 chemicals used as inerts are considered hazardous air and/or water pollutants. Over half of these inerts are stowaways on List 3. (See Figure 2.)

Superfund Amendments and Reauthorization Act (SARA). Chemicals on these lists have been found at Superfund sites (SARA 110), must be reported to state and local emergency planning and response committees (SARA 302A), or must be reported to EPA's Toxic Chemical Release Inventory (SARA 313). SARA 110 contains a list of the 275 highest ranking priority pollutants and 22 of them are also inert ingredients. When used in certain quantities, 14 chemicals used as inerts are considered "extremely hazardous substances" and are regulated under SARA 302A. In addition, 84 must be reported to the Toxic Chemical Release Inventory. Approximately 60% of the chemicals used as inert ingredients regulated under SARA are classified by EPA as of unknown toxicity. (See Figure 2.)

Despite the fact that EPA is directly responsible for implementing environmental laws, it appears that information about hazardous substances identified in these laws has not significantly affected pesticide policy. The fact remains that 485 hazardous pollutants are used as inerts and only 8 of them must be listed on the label.

Table 1
Inert Ingredients Classified as Carcinogenic by Regulatory Agencies

Chemical	CAS Number	List	NTP	IARC	Proposition 65
Formaldehyde	50-00-0	1	●	probable	
Chloroethane	75-00-3	2			■
Aminotriethanoic acid	139-13-9	3	●	possible	
Antimony trioxide	1309-64-4	3		possible	
Asphalt	8052-42-4	3		possible	
Butylated hydroxyanisole	25013-16-5	3	●	possible	■
Carbon black	1333-86-4	3		possible	
Coal tar	8007-45-2	3		known	
Cristobalite	14464-46-1	3	●	known	■
Dichloroacetic acid	79-43-6	3			■
FD & C Violet No. 1	1694-09-3	3		possible	
o-Phenylphenol, sodium salt	132-27-4	3		possible	
Potassium bromate	7758-01-2	3		possible	■
Saccharin	81-07-2	3	●	possible	■
Saccharin sodium	128-44-9	3	●		■
Safrole	94-59-7	3	●	possible	■
1,1,2,2-Tetrachloroethane	79-34-5	3			■
2,4,5,6-Tetrachloroisophthalonitrile (chlorothalonil)	1897-45-6	3			■
Attapulgite	12174-11-7	4A		possible	
Carrageenan	9000-07-1	4A		possible	
Silica, crystalline quartz	14808-60-7	4B	●	known	

NTP: National Toxicology Program (U.S. Dept. of Health and Human Services. Public Health Service)
IARC: International Agency for Research on Cancer
Proposition 65: California's Safe Drinking Water and Toxic Enforcement Act of 1986
●: classified as "reasonably anticipated to be carcinogenic" by NTP
known, probable, possible: IARC carcinogenicity classification; requires varying levels of evidence
■: identified as a carcinogen by Proposition 65

According to EPA policy, chemicals classified as carcinogens by the National Toxicology Program or the International Agency for Research on Cancer should be on List 1: Inerts of Toxicological Concern. For 16 inert ingredients, this policy has not been followed.

Malignant Neglect: Carcinogenic Inerts

The International Agency for Research on Cancer (IARC), National Toxicology Program (NTP), and the state of California under the Safe Drinking Water and Toxic Enforcement Act (Proposition 65) all publish lists of known or suspected carcinogens (Table 1). According to IARC, twelve chemicals used as inerts are possibly carcinogenic, one is a probable carcinogen, and three are known carcinogens.[8]

The way in which these carcinogenic inerts have been classified by EPA according to toxicity is a startling indictment of the inerts policy. Only one probable carcinogen, formaldehyde, has List 1 status and so must be disclosed on the label. One of the known carcinogens, crystalline quartz silica, is on List 4B; therefore, it does not *have* to be disclosed as toxic on the label of the 1,560 products that contain it.[17] Two possible carcinogens also can be found on List 4A: Minimum Risk Inerts. The integrity of List 4A, which also contains cookies and corn cobs, comes under serious dispute in light of these revelations. The most disturbing revelation is that 75% suspected or known carcinogens used as inerts receive the undeserved benefit of anonymity that comes with List 3 status.

