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Alternatives to NIMBY gridlock: voluntary approaches to radioactive waste facility siting in Canada and the United States

Abstract: Neither Canada nor the United States has sited a new radioactive waste management facility in more than two decades, despite the continuous generation of new waste and the paucity of reliable disposal capacity. Both nations have stirred up considerable political controversy in attempting to site such facilities, with aggressive local collective action consistently blocking proposals. Building on provincial experience in gaining public support for hazardous waste facility siting through a voluntary, comprehensive process, both Ontario and Nebraska show signs of deviating from the classic Not-in-My-Back-Yard (NIMBY) response for low-level radioactive waste. Through a variation of the process used successfully in Alberta and Manitoba for hazardous waste, Ontario and Nebraska have demonstrated the potential applicability of these alternative siting principles for radioactive waste.

Sommaire : Ni le Canada, ni les États-Unis n'ont construit de nouvelles installations de gestion des déchets radioactifs depuis plus de deux décennies, malgré la production continue de déchets supplémentaires et malgré la faible capacité d'élimination fiable. Les deux nations ont déclenché des controverses politiques considérables en essayant de mettre en place de telles installations, et leurs propositions ont été bloquées systématiquement et agressivement par les collectivités locales. Forts de certaines expériences provinciales pour gagner le soutien du public envers l'emplacement d'une installation de déchets dangereux grâce à un processus volontaire et extensif, l'Ontario et le Nebraska semblent dévier de la réaction classique « pas dans ma cour » en ce qui concerne les déchets faiblement radioactifs. Par l'entremise d'une variante du processus utilisé avec succès pour les déchets dangereux en Alberta et au Manitoba, l'Ontario et le Nebraska ont démontré qu'on pourrait éventuellement appliquer ces principes de rechange pour l'emplacement des installations traitant les déchets radioactifs.

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Waste management and the siting of waste disposal facilities remain among the most controversial environmental issues in both Canada and the United States. Both nations continue to generate substantial quantities of solid, biomedical, hazardous, and radioactive wastes and have experienced considerable difficulty in finding politically and technically suitable areas for opening new treatment or disposal facilities. Indeed, in most areas of waste management in both nations, the siting process has regularly ground to a halt. Consistent across varied provinces and states, the announcement of a siting decision quickly meets an outraged public reaction, the so-called Not-in-My-Back-Yard (NIMBY) syndrome. Time and again, proposed facilities are thwarted as either governmental or private sector proponents back off in the face of such forceful opposition.

The NIMBY syndrome has produced a mixed set of outcomes for effective waste management. On the one hand, many poorly conceived siting efforts have been rejected and the growing inability to open new waste treatment or disposal capacity has prodded governments and waste generators into placing greater emphasis on waste reduction and recycling efforts. At the same time, however, even if the most ambitious current goals for reduction and recycling in Canada and the United States are realized, huge quantities of diverse types of waste require safe treatment and disposal methods. The inability to open new facilities means that new, safer technologies are not being employed, leaving the bulk of the waste management burden on older, less sophisticated technologies and, increasingly, waste storage at the site of generation. These ramifications of NIMBY politics are cause for considerable concern and suggest the need for at least some addition of waste management capacity, particularly in those regions – or for those wastes – where current methods are suspect at best.

As a result, governments in both Canada and the United States need to revisit the issue of how they pursue siting. To date, both nations have tended to rely almost exclusively on top-down processes of site selection. Under these approaches, either governmental officials or private waste management firms use varying criteria to select their preferred site. In both instances, the site evaluation process takes place in the absence of public consultation or any larger strategy to distribute on an equitable basis the burden for waste management across a province, state, or region. As a result, siting decisions, once revealed, seem coercive and unfair to the proposed host communities, who feel they have been unjustly targeted to bear the sole burden for waste disposal. Consequently they take effective collective action through NIMBY-type protest.

The most impressive exception to this pattern of siting gridlock stems from a series of cases in hazardous waste in the 1980s. The first, and perhaps most prominent, of these involved mid-decade efforts by the province of Alberta to open a comprehensive facility for all hazardous waste generated in the province and develop an integrated province-wide system of

transportation, storage, reduction, and recycling. An extensive public education process preceded any efforts to consider specific sites and provincial authorities made clear that siting would only be considered among communities that formally volunteered after extensive study. This process, combined with a series of related innovations, culminated in the emergence of multiple volunteers and the eventual opening of a comprehensive waste management facility in Swan Hills in 1987.¹ This approach has been successfully replicated for hazardous waste in Manitoba and has begun to be adopted for hazardous waste in American states such as Minnesota and North Carolina, with generally encouraging results. Nonetheless, a voluntary approach to siting and waste management remain the exception for most types of wastes in most provinces and states.

A central concern of this article is the more general applicability of the "Alberta approach" to other areas of siting and waste management. This article examines the politics of attempting to site facilities for low-level radioactive waste in Canada and the United States. It reviews historic patterns of conflict – traditional top-down siting approaches that result in familiar gridlock – but also considers more recent efforts, in Ontario and Nebraska, to learn from the Alberta experience and devise a voluntary, comprehensive approach to the problem of siting and waste management. The following case analyses suggest that this approach is no sure elixir for cooperation, but continues to appear far more promising than prevailing approaches and warrants further testing and development.

The case of low-level radioactive waste

Few cases could provide as tough a test of the replicability of the Alberta approach as low-level radioactive wastes. Whereas solid wastes pose certain environmental risks, neither they nor most hazardous or biomedical wastes pose a proven risk to both human health and the environment through contamination comparable to radioactive wastes. Indeed, in both Canada and the United States, the siting of facilities for either high-level or low-level radioactive wastes has been extremely controversial. The radioactive waste issue has probably triggered more political conflict over siting than hazardous waste. Consequently neither Canada nor the United States has opened a new storage or disposal facility for either high- or low-level waste in more than twenty years.² Meanwhile, the waste continues to be generated, either being stored on site or shipped to one of the few

1 Barry G. Rabe, "Beyond the NIMBY Syndrome in Hazardous Waste Facility Siting: The Albertan Breakthrough and the Prospects for Cooperation in Canada and the United States," *Governance: An International Journal of Policy and Administration* 4, no. 2 (April 1991), pp. 184–206.

