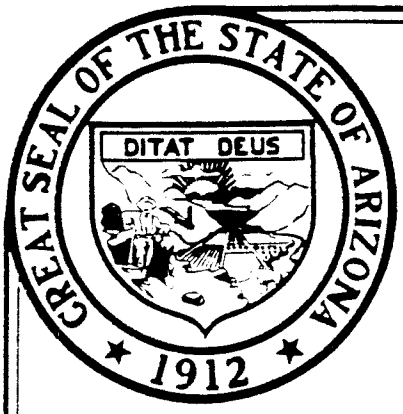

PERFORMANCE AUDIT

PESTICIDE REGULATION

PROGRAMWIDE ISSUES

Report to the Arizona Legislature
By the Auditor General
November 1990
90-6

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November 30, 1990

Members of the Legislature
State of Arizona

The Honorable Rose Mofford
Governor of the State of Arizona

Transmitted herewith is a report of the Auditor General, A Performance Audit of Pesticide Regulation: Programwide Issues. This report is the first in a series of five reports on Pesticide regulation and is in response to Chapter 162, Section 7, of the 1989 Session Laws.

The report contains our conclusions regarding the general state of Pesticide regulation in Arizona. Our overall conclusion is that Arizona generally has good pesticide laws, but weak enforcement programs. The greatest single need appears to be a greater commitment to enforcement on the part of some agencies responsible for implementing the laws.

This report also contains information developed in response to specific requirements of Chapter 162, Section 7, of the 1989 Session Laws. This information ranges from a review of pesticide regulation in all 50 states, to the most comprehensive information yet developed regarding the amount and types of pesticides applied in Arizona.

My staff and I will be pleased to discuss or clarify items in the report.

Sincerely,

Douglas R. Norton
Auditor General

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INTRODUCTION AND BACKGROUND

The Office of the Auditor General has conducted a performance audit of the agricultural pesticide regulatory function of four State agencies: the Arizona Commission of Agriculture and Horticulture (ACAH), the Department of Environmental Quality (DEQ), the Industrial Commission of Arizona (ICA), and the Department of Health Services (DHS). This performance audit was conducted in response to the requirements of Chapter 162, Section 7, of the 1989 Session Laws. This report on programwide issues is one of five reports prepared as a result of this audit.

Pesticide Regulation In Arizona

The 1986 Environmental Quality Act designated four State agencies, ACAH, DEQ, DHS, and ICA to share agricultural pesticide regulatory responsibilities in Arizona. These divisions of responsibilities among agencies is typical of a majority of other states.

- ACAH registers pesticides for use in the State, licenses agricultural pesticide users, and enforces the regulations governing against the improper use of pesticides. ACAH shares responsibility with the University of Arizona Cooperative Extension Service for implementing Integrated Pest Management Programs to reduce the use of pesticides.

- DEQ monitors for the presence of pesticides in the environment and is responsible for overseeing remediation of pesticide-contaminated sites. DEQ also determines the potential of pesticides to leach into ground water. If certain pesticides are found to leach, DEQ has the authority to ban their use in Arizona. DEQ shares the responsibility for pesticide container disposal with ACAH.

- DHS investigates pesticide poisoning and maintains a registry of these poisonings. DHS is also responsible for informing healthcare professionals about how to better recognize pesticide poisoning. DHS establishes tolerances for pesticide residue in food and has authority to embargo food containing pesticides above tolerance levels.

- Until January 1, 1991, ICA will be responsible for investigating and enforcing pesticide-related worker safety laws. The new Department of Agriculture will then assume these responsibilities, including the enforcing of those laws relating to the notification and posting of pesticide applications, determining when workers can reenter fields, providing workers with washing facilities, and training employees on safe handling of pesticides.

Staffing And Budget

For fiscal year 1989-90, approximately $4,829,000 and 21 Full-Time Equivalent (FTE) employees were allocated to perform pesticide regulatory functions in the three of the four State agencies audited.[1] Funding for pesticide regulation is obtained from several sources including the General Fund, Federal funds, and special funds established for specific programs or purposes. An example of a special fund is the Boll Weevil Eradication Program (BOWEP) that is funded by growers through a cotton bale surcharge. The following Table lists staffing and budget information for three of the four State agencies.

TABLE 1

ARIZONA COMMISSION OF AGRICULTURE AND HORTICULTURE, DEPARTMENT OF HEALTH SERVICES, AND INDUSTRIAL COMMISSION OF ARIZONA ESTIMATED EXPENDITURES AND FTEs FISCAL YEARS 1987-88, 1988-89, AND 1989-90 (Unaudited)

	1987-88		1988-89		1989-90	
Agency	Expenditures	FTEs	Expenditures	FTEs	Expenditures	FTEs
ACAH	$ 670,148	18.2	$ 730,500	18.5	$ 676,651	18.0
BOWEP	3,211,987	(a)	4,668,784		4,007,315	
DHS	51,595	2.0	61,390	2.0	61,500	2.0
DEQ	N/A	N/A	N/A	N/A	N/A	N/A
ICA(b)	24,944	1.1	37,491	1.1	23,290	1.1
TOTAL	$3,958,674	21.3	$5,498,165	21.6	$4,828,756	21.1

(a) The BOWEP Program employs approximately 35 full-time staff and 85 staff that work 9 to 10 months per year.

(b) ICA Expenditures are estimates based on ICA calculations.

Source: Arizona Commission of Agriculture and Horticulture, Department of Health Services, and Industrial Commission of Arizona estimates of pesticide-related expenditures and FTEs.

(1) DEQ stated that they were unable to provide Pesticide-Related Expenditures and FTEs because of accounting system problems.

Audit Scope

The scope of this audit was defined by Chapter 162, Section 7, of the 1989 Session Laws. Chapter 162 required that several specific items be addressed. These specific items are as follows:

"A. The auditor general shall conduct a performance review audit during the 1989-1990 fiscal year of the pesticide regulatory program established by this act under the Arizona commission of agriculture and horticulture, the industrial commission, the department of health services and the department of environmental quality. The review shall include:

1. A performance audit, as defined in section 41-1279, Arizona Revised Statutes.
2. Review of statutory and administrative pesticide regulatory programs in other states.
3. Proposals for pesticide regulation described in professional and academic publications.
4. A quantitative and qualitative report of pesticide use in this state.
5. A compilation of pesticide related incidents and accidents reported to the various state agencies from the effective date of this act through June 30, 1989.
6. Specific recommendations for statutory and administrative changes to improve pesticide regulation in this state, considering economic, environmental and public health and safety factors.

B. The report shall be completed and presented to the governor and legislature not later than November 30, 1990."

As directed, this report focuses on agricultural pesticide regulatory programs. However, there is significant pesticide use in the State that is not overseen by any of the four agencies we audited. It is estimated that 75 percent of all pesticides used in Arizona are related to agriculture. These pesticides were the basis of our work. The remaining 25 percent are used for other purposes such as structural building pest control, government, and homeowner use. The use of pesticides to protect buildings and grounds is regulated by the Arizona Structural Pest Control Board. The use of pesticides on Indian lands is regulated directly by the Environmental Protection Agency. The use of pesticides by homeowners is virtually unregulated.

Organization of Reports

Because of the volume of Findings we present, we have organized our work into five reports, a report on programwide issues, and a report for each of the four agencies audited. This report on programwide issues contains one Finding and sections addressing four of the six specific statutory requirements for the audit. The other two requirements (performance audits of each agency and recommendations for statutory and rules changes) are addressed in the agency reports.

Acknowledgements

During the audit we contacted literally hundreds of people and organizations, both public and private. Their cooperation and assistance was invaluable, and we express appreciation to them. We also express appreciation to the Commissioners, Directors, and staff of the Arizona Commission of Agriculture and Horticulture, the Department of Environmental Quality, the Industrial Commission of Arizona, and the Department of Health Services for their cooperation and assistance during the audit.

FINDING

ALTHOUGH ARIZONA HAS INSTITUTED SOME OF THE MOST PROGRESSIVE PESTICIDE REGULATORY PROGRAMS IN THE NATION, IMPLEMENTATION HAS BEEN LESS THAN SATISFACTORY

We found Arizona's pesticide laws are some of the most progressive in the United States. However, these laws have not been effectively implemented and enforced. This lack of enforcement appears to have less to do with the way the program is structured, than it does with a weak commitment to enforcement on the part of some of the agencies responsible for implementing the laws.

Arizona Has Progressive Pesticide Programs

With the passage of the Environmental Quality Act (EQA) in 1986, the Legislature instituted some of the most progressive pesticide regulatory laws in the nation. The EQA reorganized the State's pesticide regulatory structure and added several innovative programs that compare very favorably with those of other states.

Environmental Quality Act required major regulatory reorganization - The 1986 EQA rebuilt Arizona's pesticide regulatory structure. The Act eliminated the Board of Pesticide Control and transferred most of the responsibility for the State's agricultural pesticide regulatory functions to the Arizona Commission of Agriculture and Horticulture (ACAH). Environmentally related pesticide regulatory responsibilities previously assumed by the Department of Health Services (DHS) were shifted to the new Department of Environmental Quality (DEQ), which was also created by the EQA. Although released from environmental regulatory duties, DHS was given the regulatory responsibility of developing a system for reporting and preventing pesticide poisoning. Finally, the EQA transferred the worker safety responsibilities of the Board of Pesticide Control to the Industrial Commission of Arizona and established a Pesticide Worker Safety Inspection Program within the Commission.

Several innovative programs created by EQA - The EQA not only reorganized Arizona's pesticide regulatory structure, but also added several new programs. New program features for each agency are listed below.

- **DEQ Pesticide Contamination Prevention Program** - DEQ is required to identify pesticides having the potential to pollute ground water and also to monitor soil and water in agricultural areas to determine the presence of specific pesticides. If certain pesticides are found in ground water, DEQ has the authority to prohibit their use in Arizona. Arizona and California are the only states that have instituted comprehensive programs to determine the effect of pesticides on ground water.

- **DEQ Water Quality Monitoring Program** - EQA directs DEQ to conduct ongoing water monitoring of both surface and ground water for the presence of pesticides.

- **DHS Pesticide Reporting and Prevention Programs** - The EQA requires that DHS establish a pesticide registry to record incidents related to human health. DHS must also provide training to the medical community in recognizing pesticide poisoning.

- **ACAH Integrated Pest Management Program** - ACAH's Integrated Pest Management (IPM) Program specifies research, instruction, and development components for the purpose of reducing the use of pesticides.

- **ACAH Buffer Zones/PMAs** - The 1986 EQA instituted buffer zone and Pesticide Management Area (PMA) provisions to minimize the damage to humans and property caused by pesticide applications. Buffer zone provisions prohibit application of certain pesticides within a prescribed distance of homes or other institutions such as schools or hospitals. PMA provisions require that the applicator inform, when possible, the ACAH Director of upcoming applications.

- **ICA Worker Safety Inspection Program** - ICA was required to develop worker safety rules governing the use of pesticides. These rules address areas of training, the length of time workers must wait to reenter fields after pesticides have been applied, prior notification and posting, decontamination and washing facilities, and protective clothing. The only other state with similar requirements is California.

Arizona programs compare favorably with those of other states - Arizona's agricultural pesticide regulatory programs compare favorably to those of other states. In virtually all areas of agricultural pesticide regulation, Arizona provides levels of regulation similar to or greater than those of other states. Arizona has enforcement and remediation

authority to address violations of pesticide laws. The only areas in which Arizona has less regulation than that in some other states are the areas of container disposal and monitoring for the presence of pesticides in food.

Program Implementation Unsatisfactory

Although Arizona has instituted progressive pesticide programs, their implementation to date has been less than satisfactory. We found strong enforcement lacking in two of the three agencies with enforcement programs. In addition, some pesticide regulatory programs suffer because they are considered lower priority than other agency programs.

Enforcement Weak in ACAH and ICA - In two of the three agencies charged with enforcing the pesticide laws, we found enforcement weak. Enforcement by ACAH is particularly weak, even though the EQA seemed to anticipate this problem and included in the legislation a procedural safeguard requiring that the Attorney General review ACAH enforcement cases. Several reasons may explain why enforcement by ACAH is weak.

Strong enforcement of pesticide laws is the basis of an effective pesticide regulatory program. The purpose of pesticide regulation is to help ensure that potentially dangerous chemicals are properly used and discarded, thus minimizing the potential for harm to human health and the environment. Unless improvements are made, substandard enforcement may result in a lack of protection for both Arizona's citizens and its environment. Summaries of enforcement problems we found in the two agencies are listed below.

- **ACAH** - ACAH enforcement practices are among the worst we have audited. All aspects of ACAH enforcement were deficient. For example, in some instances ACAH staff reportedly tried to discourage people from filing complaints. In other instances, ACAH staff never investigated complaints that were filed. Of the 414 cases we reviewed, a majority (239 of 414) were inadequately investigated, many in an untimely manner. Slow investigations also caused nine cases to have the violation downgraded because statutes of limitations were exceeded.

The disciplinary actions that have been taken were equally unsatisfactory. People found to have committed violations received weak sanctions -- even for multiple violations. Penalties have usually consisted of small fines with no action against the violator's license. Further, penalties were often determined through "negotiated settlements" with the licensee behind closed doors in the Director's office.

- **ICA** - ICA has simply not aggressively enforced pesticide laws and rules. The Legislature funded five positions for pesticide enforcement. Our analysis determined that ICA used only 1.1 Full-Time Equivalent (FTE) staff for pesticide enforcement and used the remaining resources for other functions. Effective worker safety enforcement requires the strong presence of inspectors in the field. We found that ICA staff field presence is limited. In fact, ICA does not even station staff in Yuma, the area in which the largest number of farm workers are employed.

Enforcement has been weak at ACAH in spite of the unusual oversight authority granted the Attorney General by the EQA. The 1986 EQA mandates that the Attorney General review ACAH enforcement cases prior to final adjudication. In some cases, this review has resulted in more effective enforcement. However, in other instances, ACAH has failed to address concerns raised by the Attorney General. As a result, it appears that even using the Attorney General as a check on ACAH actions has not ensured strong enforcement.

Several reasons for weak ACAH enforcement - Why has enforcement been weak at ACAH? Several factors may contribute to the problem, including the perception that pesticides are not that harmful; ACAH's dual responsibility for both promoting and regulating the industry; and familiarity with the regulated community due to the relatively small number of applicators and growers involved with pesticides.

A basic underlying cause may be differences in the perceived danger inherent in the use of pesticides. A recent doctoral study in Arizona measured and compared the perception of pesticide risk by ACAH pesticide enforcement staff, agricultural pesticide applicators, and the public.(1) The study found that the public perceives pesticides to be

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(1) Shem, Pak. "Variation in Risk Perception: A Barrier to the Implementation of Pesticide Control Policies," 1990.

more dangerous than do agricultural pesticide applicators. The pesticide risk perception of ACAH enforcement staff was closer to the perception of agricultural pesticide applicators than that of the public.

Lower risk perception may influence enforcement effectiveness. According to the study:

> "...the capacity of field level administrators to enforce regulations will depend upon the degree to which they see the use of pesticides as potentially harmful to applicators and residents. Hence, if they perceive the use of such materials as a low risk, they may well relax enforcement of rules and regulations, which will result in incomplete discharge of the regulatory function by the field level administrators."

ACAH's dual role of both promoting agriculture and at the same time regulating the use of agricultural pesticides could also affect regulatory effectiveness. A major ACAH role is to assist and further the agricultural industry in the State. However, ACAH is also charged with regulating and enforcing pesticide usage. When these roles overlap, enforcement may suffer. For example, ACAH oversees the Boll Weevil Eradication Program, a joint effort with industry to eliminate a pest bothersome to Arizona's cotton production. ACAH, however, must also enforce violations resulting from pesticide applications for the Boll Weevil Program.

Another factor that may explain ACAH's weak enforcement is the close relationship between the State's agricultural industry and ACAH. There are approximately 49 aerial applicators in the State and six ACAH inspectors. Both groups know each other and are in frequent contact because inspectors monitor pesticide applications and investigate complaints. In addition, there are other, sometimes long-standing, professional ties between these two groups. Before working for the State, the ACAH Division Director in charge of pesticide enforcement operated an aerial application business for over 30 years. Other ACAH staff were previously involved in the pesticide industry or agriculture.

