

INERT INGREDIENTS IN PESTICIDES: WHO'S KEEPING SECRETS?

Inert ingredients are among pesticides' strongly held secrets. They are chemicals used in pesticide products to make the pesticide more potent or easier to use. For years, pesticide manufacturers have claimed that they were trade secrets and it was almost impossible for pesticide users or concerned activists to find out about them. Despite their misleading name, inerts are neither chemically, biologically, or toxicologically inert. Although they are only minimally tested, many of them are known to state, federal, and international agencies to be hazardous.

A 1996 court decision opened the possibility of getting some information about inert ingredients via the federal Freedom of Information Act. While manufacturers are still able to withhold this information if they can justify their claim to the U.S. Environmental Protection Agency (EPA), most of the companies EPA has contacted so far have been willing to identify inerts. Only 8 manufacturers, out of 38, have withheld information about inerts.

NCAP, with the help of over 250 supporting organizations and attorneys general in 7 states, has petitioned EPA to require that all pesticide ingredients be identified on product labels. All of us are exposed to pesticides on a daily basis; at the very least, we have the right to know the identity of the chemicals to which we're being exposed. EPA needs to act soon on NCAP's petition and implement our right to know.

BY CAROLINE COX

Imagine, with tongue in cheek, that pesticide companies were forthcoming. "Why yes," their representatives would say as they showed their newest products. "These are toxic, designed to kill, but they shouldn't cause any unreasonable problems. And yes, we use them on your food, in your house, in your schools and parks, and lots more places, but we do need to protect the investment we've made in developing these products. So most of what's in them is going to be kept a secret, unless you really make an effort and we have to tell you."

Absurd as this little story sounds, it's not far from the truth. Cookies, shampoo, cat food, contact lens solutions, body lotion, and over-the-counter painkillers, to name a few, all provide a lot more information about what's in them than do pesticides. Most pesticide ingredients are misleadingly identified only by the words "inert" or "other." (For a definition, see "What is an 'Inert' Ingredient?"

below.) These ingredients often make up the bulk of a pesticide product.

The absurd story inspires a string of

questions. Why do we need information about inerts? Why are so many pesticide ingredients unidentified? How can we

WHAT IS AN "INERT" INGREDIENT?

Inert, when applied to pesticide ingredients, does not mean biologically, chemically, or toxicologically inert. Under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the U.S. pesticide law, inert ingredients are defined simply by excluding active substances.

Active ingredient: An ingredient that will prevent, destroy, repel, or mitigate any pest. (Under FIFRA, four other categories of biologically active chemicals are included in the definition of an active ingredient: plant growth regulators, defoliants, desiccants, and nitrogen stabilizers.)¹

Inert ingredient: Any pesticide ingredients other than an active ingredient. They are used as solvents, surfactants, diluents, carriers, catalysts, synergists, intensifiers, and more than

30 other uses.² Recent EPA policy allows the term "other" to be substituted for the term "inert" on pesticide labels.³

According to EPA policy, inerts are intentionally added substances, not contaminants. They do not include adjuvants, chemicals added by the pesticide user during application.⁴

The mixture of active and inert ingredients in a commercial pesticide product is called the full formulation.

1. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Sec. 2(a). Available at www.epa.gov/pesticides/fifra.htm.
2. FIFRA. Sec. 2(m)
3. U.S. EPA. Office of Pesticide Programs. 1997. Pesticide regulation (PR) notice 97-6. www.epa.gov/opprd/inerts/pr97-6.html.
4. U.S. EPA. 1987. Inert ingredients in pesticide products; Policy statement. Fed. Reg. 52(77): 13305-13309, Apr. 22. Also available at www.epa.gov/opprd001/inerts/fr52.htm.

Caroline Cox is JPR's editor.

identify inerts? Will manufacturers provide any of this information? Which companies are forthcoming? Which ones are not? Answers to these questions follow.

Inerts Are Important!

