United States General Accounting Office

GAO

Report to the Chairman, Committee on Agriculture, Nutrition, and Forestry, United States Senate

October 1993

PESTICIDES

Limited Testing Finds Few Exported Unregistered Pesticide Violations on Imported Food

GAO/RCED-94-1

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-203051

October 6, 1993

The Honorable Patrick J. Leahy
Chairman, Committee on Agriculture,
Nutrition, and Forestry
United States Senate

Dear Mr. Chairman:

While pesticides are used extensively to enhance worldwide agricultural productivity, human exposure to pesticide residues above certain levels can cause adverse health effects. Over the past several years, public concern has heightened about pesticide residues in or on food. In particular, the perception is widespread that some pesticides that are not permitted to be used on food in the United States, but are permitted to be exported to other countries, may be returning to the United States as residues on imported food. This process is sometimes referred to as the "Circle of Poison."

At your request, we (1) identified unregistered pesticides[1] produced in the United States for export and (2) determined, on the basis of the results of Food and Drug Administration (FDA) and U.S. Department of Agriculture (USDA) testing, whether these pesticides are returning to the United States as residues on imported food. Because you were particularly interested in products imported from Mexico and Mexico is the largest exporter of fruits and vegetables to the United States, we concentrated our efforts on FDA's monitoring of these foods. Furthermore, we sought to identify any limitations that prevent FDA from testing for U.S.-manufactured unregistered pesticides returning to the United States on imported foods. To meet these objectives, we obtained and analyzed test results for the latest 3 complete fiscal years, 1989-91.

Results in Brief

GAO identified 27 unregistered food-use pesticides that were manufactured in the United States for export. Nineteen were never registered for food use in the United States, including six that FDA was not aware of until our review. Food-use registrations for the other eight have been canceled.

[1]Unregistered pesticides are those containing an active ingredient that either was (1) never registered or (2) previously registered with the Environmental Protection Agency, then subsequently canceled. An active ingredient is the component in any pesticide product that kills, or otherwise controls, target pests. Pesticides are regulated primarily on the basis of active ingredients.

In fiscal years 1989-91, FDA tested for 14 of the 27 exported unregistered pesticides and found 88 violations involving 4 different pesticides. One pesticide, monocrotophos, accounted for 69 of the 88 violations. Testing results for Mexican produce were similar to results for produce worldwide; Mexican produce accounted for about half of the violations found. For most of the 14 pesticides, FDA tested over 20,000 samples. FDA did not test imported produce for the 13 remaining pesticides because it either did not believe that testing was warranted or was unaware that the pesticides existed. It is not possible to determine whether the pesticides responsible for all of the violations originated in the United States because of difficulties in tracking the production and use of exported unregistered pesticides. Of the four pesticides for which FDA found residue violations, two are manufactured in other countries besides the United States.

USDA tested imported meat and poultry for only 3 of the 27 unregistered pesticides and found no residue violations among the 7,200 samples tested in fiscal years 1989-91. USDA science officials said that food-use pesticide residues would not be expected to be found in animal tissue. For most unregistered pesticides used overseas, USDA relies on foreign countries' laboratories for monitoring pesticide residues. USDA certifies testing standards at these laboratories to be "at least equal to" U.S. standards.

Information gaps and minimal legislative requirements prevent FDA from fully testing for some unregistered pesticides manufactured in the United States for export that might be returning to this country on imported food. Because official agency sources do not have complete data, FDA relies on commercial market data (pesticide sales and usage information for a particular country) and reference sources (texts providing descriptive information about a pesticide and its uses) to identify pesticides for testing. However, these sources, too, are incomplete; indeed, they failed to identify over 20 percent, or six, of the pesticides on our list. In addition, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) does not require U.S. manufacturers to provide the Environmental Protection Agency (EPA) or FDA with samples, test methods, or pesticide-use information for unregistered pesticides. Recently, a pesticide manufacturers' trade association voluntarily provided FDA with reference standards[2] and test methods for the unregistered pesticides that its members manufacture. However, this constituted a one-time event, rather than an established practice of keeping FDA apprised of new pesticides and how to test for them. As a result, gaps in FDA's knowledge of unregistered

[2]A reference standard is a pure pesticide sample used for calibrating test equipment for detecting pesticide residue.

pesticides, how to test them, and which commodities to test are likely to continue.

Background

According to USDA estimates, the United States imports between 10 and 20 percent of its total supply of fruits and vegetables. This amounted to about 6.9 million metric tons of fresh and frozen fruits and vegetables in calendar year 1991. Six countries supplied 80 percent of this total. The largest single supplier is Mexico, which provided 30 percent of the total in 1991. (For more information on Mexico's status as an exporter of fruits and vegetables to the United States, see app. I.)

In 1991, the United States imported 1.2 million metric tons of meat and poultry, or about 6 percent of the nation's total supply. Mexico supplied less than 1 percent of the meat and poultry imports.

EPA estimated that in 1991 about 400 million pounds of U.S.- manufactured pesticides were exported; for 1990, EPA's estimate was 390 million pounds. EPA does not have a figure for what portion of that total was unregistered. However, the National Agricultural Chemicals Association surveyed its members about pesticide exports in 1990. The members reported exports of 371 million pounds, of which about 9 percent, or 33.7 million pounds, was unregistered.

Three federal agencies—EPA, FDA, and USDA—share responsibility for regulating pesticides, including monitoring pesticide residues in the U.S. food supply.

EPA registers or licenses the uses of pesticides under FIFRA and sets tolerances[3] for pesticide residues under the Federal Food, Drug, and Cosmetic Act (FFDCA). To register a pesticide, EPA must determine that the pesticide will not cause any "unreasonable adverse effects on the environment" or on humans. Over the years, EPA has canceled, suspended, or significantly restricted the registrations of a number of pesticides (or pesticide product ingredients) because of the unreasonable hazards they posed to humans or the environment.

Under FIFRA, as amended, EPA has the authority to regulate the sale and use of pesticides in the United States. Other than certain record-keeping and labeling requirements, FIFRA does not provide EPA with the authority to regulate unregistered pesticides manufactured solely for export. A

[3]A tolerance is the maximum amount of a residue permitted in or on a food.

pesticide may be unregistered because (1) its registration was canceled, (2) it is in the process of being registered, or (3) the manufacturer chose not to register it here. For example, manufacturers have stated that the market for some pesticides in the United States is too small to warrant applying for a registration.

