

Public Concerns and Issues: Siting Hazardous Waste Facilities

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Site selection for hazardous waste facilities is a difficult and controversial process. In-depth analysis of the issues involved in previous siting attempts and the reasons for public opposition allow proponents to prepare for, rather than react to the issues most likely to arise during new siting attempts, thus avoiding costly and time consuming delays. The issues are characteristic of opposition not only to hazardous waste facility siting, but to many other facilities viewed as socially or environmentally unacceptable. As such they provide a guide to proponents initiating siting attempts.

The objective of this paper is to identify hazardous waste issues of relevance to the public, based on the concerns expressed during previous attempts to site hazardous waste facilities. Some inferences are drawn as to the key components of the issues.

The study method was designed to acquire an understanding of the concerns of the public. Given that the public can be defined a number of ways, the "target public" identified by Robbins (1982:513) was used as a basis for analysis. Robbins' target public includes residents and nearby landowners: users of groundwater or surface water near the proposed site or in the nearby airshed: local officials: zoning and planning staff: leaders of key civic, conservation, and business groups: public health and safety interests: local scientists and engineers; and unions, farmers, ranchers, and members of other important sectors.

Elected officials, who are normally held to represent the views of their constituents, were excluded from the "target public" category. It became clear during the analysis that much public concern and opposition was directed toward the government and its employees, and it was therefore reasonable to exclude the opinions of the federal and provincial employees.

Three main sources of data were used. Approximately 100 newspaper reports on siting attempts in Alberta, British Columbia, and Ontario, recorded in the Canadian Periodical Index for the years 1980 to February 1986, were the primary data base for the analysis. An on-line computer search of three reference system data bases provided approximately 600 references to hazardous wastes and siting, of which 150 were collected and reviewed. A further 50 reports and articles were collected and reviewed.

Delineation of the indices to be recorded was based on past work in this area by Krawetz (1979), Taylor (1981), and others. By combining the results of these studies and building upon the indices derived by Krawetz (1979), Seventeen analytical constructs were derived, referred to from here on as issues. The terms "issues" and "concerns" were considered separately. Concerns were defined as matters of individual importance to the public. For example, the following may be considered concerns:

1. Contaminated drinking water;
2. Exposure to toxic air emissions; and
3. Direct physical contact with toxic substances.

The issue they characterize is the "Effect on human health."

Content analysis technique were used to identify and classify public concerns indicated in the newspaper reports into the seventeen issue categories. Site specific concerns were

eliminated during the analysis, leaving 48 general concerns. In total there were 586 references to the 48 concerns included in the issues noted above (Table 1). Each of these issues is examined below, and inferences are drawn as to the reasons for some of the major concerns, which are listed in order of importance. The issues (with percent of total issues for the three provinces indicated in brackets) are as follows:

1. Government actions and activities (11.3%);
2. Technology (9.2%);
3. Credibility (81.4%);
4. Economic viability (8.2%);
5. Effects on the community (8.2%);
6. Risk and safety (7.9%);
7. Effects on the environment (7.7%);
8. Location (7.7%);
9. Effects on human health (5.6%);
10. Communication (5.6%);
11. Justification of need (4.8%);
12. Role of the public (4.4%);
13. Ownership (3.6%);
14. Equity (2.4%);
15. Boundaries (2.4%);
16. Liabilities (2.4%); and
17. Quality of life (1.4%)

GOVERNMENT ACTIONS AND ACTIVITIES

The issue of government actions and activities was characterized by four concerns:

1. The need for initiating or improving hazardous waste legislation;
2. The need for improvements in monitoring, enforcement, and regulating;
3. The perception of government interference in the site selection process; and
4. The relationship between the government, Crown corporations, and the private sector.

The dangerous compounds and products that produce toxic wastes have properties of value groups. Government and the public must face up to many conflicting demands. As

Segal et al. (1981:26) explained: "Environmental laws and regulations address two partially conflicting needs: a long, healthy life in a clean environment, and the material benefits of technology. These basic goals are not mutually exclusive, but they require careful balancing to result in the most good for the most people."

Where hazardous waste legislation did exist, the public claimed that inspection was inadequate, regulations were ignored, and penalties were insufficient if not absent. Furthermore, the public lacks confi-

dence in the Government's willingness to enforce regulations.

TECHNOLOGY

The choice of technology and its associated risks and impacts caused considerable comment. Three particular concerns were expressed:

1. Choice of technology and technical merits, especially the degree of risk associated with the facility;
2. Types, quantities, and hazards of waste residues following treatment or requiring disposal; and
3. Sizing of facilities.

