Rachel's Environment & Health News
#533 - How They Lie, Part 6: The True Story of Alar, Part 4
February 12, 1997

In late February, 1989, Natural Resources Defense Council (NRDC), a mainstream environmental organization, published a lengthy report on pesticides endangering children's health.[1] The CBS TV news show, "60 Minutes," publicized NRDC's findings February 26, 1989. Most of the "60 Minutes" show was spent describing the government's pesticide- regulation process, which was incapable of keeping industrial carcinogens (cancer-causing chemicals) out of the nation's food supply. However, the opening images of "60 Minutes" highlighted an apple overlaid by a skull and crossbones while a voice described the threat from Alar, and that is what stuck in peoples' minds. To this day, most people think the "60 Minutes" show was all about Alar on apples. In reality, the show was about government failure to protect the food supply from cancer-causing industrial chemicals --a problem that still has not been resolved.

Back in 1989, Alar offered an excellent example of failed regulation. By 1989, high doses of Alar (or its contaminant and breakdown byproduct, UDMH) had been shown to cause cancer in male and female mice, male and female hamsters, and male rats. The International Agency for Research on Cancer had labeled UDMH a "possible" carcinogen in humans and the U.S. government's National Toxicology Program had labeled UDMH a "probable" human carcinogen, as had the Carcinogen Assessment Group within U.S. Environmental Protection Agency [EPA]. (See REHW #530, #531, #532.) The acting chief of the EPA, John A. Moore, had said on February 1, 1989, "There is an inescapable and direct correlation between exposure to UDMH and the development of life-threatening tumors in mice."[2] Yet Alar/UDMH was still legal for apples.

Government officials did not miss the point of the "60 Minutes" program, and they moved quickly to defend their record. On March 16, 1989, Frank E. Young, chief of the Food and Drug Administration (FDA), issued a press release[3] which offered a joint statement by FDA, EPA and USDA [U.S. Department of Agriculture], reassuring the public that apples were safe. The press release made several key points:

1. A recent progress report of [Uniroyal's] ongoing studies shows that a breakdown product of Alar [UDMH] causes certain kinds of tumors in mice.

2. FDA monitors apples and often finds no Alar, or amounts of Alar that are less than the allowable limit.

3. Only 5% of the U.S. apple crop was treated with Alar in 1988.

In sum, the government's assurances boiled down to this: yes, Alar/UDMH causes cancer in animals but Alar isn't used on most apples, so apples and apple products are safe.

As it turned out, this attempt to reassure the public backfired. In May, 1989, CONSUMER REPORTS (CR) magazine published an independent analysis of Alar on apples purchased in the New York area and reported finding Alar residues on 55% of them.[4] Edward Groth of Consumers Union subsequently revealed that FDA itself has found Alar on 38% of the apples it had tested in 1988.[5] Furthermore, CR revealed that the FDA was using antiquated and insensitive laboratory techniques which could not measure Alar below 500 parts per billion (ppb). As CONSUMER REPORTS said, "Looking for daminozide [Alar] in apple juice with PAM II [the test method used by FDA] is like trying to catch speeders with a radar gun that doesn't work for speeds under 100 mph." [FDA subsequently adopted the more sensitive test method recommended by CONSUMER REPORTS.] After CR reported its independent Alar measurements, several state governments and news organizations conducted surveys of their own and reported finding Alar on 22% to 79% of red apples all across the country.[6] On average, it appears, about half of all red apples for sale in 1989 had been sprayed with Alar, not 5%. It was clear that FDA, EPA and USDA were badly misinformed or were lying.

The apple industry, too, began distributing false information about Alar. The industry paid more than a million dollars to Hill & Knowlton, a large PR firm, to design and run ads saying that you would have to eat a box-car-load of apples each day to be harmed by Alar.

The rationale behind such an argument is that laboratory animals were exposed to high doses of Alar and UDMH, to see if high doses would produce cancers. For humans to be exposed to equivalent high doses, they would have to eat a box-car-load of apples each day. However, this is a dishonest representation of the science involved.

Just because high doses cause cancer in animals, it does not mean that ONLY high doses cause cancer in animals. Among public health authorities in the U.S., the assumption is that cancer-causing chemicals follow a linear dose-response curve: if 10 milligrams of a substance causes 4 cancers in 10,000 people, then 5 milligrams will cause two cancers in 10,000 people and 2.5 milligrams will cause one cancer in 10,000 people. However, it is also true that 2.5 milligrams will also cause 2 cancers in 20,000 people and 4 cancers in 40,000 people. Under this linear dose-response assumption, exposing a large population (such as half of all the people who eat red apples) to a carcinogen like Alar/UDMH will cause cancer in some of them, even though none of them received a high dose.

