INSTITUTE FOR PUBLIC POLICY AND BUSINESS RESEARCH
THE UNIVERSITY OF KANSAS

RESPONSE OF KANSAS' SMALL BUSINESSES TO ENVIRONMENTAL REGULATION: IMPLICATIONS FOR TRAINING

by

M. Elizabeth Stella
Associate Scientist

Charles F. Krider
Professor of Business
Co-Director

Steven Maynard-Moody, Associate Professor of
Public Administration/Government

September 1993
Report No. 209

TABLE OF CONTENTS

ACKNOWLEDGMENTS

This research was funded by the Division of Continuing Education at the University of Kansas. We would like to express appreciation to the survey respondents from the Kansas business community; we appreciate the willingness of over 500 businesses to be interviewed. A special thanks to Diane Lander for her contributions to the development of the survey instrument, for piloting the survey, and for the literature review, to Kathleen Brady-Mowrey for her help with the survey, and to Amy Bush-Enos for word processing.

A copy of this report may be obtained from the Institute for Public Policy and Business Research, 607 Blake Hall, University of Kansas, Lawrence, Kansas 66045.

INTRODUCTION

Current U.S. environmental law is based upon the National Environmental Policy Act of 1969 (NEPA, 42 U.S.C.A. Sec 4321-4370). NEPA and subsequent environmental policies and regulations significantly affect the economy and individual businesses. Policies and regulations create markets for goods and services needed by firms seeking to comply with regulations. While compliance can result in savings by use of more efficient processes, businesses can also incur costs as they seek to comply with environmental regulations. As the EPA's regulatory efforts spread, small businesses increasingly feel the impact. The large variety of local, state, and federal laws must be dealt with simultaneously, along with the inconsistency between local, state, and federal regulations. In some cases, small businesses just do not have the necessary capacity or funding to comply with existing regulations or to adjust to new regulations and policies.

In general, the most researched and publicized issues stemming from environmental regulations and policies are predominantly "after-the-fact" issues. For businesses, environmental issues can seem very large in scope, costly, and never ending. An individual company may face a large range of environmental issues: solid waste, waste water, air pollution, pesticides, PCB's, radon, etc. The question becomes one of how to cope with the entire range of environmental requirements in a situation that never stabilizes. New rules and regulations beget even newer rules and regulations, so keeping up becomes difficult at best (Blue, Meneguzzi, & Cole, 1992). Unfortunately, keeping up is not the only problem. As environmental regulations and policies are modified, they will probably continue to increase in scope and complexity and become even more stringent (Ofori, 1992).

Once a firm has identified the regulations that apply, it must then determine how to comply. Compliance becomes complicated and expensive. Firms often face escalating excise taxes imposed because of old machinery (Ziffer, 1992). Firms must consider replacing old facilities and machinery not built to meet current regulations or standards. Intermediary solutions may require expensive retrofitting (Caney, 1992). Disposing of waste is a growing problem as landfills reach capacity, landfill costs increase, and regulations make siting a new landfill more difficult (Carlile, 1992). While compliance often costs, small businesses may find it more difficult to pass the cost of compliance on to their customers because passing on their costs may make them less competitive (McKee, 1992).

In the midst of trying to be informed of and comply with environmental regulations, firms also face legal issues stemming from environmental regulations and policies. Environmental laws, regulations, policies, enforcement procedures, and interpretations of compliance are set by

all three levels of government and may not be in agreement (Forbes, 1992; Biles, 1992). Thus, firms face liability issues in the form of common law and specific legislation, regulations, bylaws, and policies (Blue et al., 1992; Darcey, 1992; Kiser, 1992).

Serious legal problems confront firms and individual managers. Infractions can result in expensive fines as well as criminal charges. Courts have ruled that a manager can be guilty even if the manager does not know about the regulation or is unaware that corporate behavior violates a "nuanced" interpretation (Spencer, 1992; Riesel & Jacobson, 1992). Thus the traditional lines between civil and criminal law are blurred and the result is increased anxiety, uncertainty, and commercial paralysis. The focus is actually moving away from the environmental issues and moving toward the legal and political issues (O'Leary, 1991). This has an especially significant impact because no company is ever completely in compliance due to the large number of environmental laws, their complexity, and the constant changes in regulations (Personal communication; Spencer, 1992). Because environmental regulations and policies change frequently, many firms try to "over-comply" (Filipczak, 1992).

Firms and individual managers face a real and substantial challenge in identifying their potential obligation and liability (Rittenberg, Haine, & Weygandt, 1992). One way to address this problem is to use internal environmental audits to evaluate compliance obligation, firm and individual manager exposure and liability, and compliance status (Riesel & Jacobson, 1992). An environmental audit is a primary tool for companies questioning their level of compliance. The audit process itself can be complicated and require the cooperation of a wide variety of people but software does exist to help guide and document the process. The audit process may point out unsafe work practices, discover potential contamination sites, reveal the potential for accidental spills, present alternatives to toxic chemicals in the work place, and report other aspects of business operations that might be in violation of legal requirements.

To summarize, there is no clearly defined, comprehensive, and integrated federal policy, so states and localities can develop their environmental regulations according to their own needs and interpretations. Thus, the regulation umbrella is growing and so are costs. Compliance is expensive, and the failure to comply carries with it heavy punishment.

The literature is surprisingly silent on how businesses find out about existing regulations, new regulations, or changes in regulations. It does not identify information needs, where companies get environmental regulation and compliance information, and where companies go for technical assistance with implementation/compliance problems. Does this mean these are not current business problems? Large businesses have the capacity to support a staff of environmental specialists or to access specialists or consultants, but most small businesses do not and cannot (Alston & Stoss, 1992).

Environmental information is available in general interest databases, but these databases may not meet the specific needs of small businesses. There is a real need for new information delivery systems which provide effective and efficient access to information. Although there are many sources, environmental information is often organized or available by regulation area or

type of pollutant (e.g., air, asbestos, water, PCB's, radon, wetlands, etc.). Thus, for most businesses with multiple areas of regulation, there is no single source of information. Even public agencies such as the EPA or state agencies may not have one source that can tell a business which rules apply. Enhancements and modifications in services and technologies continue to change how environmental information is produced, identified, and accessed, making it difficult to determine which information source and what specific information is applicable and relevant. Keeping up with current developments requires a tremendous amount of time and effort because the environmental issues encompass many disciplines and this multi-disciplinary characteristic exacerbates the information search process. Effective information exchange is also hampered by the history of conflict between the business community and the environmental interest groups.

Information sources can be grouped into three categories: general interest or broad base, technical or scientific, and business related. The factors determining access to different sources of information are need, coverage, cost, and format. The most common environmental information sources are periodical literature (e.g. newspapers, magazines, news summaries, and newsletters), bibliographic sources, books, databases, consulting firms, and state and federal agencies. Periodical literature is timely, specifically identifies the various current issues the public feels are important, and gives a reasonable reading of the public's perceptions and feelings about the issues. This may be especially useful given that business issues are frequently driven by public opinion. The information contained in most of the periodical literature is often not detailed and thus is generally more useful to the public than to the business community. Although environmental information is widely scattered throughout these sources and the information spans a wide range of topics, it is often difficult to sort out and determine what is relevant or applicable. Bibliographic files are useful because they provide a bridge between popular or general interest literature and the more scientific, technical writings. Newsletters are widely read by management for environmental information. The Bureau of National Affairs (BNA) has a long-standing reputation for producing materials which offer terse, highly researched, and objective descriptions. They often provide names and addresses of organizations and persons mentioned in the articles.

Several books may be useful sources of information for businesses. The *Kirkothmer Encyclopedia of Chemical Technology* provides comprehensive technical treatment of the environment and includes information on chemical contamination, hazardous waste management, and chemistry information resources. Legislative histories of various laws are also reviewed. They are comprehensive and provide insight into interpretations, purpose, and significance of a given law. A preamble presents the current intent of an administrative agency regulation, and preambles may be found in the *Federal Register*. The *Code of Federal Regulations* (CFR) is a complete source of all federal regulations. Finally, *The Government Institutes' Environmental Law Handbook* presents a good overview of environmental law.

Databases seem to be the fastest growing information medium. Anything found in hard copy is probably also available on some database or bulletin board, although the reverse may not be true. There are databases that cover environmental topics. For example, Greenwire is a new

service that covers environmental news. Electronic bulletin boards offer both general and technical help and are especially useful for answering questions like "Where do I ..?", "How do I ...?", and "Which software package is the best for ..?" A series of articles provides an excellent summary of available databases and the information they contain (Alston & Stoss, 1992). Despite the flurry of activity around tracking and gathering environmental information, companies still are not very competent at it. One factor contributing to limited use of databases is how information is indexed. Training and perseverance are needed to access specific information.

To summarize, the review of the literature revealed that, for small businesses, being informed about environmental regulations is a difficult task because of the diversity of regulations, the lack of coordination between different levels of government, by frequent changes in regulations, and the lack of a single source of information.

So what are small businesses in Kansas doing to cope with and respond to environmental regulations? The purpose of this study was to:

- Determine how Kansas firms are organized to deal with environmental regulation and compliance;
- Determine where Kansas firms currently obtain information regarding environmental regulations;
- Determine what issues and barriers are faced by Kansas firms in obtaining information regarding current and future environmental regulations;
- Determine and prioritize unmet needs for information and training related to environmental regulation and compliance.

PROCEDURES

Although small businesses are struggling with increasing environmental compliance costs as regulation spreads to smaller companies, little information regarding what information and training small businesses need exists. To determine what Kansas' small businesses know about environmental regulations and compliance, where they obtain their information, what additional information they need, and what training is needed, a telephone survey was conducted. The survey was developed with the Kansas Department of Health and Environment (KDHE) and the University of Kansas Center for Environmental Education and Training staff knowledgeable in environmental regulations. It was then field tested with a small number of businesses.