Under FFDCA, FDA enforces tolerances set by EPA on raw agricultural commodities and processed foods. Agricultural commodities that FDA examines include all unprocessed fruits, vegetables, eggs, nuts, and grains. FDA field organizations perform sampling and testing of imported foods at the time of entry. FDA has 6 regions, 21 districts, and 12 laboratories throughout the country that test for pesticide residues. Districts that have entry points for imported food are responsible for sampling a certain number of food items entering, selecting a sample from a small portion of those shipments, and sending the sample to FDA's laboratories to be tested for pesticide residues.[4]

USDA's Food Safety and Inspection Service (FSIS) is responsible for monitoring imported meat and poultry for pesticide residues. Federal meat and poultry inspection laws require countries that export meat and poultry to the United States to have inspection programs that test for contaminants before the food is exported. FSIS reviews foreign inspection systems to ensure that their requirements are equal to U.S. requirements. FSIS also reinspects samples of imported meat and poultry products as they enter the United States. Data derived from import reinspection constitute a check on the effectiveness of the foreign inspection systems. We did not evaluate FSIS's foreign inspection and monitoring program; however, GAO is currently conducting a review of FSIS's residue monitoring program, which will encompass some aspects of the import inspection program.

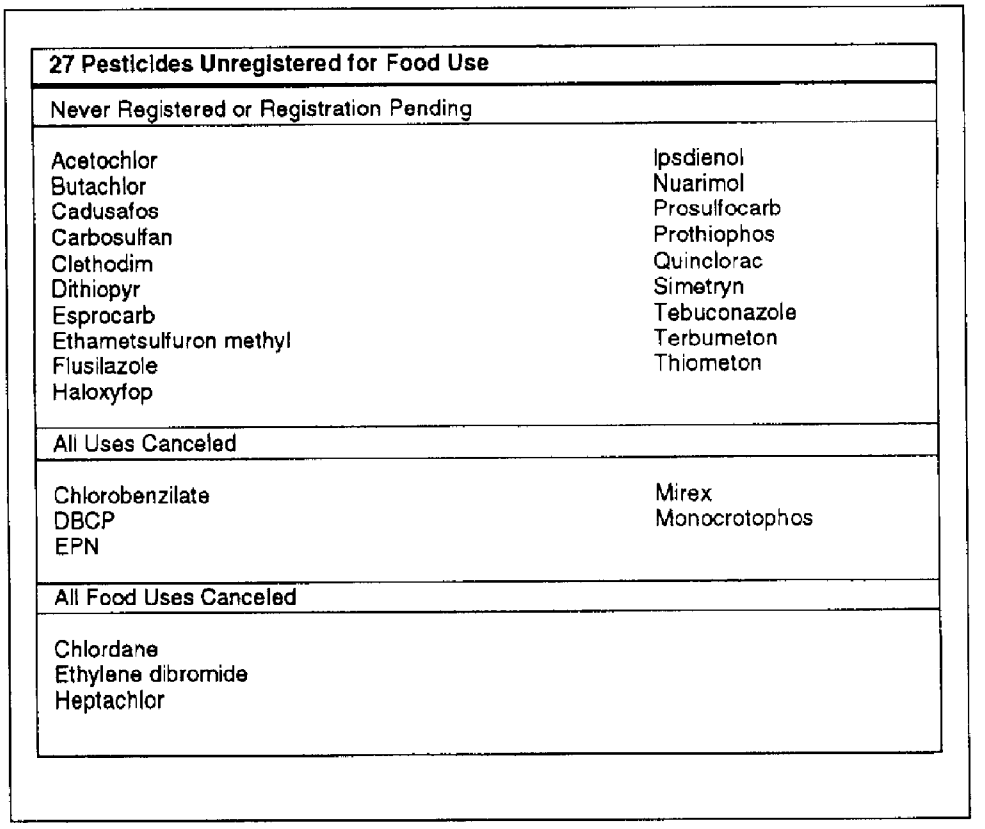
United States Produces and Exports 27 Unregistered Pesticides

We identified 27 unregistered food-use pesticides that were produced in the United States and exported to other countries from 1989 through 1991. (See fig. 1.) Of these 27 pesticides, 19 have never been registered, 5 have been canceled by EPA or voluntarily canceled by the manufacturer, and 3 have had their food uses canceled. For the latter three, some nonfood uses, such as ant and termite control, remain. (See app. II, which describes our objectives, scope, and methodology, for a discussion of the derivation of this list. App. III provides additional information about the unregistered

[4]Imported food containing pesticide residues is in violation of the Federal Food, Drug, and Cosmetic Act unless the pesticide residue is exempted from a tolerance requirement, or the residue is below the tolerance level established for the particular pesticide on the specific food.

pesticides on the list, including their current registration and tolerance status.)

Figure 1: 27 Pesticides Produced in and Exported From the United States That Were Not Registered for Food Use, 1989-91



Although Limited, Testing Found Few Instances of Violative Residues

FDA and USDA testing conducted in 1989-91 revealed few violations of residue tolerances. However, neither agency tested for all unregistered pesticides on our list. In those instances in which violations occurred, available records made it difficult to determine whether the United States was the pesticide's country of origin.

FDA Tested for 14 Pesticides, Found Few Residue Violations

From 1989 through 1991, FDA tested imported produce for 14 of the pesticides on our list. It tested more than 23,000 samples for each of 11 of the 14 pesticides, 18,000 samples for 1 pesticide, and over 1,000 samples for each of the last 2 pesticides. It found 88 violations involving four pesticides (see table 1). One pesticide—monocrotophos, an insecticide used on various imported fruits and vegetables—accounted for 69 of the

88 violations, a violation rate of 0.28 percent of samples taken. The three other pesticides had violation rates at levels of less than 0.05 percent of the samples taken. (See table IV.1, in app. IV, for a complete list of the pesticides FDA tested for, the number of samples tested, and the number of detections and violations found).

The 14 pesticides tested for included 6 of the 8 canceled and 8 of the 19 never-registered pesticides. An FDA official said that the two canceled pesticides that FDA did not test for—DBCP and ethylene dibromide—are both used primarily as fumigants that dissipate rapidly and would not be likely to leave significant residues.

Table 1: Pesticide Residue Violations on Food Imported From All Countries in Fiscal Years 1989-91

Pesticide residue found	Number of samples tested	Number of violations	Percent of violations
Monocrotophos	24,382	69	0.28
EPN	18,186	7	0.04
Prothiophos	25,551	6	0.02
Heptachlor	25,029	6	0.02

All four pesticides found are insecticides, and all but prothiophos are canceled pesticides. For the canceled pesticides, scientific data establish their potential to harm humans and the environment. For example, monocrotophos is acutely toxic orally and can cause nervous system problems. For prothiophos, which is unregistered, less information is available, but it indicates adverse reproductive effects. (For more information on health effects of these four pesticides, see app. V.)

