

---

# Appendixes

# The OTA Industry Survey

In order to gather some quantitative data about industry's perspectives on hazardous waste reduction, OTA conducted a survey of industry personnel in February and March 1986, which asked questions about how and why waste-related decisions are made. The survey was administered to all participants in two OTA Industry Workshops. In addition, it was mailed to 108 industry personnel in a variety of industries that use hazardous substances. (That is, the survey was given to 141 people.) All of the respondents were people who had previously shown some interest in hazardous waste reduction and all were involved in some way in waste decisions made at their company. The survey sample was not, therefore, random. Over 85 percent of respondents had technical backgrounds. A special attempt was made to elicit responses from small and medium-sized businesses.

Ninety-nine completed responses were received (a 70 percent response rate) from companies in more than 20 States; 43 were received from small to medium-sized companies and 56 from large corporations. Eleven Standard Industrial Classifications (SIC) are represented in the OTA sample (see table A-1). The large number of chemical company respondents reflects the fact that chemicals and allied products (SIC 28) is responsible for approxi-

mate 50 percent of the RCRA hazardous waste generated in the country.

The survey form was divided into three parts: 1) request information about the size, location of the respondent's company; 2) information about current waste reduction efforts; 3) information about the respondent's views on future waste reduction efforts. The first part of the survey was divided into two sections: one for companies with 100 or more employees and one for companies with fewer than 100 employees. The second part of the survey was divided into two sections: one for companies with 100 or more employees and one for companies with fewer than 100 employees. The third part of the survey was divided into two sections: one for companies with 100 or more employees and one for companies with fewer than 100 employees.

The survey was divided into three parts: 1) request information about the size, location of the respondent's company; 2) information about current waste reduction efforts; 3) information about the respondent's views on future waste reduction efforts. The first part of the survey was divided into two sections: one for companies with 100 or more employees and one for companies with fewer than 100 employees. The second part of the survey was divided into two sections: one for companies with 100 or more employees and one for companies with fewer than 100 employees. The third part of the survey was divided into two sections: one for companies with 100 or more employees and one for companies with fewer than 100 employees.

Si lamar, Lthen asked about the impact of waste reduction efforts on the economy (Q. 2-8), economic factors affecting the industry to increase productivity and improve the quality of life. The survey was divided into three parts: 1) request information about the size, location of the respondent's company; 2) information about current waste reduction efforts; 3) information about the respondent's views on future waste reduction efforts.

When asked specific questions about the waste reduction efforts (Q. 2-4), economic factors affecting the industry to increase productivity and improve the quality of life. The survey was divided into three parts: 1) request information about the size, location of the respondent's company; 2) information about current waste reduction efforts; 3) information about the respondent's views on future waste reduction efforts.

Among waste reduction activities implemented to date (Q. 2-6), in-process recycling was ranked first, particularly by large companies. Changes in equipment or technology were ranked second, and improvement in housekeeping and general operations changes ranked third. Clearly the least used action of all companies responding to this survey was making changes in the final product(s).

Companies were divided in their responses to questions about the ways in which they plan waste

**Table A-1.—Distribution of Respondents to OTA's Industrial Survey**

SIC number	Short SIC title	Number of respondents in OTA survey
22	Textile mill products . . .	2
26	Paper and allied products . .	1
28	Chemicals and allied products . . . . .	34
29	Petroleum and coal products	5
30	Rubber and miscellaneous plastics . . . . .	3
33	Primary metals industries . .	3
34	Fabricated metal products . .	16
35	Machinery, except electrical .	8
36	Electric and electronic equipment . . . . .	10
37	Transportation equipment	9
38	Instruments and related products . . . . .	6
39	Miscellaneous manufacturing	1
unknown		1
Total	...	99

SOURCE: Office of Technology Assessment

reduction actions and target waste streams (Q. 2-5). When asked "are you more likely to focus on the weight or volume of waste rather than the specific threat or level of hazard of the waste?" 46 percent replied in the affirmative. Of those, most (76 percent) said that lack of information as to the degree of hazard of waste(s) was not a problem. While most respondents indicated that they gave "much attention" to all different kinds of air and water emissions, responses overall indicated that water emissions are somewhat more likely to receive attention than air emissions (Q. 2-7).