NCAP has been working for a decade to learn the identities of the inert ingredients in pesticide products. It's important to remember just why we need this information and why we're fighting to get it.

NCAP's answer to these questions is four-pronged. First, the ethical questions in any discussion of inert ingredients are powerful. We're exposed to pesticides every day, and most of these exposures are ones over which we have no control. We are entitled, at the very least, to complete identification of all of the ingredients to which we're being exposed.

Second, inerts are inadequately tested. In order to be registered for use in the U.S., pesticides undergo a series of tests that assess their toxicity and environmental fate. Most of the testing, however, ignores inert ingredients; this includes tests of the pesticide's ability to cause cancer, genetic damage, and birth defects. The full formulation is tested mainly for short-term effects: eye irritation, skin irritation, and tests to determine lethal doses.¹ Some toxicology testing is separately required of chemicals used as inerts, but even EPA calls these requirements "minimal."²

Third, many inerts are hazardous. Despite their limited testing, of the almost 2300 chemicals³ that EPA believes are currently used as inert ingredients, over 600 (26 percent) have already been classified as hazardous by state, federal, and international agencies.⁴ This includes chemicals listed under the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and others. Examples of hazardous and commonly used inerts include crystalline silica (causes cancer and genetic damage),⁵ naphthalene (causes anemia and liver damage),⁶ xylenes (cause headaches, confusion, and fetal death),⁷ and erioglaucine (FD&C Blue Dye No. 1; causes malignant tumors in laboratory tests).^{8,9} How many inerts would have

identified hazards if they were comprehensively tested? It is impossible to know.

Finally, inerts put people's health at risk. A recent incident in New York powerfully illustrates how complex inerts' health impacts can be. In April of 1996, and again in August, Terminex International Co. treated the home of the Trimper family in Rotterdam for termites with an insecticide, probably Dursban TC.¹⁰ Dursban TC is a commonly used termiticide containing chlorpyrifos.¹¹ The Trimpers had asked for another chlorpyrifos insecticide, Equity,¹⁰ but Terminex applied Dursban instead.¹²

Following the second treatment, three-year-old Kyle Trimper became ill with unexplained high fevers and respiratory problems. His parents were also ill, and his mother suffered two miscarriages during the following year.¹⁰

In early 1997, the family complained

to the New York Department of Environmental Conservation about the lingering odors in their home, and the health problems Kyle was having. The agency came to their house, along with the Department of Health, and collected air samples several times.¹⁰ Because Terminex asserted that the insecticide applied in the Trimper home was Equity, even though the applicator who had done the treatment admitted otherwise, the agencies looked at inert ingredients in the air of the Trimper's home.¹² (This analysis for inerts as part of an enforcement investigation is extremely rare.) Equity's inert ingredients are identified by Dow AgroSciences, its manufacturer, as "proprietary emulsifiers, proprietary solvents, and propylene glycol."¹³ Dursban TC's inerts, according to Dow, are also proprietary, but include "xylene range aromatic solvent."¹⁴



A. Mosher

Like all pesticides, lawn care sprays have many unidentified "inert" ingredients.

The air samples were, in a word, frightening. The agencies found a mixture of solvents, including benzene, toluene, ethylbenzene, xylenes, and trimethyl benzenes. The Department of Health analyzed the components of a sample of Dursban TC, and then compared it with what they found in the Trimper's house. The result was "a very close match."¹⁰

The benzene in the Trimper's house was particularly frightening. Benzene is "carcinogenic to humans,"¹⁵ according to the International Agency for Research on Cancer because people who are exposed to it are at increased risk for leukemia. In laboratory studies it has caused tumors in multiple organs and also causes genetic damage.¹⁵ EPA classified benzene as "of toxicological concern" in 1987 and asked pesticide manufacturers to stop using it.² By 1991 EPA had removed benzene from its list of pesticide inert ingredients¹⁶ because the agency believed that it was no longer being used. So why was it in the Trimper's house? Because Dursban TC contains "a mix of petroleum distillates" according to EPA's Kerry Liefer.¹⁰ And that mix contained benzene.