Although the four pesticides that had residues exceeding acceptable levels are used in many countries and on many commodities, FDA found their residues on only a few specific commodities, or on food from the same few countries, during the 3-year period we reviewed. For example, although EPN may be used on more than 20 commodities and FDA testing for EPN included more than 100 food samples from each of 23 countries, all seven EPN violations occurred on only one commodity from one country—peppers from Mexico. A similar situation exists with prothiophos. FDA tested for it in over 25,000 samples and found six violations. Five of the six violations found were on gherkins imported from Sri Lanka in 1991, and the sixth involved mustard greens imported from Thailand in 1989.

Testing results for Mexican produce were similar to results for produce worldwide. Of the four pesticides that FDA found to be in violation, three were found on Mexican produce. Mexico accounted for 45, or just over half, of the 88 total tolerance violations, including all 7 for EPN (see table 2).

Table 2: Pesticide Residue Violations Found on Imported Mexican Food in Fiscal Years 1989-91

Pesticide residue found[a]	Number of samples tested	Number of violations	Percent of violation
Monocrotophos	10,162	34	0.33
EPN	7,291	7	0.10
Heptachlor	10,116	4	0.04

[a]Monocrotophos and EPN have authorized uses in Mexico, but heptachlor does not.

In addition, EPA records show that 4 of the 27 unregistered pesticides produced in and exported from the United States were shipped to Mexico from 1989 to 1991. Two of these 4 were among the 14 pesticides FDA tested for; one of the 2 was found to have residues above tolerance levels. However, the pesticide found above tolerance levels is also manufactured overseas, so the United States may not have been the source of the pesticide.

FDA Did Not Test for 13 of the 27 Pesticides

FDA did not test for 13 of the pesticides on our list. These 13 consist of 11 never-registered and 2 canceled pesticides. It did not test for 6 of the 13 for one or both of the following reasons: (1) The pesticide is unlikely to leave a residue or (2) the United States imports low volumes of the products from countries in which the pesticide was likely to be used. For a seventh pesticide, an FDA official said no testing was done because the pesticide had no apparent adverse health characteristics that would warrant testing.

FDA was not testing for the other six pesticides because it was not aware that they existed. These six represent over 20 percent of the 27 unregistered pesticides. In May 1990, FDA compiled a list of nearly 700 pesticides that "could conceivably be used in domestic or foreign food production," but the list did not contain these 6 pesticides. FDA became aware of these pesticides only in the fall of 1991, when GAO, EPA, and the National Agricultural Chemicals Association reconciled lists of unregistered exported pesticides that EPA and the Association had

prepared for the Senate Committee on Agriculture, Nutrition and Forestry. (App. VI identifies untested pesticides.)

FSIS Tested for Three Pesticides, Found No Violations

FSIS tested imported meat and poultry for 3 of the 27 pesticides on our list—chlordane, heptachlor, and mirex. It found no violations among the 7,200 samples tested. FSIS's policy is to test imports for the same pesticides that are tested for domestically. The three pesticides that the Service tests for were once registered in the United States, persist in the environment, and have shown evidence of accumulating in the tissue of animals.

For the remaining 24 pesticides, FSIS officials said that, in the absence of specific information on health concerns about residues, they would not test nor require foreign countries to test for these pesticides. According to the officials, their position rests in part on the fact that, because registered food-use pesticides generally do not demonstrate a tendency to accumulate in animal tissue, they do not believe that unregistered food-use pesticides would behave differently. In addition, they stated that developing test methods for pesticide residues is expensive. However, should evidence raising a concern about these pesticides' residue come to their attention, FSIS would assess what steps should be taken to ensure food safety. They knew of no such information about these pesticides.

In general, for unregistered pesticides used overseas, FSIS relies on its certification of foreign countries' laboratories to ensure that residues of unregistered pesticides are not on imported meat. Foreign laboratories must meet a standard "at least equal to" U.S. requirements. Foreign countries exporting meat to the United States certify that the meat meets U.S. standards, including the absence of residues of pesticides not registered for food use in the United States. Other than the pesticides tested for in the domestic program, FSIS does no independent testing for these unregistered pesticides.

Not All Residues of Unregistered Pesticides May Come From U.S.-Manufactured Pesticides

It is difficult to establish the origin of residues from unregistered pesticides found on imported food, for two reasons. First, from available records, it is not possible to track where all U.S.-exported unregistered pesticides were sold or used. Second, many of the 27 unregistered pesticides are manufactured in other countries besides the United States.

Records that EPA and the U.S. Customs Service maintain generally do not identify specific pesticides exported, quantities shipped, their destinations,

or crop uses. For example, EPA requires for its annual-production data base that manufacturers report quantities of pesticides exported but not export destinations. EPA obtains destination information, but often not specific pesticide identification, under FIFRA's section 17 export notification requirements. U.S. Customs' export declaration records often identify pesticides only by tariff classification categories. In addition, these sources do not identify foreign crop uses. Without such information, these records cannot be used to track U.S.-exported pesticides.

Recently, EPA has taken steps to improve its reporting systems, which should improve information on exported pesticides. However, these changes will not provide information on crop uses of exported pesticides. (For information on EPA's efforts, see app. VII.)

Furthermore, we found that at least 12 of the 27 unregistered pesticides are manufactured both overseas and in the United States. At least 2 of the 12 pesticides produced abroad are imported into the United States in their crude state, or technical grade, for formulation into commercial products for sale abroad, according to pesticide manufacturing officials. In fact, two of the four pesticides causing the violations were, and may still be, produced overseas, as well as in the United States. As a result, we were able to determine that only two pesticides—heptachlor and prothiophos—that left unacceptable levels of residue came from the United States. (See app. VIII for additional information about foreign production of unregistered pesticides.)

A Lack of Information Prevents FDA From Testing for All Possible Exported Pesticides

FDA lacks sufficient information to identify all exported unregistered pesticides and to identify on what crops these pesticides are used. FDA needs this information to determine which imported crops to test for pesticide residues. However, even if FDA had foreign crop pesticide usage data, it could not test for some pesticides because FIFRA does not require manufacturers of unregistered pesticides to give FDA pesticide reference standards and test methodologies.

Commercial and Reference Sources Do Not Contain Complete Pesticide Information

FDA relies on commercial market data (data that identify what pesticides are used on what crops in a particular country) and reference sources (for example, the Royal Society of Chemistry's Agrochemical Handbook) to identify foreign-use pesticides. The handbook provides information on such items as pesticide crop uses and pests controlled. However, these sources are not comprehensive; they did not identify all of the unregistered pesticides on our list. Also, the information they provided on

pesticide use sometimes differed from the information we found in another reference source or in export documents.