The length of time that a specific substance has been designated by IARC is of interest. For instance, benzyl violet 4B (FD & C Violet No. 1); bitumens (asphalt); butylated hydroxyanisole; carrageenan; potassium bromate; saccharin; safrole; and o-phenylphenol, sodium salt all were evaluated by IARC as possibly carcinogenic in 1987, the year EPA announced its inerts policy. Coal tar also was designated as a known carcinogen in 1987. Ten years later, all nine substances still hide on List 3: Inerts of Unknown Toxicity, despite the fact that, according to EPA criteria, the IARC designation qualifies them for List 1 status.

The National Toxicology Program has found that eight chemicals used as inerts "may be reasonably anticipated to be carcinogenic."[18] Six of the eight chemicals are on List 3 and one is on 4B, even though all seven should be on List 1: Inerts of Toxicological Concern. Under Proposition 65, the state of California identifies ten chemicals used as inerts as carcinogenic.[19]

How many more carcinogens are used as inerts that we do not know about? Under the current policy, we will never know. Inert ingredients and the full formulations that contain them are not tested for carcinogenicity, only the active ingredient is. Meanwhile, the general public and the environment are victims of malignant neglect.

Occupational Hazards

The Occupational Safety and Health Administration (OSHA) compiles a list of hazardous chemicals.[20] This list, as well as other sources of information, must be consulted by industry during the preparation of Material Safety Data Sheets (MSDSs). A total of 127 chemicals used as inerts are on OSHA's list of occupationally hazardous substances. Nearly half of these chemicals have been granted List 3 status.

Other Hazards

The list of chemicals used as inert ingredients is littered with other examples of inerts whose toxicity virtually is ignored. List 2, chemicals with a high priority for testing (but seemingly *not* for assessment as toxic and disclosure on the label), is full of neurotoxins such as xylene,[15] developmental toxicants such as toluene,[14] and genotoxins such as o- and p-cresols.[21] Endocrine disruptors such as bisphenol A and ethoxylates of nonylphenol can be found on List 3.[22,23]

Implications for Inerts Policy

The majority of inert ingredients that have been identified as hazardous *by EPA and other agencies* are buried deep in List 3: Inerts of Unknown Toxicity. These "unknown" and undisclosed toxins have been identified as air and water pollutants, extremely hazardous under the Superfund Amendments and Reauthorization Act, occupationally hazardous, carcinogenic, and/or possessing some other toxicity concern. In addition, the vast majority of active inerts have been classified as of unknown toxicity. At the very least, then, EPA's encouragement to registrants to replace List 1 inerts with those found on List 3 (and List 4) is meaningless. Registrants could easily replace a "known" toxin with one whose toxicity is unknown only to EPA's Office of Pesticide Programs.

WHAT YOU DON'T KNOW CAN HURT YOU

Because information about most inert ingredients is not publicly available, it is difficult to know how frequently hazardous inerts are used in pesticide products. In an effort to determine the extent of the health and environmental threat, NCAP has filed a number of formal requests with EPA under the Freedom of Information Act (FOIA). FOIA establishes the public's right to obtain information from federal governmental agencies. NCAP has exercised this right in order to find out how many products contain certain known or suspected carcinogens, active inerts, and endocrine disruptors, among other health and environmental concerns. We have also requested the identities of inert ingredients in specific products.

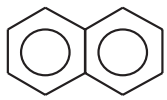
Many of NCAP's FOIA requests are still being processed by EPA. However, preliminary findings indicate that hazardous inerts are sometimes widely used in pesticide products. In some cases, a hazardous inert ingredient is a component of thousands of pesticide products. (See Table 2.)

Table 2
Numbers of Pesticide Products Containing Certain Hazardous Inerts

Inert Ingredient	CAS Number	List	Hazard	Number of Products
o-Cresol	95-48-7	2	genotoxicity[21]	5[26]
Ethylbenzene	100-41-4	2	neurotoxicity, renal and ocular effects[24]	15[26]
Toluene	108-88-3	2	developmental toxicity[14]	112[26]
Butylated hydroxyanisole	25013-16-5	3	possible carcinogenicity[8]	67[27]
Chloropicrin	76-06-2	3	severe respiratory tract irritation[10,11]	28[17]
Cristobalite	14464-46-1	3	known carcinogenicity[8]	1,561[27]
Naphthalene	91-20-3	3	jaundice[25]	unknown, many[28,29]
o-Phenylphenol, sodium salt	132-27-4	3	possible carcinogenicity[8]	44[27]
Ethoxylated alkylphenols	9016-45-9	4B	endocrine disruption[23]	2634[30]
Ethoxylated p-nonylphenol	26027-38-3	4B	endocrine disruption[23]	443[30]