The other Dursban inerts found in the Trimper's home are also hazardous. Toluene causes confusion, memory loss, nausea, and can harm unborn babies when their mothers are exposed.¹⁷ Trimethylbenzenes damage the nervous system and are irritating to eyes.¹⁸ Xylenes cause headaches, nausea, confusion,

kidney damage, and fetal death.⁷

The Trimper case is unlikely to be just an isolated incident since Dursban TC is one of the most widely used liquid termiticides in the U.S.¹⁰ However, when termite treatments cause problems, attention almost always focuses on the active ingredient. It is rare that there's any consideration of inerts. As a result, it is impossible to know how often incidents like the Trimper's occur.

The Trimper story shows that the inerts issue is basically simple. It sets our health and our right to know up against the profits and competitive advantages of a relatively small but powerful group, pesticide manufacturers. Pesticide regulation has traditionally deferred to manufacturers, but our activism can bring the balance back toward the public interest.

Why Are So Many Inerts Unidentified?

Fundamentally, the reasons for inert ingredient secrecy can be summed up in one word: expediency. Regulating pesticides on the basis of their active ingredients means that EPA can focus its limited resources on roughly 900 active ingredients instead of over 20,000 pesticide products.¹⁹ Alternate formulations may boost this number to 60,000.²⁰ Pesticide manufacturers have the freedom to adjust ingredients based on market conditions, availability, and other factors without close regulatory oversight. "Pes-

ticide manufacturers play the market on inert ingredients," said EPA insecticide product manager Phil Hutton. "The inerts vary and if it's xylene, or petroleum distillates, or whatever, as long as their chemists or toxicologists think it's safe, they use it."²¹

While pesticide manufacturers often claim that inert secrecy allows them to maintain a competitive advantage over their rivals, this argument is weak. State-of-the-art laboratory equipment gives most manufacturers the ability to accurately identify the ingredients in their competitors' products.²²

Getting Information About Inerts

There is currently no easy, or completely successful, way that either pesticide users or people concerned about pesticide use can get information about inerts. A combination of the following approaches is the best tactic to take:

Medical emergencies: Physicians, other medical professionals, and public health agencies who are assisting patients who have been poisoned by a pesticide need immediate access to information about inert ingredients. Such access is allowed by EPA regulations when "disclosure is necessary in order to treat illness or injury or to prevent imminent harm..."²³ EPA relies on manufacturers to provide this information. However, there is no formal requirement that they



The companies that manufacture these herbicides have refused to identify their "inert" ingredients.

Table 1
Pesticide Manufacturers and "Inert" Ingredients

Companies that have identified inert ingredients

AgrEvo (partial information) (1) (2)
American Cyanamid (partial information) (3)
BioDyne Americas Corporation (4)
Carroll Company (4)
Chas H. Lilly Co. (5)
Continental Coatings (4)
Dow AgroSciences LLC (DowElanco) (3, 6-8)
DowBrands L.P. (9)
DuPont (partial information) (3)
Ecogen, Inc. (10)
GB Biosciences Corporation (1)
Health-Chem Corporation (11)
Hi-Tek Chemical Corporation (12)
Hi-Yield Chemical Company (13)
Howard Fertilizer Company, Inc. (14)
Kop-Koat, Inc. (15)
Lebanon Fertilizer (19)

Midland Chicago Corporation (15)
Monsanto Company (3,16)
Olin Corporation (10)
Platte Chemical Company (1,9,13)
Plato Industries, Inc. (11)
Prentiss Incorporated (9)
Professional Disposables Inc. (5)
Pursell Industries, Inc. (17)
Realex, Div. of United Industries Corporation (6)
Rhone-Poulenc Ag. Co. (1, 5)
Sandoz Agro, Inc. (15)
Schneid Professional Disposables, Inc. (18)
Sea-Master Marine Coatings, Inc. (11)
Uniroyal Chemical Co. (partial information) (20)
The Valspar Corporation (1, 9)
Voluntary Purchasing Group (13)
Whitmire Micro-Gen Research Laboratories (1, 9)