2 For an excellent overview of the American case, see Mary R. English, *Siting Low-Level Radioactive Waste Disposal Facilities: The Public Policy Dilemma* (New York: Quorum, 1992). There is no scholarship of comparable depth on the Canadian case.

remaining waste disposal facilities that were opened before this aspect of waste disposal became so controversial.

Whereas high-level radioactive waste siting remains deadlocked in both nations, there are some promising possibilities for cooperation in low-level waste siting, particularly in the province of Ontario, which otherwise has experienced classic Nimbyism in both hazardous waste and solid waste facility siting.³ What makes the Ontario case especially interesting is that, contrary to virtually all prior low-level radioactive waste siting experience in Canada and the United States, multiple communities have voluntarily and actively been exploring the possibility of hosting a facility. Moreover, they have agreed to do so through a process that draws heavily on the approach to siting initiated in Alberta in the 1980s. As we shall see, this case indicates that the voluntary approach to siting may indeed have replication prospects beyond the area of hazardous waste facility siting. This case, as well as important cases from the American siting experience, will be examined in depth, after a brief introduction to the basic history and evolution of low-level radioactive waste policy in the respective nations.

Early stages of low-level radioactive waste management in Canada and the United States

The technical and political dimensions of low-level radioactive waste management are quite similar in Canada and the United States, perhaps more so than they are for hazardous waste. Both federal governments played a fundamental role in endorsing and subsidizing the nuclear power industry in the decades following the Second World War. Despite tendencies towards regulatory decentralization in both nations, particularly Canada, both federal governments have assumed central responsibility for radioactive waste management. These governments continue to play a far more central role in virtually every aspect of radioactive waste regulation and management than they do for hazardous, biomedical, or solid wastes. However, both governments have delegated somewhat more authority to provinces or states in this area in recent years, although this trend has clearly advanced more rapidly in the United States than in Canada.⁴

Canada and the United States also tend to speak much the same technical language concerning nuclear power and radioactive waste. The Canadian

3 Doug Macdonald, *The Politics of Pollution: Why Canadians Are Failing Their Environment* (Toronto: McClelland and Stewart, 1991), ch. 14.

4 This pattern is, of course, at variance with the general Canadian tendency to pursue more decentralized environmental regulatory policy than the United States. See Grace Skogstad and Paul Kopas, "Environmental Policy in a Federal System: Ottawa and the Provinces," in *Canadian Environmental Policy: Ecosystems, Politics and Process*, ed. Robert Boardman (Toronto: Oxford University Press, 1992), pp. 43-59.

nuclear industry continues to promote actively its compact Candu 3 nuclear reactor in the United States.⁵ Moreover, waste definitions and classification schemes are similar and the technological options for waste reduction and disposal are largely identical. Perhaps most important, both nations have experienced strikingly similar patterns of conflict for radioactive waste facility siting. The seemingly intractable conflicts so evident in the American low-level radioactive waste cases closely resemble the nation's pattern of hazardous waste facility siting. In turn, the Canadian approach to low-level radioactive waste facility siting until 1986 was in many respects a carbon copy of the approach – leading to NIMBY results – that continues to be used in many individual states and multi-state compacts.

The major sources of commercial low-level radioactive waste (LLRW) in both nations include nuclear power plants, biomedical and industrial research, and non-military governmental projects. The most common source, of course, remains nuclear power plants, many of which were opened in the 1960s and are beginning to approach the end of their functioning capacity. When such plants are closed, as appears inevitable for aging facilities in future decades, they no longer will generate new LLRW. At this stage, however, they must be decommissioned and decontaminated, which will create an entirely new – and potentially massive – type of LLRW disposal problem. In general, LLRW in both nations consists of materials contaminated with small amounts of radioactive substances, such as clothing, packaging, animal carcasses, medical fluids, and power reactor liquids. Such wastes need to be isolated from humans for between sixty and three hundred years. In contrast, high-level radioactive wastes include both the solid spent fuel from nuclear reactors and the concentrated fission products left in liquid form after spent fuel has been chemically reprocessed to retrieve plutonium and unfissioned uranium.

In the United States, the Pacific and Atlantic oceans served as repositories for LLRW during its first three decades of generation. Commercial land disposal of these wastes began in the early 1960s, with the opening of six facilities, all of which used shallow land burial technology. This approach was fairly primitive, burying waste in shallow trenches and often storing waste in cardboard boxes until the burial was completed. However, three of these facilities were closed during the 1970s due to evidence of leakage and other forms of contamination. The three remaining facilities, located in Washington, Nevada, and South Carolina, have begun to approach the end of their anticipated operational lives, with the Beatty, Nevada, facility having closed in January 1993. This facility shortage has triggered new legislation, the Low-Level Radioactive Waste Policy Act of 1980 and its 1985 amend-

5 John Urquhart, "Canadian Nuclear Industry Expects Orders to Rise, Plans Compact Reactor for U.S.," *Wall Street Journal* (10 February 1990), p. B6.

ments. These turned considerable siting authority over to the states and set up a complex system of incentives and timetables whereby states would assume responsibility for their wastes.⁶ However, most states or compacts have employed traditional, top-down siting strategies, and not a single new facility has opened in the period following enactment of the new legislation.

In Canada, the Canadian Atomic Energy Act of 1946 established the basic framework for radioactive waste which endures to this day. It created the Atomic Energy Control Board (AECB), which retains authority for licensing and regulating the nuclear industry, including waste storage and disposal. It is distinct from Atomic Energy of Canada Limited (AECL), which is responsible for federal research and development related to nuclear energy, and Ontario Hydro, a major provincial public corporation, which is responsible for management of that province's nuclear power plants. The AECB does share regulatory authority in the sense that it typically confers in a "working group" process with related federal and provincial agencies. Provincial involvement is a particular concern in that Canadian LLRW is overwhelmingly concentrated within its largest province. Sixteen of the nation's eighteen nuclear power plants are located in Ontario and, by all available measures, well over 90 per cent of Canada's LLRW is generated within this single province, forcing the federal government to be sensitive to provincial concerns.