<u>Low prioritization impedes success of other pesticide programs</u> - Because agencies have designated some pesticide programs as a lower priority, these programs have not been as effective. As previously mentioned, ICA

has used much of its resources allocated for pesticide programs to perform other duties. In addition, at DEQ some pesticide cleanups are postponed in favor of more dangerous situations involving materials DEQ deems more hazardous. At DHS, we found little has been done to improve the reporting of pesticide incidents or train physicians in recognizing pesticide poisoning. Other DHS budget priorities have superseded additional funding for pesticide programs.

Current Regulatory Structure Sufficient

Although our reports outline several problems with the present system of pesticide regulation in the State, we recommend retaining the current regulatory structure. Arizona's diffused pesticide regulatory structure (dividing responsibility among several agencies) is typical of a majority of other states and offers strong potential advantages. Although this fragmentation has caused some problems, the most serious problems appear to occur because the agencies are not enforcement-minded.

Current regulatory structure typical and has some benefits - Arizona's fragmented pesticide regulatory structure is similar to those in most other states. Arizona, like most states, delegates primary pesticide regulatory authority to its agriculture agency. Other agencies typically involved are those related to health, the environment, and worker safety. (Recent legislation in Arizona, however, will place the responsibility for pesticide worker safety enforcement with the new Department of Agriculture beginning in January 1991). Only five states -- New York, New Jersey, Connecticut, Alaska, and Rhode Island -- place primary responsibility in an environmental agency.[1]

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(1) These five states differ considerably from Arizona in terms of the amount and type of agriculture, and the use of pesticides. Agriculture in those states is primarily vegetables and/or orchards. Pesticides are almost always applied with ground-based equipment. Much of the pesticide use is related to buildings, utility and government right-of-ways, lawn care, industry, or nurseries. Connecticut and New York have separate entities that promote agriculture.

There are three advantages to a properly administered, fragmented regulatory structure: efficiency, familiarity with and knowledge of the industry, and a system of checks and balances. Efficiency occurs because the various pesticide regulatory programs are administered by those agencies that conduct similar programs in other areas and have staff and resources already committed to related tasks. For example, DEQ not only monitors water for the presence of pesticides, but is also required to monitor water for a variety of other elements. This is also true for DEQ's hazardous waste remediation function. Cleanup of sites contaminated by pesticides is only one part of DEQ's larger hazardous waste remediation program. Regulatory programs at DHS and ACAH also involve several different areas of responsibility. Not only does DHS have a pesticide poisoning registry but also one for AIDS, cancer, and other diseases. In addition to pesticides, ACAH regulates and also works with the agriculture industry in several other areas. ACAH already has staff stationed in the agricultural areas of the State. These staff are in a position to assist pesticide enforcement staff with pesticide complaints on an as-needed basis.

A fragmented structure may also promote better cooperation and understanding between the agencies and the regulated community. For example, a regulated community, such as farmers and doctors, may respond better to ACAH and DHS than to another regulatory agency that has no direct relationship to their work. In addition, regulatory decision making may be aided because the regulating agencies have specific knowledge of and experience in the industry they are regulating. For example, doctors at DHS may be better able to educate the medical community about pesticide poisonings. ACAH, because of its knowledge of agricultural practices, may be better able to develop programs to regulate pesticide-use reporting than would an environmental agency, for instance.

A fragmented regulatory structure can provide a check and balance on the agencies involved in pesticide regulation. For example, if one agency's enforcement is limited, another may be able to assume part of this responsibility to help ensure proper action is taken. For example, in our ACAH report we discuss how ACAH failed to take proper action on

several, serious pesticide poisonings. Fortunately, in one case using its own authority, DEQ and the Attorney General pursued and took strong action against the violator. If all regulatory authority had been concentrated in one agency, enforcement in this case might never have occurred.

Fragmentation has caused some problems - Although a fragmented regulatory structure is common nationally and provides some benefits, it has resulted in certain problems in Arizona. Some enforcement cases are not referred to other appropriate agencies for action. Effective pesticide container disposal and efficient pesticide-use reporting may also be hampered by the fragmented structure.

One enforcement problem exacerbated by a fragmented regulatory structure is that some enforcement cases have not been addressed by more than one agency, when appropriate. An example of this is a case (see ACAH report #90-7, page 9) in which a complaint was filed with ACAH concerning a pesticide applicator employee who was poisoned by pesticides while on his job. ACAH did not report the incident to ICA, the agency that enforces worker safety pesticide laws. (We also report that ACAH did not pursue an investigation of the applicator although warranted). Our analysis of pesticide complaints found at least 50 cases in which agencies could have reported these incidences to the other agencies, but did not.

Other problems caused by a fragmented regulatory structure relate to the laws governing reporting of pesticide use and pesticide container disposal. Both DEQ and ACAH regulate pesticide container disposal. Each enforces different laws and rules that are derived from Federal and State laws governing container disposal. There are two sets of Federal rules, three sets of State rules, and multiple county codes and city ordinances that impact container disposal. To date, there has been no attempt by either ACAH or DEQ to coordinate their individual requirements in each set of rules. According to a DEQ study, without cross-references, regulated pesticide users who read only one set of agency rules, may fail to realize that there are separate requirements.[1]

If not addressed, Arizona's fragmented pesticide regulatory structure could cause unnecessary reporting problems for pesticide users. According to ACAH requirements, agricultural pesticide users currently must either report or retain records of pesticide sales and use. In the future, DEQ may also require reporting of sales and use information for those pesticides found to have the potential to leach into ground water. Unless these agencies work together to develop a single reporting system, pesticide users may be subjected to overlapping and perhaps duplicate reporting requirements (See Report #90-7, Finding VI).

Needed: A Commitment To Enforcement

Poor enforcement of the pesticide laws appears to be caused primarily by ACAH and ICA's weak commitment to enforcement. Even though the organizational placement of some programs (notably the programs under ACAH that have close ties to the agricultural industry) may appear to deter enforcement, changing the structure of the pesticide regulatory program is no guarantee that problems will be resolved. Instead, what is needed is something that is difficult to legislate -- a commitment to enforcement.

As noted previously, there are significant advantages to placing programs with agencies that are already involved with similar programs and have knowledge and interest in the area. While close ties to an industry can influence enforcement, if an agency is not interested and knowledgeable in an area, its commitment to enforcement may be no better than an agency with close ties to the industry it regulates. For an example, ICA has not developed and implemented an effective pesticide-related worker safety inspection program. (See Report #90-9). In addition, the priority of a program relative to an agency's other programs also affects enforcement. If pesticides are perceived by the agency as being less dangerous, or as less of a widespread problem than other environmental

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(1) Brown, Al. "Pesticide Container and Residue Disposal in Arizona: A Public Policy Analysis." 1989.

hazards, they may not receive high priority for enforcement. For example, DEQ has not taken timely actions against some pesticide-related hazardous waste sites. (See Report #90-8). Thus, the organizational placement of a program is no guarantee of good enforcement.

We believe the three most important elements of good enforcement are good laws, a commitment to enforce those laws, and adequate resources. An administrator committed to enforcing a law will generally not be deterred by the program's location. Similarly, an agency committed to enforcement will be able to demonstrate that it has taken action within the limits of its resources. (Conversely, providing resources to an agency not committed to enforcement is no guarantee of obtaining enforcement.) Arizona has good pesticide laws, what is needed now is a greater commitment to enforcing those laws. Once the commitment is evident, the resource question can be addressed. However, achieving that commitment cannot be legislated, rather it must come from the highest levels of the executive branch.

RECOMMENDATION

1. The director of the new Department of Agriculture should develop within the agency a commitment to pesticide regulation. He should specifically consider implementing the recommendations contained in reports #90-7, and 90-9, which identify ways to improve procedures and strengthen enforcement.

2. The Directors of the new Department of Agriculture and DEQ should coordinate efforts to: (a) develop a single pesticide reporting system, and (b) develop a container disposal program.

PESTICIDE REGULATION IN THE FIFTY STATES

Federal pesticide, environmental, and consumer protection laws shape pesticide regulatory activities in the 50 states, but permit great latitude in both the extent and organization of individual state regulation. As a result, state regulatory activity varies widely, with Arizona being one of the most active regulators. Most states, including Arizona, divide pesticide regulatory responsibilities by function among several agencies, and use various methods to manage this division. While Arizona's division of pesticide regulatory functions is similar to that of most states, Arizona's organization of regulatory responsibilities differs in significant ways.

Background

Chapter 162, Section 7, of the 1989 Session Laws, directed the Office of the Auditor General to review statutory and administrative pesticide regulatory programs in other states. A telephone survey was, therefore, conducted to determine the regulatory functions performed by each state, either on its own authority, or as mandated by or delegated under Federal law. For each function performed, it was further determined which state agency, or agencies, performed the function. Information concerning proposed legislation and trends in assignment of regulatory functions was also obtained. Because of the complexity and technical nature of pesticide regulatory activities, the differences among the states in the scope and definitions of specific responsibilities, and the lack of any standard nomenclature for agencies involved in pesticide regulation, direct comparisons of functions and their assignment were often difficult. The results of the survey are thus indicative, not definitive.

Federal Laws Shape State Regulation, But Permit Wide Variation

Individual state pesticide regulation is patterned directly after the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) that establishes regulatory standards and programs for the manufacture, use, and disposal of pesticides. Other Federal laws that address broader environmental, resource, and food regulatory issues also impact State pesticide regulatory functions. These laws include the Safe Drinking

Water Act, the Clean Water Act, the Resource Conservation and Recovery Act, the National Environmental Policy Act, the Food, Drug and Cosmetic Act, the Endangered Species Act, and the Comprehensive Environmental Response Compensation and Liability Act.

In addition to shaping state pesticide regulatory activities, FIFRA and the other laws noted permit delegation of Federal regulatory authority to the individual states. States, however, may or may not elect to assume some, any, or all of the pesticide regulatory authority and responsibility that Environmental Protection Agency (EPA) can delegate to them under Federal laws. States are also free to regulate more stringently and extensively than Federal laws require. Thus, both the extent and organization of pesticide regulation may -- and does -- vary substantially from state to state.

Arizona Is Among The Most Active Regulators

All 50 states are involved in pesticide regulation to some degree. Most have accepted delegation of authority from the EPA to enforce Federally mandated pesticide regulatory programs, but two states have accepted little or no delegated authority, and others have elected not to accept authority in specific areas. Nebraska, for example, has accepted no delegation of FIFRA authority to regulate pesticides, and Colorado has accepted responsibility only for certification of commercial pesticide applicators. Thus, the EPA itself administers and enforces most Federal pesticide regulations in those states. Iowa administers FIFRA programs, but recently returned to EPA responsibility for administering Resource Conservation and Recovery Act (RCRA) programs, including RCRA regulations affecting disposal of pesticides and pesticide containers.

Arizona and California are among the states most active in pesticide regulation. Both accepted the full range of authorities delegated by EPA.[1] They also administer regulatory programs that in some respects

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(1) The EPA has since withdrawn its delegation of authority to California for administration of RCRA programs; however, California maintains waste disposal programs similar to those of RCRA.

are more stringent and extensive than those required by Federal laws. For example, both states require studies of the fate of pesticides in the environment in addition to those required by the EPA to assess leaching potential of agricultural pesticides.

States Group Regulatory Activities By Function Among Several Agencies

The survey identified 34 specific activities undertaken in support of pesticide regulation. Two of these, development of Integrated Pest Management (IPM) programs and testing of foods for pesticide residues, are university extension service and agricultural agency responsibilities, respectively, in most states. The other 32 activities can be grouped into four broader functional areas: 1) control of the use, sale, and application of pesticides, 2) protection of water resources from pesticide pollution, 3) measuring and reducing public exposure to pesticides, and 4) protection of farmworkers from exposure. In most states, the first three of these functional areas are the responsibility, of an agriculture, environment, and a health agency, respectively. Protection of farmworkers is also the responsibility of an agricultural agency in most states. In others, however, a labor agency has the responsibility, or plays a role.

In most states, the agricultural agency assumes the major responsibility for pesticide regulation within a multi-agency management system. In only five states -- New York, New Jersey, Connecticut, Rhode Island, and Alaska -- is primary responsibility for pesticide regulation vested in an environmental agency. Survey respondents reported a trend toward greater centralization of pesticide regulation in 23 states, mostly in the agricultural agency. Only three reported a trend toward further decentralization. The latter group includes California, where two initiatives to appear on the ballot in the 1990 general election would transfer substantial responsibilities from the Department of Food and Agriculture to other agencies.

Arizona's Pesticide Regulatory Structure Differs In Several Respects

Distribution in Arizona of responsibility for the broader, functional areas of pesticide regulation generally conforms to the national pattern. Arizona's regulatory structure, however, differs from the majority of other states in several respects:

- Arizona has a more comprehensive system of licensing, certification, and permits to control the sale and use of pesticides than any other state except California. Most other states, for example, do not license, certify, or permit agricultural pilots, application equipment, pest control advisors, or growers, as buyers of agricultural pesticides.

- Arizona is one of only ten states in which the regulation of pesticide recordkeeping and reporting requirements is not the exclusive responsibility of an agricultural agency. In Arizona, both ACAH and DEQ have this authority.

- Arizona is one of only eleven states in which an agricultural agency does not have exclusive authority to cancel or restrict use of a registered pesticide. In Arizona, both ACAH and DEQ have this authority.

- Arizona is one of only 18 states that maintain a pesticide poisoning registry, and one of only 23 states that educates healthcare professionals in the identification of pesticide poisoning.

- Arizona is one of only seven states in which regulation of the use of agricultural and structural pesticides is managed by different agencies. In Arizona, the Arizona Commission of Agriculture and Horticulture regulates use of agricultural pesticides, and the Structural Pest Control Board regulates the use of structural and horticultural pesticides.

States Use Various Methods To Manage Multiple-Agency Regulation

In a number of states, efforts have been made to deal with the problems created by fragmented and overlapping authority, by coordinating and harmonizing multi-agency activity. In 25 states interagency agreements or Memoranda of Understanding (MOUs) have been adopted that delineate the boundaries between agencies' authorities, responsibilities, and activities. The EPA, which is responsible for the administration of Federal pesticide regulations and for the supervision of cooperative regulatory programs delegated to the individual states, actively promotes

interagency MOUs among state agencies as a means of dealing with the excessive fragmentation of regulatory programs and responsibilities. In two states, special oversight bodies assist in the management of pesticide regulatory programs shared by or involving different agencies. Wisconsin uses a Pesticide Review Board comprised of representatives from the agriculture, environmental, and health-related state agencies to determine which pesticides should be banned. Florida uses an Interagency Committee on Pesticide Regulation to decide whether additional information is needed to determine if specific pesticides have ground water leach potential.

In Arizona, an effort to clarify the major roles of the Commission of Agriculture and Horticulture and the Department of Environmental Quality has been attempted. ACAH and DEQ prepared a draft Memorandum of Understanding, but their efforts to define and coordinate their respective responsibilities and activities foundered in 1988 over differences concerning interpretation of State statutes and validity of extant regulations.

QUANTITY AND QUALITY OF PESTICIDES USED IN ARIZONA

Chapter 162, Section 7, of the 1989 Session Laws requires us to prepare "[a] quantitative and qualitative report of pesticide use in this state."(1) To meet this mandate, we developed data on the types and amounts of agricultural pesticides used in Arizona in 1989. With two panels of experts, we then reviewed both the amount of data and the qualitative aspect of pesticide use.

Quantitative Review Of Pesticide Use

Because comprehensive records on agricultural pesticide use are not available, the amount of pesticides applied in Arizona cannot be determined precisely. We attempted to estimate the quantity of pesticides used from sales information and the records of custom applications. The estimates developed through this analysis are the most comprehensive developed to date in Arizona.

Methodology - Although sales of pesticides are not a direct indicator of the quantity of pesticides actually applied in Arizona in any given year, sales data do provide valuable information for estimating pesticide use. We attempted to determine the total amount sold in 1989 of each agricultural pesticide registered for use in Arizona. All 49 sellers engaged in the retail sales of pesticides to Arizona buyers were surveyed and asked to submit detailed sales information.

Of the 49 sellers surveyed, 46 responded to our request and submitted their sales data. All pesticide products were then converted from their brand names to common active ingredients (chemical names) so that similar pesticides sold by different manufacturers could be aggregated into a single total amount. Amounts included in our analysis exclude sales of

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(1) Based on the language of the Session Law and input from legislative staff, we limited our review to agricultural pesticides.

pesticides for use by structural pest control personnel, government agencies, irrigation districts, and homeowners, as well as applications to rights-of-way, ditchbanks, etc. Our figures also exclude applications on tribal lands, golf courses, and cemeteries.