The use of secure landfills for disposing of hazardous wastes

received the bulk of the public criticism. The comments, which took a variety of forms, generally related to three factors identified by Bingham and Miller (1984:475). First, there is no way to design a completely risk-free facility, second, it is virtually impossible to demonstrate that a facility is safe, and finally, well-meaning professionals on both sides find their integrity and reputation under attack. The issue of credibility related strongly to choice of technology, as the public had little faith in the proposals put forth by industry.

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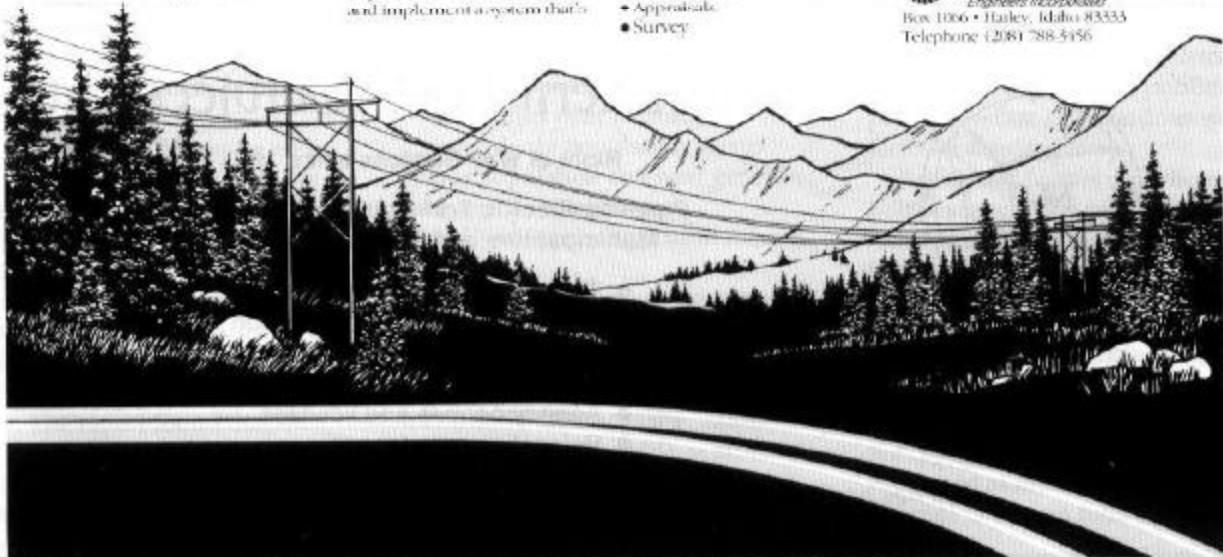
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CREDIBILITY

The issue of credibility was related to three main groups:

1. Government, either its environmental agency or a particular spokesman;
2. The proponent of industry in general; and
3. Crown corporations.

Doubts about the credibility of any of these groups can develop for a number of reasons, such as a perception of interference, political expediency over environmental concerns, unwillingness to answer questions, or unexplained action. The waste treatment and disposal industry in the United States has lost much credibility over the past years. Many of the proponents submitting proposals in Canada are controlled, directly or indirectly, by American firms and therefore are subject to the same lack of credibility. Faced with numerous examples on industry mismanagement, the public requires assurances from governments that the action of generators, transporters, and disposers of hazardous wastes will be strictly controlled.

ECONOMICS

A number of economics considerations must be taken into account when discussing hazardous waste management. Four concerns were particularly important to the public during the siting attempts.

1. Advisability of financial incentives or subsidies, and the effects of regulation on supply and demand;
2. Pricing factors such as who pays, how, and what is the relationship between price and the continuation of illegal dumping;
3. Effect of market of marketing on siting (or economics versus safety); and
4. Competition between new facilities and existing waste management industry.

The most common trend in hazardous waste management is toward the implementation of laws and regulation. The generally held opinion, and the basis for much of the legislation, is that more stringent control of hazardous wastes will increase the costs of storage, treatment, and disposal, thereby providing waste generators with an incentive to reduce waste generation

through recycling, materials and energy recovery, or more efficient, alternative production processes (Wolf 1980:532; Environmental Resources Management Inc. 1982:3.19). A negative effect of legislation and regulation may be a dramatic increase in the demand for proper disposal sites. The closing of marginal sites would further increase demand for new facilities, which are difficult to site (Duberg, Frankel and Niemczewski 1980:85).