Contrary to the American approach of ocean dumping and later commercial facility development, Canada has generally favoured a quiet, *de facto* approach to LLRW, encouraging storage and disposal at or near the sites where the waste is generated. Most nuclear power plants keep such wastes on site under "interim storage" provisions, as some American plants are beginning to do as disposal options narrow. In Canada, however, it is expected that many of these wastes will eventually be shipped to one or more permanent facilities. In turn, wastes generated from the use of radioisotopes sold by the AECL Commercial Products Division must be returned for burial at the AECL Chalk River Nuclear Laboratories in central Ontario. Finally, perhaps the most controversial disposal sites are located in and around the town of Port Hope, which has become a rough radioactive waste counterpart to the American Love Canal episode with hazardous wastes. Indeed, it was the controversy surrounding the Port Hope case that put the radioactive waste disposal issue on the Canadian political agenda more than fifteen years ago and triggered a search for more effective siting and disposal methods.

The evolution of Canadian LLRW management

The problem of radioactive waste disposal at Port Hope actually preceded

6 English, *Siting Low-Level Radioactive Waste Disposal Facilities*.

the formation of the AECB and the development of the nuclear power industry by more than a decade. Wastes generated by various domestic and military activities were deposited at several sites within the town of Port Hope from 1933 to 1948. Some of these wastes were transferred to nearby locations, including Welcome and Port Granby, in later years. However, it was not until 1975 that extensive radioactive contamination was discovered in Port Hope. This contamination, most of it in the form of radioactive soil, had been widely dispersed around the community. Radioactive waste had been deposited in the Port Hope harbour and a number of buildings in the town were constructed with contaminated material.

After the AECB completed a series of remedial actions in Port Hope and other contaminated areas, in 1980 it asked Eldorado Resources Limited, a federal crown corporation now known as CAMECO, to begin work on the design and siting of advanced LLRW disposal facilities.⁷ However, Eldorado's approach to siting in many ways resembled the pattern of Ontario's approach to hazardous waste facility siting and of troubled LLRW compact states such as Connecticut, New York, and Michigan, among others. Without any public consultation, Eldorado began the process of examining alternative sites, using various technical criteria to assess the suitability of each potential area. In August 1980 authorities announced that Eldorado "had taken options on two properties in the Port Hope area" and that they intended to complete surficial geological assessment on both sites before selecting one.

Typical of regulatory approaches to siting, the first opportunities for public participation were to be delayed until after these announcements, confined to the federal environmental impact assessment process. An assessment panel was appointed and received the formal site proposal and an environmental impact statement. This material was also made available to the public and local "issue identification" or "scoping" meetings were planned to acquire public input. However, the public reaction to the announcement of the two site candidates was so strong that these meetings were delayed until after a final site had been selected. At this point, public opposition so intensified that the federal government suspended the process and dropped the two sites from further consideration.

The emergence of the voluntary process

In response to this standoff, the minister of state for forestry and mines appointed an independent siting process task force in December 1986 to develop a less confrontational site selection process. The task force was commissioned to focus its efforts on the development of a process for siting

⁷ CAMECO is now a semi-private firm due to a joint-venture with a Saskatchewan-based private firm.

a disposal facility in Ontario for the existing, ongoing and historic wastes in the Port Hope area and, where advantageous, for the disposal of other existing and ongoing low-level wastes located in the province. The main objective of the process was to be the voluntary identification of one or more host communities, each with a suitable disposal technology.

The task force, in turn, suggested that a process driven by "social" rather than "technical" criteria be applied to resolve the low-level radioactive waste disposal problem. In many respects, the successful experience of siting a comprehensive hazardous waste disposal facility in Alberta in the mid-1980s became a model for the task force as it rethought the process of low-level radioactive waste disposal facility siting. This new process, proposed in a 1987 task force report entitled "Opting for Cooperation," drew heavily on the Alberta hazardous waste process and, in the words of one task force member, "built on the mistakes [Alberta] made." The task force was highly critical of the AECB for allowing technical criteria to drive the previous selection process and thereby failing to consult with affected communities until site selection was effectively completed. Not only had the AECB relied heavily on technical rather than social criteria in its siting endeavours, according to the task force, but it also insisted that low-level radioactive waste be disposed of through land burial rather than stored or handled through other methods.

Given these concerns, the task force strongly recommended that a new siting process be established wherein potential volunteer communities would have the opportunity to learn about the problems of LLRW management as well as the possible payoffs if they decided to accept a site. It was the task force's position that volunteer communities should be free to opt out at any point in the exploratory phases of the process. Those deciding to proceed would become full partners in making decisions on all relevant matters. As a result, site selection and design, type of disposal technology, and impact management, along with other important features, were left open to negotiation rather than being imposed from on high by authorities. Finally, this cooperative/consultative process would not only guarantee the health and safety of a volunteer community's citizens, but equity payments would assure that the community would be better off in economic terms *after* site construction was completed than it had been before. These provisions were not only a dramatic departure from prior LLRW siting efforts in Canada and the United States but they also featured many of the key components for successful siting, including voluntarism and comprehensiveness, so crucial to the Alberta and related cases in hazardous waste.

Implementing the voluntary process

The 1987 release of the task force report led to efforts to refine and ultimately to implement the new siting process. On 30 September 1988 the minister of energy, mines and resources appointed a new siting task force

(STF) to implement the first three phases of the voluntary approach to siting. The second "opting for cooperation" task force was asked to refine a five-phase siting process that considered the role of potential volunteer communities, a tentative discussion of disposal and storage options, the terms of reference for negotiation with local communities, and detailed cost estimates of implementation. Given the high levels of interest generated by the process, the new STF was given twenty-three months to complete its work.⁸

Besides trying to clarify a few matters concerning site suitability and alternative technical options for potential host communities, some elements of the consultative process, particularly as they concern community liaison groups (CLG), had to be addressed. First of all, it was decided that all CLG meetings should be open to the public, despite the absence of American-like regulations that mandate such openness. Second, depending upon the response of those attending the meetings, a CLG could decide to opt out of the process at any time. Furthermore, a community could decide to receive newly generated, as well as historic, radioactive wastes, even if the amounts would be relatively small and it would thereby be only a part of a larger waste management solution.⁹

While various guidelines and criteria were being established by the STF, consultations began with regions and communities. In November 1988 exploratory letters were sent to 850 communities. Four months later, follow-up letters were sent to invite two representatives from each community to attend one of eight regional information meetings. At these meetings, community representatives were informed of the need for improved management of LLRW, the process principles already established, and some of the safeguards available to those interested in pursuing the process. Community representatives, in turn, asked about how communities would be consulted, how they would be defined in the first place (some contiguous communities were interested and wanted to proceed together), and how their CLGs, if formed, would measure community acceptance. They asked, furthermore,

8 Government of Canada, Minister of Energy, Mines and Resources, *Opting for Cooperation: The First Phases* (Ottawa: MEMR, 1990), p. 9.