Respondents expressed some concern that not all actions undertaken in industry in the name of waste reduction are as environmentally beneficial or economically profitable as they may initially appear. Sixty percent agreed with the statement: "what might be hailed as a successful waste avoidance [reduction] effort by a company may be misleading as to its environmental or economic benefits."

When asked about existing Federal waste reduction activities, specifically EPA's recent RCRA waste minimization certification requirements for waste generators which appears on manifests (Q. 2-2), virtually all respondents were familiar with them (only 3 percent not familiar) and 40 percent said that these requirements have prompted them to increase waste reduction. Uncertainty about EPA's or States' regulations and enforcement were not considered likely to hamper future waste reduction by most respondents (71 percent), although small companies were more likely to find that such uncertainties limit their action than were large companies. Thirty-five percent of small companies and only 25 percent of large companies said their waste reduction efforts would be limited by uncertainties about regulations (Q. 3-5).

Respondents were then asked to consider a variety of types of Federal waste reduction programs and evaluate their impact on waste reduction efforts in the respondent's company (Q. 3-1). Programs which respondents indicated would have the greatest positive impact on waste reduction were, first, a tax credit for capital spending on waste reduction and, second, reduced possibilities for land disposal through enforcement of RCRA programs. Following close behind were such considerations as increasing Superfund liabilities and technical information and assistance programs of various kinds. Potential programs that were rated as having little positive or no significant impact were: 1) presidential awards for outstanding waste reduction efforts, 2) Federal grants for State waste reduction pro-

grams, and 3) a mandated Federal waste reduction schedule. Respondents also clearly indicated (84 percent) that a Federal information collection program which would require regular reporting by industry on toxic chemical generation would not stimulate more waste reduction (Q. 3-9).

When asked specifically about the possibility of mandated reduction levels (Q. 3-4), small and large businesses gave very different responses. Seventy-five percent of large companies said such a program "would be difficult to implement and enforce and, therefore . . . Use . . . have . . . little effect, and might hamper our efforts." Only 47 percent of small companies chose this response. Instead, more than half responded that mandated reduction "would bring more attention to the issue and motivate industry to avoid the generation of waste." Overall, **62 percent of respondents opposed mandated reduction.**

A similar split appears in responses to a question about further Federal Government action (Q. 3-2):

Overall, with regard to waste avoidance [reduction], if you had your way would you want the Federal Government to do the things just the way they are now or they take some further action to assist in [reducing] activities?

**Sixty-seven percent of small business respondents favored further Federal Government action; only 50 percent of large businesses did. Overall, 57 percent of respondents favored some further action by the Federal Government to assist industry in waste reduction.**

However, when asked whether this further government action should be carried out by the States or by the Federal Environmental Protection Agency (EPA) (Q.3-3), small business respondents clearly favored State action (67 percent in favor). The reason most often cited for this preference was that a State government has a better understanding of the particular needs of businesses in the State than does the Federal EPA and can be more flexible in dealing with problems. Large business respondents were more evenly divided between State and Federal action. They found it easier to deal with one uniform program for all their operations than with a variety of State programs. Overall, 58 percent of respondents preferred State action to Federal action.

When asked about current State waste reduction programs (Q.2-3), 43 percent of respondents said that State programs had affected their waste reduction efforts thus far. 13 out of 24 per-

cent of these believed that the State program had served as some form of subsidy or aid without which their waste reduction effort would have been less.

When respondents were asked to rank the importance of different waste reduction activities in *future* waste reduction (Q.3-7), the results were similar to the rankings they gave to activities in current waste reduction. Housekeeping and operations changes dropped somewhat in importance, leaving in-process recycling and equipment and technology changes as the important strategies for future reduction. Final product changes and raw materials changes were still at the bottom of the list.