In addition, we analyzed and collected from custom application reports (Form 1080) information on the quantities of each pesticide applied by custom applicators. All pesticide applications which are made by commercial firms hired by growers must be reported to ACAH. While data compiled from custom application reports are a more direct measure of actual quantities of pesticides applied (compared to sales data), they understate total quantities because many pesticide applications are not covered by this reporting requirement. For example, a grower who applies his own pesticides to his crops with a ground rig, does not have to report to ACAH.

Finally, we asked two panels of pesticide experts to review our quantity estimates, and to comment on the quality of products used in Arizona. The first panel consisted of seven pest control advisors, two aerial applicators, a professor of agriculture from the University of Arizona, a chemist from the State Chemist's Office, a pesticide expert from the Department of Environmental Quality, a pesticide specialist with the Yuma Valley Agricultural Center, and a Farm Bureau representative. The second panel, assembled by the Farm Bureau, consisted of about 13 growers and members of grower organizations.

Amounts and types of pesticide use - As shown in Table 2 (page 23), an estimated total of 11 million pounds of pesticides (reported as pounds of active ingredient) were used in Arizona in 1989. Custom applicators reported on the Form 1080s that they used almost 7 million pounds of pesticides, while the sellers we surveyed indicated that they sold almost 10 million pounds of pesticides. The total estimate of 11 million pounds is greater than the estimate of total sales, because for some pesticides the amounts reported used by custom applicators were greater than the amounts reported sold. In these cases sales amounts were adjusted upward to better represent actual pesticide use. (For further discussion and explanation of the differences between Form 1080 and sales amounts, see next section.)

Almost one-third of all pesticides sold in Arizona were insecticides. Defoliants, dessicants, and growth regulators represented about one-fourth of all pesticides sold. Fumigants and herbicides each account for about 20 percent of pesticides sold.

TABLE 2

1989 AGRICULTURAL PESTICIDE USE IN ARIZONA
AS CALCULATED FROM FORM 1080 AND SELLER DATA

Type of Pesticide	Total Active Ingredient From Sellers (In Pounds)	Total Active Ingredient From Form 1080 (In Pounds)	Highest Estimated Use In Pounds(a)
Insecticides	3,033,495	3,602,918	3,854,461
Herbicides	1,903,527	390,236	1,921,816
Defoliants, dessicants, and growth regulators	2,323,193	2,430,972	2,440,463
Fungicides and bactericides	434,804	425,025	624,816
Fumigants	2,041,425	-0-	2,041,425
Biological insecticides	1,211	10,000	10,000
Miticides	59,268	49,704	59,557
Nematicides	29,997	1,707	29,997
Rodenticides	106	-0-	106
Other	32	-0-	32
TOTAL	9,827,058	6,910,562	10,982,673

(a) This column represents the best estimate of total agricultural pesticide use in Arizona. It was derived by determining for each individual active ingredient the higher of the two amounts indicated from Form 1080s and seller data.

Source: Office of the Auditor General staff compilation of Form 1080s and the information provided by permitted sellers of pesticides in Arizona in 1989.

Differences in estimates - As shown in Table 2, there is often a great difference between the amount of pesticides reported by dealers, and what

is recorded on the Form 1080s. Consultants told us there are several reasons that may account for this difference. First, some sales figures may be greater than the Form 1080 figures for the following reasons:

- Many growers apply their own pesticides via ground application and, therefore, are not required to report these applications on Form 1080s. This is especially true for herbicides, miticides, and nematicides.

- Growers may purchase pesticides late in one year when prices are relatively low, but use them the next year. This could account for either a high or low reporting of particular pesticides.

- Sellers may have reported their industrial pesticide sales along with their agricultural sales. They may also have included sales to sod farms, golf courses, and similar buyers, even though applications to such locations do not require the completion of a Form 1080.

- Sellers may have included out-of-state sales as it would be difficult to separate these from sales within Arizona.

- Some sellers may have included wholesale figures in their retail sales, as they may not have considered that buyers might re-sell a pesticide. Therefore, some sales figures may have been reported more than once.

- We did not survey government agencies, but according to our consultants, state and local governments use significant amounts of pesticides.

Second, sales figures may be less than Form 1080 figures or may be underreported for the reasons that follow.

- Some of the Form 1080 figures may include pesticides purchased from outside of Arizona and, therefore, would not appear in our sales figures.

- Although we sent each seller a survey listing all pesticides considered agricultural, several sellers did not use the survey and may not have reported sales of what we considered to be agricultural pesticides (i.e., some sellers may have considered sulfur a fertilizer instead of a pesticide).

- Some growers may have used pesticides purchased prior to 1989 and, therefore, would not have recorded these pesticides in 1989 sales figures.

- Sellers may have deliberately underreported sales figures.

Qualitative Review Of Pesticide Use

The quality of pesticides used in Arizona is difficult to assess. The statutes do not specifically define what a qualitative review should entail. Based on our review of literature and discussion with experts, we limited the scope of our work to a review of the potency and toxicity of pesticides. However, information on the effects of many newer products is limited.

New pesticides are more potent - In most instances, modern pesticides are manufactured to be more potent at lower volume than those used in the past. Although some panel members agreed that determining the quality of both past and present pesticides is very difficult, they told us that one way to assess the quality of pesticides is to compare the amount used today to the amount used in the past. The State Chemist's environmental specialist said that the quantity of newer pesticides being used today is, in some cases, only a small fraction of the amount of older pesticides used a few years ago. Whereas most pesticides are still applied in gallons or quarts per acre, some are now applied in ounces or grams per acre. For example, whereas application rates for chlorinated hydrocarbons and organophosphates (older types of pesticides) may be as high as 5 pounds of active ingredient per acre, average application rates for pyrethroids used in Arizona are only 0.1 pound of active ingredient per acre. Experts indicate the present trend continues to be toward reducing the amount applied per acre.

Toxicity of pesticides has decreased, but many remain harmful - Because most pesticides are meant to destroy undesirable organisms, they are obviously toxic materials. However, in recent years, due to a trend away from highly toxic substances that persist in the environment, pesticides have been developed that degrade more quickly. However, long-term health effects of these newer products may not be well known.

"Signal words" on pesticide labels identify the relative toxicity of a product. The word "Danger" identifies the substance as a highly toxic one, and a taste to a teaspoonful of the product would very likely kill the average person. The word "Warning" on the label means that the

product is moderately toxic. A teaspoonful to a tablespoonful would also be likely to kill the average person. The word "Caution" informs the user that the material has low toxicity and is comparatively less dangerous. However, ingesting an ounce to more than a pint could still prove lethal for the average person.

Panel members agreed that even those pesticides that are determined safe by the EPA, may still be dangerous if placed in untrained hands. Of the active ingredients in our study that were noted as being used or sold in Arizona, 22 are considered highly toxic and four are noted as being odoriferous. For easy reference, these pesticides are printed in boldface in Appendix I.

Some pesticides affected by EPA and DEQ requirements - Because of new government requirements, some pesticide manufacturers are choosing not to reregister some pesticides, while other pesticides do not meet the requirements. The EPA allows pesticide manufacturers several years to prove their products are safe. The EPA may cancel product registrations when companies fail to test products, tests fail to meet EPA requirements, or test results prove products are dangerous. Meanwhile, DEQ requires companies to submit environmental fate data to identify pesticides that have the potential to pollute ground water. Some of our consultants stated that pesticide manufacturers are allowing some product registrations to lapse when they discover that the cost of testing their products to meet EPA or DEQ requirements is greater than the profits they can reasonably expect to obtain from their sale. However, some consultants also said that many of these products are effective. Pesticides determined dangerous (e.g., DDT) have been banned by the EPA. Pesticides that have been banned, or will be dropped, are noted in Appendix I. Of course, new products are constantly being introduced in the marketplace. However, according to the State Chemist's environmental specialist, some older pesticides may be as effective as the newer ones for particular crop and pest conditions.

REVIEW OF PROFESSIONAL AND ACADEMIC PROPOSALS

As the Legislature directed our review include "proposals for pesticide regulation described in professional and academic publications," we conducted an extensive search of appropriate data banks to obtain information on professional and academic proposals, as well as other needed information. This search is described below. We also obtained copies of all bills before the U.S. Senate and the U.S. House of Representatives, and copies of major regulatory proposals under consideration in the other 49 states. Many of these proposals, other regulatory activities, and regulatory problems were discussed in personal or telephone interviews with officials and experts throughout the United States and Arizona who are responsible for, or concerned with, pesticide regulation. The information developed is reflected in discussions and Findings throughout the audit reports. A bibliography of the publications and documents reviewed, along with lists of organizations contacted during the audit, are listed in Appendix II.

General Findings From The Literature Review

The literature search provided information to assist us in many of our Finding areas:

- **Food Safety** - The literature indicated the public's growing concern about the ability of the FDA to adequately sample and test produce for pesticides. The EPA's tolerance levels for pesticides in food were also questioned. Several states have instituted their own testing programs because of the perceived inadequacies of FDA's program.

- **Integrated Pest Management**[1] - Integrated Pest Management (IPM) has received attention in a number of recent studies. Both the National Research Council and the Office of Technology Assessment have issued reports that contain summaries and recommendations regarding IPM. Several states have implemented extensive IPM programs and have developed unique funding mechanisms for these programs.

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(1) Integrated Pest Management is the use of both chemical and nonchemical methods to suppress or control crop infestation.

- **Pesticide Containers** - Our review of literature found that programs are underway in five states to address the problems of pesticide container disposal. These programs encourage or mandate recycling or reuse of containers. The pesticide manufacturing industry is also moving towards recyclable and reusable containers.

- **Water Monitoring** - According to the literature, monitoring for pesticides in water, particularly ground water, is a fairly recent phenomenon. Previous thinking had supposed that ground water was protected from pesticide leaching. Testing performed in the late 1970s found that ground water was indeed being contaminated with pesticides. As a result, Federal and State programs have been implemented to monitor for the presence of pesticides in ground water. Our review of the literature, however, found that few states, to date, have yet developed a comprehensive ground water monitoring system.

- **Worker Safety** - Worker safety is also addressed in the literature. We were able to derive information regarding the health effects of pesticides on workers.

- **Pesticide Drift Control** - Literature relating to drift control ranged from technical treatises to recommendations on what states can do to alleviate problems caused by pesticides drifting off target during application. The Texas Center for Policy Studies has released a comprehensive study on this topic and other pesticide-related problems now facing states.

Pesticide Regulation Criticized

We found few studies addressing the broader policy and structural issues involved in pesticide regulation. Two recent studies which address these issues criticize current pesticide regulatory practices at both the Sate and Federal levels. Both the Texas Center for Policy Studies in its report "The Pesticide Crisis: A Blueprint for States," and by William H. Rodgers, Jr. in "Environmental Law, Volume 3: Pesticides and Toxic Substances" cite the lack of substantive information about pesticide toxicity, mobility, and its use as a major stumbling block in developing effective regulation. The Texas Center notes that "state and federal agencies are frozen in the preposterous stance of permitting the use of a wide range of products without even the most basic information about them." Rodgers' position concurs with this, noting that "knowledge gaps" exist regarding pesticide production, distribution, usage, application, mobility, toxicity, exposures, and economic advantages. Rodgers also stated that developing pesticide regulation is difficult because regulatory duties are often fragmented among various agencies. In

addition, differing points of view about pesticide issues have a tendency to attract interest groups that conflict; and conflict, not consensus, is the key to pesticide law.

Methodology

Our review of professional and academic proposals was designed to secure the required information in a timely manner at the least possible cost. Data bases available to the Legislature and state agencies, through subscription or at relatively reasonable cost, provided most of the citations and abstracts needed. Citations and abstracts were then reviewed to determine those pertinent, and texts were obtained, as needed, from local libraries or purchased when otherwise unavailable. Copies of U.S. Senate and House of Representative Bills were provided by the U.S. Congress. Copies of bills recently adopted or pending in state legislatures were obtained from various state officials during our survey of statutory and administrative pesticide regulatory programs in other states (see Appendix II).

We identified and selected the data bases to be searched with the assistance of staff of the U.S. Congressional Reference Services, the Library of Congress, the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, the National Conference of State Legislatures, the Council of State Governments, and the State of Arizona, University of Arizona, and Arizona State University Libraries. Major data base searches were also conducted free of charge by the Science-Engineering Library of the University of Arizona and, under contract, by the Fee-Based Information and Research Service Team of the Arizona State University Libraries (ASU-FIRST).

Data Bases Searched

Two primary data bases, the AGRICOLA data base of the U.S. National Agricultural Library (1984-1989), Beltsville, MD., and the ENVIROLINE data base (1970-1990) of R. R. Bunker, New York, N.Y., were searched by the University of Arizona and Arizona State University (ASU-FIRST), respectively. AGRICOLA provides comprehensive coverage of worldwide journal literature and monographs on agriculture and related subjects.

AGRICOLA contains over 2.5 million records that are updated monthly. ENVIROLINE provides indexing and abstracting coverage of more than 5,000 international primary and secondary source publications, including the Federal Register and other government documents, reporting on all aspects of the environment. ENVIROLINE contains over 131,000 records that are also updated monthly.

In addition, the University of Arizona searched the Selected Water Resources Abstracts (1980-1989) of the Department of the Interior, and ASU-FIRST searched for nonduplicative citations in eight other commercial data bases. These data bases were AGRIBUSINESS U.S.A. (1985-1990), CHEMICAL EXPOSURE (1974-1987), ENVIRONMENTAL BIBLIOGRAPHY (1974-1989), FSTA/Food Science and Technology Abstracts (1969-1990), LIFE SCIENCES COLLECTION (1979-1989), MEDLINE (1983-1990), NIOSH/Occupational Safety & Health (NIOSH) (1973-1989), and POLLUTION ABSTRACTS (1970-1990). Collectively, the additional data bases contained several million additional records.

The University of Arizona and the ASU-FIRST searches developed approximately 1,800 and 1,500 citations, respectively. A limited number of additional pesticide-related citations were obtained from the data bases of the National Conference of State Legislatures (LEGISNET) and the Council of State Governments (ISIS), which were the subject of on-line searches conducted by audit staff, and commercial searches conducted by the Comprehensive Dissertation Query Service of Ann Arbor, Michigan.

PESTICIDE-RELATED INCIDENTS AND ACCIDENTS REPORTED TO STATE AGENCIES

Chapter 162, Section 7, of the 1989 Session Laws requires us to compile a listing of the pesticide-related incidents and accidents reported to four specified State agencies from the effective date of the EQA (August 13, 1986), through June 30, 1989. We reviewed documentation of the incidents and accidents between these dates that were reported to the Arizona Commission of Agriculture and Horticulture (ACAH), the Department of Environmental Quality (DEQ), the Department of Health Services (DHS), and the Industrial Commission of Arizona (ICA), and identified 397 confirmed incidents involving agricultural pesticides.[1] The number of incidents reported to each agency is shown in Table 3 (see page 32), and the following sections describe our findings in detail.

Arizona Commission of Agriculture and Horticulture (ACAH)

ACAH regulates pesticide use through the licensing of users, sellers, and applicators of agricultural pesticides. The Commission is also statutorily mandated to investigate the complaints it receives directly, and those referred to it by other governmental agencies.

Between August 13, 1986 and June 30, 1989, the Agricultural Chemicals and Environmental Services Division of ACAH (ACES) logged a total of 337 complaints. Of these, 17 were also reported to one or more other agencies. Incidents reported to ACES cover a wide range of complaints. For example, some citizens living near agricultural areas call ACES when pesticides drift onto their property and cause health problems or damage landscaping; others report being sprayed with pesticides while driving on roads adjacent to these areas. In addition to complaints from private citizens, ACES also receives complaints from a number of specialized groups: beekeepers report bees dying from pesticide spray on blooming

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(1) Because some incidents were reported to more than one agency, the number of incidents reported to each agency total more than 397, and this figure represents only the number of unique incidents reported.