After the survey instrument was developed, a random sample was drawn from a list of Kansas businesses which employed 10 to 500 workers. The sample was drawn from eight categories or industrial sectors (Table 1). These categories were chosen because of the

importance of environmental regulation to those industry sectors. Each firm was contacted by telephone to determine who was responsible for environmental regulation/compliance. The survey was either completed with that person at that time or an appointment was made for completing it at a later time. Surveys were completed by 506 businesses, with 414 declining to participate, yielding a response ratio of 0.55.[1]

Table 1
SURVEY SAMPLE

Sector:	No. Firms in Data Base	Percent	Number Surveyed	Percent Surveyed	Z *
Agriculture	344	6.9	32	6.3	0.14
Mining	223	4.5	22	4.3	0.05
Construction	45	.9	3	.6	0.07
Manufacturing	1388	27.8	154	30.4	-0.07
Transportation	446	8.9	43	8.5	0.09
Wholesale	151	3.0	21	4.2	-0.27
Retail	498	10.0	59	11.7	-0.41
Services	1900	38.0	169	33.4	1.27
Not known			3	.6	-0.13
Total	4995	100.0	506	100.0	

* No significant differences were found.
Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

[1] Ninety-five percent of the time, the results from a survey such as this should differ by no more than 5 percent in either direction from what would have been obtained by interviewing all firms in the data base. Table 1 compares the proportion of firms included in the sample of each industry sector to the entire population within each sector. Although minor differences existed, those differences were not statistically significant. Therefore, the sample is representative of the population at large.

FINDINGS

Impact of Environmental Regulations

Ninety percent of those surveyed report that their products, activities, or processes are subject to federal, state, or local environmental regulations. Table 2 shows that a majority of firms are affected by hazardous waste, solid waste, spills/release, and water regulations.[2] Eighty-three percent said regulation issues were moderately to extremely important to their firm (Table 3). Ninety-seven percent have some degree of difficulty understanding the environmental regulations that apply to their firm. These results indicate that most firms are affected by environmental regulations, are concerned about regulations, and are having difficulty understanding them. Clearly, small firms in Kansas are feeling the impact of environmental regulations.

Table 2
TYPE OF ENVIRONMENTAL REGULATION AFFECTING FIRMS

Regulation	Percentage of Firms
Hazardous waste	75%
Solid waste	62%
Spills/release	58%
Water	55%
Recycling/waste management	49%
SARA Title III	46%
Air	45%
Ozone depleting substances	30%
Asbestos, lead, PCB, other toxic substances	28%
Underground storage tank	25%
Pesticide	24%

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

[2]See Appendix A for analysis by industry sector.

Table 3
IMPORTANCE OF ENVIRONMENTAL REGULATIONS

Importance of environmental issues:	Percentage of Firms
Extremely important	50%
Moderately important	33%
Slightly important	14%
Not important	3%

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

How Firms Are Organized to Respond

Within firms, responsibility for environmental regulation compliance is often organized by regulatory program (air, water, hazardous waste, etc.), by functional area (regulation, legal, financial, compliance, training), or by some other method. Thirty-eight percent of firms surveyed are organized by regulatory program (air, water, hazardous waste, etc.), and 41 percent are organized by functional area (regulation, legal, financial, compliance, training). The remaining 21 percent are organized by some other method.[3] In 23 percent of the firms, the owner, president, or vice president of the firm was the person identified as most knowledgeable about environmental regulations, 41 percent identified an administrative person (manager, director, coordinator, administrative assistant, etc.), 5 percent identified a safety, regulatory, or environmental officer/department, and 1 percent identified an engineer. The remaining companies identified others such as an attorney, lab technician, staff counselor, bookkeeper, etc. Thus, the majority of small businesses must rely upon someone who has multiple duties to keep the firm informed about and in compliance with environmental regulations.

Firms Access to Information

Only half of the firms reported conducting an internal environmental audit and 91 percent of those had conducted the audit within the past three years. Table 4 shows that the larger the firm, the more likely it was that an internal environmental audit had been conducted. Table 5 shows that manufacturers were more likely to have conducted an internal audit than other industries.

[3]See Table 2, Appendix A for analysis by industry. See Appendix C for analysis of all questions by how firms are organized.

Table 4
PERCENTAGE OF FIRMS CONDUCTING INTERNAL ENVIRONMENTAL AUDIT BY FIRM SIZE

Conducted Audit?	Number of Employees * 10-14	15-29	30-99	100-500	Total Firms
Yes	41%	49%	54%	63%	50%
No	53%	42%	41%	29%	43%
Don't Know	7%	9%	6%	9%	7%
	N = 137	125	174	70	506

* $p < .047$

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 5
INTERNAL ENVIRONMENTAL AUDIT CONDUCTED BY INDUSTRY

	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Yes	10	10	0	101	21	6	20	81	249
No	18	10	3	43	20	11	30	80	215
Don't Know	4	2	0	8	2	3	9	8	36

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Fifty-four percent reported that someone from their facility had attended an environmental conference and most of them (85 percent) had attended a conference in the past two years. Again, the larger the firm, the more likely it was that someone had attended a conference (Table 6). The list of who sponsored the conference attended most recently is included in Appendix B.

Table 6
ENVIRONMENTAL CONFERENCE ATTENDANCE: PERCENTAGE OF FIRMS

Conference Attended?	Number of Employees * 10-14	15-29	30-99	100-500	Total Firms
Yes	48%	49%	54%	73%	54%
No	46%	46%	39%	23%	41%
Don't Know	6%	5%	7%	4%	6%
N =	137	125	174	70	506

* $p < .031$

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Firms were asked to identify their primary sources for learning about **existing** environmental regulations and obligations (Table 7). Over 25 percent of the firms stated that they rely upon trade groups and magazines, professional organizations and publications, newsletters, and general publications for information. A sizeable percentage also turn to KDHE, OSHA (Occupational Safety and Health Administration), and the EPA (Environmental Protection Agency). Firms also turn to trade groups and magazines, newsletters, professional organizations and journals, and general publications as primary sources of information regarding new regulations and changes (Table 7). KDHE and other state agencies, as well as OSHA and the EPA, are other important sources of information regarding new regulations and changes. A slightly different picture emerges when firms seek technical assistance for compliance (Table 7). Twenty-three percent of the firms turn to other sources, such as suppliers, for technical assistance. Other sources include KDHE and other state agencies, OSHA, EPA consultants, and employees in other organizations or plants.

Table 7
PRIMARY SOURCES OF INFORMATION: PERCENTAGE OF FIRMS

	Existing Regulations	New/Changing Regulations	Technical Assistance
LOCAL:			
Local Emergency Planning Commission	1%	1%	1%
Local County Health Department	3%	3%	3%
Local Zoning Commissions	1%	<1%	<1%
Other local agency	4%	5%	4%
STATE:			
State Emergency Response Commission	2%	1%	<1%
KDHE	16%	13%	13%
"Right-to-Know" Organization	<1%	1%	1%
Ks Corporation Commission	1%	1%	1%
Other state agency	14%	14%	11%
FEDERAL:			
OSHA	17%	13%	12%
USDA	1%	1%	1%
FDA	1%	1%	1%
FTC	0%	0%	0%
EPA	17%	16%	13%
Other federal agency	7%	6%	3%
TRADE GROUPS, PUBLICATIONS, NEWSLETTERS:			
Trade groups/magazines	28%	26%	9%
Newsletters	26%	24%	9%
Professional organizations/journals	24%	23%	8%
General publications	24%	20%	5%
OTHER:			
Employees in other organizations/plants	9%	6%	11%
Consultants	7%	8%	13%
Corporate staff	6%	6%	7%
Suppliers	6%	3%	5%
Environmentalists/groups/publications	4%	4%	4%
Private training companies	3%	3%	2%
Law firms/attorneys	2%	2%	2%
Networks or data bases	1%	1%	0%
Public libraries	1%	1%	1%
Catalogs (Whole Earth, etc.)	1%	1%	<1%
Fairs/shows	0%	<1%	0%
Other	11%	23%	23%

* Firms could respond to more than one item

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

When asked to rank their sources of information for existing regulations, KDHE and trade groups and magazines were ranked first by 10 percent of the firms and some "Other" source was ranked first by 14 percent (Figure 1). Trade groups and trade magazines were the second choice of 18 percent. Professional organizations and journals were the second choice of 12 percent and the third choice of 14 percent. When the first through third rankings are combined (Figure 1), trade groups and magazines and professional organizations and journals, newsletters, and "other" are important sources of information for existing regulations. EPA, OSHA, and KDHE are agencies most frequently cited the top three sources of information regarding existing regulations.

Similar patterns occurred when firms ranked sources of information regarding new or changing regulations (Figure 2). Trade groups and magazines, professional organizations, "other" (especially suppliers), and newsletters were frequently mentioned as first, second, or third choice. EPA, OSHA, KDHA, and other state agencies were also cited frequently.

The largest percentage of firms listed "Other" as the first ranked source of technical assistance (Figure 3). The largest primary source within that miscellaneous group was suppliers. OSHA, consultants, EPA, professional organizations and journals, newsletters, and KDHE were ranked by at least 20 percent of the firms as a top ranked resource for technical assistance.

Firms were specifically asked about use of data bases and hotlines. Ninety-one percent of the firms do **not** use online data bases such as EPA's Pollution Information Exchange System, and 78 percent do not use the EPA hotlines.