FDA consulted commercial and reference sources in an attempt to compile a comprehensive list of the food-use pesticides in use worldwide. It used multiple sources of information because no one source exists that provides complete and accurate pesticide information. FDA compiled a list of almost 700 pesticides in May 1990. The list was not all-inclusive—it did not contain six unregistered pesticides that both the National Agricultural Chemicals Association's and EPA's records showed as having been exported from the United States in 1990. Also, the information about pesticide use provided by FDA's sources was sometimes different from that found in export documents. For example, FDA's market information for one pesticide indicated use on soybeans in Canada and Argentina. The market data did not indicate that Mexico imported the pesticide, although U.S. export documents showed that it was exported to Mexico. Also, the use information we obtained lists many other commodities besides soy that this pesticide may be used on.

FDA Does Not Have Testing Capability for Unregistered Pesticides

Moreover, had FDA identified these pesticides, it would still not have been in a position to test for them. It did not have the pesticide reference standards and test methodologies necessary to conduct tests to detect the pesticides. Under FIFRA, for products registered in the United States, the manufacturer is required to provide EPA with residue chemistry data—that is, what form the pesticide takes after application—and a reference standard of the pesticide. EPA, in turn, makes this information available to FDA. However, manufacturers are not required by law to submit a reference standard and residue data for unregistered pesticides. During the 1989-91 review period, FDA did not have reference standards for 7 of the 27 unregistered pesticides.

However, as a result of the Senate Agriculture, Nutrition, and Forestry Committee's hearing on September 20, 1991, concerning S. 898, the proposed Circle of Poison Prevention Act, the National Agricultural Chemicals Association offered to provide export and testing information about unregistered pesticides to FDA. Specifically, the Association provided

- a list of unregistered U.S.-produced pesticides and the countries and crops for which they are registered;[5]
- analytical methods for detecting residues of these pesticides on any imported food; and
- reference standards for six of seven pesticides for which FDA had no standards.[6]

Subsequently, FDA, in its fiscal year 1993 and 1994 monitoring plans, directed its regional offices to test for these pesticides on a selective basis.

The Association's provision of information was a one-time event. A formalized process has yet to be established by which pesticide manufacturers provide FDA with needed information on new unregistered pesticides, as they become available on the export market. Also, not all pesticide manufacturers belong to the Association.

Conclusions

Although the tests were limited in nature, the FDA and USDA test results we reviewed showed few violations of residue tolerances involving unregistered exported pesticides on foods imported into the United States.

However, the lack of timely and complete data on exported unregistered pesticides prevents FDA from testing imported foods for these pesticides. FDA's current sources of information are not adequate to identify new pesticides promptly. Moreover, FIFRA does not currently require manufacturers to provide reference standards and test methods for unregistered pesticides. Without this information, FDA is unable to conduct the tests needed to ensure that violations are not occurring.

Matter for Congressional Consideration

To help FDA obtain the information it needs to test for pesticide residues, the Congress may wish to consider amending FIFRA to require manufacturers of unregistered pesticides sold to foreign purchasers to provide EPA with information on export destinations, foreign registration, pesticide reference standards, and test methods and require EPA to make this information available to FDA.

[5]Most developed countries have established a regulatory process to determine the risks and benefits associated with pesticides and to promote their safe and effective use.

[6]The six pesticides are dithiopyr, ethametsulfuron methyl ester, esprocarb, haloxyfop, prosulfocarb, and tebuconazole. The exception is ipsdienol, a synthetic (nature-identical) insect pheromone, which is manufactured by a non-Association member.

Recommendation

Given no statutory requirement for pesticide manufacturers to provide EPA with information on export destinations, foreign registration, and pesticide reference standards and test methods, we recommend that the Administrator of EPA work with industry to acquire this information on a continuing basis and provide it to FDA for use in monitoring pesticide residues.

Agency Comments

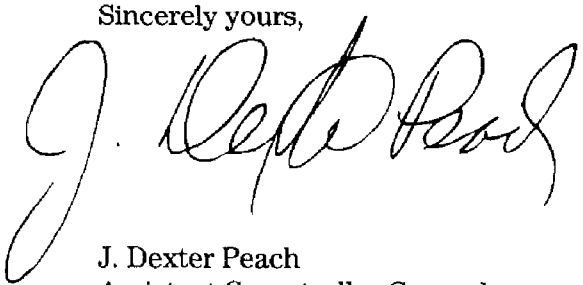
As agreed, we did not obtain written agency comments on a draft of this report. However, responsible officials from EPA's Office of Pesticide Programs, FDA's Center for Food Safety and Applied Nutrition, and USDA's Food Safety and Inspection Service reviewed and commented on the report. Although generally in agreement with the material presented, they did suggest some alternative language to clarify our presentation. EPA also provided more current information on the registration and tolerance status of the 27 pesticides. Where appropriate, their suggestions and more current information have been incorporated.

To obtain a list of exported pesticides, we reviewed documents and interviewed officials from EPA, FDA, the National Agricultural Chemicals Association, and the Foundation for Advancements in Science and Education. To learn which pesticide residues are found on imported food, we reviewed test results from FDA and USDA. We interviewed and obtained information from officials at EPA and from pesticide manufacturers to determine the pesticides' registration status and manufacturers' reasons for not seeking registrations. GAO conducted this review between July 1991 and August 1993 in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly release its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, copies will be sent to the appropriate congressional committees, the Administrators of EPA and FDA, and other interested parties.

The report was prepared under the direction of Richard L. Hembra, Director, Environmental Protection Issues, who can be reached at (202) 512-6111, if you or your staff have any questions. Major contributors to this report are listed in appendix IX.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

Contents

Figure

Abbreviations

DBCP	1,2-dibromo-3-chloropropane
EPA	Environmental Protection Agency
EPN	0-Ethyl 0-(p-nitropheny) phenylphosphonothioate
FDA	Food and Drug Administration
FFDCA	Federal Food, Drug, and Cosmetic Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FSIS	Food Safety and Inspection Service
GAO	General Accounting Office
OCM	Office of Compliance Monitoring
PIC	Prior Informed Consent procedure
USDA	U.S. Department of Agriculture

Mexican Produce Imports and Unregistered Pesticides With Authorized Uses in Mexico

Table I.1 lists the top six countries from which the United States imported fresh or frozen fruits and vegetables in 1991. As can be seen, Mexico was the country providing the largest volume of fruits and vegetables—30 percent of all fresh or frozen produce—imported into the United States in 1991.

Table I.1: Fresh or Frozen Fruit and Vegetable Imports From Selected Countries, 1991

Country	Total quantity imported (metric tons)	Percent of total
Mexico	2,069,710	30.00
Ecuador[a]	1,173,243	17.01
Costa Rica[a]	819,236	11.87
Honduras[a]	516,488	7.49
Canada	539,696	7.82
Chile	446,825	6.48
All other countries	1,333,875	19.33
Total	**6,899,073**	**100.00**

[a]Bananas account for more than 80 percent of the total imports for this country.

Source: Foreign Agricultural Trade of the United States, Calendar Year 1991 Supplement (July 1992).