Companies that have withheld inert ingredient information

AgrEvo (partial information) (2)
American Cyanamid (partial information) (3)
Amrep, Inc. (21)
DuPont (partial information) (3)
Hartz Mountain Corporation (22)
IBC Manufacturing (23)
The Scotts Company (6)
Uniroyal Chemical Co. (partial information) (19)

Sources:

1. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1999. Letter from C. Furlow to H. Knight, NCAP, July 12.
2. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to C. Cox, NCAP, Apr. 21.
3. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1999. Letter from C. Furlow to D. Goodman, Northern Appalachian Restoration Project, Mar. 9.
4. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to N. Grier, NCAP, Nov. 14.
5. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1998. Letter from C. Furlow to N. Grier, NCAP, Feb. 4.
6. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1999. Letter from C. Furlow to C. Cox, NCAP, Feb. 22.
7. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1998. Letter from C. Furlow to C. Cox, NCAP, June 5.
8. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to K. Juul, NCAP, June 13.
9. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1999. Letter from C. Furlow to S. Marquardt, July 12.
10. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to N. Grier, NCAP, Mar. 19.
11. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to N. Grier, NCAP, Apr. 4.
12. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1998. Letter from C. Furlow to N. Grier, NCAP, Feb. 27.
13. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1998. Letter from C. Furlow to C. Cox, NCAP, Nov. 30.
14. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to K. Juul, NCAP, Apr. 18.
15. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to N. Grier, NCAP, May 22.
16. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1999. Letter from C. Furlow to C. Cox, NCAP, May 3.
17. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to K. Juul, NCAP, Mar. 27.
18. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to N. Grier, NCAP, July 25.
19. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to K. Juul, NCAP, Mar. 12.
20. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to K. Juul, NCAP, Feb. 13.
21. Amrep, Inc. 1997. Letter from S.V. Knapp, director of regulatory affairs, to S.Y. Street, U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch, June 4.
22. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1997. Letter from C. Furlow to P. Orum, Working Group on Community Right to Know, Jul. 25.
23. IBC Manufacturing Company. 1997. Letter from C.I. Utrata, attorney, to S.Y. Street, U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch, Nov. 10.

identify inert ingredients.²⁴

Material safety data sheets: Also known by their acronym, MSDS, these are documents produced by pesticide manufacturers under the mandate of the Occupational Safety and Health Act.²⁵ They provide information about the hazards of chemicals, and sometimes identify some of the inert ingredients in a pesticide product. MSDSs are available by calling the manufacturer of a specific product, by asking a pesticide retailer, or

by visiting a manufacturer's web site. In general, MSDSs identify those inert ingredients that have been classified as hazardous by the Occupational Safety and Health Administration,²⁶ but not all companies interpret the requirements of the law in the same way. If inert ingredients are identified on an MSDS, it is usually only a partial list.

Freedom of Information Act requests: Federal law (called the Freedom of Information Act, FOIA) guarantees public ac-

cess to EPA's pesticide documents except for specific classes of documents that are exempt from the law.²⁷ Since pesticide manufacturers submit forms that identify inerts to EPA, these documents, at least theoretically, are available through FOIA. For many years, pesticide manufacturers routinely claimed that these documents were exempt from FOIA because that law protects trade secrets and confidential business information from disclosure.