The quantity of wastes to be sent to off-site treatment is very cost sensitive. If tariffs at the facility, together with the transportation costs, are very high, then generators will either develop on-site facilities or dispose of wastes elsewhere, perhaps illegally. Some form of subsidy could help to resolve this problem, but the public is not necessarily pleased at using public funds for what is perceived to be an industry problem.

EFFECTS ON THE COMMUNITY

Siting a hazardous waste facility in a community will inevitably have profound effect on that community. The public appeared to have five particular concerns:



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1. Conflict with existing land uses;
2. Input and influences of the community regarding siting decisions and the operation and management of the facility;
3. Decline in property values;
4. Expropriation; and
5. Alteration in traffic patterns and quantity.

The population density criteria generally used in siting facilities typically result in the selection of rural locations. Conflict with existing land uses is often a concern in these situations, as industrial facilities are seen as incompatible with the rural or agricultural nature of the community (Keystone Center 1982:20).

Furthermore, the public is often reluctant to encourage further sitings of high waste generating industries attracted by the benefits of local waste disposal.

The social cost associated with facilities fall most heavily on the local community. These costs include potential health and environmental effects, noise and traffic congestion, and the stigma associated with being "the local dump" (Bacow and Milkey 1982:268). To the extent that these risks are reflected in the real estate market, property values may fall (ibid. 1982:268; McGlennon 1984:463).

RISK AND SAFETY

Three concerns were raised under the issue of risk and safety:

1. Spills and accidents during transport;
2. Consequences of "doing nothing," i.e., continuation of improper disposal, illegal dumping and
3. Safety at facilities and at transfer station.

The risks associated with truck transport of hazardous wastes were considered in a report commissioned by the U.S. Environmental Protection Agency. The report found that the risk is equal to or greater than the risk associated with treatment and disposal facilities (Rosbe 1984:509). The public appeared to recognize that

action was necessary to resolve the hazardous waste problem, although question were raised as to why the government had not acted sooner. Past instances, however, of fires and explosions at storage and treatment facilities raised many questions about safety. In effect, the demand for "doing something" is in conflict with risk and safety concerns associated with siting facilities.

EFFECTS ON THE ENVIRONMENT

There was considerable overlap between the issues of effect on the environment and effects on human health. In most cases the public expressed health concerns in terms of the effect of facilities on the environment. In addition, many of the pathways identified as possible routes to the environment were similar to those identified for health hazards (Wolf 1980:468). The following, self-explanatory, concerns were expressed in relation to this issue:

1. Contamination of groundwater and surface waters;
2. The threat that wastes pose (unspecified) to the environment;
3. Damage to crops, livestock, and agricultural land; and
4. Air Pollution.

LOCATION

Four concerns were raised under the issue of location:

1. The NIMBY syndrome, or "Anywhere but here!"
2. Conflict over locating sites in areas of dense population versus sparse population and near generators versus remote sites;
3. Use of prime agricultural land; and
4. Centralized versus decentralized facilities.

Opposition to facility siting is often characterized by the media, government, and industry as the "not-in-my-backyard" of NIMBY syndrome. The public has at times expressed its opinion in exactly these terms, but underlying concerns is a prime

component in understanding the reasons for the opposition and thereby resolving the problems.

In choosing the location for a facility the public expressed a preference for a number of conflicting alternatives. In large cities, the public generally preferred a site in a remote area with low population. On the other hand, rural residents felt the site should be close to the point of generation and if necessary, in an area of denser population. These concerns relate strongly to the issue of equity with the rural areas being asked to bear the risks while the primary benefits go elsewhere.

EFFECTS ON HUMAN HEALTH

There were five concerns related to the issue of effects on human health:

1. The danger of hazardous wastes, which have the potential to cause health problems over both the short and long term;
2. Potable water contamination;
3. Exposure to toxic air emissions;
4. Fires, explosions, and transportation accidents; and
5. Direct physical contact with, or accumulation in, the body or food chain.

Hazardous waste disposal facilities pose a variety of potential health risks to local residents and the community. Past incidents and reports of environmental contamination resulting in health problems serve as the basis for the public's perception that all hazardous waste facilities are dangerous.

Additional factors complicate the public's perception of risks posed by hazardous waste facilities (Melius, Costello and Kominisky 1984:471). Many of the health risks posed by exposure are insidious, difficult to detect, and not immediately evident. Potential chronic effects are seen as reasons for not accepting a facility in the community, and sometimes are expressed as moral issues concerning possible effects on future generations

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or possible disruption of the public's "peace of mind" (OWMC 1983:37).