Table I.2 lists the four largest fruit and vegetable imports in 1991 by volume, along with the percentage supplied by Mexico. As the table shows, Mexico is the major supplier of imported melons and tomatoes. In addition, Mexico is a major supplier of cucumbers, onions, and peppers.

Table I.2: Fruit and Vegetable Imports Worldwide and From Mexico, 1991

Commodity	Quantity imported (metric tons)	Percent of all imports	From Mexico (metric tons)	
			Quantity	Percent
Bananas	3,415,129	49.50	217,390	6.37
Melons	512,224	7.42	339,447	66.27
Tomatoes	360,823	5.23	353,576	97.99
Grapes	332,476	4.82	42,895	12.90
Subtotal	**4,620,652**	**66.97**	**953,308**	**20.63**
All other	**2,278,421**	**33.03**	**1,116,402**	**49.00**
Total	**6,899,073**	**100.00**	**2,069,710**	**30.00**

Source: Foreign Agricultural Trade of the United States, Calendar Year 1991 Supplement (July 1992).

Also, Mexico authorizes the use of six of the pesticides on our list. They are listed with authorized uses in table I.3.

Table I.3: Unregistered Pesticides With Authorized Food Uses in Mexico

Pesticide	Authorized use on
Cadusafos	Potatoes
EPN	Strawberries, beans, tomatoes, oranges, walnuts, soybeans, grapes
Haloxyfop	Soybeans
Monocrotophos	Peanuts, sugar cane, tomatoes, potatoes, soybeans
Prothiophos	Corn
Tebuconazole	Barley, wheat

Objectives, Scope, and Methodology

In a May 9, 1991, letter and subsequent meetings, the Chairman, Senate Committee on Agriculture, Nutrition, and Forestry, asked us to obtain information on U.S. exports of unregistered pesticides and information on their residues on imported food, in particular, imports from Mexico. The objectives of our review were to (1) identify unregistered pesticides produced in the United States for export and (2) determine, on the basis of the results of the Food and Drug Administration's (FDA) and the U.S. Department of Agriculture's (USDA) testing, whether these pesticides are returning to the United States on imported fruits, vegetables, meat, and poultry. We were asked to obtain specific information on Mexico because of the large volume of fresh fruits and vegetables that country exports to the United States. In addition, for a sample of unregistered pesticides, we were asked to determine manufacturers' reasons for not obtaining U.S. registrations and to find information on known health and environmental effects for pesticides found at violative levels. We also looked into limitations that prevent FDA from testing imported food for unregistered pesticides manufactured in the United States.

In connection with the identification of unregistered pesticide exports, we were initially asked to identify pesticides produced, quantities exported, and countries of destination. However, as stated in our April 1989 report on the Environmental Protection Agency's (EPA) implementation of section 17 of the Federal Insecticide, Fungicide, and Rodenticide Act, no one source contains information on the specific chemical name, quantity, and country of destination.[1] We found the situation had changed little by August 1991. Consequently, we had to use several sources to develop a list of unregistered pesticides produced in the United States and exported. The criterion we used for selecting pesticides for our list was food-use pesticides with evidence of U.S. production but no U.S. food-use registration or tolerances as of December 31, 1990. An exception was that if the pesticide was once registered and subsequently canceled, but still had food tolerances, it remained on our list.

Our list contains both pesticides that have not obtained a registration in the United States and those that for health or environmental reasons have had food registrations canceled. We took different approaches to develop each category.

To compile our list of pesticides that have not obtained a registration, we took the following steps. We used a list that had been prepared by EPA and

[1]Pesticides: Export of Unregistered Pesticides Is Not Adequately Monitored By EPA (RCED-89-128, Apr. 25, 1989).

industry in response to the Chairman's request that they identify pesticides that may be prohibited from export because of provisions of S.898, known as the Circle of Poison Prevention Act of 1991. EPA reviewed 555 calendar year 1990 Foreign Purchaser Acknowledgement Statements and determined that, of 121 active ingredients, 42 had neither a food tolerance nor a registered food use. The National Agricultural Chemicals Association surveyed its members about pesticide exports and identified 25 exported unregistered pesticides. We used both lists to determine which unregistered pesticides had food uses, had been produced in the United States, and were exported. After reconciling differences between the two lists, we identified 21 unregistered pesticides that had been exported from the United States in 1990. This portion of our list contains only 21 pesticides, none of which were ever registered, because we eliminated pesticides listed by more than one name and pesticides subsequently determined to be for nonfood use.

To identify once-registered pesticides produced in and exported from the United States, we used a list EPA had developed for the United Nation's Prior Informed Consent (PIC) procedure. The PIC procedure, sponsored by the United Nations Environmental Programme and the Food and Agriculture Organization, is a voluntary framework for countries to exchange information on chemicals in international trade. The procedure is based on the principle that international shipment of a chemical that is banned or severely restricted[2] to protect human health or the environment should not take place without the agreement of or contrary to the objection of the importing country. EPA's submission contained 43 banned and 10 severely restricted pesticides. We identified six banned and four severely restricted pesticides that may have been produced and exported from the United States on the basis of information from EPA and the Foundation For Advancements In Science and Education. The six banned pesticides on the PIC list are canceled in the United States, and the four severely restricted, with the exception of one discussed below, have had their food uses canceled.

Thus, we identified 31 exported pesticides unregistered for food use, 21 never registered, and 10 for which all uses or food uses had been canceled. Because of the limitations on information on pesticide production and export, our list may not be comprehensive. However, the list we used for

[2]Under PIC, a banned pesticide is defined as one for which all registered uses have been prohibited by final government action, or for which all requests for registration or equivalent action for all uses have not been granted for health or environmental reasons. A severely restricted pesticide is defined as a limited ban—a pesticide for which virtually all registered uses have been prohibited by final government regulatory action, but for which certain specific registered use or uses remain authorized.

our analysis contains only 27 of the 31 pesticides. We removed from this list three pesticides which leave residues that, when tested, produce results identical to three registered food-use pesticides. These three—alphamethrin and carbendazim, both never-registered pesticides, and bromoxynil butyrate, which has been canceled—produce residues that are the same as those of the registered pesticides cypermethrin, benomyl, and bromoxynil, respectively. We also removed carbofuran from our final list. Although it is severely restricted on the PIC list, because the granular form, which is toxic to birds, will be canceled nationwide by August 31, 1994, it remains registered in the United States and is permitted on more than 50 commodities. Hence, our final list contains 27 unregistered pesticides—19 that were never registered, 5 that had all uses canceled, and 3 that had all food uses canceled.

To determine whether unregistered pesticides that are produced in and exported from the United States are found as residues on imported food, we reviewed the results of FDA's and USDA's tests of imported food samples. For both agencies, sampling data covered 3 fiscal years (1989-91) of imported samples for fruits, vegetables, spices, eggs, nuts, meat, and poultry worldwide. We did not evaluate the effectiveness of FDA's or USDA's sampling programs.