As a result of a lawsuit filed by NCAP in collaboration with the National Coalition Against the Misuse of Pesticides, a federal court ruled in 1996 that inert ingredients do not meet the statutory definition of a trade secret, and can only be protected as confidential on a case-by-case basis. The court also ruled that inerts did not have special protection under FIFRA, the national pesticide law.²⁸ This has opened up an avenue by which inert ingredient information is potentially available to the public. In the three years since the favorable decision in NCAP's lawsuit, NCAP, other organizations, and people acting on their own behalf have filed FOIA requests for the identity of inerts in literally thousands of products. EPA has now responded to several hundred of these requests.²⁹

There are three major drawbacks to the FOIA process. First, it is only available to people who are familiar with the law and know how to make an official request. Second, it is slow; most of NCAP's requests have required months or years to complete. Third, under the process outlined by the decision in NCAP's lawsuits, pesticide manufacturers can claim that the inerts in a particular product are confidential if they justify such a claim to EPA.²⁹ Some manufacturers continue to withhold the identity of some or all of the inerts in their products. We have a long road to travel before full disclosure of inert ingredients is a reality.

Which Manufacturers Withhold Information About Inerts?

According to the trade associations that represent the pesticide industry, the inerts issue is relatively simple. Pesticide manufacturers need to protect the identities of the inert ingredients they use in their pesticide products. As stated by the American Crop Protection Association and five other collaborating trade organizations, "Inert ingredients play a significant role in achieving the unique characteristics of a product. Thus, maintaining the confidentiality of the use of these ingredients

is extremely important."³⁰

When questioned individually, however, pesticide manufacturers' policies vary widely. A few manufacturers (Monsanto Co.³¹) have stated that they will identify inert ingredients to anyone who asks. Others (Lilly/Miller³² and DuPont³³) state that the decision to provide information about inerts is made on a case-by-case basis, in line with the decision in NCAP's FOIA lawsuit. Still others (Astra Zeneca,³⁴ Novartis,³⁵ and Uniroyal Chemical Company³⁶) assert a claim of confidentiality that goes beyond the legal guidelines. Many did not respond to NCAP's request for a description of their policies.

How manufacturers act, however, is clearly more important than how they describe their policies. Based on the Freedom of Information Act requests that EPA has answered in the last three years,

we can start to identify which manufacturers are willing to provide inert ingredient information to the public. Table 1, on page 5, identifies manufacturers that have provided and manufacturers that have withheld information about the identity of inert ingredients. (Note that some manufacturers are listed twice, as they have provided the identity of some inerts but withheld the identity of others.)

Although this sample of responses is still small (just over 100 products and 35 manufacturers), the message is clear. When forced by the Freedom of Information Act to decide whether they need to withhold the identity of inert ingredients, most manufacturers opt for disclosure.

What Next?

Getting information about inerts in pesticides is currently a frustrating, time-

DOES ANYONE REALLY KNOW ?

Can anyone accurately identify all of the ingredients in a pesticide? Chances are that the answer to this question is no.

We assume pesticide manufacturers know what's in their products, but this is an oversimplification. The Trimper story shows that pesticide manufacturers can identify inert ingredients as mixtures that leave hazardous ingredients unidentified.¹

We also assume that EPA knows the ingredients in pesticide formulations. This also is not true. Although manufacturers provide EPA with lists of the ingredients in each of their products, EPA's Office of the Inspector General found that EPA's pesticide database contained hundreds of chemicals that were identified only as "chemical name not available." A random sample of database entries found that almost half contained errors in the identification and coding of

inerts.² For example, NCAP asked EPA for a list of products that contained the inert ingredient naphthalene. EPA located three products containing naphthalene and reported that there were coding errors that made a complete list impossible.³ A quick scan through an MSDS compilation⁴ located 22 products, and there are likely hundreds more.

At this time, accurate laboratory analysis is probably the only way to know with certainty what the ingredients in a pesticide are.