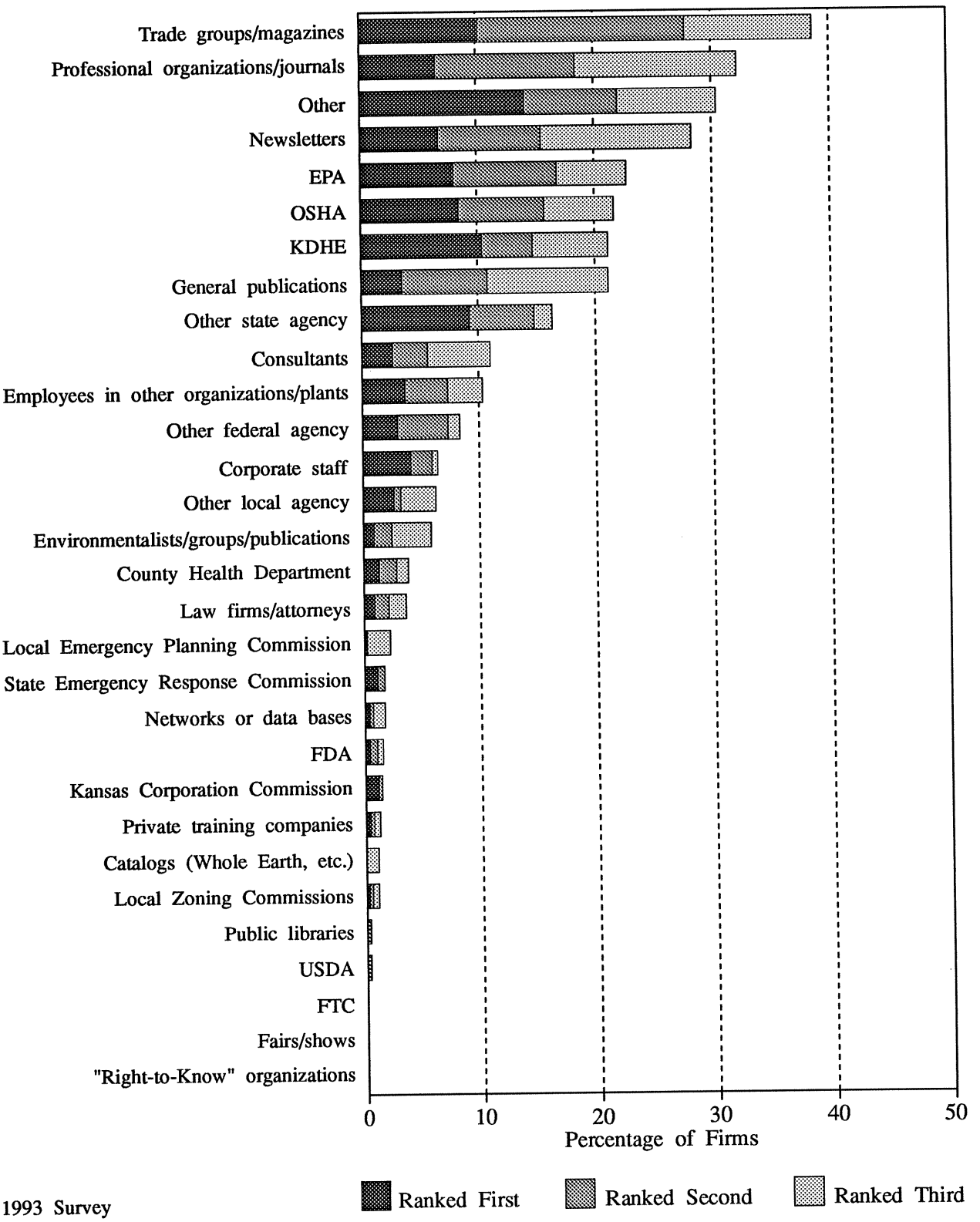
The pattern that emerges is one of turning to state and federal agencies as well as trade groups and publications for information regarding existing and new regulations. Firms turn to a larger group (state and federal agencies, trade groups/publications **plus** consultants, employee networks, and suppliers) for technical assistance in matters of compliance. The survey was not designed to identify why firms use a larger pool of sources for technical assistance. Perhaps it is more difficult to find sources who can interpret regulations and help contain compliance costs.

Firms Access to Training

In 76 percent of the firms, the department or person responsible for environmental compliance is also responsible for environmental training. Forty-six percent of the firms had someone who received environmental training in the past 12 months, 49 percent had no one who had received training, and the remaining 5 percent did not know if training had occurred. The larger the firm, the more likely it was that training had occurred (Table 8). Training for the firm or facility was most frequently provided by someone on the staff (Table 9). Fourteen percent of the firms hired a consultant and another 9 percent used a trade association or organization. Very few obtained training through universities or community colleges. The use of in-house staff, consultants, and trade associations may indicate that firms prefer training that is customized to their particular needs.

The type of training currently provided to employees of over 80 percent of the firms is general awareness/familiarization and safety training (Table 10). Emergency response, function specific training, and certification training also occur for many firms. These topics may be the ones that require some degree of customization or specificity across industry sectors.

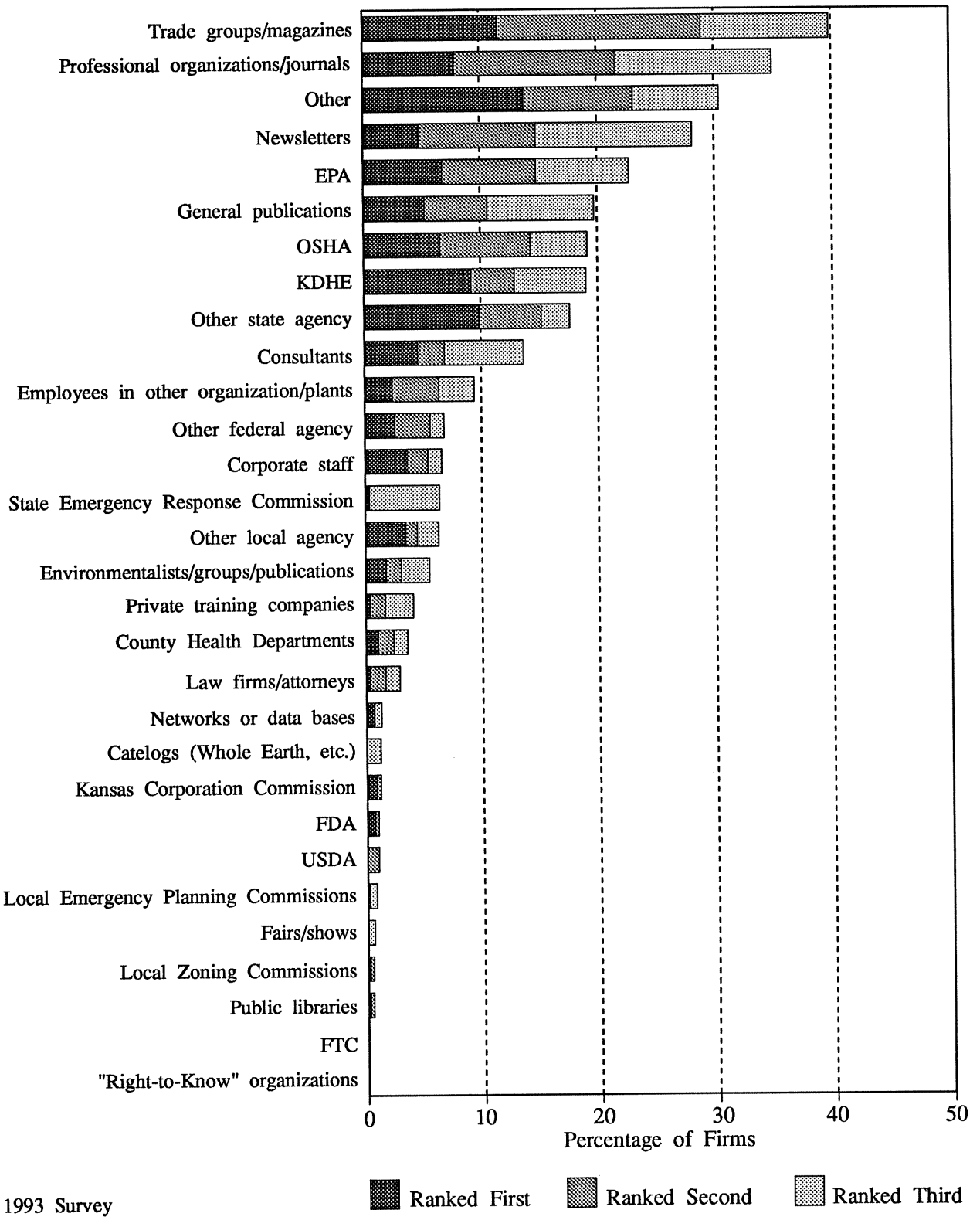
Figure 1
Information Sources for Existing Regulations
(Ranked by Importance)



1993 Survey

Figure 2

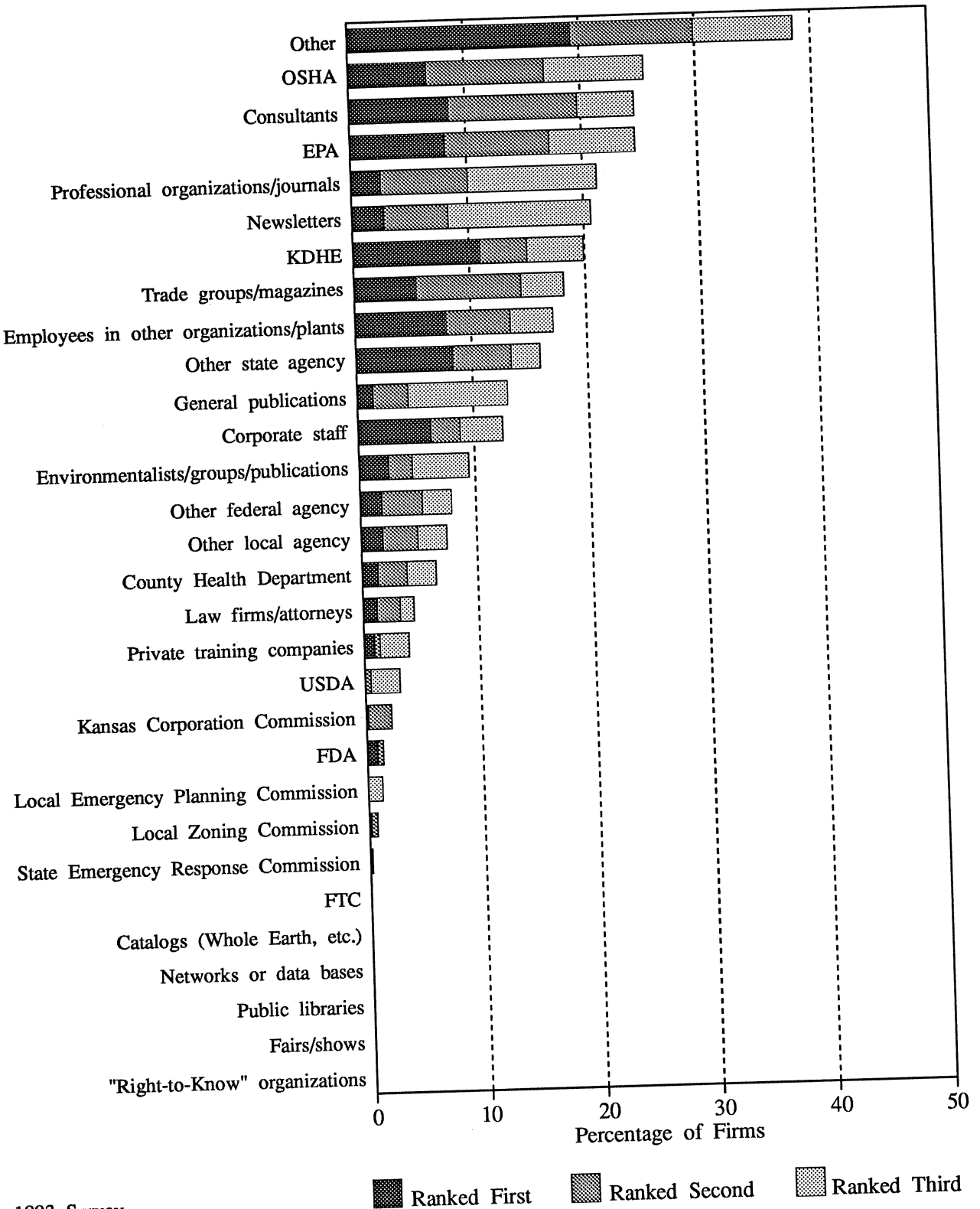
Information Sources for New or Changing Regulations (Ranked by Importance)