To determine whether pesticides not registered in the United States are authorized for use in Mexico, we used information from FDA, USDA, and the Mexican government to determine authorized uses in Mexico. To report residues found on imports from Mexico, we reviewed sampling results for Mexico separately from results for other countries.

To understand why manufacturers have not registered pesticides in the United States, we asked them. We also reviewed EPA data to determine the registration status of all 27 pesticides. To determine health and environmental effects, we reviewed risk and health assessment data published by EPA.

We conducted our review between July 1991 and August 1993 in accordance with generally accepted government auditing standards. As agreed, we did not obtain written agency comments on a draft of this report. However, EPA, FDA, and USDA officials, including division and program heads, reviewed and commented on the factual material in the report and generally agreed with the facts presented. The officials' comments have been incorporated, where appropriate.

Current Registration and Tolerance Status of Unregistered Pesticides Produced in and Exported From the United States

Registration Application Status

The registration status of the 27 pesticides on our list varies from those which have never been registered for food use to those whose food-use registration has been canceled. Currently, of the 19 pesticides that were never registered for food use as of December 31, 1990, 12 have no applications at the Environmental Protection Agency, 5 have pending food-use applications, 2 have obtained a food-use registration, according to EPA's registration documents and manufacturer-provided information. Of the eight remaining pesticides, all uses of five and the food uses of the other three have been canceled. Table III.1 shows the registration application status of the 27 unregistered pesticides, according to EPA and manufacturers' information.

Table III.1: July 1993 Status of Food-Use Registration Applications for Our List of 27 Unregistered Pesticides

Pesticide	Type of pesticide	Application status
Acetochlor	Herbicide	Pending
Butachlor	Herbicide	No application submitted
Cadusafos	Soil insecticide	No application submitted
Carbosulfan	Insecticide	Pending
Chlordane	Insecticide	All food uses canceled
Chlorobenzilate	Insecticide	Registration canceled[a]
Clethodim	Herbicide	Registered
DBCP	Fumigant	Registration canceled
Dithiopyr	Herbicide	No application submitted[b]
EPN	Insecticide	Registration canceled[a]
Esprocarb	Herbicide	No application submitted
Ethametsulfuron methyl	Herbicide	Withdrawn
Ethylene dibromide	Fumigant	All food uses canceled
Flusilazole	Fungicide	Pending
Haloxyfop	Herbicide	Pending
Heptachlor	Insecticide	All food uses canceled
Ipsdienol	Semiochemical	No application submitted
Mirex	Insecticide	Registration canceled[a]
Monocrotophos	Insecticide	Registration canceled[a]
Nuarimol	Fungicide	No application submitted
Prosulfocarb	Herbicide	No application submitted
Prothiophos	Insecticide	No application submitted
Quinclorac	Herbicide	Registered
Simetryn	Herbicide	No application submitted
Tebuconazole	Fungicide	No application submitted[c]
Terbumeton	Herbicide	No application submitted
Thiometon	Insecticide	No application submitted

[a]Use of this pesticide was voluntarily canceled by pesticide manufacturers.

[b]Pesticide is registered for nonfood use only.

[c]Application submitted for nonfood use.

We asked manufacturers of pesticides with no registration application pending why they did not seek registration. The firms we contacted cited market circumstances that would render the product uneconomical in the United States and therefore did not warrant applying for registration. These circumstances included (1) a market too small or nonexistent

because the pesticide's uses are for crops not grown or little-grown in the United States, (2) a pesticide that proved ineffective for its intended crop uses, and (3) a pesticide that was ineffective on the crop for which it was developed because of how the crop is grown here.

Tolerance Status

Prior to or at the time of applying for pesticide registration for uses on food, manufacturers also have to separately petition EPA for pesticide residue tolerances on food under section 408 of the Federal Food, Drug, and Cosmetic Act. Manufacturers of 13 of the 19 never-registered pesticides on our list have sought tolerance approvals from EPA. Since December 31, 1990, EPA has set tolerances for four pesticides—a temporary tolerance for acetochlor on field corn for animal feed, a temporary tolerance for cadusafos on bananas, tolerances for quinclorac, and interim tolerances for clethodim on 22 commodities.

EPA may also issue an import tolerance for a pesticide, which states the permissible level of the pesticide's residue that can be in or on imported food. Manufacturers have requested import tolerances from EPA for two pesticides.

When EPA cancels a pesticide registration, it will also revoke approved tolerances. However, because registration and tolerance cancellation are separate legal actions, pesticides have tolerances even though they are no longer registered for use in the United States. Of the eight canceled pesticides (see table III.1), three still have tolerances: chlorobenzilate, ethylene dibromide, and monocrotophos. However on June 9, 1993, EPA published in the Federal Register its intent to revoke the three pesticides' tolerances. Table III.2 shows the tolerance status of the 27 unregistered pesticides, according to EPA officials and the Code of Federal Regulations (CFR), Volume 40, part 180—"Tolerances and Exemptions From Tolerances for Pesticide Chemicals in or on Raw Agricultural Commodities."

Table III.2: July 1993 Status of Food Tolerance Petitions for Our List of 27 Unregistered Pesticides

Pesticide	Tolerance petition status
Acetochlor	Pending
Butachlor	Pending
Cadusafos	Import tolerance
Carbosulfan	Pending
Chlordane	No tolerances
Chlorobenzilate	Tolerances exist
Clethodim	Interim tolerance
DBCP	No tolerances
Dithiopyr	Pending
EPN	No tolerances
Esprocarb	No tolerances
Ethametsulfuron methyl	Withdrawn
Ethylene dibromide	Tolerances exist
Flusilazole	Pending
Haloxyfop	Pending
Heptachlor	No tolerances
Ipsdienol	No tolerances
Mirex	No tolerances
Monocrotophos	Tolerances exist
Nuarimol	Discontinued
Prosulfocarb	No tolerances
Prothiophos	Inactive
Quinclorac	Tolerances exist
Simetryn	No tolerances
Tebuconazole	Pending
Terbumeton	No tolerances
Thiometon	No tolerances

Number of Food Samples With Any Amount of Unregistered Pesticide Residue Detected

FDA found nonviolative amounts of the 14 unregistered pesticides they tested for. Table IV.1 provides information on the numbers of samples on which a detectable amount of a pesticide was found. Detectable amounts may range from only a trace amount (an amount too little to quantify) to an amount that violates an established tolerance.