NAPHTHALENE: A CASE STUDY

Naphthalene is an active ingredient in 16 currently registered products, primarily moth repellents.[13] It is also cleared for use as an inert and is on List 3, despite the fact that the Agency for Toxic Substances and Disease Registry (ATSDR) first published a toxicological profile of it in 1989. The 1995 edition contains 200 pages and over 400 citations.[25] Here are some of the things we know about the toxicity of naphthalene:



Naphthalene
($C_{10}H_8$)

- In 1990, a total of 2,400 cases of accidental ingestion of household products containing naphthalene, such as mothballs and deodorant blocks, were reported to 72 Poison Control Centers in the United States. Children under the age of six accounted for nearly 90% of the cases.[31]

- The most frequent manifestation of naphthalene poisoning is hemolytic anemia (destruction of red blood cells), which can give way to varying degrees of jaundice and liver enlargement.[25]

- In children, severe jaundice resulting from naphthalene-induced hemolysis can result in permanent neurological damage, motor disturbances, convulsions, and death.[32,33]

- Naphthalene is considered a hazardous air and water pollutant.[9]

- Naphthalene is among the 100 hazardous substances most commonly found at Superfund sites. According to EPA and ATSDR, these 100 substances pose "the most significant potential threat to human health due to their known and suspected toxicity to humans."[34]

The most important thing that remains unknown about naphthalene is exactly how many products contain it as an inert ingredient. NCAP's 1996 Freedom of Information Act (FOIA) request revealed that, according to EPA's database, naphthalene is present in at least two products as an inert.[28] The FOIA officer later located *another* product through his own independent search effort, bringing the total to three.[28] Purely by accident, while reading Material Safety Data Sheets for pesticides, NCAP discovered that naphthalene was present in two more products.[35]

Unfortunately, the total number of products that contain naphthalene probably far exceeds five. Recently, the FOIA officer discovered that naphthalene is a constituent of Aromatic 150 at a concentration of 10%.[29] A coding error caused naphthalene to be omitted from EPA's database whenever this compound was used in a product. The FOIA officer believes that this solvent is widely used and that discovering how many products contain it is probably impossible.

That naphthalene can still be used as an active ingredient in moth balls—at concentrations of 99.9999%—is appalling. Even more troubling, however, EPA cannot say with any confidence how many products contain naphthalene as an inert ingredient. Such secrecy by way of bureaucracy is unacceptable. Furthermore, naphthalene's presence on List 3: Inerts of Unknown Toxicity is indefensible.

"Naphthalene's presence on List 3: Inerts of Unknown Toxicity is indefensible."

RECOMMENDATIONS: FULL POSSESSION OF THE FACTS

Without their informed consent, untold numbers of people are exposed to known carcinogens, developmental and reproductive toxicants, genotoxins, and neurological toxins in the guise of inert ingredients. Clearly, the term "inert" does not accurately describe the effects of exposure to these chemicals and, ultimately, EPA has been unsuccessful in its attempts to protect the general public and the environment from their hazards.

Two very important steps must be taken to put an end to secrecy and willful ignorance:

1. Full Label Disclosure of All Product Ingredients

Currently, far too many chemicals that have been assessed by EPA and other agencies as hazardous remain undisclosed on pesticide product labels. The only solution is for EPA to require pesticide labels to list all ingredients. If cookie boxes and shampoo bottles can be accompanied by a complete ingredient statement, then so can pesticide products. Consumers and workers have a right to easy access to such information so that they can make informed decisions and better protect themselves.

2. *Full Formulation Testing for a Wide Range of Toxic Effects*

Currently, EPA's evaluation of a pesticide product's toxicity relies on a very small piece of the pesticide picture. Active ingredients are subject to a battery of tests to determine environmental fate, toxicity, and effects on wildlife and nontarget organisms. In contrast, the mixture of active and inert ingredients to which we are exposed is *not* assessed for a wide range of effects, including neurotoxicity, carcinogenicity, teratogenicity, adverse reproductive effects, and mutagenicity.