High doses are used in animals studies because only 20 to 200 animals are used in any experiment. This is so because it is expensive to maintain large populations of animals under experimental conditions. If a certain dose of a cancer-causing chemical were sufficient to cause cancer in one out of every 10,000 animals, testing that same dose on 200 animals would not reveal any effect. (A chemical that caused cancer in one among every 10,000 exposed people would create a real public health calamity; if all 250 million Americans were exposed to such a chemical, it would cause 25,000 cancers. This would be a public health disaster by anyone's reckoning.) Therefore, to try to detect carcinogens that might affect only one in 10,000, or one in 100,000 animals (or people), yet not test more than about 200 animals (for cost reasons), high doses must be used to see if any effect can be observed. This approach may not satisfy everyone, but no one has yet suggested a better alternative.

Therefore, there are good reasons for testing high doses on animals, and there is no good reason for saying that people have to be exposed to the same high doses for them to be endangered. The argument, "You would have to eat a box-card-load of apples every day to be endangered by Alar" is specious, false, not valid, untrue.

John Rice of the International Apple Institute admitted in a public forum in June, 1989, that the "boxcar" ads were a dishonest representation of the science of Alar and cancer, but he justified the dishonesty by saying that the "60 Minutes" use of an apple with a skull and crossbones was dishonest, too.[7] (The "boxcar" argument was first used by Uniroyal, the manufacturer of Alar, in 1985 and it was as dishonest then as it was in 1989.[8])

Another common argument from the apple industry, and from scientists who spend their lives pooh-poohing the threats from farm chemicals (such as Bruce Ames and Lois Gold[9]), was this: mice were given such high doses of Alar and UDMH that they were poisoned, so it's not fair to claim that Alar or UDMH causes cancer at lower doses. In technical jargon, the mice were given Alar at levels that exceeded their "maximum tolerated dose" or MTD. Today, in modern cancer tests, typically a group of animals is given a dose just below the MTD, another group is given half the MTD and a third group is given zero. The original studies by Bela Toth in 1973 and 1977 (see REHW #529) gave all the mice only one dose --23.3 milligrams of UDMH per kilogram of body weight per day (mg/kg per day). This dose did exceed the MTD and some of the animals suffered liver damage. However, this dose also produced rare cancers of the blood vessels in 42 out of 50 mice, providing an

important clue to the characteristics of UDMH.

When EPA finally forced Uniroyal to conduct new studies of UDMH in mice in the period 1987-1991, mice were given 13 mg/kg per day and 7.3 mg/kg per day. Even Bruce Ames and Lois Gold had to admit that 7.3 mg/kg per day did not approach the MTD,[10] yet this amount of UDMH caused cancer in 31 out of 67 mice (46%) and the 13 mg/kg per day dose caused cancer in 67% of the exposed mice.[11] Despite whatever shortcomings the Toth studies may have had, Toth's 1973 and 1977 findings were corroborated by Uniroyal's studies, using up-to-date protocols. Alar/UDMH DOES cause cancer and no prudent parent would want his or her infants or children to eat or drink such a substance. Even if Bruce Ames were correct when he asserts that the vast majority of cancer-causing chemicals in our food are naturally-occurring --an assertion that has many problems of its own --who in their right mind would expose their infant or child to an ADDITIONAL, unnecessary, human-created danger from Alar/UDMH if they could avoid it?

In November of 1989, Uniroyal voluntarily took Alar off the market in the U.S. in response to public anger. The public was no doubt angry at being lied to repeatedly by government, Uniroyal, grocery stores, and the apple growers' association. Uniroyal recalled existing supplies of Alar, then repackaged and re-labeled them B-Nine, for use on flowers. (Alar and B-Nine are separate Uniroyal products with identical chemical composition.) A Material Safety Data Sheet (MSDS) for B-Nine issued by Uniroyal in 1990 said "no evidence of carcinogenicity."[12]

In 1992, based on the Uniroyal studies, EPA reduced its estimate of the cancer danger from Alar/UDMH by half, to about 23 cancers per one million people exposed for a lifetime.[13] However, in 1993, the National Academy of Sciences told EPA that it should be multiplying by another safety factor of 10 when calculating the hazards of chemicals to children because children are more sensitive than adults.[14] If we follow the National Academy of Science's advice, the latest assessment of the Alar hazard would be 23 x 10 = 230 cancers per million children exposed. Given the uncertainties surrounding any such assessment, this is not different from NRDC's 1989 estimate of the hazard, which was 240 cancers per million children exposed. And that is where the science of Alar stands today.