Table IV.1: Food Samples Tested and Number of Detections

Pesticide	Samples tested	Number of nonviolative detections[a]	Number of violations	Total number of detections
Acetochlor	23,735	0	0	0
Butachlor	23,002	0	0	0
Carbosulfan	1,134	0	0	0
Chlordane	25,043	17	0	17
Chlorobenzilate	23,380	0	0	0
EPN	18,186	3	7	10
Flusilazole	23,100	0	0	0
Heptachlor	25,029	32	6	38
Mirex	24,651	0	0	0
Monocrotophos	24,382	56	69	125
Nuarimol	23,002	0	0	0
Prothiophos	25,551	0	6	6
Simetryn	1,287	0	0	0
Thiometon	24,524	0	0	0
Total		**108**	**88**	**196**

[a]This includes 45 trace detections—11 of chlordane, 19 of heptachlor, and 15 of monocrotophos.

Pesticides Found Violative Potentially Pose Health Risks to Humans and the Environment

Of the 27 unregistered pesticides on our list, FDA found 4 that exceeded acceptable residue levels during the 3-year sample period. Heptachlor has had all food uses canceled; EPN and monocrotophos have had all uses, including their food uses, canceled; prothiophos is a pesticide that is not registered for use in the United States. All four are insecticides. For the three pesticides for which U.S. food uses have been canceled, scientific data exist that establish their potential harm to humans and the environment. EPA has therefore taken action to reduce the exposure of humans and the environment to them. Test results for the one never-registered pesticide likewise raise health concerns, although no complete assessment has been made. More specifically, no assessment has been made about the potential harm from the residue amounts found during these 3 years by FDA.

EPA has canceled the food use of heptachlor because of a number of adverse human and environmental effects. Heptachlor is a probable human carcinogen, causing an increase in benign and malignant liver tumors in laboratory rats and mice. It is also capable of causing embryo toxicity and birth defects in laboratory animals. Heptachlor can also cause reproductive system effects in fish, birds, and mammals. It is moderately toxic overall and is very highly toxic to fish and freshwater invertebrates. Heptachlor persists in the environment and accumulates in the fatty tissue of animals, resulting in bioaccumulation in the food chain.

In 1974, EPA issued a Notice of Intent to Cancel most uses of heptachlor and chlordane, a related compound. Because long-term exposure to these pesticides in the diet could cause cancer, EPA canceled all registered food uses in the mid-1970s. In 1988, after a series of hearings and stages of cancellation, all remaining uses were canceled in the United States, with the exception of heptachlor's use to control fire ants in power transformers.

All uses of EPN have been canceled because of its highly acute toxicity and ability to cause delayed neurotoxic effects. This insecticide is extremely acutely toxic by inhalation or oral exposure and has been shown in animal studies to produce delayed neurotoxic effects after just one dose. These health effects are of concern to mixers and loaders, applicators, and field workers. Also, dietary consumption of EPN through treated foods was a concern. In addition, EPN has ecological effects, such as reduced populations of organisms—for example, honeybees—and acute toxicity to aquatic organisms. Certain uses can pose hazards to certain endangered or

threatened mammals, birds, aquatic organisms, crustaceans, reptiles, and insects.

In 1987, EPA proposed conducting a special analysis of the risks and benefits of EPN, on the basis of concerns about risks to applicators and nontarget species. Following that announcement, all but one registrant voluntarily canceled registration of the pesticide. When the last registrant failed to submit required data for continued registration, EPA terminated the investigation. In December 1987, with no viable registrations, the pesticide was effectively canceled.

All uses in the United States of monocrotophos are canceled because it poses health concerns for both humans and avian species. The registrants voluntarily canceled registration of this pesticide, effective July 1989. For humans, the pesticide causes very highly acute oral toxicity and is a potent cholinesterase inhibitor (linked to nervous system problems). It is toxic to fetuses and causes problems such as runting, reduced fetal weights, and maternal toxicity. It is also a weak mutagen. For birds, it is one of the most acutely toxic pesticides that exist. It is mobile in soil and may have the potential to contaminate groundwater.

Prothiophos is a pesticide that has never been registered for use in the United States. The registrant submitted a petition for an import tolerance in 1984. However, the petition is inactive because the registrant has not provided EPA with additional data to verify study results. EPA requested the data to verify the results of some studies, which show developmental toxicity in rats and rabbits but which used samples that may have been contaminated. Reproductive studies indicate evidence of reduced fertility, increased mortality, and reduced liver weights. In addition, prothiophos is toxic to fish. Also, the World Health Organization classifies prothiophos as a moderately hazardous pesticide.

Pesticide Residues FDA Tested for and Did Not Test for in Fiscal Years 1989-91

Of the 27 unregistered pesticides on our list, the Food and Drug Administration tested for 14, as shown in table VI.1.

Table VI.1: 14 Unregistered Pesticide Residues That FDA Tested for in Fiscal Years 1989-91

Pesticide	Registration status	Violation found
Acetochlor	Pending	No
Butachlor	No application submitted	No
Carbosulfan	Pending	No
Chlordane	Canceled	No
Chlorobenzilate[a]	Canceled	No
EPN[a]	Canceled	Yes
Flusilazole	Pending	No
Heptachlor	Canceled	Yes
Mirex[a]	Canceled	No
Monocrotophos[a]	Canceled	Yes
Nuarimol	No application submitted	No
Prothiophos	No application submitted	Yes
Simetryn	No application submitted	No
Thiometon	No application submitted	No

[a]Use of this pesticide was voluntarily canceled by the manufacturer(s).

FDA did not test for the 13 other pesticides on our list. According to FDA officials, FDA did not test for seven of these pesticides because (1) it did not expect to find residue of these pesticides or (2) the volume of imported commodities which might have residues was low, thus making them a low priority for testing purposes. For the other six pesticides, FDA was not aware that the pesticides existed. Table VI.2 lists the pesticides in each category.

Table VI.2: 13 Unregistered Pesticide Residues FDA Did Not Test for in Fiscal Years 1989-91 and Reasons for Not Testing

Pesticide	Registration status, July 1993	Reason FDA did not test	
		Low priority	Not aware of pesticide
Cadusafos	No application submitted		✔
Clethodim	Registered	✔	
DBCP	Canceled	✔	
Dithiopyr[a]	No application submitted		✔
Esprocarb	No application submitted		✔
Ethametsulfuron methyl	Withdrawn		✔
Ethylene dibromide	Canceled	✔	
Haloxyfop	Pending	✔	
Ipsdienol	No application submitted		✔
Prosulfocarb	No application submitted	✔	
Quinclorac	Registered		✔
Tebuconazole[b]	No application submitted	✔	
Terbumeton	No application submitted	✔	

[a]Pesticide has not been registered for food use, only nonfood use.

[b]Pesticide is not registered for food use, although an application has been submitted for nonfood uses.

Status of EPA's Efforts to Improve Pesticide Export Information

In our April 1989 report entitled Pesticides: Export of Unregistered Pesticides Is Not Adequately Monitored by EPA, GAO discussed deficiencies and made recommendations about two pesticide reporting systems—the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) section 7 annual production reporting and the FIFRA section 17a export notice. This appendix provides a progress report on EPA's efforts to improve the reporting systems.