TABLE 3

AGRICULTURAL PESTICIDE - RELATED INCIDENTS AND ACCIDENTS REPORTED TO STATE AGENCIES 8/13/86 - 6/30/89

Agency	Number of Incidents
Arizona Commission of Agriculture and Horticulture (see also Table 4)	
Bee Kill	41
Buffer Zone	10
Container Disposal	10
Drift	42
Health Effects	48
Illegal Residue	15
Odor	48
Overflight	17
Overspray	35
Property Damage	12
All Others (see Table 4)	59
Total	337
Department of Environmental Quality	
Container Disposal	28
Soil or Water Contamination (two also involved containers)	14
Accidental Spills (one also involved containers)	11
Other	5
Total	58
Industrial Commission of Arizona	
Farmworker	10
Commercial Application's Employee	2
Total	12
Department of Health Services	
Farmworkers	5
Commercial Applicator Employees	5
General Public	4
Total	14
TOTAL	421
Less duplicates (reported to more than one agency)	-24
NUMBER OF UNIQUE INCIDENTS	397

Source: Office of the Auditor General staff review of complaint logs, inspection files, and investigation records at the Arizona Commission of Agriculture and Horticulture, the Department of Environmental Quality, the Industrial Commission of Arizona, and the Department of Health Services.

fields or hives; school staff call about pesticide applications during school hours without prior notice or a proper buffer zone; and Federal inspectors report illegal pesticide residue on Arizona produce tested before sale. ACES also receives complaints involving pesticide application aircraft. Table 4 (see page 34) illustrates the different types of complaints reported to ACES.

We were able to confirm 337 incidents reported to ACES, but the actual number may be much higher. Before logging a complaint, ACES verifies the incident involves agricultural pesticides. A separate record called a Concern Log documents additional complaints. Between December 9, 1986 and June 14, 1989, the Concern Log lists 201 incidents. ACES staff said some reported incidents are considered so minor they are not even listed on the Concern Log. Other agencies did investigate some of these incidents and found they involved agricultural pesticides. (For a review of ACAH enforcement programs, see Report #90-7, Findings I and II.)

Department of Environmental Quality (DEQ)

DEQ directs efforts to identify and clean up sites where soil or water have been contaminated by pesticides or other hazardous materials, whether caused by a temporary emergency or long-term residue buildup from agricultural or industrial activities.

The Department receives complaints directly from the public and referrals to it by other agencies, including Federal, State, city, county, and tribal governments. According to the Department's records, 57 incidents involving agricultural pesticides were reported to and investigated by them during the specified time period. Of these, one was also reported to DHS. Reports filed with DEQ include eleven accidental pesticide spills, 28 cases of desert dumping of pesticide containers, and 14 cases of soil contamination at airstrips used by aerial applicators in the 1960s before modern mixing and tank rinsing techniques were implemented.

TABLE 4

PESTICIDE-RELATED INCIDENTS AND ACCIDENTS REPORTED TO THE ARIZONA COMMISSION ON AGRICULTURE & HORTICULTURE BY FISCAL YEAR

Incident Type	1986-87(a)	1987-88	1988-89	Total
Bee Kill	15	16	10	41
Buffer Zone	7	2	1	10
Container Disposal	5	4	1	10
Disposal(b)		2		2
Domestic Animals(b)	2			2
Drift	11	16	15	42
Health Effects	10	20	18	48
Illegal Application(b)			1	1
Illegal Residue	5	3	7	15
Illegal Sales(b)			7	7
Livestock(b)	3			3
Miscellaneous	1	10	8	19
Misuse(b)	3	3		6
Noise(b)		1		1
Odor	32	14	2	48
Over Tolerance	6	1	3	10
Overflight	4	10	3	17
Overspray	6	6	23	35
Pesticide Storage(b)	1			1
Property Damage	4	6	2	12
Spills(b)	2		1	3
Unlicensed(b)	1			1
Worker Safety(b)	3			3
TOTAL	121	114	102	337

(a) August 13, 1986 through June 30, 1987.

(b) Incident category was used in only one or two of the three fiscal years.

Source: Arizona Commission of Agriculture and Horticulture, Agricultural Chemical and Environmental Services Division Annual Reports for Fiscal Years 1986-87, 1987-88, and 1988-89.

Like the other agencies we reviewed, DEQ may have received more complaints involving agricultural pesticides than we report here. The Department could not produce files on 42 possible contamination sites,

some of which may have involved agricultural pesticides. In addition, when we reviewed the Department's records in March and April 1990, DEQ had not yet investigated some events reported during the 1986-89 time period. DEQ records also indicate that some pesticide-contaminated sites discovered and reported before August 13, 1986, had not been cleaned up by March 1990. In searching for incidents reported within the relevant time frame, we uncovered information about 26 such sites.[1]

Industrial Commission of Arizona (ICA)

The Arizona Environmental Quality Act of 1986 includes a specific mandate for ICA to promulgate and enforce rules regarding worker safety from pesticide-related hazards. ICA's Division of Occupational Safety and Health executes this mandate by conducting on-site inspections at farms and commercial applicators' facilities in response to complaints from current employees at these locations.

We identified 12 agricultural pesticide-related incidents that were reported to ICA during the specified time. Of these, six were also reported to DHS. Incidents reported to ICA involved fieldworkers that were sprayed with pesticides or entered fields too soon after pesticides were applied, and employees of commercial applicators that were exposed to pesticides while mixing or loading chemicals.

Again, incidents and accidents reported here may be understated. Between August 1986 and June 1989, ICA received complaints and referrals on at least seven more events that appeared to be related to agricultural pesticides. However, because these events were not reported by employees, ICA did not investigate them.[2] Therefore, we could not determine from

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(1) As we were searching for incidents reported within the time period defined by H.B. 2090, we may not have encountered all sites reported prior to that period that are still contaminated. More such sites might be identified by examining DEQ's records for years prior to 1986.

(2) A.R.S. §23-408 gives ICA the responsibility for investigating complaints signed by employees or employee representatives, if there are reasonable grounds to believe a violation exists. Although the same statute authorizes ICA to conduct other investigations deemed appropriate by ICA's Director, the Agency has a policy of not investigating so-called "nonformal" complaints.

ICA's records whether these were valid pesticide-related incidents. Furthermore, some incidents affecting migrant workers may never come to ICA's attention, as these workers may be less likely than more secure workers to file complaints with governmental agencies.

Department of Health Services (DHS)

DHS is required by statute to maintain a pesticide registry (a compilation of pesticide poisonings reported to the Department). Each event recorded in the registry is classified as a "case", "suspected case", or "no case", according to the assessment of the healthcare professional who treated the affected person. DHS received healthcare professionals' reports of 14 agricultural pesticide-related incidents that resulted in 25 "cases" or "suspected cases" of pesticide poisoning. Six of these were also reported to ICA.

In addition to Pesticide Poisoning Surveillance Reports submitted by healthcare professionals, DHS receives complaints from people who believe they may have been exposed to pesticides. The Department investigates these incidents, and provides information and assistance to the complainant. However, if the affected person did not consult a healthcare professional, or if the healthcare professional did not report the incident to DHS as a confirmed "case" or "suspected case", DHS classifies the incident as "no case".

Aside from recording the number of agricultural pesticide-related incidents, the Pesticide Registry also lists 27 "cases" and "suspected cases" related to structural and horticultural pesticides, and eleven cases of other or unknown origin. Poisonings from a variety of causes, including occupational exposure and accidental contact with discarded pesticide containers, are reported to DHS.

The number of pesticide poisonings during the relevant time period may be greater than the 14 reported here. According to DHS officials, many victims, especially migrant workers, do not visit healthcare

professionals in Arizona, and some healthcare professionals fail to report poisonings. (See Report #90-10, Finding I.) Our research at ACAH indicated many people who reported health problems to ACAH did not seek medical care, and ACAH did not always inform DHS of health complaints related to pesticides. In addition, DHS' Pesticide Poisoning Surveillance Report form does not require a description of the event that caused the poisoning, or identification of the substance involved. We counted only those incidents where supplementary information indicated they were related to agricultural pesticides.

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Agriculture and Horticulture
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Office of the State Chemist
State Agricultural Laboratory
Agricultural Chemicals and
Environmental Services Division

November 29, 1990

Mr. Douglas R. Norton
Auditor General
2700 North Central Ave.
Phoenix, AZ 85004

RE: Agency Response to Pesticide Regulation Draft

Dear Mr. Norton:

The agency response to the seven findings of your audit to the pesticide regulations is enclosed. Also included is the Commission response as faxed to us by Kenny Evans, Chairman.

If you have any questions, please contact me.

Respectfully,

Dr. Ivan J. Shields, Director
Commission of Agriculture
and Horticulture

IJS:tg

Enclosure

November 29, 1990

Douglas Norton
Auditor General
1700 North Central Suite 900
Phoenix, Arizona 85004

Mr. Norton:

We appreciate the opportunity to comment on items reviewed during your recent audit. The scope of your audit made completion nearly impossible in the time frame allotted. Your staff did a commendable job, considering the magnitude and nature of the work required. Audits generally focus on negatives. On complex issues, the public has a right to have the State's successes highlighted as well. Although the successes are acknowledged in your report, for balance, they ought to be highlighted just as the shortcomings are.

As Commissioners, we take the findings of the audit very seriously. We consider allegations that State employees have failed to enforce pesticide rules as a serious breach of responsibility. Although our first reaction was anger and disappointment, we have chosen to use the resources at our disposal to investigate and correct the problems identified. As you are aware, we have already asked the Attorney General to investigate and prosecute any employee who has broken the law. We have also asked the Attorney General to provide counsel about possible disciplinary action we can take against any employee who is proven to have failed to carry out the rules adopted by the Commission. We ask that allegations of malfeasance or obstruction of justice be vigorously prosecuted. We also ask that you direct

your staff to cooperate in those endeavors.

As farmers and ranchers, we want the rules enforced vigorously, but fairly. We want the farmers and applicators to be educated to **PREVENT** violations and to eliminate unnecessary pesticide use. If violations occur, we want the violators punished as per the rules. We want the "bad guys" -- those with repeated serious convictions put out of business. They must be afforded their constitutional rights, but once due process has been served we expect enforcement of the rules. Anything less is just not acceptable. If the incidents cited in the report are accurate, enforcement has not been fair or strict enough.

We concur with the audit report finding regarding drift and pesticide container disposal. Both issues pose significant legal and technical issues but they must be addressed and resolved. The Federal EPA has worked more than 5 years now on the Drift issue and still have not even come up with a definition for drift. We believe that perceived exposure poses a problem whether or not actual exposure occurred. We further believe that much of the problem resolves around being a "good neighbor." We have developed buffer Zones, PMA's and "Sensitive Areas" with that in mind. Unfortunately, we can not force someone to be a good neighbor. We would support efforts to eliminate off target exposure to drift.

The container storage and disposal issue is by far the most hazardous pesticide issue facing both the public and the industry. We strongly support efforts to provide "cradle to

grave' tracking of pesticide containers and believe a technical advisory team could develop a workable plan to minimize or eliminate improper pesticide container disposal.

The statutory division of responsibilities within the Commission between the staff (state employees who are supposed to enforce the law) and the Commissioners (public and industry representatives who adopt the rules) will cease to exist in one month (December 31, 1990). At that point, state employees under the new Director will assume all of the responsibilities in the newly formed Department of Agriculture. We believe the new Director ought to and will use the information from the audit and the subsequent information and counsel received from the Attorney General in structuring the new Department of Agriculture.

As a Commission, we spent thousands of hours developing what you, and others, acknowledge are some of the most stringent and comprehensive environmental regulations in the entire country. We studied more than 3,000 pages of technical data and pushed through some of the most significant rule changes in the State's history. We faced many obstacles in that process. Political activist pushed for more stringent rules. Industry spokesmen testified that the proposed rules were stricter than other states and would discriminate against Arizona's family farmers. The compromise reached did not give either side all that they wanted. The compromise rules finally adopted favor the environment more than industry. As you report, the rules compare

favorably to any state -- even California. They are more stringent than liberal, environmentally activist states like Massachusetts or Vermont. Adoption of the rule package represents a negotiated balance between conflicting interest groups. With the exception of a small number of technical, legal issues on which we received conflicting legal counsel, the rules carry out legislative intent. In the highly charged emotional climate that surrounds environmental issues, we are the only agency to have completed that monumental rule making task. During the period of transition we experienced the following transitional conditions:

PERIODS IN WHICH WE WERE TRYING TO ENFORCE RULES:

1) Based on: PRIOR LAW with PRIOR RULES & REGULATIONS
2) Based on: SOME NEW LAWS BUT MOST OLD RULES
3) Based on: NEW LAW, SOME NEW RULES & SOME OLD RULES
4) Based on: NEW LAW, MOST NEW RULES & SOME OLD RULES
5) Based on: NEW LAW and ALL NEW RULES

Obviously, this transition created periods of confusion. Some of the incidents cited in the audit report show that even the audit staff, after months of study, misinterpreted which rules were in effect at which times. Application of rule in each time frame was based on counsel received from the Attorney General's representative. It is not valid to criticize the agency for failing to enforce a rule if the rule or procedure was not even adopted **until after** the incident occurred. We have made great strides in getting the rules and regulations in place. We

have struggled to train and re-train and cross-train the staff. We have spent significant time and resources educating, training and certifying the farmers, pest control advisers, sellers and others who handle ag chemicals. In fact, other states have even patterned their programs on our successes. We are, therefore, extremely disappointed to learn of your allegations that the Director and his staff, who are given the **statutory** responsibility by the legislature to enforce the law and rules, have been "reluctant" so to do. As discussed above, the staff performance is being addressed by the Attorney General. The rules are not the problem, enforcement may have been.

Many of the topics discussed in the audit are emotionally charged, highly technical issues about which some of the best experts in the world disagree. On some of these issues, the brevity which was required in preparing the document only allowed your staff to include generalizations or judgmental comments. Some points are of such significance that they require a more in depth response. As an example, IPM is a simple acronym used to describe a very general concept. Some aspects of the concept are well understood, easily documented and widely used. Other aspects are highly technical, undocumented and often speculatively at best. In Arizona, the principles of Integrated Pest Management are more widely accepted and used than in most any other state. We applaud the efforts of the staff person who focused on this issue. We concur that more can and should be

done to develop additional IPM practices that Arizona farmers can use. Adding additional taxes on the farmer to do this is not the correct approach. California currently spends millions annually trying to find new IPM techniques. Any techniques developed by them will be readily adopted and used by Arizona farmers as well. Arizona's farmers, **through self imposed taxes**, already spend 12 times more than State Government on IPM in an attempt to reduce the amount of agricultural chemicals we must use. Everyone benefits from those expenditures. The need is for a more **BALANCED BASE** of financial support. Though we are a model for other states to emulate, more can be done. Unfortunately, some of our best tools -- ie. quarantines and inspection stations -- meet stiff public resistance. The key is education, not money. Emphasis should be placed on all aspects and options for pest control including, but not limited to, safe pesticide use and worker safety training.

Some of the enforcement issues are complex from both a legal and technical standpoint. On some issues, the State and Federal regulations have changed -- sometimes more than once -- during the period reviewed. Issues such as 1) constitutional presumption of innocence vs. rules of evidence, 2) conflicting primacy on Federal and State FIFRA, CERCLA, CWA and OSHA Regulations -- ie. which agency does what. 3) an individual's constitutional rights against double jeopardy -- ie. allowing the agency with the stiffest penalty structure to take the lead

in prosecuting serious offenses, 4) the right to know vs. historic property rights issues, 5) how to proceed when we receive conflicting legal counsel, etc. It is understandable, therefore, how some of the rules or events were misunderstood or misinterpreted by the auditors in the legislatively imposed rush to complete the audit. For instance, through out the document, staffers equate the issuance of a citation with a finding of guilt (ie. see pages 24-26). An individual is innocent until **PROVEN** guilty. The issuance of a citation was intended to be a charge that the person **MAY** have violated a rule. The receipt of a complaint was to be handled as a **POTENTIAL** violation -- or a request for information depending upon the circumstance. With that in mind, for several years, we actively encouraged people to call ACAH whenever they had a concern, whether it involved an incident or not. We discussed and announced this through television and the other media in an effort to get people to call in so we could discuss their concerns. We even went so far as to print up wallet size cards with our phone number and general safety information. We assumed that educating the public and allaying unnecessary fears was a part of our mission. Obviously, encouraging the public to call backfired on us. First, additional calls were misinterpreted as meaning more problems existed. Secondly, staff persons who become over zealous in trying to allay public fears may cross the line and become "reluctant" to investigate potential violations. Even the process initiated may create that perception of reluctance or

"cover-up" whether or not it is true.