1993 Survey

Figure 3

Sources for Technical Assistance (Ranked by Importance)



1993 Survey

Table 8
PERCENTAGE OF FIRMS WHOSE EMPLOYEES RECEIVED ENVIRONMENTAL TRAINING IN THE LAST TWELVE MONTHS

Training Received?	Number of Employees * 10-14	15-29	30-99	100-500	Total Firms
Yes	37%	44%	49%	65%	46%
No	60%	50%	46%	29%	49%
Don't Know	3%	6%	5%	6%	5%
	N = 137	125	174	70	506

* $p < .004$

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 9
TRAINING PROVIDERS USED BY FIRMS *

	Percentage of Firms
Facility's staff	51%
Consultant	14%
Trade assoc., organization, or Chamber of Commerce	9%
Professional environmental training firms	6%
None/not sure	6%
Suppliers/manufactures/ distributors	3%
Seminars/conferences	3%
University	3%
EPA	3%
Community College	2%
KDHE	2%
Professional education firms	2%
Insurance company	2%
OSHA	2%
Other	6%

* Firms could specify more than one source

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 10
TRAINING CURRENTLY PROVIDED FOR EMPLOYEES

	Percentage of Firms
General awareness/familiarization	84%
Safety	84%
Emergency response	68%
Function specific training	63%
Certification training	33%
Other	13%

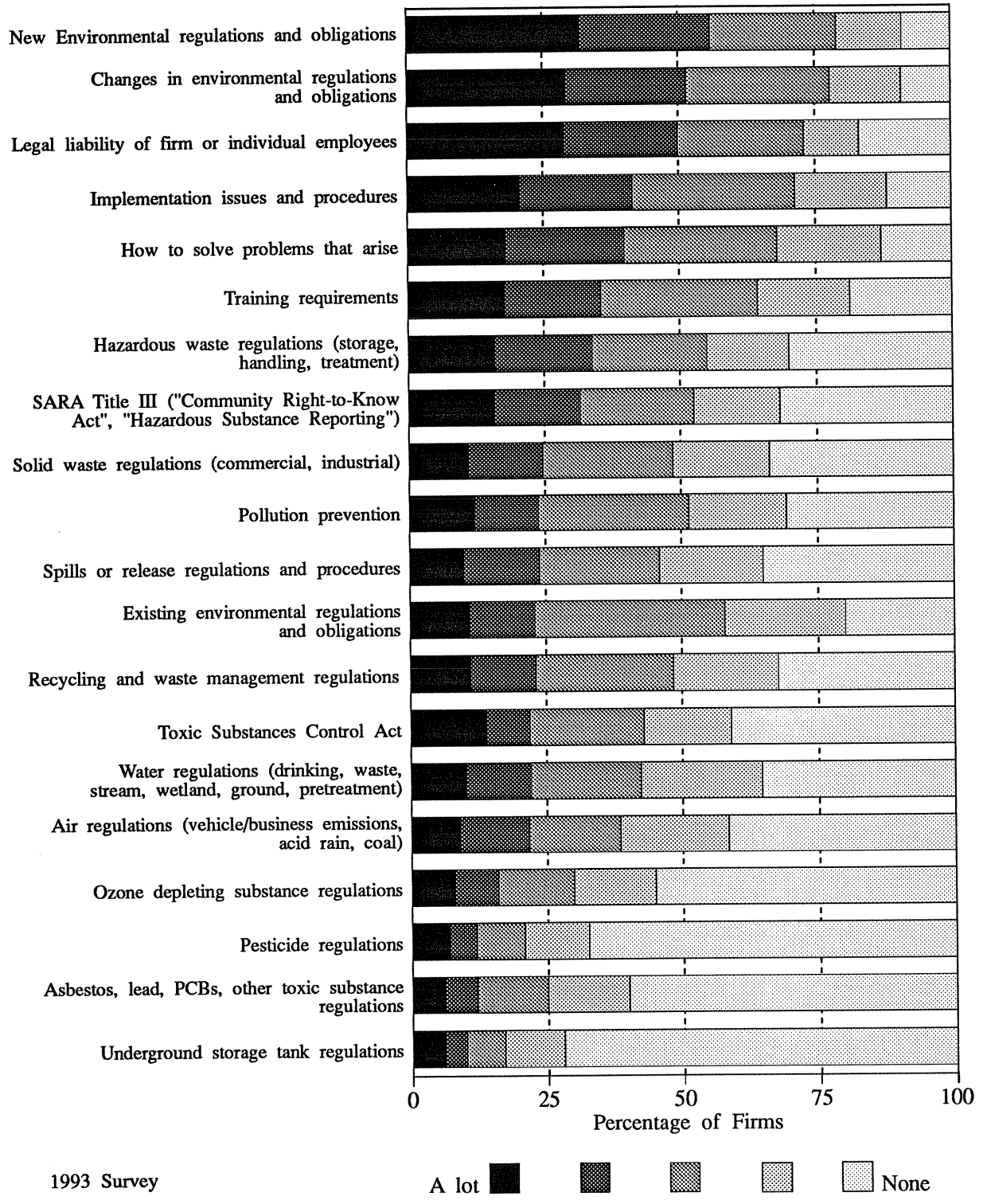
Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Firms Need for Information and Training

Firms were asked to indicate the amount of additional information needed about certain topics on a five point scale. Figure 4 shows that the largest percentage of firms indicated that they needed much more information (ranked 1 or 2) on new regulations and obligations, changes in regulations, legal liability, implementation issues, problem solving, and training requirements. They also needed more information in specialized areas of hazardous waste and SARA Title III. Other areas of need included pollution prevention and existing regulations.

For 25 percent of the firms, obtaining current and needed information regarding environmental regulations and obligations is difficult due to lack of knowledge concerning where to obtain information (Table 11). For an additional 32 percent, regulations are either too difficult to understand or the information seems conflicting and inconsistent. As the additional complaints listed in Table 11 are reviewed, the recurring theme is one of lack of time to obtain information, the complexity of regulations, and the constant changes in regulations. Table 12 shows that the top four barriers are problems for firms of all sizes.

Figure 4
Amount of Additional Information Needed



1993 Survey

Table 11
MAJOR BARRIERS TO OBTAINING INFORMATION

	Percentage of Firms
Don't know where to look for information	25%
Regulations too difficult to understand	19%
Information is conflicting/inconsistent	13%
Too time consuming to track	12%
Information not available	11%
Diversity of regulations	10%
Information changes too quickly	10%
No central source	9%
Too costly to track	9%
Uninformed local, state, federal employees	9%
No official notification of changes	5%
No one responsible at this facility	2%
Other	17%

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 12
BARRIERS TO OBTAINING INFORMATION BY FIRM SIZE: PERCENTAGE OF FIRMS

	Number of Employees				Total
Top Four Barriers:	10-14	15-29	30-99	100-500	Firms
Don't know where to look	26%	26%	35%	14%	25%
Regulations difficult to understand	18%	27%	38%	17%	19%
Conflicting/inconsistent information	22%	27%	34%	17%	13%
Too time consuming to track	34%	22%	34%	10%	12%
	N = 137	125	174	70	506

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

For firms who currently need training for their employees, training is needed in existing regulations, new regulations, changes in regulations, hazardous waste requirements, and training requirements (Table 13). Table 14 shows the type of training needed by each industry sector.[4] The most frequently cited training need for the agriculture sector was training in existing and new regulations. Hazardous waste regulation training is needed by the mining sector. The needs of the manufacturing sector are more diverse, with hazardous waste regulations, existing, new, or changing regulations, and training requirements being frequently mentioned areas. The transportation sector, wholesale, and retail sectors all need training in existing, new, and changing regulations. Hazardous waste regulations was an area of concern for the transportation and retail sectors and problem solving, recycling/waste management regulations, and training requirements concerned retail firms. The service sector also needs training in existing/new/changing regulations, in hazardous waste regulations, and in training requirements.

Compliance Issues

Over 20 percent of the firms reported that the cost of compliance and the difficulty of keeping up with changes are the biggest barriers to achieving and maintaining environmental compliance (Table 15). Table 16 shows that firms of all sizes struggle with these barriers. Thirty percent of the firms do not try to anticipate or prepare for future compliance requirements (Table 17). For those that do, 42 percent rely upon professional or trade resources (magazines, journals, newsletters, meetings, workshops).

[4]See Appendix A for tables of all analyses by industry sector which were not included in the text of the report.

Table 13
FIRMS' CURRENT TRAINING NEEDS

	Percentage Needing:
Existing regulations/obligations	19%
New regulations/obligations	18%
Changes in regulations/obligations	17%
Hazardous waste regulations	17%
Training requirements	12%
How to solve problems	8%
Implementation issues/procedures	7%
Spills/release regulations and procedures	7%
Solid waste regulations	6%
Legal liability	5%
Air regulations	5%
Water regulations	5%
Recycling and waste management regulations	5%
SARA Title III	4%
Pollution prevention	4%
Pesticide regulations	3%
Asbestos, lead, PCBs, other toxic substance regulations	3%
Toxic Substances Control Act	3%
Underground storage tank regs	2%
Ozone depleting substance regulations	2%

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 14
TRAINING NEEDS BY INDUSTRY

	Number of Firms by Industry:*								
TYPE:	Agriculture	Mining	Construction	Manufacturing	Transportation	Wholesale	Retail	Services	Total
Existing regulations & obligations	10	3	0	28	10	2	12	30	95
New regulations & obligations	11	2	0	27	7	4	11	30	93
Changes in regulations	8	2	0	23	7	4	15	25	84
Implementation issues/procedures	3	0	0	13	0	3	3	12	34
How to solve problems	6	2	0	10	1	3	7	15	40
Air regulations	1	1	0	5	3	1	2	11	24
Water regulations	3	0	0	8	5	0	1	8	25
Solid waste regulations	4	1	0	7	4	0	4	10	30
Pesticide regulations	5	0	0	1	1	2	1	5	15
Underground storage tank regulations	2	0	0	1	3	0	2	4	12
Hazardous waste regulations	2	6	0	30	7	1	6	35	87
SARA Title III	0	1	0	7	2	1	3	8	22
Recycling/waste management regulations	1	0	0	6	3	0	7	6	23
Spills/release regulations	1	2	0	13	4	3	4	7	35
Asbestos, lead, PCBs, other toxic substances regulations	0	0	1	2	2	0	1	7	13
Ozone depleting substance regulations	0	0	0	0	1	0	2	5	8
Toxic Substance Control Act	1	1	0	6	2	0	1	6	17
Pollution prevention	1	1	0	4	3	0	2	9	20
Training requirements	5	4	0	19	4	2	7	18	59
Legal liability of firm/employees	3	2	0	4	4	1	2	7	23