1. Darcey Publications. 1999. Dursban TC inerts benzene, trimethylbenzene, suspects in boy's illness following termiticide mishap. *Pesticide Report* 3(1):1-8, June 12.
2. U.S. EPA. Office of the Inspector General. 1991. Report of audit. Inert ingredients in pesticides. Washington D.C., Sept. 27.
3. Personal communication between Holly Knight, NCAP, and Calvin Furlow, EPA Public Information and Records Integrity Branch. Spring 1997.
4. *MSDS reference for crop protection chemicals*. Fourth edition. 1992. New York; Chemical and Pharmaceutical Press.

consuming, and unacceptable process. Not even medical professionals have easy access to complete information. Material safety data sheets are a relatively easily accessible source of information, but they don't identify all inerts; many MSDSs identify none. The Freedom of Information Act process is cumbersome, time-consuming, and does not always provide the information we are seeking. Clearly, we need a better way.

In January 1998, NCAP and 180 supporting organizations submitted a rule-making petition to EPA asking the agency to require that all pesticide ingredients be identified on product labels. A parallel petition was submitted by the attorneys-general from New York, Alaska, Connecticut, Guam, Massachusetts, Minnesota, New Hampshire, and Wisconsin. Eighty additional organizations signed on to the petition in 1999.

This regulatory change would make inert ingredient information easily available to pesticide users and the general public. Since most pesticide manufacturers, based on NCAP's experience, will identify inerts, there should be no major obstacle blocking EPA's action. However, EPA has not yet decided how to respond to the petition.

Conclusion

Information is one of the cornerstones of a democracy; without accurate facts it is impossible for citizens to make responsible decisions. The popular support for all kinds of right-to-know programs demonstrates just how important information is to our society. Inert ingredients in pesticides should be no exception.

Although existing methods for getting information about inerts are awkward and time-consuming, a majority of the pesticide manufacturers approached through the Freedom of Information Act have been willing to stop withholding information about inerts. EPA needs to require that the other manufacturers join with their competitors and provide this information. It's time to end inert secrecy and identify all pesticide ingredients on product labels. ♣



Pesticide labels should identify all ingredients.

References and Notes

1. Code of Federal Regulations. Title 40. Sec. 158.240-158.740.
2. U.S. EPA. 1987. Inert ingredients in pesticide products; Policy statement. *Fed. Reg.* 52(77): 13305-13309, Apr. 22. Also available at www.epa.gov/oppr001/inerts/fr52.htm.
3. Getting an accurate number of chemicals used as inerts is difficult. The number used here, 2300, is based on NCAP's counts from EPA lists. EPA's own count is 2200 inerts as of January 1999. See U.S. EPA. Office of Pesticide Programs. 1999. Status report for PPDC: "Inert" or "other" ingredients in pesticide products. www.epa.gov/oppead1/cb/ppdc/inert.htm, Jan. 7. Pp.2-3.
4. This information comes from an analysis done by NCAP and published in "Worst Kept Secrets: Toxic Ingredients in Pesticides," an NCAP report published in January 1998. The actual numbers have been updated as EPA updates its list of chemicals used as inert ingredients.
5. International Agency for Research on Cancer. 1997. Silica. <http://193.51.164.11/htdocs/Monographs/Vol68/SILICA.HTM>.
6. Acros Organics. 1998. Material safety data sheet: Naphthalene 99%. Fairlawn NJ www.fishersci.com.
7. U.S. Dept. of Health and Human Services. Agency for Toxic Substances and Disease Registry. 1995. Toxicological profile for total xylenes. Atlanta, GA.
8. International Agency for Research on Cancer. 1997. Brilliant Blue FCF diammonium and disodium salts. <http://193.51.164.11/htdocs/Monographs/Vol16/BrilliantBlueFCF.HTM>.
9. National Cancer Institute. 1995. Questions and answers about soft tissue sarcoma. http://cancer.net.nci.nih.gov/clinpdq/site/Questions_and_Answers_About_Soft_Tissue_Sarcoma.htm.
10. Darcey Publications. 1999. Dursban TC inerts benzene, trimethylbenzene, suspects in boy's illness following termiticide mishap. *Pesticide Re-*