COMMUNICATION

Three communication concerns were of importance to the public:

1. What restrictions would be placed on release of information and in what form the information would appear, considering that much of the available information is unclear or uses technical jargon;

2. Uncertainty about the roles of the various participants, especially those of the government and Crown corporations; and

3. Unavailability of decision-makers for meetings, of their willingness to communicate openly with the public.

Technical writers tend to use complicated language, combined with highly specialized terminology, allowing precise communication among knowledge practitioners. The same complex language, however, renders technical literature inaccessible to the interested lay reader (Whitmore and Carnes 1981:104). In contrast, oversimplified information is viewed by many as a tactic of the proponent to avoid questions.

JUSTIFICATION OF NEED

Three concerns were raised under the justification issue:

1. Availability of alternatives to treatment and disposal, particularly reduction in generation, through recycling and reuse of wastes;

2. Reliability and accuracy of inventories of waste quantity and types, and number of old disposal sites requiring clean-up; and

3. Validity of arguments justifying the need for facilities.

The public was aware of the alternatives available for handling hazardous wastes. They suggest several alternatives, with disposal being at the bottom of the preference list. The validity of inventories, the primary justification for facilities, was

questioned. The issue is complicated by ongoing additions and deletions to the list of which wastes are, in fact, hazardous.

Furthermore, the projection of future generation rates, even with a reasonable estimate of existing quantities is difficult because of the many factors affecting waste generation.

ROLE OF THE PUBLIC

Only two concerns were raised under the issue of the role of the public. These concerns are common to many public reviews, not just those dealing with hazardous waste management:

1. The amount of input and influence the public will have in hazardous waste management programs and in site selection; and

2. At what stage the public should be included in the site selection process.

These two concerns, public participation and timing of the participation, are closely related. In general, the public felt it should have a strong and influential role in the siting process from the earliest stages through to operation and post-closure maintenance.

Numerous authors have debated the need for and most appropriate form of public participation. In hazardous waste facility siting attempts it is clear that only the most comprehensive public participation program will satisfy the public.

OWNERSHIP

The issue of ownership of hazardous waste facilities was clearly based on the question of:

1. Public-versus private ownership.

Of the various options available, the public appeared to favor ownership by the public through a Crown corporation. This option was considered to provide the maximum amount of accountability while

allowing the government to act as an independent observer.

EQUITY

Two concerns related to the issue of equity were expressed in two provinces:

1. Benefits go to the owner/operator, waste generators, and public at large, while risk is to the community; and

2. Use of the cheapest site, in terms of number of residents, or political expediency, implies not necessarily the best site.

The benefit a community receives from a facility, such as increased tax revenues and possibilities for new jobs, are small compared to the social costs (Bacow and Milkey 1982:269). Balancing the benefits against the health, environmental, and social disadvantages was a common public concern.

BOUNDARIES

Two concerns were expressed about the issue of boundaries:

1. Importation of waste inter-provincially or internationally; and

2. Potential for a facility to attract new industries, creating an industrial intrusion into an area (particularly an agricultural area).

In some provinces, establishing and maintaining an economically viable facility in some provinces may necessitate the importation of waste from other provinces or the United States. The public generally found the idea of important unacceptable.

LIABILITY

The issue of liability arose in two of the provinces and is characterized by only one concern:

1. Determining the group liable for economic loss due to leaks and spills.

Most of the existing provincial regulations on hazardous wastes do not include any specific rule regarding civil liability. As a result, ordinary fault is applied (OECD 1985:76).

QUALITY OF LIFE

The last issue, quality of life, is characterized by only one rather complex concern:

1. Negative alterations in life style, the image of the community, peace of mind, and effects of relocating.

"Quality of life" as an issue is rather ambiguous and difficult to define precisely but does include a fear that the community will be seen as the "local dump", which is a negative alteration in the image of the community.

The forgoing discussion has identified the concerns held by the public during hazardous waste facility siting attempts in Alberta, British Columbia, and Ontario as indicated in newspaper articles between 1980 to 1986. The identified concerns were categorized under seventeen issues and some inferences drawn as to the key components of the issues.

Clearly the issues must be resolved to ensure that hazardous waste facility sites can be established to the satisfaction of government, proponents, and the public. This most difficult task can be brought to at least an informed compromise if all parties are fully aware of the issues through education and an opportunity to participate in the process. Given the failure of so many of the siting attempts in North America a public participation program based on preparing for and responding to the issues may prove a less controversial and more successful means of reducing public opposition.

Table 1 Issues and concerns identified in the provinces of Alberta, British Columbia, Ontario and elsewhere, as listed in order of importance to the public as determined by frequency of appearance.