9 In addition to these and related guidelines, it was felt that tentative site elimination criteria had to be established. In Level One if just *one* criterion was met, the site would be eliminated; in Level Two, one of the criteria could be present and the site would not be immediately eliminated. Individual communities could add further criteria if they wished. Five Level One criteria were established: resources identified by the Ministry of Natural Resources as requiring protection; federal or provincial parks, existing or proposed; natural areas (wildlife, wetlands); unstable lands (flood, fault, earthquakes); and archaeological, historic or cultural resources. After modest revisions suggested by CLGs in January 1990, by February and March the fourteen communities meeting with the STF agreed to the reasonableness of these criteria. However, they were given the option of defining and ranking them through their CLG's in ways that they deemed appropriate to local circumstances.

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about the characteristics of and the hazards associated with LLRW, the dangers involved in transporting LLRW to their communities, the ongoing problems associated with managing such a facility, the type and number of jobs available to local citizens if a facility were built, and the impact on tourism.

After the regional consultations, twenty-six communities requested additional meetings and/or information. Between the regional meetings and follow-up informational sessions held by the STF, five communities dropped out. An additional seven withdrew after the informational sessions, leaving fourteen to enter the next phase of the process. At this point, the remaining communities created their CLGs. Various formal and informal contacts, including ads in local newspapers, were used to create tentative lists. The STF staff called those listed to see if they met the criteria. A final list was printed in newspapers to allow a two-week comment period regarding the representativeness of the list. By the end of November 1989, ten CLGs were formed. An additional one was completed in January 1990, followed by one more in March and the last two in April. By request of the local councils, the STF had taken responsibility for selecting CLG members.

As this process unfolded, the advantages of a voluntary over a top-down process became clear. In the voluntary process with which the STF has experimented, the typical kind of NIMBY confrontation has not occurred. To the contrary, the various CLGs networked; in other words, they shared information and ideas and learned from each other's experience, as exemplified by the January 1990 Thunder Bay meeting of chairs and facilitators of CLGs.

The results of extensive consultation varied considerably within communities, between them and the STF, and between the communities and outside experts that the former had selected. In Manitouwadge, Ear Falls, Red Lake, Atikokan, Mattice-Val Cote and Upsala, both the CLGs and the local councils rejected further consideration of hosting a site. The CLGs of the United Townships of Rolph, Buchanan, Wylie, and McKay and of the Townships of Head, Clara, and Maria declined to continue. The CLGs of Deep River, Hornepayne, and Chalk River chose to withdraw, but their respective councils approved movement into the next phase. In contrast, the Elliot Lake and James Township CLGs wanted to continue, but their respective councils refused.

The concerns of those communities that opted out were familiar: the potential health risks, and the risks to ground and surface water, were perceived to be too high, with a baseline health study considered absolutely essential before proceeding; the potential negative impacts on economic development and tourism were believed to be too severe; the potential transportation risks and effects were also thought to be too great; finally, local citizens were not convinced of the long-term integrity of the technology needed to manage LLRW.

Although these constituted the biggest concerns, others involved a lack

of trust in the federal government's willingness to pay for compensation and to establish a well-managed facility, as well as a continuing distrust of the AECB. The AECB clearly lacked the public credibility that the crown corporations had developed for hazardous waste in Alberta and Manitoba. There was concern that, were a community to accept LLRW, other sorts of waste, including high-level radioactive materials or hazardous wastes, would ultimately migrate there for disposal.¹⁰ These fears were exacerbated by Ontario's extremely controversial efforts to locate sites for disposal of hazardous and solid wastes in the 1980s and 1990s.¹¹ In both of these cases, technical, top-down approaches to facility siting have led to the familiar outcome of gridlock. In hazardous waste facility siting, for example, the province has devoted more than twelve years and spent more than \$100 million in attempting to impose a facility on a highly reluctant Ontario community, with no final agreement yet attained.

Possible site volunteers

These withdrawals did not constitute the end of the voluntary siting process. Despite the concerns that prompted a number of CLGs or councils to opt out, several communities remained interested in the siting process and continued deliberations with STF officials through 1994. Moreover, one source community was interested in cleaning up LLRW located within its own boundaries.

Among the potential volunteer communities, the Deep River council (a neighbour of the Chalk River facilities of AECL) chose to proceed after its CLG said no for four cluster communities. These communities are located in northeastern Ontario, with Ottawa 115 kilometres to the south, and have a combined population of approximately 3,800. The two major concerns of the citizenry involved the desire that the historic wastes of the Port Hope area be managed *there* before being moved anywhere, and the concern that an accident or spill could occur if LLRW were transported through surrounding areas. The Deep River council agreed to continue the process, subject to the following provisos: given the risks and costs of transportation, siting a new facility where it is now located would be the best option; that any waste relocated to Deep River should be transported by rail with the material stored in suitable containers; and that, during or at the end of Phase Four, a referendum should be held concerning whether or not to continue the process, with any associated costs to be paid for by the government. Chalk River agreed to go along with the Deep River council. Since there are no sites in Chalk River, it seems to want to be part of the process to protect its interests.

¹⁰ *Opting for Cooperation: The First Phases*, pp. 53-54.

¹¹ Macdonald, *The Politics of Pollution*, ch. 14.

Technical studies are proceeding at Deep River and a working group has been formed, consisting of CLG and STF members as well as representatives of relevant provincial and federal ministries, to develop criteria for matching sites with technologies. Much of their attention has focused on two preferred sites, one below and one above ground, which were announced on 20 July 1994. These sites are located on some four thousand hectares in the southeast portion of Deep River. Geraldton, a community of 2,900 residents located the farthest west of all the potential sites, approximately forty-five kilometres northeast of Thunder Bay, was intrigued by the process, given the project's potential contribution to economic diversification, but its local council withdrew before a referendum scheduled for November 1994 could take place. Two problems became interwoven in producing the withdrawal – annexation of land intended for a facility and political opposition. The Ontario Municipal Board ultimately approved the necessary township annexations, but only after administrative delays extended the process from the anticipated three months to one year. Given this delay, the CLG and council had only eight months to complete all relevant technical work prior to the November referendum, as an opposition group known as Stop the Ongoing Process (STOP) had successfully pressured to move the vote from March 1995 to the prior November. This meant that the technical work could not be completed in time for the referendum, the STF had to certify that this basic deadline would go unmet, and the CLG asked the local council to opt out, which it did.