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

=====

[1] Bradford H. Sewell, Robin M. Whyatt and others, INTOLERABLE RISK: PESTICIDES IN OUR CHILDREN'S FOOD (New York: Natural Resources Defense Council, 1989). This report is out of print and no longer available from NRDC.

[2] Al Heier, "EPA Accelerates Process to Cancel Daminozide [Alar] Uses on Apples; Extends Tolerance," EPA ENVIRONMENTAL NEWS [press release] February 1, 1989. Heier can be reached at (202) 260-4374.

[3] U.S. Food & Drug Administration, untitled press release [P89-12] dated March 16, 1989.

[4] "Alar: Not gone, not forgotten," CONSUMER REPORTS May, 1989, pgs. 288-292. On test methods, see "Test methods:" The weak link?" in the same issue, pg. 289.

[5] Edward Groth III, "Alar in Apples," SCIENCE Vol. 244 (May 19, 1989), pg. 755.

[6] Numerous press reports of the results of independent testing of apples were submitted to EPA by Consumers Union (publisher of CONSUMER REPORTS) in: Edward Groth III and Mark Silbergeld, "Comments of Consumers Union of U.S., Inc. on the EPA's Proposal to Extend the Existing 20 ppm Tolerance for Daminozide Residues in Apples and Apple Products (FEDERAL REGISTER, February 10, 1989, p. 6392," (Mount Vernon, N.Y.: Consumers Union, April 11, 1989).

[7] Personal communication from Edward Groth III of Consumers Union February 12, 1997, who was present at a panel discussion when Mr. Rice made his statement.

[8] Nancy Jenkins, "Fruit-Chemical Ban Weighed," New York Times August 30, 1985, pg. B4.

[9] Bruce Ames and Lois Swirsky Gold, "Pesticides, Risk, and Applesauce," SCIENCE Vol. 244 (May 19, 1989), pgs. 755-757. See also: Jean Marx, "Animal Carcinogen Testing Challenged," SCIENCE Vol. 250 (November 9, 1990), pgs. 743-745. See also, Lois Swirsky Gold and others, "Rodent Carcinogens: Setting Priorities," SCIENCE Vol. 258 (October 9, 1992), pgs. 261-265. The Ames/Gold thesis, that high doses cause cell death followed by cell regeneration which leads to cancer where cancer would not have otherwise occurred, seems to have been refuted and put to rest; see "Cell Proliferation and Chemical Carcinogenesis," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 101, Supplement 5 (December, 1993), which is the proceedings of a conference held January 14-16, 1992, sponsored by the National Institute of Environmental Health Sciences and others.

[10] Lois Gold quoted in Eliot Marshall, "A is for Apple, Alar, and... Alarmist?" SCIENCE Vol. 254 (October 4, 1991), pgs. 20-22.

[11] Toth's and Uniroyal's (unpublished) findings are compared in Adam Finkel, "Alar: The Aftermath," SCIENCE Vol. 255 (February 7, 1992), pgs. 65-66. And see Adam Finkel, "Toward Less Misleading Comparisons of Uncertain Risks: The Example of Aflatoxin and Alar," ENVIRONMENTAL HEALTH PERSPECTIVES Vol. 103, No. 4 (April 1995), pgs. 376-385.

[12] Beth Rosenberg, "The Story of the Alar Ban: Politics and Unforeseen Consequences," NEW SOLUTIONS Vol. 6, No. 2 (Winter 1996), pgs. 34-50. B-Nine MSDS, see pg. 40. Subscriptions to the quarterly NEW SOLUTIONS, are $40/year from: P.O. Box 281200, Lakewood, Colorado 80228-8200; phone (303) 987-2229.

[13] U.S. Environmental Protection Agency, "Statement by the U.S. Environmental Protection Agency on Alar" (Washington, D.C.: U.S. Environmental Protection Agency, February 25, 1992).

[14] Philip J. Landrigan and others, PESTICIDES IN THE DIETS OF INFANTS AND CHILDREN (Washington, D.C.: National Academy Press, 1993), pg. 362.

Descriptor terms: alar; pesticides; apples; nrdc; natural resources defense council; epa; bans; regulation; daminozide; udmh; carcinogens; cancer; uniroyal; iarc; carcinogen assessment group; cag; intolerable risk: pesticides in our children's food;

Rachel's Environment & Health News is a publication of the Environmental Research Foundation, P.O. Box 160, New Brunswick, NJ 08903-0160; Phone: (732) 828-9995; Fax (732) 791-4603; E-mail: erf@rachel.org; http://www.rachel.org. Unless otherwise indicated, Rachel's is written by Peter Montague.