As a result, EPA has been flying blind, attempting to regulate pesticides with less than all the facts. The agency has been hindered both by a lack of crucial information and by inaction on existing information. Now, the direction should be clear: Full possession of all the facts. The entire pesticide product, which includes active and inert ingredients, must be subjected to all of the toxicological and ecological effects testing required for registration.

"It is the public that is being asked to assume the risks that the insect controllers calculate. The public must decide whether it wishes to continue on the present road, and it can only do so when in *full possession of the facts.*"

—Rachel Carson
Silent Spring

APPENDIX : INERT INGREDIENTS THAT ARE OR HAVE BEEN USED AS ACTIVE INGREDIENTS

LIST 1

50-00-0	Formaldehyde
108-95-2	Phenol

LIST 2

120-32-1	2- Benzyl-4-chlorophenol
111-76-2	Butyl cellosolve
88-04-0	4-Chloro-3,5-dimethylphenol
108-39-4	m-Cresol
1319-77-3	Cresylic acid
108-94-1	Cyclohexanone
84-74-2	Dibutyl phthalate
95-50-1	o-Dichlorobenzene
75-71-8	Dichlorodifluoromethane
97-23-4	Dichlorophene
111-77-3	Diethylene glycol monomethyl ether
131-11-3	Dimethyl phthalate
68602-80-2	Distillates (petroleum), C12-30 aromatic
68477-31-6	Distillates (petroleum), cat. reformer fractionator residue, low boiling
64742-54-7	Distillates (petroleum), hydrotreated heavy paraffinic
64742-55-8	Distillates (petroleum), hydrotreated light paraffinic
68476-30-2	Fuel oil, No. 2
149-30-4	2-Mercaptobenzothiazole
108-10-1	Methyl isobutyl ketone
100-02-7	4-Nitrophenol
64771-72-8	Paraffins (petroleum), normal C5-20
64742-94-5	Solvent naphtha (petroleum), heavy aromatic
64742-95-6	Solvent naphtha (petroleum), light aromatic
64742-88-7	Solvent naphtha (petroleum), medium aliphatic
8052-41-3	Stoddard solvent
108-88-3	Toluene
71-55-6	1,1,1-Trichloroethane
75-69-4	Trichlorofluoromethane
102-71-6	Triethanolamine
1330-20-7	Xylene