In addition to the potential volunteer communities, some source communities decided to proceed to the next phase as well. Port Hope, located forty-five kilometres east of Toronto with a population of 10,300 residents, has been most active among communities in this category, although the local council has never passed a resolution expressing interest in participating as a volunteer community. Its citizens want, primarily, to find a permanent site for the wastes deposited within town boundaries and secure restoration of its badly contaminated harbour in the process. Furthermore, they want to play a major role in the cleanup and hope to do this by having their CLG stay in operation until the process is over. To fulfill its role, it seeks to be empowered to hire consultants and contract for studies as necessary. In short, the Port Hope community, through its CLG, hopes to participate in the establishment of criteria for selecting a site, in the cleanup of old sites, and in the decision regarding which wastes will be moved from the old to new sites. In October 1992 the Port Hope council passed a resolution expressing a willingness to continue negotiations but emphasizing key conditions, such as components of the compensation package.

Construction of a new harbour for Port Hope, however, has become a central stumbling block in LLRW facility siting. The International Joint Commission has identified Port Hope harbour as among the forty-three most environmentally hazardous sites bordering the Great Lakes and in need of

immediate "remedial action," due to extreme contamination from LLRW and other toxic substances.¹² In response, the Port Hope CLG recommended that the harbour be included under the criteria to be developed jointly by the Port Hope CLG and the STF. It also recommended that the government of Canada consider creation of a new harbour in Port Hope as a demonstration of its commitment to the environmental integrity of the Great Lakes. Such linkages could formally integrate LLRW management with the larger issues of sediment contamination and area-wide remediation, possibly leading to increased public support and greater integration of environmental management in this part of Ontario. However, the STF lacks authority to make such commitments, confining Port Hope's likely involvement to management of its own, abundant, wastes. Greater integration of various aspects of the environmental regulatory process may be one of the greatest lessons from this process, as the federal government is committed to harbour restoration but is not formally linked with the siting process.

Hope Township has also remained active, although only as a source community. Its CLG suggested the following as an interim response. It wants control of how wastes are evacuated and transported from the Welcome LLRW site, as it is very concerned about radioactive and arsenic wastes. Second, since the township will be affected by decisions regarding what to do with its historic wastes, it should be part of the consultations that determine where the new site will be located. Finally, its CLG should continue to function until the process is complete. The Hope Township council went on record in support of this response and has continued to examine issues such as assessment of soil-cleaning levels. Newcastle, a Toronto exurb with 34,100 residents, has also continued to be involved in the process. Like other source communities, its involvement has been motivated in large part by its concern over Port Granby wastes.

As this winnowing among possible candidates has continued, a new task force was created in 1991 and 1992, and was expected to complete siting deliberations over four years. During this period, the potential volunteer community has begun to explore the technical, environmental, and social impacts of receiving wastes while source communities have begun to examine the impact of removing wastes. Joint decision making has been emphasized, including the beginning of operational planning in the remaining volunteer community (Deep River) and the three remaining source communities (Port Hope, Hope Township, and Newcastle). Although it is possible that this process could collapse, many observers remain optimistic as serious dialogue continues in multiple settings.

12 On the remedial action process of the IJC, see John H. Hartig and Michael A. Zarull, eds. *Under RAPS: Toward Grassroots Ecological Democracy in the Great Lakes Basin* (Ann Arbor: University of Michigan Press, 1992)

Features common with related siting agreements

The signs of evolving cooperation in LLRW siting in Canada are remarkable given the historic opposition to siting all sorts of LLRW disposal facilities in both Canada and the United States. Even more so than in hazardous waste policy, examples of LLRW siting successes are hard to find in either nation. The dismal American experience is one that Canada has apparently learned from and chosen to avoid. Examining the poor track record of many of its own provinces in hazardous and solid waste facility siting, and its highly contentious early approach to LLRW siting, Canada undertook a significant reform of its siting policy in 1986. Officials chose to model their new policy on the successful experiment completed in Alberta in 1984, since replicated in Manitoba in 1992. As in these hazardous waste facility siting cases, several key features were present.

First, early, extensive public education and participation efforts were crucial to the siting processes in Alberta and Manitoba. Such a pattern closely resembles the Canadian LLRW siting effort. Public information and participation activities were not as numerous as in the western provinces but were extensive and were based on the principles of voluntarism. All involved communities were given the option to withdraw at any point of the process. Moreover, they were also assured of direct input in the selection of technology at any facility that might be opened, a decision that is usually finalized by authorities in advance of any siting negotiations.

Second, the successful siting efforts in Alberta and Manitoba further indicate that citizens want reassurance that they will not become a magnet for wastes from other provinces or states if they agree to open a new disposal facility. Some formal agreement to share the burden for waste management in a fair way was crucial in both Alberta and Manitoba. In turn, Canada's LLRW siting efforts have promoted the notion of burden sharing in a variety of ways. Perhaps most important, siting officials have remained open on the ultimate number of places that will participate in waste management and whether they will provide waste storage or more "permanent" disposal. It is possible, for example, that one major facility will emerge but that other communities will develop more modest facilities. Such options simply are foreclosed in the American states or compacts, where there is usually an intensive search for a single site to employ a single disposal technology to dispose of all the wastes that are eventually shipped its way.

The Canadian process has also benefited from a general sense of assurance that it will not become a magnet for wastes from other parts of Canada. Since Ontario generates the vast majority of Canada's LLRW, there is little threat of exploitation by neighbouring provinces. Moreover, officials have stated that any new LLRW facility will not accept waste from the

United States or other nations. Such a shift in position could indeed undermine the cooperation that has emerged thus far.

The final aspect of burden-sharing, combining siting efforts with expanded efforts to reduce the volume of waste being generated, has proven less prominent in LLRW deliberations in either Canada or the United States than in the hazardous waste facility siting agreements in Alberta and Manitoba. Both nations have made significant strides in waste reduction in recent years, but this has not formally been incorporated into siting deliberations. By contrast, several European nations have successfully made this linkage central to their siting policies.¹³

Third, compensation and safety protection were of enormous importance in the successful hazardous waste facility siting cases. Canadian LLRW siting officials have proven extremely open to alternative siting technologies and varying types of compensation packages. In Port Hope, for example, the issue of facility siting has been directly linked with harbour dredging and cleanup, an action that, if completed, would offer considerable environmental and economic benefits for local residents.