**A large majority of respondents (84 percent) estimated that current and likely future waste reduction efforts would have no effect on or might increase their company's employment (Q.3-8)**

Finally, respondents were asked to estimate changes in their capability to avoid generating hazardous

waste (Q.3-10). They were asked: "Using best available technology in 1980, how much (by weight) of the hazardous waste (all types in all types of environmental media) generated by your operation in 1980 could have been avoided?" Fifty-nine percent responded "less than 25 percent," 30 percent responded "25 to 50 percent," and 11 percent responded "50 to 75 percent." When asked:

Using best available technology in 1985, how much (by weight) of hazardous waste (all types in all types of environmental media) generated but your operation in 1985 could have been avoided?

answers shifted slightly upward (15 percent responded 50 to 75 percent reduction possible). OTA could discern no pattern among the 10 to 15 percent of companies indicating that large amounts of waste reduction were possible.

## SAMPLE COPY OF OTA'S INDUSTRY SURVEY

### INDUSTRY PERSPECTIVES ON HAZARDOUS WASTE AVOIDANCE

#### Important Definitional Note:

In completing this survey, please keep in mind the following. The OTA project is concerned only with those actions taken by waste generators to **avoid** the generation of, management of, and introduction into the environment (external to plant operations) of any hazardous materials. In this survey We use the term "waste avoidance" to refer to such activities. When a broader scope of activities (including waste avoidance and better ways of managing wastes or the use of offsite recycling/recovery) is meant, we use the term, "waste reduction." Note also that OTA is also concerned with all types of hazardous wastes, emissions, and discharges into all environmental media.

Part 1: Although none of these results will be linked to a specific individual or company, some information about you and your company will allow us to better interpret all the responses:

1-1: Check off one of the following that most closely describes your situation:

- a) ☐ I am a technical person (i.e., a science or engineering background) involved in plant operations
- b) ☐ I am a technical person in a mid-level management position
- c) ☐ I am a technical person at the corporate rather than plant operations level
- d) ☐ I am a non-technical person at the corporate level
- e) ☐ other. Please explain briefly:

1-2: With regard to your company's efforts to avoid generating **waste**:

- a) ☐ I make decisions leading to actions
- b) ☐ I make recommendations to others for decisions
- c) ☐ other. Please explain briefly:

1-3: Your operation is best characterized as:

- a) ☐ small or medium sized company
- b) ☐ large company with corporate technical resources on which to draw
- c) ☐ other. Please explain briefly:

1-4 : With regard to what your company does primarily:

- a) Its SIC number is \_\_\_\_\_
- b) Its chief products or outputs are: \_\_\_\_\_
- c) Something else you think relevant: \_\_\_\_\_

1-5: Your principal activity is in the State of \_\_\_\_\_ in which there is, as far as you know (check off as many as apply):

- \_\_\_\_\_ no waste reduction program
- \_\_\_\_\_ a technical assistance program for waste reduction
- \_\_\_\_\_ an information transfer program for waste reduction
- \_\_\_\_\_ some type(s) of tax on your hazardous waste
- \_\_\_\_\_ some type of awards program for waste reduction
- \_\_\_\_\_ some other governmental effort concerning waste reduction,  
please explain briefly:

1-6: Because Congress required EPA to prepare a report on waste reduction, EPA has had several contractor studies underway. Have you or your company participated in any of these studies or sumeys:

\_\_\_\_\_ no                      \_\_\_\_\_ yes                      \_\_\_\_\_ don't know

part 2: Factors which now are relevant and important to your efforts:

THE FOLLOWING SECTION ASSUMES THAT YOU HAVE UNDERTAKEN WASTE AVOIDANCE EFFORTS WITHIN THE CONFINES OF YOUR PLANT OPERATIONS. IF THIS IS NOT THE CASE, SKIP TO SECTION 3, PAGE 5.