Rank	Issues and Concerns	Alberta	British Columbia	Ontario	Total	Sources Elsewhere
1	Government Actions and Activities					
	• Need for or improvements in legislation	9	4	7	20	9
	• Need for or improvements in monitoring, enforcement and regulation	8	4	7	19	1
	• Government interference or bias	5	0	9	14	3
	• Relationship between Government, Crown corporations, and industry	6	1	6	13	0
	<i>Subtotal</i>	28	9	29	66	13
2	Technology					
	• Choice of technology, technical merits	7	4	23	34	14
	• Waste residues, types, hazards, quantity	1	0	14	15	5
	• Sizing of facilities	1	0	4	5	0
	<i>Subtotal</i>	9	4	41	54	19
3	Credibility					
	• of Government, agency or spokesperson	9	1	17	27	10
	• of proponent or industry	7	1	4	12	8
	• of Crown corporation	4	0	6	10	0
	<i>Subtotal</i>	20	2	27	49	18
4	Economic Viability					
	• Advisability of financial incentives	11	1	7	19	3
	• Pricing factors	3	7	5	15	0
	• Effects of market on siting	4	0	6	10	5
	• Competition between new and existing facilities	0	0	4	4	1
	<i>Subtotal</i>	18	8	22	46	9
5	Effects on the Community					
	• Conflict with existing land uses	1	2	18	21	5
	• Input and influence of community	2	1	6	9	1
	• Decline in property values	4	0	4	8	10
	• Expropriation	1	0	5	6	0
	• Alterations in traffic pattern & number	0	0	4	4	7
	<i>Subtotal</i>	8	3	37	48	23
6	Risk and Safety					
	• Spills and accidents during transport	12	1	11	24	9
	• Consequences of "doing nothing"	5	3	4	12	2
	• Safety at facilities	3	0	7	10	4
	<i>Subtotal</i>	20	4	22	46	15
7	Effects on the Environment					
	• Contamination of ground & surface water	4	2	13	19	14
	• Unspecified threat to the environment	5	0	6	11	5
	• Damage to crops, livestock, lands	1	0	8	9	9
	• Air pollution	2	0	4	6	9
	<i>Subtotal</i>	12	2	31	45	37
8	Location					
	• The NIMBY syndrome	2	5	12	19	1
	• Dense vs. sparse population, and near generators vs. remote sites	6	0	7	13	0
	• Use of prime agricultural land	1	0	6	7	0
	• Centralized vs. decentralized facilities	1	0	5	6	0
	<i>Subtotal</i>	10	5	30	45	1

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Rank	Issues and Concerns	Alberta	British Columbia	Ontario	Total	Source Elsewhere
9	Effects on Human Health					
	• Potential for harm	7	0	10	17	16
	• Potable water contamination	0	1	6	7	4
	• Exposure to toxic air emissions	0	0	3	3	6
	• Fires, explosions, and transportation	1	0	2	3	7
• Direct physical contact or accumulation in the body or food chain	1	1	1	3	5	
	<i>Subtotal</i>	9	2	22	33	38
10	Communication					
	• Restrictions on release of information	7	1	13	21	10
	• Clarity of roles of participants	0	1	6	7	0
	• Availability & attitude of decision makers	1	0	4	5	0
	<i>Subtotal</i>	8	2	23	33	10
11	Justification of Need					
	• Availability of alternatives	3	6	5	14	9
	• Reliability of inventories	5	0	5	10	1
	• Validity of justifying arguments	1	2	1	4	8
	<i>Subtotal</i>	9	8	11	28	18
12	Role of the Public					
	• Input and influence of public	6	4	12	22	7
	• At what stage should public be included?	2	0	2	4	2
	<i>Subtotal</i>	8	4	14	26	9
13	Ownership					
	• Private vs. public ownership	11	4	6	21	1
	<i>Subtotal</i>	11	4	6	21	1
14	Equity					
	• Risk to the community	2	0	7	9	9
	• Use of cheapest site, not necessarily the best	2	0	3	5	2
	<i>Subtotal</i>	4	0	10	14	11
15	Boundaries					
	• Importation of wastes	6	4	1	11	3
	• Potential for facilities to attract new industry creating industrial intrusion in a community	0	0	3	3	4
	<i>Subtotal</i>	6	4	4	14	7
16	Liability					
	• Who is liable for economic loss due to leaks or spills	3	0	5	8	4
	<i>Subtotal</i>	3	0	5	8	4
17	Quality of Life					
	• Negative alteration in life style, image of community, peace of mind	0	1	7	8	13
	<i>Subtotal</i>	0	1	7	8	13
	TOTAL	183	62	341	586	246

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