

**America's National LLRW Policy:
Waste Policy from a Garbage Can?**

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Introduction

The nation's current policy for low-level radioactive waste (LLRW) was established in 1980 when Congress passed an act with a single clearly stated goal: the creation of a more equitable distribution of disposal capacity for the waste. In simple terms, this meant that a network of approximately six to nine regional disposal facilities should have operating by the end of 1985. However, more than 23 years after passage of the LLRW Policy Act of 1980, this still has not happened. In fact, two of the three then-operating facilities are still in operation, and the available disposal capacity continues to decline as it is filled. Congress in 1985 revisited the issue and replaced the original act with a more forceful amended act, intended to get new disposal capacity in place by 1993. Although as many as 14 states and compacts started site selection programs, there are currently no siting projects in progress, and none are likely to resume for many years. The immediate crisis that precipitated the national policy has passed, and Congress has not shown any interest in revisiting the issue again. In short, despite the unprecedented cooperation of the states to select a novel state-based solution with Congressional approval, the policy failed.

The question is this: can the formulation, enactment, implementation and ultimate failure of the national LLRW policy—as well as Congress' reluctance to revisit the issue—be explained using the multiple streams framework, as developed by Kingdon (1984, 1995), Zahariadis (1999), and others? I answer this question in the affirmative.

Literature Review

As originally developed by Kingdon, the model sought to explain the reasons why policy issues rise and fall on the Congressional agenda, and how these problems get linked to solutions

there. Kingdon did not specifically address how the selected problems and solutions became enacted or implemented, only how they rose and fell chaotically on the Congressional agenda. Other researchers have used the multiple streams framework to compare policy development on common issues between different nations (e.g., Zahariadis and Allen, 1995; Blankenau, 2001; Elson, 2002) as well as within governments at different levels (e.g., Stout and Stevens, 2000; Elson, 2002, Lorendahl, 1991), both on single issues (e.g., Travis and Zahariadis, 2002; Stout and Stevens, 2000; Blankenau, 2001; Zahariadis, 1996) and on multiple issues (e.g., Zahariadis, 1992). To varying degrees, these writers also extend the model from policy formulation through enactment. The literature review does show any examples where researchers extended the framework beyond this point, to policy implementation and evaluation. The LLRW issue, however, is a case where the model can be used to explain the manner in which the policy was implemented. Because of the nature of the issue and its solution, the framework is also key to understanding why the states' attempts to implement the policy failed, and also explains why evaluation of the policy (that is, the effort to understand why it has failed) has so far been mostly unsuccessful.

A review of the literature on the LLRW issue shows that most of the existing material has been written from four general perspectives:

- a historical approach, focusing on what LLRW is, where it comes from, how it has been dealt with in the past, what problems there have been, what the plans for dealing with the waste were and are now, and other related matters (Bremen and Visocki, 1992; Saunders, 2002; Tano, 1999).
- a legal approach, focusing primarily on the federal LLRW Policy Act of 1980 and its 1985 amendments, explaining the rationale for the system, how the system was supposed to work

and how well implementation actually worked, as well as dealing with administrative rules and regulations, and public response in court and in the administrative arena (Ashe, 1993; Weissert and Hill, 1994; Coates and Munger, 1996; Hill and Weissert, 1995; Mostaghel, 1994).

- a technical approach, which considered only the hard-science aspects of the problem: waste form and composition, the behavior of radioactive materials in the environment, radiation dose and risk comparisons, the geology and hydrology of actual and potential disposal sites, and the like, including some comparative economic approaches (Wagner, 1998; Coates, Heid and Munger, 1994; Hayden and Bolduc, 1997). [See extended endnote following figures at t
- a social construction approach, which looked especially at the reasons for public opposition to the siting of disposal facilities, focusing mostly on risk perception and communication, or on questions such as the social construction of risk, authority, trust, equity, participation, and legitimacy (Dodson, 1998; Albrecht, Amey and Amir, 1996; Coates, Heid and Munger, 1994; Kearney and Smith, 1994; English, 1992; Hunold, 2002).