LIST 3

67-64-1	Acetone
828-00-2	6-Acetoxy-2,4-dimethyl-m-dioxane
68131-40-8	**Alcohols, C11-15-secondary, ethoxylated***
68603-15-6	Alcohols, C6-12
97-59-6	Allantoin
107-18-6	**Allyl alcohol***
7429-90-5	Aluminum (metal)
68603-42-9	Amides, coco, N,N-bis(2-hydroxyethyl)
7784-25-0	Ammonium alum
16919-19-0	Ammonium fluosilicate
544-60-5	Ammonium oleate
1113-38-8	Ammonium oxalate
7783-18-8	Ammonium thiosulfate
628-63-7	Amyl acetate
104-46-1	p-Anethole
28300-74-5	Antimony potassium tartrate
8052-42-4	Asphalt
83-79-4	**Barbasco (rotenone)***
513-77-9	Barium carbonate
13701-59-2	Barium metaborate
100-52-7	Benzaldehyde
60-12-8	Benzeneethanol
2634-33-5	1,2-Benzisothiazolin-3-one
94-09-7	Benzocaine
120-51-4	Benzyl benzoate
5437-45-6	Benzyl bromoacetate
1214-39-7	N6-Benzyladenine
71786-60-2	N,N-Bis(2-hydroxyethyl)-C12-18-alkylamine
120-40-1	N,N-Bis(2-Hydroxyethyl) dodecanamide
17123-43-2	N,N-Bis(2-hydroxyethyl)-glygine, sodium salt
26635-93-8	N,N'-Bis(polyoxyethylene)-oleylamine
26635-92-7	N,N'-Bis(polyoxyethylene)-stearylamine
1303-96-4	Borax
10043-35-3	Boric acid(H3BO3)
12179-04-3	Boric acid (H2B4O7), disodium salt, pentaborate
35691-65-7	2-Bromo-2-(bromomethyl) pentanedinitrile
52-51-7	Bronopol
107-88-0	1,3- Butanediol
78-92-2	sec- Butanol
9003-13-8	Butoxypolypropylene glycol
94-26-8	Butyl p-hydroxybenzoate
128-37-0	Butylated hydroxytoluene
98-54-4	p-tert- Butylphenol
2650-18-2	C.I. Acid Blue 9, diammonium salt
1934-21-0	C.I. Acid Yellow 23, trisodium salt
10137-74-3	Calcium chlorate
7778-54-3	Calcium hypochlorite
12168-85-3	Calcium oxide silicate
4075-81-4	Calcium propionate
10124-41-1	Calcium thiosulfate
76-22-2	Camphor
334-48-5	Capric acid
124-38-9	**Carbon dioxide***
8001-78-3	Castor oil, hydrogenated
8007-20-3	Cedarleaf oil
56-95-1	Chlorhexidine diacetate
10049-04-4	Chlorine dioxide
104-55-2	Cinnamaldehyde
8007-45-2	**Coal tar***
61789-51-3	Cobalt naphthenate
61789-18-2	Coco alkyltrimethyl quaternary ammonium chlorides
1184-64-1	Copper carbonate
20427-59-2	Copper hydroxide
12069-69-1	Copper hydroxy carbonate (Cu2(OH)2CO3)
1338-02-9	Copper naphthenate
3251-23-8	Copper nitrate
7758-98-7	Copper sulfate
12002-51-6	Cresylic acid, potassium salt
527-09-3	Cupric gluconate
1317-39-1	**Cuprous oxide***
108-80-5	Cyanuric acid
36445-71-3	Decyl phenoxybenzenedisulfonic acid, disodium salt
1322-98-1	Decylbenzenesulfonic acid, sodium salt
51344-62-8	Dehydroabietylamine-ethylene oxide condensate (1:2)
3734-33-6	Denatonium benzoate
123-42-2	Diacetone alcohol
78-88-6	2,3-Dichloro-1-propene
108-83-8	Diisobutyl ketone
121-54-0	p-Diisobutylphenoxy- ethoxyethyl dimethyl benzyl ammonium chloride
78-66-0	3,6-Dimethyl-4-octyne-3,6-diol
28804-88-8	Dimethylnaphthalene
6440-58-0	Dimethylol-5,5-dimethylhydantoin
51200-87-4	4,4-Dimethyloxazolidine
122-39-4	Diphenylamine
25265-71-8	Dipropylene glycol