In another classic example of the confusing and complex nature of the rules, the auditor's analysis of the point system failed to identify that the points are cumulative both within and across categories. This results in a gross under estimation of the number of points assignable with a given violation. In the example used, the auditor misstated that a pesticide user who killed an endangered bird would receive the same point penalty as one who killed a sparrow. The point system actually allows double the point penalty quoted -- 1-10 points under 2.d. (nontarget bird kills.) **PLUS** 1-10 more under 2.i. (killing one ... endangered species). Additionally, he could receive up to 30 additional points if he contaminated water, soil and caused property damage in the same incident. Additional points assigned under sections 3, 4, 5, and 6 could bring the total up to 135 points -- well over the amount needed to levy the maximum fine and penalty. The points are cumulative not singular. Additionally, the violator is subject to Federal Civil and Criminal Prosecution as well. The rules are adequate -- provided enforcement is fair but strict. That may not have been the case.

Funding for pesticide enforcement continues to be a problem. The DOA grade classifications discriminate against ACAH pesticide inspectors. Once trained and qualified, pesticide inspectors and chemists can get jobs at ADEQ or other sister agencies at an average 1-3 grade levels higher than with the Commission. This

adds to high turn over rates, increases training costs and lowers staff moral. The Public currently places a great deal of emphasis on environmental issues, including pesticides. They expect the State's pesticide inspectors to be at least equally competent with other state employees. Fairness would indicate a review in this area is warranted.

The State Ag Lab and State Chemist have been housed in a facility that could not even be certified if it were a private laboratory. For more that four years we have fought with DOA about getting moved to a modern facility. Although that will be accomplished in the near future, the results of being forced to work in a substandard facility are reflected in tardy reporting as documented in your report. Staff did a credible job considering the difficult surroundings.

In summary, trying to measure the success of pesticide enforcement is difficult. The process is made even more difficult when:

1) dramatic changes in the rules occur during the audit period

2) public awareness and sensitivity to the issues increase markedly, as evidenced by significant increases in complaints and incidents in other states.

3) the counsel received about legal issues changes in response to changing circumstances

4) the Commission of Ag and Horticulture will be replaced by the new Department of Agriculture in less than a month.

We believe that farmers and ranchers want vigorous, fair

enforcement of pesticide rules. We support efforts to eliminate all unnecessary use of agricultural chemicals. We believe that improper storage and disposal of pesticide containers continues to pose the most significant threat to both people and the environment. We encourage the appointment of a task force to develop innovative methods of solving this problem. We believe that drift is a major problem complicated by urban sprawl and poor planning and zoning. We support efforts to develop better target efficiencies and to increase the use and effectiveness of sensitive areas, Pest Management Areas and Buffer Zones.

We concur that enforcement is as much an attitude as a process. We have requested the Attorney General look into issues raised in your report. If violations of law have occurred we have requested that they be prosecuted. If, as you assert, staff has been "reluctant" to enforce the regulations we worked so hard to get into place, disciplinary action will be recommended.

Finally, we believe our rules and our results compare very favorably with other states -- when results are measured as protection of public health and the environment -- not as telephone calls. Much more can and ought to be done. The poisoning of even one child because of improper storage or disposal is a tragedy that must be eliminated. But progress must be measured by not only where we are but where we have come from. Six years ago pesticide incidents were on the front page of the newspaper at least once a week. During the early 1980's, more complaints were received in some months than we have received in

TOTAL over the last three years. Much more needs to be done but much improvement has, in fact, already occurred. With the assistance and support of the legislature and the public at large, we expect that Arizona will emerge as a model for other states. More importantly, we will be able to control pests with less chemical usage and with fewer problems for both humans and the environment.

Attached herewith is a summary response requested from the staff. It is not offered as Commission policy, neither has it been edited by the Commissioners. It is offered as perspective only.

Sincerely,

Kenny Evans,
Chairman
Arizona Commission of Agriculture & Horticulture

ARIZONA COMMISSION OF AGRICULTURE & HORTICULTURE
RESPONSES TO AUDITOR GENERAL'S REPORT

FINDING I - ACAH IS RELUCTANT TO CONDUCT THROUGH AND TIMELY INVESTIGATIONS OF PESTICIDE COMPLAINTS.

RESPONSE: The Commission accepts the Auditor General's finding, however, investigations were assigned and conducted according to established priorities and investigated in a thorough and objective manner with the evidence collected determining the outcome. The audit concedes that investigations were generally initiated within one day of receipt of the complaint. It is felt that had it not been for budget constraints, personnel shortages and demands on the inspectors' time for other required pesticide regulatory duties that the ACAH would have been able to reduce delays and initiate more investigations on its own initiative. An additional factor is that the program is relatively new and the performance audit was commenced shortly after the program began.

If full staffing had been maintained within the various program responsibilities we believe that acceptable program objectives would have been attained. Higher performance with additional better qualified personnel needs to be considered to accomplish the mandated objectives.

Possible Violations Are Not Investigated:

In the example of the 1989 incident the audit references on page 8 the concerned homeowner called to inquire as to certain specifics about an application in progress. The homeowner was concerned because the family had a history of allergies. The agency receives many calls about the use of pesticides and it may be interpreted as a concern by the receiver of the call and a complaint by the caller.

Every complaint of a non-notification of a school is investigated. However, there have been many instances in which during the preliminary investigation it was discovered that the application was outside the statutory limitations.

Staff interpretation of the incidences listed as examples on pages 9 and 10 does not agree with the interpretation by the auditors. As an example, the 1987 monitoring incident, the Division Director did not request that the monitoring form be rewritten. The inspector doing the monitoring had made a contradiction on the form and it was suggested it be corrected to remove the contradiction. The correction strengthened the ACES position of a possible violation had a complaint been

received. The staff did not feel that a complaint was necessary under the circumstances.

Investigations Appear Designed To Ignore Violations:

Under this heading the statement "Even when ACES does pursue a complaint, the manner in which investigations are conducted often appears designed to avoid identifying violations." If the percentage of cases proven to be violative is considered the preceding statement is inconsistent with that fact.

On the following page 11, two cases are offered as proof that "ACES often closes cases without thoroughly investigating the complaints."

The first case was investigated following all procedures, samples were taken, residues found, application records located, area treated identified, statements taken from complainant and a witness, and the applicator interviewed (he did elect not to give a written statement). The investigation determined that there was not a violation of buffer zone statutes. The persons writing the report may disagree with the charge made against the applicator and the resulting penalty, but for them to use this case as an example of a lack of a thorough investigation is not consistent with the point they attempt to make.

The second example is inconsistent with the case file and considerable time and effort was spent by a competent inspector and no documented evidence was found. The case was closed because no corroborating evidence supporting the complaint could be discovered after a comprehensive investigation, not because of the reason stated in the report.

Investigations not pursued without documentation of application. This statement is not consistent with policies adopted by the agency. It is true that a copy of the pesticide-use report (Form 1080) does much better document the facts of the case relating to the application and does so under the signature of the applicator. The auditors themselves reviewed a case in which an applicator did not submit a Form 1080 and the applicator was charged with a violation. In another case a Form 1080 was never found, even though spray records for both farms were reviewed by the inspector. In addition, comments were made concerning a lack of a description of the aircraft by the complainant and the results of the laboratory analysis of the sample. No mention is made that the case file contains information that the incident occurred at night and the complainant stated he could only see the lights of the aircraft or that the case file contains information that the man's

wife had washed his motorcycle prior to the samples being taken thereby making the samples useless. This case was not closed because of not having a Form 1080. It was closed because ACES could not document a violation.

Substantial Delays In Investigative Process:

It is implied that ACAH intentionally delays its investigations. As has been previously pointed out, investigations are initiated immediately. Delays that may occur are, considering available staff and workload, those that are beyond the control of the person doing the investigation.

It is the interpretation of the Attorney General's office that the clock starts at the initiation of the investigation.

Recommendations.

One recommendation is that ACAH needs to initiate more complaints on its own, not just those of third parties. Considering the amount or case work now accomplished by an extremely small staff, the only way the agency could initiate more cases is to have a larger staff of investigators, more office support, more chemists and a much larger budget. At the conclusion of the 1990 monitoring season, all ACES inspectors had accrued the maximum of 240 hours of overtime and the mileage budget was depleted.

FINDING II - ACAH HAS NOT TAKEN ADEQUATE DISCIPLINARY ACTIONS IN PESTICIDE ENFORCEMENT CASES

RESPONSE: The Commission accepts the finding of the Auditor General, however, disciplinary action was imposed according to the statute and the rules to be enforced. Early enforcement (August 13, 1986 to November, 1987) was hampered as rules had not been passed to clarify the statutes. Letters of Warning and Notices of Concern were utilized by the former agency regulating pesticides and the Attorney General's office suggested their use be retained. This advice was rescinded by a second opinion from the Attorney General's Office on November 14, 1989.

Citations negotiated were done so with the full knowledge of the Attorney General's Office. No negotiation guidelines or interpretations were made by the Attorney General's Office until November 1989. All fines were assessed pursuant to the statutes, dependent on the circumstances and no leniency was allowed.

FINDING III - **MORE CAN BE DONE TO ADDRESS THE PROBLEM OF PESTICIDE DRIFT IN RESIDENTIAL AREAS.**

RESPONSE: The Commission concurs and would support a statute change allowing for a greater buffer zone distance in residential areas and in some areas the application of pesticides may need to be restricted to ground powered equipment only. Studies have supported this and more emphasis needs to be placed on keeping pesticides within the target area.

With additional funding from the legislature the ACAH could sponsor studies to aid in the development of drift reduction measures.

FINDING IV - **IMPROPER DISPOSAL OF PESTICIDE CONTAINERS HAS BEEN WIDESPREAD.**

RESPONSE: The Commission concurs, however, the Commission feels that with additional emphasis on education and with the cooperation of the industry to design new dissolvable and returnable containers that this condition can be overcome in the future. Improper disposal of pesticide containers can best be addressed through proper education of the pesticide user.

FINDING V - **CAN ARIZONA DO MORE TO REDUCE THE USE OF AGRICULTURAL PESTICIDES?**

RESPONSE: We have requested and are continuing to request additional funding to support the IPM principles. Additional reduction of pesticide use is possible with additional education, research and promotion of IPM principles. However the varying weather conditions complicate the implementation of certain IPM principles.

FINDING VI - **A MORE COORDINATED AND COMPREHENSIVE PESTICIDE REPORTING SYSTEM COULD BENEFIT THE STATE.**

RESPONSE: The Commission concurs. We have initiated a study and are investigating a plan with the ADEQ on how to best approach the problem of gathering the required information without duplication of reporting requirements.

FINDING VII - **ACAH NEEDS TO REVISE ITS RULES ESTABLISHING ENFORCEMENT PENALTIES.**

RESPONSE: The Commission concurs. As we continue to refine our program, information is being gathered to strengthen the enforcement capabilities of the Commission. Under the administrative procedures act, changes cannot be accomplished until all aspects of the act are complied with; this requires nine months to a year to accomplish.

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

ROSE MOFFORD, GOVERNOR
RANDOLPH WOOD, DIRECTOR

November 29, 1990

Mr. Douglas R. Norton, Auditor General
Office of the Auditor General
2700 North Central Avenue, Suite 700
Phoenix, Arizona 85004

Dear Mr. Norton:

Thank you for the opportunity to meet with your staff members on November 20, 1990, regarding our review of performance audit reports entitled Pesticide Regulation: Department of Environmental Quality and Pesticide Regulation: Programwide Issues. We also appreciate the receptivity of your office to our concerns about these reports. The comments should be used as appendices to the reports.

During our November 20 meeting we discussed the footnote to Table 1, on page 2 of Pesticide Regulation: Programwide Issues. Although the revised preliminary report draft contains a change in the footnotes. I consider that a more accurate statement would be:

1. The Department's accounting system does not break out expenditures that are specifically related to pesticides. This is because of the many mandates that ADEQ must carry out, and hazardous substances in addition to pesticides it must regulate. However, estimates of the costs for handling pesticide-related matters were provided by both ADEQ programs covered by the audit.

To facilitate the review process, our specific comments are provided as attachments to this letter.

Our most significant concern regarding the performance audit of the Pesticide Contamination Prevention Program is the audit's reliance on the report by J.F. Artiola, J. Chernicky, M. Brusseau and J. Watson, which was commissioned by your office. After carefully evaluating their report, we believe that the consultants were not given all the information that they needed for the purpose of performing an adequate review of the program. Members of my staff disagree with several conclusions reached by the consultants. Their rebuttal is attached to this letter.

As currently written, the performance audit of the pesticide related cases managed by the hazardous waste program may give readers the impression that the two example cases cited are representative of all cases handled by the program. In fact, members of your staff requested information on 107 cases managed

by the hazardous waste program. Of these cases, only 29 were still active cases at the time of the audit. Eleven of the cases have been open for three or more years. Most of the unresolved cases involve long term monitoring (post-closure care) or extensive remedial work. Seventy-three percent of the audited cases have been resolved by the efforts of my staff. The tremendous cost of environmental contamination clean up forces small businesses into considering alternatives that are rejected due to legal or technical obstacles. This results in "false starts" by the responsible party that cause considerable delays. Where there is no imminent or substantial endangerment to environment or human health, the Arizona Department of Environmental Quality (ADEQ) affords the responsible party many opportunities to voluntarily resolve the problem in an affordable manner.

The auditor's reports failed to acknowledge that ADEQ always takes immediate actions to abate imminent hazards. For example, during 1987 - 1989, ADEQ secured immediate hazard abatement for 36 of 65 pesticide incident reports received during this period. Fifteen of the remaining 29 cases were determined to pose no threat to human health and the environment. The remainder were handled by other agencies, including local authorities. Hazardous waste program policy dictates that immediate hazards must be abated for all cases received by the various units having responsibility. Such interim protective measures include erection of fencing, removal of abandoned drums, removal of grossly contaminated soil, and placement of cap materials such as clay on top of contaminated sites. Once a site has been stabilized, long term remedial measures are scheduled with the responsible party.

It is also important to note that only 14 percent of ADEQ's hazardous waste cases involve pesticides. In fact, only 41 of approximately 350 commercial chemical products listed as hazardous wastes are pesticides. The universe of hazardous substances that ADEQ must respond to includes many immediately dangerous compounds that are not pesticides such as explosives, cyanides and flammables.

During the past two years, ADEQ has taken many significant enforcement actions against violators. For example, we have assessed greater than $30,000 in civil penalties from four facilities. These were the first civil actions ever taken in the history of the State of Arizona for violation of environmental protection laws. Seven additional cases were referred to the Attorney General's Office for civil penalties during the past year.

In summary, our pesticide related cases are managed by eliminating the immediate hazards and then ranking them with all other pending hazardous waste cases that must be resolved. The time required to resolve each case often depends on the responsible party's willingness to make the significant financial commitment that is always necessary for rapid correction of problems. Our limited manpower resources are used to address the most dangerous environmental problems. Existing laws and rules afford responsible parties the right to legal due process that is often used by them to delay final problem resolution. Although we are always striving to improve our performance, we believe the compliance progress made and environmental protection afforded by the approximately 200 hazardous waste cases that we were able to close last year is a respectable achievement.

Please call me directly at 257-6917, if you wish to discuss this letter or the enclosed materials.

Sincerely,

Randolph Wood

Randolph Wood, Director

Attachments

ATTACHMENT TWO November 29, 1990

COMMENTS ON AUDITOR GENERAL'S OFFICE REVISED PRELIMINARY REPORTS ON PESTICIDE REGULATION: PROGRAMWIDE ISSUES

General Comments

A factor affecting timeliness discussed with the auditors during their staff interviews was laboratory turnaround time. ADEQ uses the Arizona Department of Health Services State Laboratory for its laboratory services because we are assured of good chain of custody procedures and expert witnesses. However, the lab has its own manpower problems which have resulted in 6 to 8 months between sample submittal and sample result reporting for some samples. The Office of Waste Programs routinely collects split samples at sites contaminated by hazardous waste to ensure that honest and accurate results are reported by responsible parties. Remedial projects often involve several phases of sampling and a report must be submitted for each phase. ADEQ must wait for our lab results to come in before completing the review of reports submitted by facility owners.

