
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 information about the location of the respondents is shown in table 2. With current technology, respondents are: OH-panj; an(i Part 3 ask[;i for the res])on(it;nts' [i:~s on future tk'aste rfxiu(; t ion efforts. hot h i 11 t hf: i r (:OM-pan~ and bj go~ernment. On]} four resl)on(ients, t 11') from small busi-ness, left Part 2 blank on the g rou n(is t Ir;~ t t h c~ h a \ t; u n(i[rt i]ken no \\'a stc red u:t i on f:ff' 0 rts i 11 t]I(i r plants. A cop~ of tb[? sur[r!~ fol]oi~s" t 11 is (iis:ussion.

When asked about the important factors that affect the pace of environmental efforts (Q. 2-1), respondents cited the rising costs of waste management and increasing difficulties in using 1:111 (1 [-icsfju,s:] ;s th: / ti'o n]ost in]poranf f:l;tors. S:(ar;it' of tfl:(h ni:al i n formation about tt'a st e re]iu:(t i () n ;] n (i t hf! f'a i l u rf: of top management to make important issues) priority were rate(i l(; ast important i n s)u rri ng () r sio\\r- ing waste re-duction.

When asked about the important impact on waste reduction efforts (Q. 2-8), economic factors, new technologies, and regulatory requirements were more important than environmental perception of the company.

When asked specific questions about waste reduction efforts (Q. 2-4), economic factors-the dollar value of benefits from waste reduction and the costs of carrying it out-were rated the most significant barriers by all respondents. However, small businesses were almost twice as likely as large companies to cite other obstacles, such as the nature of the waste streams (15 percent of small businesses, 7 percent of large) and the costs of managing specific wastes (23 percent of small businesses, 15 percent of large).

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 improvements in housekeeping and general operations changes ranked third. Clearly the least used action of a 11 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, what regard to waste avoidance [reduction], if you had your way would you want the Federal Government to take the things just the way they are now or take some further action to assist in reducing waste 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 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 companys 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

3-10: 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%