2-1: Consider the following nine statements concerning factors that may already have affected the pace and extent of your Waste avoidance efforts and give each statement one of the following evaluations:

- 1<- usually true in your operation
- 2'- occasionally true in your operation
- 3 - rarely true in your operation

- \_\_\_\_\_ the capital costs of major waste avoidance efforts can not now be justified in economic terms in comparison to other capital projects in the company
- \_\_\_\_\_ government environmental regulations accomplish enough, and lead to whatever attention we can give to dealing with hazardous waste issues
- \_\_\_\_\_ we don't have enough detailed technical information on what to do for waste avoidance nor the resources to get more information
- \_\_\_\_\_ top management hasn't given waste avoidance a high priority
- \_\_\_\_\_ our technical staff is too small or too preoccupied with other more important jobs to give attention to waste avoidance
- \_\_\_\_\_ the physical nature or age of our operation does not allow us to increase our waste avoidance efforts
- \_\_\_\_\_ the rising costs of managing our wastes have made increasing waste avoidance efforts a high priority
- \_\_\_\_\_ the difficulty of using land disposal for our hazardous waste has been an important catalyst to waste avoidance in our operation.
- \_\_\_\_\_ public awareness and attention to wastes, emissions, discharges, accidental releases to the environment have not been relevant to our decision-making about waste avoidance.

2-2: With regard to EPA's recent RCRA certification requirements about waste reduction for-waste generators such as appear on manifests (check those applicable) :

- \_\_\_\_\_ I am not familiar with them
- \_\_\_\_\_ they have not posed any problem
- \_\_\_\_\_ they have caused us to increase our waste avoidance activities
- \_\_\_\_\_ other. Please explain:

2-3: Have State programs affected your Waste avoidance efforts?

a)                      y   e   s                      \_\_\_\_\_ no

b) If yes, please indicate briefly What those program(s) were:

c) If yes, do you believe that the state effort Was in some sense a form of subsidy or aid for your waste avoidance efforts without which your effort would have been less?

\_\_\_\_\_ yes                      \_\_\_\_\_ no

2-4: Have your waste avoidance efforts been held back because you lack enough detailed information on:

a) the nature (e.g. degree of hazard) of your hazardous wastes	_____	yes	no
b) the costs of managing specific wastes	_____		
c) the costs of carrying out waste avoidance	_____		
d) the dollar value of benefits (other than avoiding waste management costs)	_____		

2-5: In planning your waste avoidance actions and targeting waste streams, are you more likely to focus on the weight or volume of waste rather than the specific threat or level of hazard of the waste?

\_\_\_\_\_ yes \_\_\_\_\_ no

If yes, has lack of information on degree of hazard of your waste(s) been a problem?

\_\_\_\_\_ yes \_\_\_\_\_ no

2-6: Of the waste avoidance activities which you have implemented to date, rank the following five broad approaches in terms of their importance (1 - the most successful approach) :

\_\_\_\_\_ changes in process equipment or technology  
 \_\_\_\_\_ improvements in “housekeeping” or general operations  
 \_\_\_\_\_ changes in raw materials used in operations  
 \_\_\_\_\_ in-process recycling/recovery  
 \_\_\_\_\_ changes in the final product(s) produced



2-7: When speaking of waste reduction most people focus on solid, hazardous waste associated with RCRA regulation. Consider the following other types of hazardous 'waste' and indicate the level of attention your company is giving to reducing them. Use the following:

- 1 - much attention, action already or specific plans;
- 2 - a little attention;
- 3 - no attention at present;
- x not a relevant waste

- a) routine toxic air emissions \_\_\_\_\_
- b) accidental toxic air emissions \_\_\_\_\_
- c) unregulated discharges of hazardous  
materials to surface waters \_\_\_\_\_
- d) regulated discharges to surface waters \_\_\_\_\_
- e) discharges of hazardous materials  
to sewers \_\_\_\_\_

2-8: Rate the following circumstances with regard to their direct or indirect impact on your waste avoidance decisions and activities to date (1 - most important) :

an interest in improving public and consumer perceptions of the company

overall need to reduce costs, increase productivity, or improve product(s)

actual and perceived regulatory demands, costs, and liabilities

### Part 3: Where do we go from here?

3-1: Consider the following eight potential types of Federal programs and, assuming that they would be done well, evaluate their potential impact on your waste avoidance efforts by giving each one of the following:

- 1 - would have a major positive impact;
- 2 - would have a small but positive impact;
- 3 - would not be a significant factor