The report makes no statements about the program's outreach and education efforts. In fact, there are many examples of such activity and services provided by the program. These include our efforts to resolve the issue of pesticide container burning, public presentations on pesticide container disposal, technical assistance meetings and phone consultations.

The report neglects to acknowledge the program's attempts to resolve pesticide clean up projects through the use of nationally accepted technical and scientific standards. These include health risk assessments, geohydrological investigations, statistically sound sampling methods, and proper laboratory quality assurance/ quality control procedures. The application of these methods ensures legally defensible clean up decision making which we believe is important for preserving the Department's public accountability.

Specific Comments

Needed: A Commitment to Enforcement, pages 13 and 14:

The major recommendation of the report is the development of a commitment to better enforcement. The report also states that Arizona has good pesticide laws.

Response: During staff interviews with auditors, two significant legal weaknesses were pointed out. These include the Department's inability to obtain administrative penalties and limitations of the Water Quality Assurance Revolving Fund (WQARF) law.

We appreciate the incorporation of our comments regarding these issues into the preliminary draft report. However, we believe it is necessary to reprint our comments about the "state superfund law" (WQARF) and quality of legal services at this time because the discussion given in the preliminary draft report was inadequate. Current WQARF statutes limit the use of the fund and its authorities to situations where either ground water or surface water of the state is threatened by a release of a hazardous substance. This precludes the use of this body of laws in cases where there are no nearby floodplains or aquifers. The second example of a hazardous waste disposal site described on page 23 of the report entitled Pesticide Regulation: Department of Environmental Quality is currently ineligible for WQARF funding because of this provision. Staff recommended to the auditors that the WQARF statutes should be revised by the legislature to include threats to human health or wildlife populations as criteria that would trigger the use of the fund. Similar authorities exist in CERCLA.

We also recommend improvement of legal services available to the agency and its compliance programs. Examples of significant delays in case evaluation by the Attorney General's Office were pointed out during the audit. Staff attorneys who are ADEQ employees, similar to the EPA's Office of Legal Counsel, would improve communications and provide more direct case management by DEQ.

Pesticide-Related Incidents and Accidents Reported to State Agencies, page 33 and 34 :

The report states that contamination at airstrips used by aerial applicators occurred in the 1960s.

Response: The statement made in the report is inaccurate. ADEQ has documented improper pesticide container rinsate disposal during the 1980s. It is likely that improper disposal practices occurred at most aerial applicator airstrips in Arizona until ADEQ took its first formal enforcement action against Marsh Aviation in 1988. This case received considerable publicity and is often referred to during meetings and conversations with aerial applicators. The effective date of RCRA rules was November 19, 1980.

The last sentence on page 34 of the report states that ADEQ could not produce files on 42 possible contamination sites, some of which may have involved agricultural pesticides.

Response: An ADEQ file search for 23 missing files was requested by letter from the Office of the Auditor General on April 9, 1990. The search was conducted and we were able to find an additional 14 files. Only 9 files could not be located. The ADEQ program responsible for generating the inspection or incident reports for the 9 missing cases stated that they were either opened, but contained no entries, or were referred to other agencies because they were not ADEQ responsibilities. Therefore, the number of actual files missing should be adjusted in the final report.

THE INDUSTRIAL COMMISSION OF ARIZONA

EDWARD J. RYLE, CHAIRMAN
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LARRY ETCHECHURY DIRECTOR
(602) 542-4411

November 21, 1990

Mr. Douglas Norton,
Auditor General
Office of the Auditor General
2700 N. Central Avenue
Phoenix, Arizona 85004

Dear Mr. Norton:

This document represents the Industrial Commission's (ICA) formal response to the November 16, 1990 Auditor General's audit of the Pesticide Worker Safety Program.

The audit is critical of the ICA in two specific areas:

1. Lack of commitment to its enforcement responsibilities; and,
2. Regulations adopted were not effective

We, of course, disagree with the Auditor General's assertions and will establish that not only was the agency committed to an effective pesticide program, but that the regulation adopted by the agency provides an excellent foundation for an effective program, irrespective of which agency enforces them.

As the auditor's report indicated, because of the qualifications for our industrial hygienists, we did recruit nationally.[1] For a variety of reasons, which are adequately detailed in the report, we were delayed in the hiring of our full complement of FTEs. This certainly contributed to the problem but it was not the major reason that there was a less than an effective inspection program. The major reason, simply put, was that there were no interim regulations applicable to growers, which comprised the overwhelming majority of firms we were required to inspect.

With the creation of a Pesticide Worker Safety Program, the Industrial Commission was given the statutory authority to utilize and enforce applicable portions of the Agriculture & Horticulture Commission's (AHC) existing regulations, until the ICA was able to develop and adopt their own. What we found, early into our inspection program, however, was that AHC's regulations did not match the scope of the ICA's Pesticide Worker Safety Statute.

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1. Our industrial hygienists are college trained individuals with Master degrees in Industrial Hygiene or an equivalent science. Because of this program, we added a preference that the applicants speak Spanish.

This statute provides coverage to workers applying pesticides commercially and workers applying pesticides on behalf of growers. AHC's performance regulations (not regulations involving licensing), apply only to commercial applications and not growers.[2]. As a result, we inspected all of the commercial applicators, but we were unable to inspect the growers. Consequently, even if we had a full complement of industrial hygienists early in the program, we still could not have had an effective inspection program until we developed and adopted our own regulations. Accordingly, the agency's priorities shifted from inspection to the rule promulgation process.

With the Pesticide Worker Safety statute providing for three additional positions on our Occupational Safety and Health Advisory Committee (one member representing agri-business, one member representing agri-labor and one member representing the public), the Commission decided to adopt regulations utilizing a negotiated rule-making process[3]. This subcommittee of the Advisory Committee, which was comprised of the agri-industry members, held at least 10 public meetings and conducted three hearings in Yuma, Casa Grande and Phoenix. They came to an agreement on all the issues except one - notification and posting. At that time, the full Advisory Committee met on three different occasions to attempt to resolve the impasse before producing a set of regulations. Because there was still disagreements with respect to the notification and posting requirement, the full Industrial Commission met on two separate occasions to resolve this issue. All of this took place before the state's Administrative Procedures Act was implemented to formally adopt the regulations.

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2. AHC's existing Rule R3-10-03(A) states that all specific terms used in these rules and regulations shall have the same meaning as defined in A.R.S. §3-371, Chapter 210, Article 6

A.R.S. § 3-371, Article 6(4) defines "applicator" to mean any person who owns, leases or rents ...equipment or aircraft in order to make a custom application (emphasis added).

A.R.S. §3-371, Article 6(6) defines "custom application" to mean any application of pesticides for hire or any application by aircraft...

The Commission, over the two-plus years it took to develop and adopt these regulations, has spent more time and effort and resources on these regulations than any that we have adopted. It should be readily apparent why this agency takes exception to the Auditor's statement that the agency lacked commitment.

As to the second issue, Regulations, the auditors interviewed six people who expressed various comments regarding the regulations and this formed their conclusion that changes, particularly as it related to notification and posting, were needed. In discussions with the auditors, the auditors stated that changes should be made. However, they could offer no factual basis to support a change in the regulation for notification and posting. As I indicated earlier, these regulations were the result of a compromise between the various members of the industry. The people the auditors interviewed or the organizations they represented, all particupated in the process. It is not surprising that the various members would favor their original position over the one that resulted from a compromise. What is important to remember is that the final notification and posting requirements became the cornerstone of the regulations simply because of the significant differences in position that originally existed between the parties. Making a change to these regulations without a factual basis for that change could very well establish an unraveling of the tenuous coalition that existed in creating these rules. I guess, in the final analysis, the fact that all industry members (business and labor) supported the transfer of the ICA's pesticide regulations to the new Department of Agriculture, speaks to the quality of the final product.

There have been many industry members who have publicly acknowledged the time, effort and resources expended by this agency, in order to produce a set of regulations that all parties can live with. While I, and others, feel that these regulations represent an excellent foundation for an effective pesticide program, everyone recognizes that as facts are developed, these rules will change.

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3. Negotiated rule-making process allows the industry representatives to essentially develop the regulations without government intervention. Government's only role is to provide data upon request from the industry members. Additionally, once the essence of regulations is completed, legal advice is provided to ensure regulations are written within acceptable parameters.

In conclusion, using the Auditor General's narrow criteria as a measure of the Industrial Commission's commitment, is not only unfair but incorrect. If we were not committed, we certainly would not have spent the time or resources, nor would we have provided a set of very difficult and controversial regulations that the industry can be proud of.

Sincerely,

Larry Etchechury,
Director

ARIZONA DEPARTMENT OF HEALTH SERVICES

Office of the Director

ROSE MOFFORD, GOVERNOR
TED WILLIAMS, DIRECTOR

November 26, 1990

Mr. Douglas R. Norton
Auditor General
2700 North Central, Suite 700
Phoenix, AZ 85004

SUBJECT: COMMENTS ON REVISED PRELIMINARY REPORT DRAFT OF THE PERFORMANCE AUDIT OF PESTICIDE REGULATION

Dear Mr. Norton:

Thank you for allowing me the opportunity to review the revised preliminary report draft of the performance audit of Pesticide Regulation: Department of Health Services. I believe the revised document accurately reflects the comments we made to members of your staff during our meeting on November 16, 1990.

The Arizona Department of Health Services (ADHS) is committed to pesticide regulation. My staff has been directed to consider all the recommendations listed in the report, and to implement those that are cost effective and which are likely to result in improved reporting of pesticide related illnesses. To demonstrate our commitment, ADHS staff will immediately seek to revise the Memorandum of Understanding now in place with the Commission of Agriculture and Horticulture to assure that all citizens who believe they have been made ill from pesticides are contacted by ADHS staff.

ADHS staff will continue to participate in efforts to educate medical professionals regarding the recognition and management of pesticide poisonings, as well as the duty to report those illnesses to the Department. I am convinced the pesticide poisoning reporting registry can be improved, and have conveyed that conviction to staff.

We agree that revision of A.R.S. 36-606 to place on ADHS staff the responsibility of determining whether an undiagnosed illness or complaint of illness is associated with exposure to pesticides may benefit surveillance and reporting. However, this may require substantial additional resources for the pesticide registry.

I would like to take this opportunity to commend your staff on a job well done. We appreciate their professional and cooperative attitude.

Sincerely,

Ted Williams

Ted Williams
Director

APPENDIX I

QUANTITY AND QUALITY OF PESTICIDES USED IN ARIZONA

The pesticide sales and use data provided below, to date, is the most comprehensive for Arizona. The University of Arizona Pesticide Coordinator's Office publishes an annual pesticide sales survey that estimates the quantity of pesticides sold and used in the State. However, Dr. Paul Baker, associate specialist in pesticides, University of Arizona and the survey's most recent author, admits that there are limitations with the survey that may affect the resulting figures. For example, response rates from sellers have been poor in recent years (only ten responded in 1988). Also, from 1985 to 1987 those conducting the survey examined less than 2 percent of approximately 30,000 to 40,000 custom application forms that were completed in the past few years.

Sales survey methodology - Initially, we contacted all of the 104 permitted sellers of pesticides identified by ACAH, to inform them of our survey and to ask for their cooperation. When we asked them to provide us with figures for their retail sales of agricultural pesticides in Arizona for 1989, 42 informed us they did not sell agricultural pesticides, but only wholesaled their products, sold exclusively out-of-state, or offered similar answers. We sent a survey questionnaire to the remaining 62, but later excluded 13 of these for reasons similar to those noted above. Of the remaining 49 pesticide sellers, 46 eventually completed the questionnaire. According to consultants, the figures obtained from the three sellers that failed to complete the questionnaire would not have significantly affected our data.

The sales survey lists the brands of all agricultural pesticides registered in the State as determined by the State Chemist's Office and DEQ, their EPA numbers, and the name of the company manufacturing the pesticide. Next to each pesticide, sellers noted the retail amount sold

in the State in 1989. Auditor General staff entered this information into a data base, and then totaled quantities bearing the same EPA-numbered products.[1]

1080 methodology - A process similar to the one used to determine sales figures was used to compile quantitative information on 1989 custom applications of agricultural pesticides. Auditor General staff compiled data from all forms completed for custom pesticide applications (those done by air or for hire). There were over 40,000 Form 1080s filed in 1989 that accounted for 61,838 custom applications. Like the seller information, quantities of the same EPA-numbered pesticides were added to obtain a total for each type of pesticide.

Brands were converted to active ingredients - Each brand was then converted into its respective active ingredient(s). An active ingredient is an element in a product that destroys or controls pests. As liquids and solids can both be converted to pounds of active ingredients, according to experts, active ingredients provide the best "common denominator" upon which to base the quantity of pesticides being used in the State.

Depending on whether the product is a liquid or a solid, pesticides were converted to active ingredients in one of two ways. First, those reportedly sold or used in a dry formulation were converted to active ingredients using a computer program provided by the National Pesticide Information Retrieval System, an organization specializing in pesticide data bases. The program provides the percentage of active ingredient(s) contained in all EPA-registered pesticides. To obtain the total active ingredient amount in a formulation, total seller and Form 1080 quantities were multiplied by the percent of active ingredient(s) in each pesticide. For example, if a product contains 25 percent active

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(1) Due to the number of products sold, rather than complete our survey, some sellers provided us with computer printouts of sales data. We could not always determine the EPA numbers for products listed on these printouts, whether they were agricultural pesticides or, in some cases, whether they were even registered in Arizona.

ingredient, and 1,000 pounds of the product were sold in 1989, we were able to determine that 250 pounds (1,000 x 25 percent) of the active ingredient were present in all sales of the product.

Second, pesticides sold or used in liquid formulations were converted to active ingredient amounts by inspecting each pesticide label to determine the number of pounds of active ingredient(s) in each gallon of the pesticide. For example, if a product contains 9 pounds of an active ingredient per gallon, and 1,000 gallons of the product were sold in 1989, we were able to determine that 9,000 pounds (1,000 x 9) of this active ingredient were present in all sales of the product.

Some labels failed to provide appropriate active ingredient information. In such cases, estimates of active ingredient amounts were provided by Dr. Ed Minch, pesticide specialist at the Office of the State Chemist.

Once both liquid and solid pesticides were converted to active ingredients, amounts of the same active ingredients were combined to obtain the total quantity of each type of active ingredient. Active ingredients were then categorized by type of pesticide. Tables 5 through 14 present the total amounts of active ingredients sold or used in 1989, in the descending order of the amount sold

Toxic and odoriferous chemicals noted - Active ingredients that are highly toxic are printed in boldface in the Tables that follow. The criteria for this classification includes a known oral LD50[1] of less than 50 mg/kg of body weight and a Federally registered label that bears the words "DANGER-POISON" and the symbol of a skull and crossbones.

Those active ingredients that are odoriferous are in brackets [ ] in the Tables. Criteria for this category includes actual knowledge of odoriferous properties and a review of comments and complaints from the public and regulated sector.

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(1) LD50 means a single lethal dose of pesticide as determined by EPA-approved procedures that will kill 50 percent of laboratory test animals.