* Firms could identify more than one type of training need.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 15
BARRIERS TO ACHIEVING OR MAINTAINING COMPLIANCE

Barrier:	Percentage of Firms
Cost	22%
Keeping up with changes	21%
Understanding regulations	18%
Excessive regulation	14%
Need for training	8%
Regulatory inefficiency	8%
Excessive paperwork and reporting requirements	6%
Impact on production	2%
Other	28%

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 16
BARRIERS TO COMPLIANCE BY FIRM SIZE: PERCENTAGE OF FIRMS

	Number of Employees				Total
Top Four Barriers:	10-14	15-29	30-99	100-500	Firms
Too costly	24%	26%	33%	18%	22%
Keeping up with changes	31%	23%	30%	16%	21%
Understanding regulation	24%	26%	30%	20%	18%
Excessive regulation	21%	23%	40%	16%	14%
	N = 137	125	174	70	506

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 17
HOW FIRMS PREPARE FOR FUTURE COMPLIANCE REQUIREMENTS

	Percentage of Firms
Do not try to predict future compliance requirements	30%
Trade magazines, journals and newsletters	21%
Professional/trade association meetings or workshops	21%
Ongoing training	19%
Strategic planning sessions	10%
Over compliance	4%
TQM	1%
Pollution prevention	1%
Other	19%

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

SUMMARY AND IMPLICATIONS FOR TRAINING

Almost all firms in the industries surveyed are subject to federal, state, and/or local environmental regulations and are very concerned about regulation and compliance issues. To comply with environmental regulations, firms are most likely to be organized by functional area (regulation, legal, financial, compliance, training) or by regulatory program (air, water, hazardous wastes, etc.). A large percentage of firms identified someone with multiple responsibilities within the firm as the most knowledgeable about environmental regulations. About half of the firms provide their own training. Firms have trouble dealing with regulations due to lack of knowledge about where to obtain information, difficulty in understanding the regulations, and/or inconsistent or conflicting information. The biggest barriers to achieving and maintaining compliance are cost of compliance and difficulty with keeping up with changes. This creates a picture of firms pressed for time and resources trying to cope with complex regulation and compliance issues.

Because of limited time and resources to deal with complex environmental regulation and compliance, firms rely heavily upon trade groups, trade/professional publications and newsletters for information about existing regulations and about new or changing regulations. To a lesser extent, they also rely upon state and federal agencies. In addition to using trade groups and public agencies, firms are likely to pay consultants and use suppliers for technical assistance with compliance.

Most firms provide their employees some sort of general training in environmental regulation awareness, familiarization, and safety. A large number also provide training in responding to emergencies and in specific functions. Firms report that they need additional information in the following areas:

- New regulations;
- Changes in regulations;
- Legal liability;
- Implementation issues;
- Problem solving; and
- Training requirements.

Additional training for employees is needed in:

- Existing regulations;
- New regulations;
- Changes in regulations;
- Hazardous waste requirements; and
- Training requirements.

To meet the needs of small firms with limited time and resources but large needs for information and training, several training topics should be considered. The first, and perhaps most important, would be training that helps firms develop, implement, and assess in-house training on existing regulations and obligations, legal liability, and training requirements. Another topic that could be included in this course would be information on how to access and use data bases and governmental sources for information regarding new and changing regulations.

The survey did not explore how firms prefer to have training delivered (workshops, videos, manuals, etc.). However, several methods could be considered to allow greater access to firms who cannot afford to send employees to off-site training courses. The medium in which initial training materials are presented (e.g., printed manuals, videos, computer-based training) could also be coordinated and packaged with offers for periodic updates of information. This would enable firms to keep abreast of new developments and update their in-house training packages. KDHE and the Division of Continuing Education might consider ways to provide periodic updates in new and changing regulations, legal liability, and training requirements for those firms who have received training. Perhaps firms could receive brochures, videos, or updated training manuals (hard copy or disk) as part of a periodic retraining program.

For firms who need but cannot provide adequate training in existing, new, and/or changing regulations, courses that are customized to meet the needs of various industry groups should be considered. In addition to providing information about new and existing regulations, these customized courses could include more specific information regarding implementation and compliance issues as well as problem solving. Since the cost of compliance is a major barrier to achieving or maintaining compliance, ways to contain costs and the costs/savings of over compliance should be included. Many firms do not try to predict future compliance requirements, probably because they do not have the time and resources necessary to access the persons or groups who might have this information. Thus, training that provided information

about future regulations and changes and how to build that into current compliance activities would also be useful and should be tied to legal/liability issues. Again, because keeping up with new and changing regulations is such a problem for small firms, attention to providing periodic updates in changing regulations, legal liability, and training requirements is an additional service that should be considered.

REFERENCES

Alston, Patricia G. and Stoss, Frederick W. (1992) "Environment Online: The Greening of Databases, Part 3. Business and Regulatory Information." *Database*, 15:4, 17-35.

Biles, Blake A. (1992) "Package It Right: The Legal Considerations." *Management Review*, 81:6, 32-33.

Blue, Ian, Meneguzzi, Pamela, and Cole, Stephen R. (1992) "Business Valuation: One Step Ahead of the Law." *CA Magazine*, 125:9, 46-48.

Caney, Derek J. (1992) "CFC Buyers Squeezed by Ongoing Phaseout." *Chemical Marketing Reporter*, 242:9, 9-12.

Carlile, Jennifer (1992) "Reclaiming Landfills." *American City and County*, 107:8, 38-46.

Darcey, Sue. (1992) "Flow Control: A Tug of Waste." *World Wastes*, 35:7, 58-64.

Filipczak, Bob (1992) "Toxic Training." *Training*, 29:7, 53-56.

Forbes, Christine (1992) "Is Safety a Safe Bet?" *Industrial Distribution*, 81:9, 18-20.

Kiser, Jonathan V. L. (1992) "Ash: Too Hot to Handle?" *World Wastes*, 35:7, 38-44.

McKee, Bradford (1992) "Environmental Price Tags." *Nation's Business*, 30:4, 36-39.

Ofori, George (1992) "The Environment: The Fourth Construction Project Objective?" *Construction Management and Economics*, 10:5, 369-395

O'Leary, Meghan (1991) "The Greening of the Bottom Line." *CIO*, 7, 54-64.

Riesel, Daniel and Jacobson, Arthur (1992) "The Criminalization of Environmental Law." *Directors and Boards*, 116:4, 28-32.

Rittenberg, Larry E., Haine, Susan F., and Weygandt, Jerry J. (1992) "Environmental Protection: The Liability of the 1990s." *Internal Auditing*, 8:2, 12-25.

Spencer, Leslie (1992) "Designated Inmates." *Forbes*, 150:10, 100-102.

Ziffer, Fred E. (1992) "Managing Refrigerants in a CFC-Free Era." *Plant Engineering*, 46:14, 53-56.

APPENDIX A

ANALYSIS BY INDUSTRY

Table 1
REGULATIONS THAT AFFECT FIRMS

TYPE:*	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Air (vehicle/business emissions, acid rain, coal)	10	13	0	77	12	19	28	65	224
Water (drinking, waste, stream, wetlands, ground, pre-treatment)	22	15	0	89	30	16	30	76	278
Solid waste (commercial, industrial)	20	12	1	97	21	9	29	122	311
Pesticide	28	2	0	20	8	20	2	39	119
Underground storage tank	9	7	0	19	14	12	27	35	123
Hazardous waste (storage, handling, treatment)	21	13	2	106	25	14	47	145	373
SARA Title III	12	9	1	87	16	16	26	60	227
Recycling & waste mgmt.	10	7	1	83	14	6	37	84	242
Spills or release regs.	15	16	0	94	26	18	36	87	292
Asbestos, lead, PCBs, other toxic substances	5	6	2	38	13	4	11	59	138
Ozone depleting substances	4	4	0	42	14	4	36	8	149

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 2
FIRM ORGANIZATION FOR DEALING WITH ENVIRONMENTAL REGULATION BY INDUSTRY

TYPE:	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
By regulatory program: air, water, hazardous waste, underground storage tanks, SARA Title III	10	10	2	57	11	10	26	66	192
By functional areas: regulation, legal, financial, compliance, training	13	5	0	60	20	7	22	73	200
Other	9	7	1	34	11	4	11	29	106

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 3
ENVIRONMENTAL CONFERENCE ATTENDANCE BY INDUSTRY

	Number of Firms by Industry:								
	Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Yes	17	13	0	92	20	10	28	88	268
No	13	7	3	51	22	10	26	71	203
Don't Know	2	2	0	10	1	1	4	9	29

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 4
PRIMARY SOURCES OF INFORMATION ABOUT EXISTING REGULATIONS BY INDUSTRY

Source:*	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Local Emergency Planning Commission	0	0	0	1	0	2	0	1	4
Local County Health Dept.	1	0	0	3	2	0	2	7	16
Local Zoning Commissions	0	0	0	0	1	0	2	0	3
Other local agency	4	0	0	7	2	2	4	3	22
State Emergency Response Commission	1	0	0	1	4	2	1	1	10
KDHE	8	6	0	27	7	1	8	23	80
"Right to Know" Organization	0	0	0	0	0	0	0	1	1
Ks Corporation Commission	0	4	0	1	0	0	1	0	6
Other state agency	8	1	0	18	9	6	5	26	73
OSHA	2	4	1	17	3	1	3	55	86
USDA	2	0	0	1	0	0	0	0	3
FDA	1	0	0	0	0	2	1	2	6
FTC	0	0	0	0	0	0	0	0	0
EPA	5	4	0	34	11	3	10	21	88
Other federal agency	4	1	0	11	5	1	3	12	37
Employees in other organization or plant	3	1	0	13	1	2	9	15	44
Trade groups/magazines	8	6	2	50	11	4	17	41	139
Professional organizations and journals	8	6	0	43	11	1	10	43	122
Networks or data bases	1	1	0	2	1	0	0	2	7
General publications	2	3	1	46	10	3	10	44	119
Newsletters	4	4	2	47	13	2	13	47	132
Public libraries	0	0	0	1	0	1	0	1	3
Private training companies	1	0	0	5	0	0	1	6	13
Law firms or attornies	0	2	0	3	4	0	0	3	12
Consultants	2	2	0	18	3	2	1	7	35
Corporate personnel/staff	0	1	0	10	3	2	5	10	31
Environmentalists, groups, publications	0	0	0	16	1	2	1	1	21
Catalogs (Whole Earth, etc.)	0	0	0	2	0	0	1	0	3
Fairs or shows	0	0	0	0	0	0	0	0	0
Other	5	2	0	37	8	8	15	48	123