7575-62-4	Disodium 4-dodecyl-2,4'-oxydibenzenesulfonate
139-33-3	Disodium ethylenediaminetetraacetate
53404-45-8	Disodium monoethanolamine phosphate
12008-41-2	Disodium octaborate
12280-03-4	Disodium octaborate, tetrahydrate
1330-43-4	Disodium tetraborate
112-53-8	1-Dodecanol
2235-54-3	Dodecyl sulfate, ammonium salt
3097-08-3	Dodecyl sulfate, magnesium salt
151-21-3	Dodecyl sulfate, sodium salt
27176-87-0	Dodecylbenzenesulfonic acid
26545-53-9	Dodecylbenzenesulfonic acid, diethanolamine salt
26836-07-7	Dodecylbenzenesulfonic acid, monoethanolamine salt
27177-77-1	Dodecylbenzenesulfonic acid, potassium salt
25155-30-0	Dodecylbenzenesulfonic acid, sodium salt
27323-41-7	Dodecylbenzenesulfonic acid, triethanolamine salt
68911-49-9	Dried blood
8022-96-6	Essential Oils
107-21-1	1,2-Ethanediol
141-43-5	Ethanolamine
104-28-9	2-Ethoxyethyl p-methoxycinnamate
51344-60-6	Ethoxylated abietylamine
9004-87-9	Ethoxylated isooctylphenol
61790-81-6	Ethoxylated lanolin
11096-42-7	Ethoxylated nonylphenol complex with Iodine
104-76-7	2-Ethyl-1-hexanol
78-21-7	4-Ethyl-4-hexadecylmorpho-linium, ethyl sulfate
10096-64-7	4-Ethyl-4-octadecylmorpho-linium, ethyl sulfate
53404-49-2	Ethylene glycol ether of pinene
107-15-3	Ethylenediamine
60-00-4	Ethylenediaminetetraacetic acid
64-02-8	Ethylenediaminetetraacetic acid, tetrasodium salt
17572-97-3	Ethylenediaminetetraacetic acid, tripotassium salt
1070-03-7	2-Ethylhexyl dihydrogen phosphate
10045-89-3	Ferrous ammonium sulfate
16423-68-0	Fluorescein, 2',4',5',7'-tetraiodo, disodium salt {Spiro (isobenzofuran) tautomeric form}
110-17-8	Fumaric acid
77-06-5	Gibberellic acid
526-95-4	D-Gluconic acid
111-30-8	Glutaraldehyde
79-14-1	Glycolic acid
2836-32-0	Glycolic acid, sodium salt
9000-28-6	Gum Ghatti
13470-50-3	2-Heptadecyl-1-methyl-1-(2-stearoylamido)ethyl-2-imidazolinium methyl sulfate
4080-31-3	Hexamethylenetetramine chloroallyl chloride
51229-78-8	Hexamethylenetetramine chloroallyl chloride, cis isomer
107-41-5	Hexylene glycol
7647-01-0	Hydrogen chloride
420-04-2	**Hydrogen cyanamide***
10034-85-2	Hydrogen iodide
7722-84-1	Hydrogen peroxide
27136-73-8	1-(2- Hydroxyethyl)-2-(heptadecenyl)imidazoline
52299-20-4	2-[(Hydroxymethyl)amino]-2-methyl propanol
134-31-6	8-Hydroxyquinoline sulfate
68527-99-1	1H-Imidazolium, 1,3-bis(carboxymethyl)-4,5-dihydro -1-(2-hydroxyethyl)-2-undecyl-, dihydroxide, disodium salt
55406-53-6	3-Iodo-2-propynyl butyl carbamate
125-12-2	Isobornyl acetate
108-21-4	Isopropyl acetate
63393-93-1	Isopropyl lanolin
110-27-0	Isopropyl myristate
2682-20-4	3(2H)-Isothiazolone, 2-methyl-
26172-55-4	3(2H)-Isothiazolone, 5-chloro-2-methyl-
12379-45-2	Isothymyl 2-chloroethyl ether
61789-91-1	Jojoba bean oil
8013-10-3	Juniper tar oil
8008-20-6	Kerosene (deodorized)
8006-54-0	Lanolin
8032-32-4	Ligroine
138-86-3	alpha-Limonene
78-70-6	Linalyl alcohol
6915-15-7	Malic acid
1490-04-6	Menthol