TABLE 5 [a]

1989 ACTIVE INGREDIENTS
INSECTICIDES
IN DESCENDING ORDER OF AMOUNT SOLD

	Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
	MALATHION	833,626	823,761	9,865
	METHYL PARATHION	**343,810**	**316,826**	**26,984**
	ACEPHATE	301,186	561,345	260,159
	CHLORPYRIFOS	214,360	248,372	34,012
	DIMETHOATE	203,854	145,827	58,027
	METHOMYL	**168,262**	**200,486**	**32,224**
F	SULFUR	152,113*	340,886*	188,773
	AZINPHOS METHYL	**96,297**	**115,584**	**19,287**
	CRYOLITE	83,808	55,678	28,130
	MEVINPHOS	**79,713**	**72,003**	**7,710**
	DIAZINON	59,324	37,954	21,370
	DISULFOTON	**55,806**	**33,910**	**21,896**
	ENDOSULFAN	**55,780**	**63,252**	**7,472**
	CYPERMETHRIN	55,375	35,970	19,405
	[PROFENOFOS]	40,204	50,701	10,497
	FORMETANATE HYDROCHLORIDE	**29,390**	**11,720**	**17,670**
	ETHYL PARATHION	**26,782**	**35,046**	**8,264**
	PERMETHRIN	25,597	50,406	24,809
	ESFENVALERATE	19,896	31,109	11,213
	THIODICARB	19,336	14,794	4,542
	METHAMIDOPHOS	**17,683**	**13,011**	**4,672**
	[SULPROFOS]	17,149	16,434	715
	CARBOFURAN	**15,713**	**12,645**	**3,068**
	CARBARYL	14,525	5,589	8,936
	LAMBDA CYHALOTHRIN	11,123	11,562	439
	METASYSTOX R	9,503	2,551	6,952
X	CHLORDIMEFORM HYDROCHLORIDE	9,344	51,494	42,150
X	CHLORDIMEFORM	9,260	120,652	111,392
X	**MONOCROTOPHOS**	**8,524**	**57,787**	**49,263**
	OXAMYL	**8,165**	**10,217**	**2,052**
	PHORATE	**6,981**	**16,791**	**9,810**
	TRALOMETHRIN	5,253	5,871	618
	PIPERONYL BUTOXIDE	5,181	4,194	987
	FENAMIPHOS	**4,876**	**180**	**4,696**
	BIFENTHRIN	4,330	4,789	459
	NALED	3,884	2,284	1,600
	FENVALERATE	2,688	2,216	472
	FLUVALINATE	2,364	2,105	259
	TRICHLORFON	2,052	2,622	570
	METHOXYCHLOR	1,660	0	1,660
	DICROTOPHOS	**1,444**	**5,413**	**3,969**

(a) Numbers in all tables are rounded to the nearest pound. Active ingredients less than one pound were not included in the tables.

	CYFLUTHRIN	1,398	1,265	133
	PHOSMET	1,185	743	442
	POTASSIUM SALT OF OLEIC FATTY ACID	1,132	3,710	2,578
	METHIDATHION	842	1,636	794
	CYROMAZINE	786	368	418
X	PYRETHRINS	558	485	72
	PHOSPHAMIDON	**298**	**191**	**107**
	AVERMECTIN B1	219	132	87
	DYFONATE	160	0	160
	ISOFENPHOS	136	0	136
	LINDANE (GAMMA ISOMER OF BENZENE HEXACHLORIDE)	120	0	120
	OTHER CUBE RESINS	94	110	16
	ROTENONE	94	110	16
	PROPOXUR	92	0	92
N	TERBUFOS	48**	0	48
	METHIOCARB	41	0	41
	GOSSYPLURE HF	41	1	40
	AMIDINOHYDRAZONE	29	0	29
N	ETHOPROP	1**	0	1
	DIFLUBENZURON	0	9	9
	GOSSYPLURE	0	10	10
	FENOXYCARB	0	10	10
X	**DEMETON**	**0**	**48**	**48**
	AMITRAZ	0	53	53
	TOTAL	3,033,495	3,602,918	569,423

Key:
X - Pesticides for which all crop uses have been or will be cancelled under the EPA reregistration program.
N - Also listed under Nematicides.
F - Also listed under Fungicides and Bactericides.
Boldface - Highly toxic.
[] - Odoriferous.
* - Used equally as a Fungicide and Bactericide. Therefore, half of the total quantity appears in table 8.
** - Used equally as a Nematicide. Therefore, half of the total quantity appears in Table 12.

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 6

1989 ACTIVE INGREDIENTS
HERBICIDES
IN DESCENDING ORDER OF AMOUNT SOLD

	Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
	PROMETRYN	330,196	46,863	283,333
	GLYPHOSATE, ISOPROPYLAMINE SALT OF	268,512	6,074	262,438
	TRIFLURALIN	215,451	96,182	119,269
	EPTAM	154,056	4,459	149,597
	PENDIMETHALIN	123,210	38,622	84,588
	DIURON	111,142	19,561	91,581
	DACTHAL	91,603	26,132	65,471
	MONOSODIUM METHANEARSONATE (MSMA)	86,517	2,390	84,127
	BENEFIN	76,496	21,922	54,574
D	**PARAQUAT DICHLORIDE**	**75,551**	**36,428**	**39,123**
	CYANAZINE	67,916	12,963	54,953
	ORYZALIN	48,617	40	48,577
	PRONAMIDE	34,942	20,467	14,475
	BENSULIDE	25,592	7,373	18,219
	2,4-D	24,109	3,439	20,670
	SIMAZINE	16,144	0	16,144
	METOLACHLOR	15,643	20	15,623
	TEBUTHIURON	14,315	0	14,315
	DICAMBA	13,215	704	12,511
	FLUAZIFOP-BUTYL	10,759	1,324	9,435
	BROMACIL	10,338	0	10,338
	PROMETON	9,332	0	9,332
	BROMOXYNIL, OCTANOIC ACID ESTER OF	9,232	1,770	7,462
	SETHOXYDIM	8,430	2,761	5,669
	MCPA	7,524	6,610	914
	LINURON	4,998	15	4,983
	ATRAZINE	4,622	942	3,680
	2,4-D, DIMETHYLAMINE SALT OF	4,105	122	3,983
	OXYFLUORFEN	4,094	194	3,900
	METRIBUZIN	3,918	631	3,287
	DICLOFOP - METHYL	3,918	5,730	1,812
D	CACODYLIC ACID	3,809*	5,320*	1,511
	4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID, BUTOXYETHANOL ESTER OF	3,625	13,070	9,445
	DIETHATYL ETHYL	2,644	230	2,414
	ISOPROPYLAMINE SALT OF IMAZPYR, TECHNICAL	2,443	108	2,335
	DEVRINOL	2,425	216	2,209
	DIQUAT DIBROMIDE	1,878	166	1,712
	DISODIUM METHANEARSONATE (DSMA)	1,277	522	755
D	2-(2,4-DICHLOROPHENOXY) PROPIONIC ACID, DIMETHYLAMINE SALT	1,139	0	1,139
X	TRICLOPYR	1,082	0	1,082
	HEXAZINONE	945	0	945
	FLUOMETURON	860	0	860

	BROMACIL, LITHIUM SALT OF	784	0	784
X	BARBAN	768	1,352	584
D	**ENDOTHALL, DIPOTASIUM SALT OF**	**712**	**120**	**592**
	NORFLURAZON	622	48	574
D	CACODYLIC ACID, SODIUM SALT OF	601*	295*	306
	ALACHLOR	578	0	578
	CYCLOATE	480	0	480
	METHAZOLE	339	0	339
	OXADIAZON	285	0	285
	PROPHAM	217	0	217
	DIFENZOQUAT METHYL SULFATE	214	0	214
	AMITROLE	190	0	190
	BENTAZON, SODIUM SALT OF	182	10	172
	IMAZAQUIN	165	0	165
	DICHLOBENIL	136	0	136
	ETHOFUMESATE	102	0	102
	2,4-D, TRIETHYLAMINE SALT OF	87	0	87
	CHLOROPROPHAM	80	0	80
	4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID, DIMETHYLAMINE SALT OF	80	46	34
	PICLORAM, ISOOCTYL ESTER OF	64	0	64
	FLURIDONE	57	0	57
	BUTYLATE	34	0	34
	2,4-DB	30	35	5
	SIDURON	24	0	24
	PHENMEDIPHAM	20	29	9
	SULFOMETURON METHYL	16	0	16
	PICLORAM, POTASSIUM SALT OF	12	0	12
X	BROMOXYNIL	8	2,838	2,830
D	2-(2-METHYL-4-CHLOROPHENOXY) PROPIONIC ACID, DIETHANOLAMINE	8	0	8
X	TERBUTRYN	8	0	8
	DICAMBA, SODIUM SALT OF	0	64	64
	SODIUM SALT OF NAPTALAM	0	100	100
	MCPA, DIMETHYLAMINE SALT OF	0	443	443
D	2-(2-METHYL-4-CHLOROPHENOXY) PROPIONIC ACID, DIMETHYLAMINE	0	1,486	1,486
D	**ENDOTHALL, MONO (N,N-DIMETHYL TRIDECYLAMINE), SALT OF**	**	**	**
F	COPPER SULFATE	***	***	***
	TOTAL	1,903,527	390,236	1,513,291

Key:
X - Pesticides for which all crop uses have been or will be cancelled under the EPA reregistration program.
D - Also listed under Defoliants, Dessicants, and Growth Regulators.
F - Also listed under Fungicides and Bactericides.
* - Used equally as a Dessicant, Defoliant, and GrowthUsed primarily as a Defoliant, Dessicant, and Growth Regulators. Figures appear in Table 7.
**- Used primarily as a Fungicide and Bactericide. Figures appear in Table 8.
Boldface - Highly toxic.

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 7

1989 ACTIVE INGREDIENTS
DEFOLIANTS, DESSICANTS, AND GROWTH REGULATORS
IN DESCENDING ORDER OF AMOUNT SOLD

	Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
	SODIUM CHLORATE	2,034,914	2,109,690	74,776
	[DEF]	146,726	140,311	6,415
+	**ARSENIC ACID**	**59,365**	**79,592**	**20,227**
	ETHEPHON	24,220	33,812	9,592
	THIDIAZURON	19,952	17,426	2,526
X	[MERPHOS]	18,215	26,155	7,940
H	ENDOTHALL, MONO (N,N-DIMETHYLTRIDECYLAMINE) SALT OF	12,419	14,572	2,153
H	CACODYLIC ACID	3,809	5,320	1,511
	MEPIQUAT CHLORIDE	2,728	3,255	527
H	CACODYLIC ACID, SODIUM SALT OF	601	295	306
	1-NAPHTHALENEACETIC ACID, POTASSIUM SALT OF	209	0	209
	GIBBERILLIC ACID	21	0	21
	1-NAPHTHALENEACETIC ACID, SODIUM SALT OF	14	0	14
	DIMETHIPIN	0	544	544
H	ENDOTHALL, DIPOTASSIUM SALT OF	*	*	*
H	PARAQUAT DICHLORIDE	*	*	*
H	2-(2,4-DICHLOROPHENOXY)PROPIONIC ACID,DIMETHYLAMINE SALT OF	*	*	*
H	2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID,DIETHANOLAMINE SALT OF	*	*	*
H	2-(2-METHYL-4-CHLOROPHENOXY) PROPIONIC ACID,DIMETHYLAMINE SALT OF	*	*	*
	TOTAL	2,323,193	2,430,972	107,779

Key:
X - Pesticides for which all crop uses have been or will be dropped under the EPA reregistration program.
+ - Sales and use must cease by 11/1/90 based on DEQ requirements.
H - Also listed under Herbicides.
* - Used primarily as a Herbicide. Figures appear in Table 6.
Boldface - Highly toxic.
[] - Odoriferous.

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 8

1989 ACTIVE INGREDIENTS
FUNGICIDES AND BACTERICIDES
IN DESCENDING ORDER OF AMOUNT SOLD

	Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
I	SULFUR	152,113	340,886	188,773
H	COPPER SULFATE	67,933	0	67,933
	MANCOZEB FORMULATION BASE	47,752	29,588	18,164
	MANEB	30,865	16,626	14,239
	COPPER HYDROXIDE	26,878	16,312	10,565
	CHLOROTHALONIL	25,345	5,027	20,318
	CHLORONEB	21,279	0	21,279
	PCNB	14,322	0	14,322
	DICHLOROPHENE	10,054	0	10,054
	METALAXYL	11,281	4,607	6,674
	IPRODIONE	5,950	6,944	994
	FOSETYL-AL	5,895	500	5,395
	COPPER (METALLIC)	2,493	0	2,493
	TRIADIMEFON	2,157	1,017	1,140
	COPPER OXYCHLORIDE SULFATE	2,127	110	2,017
	BENOMYL	2,105	455	1,650
	VINCLOZOLIN	1,669	1,517	152
X	FOLPET	1,362	656	706
	DICLORAN	622	95	527
	ANILAZINE	608	0	608
X	HEXACHLOROPHENE	604	99	505
	CAPTAN	539	0	539
	BASIC COPPER SULFATE	341	396	55
	FENARIMOL	138	0	138
	FORMALDEHYDE	96	0	96
	THIOPHANATE-METHYL	65	0	65
	THIRAM	64	0	64
	ETRIDIAZOLE	60	0	60
	CARBOXIN	57	0	57
	STREPTOMYCIN SULFATE	16	0	16
	TRIFORINE	11	0	11
	COPPER TRIETHANOLAMINE COMPLEX	3	0	3
	CUPROUS OXIDE	0	190	190
	TOTAL	434,804	425,025	9,779

Key:
X - Pesticides for which all crop uses have been or will be dropped under the EPA reregistration program.
H - Also listed under Herbicides.
I - Also listed under Insecticides.

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 9

1989 ACTIVE INGREDIENTS
FUMIGANTS
IN DESCENDING ORDER OF AMOUNT SOLD

Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
DICHLOROPROPENE, MIXED ISOMERS	2,037,429	0	2,037,429
CHLOROPICRIN	2,301	0	2,301
METAM-SODIUM	1,695	0	1,695
TOTAL	2,041,425	0	2,041,425

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding sales in Arizona.

TABLE 10

1989 ACTIVE INGREDIENTS
BIOLOGICAL INSECTICIDES
IN DESCENDING ORDER OF AMOUNT SOLD

Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
BACILLUS THURINGIENSIS VAR. ISRAELENSIS	1,202	6,839	5,637
BACILLUS THURIENGIENSIS (BERLINER) VAR. KURSTAKI	9	3,161	3,152
TOTAL	1,211	10,000	8,789

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 11

1989 ACTIVE INGREDIENTS
MITICIDES
IN DESCENDING ORDER OF AMOUNT SOLD

	Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
	DICOFOL	47,316	40,276	7,040
	PROPARGITE	11,936	9,123	2,813
	DIENOCHLOR	16	157	141
	NEROLIDOL	0	12	12
X	CHLOROBENZILATE	0	136	136
	TOTAL	59,268	49,704	9,564

Key:
X - Pesticides for which all crop uses have been or will be dropped under EPA reregistration program.

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 12

1989 ACTIVE INGREDIENTS
NEMATICIDES
IN DESCENDING ORDER OF AMOUNT SOLD

	Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
	ALDICARB	**29,948**	**1,707**	**28,241**
I	TERBUFOS	48	0	48
I	ETHOPROP	1	0	1
	TOTAL	29,997	1,707	28,290

Key:
I - Also listed under Insecticides.
Boldface - Highly toxic.

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 13

1989 ACTIVE INGREDIENTS
RODENTICIDES
IN DESCENDING ORDER OF AMOUNT SOLD

Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingredients From Form 1080 (in pounds)	Difference (in pounds)
STRYCHNINE	56	0	56
ZINC PHOSPHIDE	50	0	50
TOTAL	106	0	106

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

TABLE 14

1989 ACTIVE INGREDIENTS
DIFFERENCE BETWEEN
FORM 1080 AND SELLER DATA

Active Ingredient Name	Total Active Ingredients From Sellers (in pounds)	Total Active Ingedients From Form 1080 (in pounds)	Difference (in pounds)
METALDEHYDE	32	0	32
TOTAL	32	0	32

Source: Office of the Auditor General staff compilation of 1989 Form 1080s and information provided by permitted sellers of pesticides regarding 1989 sales in Arizona.

APPENDIX II

BIBLIOGRAPHY AND CONTACTS

Appendix II, Parts I and II, contains a listing of organizations contacted and a bibliography of documents reviewed during the performance audit of pesticide regulation in Arizona. A review of proposals for pesticide regulation described in professional and academic publications, and a review of pesticide regulatory programs in other states was required by law.

Organizations Contacted

The names of more than 300 organizations contacted for information relating to the audit of pesticide regulation in Arizona are listed in Appendix II, Part I. Included in the list are public agencies and private organizations in Arizona, the 49 other states, and the District of Columbia. Among these organizations are the regulatory agencies of the Federal government and the 50 states that deal with the various aspects of pesticide regulation, offices and agencies of the U. S. Congress, and the Arizona and national offices of industry, advocacy, and research groups and organizations concerned with pesticide regulation.

Individuals Contacted

In all, audit staff contacted approximately 500 people in completing the audit of pesticide regulation in Arizona. Over 250 of these people were Arizonans -- officials of State, county, and municipal governments, farmers and farm industry representatives, representatives of advocacy groups, and private citizens. Over 200 were officials in Federal regulatory agencies in Washington, D.C. and elsewhere, officials of regulatory agencies in the other 49 states, representatives of industry and advocacy groups and academic and professional research organizations outside Arizona.