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 5
PRIMARY SOURCES OF INFORMATION ABOUT NEW OR CHANGING REGULATIONS BY INDUSTRY

Source:*	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Local Emergency Planning Commission	0	1	0	0	0	1	0	2	4
Local County Health Dept.	1	0	0	2	2	0	1	7	14
Local Zoning Commissions	0	0	0	0	1	0	1	0	2
Other local agency	3	0	0	7	1	1	5	6	23
State Emergency Response Commission	0	0	0	1	2	0	1	0	4
KDHE	5	4	0	20	4	1	5	23	62
"Right to Know" Organization	0	1	0	2	0	0	1	0	4
Ks Corporation Commission	0	4	0	0	0	0	1	0	5
Other state agency	6	2	0	18	9	5	7	23	70
OSHA	2	2	0	11	3	1	3	44	66
USDA	0	0	0	1	0	0	0	3	4
FDA	1	0	0	0	0	1	1	3	6
FTC	0	0	0	0	0	0	0	0	0
EPA	5	5	0	28	9	3	9	20	79
Other federal agency	2	2	0	9	4	1	4	8	30
Employees in other organization or plant	1	1	0	9	2	2	8	9	32
Trade groups/magazines	9	7	2	47	12	3	15	36	131
Professional organizations and journals	10	4	0	37	9	1	12	44	117
Networks or data bases	0	0	0	0	0	0	0	3	3
General publications	2	3	1	46	9	3	6	32	102
Newsletters	6	3	1	40	13	1	12	43	119
Public libraries	0	0	0	2	1	0	0	2	5
Private training companies	0	0	0	8	0	0	1	5	14
Law firms or attornies	0	1	0	2	3	0	0	3	9
Consultants	2	1	0	16	2	2	2	16	41
Corporate personnel/staff	0	1	0	10	5	1	5	6	28
Environmentalists, groups, publications	0	0	0	15	4	2	0	1	22
Catalogs (Whole Earth, etc.)	1	0	0	1	0	0	0	2	4
Fairs or shows	0	0	0	1	0	0	0	0	1
Other	5	4	1	36	7	10	15	39	117

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 6
PRIMARY SOURCES OF INFORMATION ABOUT TECHNICAL ASSISTANCE FOR COMPLIANCE BY INDUSTRY

Source:*	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Local Emergency Planning Commission	0	0	0	0	0	2	1	1	4
Local County Health Dept.	4	0	0	2	2	0	0	7	15
Local Zoning Commissions	0	0	0	0	1	0	1	0	2
Other local agency	4	1	0	4	1	1	5	5	21
State Emergency Response Commission	1	0	0	0	1	0	0	0	2
KDHE	2	4	0	19	6	0	5	25	61
"Right to Know" Organization	2	0	0	0	0	0	2	0	4
Ks Corporation Commission	0	5	0	0	0	0	0	0	5
Other state agency	7	0	0	13	6	5	5	20	56
OSHA	2	1	0	7	3	0	1	44	58
USDA	2	0	0	0	0	0	0	1	3
FDA	1	0	0	1	1	1	1	1	6
FTC	0	0	0	0	0	0	0	0	0
EPA	4	2	0	19	11	2	8	18	64
Other federal agency	1	1	0	2	2	0	3	8	17
Employees in other organization or plant	2	0	1	21	2	2	10	15	53
Trade groups/magazines	1	1	2	18	3	3	4	14	46
Professional organizations and journals	3	1	0	12	3	1	6	14	40
Networks or data bases	0	0	0	0	0	0	0	0	0
General publications	0	0	1	6	2	2	3	13	27
Newsletters	3	1	2	11	3	1	4	20	45
Public libraries	0	0	0	1	2	0	0	0	3
Private training companies	0	0	0	3	0	0	0	6	9
Law firms or attornies	0	1	0	0	5	1	1	2	10
Consultants	5	4	0	31	7	2	2	14	65
Corporate personnel/staff	0	0	0	13	2	1	7	12	35
Environmentalists, groups, publications	0	1	0	10	5	1	0	3	20
Catalogs (Whole Earth, etc.)	0	0	0	1	0	0	0	0	1
Fairs or shows	0	0	0	0	0	0	0	0	0
Other	7	4	1	42	3	11	19	36	123

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 7
USE OF ENVIRONMENTAL DATABASES BY INDUSTRY

Type:	Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
	Number of Firms by Industry:								
Environmental online databases	1	3	0	8	3	2	2	14	33
EPA hotlines	2	3	0	36	14	6	8	18	87

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 8
TRAINING ACTIVITY BY INDUSTRY

Type:	Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
	Number of Firms by Industry:								
Training and compliance separate within firm	2	6	1	33	12	2	12	43	111
Training received within last 12 months	12	8	0	76	23	14	23	75	231
Training provided by:									
Facility's staff	13	10	2	88	17	4	25	87	246
University	1	1	0	4	1	0	2	5	14
Community college	0	0	0	1	2	1	0	7	11
KDHE	3	0	0	4	0	0	1	4	12
EPA	0	0	0	5	4	1	1	4	15
Consultant	3	5	0	29	6	1	5	21	70
Training firm	1	1	0	3	0	0	2	5	12
Environmental firm	1	2	0	13	7	0	2	5	30
Other	13	7	1	41	15	12	21	61	171

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 9
TYPE OF TRAINING PROVIDED FOR EMPLOYEES BY INDUSTRY

Type:*	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
General awareness & familiarization	26	14	2	127	34	17	50	154	424
Function specific	20	8	1	108	23	13	29	113	315
Certification	13	4	1	43	21	9	29	45	165
Safety	26	18	2	135	33	20	43	147	424
Emergency response	22	13	0	104	30	16	31	129	345
Other	2	4	1	30	7	3	3	15	65

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 10
AREAS WHERE MUCH MORE ADDITIONAL INFORMATION IS NEEDED BY INDUSTRY

Type:*	Number of Firms Needing Much More by Industry: (ranked 1 or 2 on 5 point scale)								
	Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Existing regulations & obligations	13	0	2	42	8	5	14	34	118
New regulations & obligations	21	11	3	88	19	12	27	97	278
Changes in regulations	18	10	3	87	21	10	29	80	258
Implementation issues & procedures	17	6	3	68	18	8	19	70	209
How to solve problems	17	7	3	51	18	7	19	76	198
Air regulations	5	2	2	39	1	5	12	40	106
Water regulations	13	4	1	37	5	5	11	34	110
Solid waste regulations	6	3	1	45	4	3	12	45	119
Pesticide regulations	13	1	0	11	2	8	3	19	57
Underground storage tank regulations	1	0	0	13	5	4	11	13	47
Hazardous waste regulations	6	4	2	55	11	5	21	65	169
SARA Title III	8	2	2	50	12	9	20	51	154
Recycling & waste mgmt. regs.	8	0	0	35	6	2	21	46	118
Spills or release regs.	8	6	0	36	14	6	12	36	118
Asbestos, lead, PCBs, other toxic substance regs.	3	1	2	14	6	1	8	23	58
Ozone depleting substance	5	1	0	23	5	1	17	29	81
Toxic Substance Control Act	9	3	1	28	7	4	14	43	109
Pollution prevention	8	5	2	45	8	4	12	32	116
Training requirements	10	6	2	56	15	10	18	60	177
Legal liability	21	5	2	79	19	8	33	82	249

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 11
MAJOR BARRIERS TO OBTAINING INFORMATION BY INDUSTRY

Type:*	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Don't know where to look for information	9	4	1	34	8	5	15	48	124
Regulations too difficult to understand	4	7	0	35	10	5	8	26	95
Diversity of regulations	5	3	0	19	4	2	3	14	50
Information changes quickly	1	2	0	20	4	2	6	12	47
Too time consuming to track	5	1	0	18	5	7	7	15	58
Too costly to track	3	2	0	18	3	2	4	11	43
Uninformed local, state, or federal employees	3	3	0	17	7	2	3	11	46
No official notification of changes	0	1	0	10	4	1	2	7	25
No central source	4	1	0	13	5	1	6	13	43
Information not available	4	3	0	18	5	2	8	14	54
Conflicting/inconsistent information	3	4	0	22	5	2	6	22	64
No one in firm responsible	2	1	0	5	0	2	0	1	11
Other	7	2	0	26	8	2	6	35	86

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 12
BARRIERS TO ACHIEVING OR MAINTAINING COMPLIANCE BY INDUSTRY

Type:*	Number of Firms by Industry: Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Impact on current production	0	0	0	1	0	3	2	2	8
Too costly	5	7	0	32	10	11	19	29	113
Too many excessive regs.	7	2	0	23	7	5	5	20	69
Keeping up with changes	5	3	0	40	9	4	9	34	104
Need for training	0	2	1	8	7	2	5	14	39
Regulatory inefficiency	3	3	0	14	5	0	3	14	42
Understanding regulations	7	4	1	34	10	1	11	25	93
Excessive paperwork & reporting requirements	2	1	1	13	2	2	2	8	31
Other	12	8	1	53	17	6	16	65	178

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

Table 13
HOW FIRMS PREPARE FOR FUTURE COMPLIANCE REQUIREMENTS BY INDUSTRY

	Number of Firms by Industry:								
Type:*	Agriculture (N = 32	Mining 22	Construction 3	Manufacturing 154	Transportation 43	Wholesale 21	Retail 59	Services 169	Total 503)
Strategic planning sessions	1	3	0	19	5	2	2	20	52
Overcompliance	3	0	0	3	1	1	4	7	19
TQM	1	0	0	1	0	0	1	1	4
Pollution prevention	1	0	0	1	1	0	1	1	5
Ongoing training	9	6	0	28	6	6	8	34	97
Trade magazines, professional journals, newsletters	8	1	1	37	11	4	14	28	104
Profession/trade association meetings or workshops	6	3	2	35	15	4	11	31	108
Do not try to predict future compliance requirements	7	12	1	38	8	5	26	48	145
Other	10	3	2	39	7	3	7	34	105

* Firms could identify more than one.