Fourth, Alberta and Manitoba were also extremely successful in devising new managerial partnerships to defuse concern over long-term commitments to technical and financial feasibility of new facilities. As in hazardous waste, many private LLRW management corporations in both Canada and the United States have shoddy records when it comes to maintaining high levels of operational proficiency and assuring fiscal commitment to facility operation. In many siting controversies, the questionable integrity of private corporations which will be responsible for facility operation scuttles any possibility of agreement. As we shall see, slipshod public and private management helped undermine an American case in which, under a voluntary approach, an agreement may have been possible.

Both Alberta and Manitoba devised public-private partnerships designed to assuage those very reasonable concerns. Both established new crown corporations to be responsible for shared facility management with private firms that are overseen by provincial regulatory authorities. In Canadian LLRW, the governmental role will be similarly large and enduring in any new storage or disposal facilities. Indeed, the Canadian Siting Task Force has proven unusually successful at winning public trust and facilitating genuine dialogue over siting options in multiple communities. It has helped overcome understandable public reservations about both Eldorado and the AECB, a pair of public entities with long and somewhat controversial records.

These four broad features – public participation, burden-sharing, compensation and protection, and a credible governmental role in siting and

13 Ray Kemp, *The Politics of Radioactive Waste Disposal* (New York: Manchester University Press, 1992).

facility management – appear to have contributed to the evolution of cooperation in Canadian LLRW management, much as they have in prior hazardous waste facility siting agreements. We now turn to the American case, where traditional siting approaches have prevailed and faced predictable, NIMBY-type outcomes, but some experimentation with a more voluntary approach offers some hope.

The evolution of American LLRW management

The 1980 Low-Level Radioactive Waste Policy Act and its 1985 amendments represent a significant departure from traditional American approaches to LLRW that have been dominated by the federal government. They featured a series of federal mandates and incentives that encouraged individual states to form multi-state compacts to manage LLRW.¹⁴ This legislation retains federal authority for setting safety standards and orchestrates a system of timetables, incentives, and penalties related to compact creation. As is the case with many other interstate compacts, the radioactive waste compacts must be approved by Congress before becoming official.

However, this legislation also delegates a significant degree of subnational authority. It leaves to individual states the decisions concerning the other states (if any) with which they will share compact responsibilities, how they will design and implement their siting processes, and what methods they will use for disposal. Among the powerful incentives that the federal government provides to states to enter into compacts rather than manage waste on a solo basis is that those states that belong to a congressionally approved compact have the authority to exclude wastes from other states, whereas independent states cannot restrict such waste importation.

The compact approach has thus represented a unique federal government effort to delegate regulatory authority to individual states or clusters of them. Its enactment was driven in large part by the efforts of the governors of Nevada, South Carolina, and Washington. Their respective states contained the only three waste disposal sites that continued to operate in the nation after three other sites closed in the late 1970s. The governors' threat to restrict access to these sites prodded Congress to accept the compact approach that was developed by the National Governors Association.¹⁵

14 The idea of such regional approaches to pressing problems, including environmental ones, has been widely used in the United States. See Martha Derthick, *Between State and Nation: Regional Organizations of the United States* (Washington, D.C.: Brookings Institution, 1974). On regional approaches to environmental management in Canada, see M. Paul Brown, "Environmental Canada and the Pursuit of Administrative Decentralization," *CANADIAN PUBLIC ADMINISTRATION* 29 (1986), pp. 218–236.

15 On the early history of this legislation, see E. William Colglazer, Jr., ed., *The Politics of Nuclear Waste* (New York: Pergamon, 1982); Richard C. Kearney and Robert B. Garey, "American Federalism and the Management of Radioactive Wastes," *Public Administration Review* 42, no. 1 (January/February 1982), pp. 12–24.

The success of the compacts was to be measured by their ability to meet a series of federally established milestones that anticipated a fully functioning system of sites by 1993. These timetables were delayed and altered somewhat in the 1985 amendments, when it became obvious that the initial legislation had been too ambitious. Select portions of this process were invalidated by a 1992 U.S. Supreme Court decision. In particular, this decision argued that it was unconstitutional to require states to "take title" to all wastes after specified deadlines.¹⁶ However, much of the remaining structure was not overturned and, at least in some cases, the siting process continues.

All of these complicated factors were designed to promote policy coordination and facilitate long-term support for waste disposal agreements. They operated on the assumption that states and compact regions would perceive long-run advantages from entering into compacts and accepting surcharge rebates and other compensatory benefits. In this process, it was assumed, they would successfully override political resistance to facility siting. This approach hinged, in many respects, on a presumption that economic compensation alone would serve as a reliable lubricant of siting conflict.

The compact approach has enjoyed one degree of success, in that forty-two states have entered into a total of nine congressionally approved compacts. The fifteen states which belong to the two compacts that feature disposal facilities in continued operation (in South Carolina and Washington) are set for the near future, having secure facility access and the ability to exclude out-of-compact wastes if they so choose. For the remaining states and territories, however, the compact approach has largely been a nightmare. No new siting agreements have been reached in any state or compact and none are in sight in the near future. Consequently, many states, such as Michigan, are forced to store LLRW at more than fifty sites around the state; many of these sites were never intended for long-term storage or disposal and they pose significant safety and security problems. Increasingly, LLRW that cannot be shipped to South Carolina or Washington must be stored in this fashion, either at the site of nuclear power plants, hospitals, medical research institutes, or other facilities that generate some amount of LLRW. South Carolina has allowed a small amount of LLRW imports from states demonstrating some continued commitment to resolving their own waste disposal problems, imposing an increasingly steep surcharge in the process. There is, however, no assurance as to how long this export option will remain available, as the state is free to close it at any

16 *New York v. United States* (112 S. Ct. 2408, 1992). For a useful analysis of this case and its policy ramifications, see Richard C. Kearney, "Low-Level Radioactive Waste Management: Environmental Policy, Federalism, and New York," *Publius: The Journal of Federalism* 23, no. 3 (Summer 1993), pp. 57-73.

time. In turn, those states perceived as not making a reasonable commitment to waste management have been completely cut off from further access to the facility.