Documents Reviewed

More than 500 documents reviewed during the audit of pesticide regulation in Arizona are referenced in the bibliography (Appendix II, Part II). The bibliography includes the useful documents identified in a search of professional and academic literature. This search, which generated over three thousand documents, was directed by the Legislature and is described in this report's review of academic and professional literature (see page 27). The bibliography also includes documents obtained from files of the four Arizona regulatory agencies audited and from other Arizona State agencies, as well as documents obtained through the courtesy of people throughout the United States who were interviewed, and the public agencies and private organizations with which they are associated.

APPENDIX II, PART I

LIST OF ORGANIZATIONS CONTACTED
(Audit Agencies Excluded)

A. D. Williams Company, Inc., Buckeye.

AA Chemical Company, Peoria.

Agri-Business Council of Arizona, Inc., Phoenix.

Agro Phosphate Company, Yuma.

Agri-Chemical Products, Inc., Tucson.

AGS, Mesa.

Ak-Chin Chemical Company, Maricopa.

Alabama Department of Agriculture and Industries, Chemical and Plant Industry Division, Montgomery.

Alaska Department of Environment Conservation, Juneau.

Alaska Department of Environment Conservation, Environmental Health Division, Juneau.

Allied-Signal, Inc., Morristown, NJ.

Aquatic Dynamics, Inc., Phoenix.

American Association of Pesticide Control Officials, St. Paul.

Arizona Aerial Applicators Association, Maricopa.

Arizona Ag Service, Inc., Mesa.

Arizona Agricultural Aviation Association, Phoenix.

Arizona Agricultural Chemicals Association, Phoenix.

Arizona Ammonia of Tucson, Inc., Marana.

Arizona Beekeepers Association, Tucson.

Arizona Conservation & Revocation Company, Fresno, CA.

Arizona Cotton Growers Association, Phoenix.

Arizona Custom Farm Farm Service, Stanfield.

Arizona Department of Administration, Loss Control Section, Phoenix.

Arizona Department of Economic Security, Phoenix.

Arizona Department of Economic Security, District Office, Yuma.

Arizona Department of Water Resources, Basic Data Unit, Phoenix.

Arizona Farm Bureau Federation, Phoenix.

Arizona Farm Workers Union, Maricopa County Organizing Committee, Phoenix.

Arizona Fruit and Vegetable Growers Association, Phoenix.

Arizona Game and Fish Department, Phoenix.

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APPENDIX II, PART II

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APPENDIX III

SURVEY: PESTICIDE REGULATION IN THE FIFTY STATES

Chapter 162, Section 7, of the 1989 Session Laws required us to conduct a "review of statutory and administrative pesticide regulatory programs in other states." To address this requirement, we conducted a 50-state survey. The methodology and results of our survey follow.

Methodology

Through a review of pesticide programs in Arizona and selected other states, we identified 34 specific activities related to regulating the use and impact of pesticides. We also identified eleven different types of licenses, certificates, or permits to control the sale, purchase, and use of pesticides.

We designed a questionnaire to determine which of the 34 regulatory tasks are performed in each state and which state agency performs each task, and also to identify the types of licenses, certificates, and permits required by each state. We included additional questions to solicit information on proposed pesticide-related legislation and the trends in assigning regulatory functions to state agencies. We tested a preliminary version of the questionnaire in telephone interviews with officials in three states that have extensive regulatory programs, and revised the questionnaire accordingly. Exhibit A shows the final version of the questionnaire.

We telephoned[1] officials in 49 states and completed a questionnaire for each state. In all but a few states, we spoke with several officials to obtain the most accurate answers to our questions. Our interviews with staff at four State agencies -- the Arizona Commission on Agriculture and Horticulture (ACAH), the Department of Health Services (DHS), the Department of Environmental Quality (DEQ), and the Industrial Commission of Arizona (ICA) -- provided information about Arizona's programs. We completed the telephone survey in February 1990, and then coded the responses to facilitate computer recording and analysis.

Frequency Distributions of Responses to Specific Survey Questions

Tables I through V show the number of states assigning responsibility for a task to agencies corresponding to Arizona's ACAH (agriculture), DEQ (environmental), DHS (health), and ICA (labor). In some states, tasks were assigned to other agencies, such as universities or natural resource agencies; or several agencies shared the responsibility for a specific task. Certain states have not assigned some of the 34 tasks to any agency. Arizona's response in each category is indicated by an asterisk(*).

Table VI shows those states that require licenses, certificates, or permits for various pesticide-related activities.

In addition to the information shown in the Tables, we asked four general questions about pesticide regulation, with the following results:

- Twenty states had current proposals for significant changes in pesticide regulatory laws or reassigning functional responsibilities among agencies; 30 had none.

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(1) We conducted telephone interviews instead of a mail survey because of the telephone format's flexibility, and to ensure a 100 percent response rate within a limited time frame. Flexibility was necessary for several reasons:
- the scope and definitions of specific regulatory tasks varied, requiring explanation of questions and answers;
- state agencies involved in pesticide regulation have no standard nomenclature, so they could not be categorized without discussion;
- due to their complex and technical nature, some pesticide regulatory activities are not fully understood except by staff responsible for them; and
- fragmented regulatory structure required us to identify and question several people in some states.

- Twenty-three states reported a trend toward more centralized management of pesticide regulation; three reported a trend toward less centralization; and 24 reported no trend.

- Forty-three states said that structural pest control was regulated by the same agency that regulated agricultural pest control; seven did not combine these functions in one agency.

- Twenty states said they had an organizational chart depicting the assignment of pesticide regulatory responsibilities; 30 did not have such a chart.

- Twenty-five states had interagency agreements on pesticide regulation, and 25 had no such agreements.

TABLE 15

AGENCIES RESPONSIBLE FOR
CONTROL OF USE, SALE, AND APPLICATION OF PESTICIDES
IN 50 STATES

	Number of States Assigning Responsibility to Each Agency						
	Agricultural Agency	Environmental Agency	Health Agency	Labor Agency	Other Agency	Multiple Agencies	None
Register pesticides	41*	4	1		2		2
Issue licenses, certificates, and permits	40*	1	1		2	5	1
Set licensure qualifications	37*	5			4	2	2
Enforce pesticide-related regulations regarding							
- formulations	42*	4			2		2
- sales	41*	5			2		2
- storage	32	6			2	8*	2
- transport	10	6			9	20*	5
- handling & application	41*	5			2	1	1
- container disposal	12	10	1		1	24*	2
Conduct laboratory tests regarding							
- registration & formulation	35*	3	1		6	2	3
- use & application	39*	4			4	1	2
Regulate recordkeeping and reporting requirements	40	5			3	1*	1

TABLE 16

AGENCIES RESPONSIBLE FOR
ENVIRONMENTAL PROTECTION AND REGULATION OF PESTICIDE WASTE
IN 50 STATES

	Number of States Assigning Responsibility to Each Agency						
	Agricultural Agency	Environmental Agency	Health Agency	Labor Agency	Other Agency	Multiple Agencies	None
Identify potential ground water contaminants	11	5*	2		3	20	9
Monitor soil & ground water	16	7*	3		2	8	14
Authority to cancel or restrict pesticide use	39	4	1		3	2	1
Respond to emergency hazardous substance release	1	22	8		4	14*	1
Safe Drinking Water Act:							
- monitor drinking water	3	16*	23		3	4	1
- enforce water quality standards		19*	15		6	9	1
Resource Conservation and Recovery Act:							
- issue hazardous waste treatment, storage, and disposal facility permits	1	30*	11		5	1	2
- enforce regulations regarding hazardous waste treatment, storage, and disposal	1	29*	10		5	2	3
- oversee hazardous waste cleanup	2	27*	11		5	2	3
Comprehensive Emergency Response, Compensation, and Liability Act (Superfund):							
- determine liability		25*	10		5	6	4
- seek compensation	1	27*	9		6	2	5
- oversee cleanup		29*	10		6	1	4
Clean Water Act:							
- develop and implement nonpoint source and ground water management programs	3	21*	5		6	13	2

TABLE 17

AGENCIES RESPONSIBLE FOR
PESTICIDE POISONING MONITORING AND PREVENTION
IN 50 STATES

	Number of States Assigning Responsibility to Each Agency						
	Agricultural Agency	Environmental Agency	Health Agency	Labor Agency	Other Agency	Multiple Agencies	None
Maintain a pesticide poisoning reporting system	6	2	10*		4	4	24
Maintain a pesticide poisoning registry	7		7*		2	2	32
Educate healthcare professionals to identify pesticide poisoning	2	1	11*		4	5	27
Conduct a pesticide poisoning prevention program	6	1	5*		6	7	25

TABLE 18

AGENCIES RESPONSIBLE FOR
WORKER SAFETY FROM PESTICIDE-RELATED HAZARDS
IN 50 STATES

	Number of States Assigning Responsibility to Each Agency						
	Agricultural Agency	Environmental Agency	Health Agency	Labor Agency	Other Agency	Multiple Agencies	None
Establish safety standards and regulations	11	1	1	6*	3	14	14
Inspect establishments for compliance	23	1	2	9	2	7	6
Enforce worker safety standards and regulations	26	1	2	8	2	7*	4

TABLE 19

AGENCIES RESPONSIBLE FOR
MISCELLANEOUS PESTICIDE-RELATED ACTIVITIES
IN 50 STATES

	Number of States Assigning Responsibility to Each Agency						
	Agricultural Agency	Environmental Agency	Health Agency	Labor Agency	Other Agency	Multiple Agencies	None
Test for or otherwise regulate pesticide residues in food	23	1	7		2	5	12*
Develop and promote an Integrated Pest Management program	5	2			26	16*	1

TABLE 20 (Part A)

LICENSES, CERTIFICATES, AND PERMITS REQUIRED
IN 50 STATES

	Applicators				Agricultural
	Commercial	Private	Aerial	Ground	Pilots
Alaska	X	X	X	X	
Alabama	X	X	X	X	
Arkansas	X	X			X
Arizona	X	X	X	X	X
California	X	X	X	X	X
Colorado	X		X	X	
Connecticut	X	X	X		X
Delaware	X	X			
Florida	X	X	X	X	X
Georgia	X	X	X	X	
Hawaii	X	X	X	X	
Idaho	X	X	X	X	
Illinois	X	X	X	X	
Indiana	X	X	X	X	
Iowa	X	X			
Kansas	X	X	X	X	
Kentucky	X	X	X	X	
Louisiana	X	X	X	X	X
Maine	X	X			X
Maryland	X	X	X	X	X
Massachussetts	X	X	X	X	
Michigan	X	X	X	X	X
Minnesota	X	X	X	X	
Mississippi	X	X	X	X	X
Missouri	X	X			
Montana	X	X			X
Nebraska					
Nevada	X	X	X	X	
New Hampshire	X	X	X	X	X
New Jersey	X	X			
New Mexico	X	X			
New York	X	X	X		
North Carolina	X	X	X		
North Dakota	X	X	X	X	
Ohio	X	X			
Oklahoma	X	X	X	X	X
Oregon	X	X	X	X	
Pennsylvania	X	X			X
Rhode Island	X	X	X		
South Carolina	X	X	X	X	X
South Dakota	X	X	X	X	X
Tennessee	X	X	X	X	X
Texas	X	X	X	X	
Utah	X	X	X	X	
Virginia	X		X		
Vermont	X	X	X	X	X
Washington	X	X	X	X	
West Virginia	X	X			
Wisconsin	X	X			
Wyoming	X	X	X	X	X
	49	47	32	32	19

Key: X = state requires a license, certificate, or permit

TABLE 20 (Part B)

LICENSES, CERTIFICATES, AND PERMITS REQUIRED
IN 50 STATES

	Pest Control Advisors	Pesticide Sellers	Pesticide Formulators	Growers or Farmers	Equipment: Aerial	Equipment: Ground
Alaska	X	X				
Alabama	X	X			X	X
Arkansas			X		X	
Arizona	X	X		X	X	X
California	X	X		X	X	X
Colorado						
Connecticut		X				
Delaware		X				
Florida		X	X			
Georgia		X			X	X
Hawaii		X				
Idaho	X	X			X	X
Illinois		X		X		
Indiana	X	X				
Iowa	X					
Kansas		X	X		X	
Kentucky	X	X	X	X	X	X
Louisiana	X	X	X		X	X
Maine		X				
Maryland	X	X				
Massachussetts		X		X		
Michigan		X			X	
Minnesota	X	X				
Mississippi	X	X			X	
Missouri		X				
Montana		X				
Nebraska						
Nevada						
New Hampshire		X				
New Jersey	X	X				
New Mexico	X	X				
New York		X				
North Carolina	X	X			X	
North Dakota		X				
Ohio		X			X	
Oklahoma	X	X			X	X
Oregon	X	X				
Pennsylvania	X	X	X			
Rhode Island		X	X			
South Carolina		X			X	X
South Dakota		X	X	X		
Tennessee	X	X	X		X	
Texas		X	X		X	X
Utah		X	X	X		
Virginia						
Vermont	X	X				
Washington	X	X			X	X
West Virginia		X				
Wisconsin		X				
Wyoming	—	—	—	-	—	—
	21	44	12	7	18	11

Key: X = state requires a license, certificate, or permit

EXHIBIT A

PESTICIDE REGULATIONS

1. **Which state agency registers pesticides for sale in [state]?**

   Is this an independent agency or part of another agency?

2. **Which state agency issues pesticide-related licences, certificates and/or permits?**

   What agency sets the qualifications for licensure?

   For which of the following are licenses, certificates or permits issued, and by what agency:

   Commercial applicators?

   Private applicators?

   Aerial applicators?

   Ground applicators?

   Agricultural pilots?

   Equipment: Aerial?
   Ground?

   Pest Control Advisors?

   Pesticide sellers?

   Pesticide formulators?

   Growers or farmers, i.e., as buyers and not as private applicators?

3. **Which state agency (or agencies) enforces regulations regarding the following pesticide-related activities:**

   Formulations? Sales? Storage? Transport?

   Handling and application? Container disposal?

4. **What agency conducts laboratory tests related to enforcement of pesticide regulations regarding:**

   Registration and formulation? Use/application?

5. **What agency sets and supervises rules regarding pesticide record keeping and reporting requirements?**

6. **What agency is responsible for development and promotion of IPM (Integrated Pest Management) programs?**

   Is this an independent agency or part of another agency?

7. **What agency in [state] identifies pesticides with a potential to contaminate groundwater?**

8. What state agency, if any, is monitoring pesticides in soil and groundwater to modify or cancel pesticide registrations?

   What state agency has the authority to cancel or restrict use of a registered pesticide?

9. What agency monitors drinking water quality under SWDA (the Safe Drinking Water Act)?

10. What agency enforces federal (SWDA) and state water quality standards?

11. What agency permits hazardous waste storage, transport and disposal facilities under RCRA (Resource Conservation and Recovery Act)?

12. What agency enforces federal (RCRA) and state hazardous waste/solid waste regulations regarding storage, transport and disposal of hazardous wastes:

13. What agency oversees hazardous waste (RCRA) cleanups?

Under CERCLA (Comprehensive Emergency Response, Compensation, and Liability Act):

14. What agency determines liability for Federal Superfund cleanups?

15. What agency seeks compensation payments?

16. What agency responds to emergency hazardous substance releases?

17. What agency oversees cleanup of Federal and/or State Superfund sites?

18. What agency develops and implements nonpoint source and groundwater management programs under the federal Clean Water Act?

What agency undertakes the following health/related activities under FIFRA:

19. Maintains the pesticide poisoning reporting system?

20. Maintains the pesticide poisoning registry?

21. Educates health professionals to identify pesticide poisonings?

22. Conducts the pesticide poisoning prevention program?

What agency undertakes the following activities related to worker safety in regard to use of pesticides:

23. Establishes safety standards and regulations?

24. Inspects commercial establishments and applications for compliance with requirements of worker safety regulations?

25. Enforces worker safety standards and regulations?

26. What state agency, if any, tests for, or otherwise regulates, pesticide residues in food?

27. Do you have an organizational chart - or charts - that depict the assignment of pesticide regulatory responsibilities in [state]?

28. Are there any current proposals for significant changes in pesticide regulatory laws or to reassign functional responsibilities among agencies in [state]?

29. Is structural pest control regulated by the same agency as agricultural pest control in [state]?

30. Is there a trend either toward or away from a more centralized or coordinated management of pesticide regulation in [state]?

    Are there any interagency protocols or memoranda of understanding on pesticide regulation?