Source: Institute for Public Policy and Business Research, University of Kansas, 1993 Survey

APPENDIX B

SPONSORS OF CONFERENCES ATTENDED

WHO SPONSORED THE CONFERENCE ATTENDED MOST RECENTLY
(One response per entry unless otherwise indicated)

AIM
Air and Waste Management Association
Air Toxins in Missouri
ALI and ABA session
Amer. Assoc. of Airport Executives
Amer. Assoc. of Med. Instrumentation
American Dental Association
American Feed Industry Association
American Founderman's Society
American Retred Association
American Vegetable Growers Assoc.
AMS
Ass. General Contractor
Auto Dealers Association (N = 2)
Brown Medical
Cambridge Institute
Cargill Inc.
Cultured Marble Association
Dept. of Health Storage & Tank
Dept. of Water Resources (N = 3)
Detroit, Michigan
DIACA, Dept. of Agriculture
DuPont
Eagle Assoc.
Eaton Corp.
Environmental Resource Center, CO
EPA (N = 10)
Gass Processors Assoc.
General Electric
Government (N = 3)
Government Institutes Copr. (N = 2)
Heathwood Oil Co.
Insurance company (N = 3)
Insurance Management Assoc.
Johnson County
Kansas City area
Kansas Dental Assoc.
Kansas Electric Corp.
Kansas Farmers Service (N = 4)
Kansas Funeral Directors
Kansas Health Care Assoc. (N = 2)
Kansas Hospital Assoc. (N = 3)
Kansas Independent Oil & Gas Assoc (N = 2)
Kansas Livestock Assoc. (N = 3)
Kansas Medical Society
Kansas Motorcar Dealer Assoc (N = 2)
Kansas Motor Carrier Association (N = 3)
Kansas Natural Resources Council
Kansas Oil Marketers (N = 2)
Kansas Optometric Association
Kansas Reporting of Hazardous Waste Material
Kansas State Dept. of Agriculture
Kansas State University (N = 6)
KDHE (N = 16)
KG&E
KHA
KLA
Kodak
MAC
Manhattan
MAMTC Conference
Meyer Industry Supply
Missouri Dept. of Natural Resources
Missouri Emergency Preparedness Program
Missouri Medical Managers
Morris. Co. Comm. Solid Waste
Morrison & Hacker
National Cattlemen Assoc.
National Groundwater
National Solid Waste Management Assoc.
National Tapes and Coating Assoc.
National Tooling and Machine Assoc.
NEHA Program
Not Applicable
Not sure (N = 54)
Oklahoma State University
OMI, New Orleans
OSHA (N = 13)
Phillipport Oil
Printing Industry of Kansas
Professional Lawn Care Assoc. (N = 2)
Reed Braden & Co.
Regulatory Consultancy Inc.
Robin Air Conditioner
Safety Kleen (N = 10)
San Antonio Manufacturers Assoc.
Schin
Self-sponsored (N = 4)
SERC
Society of Petroleum Engineering (N = 2)
State of California
Suppliers
Terra-Con
Texas Water Commission
Trade Assoc. (N = 2)
University of Kansas (N = 3)
University of Missouri
Vickers Corp. headquarters
Vulcan Chemicals

APPENDIX C

ANALYSIS BY HOW FIRMS ARE ORGANIZED

ANALYSIS OF SELECTED QUESTIONS BY HOW THE FACILITY WAS ORGANIZED:
1 = BY REGULATORY PROGRAM
2 = BY FUNCTIONAL AREA
3 = OTHER

Q17 Do you use any environmental online data
by Q5 How is this facility organized...

Q17	Count / Col Pct	Q5 Reg. Prog. 1	Q5 Funct. Area 2	Q5 Other 3	Row Total
Yes	1	17 8.9	12 6.0	3 2.8	32 6.5
No	2	171 90.0	184 92.0	98 92.5	453 91.3
Don't Know	3	2 1.1	4 2.0	5 4.7	11 2.2
Column Total		190 38.3	200 40.3	106 21.4	496 100.0

Chi-Square	Value	DF	Significance
Pearson	8.30482	4	.08103
Likelihood Ratio	8.23401	4	.08337
Mantel-Haenszel test for linear association	7.53941	1	.00604

Minimum Expected Frequency - 2.351
Cells with Expected Frequency < 5 - 3 OF 9 (33.3%)

Number of Missing Observations: 10

* * * C R O S S T A B U L A T I O N * * *

$Q11 What are your primary sources for learning about existing regulations?
by Q5 How is this facility organized...

$Q11	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Other state agency	Q11I9	25 14.1	35 18.5	13 14.1	73 15.9
Is OSHA?	Q11J10	34 19.2	37 19.6	15 16.3	86 18.8
Is USDA?	Q11K11	0 .0	1 .5	2 2.2	3 .7
Is FDA?	Q11L12	1 .6	5 2.6	0 .0	6 1.3
Is EPA?	Q11N14	36 20.3	40 21.2	12 13.0	88 19.2
Other federal agency	Q11O15	10 5.6	19 10.1	8 8.7	37 8.1
Employees in other organizations/plants	Q11P16	25 14.1	15 7.9	4 4.3	44 9.6
Trade groups and trade magazines	Q11Q17	66 37.3	44 23.3	30 32.6	140 30.6
Professional organizations & journals	Q11R18	61 34.5	37 19.6	23 25.0	121 26.4
Networks or data bases	Q11S19	6 3.4	1 .5	0 .0	7 1.5
General publications	Q11T20	59 33.3	40 21.2	17 18.5	116 25.3
	Column Total	177 38.6	189 41.3	92 20.1	458 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q11 (tabulating 1) Info source
by Q5 How is this facility organized...

$Q11	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q11U21 Newsletters		62 35.0	44 23.3	23 25.0	129 28.2
Q11V22 Public libraries		1 .6	1 .5	1 1.1	3 .7
Q11W23 Private training companies		10 5.6	3 1.6	0 .0	13 2.8
Q11X24 Law firms/attornies		4 2.3	5 2.6	3 3.3	12 2.6
Q11Y25 Consultants		13 7.3	15 7.9	7 7.6	35 7.6
Q11Z26 Corporate resource personnel & staff		9 5.1	11 5.8	11 12.0	31 6.8
Q11ZZ27 Environmentalists, envir. publications		8 4.5	10 5.3	3 3.3	21 4.6
Q11ZZ28 catalogs(e.g. Whole Earth)		3 1.7	0 .0	0 .0	3 .7
Q11ZZ30 Other		47 26.6	48 25.4	28 30.4	123 26.9
	Column Total	177 38.6	189 41.3	92 20.1	458 100.0

Percents and totals based on respondents

458 valid cases; 48 missing cases

* * * C R O S S T A B U L A T I O N * * *

$Q13 What are your primary sources for learning about new or changing regulations?
by Q5 How is this facility organized...

$Q13	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q13A1 Is local Emergency Planning Commission?		3 1.7	1 .5	0 .0	4 .8
Q13B2 Is the local County Health Department?		3 1.7	10 5.2	1 1.0	14 3.0
Q13C3 Is the local Zoning Commission?		1 .6	1 .5	0 .0	2 .4
Q13D4 Is there another local agency?		10 5.6	11 5.7	2 2.0	23 4.9
Q13E5 Is the State Emergency Response Commission?		3 1.7	0 .0	0 .0	3 .6
Q13F6 Is the KDHE?		18 10.1	27 13.9	18 18.4	63 13.4
Q13G7 Is the "Right-to-Know" organization?		4 2.2	0 .0	0 .0	4 .8
Q13H8 Is the K Corporation Commission?		2 1.1	1 .5	2 2.0	5 1.1
Q13I9 Other state agency?		27 15.1	30 15.5	13 13.3	70 14.9
	Column Total	179 38.0	194 41.2	98 20.8	471 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q13 (tabulating 1) Sources new regs
by Q5 How is this facility organized...

$Q13	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Is OSHA?	Q13J10	28 15.6	26 13.4	12 12.2	66 14.0
Is USDA?	Q13K11	2 1.1	1 .5	1 1.0	4 .8
Is FDA?	Q13L12	2 1.1	4 2.1	0 .0	6 1.3
Is EPA?	Q13N14	34 19.0	35 18.0	10 10.2	79 16.8
Other federal agency?	Q13O15	4 2.2	19 9.8	7 7.1	30 6.4
Employees in other Organizations/plants?	Q13P16	16 8.9	12 6.2	4 4.1	32 6.8
Trade groups & trade magazines?	Q13Q17	63 35.2	42 21.6	28 28.6	133 28.2
Professional organi-zations & journals?	Q13R18	60 33.5	37 19.1	20 20.4	117 24.8
Networks or data bases?	Q13S19	1 .6	2 1.0	0 .0	3 .6
General publications	Q13T20	54 30.2	27 13.9	18 18.4	99 21.0
Newsletters?	Q13U21	58 32.4	38 19.6	21 21.4	117 24.8
	Column Total	179 38.0	194 41.2	98 20.8	471 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q13 (tabulating 1) Sources new regs
by Q5 How is this facility organized...

$Q13	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q13V22 Public libraries?		2 1.1	3 1.5	0 .0	5 1.1
Q13W23 Private training companies?		9 5.0	5 2.6	0 .0	14 3.0
Q13X24 Law firms or attornies?		2 1.1	4 2.1	3 3.1	9 1.9
Q13Y25 Consultants?		18 10.1	16 8.2	7 7.1	41 8.7
Q13Z26 Corporate resource personnel & staff?		10 5.6	9 4.6	9 9.2	28 5.9
Q13ZZ27 Environmentalists, environ. publications		7 3.9	14 7.2	1 1.0	22 4.7
Q13ZZ28 Catalogs (e.g. Whole Earth)?		2 1.1	1 .5	1 1.0	4 .8
Q13ZZ29 Fairs or shows such as lawn & garden?		1 .6	0 .0	0 .0	1 .2
Q13ZZ30 Other		43 24.0	49 25.3	26 26.5	118 25.1
	Column Total	179 38.0	194 41.2	98 20.8	471 100.0

Percents and totals based on respondents

471 valid cases; 35 missing cases

* * * C R O S S T A B U L A T I O N * * *

$Q15 (tabulating 1) What are your primary sources for technical assistance in complying with regulations?
by Q5 How is this facility organized...