The siting approach most commonly used in the states and compacts has eschewed broad public participation and a comprehensive waste management process in favour of the traditional top-down approach driven by technical criteria. In Connecticut, for example, the state's Hazardous Waste Management Service used such criteria to determine that three towns were its preferred candidates for a facility that would manage LLRW from Connecticut and New Jersey, its Northeast Compact partner. There had been no prior consultation with these communities and no prior warning that they would be a finalist. As an elected official of one of these areas explained after learning the news, "I'll never forget it. I was in shock. I had to sit down for a minute."

Residents of the other two potential host communities responded similarly, but then wasted little time in taking vigorous collective action against the proposal. Public meetings were finally held, but these became rallying events for opponents. Several interviewees recalled that, at one of these meetings, an official of the Management Service said, in essence, that "the site will go in one of these areas, and you cannot stop it." However, after months of NIMBY opposition, the proposals were withdrawn, leaving the siting process in Connecticut and New Jersey up for grabs. LLRW is no small issue in these states, as combined they produce approximately 7 per cent of the nation's total new LLRW generated each year.

Michigan exercised similar diplomacy and participatory skills in advancing its siting plans. The state grudgingly agreed to become the siting host for the seven-state Midwest Compact in 1986 and did receive considerable financial support through the rebates made available to the compact from the federal government. But like Connecticut, Michigan relied on technical criteria in the absence of public participation in its process of selecting three sites. In October 1989 three rural areas scattered about the state were informed, by mail, that they were the finalists. None were at all aware that they were under consideration for managing LLRW from around the midwest region. As one town supervisor recalled, "I first found out when the press called to ask me how I felt about all of this. It was really upsetting to find out that way." From this point, the Michigan siting process almost perfectly paralleled the Connecticut experience. After nearly two years of contentious public meetings and NIMBY opposition, the state withdrew the three sites from further consideration. However, as it failed to develop any alternative siting process, it was ousted from continued participation in the Midwest Compact, leaving it on its own to find a siting solution and cut off from any further access to the South Carolina facility.

Other compacts and states have struggled in somewhat similar fashion,

although a few have tried to incorporate some of the conditions that have proven so crucial to the cooperation emerging over Ontario LLRW siting and in the earlier examples of successful hazardous waste facility siting. Among these, the Central Compact and its host state, Nebraska, remains the closest American counterpart to this alternative approach. It emphasized a number of the key themes discussed in the Ontario case and made far more progress toward a cooperative solution than other states and compacts, although its siting process faced some serious problems and its fate remains uncertain.

An attempt at voluntarism: the case of Nebraska

Between 1981 and 1987 Nebraska followed much the same process as had Connecticut and Michigan. The state was negotiating its status in a compact, and in March 1982 the Central Compact was formed. In addition to Nebraska, the compact included Arkansas, Kansas, Louisiana, and Oklahoma, which collectively generates about 9 per cent of the nation's LLRW each year. Then, beginning in 1986, the Nebraska Department of Environmental Control drafted several regulations regarding the construction of a LLRW facility. Several public hearings were held on the compact and the facility regulations but few citizens attended the meetings. In June 1987 the compact selected a private firm, US Ecology, to develop, construct, and operate the Central Compact facility.

At this point, the Nebraska case began to diverge from the ones in Connecticut and Michigan. Nebraska was chosen as the compact's host state in 1988. This stimulated a citizens' group, *Nebraskans for the Right to Vote*, to gather the more than 150,000 signatures necessary to hold an initiative vote on whether or not the state should remain in the compact. Known as Initiative 402, 69 per cent of participating voters supported continued compact involvement in November 1988. The initiative proved a major statewide issue and several groups on both sides of the question organized and advanced their respective cases. The questions raised during the campaign focused not on site-specific issues, but on larger concerns, such as whether or not Nebraska's waste generators would have to shut down if Nebraska rejected the possibility of hosting a site.

The initiative campaign overlapped with the initiation of US Ecology and Nebraska's public participation efforts in April 1988. The Nebraska Citizens' Advisory Committee (NCAC) and the Nebraska League of Women Voters both played important roles in this process, supplementing related efforts of US Ecology. The committee was established by US Ecology and was designed to reflect diverse constituencies, as it included representatives of farming, ranching, business, environmental, and natural resource interests. It was intended to gather public opinion but also to play a significant role in advising US Ecology on key siting and facility design issues. Over a seven-month period the committee held six public meetings, at which the

public was encouraged to give their input on any aspect of the siting program. At least one meeting was held in each major region of the state.

The League of Women Voters, in turn, sponsored two series of public workshops in 1988. The first series, held in May, involved US Ecology presentations of the siting criteria that were going to be used. Citizens were encouraged to give their input about the appropriateness of the proposed criteria. The second series featured a US Ecology presentation of the proposed facility design and, again, sought public suggestions. There were five workshops in each of these two series, generating literally thousands of comments and suggestions from all around the state. Both site criteria and facility design plans were changed in response to concerns raised in these meetings.

Despite the significant involvement of the League of Women Voters, US Ecology played the most important role in the public participation process. As these other efforts were taking place, it mailed out invitations to each Nebraska municipality, county board, chamber of commerce, and natural resource district and asked them if they were interested in the possibility of hosting a facility. Using the same voluntary philosophy successful in other siting cases, the firm made clear that it would not enter an area for site testing unless invited in by local authorities. Moreover, an initial positive response was not binding; communities were told that they could withdraw at any time they wished.

In response, fifty-two municipal governments and twenty counties expressed interest in exploring the possibility of hosting a facility. Within these fifty-two communities, 111 "potential siting areas" (PSAs) were identified by US Ecology. Such a response was astounding given the pattern of near-immediate rejection of siting proposals in virtually all other states and compacts. As the process continued, some of these candidates withdrew, either for political or geological reasons, but twenty-seven PSAs in eleven different counties remained involved. Such a pattern was similar, in many respects, to the winnowing that occurred among potential volunteer sites in hazardous waste in Alberta and Manitoba and is occurring in LLRW in Ontario.