As we reported in 1989, EPA's annual production data base contains the types and amounts of pesticides being produced, sold, and distributed, including those exported in the previous year. It does not, however, contain specific chemical ingredient information for each unregistered product, including a list of the chemical names for each ingredient, although each separate reporting form that a manufacturer submits contains this information. The data base lists only the trade name and manufacturer and some general information on use, type, and quantity. EPA does not enter the specific chemical ingredient information into the automated data base. Hence, the data base as currently comprised does not permit one to identify the pesticide exported without additional research.

In August 1991, EPA's Office of Compliance Monitoring (OCM) reported to us that in March of 1991, the production data base was converted from an older data base technology to an agency-standard data base management system. It was anticipated that the conversion would permit some system enhancements to be made, but since it was only a straight conversion, no enhancements were possible.

Subsequently, in accordance with EPA's computer system plans, OCM contracted for an analysis and evaluation of the system in relation to its intended uses and other EPA information management needs. According to OCM officials, the contractor was tasked with considering recommendations that GAO and others had made to increase reporting flexibility and sophistication. In April of 1992, the contractor presented its final report with recommendations for both short- and long-term improvements. The OCM began work on several short-term improvements at that time.

On April 1, 1993, a new contractor was procured to provide system support and maintenance, as well as system redesign. The redesign effort involves improving data entry, data quality checks, and query and reporting functions and creating an ability to read data from other Office

of Pesticide Programs' data files. The redesign will permit GAO and contractor recommendations to be acted on. According to OCM officials, the redesign will begin in September 1993 and take about 6 to 9 months to complete.

The other source of information on unregistered pesticide exports is the Foreign Purchaser Acknowledgement Statement, or the section 17a export notice. In our 1989 report on EPA's implementation of this section, we found that although notices listed both the pesticide's product name and chemical name, this information was sometimes illegible or incomplete. EPA agreed that the contents of the notices lacked clarity and may not have contained enough meaningful information to be useful to recipients. Also, the notice does not contain information on amounts shipped. A second issue GAO raised in the 1989 report was that the current policy allows a notice exemption if the unregistered product contains a minor variation of a registered formulation and contains only registered active ingredients. All the manufacturers we contacted claimed this exemption as the reason for not submitting notices of export of unregistered products. We recommended that this policy be changed.

Prompted by our report, EPA proposed new regulations that would require additional chemical descriptive data and eliminate the exemption. In the policy announced February 18, 1993, EPA eliminated the exemption and will require an export notice for any registered product with a product variation or different use or claim on the label than that on the U.S.-registered product label. These changes should improve EPA's ability to identify exported unregistered pesticides.

Separately, EPA has converted section 17a notice recordkeeping from a manual system to an automated one. More importantly, EPA staff are researching identifying information for notices on which it is incomplete or absent. However, the need for this effort should diminish as the new export policy is implemented. Also, EPA reports that, since it conducted a number of inspections at establishments that produce and export unregistered pesticides, the number of notices submitted has grown from around 200 a year to around 700. The EPA inspections revealed that manufacturers' claims that products were substantially similar to registered products in composition and use were difficult to prove due to lack of supporting documentation.

Some Unregistered Pesticides Are Manufactured Overseas

Of the four pesticides that exceeded acceptable levels of residues, only two are manufactured exclusively in the United States. The other two are produced in the United States and overseas. Thus, we cannot be certain whether the residues of these two pesticides originated from American or foreign producers. Table VIII.1 lists the four pesticides for which FDA found violative levels of residues and the countries where they are manufactured.

Table VIII.1: Unregistered Pesticides Having Residue Violations and Countries of Manufacture

Pesticide	Countries of manufacture
EPN	Korea, Japan, Singapore, Taiwan, U.S.
Heptachlor	U.S.
Monocrotophos	Argentina, Brazil, India, Israel, Korea, Mexico, Netherlands, Singapore, Sweden, Switzerland, Taiwan, U.S.
Prothiophos	U.S.

Moreover, many of the other pesticides on our list are manufactured in both the United States and overseas. Of the 27 exported pesticides, 12 are manufactured both in the United States and abroad. In addition, at least 2 of the 12 pesticides are produced abroad and then imported into the United States in a technical grade for formulation into commercial products for sale abroad. Table VIII.2 lists the 27 pesticides and the countries where they are produced.

Table VIII.2: Unregistered Pesticides Exported From the United States and Countries of Manufacture

Pesticide	Countries of manufacture
Acetochlor	Hungary, U.S., overseas[a]
Butachlor	India, Israel, Netherlands, Singapore, Taiwan, U.S., overseas[a]
Cadusafos[b]	Overseas[a], U.S.
Carbosulfan	U.S.
Chlordane	U.S.
Chlorobenzilate[c]	Israel, Netherlands, U.S.
Clethodim	U.S.
DBCP[c]	U.S.
Dithiopyr	U.S.
EPN[c]	Korea, Japan, Singapore, Taiwan, U.S.
Esprocarb	U.S.
Ethametsulfuron methyl[b]	United Kingdom, U.S.
Ethylene dibromide	India, U.S.
Flusilazole	U.S.
Haloxyfop	U.S.
Heptachlor	U.S.
Ipsdienol	U.S.
Mirex[c]	U.S.
Monocrotophos[b]	Argentina, Brazil, India, Israel, Korea, Mexico, Netherlands, Singapore, Sweden, Switzerland, Taiwan, U.S.
Nuarimol	U.S.
Prosulfocarb	U.S.
Prothiophos	U.S.
Quinclorac	Korea, U.S.
Simetryn	U.S.
Tebuconazole	Germany, U.S.
Terbumeton	Spain, U.S.
Thiometon	Switzerland, U.S.

[a]Company-provided information states only that the pesticide was produced overseas without identifying specific countries.

[b]This ingredient is imported into the United States in technical grade for formulation.

[c]Although this ingredient was produced in the United States during the 3-year period we reviewed, we could not verify that it is currently produced in this country.

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.	Peter F. Guerrero, Associate Director J. Kevin Donohue, Assistant Director
Philadelphia Regional Office	Clifford W. Martin, Evaluator-in-Charge Keith Steck, Staff Evaluator Jay Scribner, Staff Evaluator Steve Jones, Staff Evaluator Donna Ruggaber, Intern
Office of General Counsel	Doreen Stolzenberg Feldman, Senior Attorney

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20884-6015

or visit:

Room 1000
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000 or by using fax number (301) 258-4066.

PRINTED ON RECYCLED PAPER

United States
General Accounting Office
Washington, D.C. 20548

Official Business
Penalty for Private Use $300

First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100