$Q15	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q15C3 Is the local Zoning Commission?		1 .6	1 .5	0 .0	2 .4
Q15D4 Is there another local agency?		7 4.0	9 4.8	5 5.2	21 4.6
Q15E5 Is the State Emergency Response Commission?		1 .6	0 .0	0 .0	1 .2
Q15F6 Is the KDHE?		25 14.5	23 12.4	15 15.5	63 13.8
Q15G7 Is the "Right-to-Know" organ.		2 1.2	2 1.1	0 .0	4 .9
Q15H8 Is the K Corporation Commission?		2 1.2	1 .5	2 2.1	5 1.1
Q15I9 Other state agency?		17 9.8	29 15.6	10 10.3	56 12.3
Q15J10 Is OSHA?		24 13.9	24 12.9	10 10.3	58 12.7
Q15K11 Is USDA?		1 .6	1 .5	1 1.0	3 .7
Q15L12 Is FDA?		2 1.2	4 2.2	0 .0	6 1.3
Q15N14 Is EPA?		27 15.6	27 14.5	10 10.3	64 14.0
	Column Total	173 37.9	186 40.8	97 21.3	456 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q15 (tabulating 1) Sources tech ass't
by Q5 How is this facility organized...

$Q15	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q15O15 Other federal agency		3 1.7	9 4.8	5 5.2	17 3.7
Q15P16 Employees in other organizations/plants?		28 16.2	18 9.7	7 7.2	53 11.6
Q15Q17 Trade groups & trade magazines?		20 11.6	16 8.6	11 11.3	47 10.3
Q15R18 Professional organizations & journals?		22 12.7	9 4.8	10 10.3	41 9.0
Q15T20 General publications?		13 7.5	10 5.4	3 3.1	26 5.7
Q15U21 Newsletters?		24 13.9	12 6.5	7 7.2	43 9.4
Q15V22 Public libraries?		1 .6	1 .5	1 1.0	3 .7
Q15W23 Private training companies?		6 3.5	2 1.1	1 1.0	9 2.0
Q15X24 Law firms or attornies?		2 1.2	5 2.7	3 3.1	10 2.2
Q15Y25 Consultants?		19 11.0	30 16.1	15 15.5	64 14.0
Q15Z26 Corporate resource personnel & staff?		9 5.2	13 7.0	13 13.4	35 7.7
Column Total		173 37.9	186 40.8	97 21.3	456 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q15 (tabulating 1) Sources tech ass't
by Q5 How is this facility organized...

$Q15	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q15ZZ27 Environmentalists, environ. publications		5 2.9	11 5.9	4 4.1	20 4.4
Q15ZZ28 Catalogs such as Who Earth?		1 .6	0 .0	0 .0	1 .2
Q15ZZ30 Other?		47 27.2	49 26.3	28 28.9	124 27.2
	Column Total	173 37.9	186 40.8	97 21.3	456 100.0

Percents and totals based on respondents

456 valid cases; 50 missing cases

* * * C R O S S T A B U L A T I O N * * *

$Q19 (tabulating 1) What additional information does your facility need with respect to environmental regulations and issues?
by Q5 How is this facility organized...

$Q19	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q19A Existing environmental regs & obligat.		37 22.6	39 21.3	19 20.4	95 21.6
Q19B New environmental regs. & obligatns.		15 9.1	24 13.1	7 7.5	46 10.5
Q19C Changes in environ. regs. & obligatns.		14 8.5	22 12.0	9 9.7	45 10.2
Q19D Implementation issue		20 12.2	24 13.1	11 11.8	55 12.5
Q19E How to solve problem		24 14.6	26 14.2	14 15.1	64 14.5
Q19F Air regulations		82 50.0	78 42.6	41 44.1	201 45.7
Q19G Water regulations		64 39.0	70 38.3	37 39.8	171 38.9
Q19H Wolid waste regs.		74 45.1	60 32.8	31 33.3	165 37.5
Q19I Presticide regs.		128 78.0	132 72.1	70 75.3	330 75.0
Q19J Underground storage		136 82.9	145 79.2	71 76.3	352 80.0
Q19K Hazardous waste regu		51 31.1	57 31.1	37 39.8	145 33.0
Column Total		164 37.3	183 41.6	93 21.1	440 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q19 (tabulating 1) Info needed
by Q5 How is this facility organized...

$Q19	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q19L SARA Title III		61 37.2	56 30.6	36 38.7	153 34.8
Q19M Recycling and waste management regs.		59 36.0	68 37.2	33 35.5	160 36.4
Q19N Spills or release regs.		63 38.4	73 39.9	34 36.6	170 38.6
Q19O Asbestos, lead, PCBs other toxic subst.		108 65.9	124 67.8	64 68.8	296 67.3
Q19P Ozone depleting substances regs.		99 60.4	117 63.9	52 55.9	268 60.9
Q19Q Toxic substancs control act		64 39.0	87 47.5	47 50.5	198 45.0
Q19R Pollution prevention		50 30.5	68 37.2	31 33.3	149 33.9
Q19S Training requirement		34 20.7	36 19.7	22 23.7	92 20.9
Q19T Legal liability of firm or employees		29 17.7	31 16.9	21 22.6	81 18.4
	Column Total	164 37.3	183 41.6	93 21.1	440 100.0

Percents and totals based on respondents

440 valid cases; 66 missing cases

* * * C R O S S T A B U L A T I O N * * *

$Q20 (tabulating 1) What are the major barriers to obtaining current and needed information regarding environmental regulations and obligations?
by Q5 How is this facility organized...

$Q20	Count / Col pct	Q5 = 1	Q5 = 2	Q5 = 3	Row Total
Don't know where to look for info.	Q20A	53 36.1	50 30.3	20 25.3	123 31.5
Regs. too difficult to understand.	Q20B	32 21.8	43 26.1	20 25.3	95 24.3
Diversity of regs.	Q20C	19 12.9	25 15.2	6 7.6	50 12.8
Info. changes too quickly.	Q20D	24 16.3	13 7.9	11 13.9	48 12.3
Too time consuming to track.	Q20E	22 15.0	18 10.9	18 22.8	58 14.8
Too costly to track	Q20F	18 12.2	11 6.7	14 17.7	43 11.0
Uninformed local, state, fed. employees	Q20G	18 12.2	16 9.7	12 15.2	46 11.8
No official notice of changes	Q20H	10 6.8	9 5.5	6 7.6	25 6.4
No central source	Q20I	13 8.8	21 12.7	10 12.7	44 11.3
Information is not available.	Q20J	30 20.4	14 8.5	10 12.7	54 13.8
Information conflicting or inconsistent	Q20K	24 16.3	26 15.8	14 17.7	64 16.4
	Column Total	147 37.6	165 42.2	79 20.2	391 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q20 (tabulating 1) Barriers
by Q5 How is this facility organized...

$Q20	Count / Col pct	Q5 = 1	Q5 = 2	Q5 = 3	Row Total
No one designated to be responsible	Q20L	0 .0	9 5.5	2 2.5	11 2.8
Other	Q20M	30 20.4	28 17.0	27 34.2	85 21.7
	Column Total	147 37.6	165 42.2	79 20.2	391 100.0

Percents and totals based on respondents

391 valid cases; 115 missing cases

* * * C R O S S T A B U L A T I O N * * *

$Q25 (tabulating 1) What type of environmental training do employees of this facility need?
by Q5 How is this facility organized...

	Q5			
Count / Col pct	1	2	3	Row Total
$Q25				
Q25A Existing regulations	36 36.4	41 34.2	17 31.5	94 34.4
Q25B New regulations	35 35.4	39 32.5	18 33.3	92 33.7
Q25C Changes in regulation	36 36.4	31 25.8	16 29.6	83 30.4
Q25D Implementation issues	15 15.2	15 12.5	4 7.4	34 12.5
Q25E Problem solving	17 17.2	19 15.8	4 7.4	40 14.7
Q25F Air regulations	11 11.1	11 9.2	2 3.7	24 8.8
Q25G Water regulations	11 11.1	10 8.3	4 7.4	25 9.2
Q25H Solid waste regs.	13 13.1	16 13.3	1 1.9	30 11.0
Q25I Pesticide regs.	5 5.1	9 7.5	1 1.9	15 5.5
Q25J Underground storage tank regs.	7 7.1	5 4.2	0 .0	12 4.4
Q25K Hazardous waste regs	34 34.3	38 31.7	15 27.8	87 31.9
Column Total	99 36.3	120 44.0	54 19.8	273 100.0

Percents and totals based on respondents

(Continued)

* * * C R O S S T A B U L A T I O N * * *

$Q25 (tabulating 1) Training needed
by Q5 How is this facility organized...

$Q25	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q25L SARA Title III		5 5.1	12 10.0	5 9.3	22 8.1
Q25M Recycling & waste management regs.		5 5.1	9 7.5	9 16.7	23 8.4
Q25N Spills or release reg		10 10.1	17 14.2	8 14.8	35 12.8
Q25O Asbestos, lead, PCBs other toxic subs.		5 5.1	8 6.7	0 .0	13 4.8
Q25P Ozone depleting substance regs		2 2.0	5 4.2	1 1.9	8 2.9
Q25Q Toxic substances control act		4 4.0	9 7.5	3 5.6	16 5.9
Q25R Pollution prevention		6 6.1	11 9.2	3 5.6	20 7.3
Q25S Training requirements		26 26.3	18 15.0	15 27.8	59 21.6
Q25T Legal liability of firm or employees		5 5.1	8 6.7	10 18.5	23 8.4
	Column Total	99 36.3	120 44.0	54 19.8	273 100.0

Percents and totals based on respondents

273 valid cases; 233 missing cases

* * * C R O S S T A B U L A T I O N * * *

$Q26 (tabulating 1) What are the major barriers to achieving or maintaining environmental compliance?
by Q5 How is this facility organized...

$Q26	Count / Col pct	Q5 1	Q5 2	Q5 3	Row Total
Q26A Impact on production		3 2.1	4 2.3	1 1.1	8 2.0
Q26B Too costly		43 29.9	45 25.9	24 27.0	112 27.5
Q26C Too many regs.		26 18.1	31 17.8	12 13.5	69 17.0
Q26D Keeping up with changes		38 26.4	37 21.3	28 31.5	103 25.3
Q26E Need for training		16 11.1	14 8.0	9 10.1	39 9.6
Q26F Regulatory ineffi-ciency		21 14.6	13 7.5	8 9.0	42 10.3
Q26G Understanding regs.		33 22.9	41 23.6	19 21.3	93 22.9
Q26H Excessive paperwork & reporting requirmts		17 11.8	8 4.6	6 6.7	31 7.6
Q26I Other		53 36.8	84 48.3	40 44.9	177 43.5
	Column Total	144 35.4	174 42.8	89 21.9	407 100.0

Percents and totals based on respondents

407 valid cases; 99 missing cases