\_\_\_\_\_ technical information on specific waste avoidance approaches is made available free to you

\_\_\_\_\_ free technical assistance especially designed for your operation to help develop your waste avoidance effort is made available to you

\_\_\_\_\_ some type of tax credit or advantage is made available to you for capital spending on waste avoidance

- \_\_\_\_\_ a specific Federal requirement is **mandated** for a certain amount of waste reduction over a specified time as compared to some base year of waste generation
- \_\_\_\_\_ Presidential' awards are given annually for outstanding waste reduction efforts
- \_\_\_\_\_ Federal grants are made to states for Whatever programs they want to use to enhance industrial waste avoidance efforts
- \_\_\_\_\_ through RCRA regulatory programs and their enforcement, the use of land disposal is greatly reduced and all waste management costs increase still more
- \_\_\_\_\_ under the Superfund program, waste generators face increasingly greater burdens to pay for cleanups of toxic waste sites either offsite or onsite

3-2: Overall, with regard to waste avoidance, if you had your way would you want the Federal government to:

- \_\_\_\_\_ leave things just the way they are now
- or
- \_\_\_\_\_ take some further action to assist industry to carry out more waste avoidance activities?

3-3: If the government did decide to take some further Federally mandated and funded actions, would you prefer to have them implemented by those States that wanted to have a waste reduction program or by the Federal EPA?

\_\_\_\_\_ the States                      \_\_\_\_\_ Federal EPA

If you prefer a state program, explain briefly:

3-4: If some Federally mandated schedule to carry out specific amounts of waste reduction on a plant *or* company basis were established, and if that schedule was industry-specific and gave credit for past reduction efforts, do you believe that

- \_\_\_\_\_ it would bring more attention to the issue and motivate industry to avoid the generation of waste
- or
- \_\_\_\_\_ it would be difficult to implement and enforce and, therefore, it would be of little use, have little effect, and might hamper our efforts

3-5: Will your future waste avoidance activities be limited to a significant extent by your uncertainties about EPA's and your State's environmental regulations and their enforcement?

\_\_\_\_\_ yes \_\_\_\_\_ no

3-6: What might be hailed as a successful waste avoidance effort by a company may be misleading as to its environmental or economic benefits. Do you agree?

\_\_\_\_\_ yes \_\_\_\_\_ no

If yes, could you briefly explain why you agree:

3-7: Considering your future waste avoidance efforts, rank the following five broad approaches as to their expected importance (1 - most important):

- \_\_\_\_\_ changes in process equipment or technology
- \_\_\_\_\_ improvements in 'housekeeping' or general operations
- \_\_\_\_\_ changes in raw materials used in operations
- \_\_\_\_\_ in-process recycling/recovery
- \_\_\_\_\_ changes in the final product produced

3-8: Considering what you have done already and what you might do in the future, which of the following is most correct

\_\_\_\_\_ **waste** avoidance in our company will either have no effect on our total employment or might increase it

or

\_\_\_\_\_ **waste** avoidance in our company will reduce employment.

3-9: There is interest in adopting at the Federal level some type of requirement to have EPA conduct an inventory of hazardous waste generation (in its broadest multimedia terms) by industry, similar to what New Jersey has done on one occasion. Would such regular reporting by industry of all of its toxic chemical generation stimulate more waste avoidance by your company?

\_\_\_\_\_ yes \_\_\_\_\_ no

3-10: Please evaluate the potential for waste avoidance in your industry in the following two situations:

a) Using best available technology in 1980, how much (by weight) of the hazardous waste (all types in all types of environmental media) generated by your operation in 1980 could have been avoided?

\_\_\_\_\_ less than 25%      \_\_\_\_\_ 25% to 50%      \_\_\_\_\_ 50% to 75%

b) Using best available technology in 1985, how much (by Weight) of the hazardous waste (all types in all types of environmental media) generated by your operation in 1985 could have been avoided?

\_\_\_\_\_ less than 25%      \_\_\_\_\_ 25% to 50%      \_\_\_\_\_ 50% to 75%