- port* 3(1):1-8, June 12.
11. U.S. EPA. Office of Pesticide Programs. 1999. USEPA/OPP chemical ingredients database. www.cdpr.ca.gov/docs/epa/epachem.htm.
12. Personal communication with Bruce Trimmer, July 19, 1999.
13. DowAgroSciences. 1998. Material safety data sheet. Equity Termiticide Concentrate. www.dowagro.com.
14. DowAgroSciences. 1998. Material safety data sheet: Dursban TC Termiticide Concentrate. www.dowagro.com.
15. International Agency for Research on Cancer. 1987. Benzene (Group 1). IARC Monographs on the evaluation of carcinogenic risk to humans. (Suppl. 7):120. <http://193.51.164.11/htdocs/Monographs/Suppl7/Benzene.html>.
16. U.S. EPA. Office of Pesticides and Toxic Substances. 1991. List of pesticide product inert ingredients. Washington, D.C., July 22.
17. U.S. Dept. of Health and Human Services. Agency for Toxic Substances and Disease Registry. 1998. Toxicological profile for toluene. Atlanta, GA.
18. Aldrich Chemical Co. 1998. Material safety data sheet: 1,2,4-trimethylbenzene. Milwaukee, WI. www.sigma-aldrich.com.
19. Aspelin, A.L. 1997. Pesticides industry sales and usage: 1994 and 1995 market estimates. U.S. EPA. Office of Pesticide Programs. Biological and Economic Analysis Div. Washington, D.C.
20. U.S. EPA. 1999. In the matter of: Pesticide Program Dialogue Committee. www.epa.gov/oppead1/cb/ppdc/transcript.htm, Jan. 7-8. p. 307.
21. Winegar, K. 1994. Trouble in the sky: Pesticide use on aircraft. *Informed Consent* (Jan./Feb.):4-7,36-38.
22. Declaration of Virgil Boekelheide. In *Northwest Coalition for Alternatives to Pesticides et al v. Browner*. 941 F. Supp. 197 (D.D.C. 1996).
23. Code of Federal Regulations. Title 40. Sec. 2.307.
24. U.S. EPA. Office of Pesticide Programs. Public Information and Records Integrity Branch. 1999. E-mail from Calvin Furlow, July 30.
25. Code of Federal Regulations. Title 29. Sec. Sec. 1910.1200(f)(11).
26. Code of Federal Regulations. Title 29. Sec. Sec. 1910.1200(g)(2)(c)(1).
27. U.S. EPA. Office of Pesticide Programs. 1994. Pesticide regulation (PR) notice 94-3. www.epa.gov/opppmsd1/PR_Notices/pr94-3.html.
28. *Northwest Coalition for Alternatives to Pesticides et al v. Browner*. 941 F. Supp. 197 (D.D.C. 1996).
29. U.S. EPA. Office of Pesticide Programs. 1999. Status report for PPDC: "Inert" or "other" ingredients in pesticide products. www.epa.gov/oppead1/cb/ppdc/inert.htm, Jan. 7.
30. American Crop Protection Assoc., Chemical Manufacturers Assoc., Chemical Producers and Distributors Assoc., Chemical Specialties Manufacturers Assoc., International Sanitary Supply Assoc., and Responsible Industry for a Sound Environment. 1998. Letter to Lynn Goldman, Marcia Mulkey, and Don Sadowski. Washington, D.C.
31. Monsanto Co. 1999. Glyphosate health and safety — inerts disclosure. www.monsanto.com/ag/articles/G-hhs04.HTM.
32. Personal communication with John Wohler, Garden Grow regulatory manager. July 22, 1999.
33. Personal communication with Gabrielle King, DuPont communications. July 13, 1999.
34. Personal communication with Ed Ready, Astra Zeneca regulatory affairs. July 22, 1999.
35. Personal communication with Dick Feulner, Novartis regulatory affairs manager. July 13, 1999.
36. Kasanow, D. 1997. Letter to S.Y. Street. U.S. EPA. Office of Pesticide Programs. Public Response and Program Resources Branch. McKenna & Cuneo, Washington D.C., Feb. 7.