2492-26-4	2-Mercaptobenzothiazole, sodium salt
34590-94-8	(2-Methoxymethylethoxy)-propanol
67-56-1	Methyl alcohol
119-36-8	Methyl salicylate
137-20-2	N-Methyl-N-oleoyltaurine, sodium salt
1321-94-4	Methylnaphthalene
10058-23-8	Monopotassium peroxymonosulfate
110-91-8	Morpholine
91-20-3	Naphthalene
135-19-3	beta-Naphthol
9004-70-0	Nitrocellulose
53404-62-9	N-[alpha-(Nitroethyl)-benzyl] ethylenediamine, potassium salt
112-05-0	Nonanoic acid
106-24-1	2,6-Octadien-1-ol, 3,7-dimethyl-, (E)-
111-87-5	1-Octanol
8007-70-3	Oil of anise
8008-51-3	Oil of camphor
8000-27-9	Oil of Cedarwood
8000-29-1	Oil of citronella
8007-02-1	Oil of lemongrass
68443-05-0	Oleic acid, sulfonated, sodium salt
8050-07-5	Olibanum
8008-57-9	Orange oil
144-62-7	Oxalic acid
59720-42-2	1H,3H,5H-Oxazolo[3,4-c]oxazole, methanol deriv.
56709-13-8	1H,3H,5H-Oxazolo[3,4-c]-oxazole, poly(oxymethylene) deriv.
6542-37-6	1H,3H,5H-Oxazolo[3,4-c]-oxazole-7a,(7H)-methanol
8012-95-1	Paraffin oils
8007-44-1	Pennyroyal oil
109-66-0	n-Pentane
140-01-2	Pentasodium diethylenetriaminepentaacetate
64742-16-1	Petroleum resins
68608-26-4	Petroleum sulfonic acids, sodium salts
132-27-4	o-Phenylphenol, sodium salt
7664-38-2	Phosphoric acid
8011-48-1	Pine tar
51-03-6	**Piperonyl butoxide***
9003-29-6	Polybutylene
9003-27-4	Polyisobutylene
9003-39-8	Polyvinylpyrrolidone
298-14-6	Potassium bicarbonate
7646-93-7	Potassium bisulfate
7778-50-9	Potassium dichromate
7681-11-0	Potassium iodide (KI)
13429-27-1	Potassium myristate
7757-79-1	Potassium nitrate
7722-64-7	Potassium permanganate
7492-30-0	Potassium ricinoleate
68424-85-1	Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides
68391-01-5	Quaternary ammonium compounds, benzyl-C12-18-alkyldimethyl, chlorides
61789-77-3	Quaternary ammonium compounds, di(coco alkyl)dimethyl, chlorides
68153-33-3	Quaternary ammonium compounds, di-C10-16-alkyldimethyl, chlorides
73398-64-8	Quaternary ammonium compounds, di-C8-18-alkyldimethyl, chlorides
59-40-5	N-(2-Quinoxalinyl)sulfanilide
65997-05-9	Rosin, partially dimerized
15662-33-6	Ryanodine
69-72-7	Salicylic acid
6834-92-0	Silicic acid (H2SiO3), disodium salt
61789-31-9	Soap, coconut oil
26628-22-8	Sodium azide
7631-90-5	Sodium bisulfite
7775-09-9	Sodium chlorate
7775-11-3	Sodium chromate
53404-78-7	Sodium di(monoethanolamine) phosphate
126-96-5	Sodium diacetate
17421-79-3	Sodium ethylenediaminetetraacetate
16893-85-9	Sodium fluosilicate
7775-19-1	Sodium metaborate
7632-00-0	Sodium nitrite
1344-08-7	Sodium sulfide
7757-83-7	Sodium sulfite
7772-98-7	Sodium thiosulfate
650-51-1	Sodium trichloroacetate
61791-34-2	N-(Soya alkyl)-N-ethylmorpholinium ethylsulfate
57-11-4	Stearic acid
5329-14-6	Sulfamic acid
8002-33-3	Sulfated castor oil
7446-09-5	Sulfur dioxide
7664-93-9	**Sulfuric acid***
7704-34-9	Sulphur
1401-55-4	Tannins
98-55-5	alpha-Terpineol
79-34-5	1,1,2,2-Tetrachloroethane
1897-45-6	**2,4,5,6- Tetrachloroiso-phthalonitrile (chlorothalonil)***
533-74-4	Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione
119-64-2	Tetralin
27193-28-8	(1,1,3,3-Tetramethylbutyl)-phenol
7320-34-5	Tetrapotassium pyrophosphate
89-83-8	Thymol
104-15-4	p-Toluenesulfonic acid
30526-22-8	Toluenesulfonic acid, potassium salt
12068-03-0	Toluenesulfonic acid, sodium salt
3380-34-5	2,4,4'-Trichloro-2-hydroxy diphenyl ether
76-06-2	**Trichloronitromethane (chloropicrin)***
27519-02-4	(Z)-9-Tricosene
2224-49-9	Triethanolamine laurate
139-96-8	Triethanolamine lauryl sulfate
2717-15-9	Triethanolamine oleate
112-27-6	Triethylene glycol
122-20-3	Triisopropanolamine
3424-21-3	Triisopropylamine
139-08-2	Trimethyl tetradecylphenyl ammonium chloride
75673-43-7	3,4,4-Trimethyloxazolidine
150-38-9	Trisodium ethylenediaminetetraacetate
139-89-9	Trisodium N-(2-hydroxyethyl)ethylenediaminetriacetate
5064-31-3	Trisodium nitrilotriacetate
8006-64-2	Turpentine oil
112-38-9	10-Undecenoic acid
30346-73-7	Xylenesulfonic acid, potassium salt
1300-72-7	Xylenesulfonic acid, sodium salt
1300-71-6	Xylenols, mixed
7440-66-6	Zinc (metallic)
7646-85-7	Zinc chloride
12001-85-3	Zinc naphthenate
68813-94-5	Zinc sulfate, basic
7446-19-7	Zinc sulfate, monohydrate
1314-23-4	Zirconium oxide