But at this point the process began to sour. Rather than pursue continued public dialogue with all possible candidates, as in Ontario, the Central Compact moved very quickly to narrow the field and attempt to reach an agreement in short order. Their pace was driven in part by Nebraska law, which called for site announcement by 1 January 1989, one year ahead of the timetable in the federal legislation. The NCAC used a "blind" format involving technical information on remaining areas to select three of them for further examination and, in the process, eliminate all other possible candidates. The NCAC chose rural sites in Boyd, Nemaha, and Nuckolls counties and US Ecology designated specific areas within these counties as its finalists on 18 January 1989. This selection was little more than three

months after the statewide referendum, reflecting the extremely fast pace of site selection after the initial public participation efforts. Hence, there was little opportunity for the sorts of extended discussions and review of multiple candidates so crucial to the other siting agreements.

Generous compensation packages began to be offered at this point, as called for in the authorizing legislation, providing a steady flow of new, largely unrestricted income to each of the three county finalists. In 1989, for example, each of the three final counties received \$100,000. US Ecology completed concurrent investigations at the three sites but focused most of its subsequent analysis on a Boyd County site, located in McCully Township (population 160). This township is located near the village of Butte (population 540), upon which it is dependent for all educational and fire protection services. US Ecology was attracted to the Butte site for technical reasons as well as its knowledge that it had strong support for the facility from the Butte Board of Commissioners, which had twice passed resolutions supportive of hosting the facility. US Ecology announced on 31 December 1989 that the Butte site had been selected as the preferred host area, closing its information office and related efforts in Nuckolls and Nemaha counties within a few months.

The selection of this site, however, was a serious blunder that undermined the public trust and dialogue that had been developed to that point. Despite the support of Butte elected officials and the neighbouring communities of Anoka and Lynch, there were numerous warning signs that any effort to attempt to impose a siting decision in Boyd County would be ill-fated. One day prior to the January 1989 announcement that a Boyd County site would be one of three finalists, the Boyd County Board of Commissioners had voted to rescind their invitation to US Ecology. In turn, neighbouring communities of Spencer (population 645, located 20 kilometres east of Butte) and Naper (population 171, located twenty kilometres west of Butte) had registered strong opposition in advance of the January announcement. Butte, Spencer, and Naper have a long-standing history of animosity toward one another, with a series of skirmishes over the placement of railroads, highways, the county fair, and the county seat. Some of these battles date back to the nineteenth century, but the tensions endure through the 1990s, only inflamed further by the LLRW proposal. Moreover, there is considerable tension among the communities over a proposed merger of the Butte and Spencer high schools, which would mean that one of these communities will soon lose its secondary school. There is also resentment over division of the compensation package, as Butte has received \$300,000 in virtually unrestricted funds for each of the past several years, while its respective neighbours have received little if any financial support. Finally, a strong grass-roots organization, Save Boyd County, had already formed to oppose the facility before US Ecology had chosen to press ahead, and would later seek advice from national anti-nuclear groups on civil dis-

obedience and harassment tactics. In short, Boyd County hardly seemed an auspicious place to pursue siting, especially when opposition was already mounting and other volunteer candidates had expressed interest in the possibility of hosting a facility.

The selection of Butte was viewed by many as a fundamental break of US Ecology's earlier promise to only pursue siting where a genuine volunteer commitment was evident. In fact, as late as December 1988 a US Ecology vice-president had reassured the Boyd County commissioners that the firm would leave if at any future point local citizens wanted them to do so. Despite the strong opposition, a group of Butte citizens, People for Progress, have continued to rally support for the site and claim to have five hundred supporters throughout the county. Since the siting process began, there have been two Village of Butte Board of Commissioners elections, and on both occasions candidates supportive of the site have been elected or re-elected. Butte's and McCully Township's elected county board representatives have continued to support the site. However, all subsequent US Ecology efforts to hold public meetings and discussions of the proposal have proven extremely divisive, leaving the future of the siting proposal for Butte in near-total disarray. The credibility of US Ecology has been badly damaged, in Boyd County and the remainder of Nebraska, by this episode, making it an unlikely candidate to lead any resumption of the voluntary siting process. "I don't think that US Ecology could hold another meeting in [Boyd County]," noted one siting opponent. "They would just get run out on a rail."

This failure should not, however, mar the considerable early achievements of the Nebraska siting process. Far more so than any other compact, extensive efforts were made to involve the public. Much to its credit, this voluntary process attracted numerous potential participants. It is impossible to know whether selection of another finalist community, or keeping open options for numerous potential communities, might have led to a different outcome. Nonetheless, the compact's determination to proceed rapidly to a siting decision, as dictated by Nebraska legislation, and US Ecology's adamant choice of Butte in the face of numerous warning signs of conflict, should not lead to rejection of the Nebraska case as typical of siting failure. At least in the stages leading up to site selection, the Nebraska case bears a good deal of resemblance to the Ontario LLRW case and those in hazardous waste discussed earlier. Moreover, there is a very real possibility of reviving the siting process, given continued support for a site by residents of Butte, Anoka, and Lynch.

Conclusions

The Ontario LLRW siting case indicates that many of the siting lessons drawn from hazardous waste facility siting can be applied with some success to the contentious issue of radioactive waste disposal. In turn, the American

experience in LLRW generally confirms the overall pattern of failed siting in hazardous waste, although the Nebraska case suggests a possibility of implementing some version of the voluntary approach in the United States. In recent months some states and compacts have begun to explore this approach, most notably Connecticut, which has chosen to revise its siting efforts in this way.¹⁷ However, it remains unclear whether such states will merely extend a general invitation for volunteers, or instead attempt to develop the more comprehensive process necessary to enhance the prospects of extended dialogue over siting options and, in turn, increase the likelihood of siting agreements. Far from foolproof, the voluntary approach, in all its facets, does offer a fresh alternative to prevailing approaches to controversial facilities. Beyond waste management facilities, both Canada and the United States have experienced increasing conflict over a wide array of siting efforts, including proposed facilities for drug and alcohol rehabilitation, nursing homes and hospices, public housing, and air and rail transport. National and subnational governments in both nations have generally groped for strategies that can foster serious public dialogue over siting options and lead to cooperation in final siting decisions. Both governmental and private sector officials in a wide array of policy areas plagued by NIMBY-type reaction may well benefit from careful consideration of these more successful efforts in waste facility siting.

17 This shift in policy was approved by the Connecticut legislature in April 1993. It proposed extensive public participation provisions combined with financial support to potential volunteers. See Richard C. Kearney and Ande A. Smith, "The Low Level Radioactive Waste Siting Process in Connecticut: Anatomy of a Failure," Paper presented at the 1993 annual meeting of the American Society for Public Administration, San Francisco.