LIST 4A

68140-00-1	Amides, coco, N-(hydroxyethyl)-
143-18-0	Potassium oleate
64-19-7	Acetic acid
77-92-9	Citric acid
9004-53-9	Dextrin
56-81-5	Glycerin
8001-26-1	Linseed oil
7727-37-9	Nitrogen
9002-88-4	Polyethylene
144-55-8	Sodium bicarbonate
7647-14-5	Sodium chloride
8001-22-7	Soybean oil

LIST 4B

7446-70-0	Aluminum chloride
10043-01-3	Aluminum sulfate
506-87-6	Ammonium carbonate
7783-20-2	Ammonium sulfate
65-85-0	Benzoic acid
61791-31-9	N,N-Bis(2-hydroxyethyl)-(coconut oil alkyl)amine
10043-52-4	Calcium chloride
1305-62-0	Calcium hydroxide
1305-78-8	Calcium oxide
7778-18-9	Calcium sulfate
7440-44-0	Carbon
8001-79-4	Castor oil
9004-32-4	Cellulose carboxymethyl ether, sodium salt
36653-82-4	Cetyl alcohol
8001-31-8	Coconut oil
112-30-1	1-Decanol
7722-88-5	Diphosphoric acid, tetrasodium salt
7558-79-4	Disodium phosphate
9004-82-4	Dodecanol, ethoxylated, monoether with sulfuric acid, sodium salt
64-17-5	Ethanol
91-53-2	Ethoxyquin
141-78-6	Ethyl acetate
10028-22-5	Ferric sulfate
7782-63-0	Ferrous sulfate heptahydrate
111-27-3	1-Hexanol
120-72-9	1H-Indole
67-63-0	Isopropyl alcohol
7786-30-3	Magnesium chloride
7487-88-9	Magnesium sulfate
99-76-3	Methyl p-hydroxybenzoate
124-07-2	Octanoic acid
112-80-1	Oleic acid
7778-53-2	Phosphoric acid, tripotassium salt
8002-09-3	Pine oil
80-56-8	alpha-Pinene
9005-08-7	Polyoxyethylene distearate
8050-33-7	Polyoxyethylene ester of rosin
9016-45-9	Polyoxyethylene nonylphenol
9005-64-5	Polyoxyethylene sorbitan monolaurate
9005-65-6	Polyoxyethylene sorbitan monooleate
25322-69-4	Polypropylene glycol
584-08-7	Potassium carbonate
61789-30-8	Potassium coconut oil soap
1310-58-3	Potassium hydroxide
67701-09-1	Potassium salts of fatty acids (C8-18 and C18 unsatd.)
24634-61-5	Potassium sorbate
71-23-8	n-Propanol
79-09-4	Propionic acid
94-13-3	Propyl p-hydroxybenzoate
57-55-6	Propylene glycol
8008-74-0	Sesame seed oil
63231-67-4	Silica Gel
7631-86-9	Silicon dioxide
67701-10-4	Soap: (Fatty acids, C8-18 and C18-unsatd., sodium salts)
532-32-1	Sodium benzoate
577-11-7	Sodium bis(2-ethylhexyl) sulfosuccinate
7681-38-1	Sodium bisulfate
7647-15-6	Sodium bromide
497-19-8	Sodium carbonate
7558-80-7	Sodium dihydrogen phosphate
1639-66-3	Sodium dioctyl sulfosuccinate
7681-49-4	Sodium fluoride
10124-56-8	Sodium hexametaphosphate
1310-73-2	**Sodium hydroxide***
7631-99-4	Sodium nitrate
143-19-1	Sodium oleate
137-40-6	Sodium propionate
533-96-0	Sodium sesquicarbonate
1344-09-8	Sodium silicate
7757-82-6	Sodium sulfate
7758-29-4	Sodium tripolyphosphate
110-44-1	Sorbic acid
7601-54-9	Trisodium phosphate
57-13-6	Urea
1314-13-2	Zinc oxide
557-05-1	Zinc stearate

* restricted use pesticide

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