Many writers used more than one of these perspectives, but few contained them all. I was unable to find any research that approached the LLRW issue through any of other commonly used theoretical frameworks, such as institutional rational choice or its derivatives or extensions, the stages heuristic, multiple streams, punctuated equilibrium, advocacy coalition, or policy diffusion. There were no systematic attempts to model or understand the entire policy issue, each writer instead focusing on one or a few particular aspect(s) or development(s) rather than attempting to generate a comprehensive treatment of the issue.

Methodology

Research for this project required qualitatively analyzing selected primary and secondary sources from the early 1970s through the passage of the LLRWPA of 1980, and on to the present. Primary sources included sources such as the Congressional Record and various committee reports to reports from the General Accounting Office and federal agencies. Secondary sources included news reports from various mass-media and industry periodicals, as well as subsequent research work such as that listed above. Since time is one of the primary constraints in the framework, a chronology and several timelines were constructed to illustrate the actions and interactions within the Congressional garbage can, and the interaction between Congress and other players in the decision making process, such as the states, federal agencies, and private groups.

Applying the multiple streams framework to the LLRW issue requires some adaptation, as seems necessary in every application (Zahariadis 1992, Blankenau 2001). The multiple streams framework is normally presented with a fully chaotic and essentially random “garbage can,” as was originally proposed by Cohen, March and Olsen (1972), wherein the actors do not have any control over the flow of the streams or their contents, nor any clear preferences for any problems or solutions. Zahariadis (1999) notes that the assumption of randomness allows for the discovery of order when and to what degree it does occur within organized anarchies. In this paper, I consider as essential the inherent order that exists within Congress, order that is mediated by party, committee, and subcommittee structure and the exercise of authority by those at the center of the structure. Exercise of agenda-setting power (delegation and exercise of authority by leadership) may or may not be part of policy entrepreneurship. I suspect that

entrepreneurs make use of the existing structure and authority of leadership as a matter of course, but that leadership authority only occasionally participates in entrepreneurship; however, that is not a part of this investigation. In addition, I conceive of not only an entrepreneurial role, but that of an anti-entrepreneur as well, one who attempts to keep windows closed, and streams of problems, solutions, and political approval apart (for example, see Tichenor, 2002, for discussion of the blocking and enabling power of committee chairmen regarding immigration policy, even over the objection of the chamber leadership). The system remains chaotic, that is, essentially unknowable in detail, but the structure and exercise of power within the garbage can and does provide limited direction to the process.

Part of what makes Congress chaotic is that, while there is structure and exercise of authority to try to shepherd problems and solutions together with political acceptability (metaphorically the 'herding cats' problem), there are more forces at work than just the established internal structure and authority. With a handful of participants in such an arrangement, results might be predictable, but with the hundreds to thousands actually involved, the situation is too complex for analysis. In addition to the leadership and anti-entrepreneurs noted above, there are also:

- outside lobbyists who keep pushing their problems and solutions toward leaders and others;
- Congressional staff may have interests and be pushing or pulling for various problems and solutions;
- certainly, the members of Congress will be pushing and pulling for their own interests, trading support, and following the direction of party leadership.

Blankenau (2001) lists four traditional hypotheses of multiple streams, plus an additional hypothesis of his introduction. These are:

1. Events make agenda when accepted indicators show worsening conditions and/or a crisis/focusing event occurs.
2. Solutions become attached to problems only when they are technically feasible and of accepted value.
3. The political environment for formulation must include a supportive national mood, acquiescence from key interest groups, and entrepreneurship by key governmental actors.
4. Political structure affects how long and large of a window opens for policy change.
5. Policy passage requires problem identification, an acceptable solution, and a conducive political environment.

To this list, I would add a sixth to account for implementation: *the framing of the problem and its selected solution will affect (that is, constrain or encourage) implementation of the solution, and thus, its success or failure in resolving the problem.*

The implication of this is that problems will be resolved—or not—because the framing of the problem relates to the acceptance of the selected solution and the way it is implemented. The solution may or may not solve the initial problem. In the case of LLRW, the framing of the problem (as an equity issue between the states) and the selected solution (creation of more disposal capacity on a regional basis) did not enable those responsible for implementation to solve the problem. In fact, the problem framing and selected solution heavily constrained implementers: states were not responsible for finding a solution to the real problem (which was primarily increasing volumes of LLRW and declining disposal capacity, along with unclear definitions, inadequate regulations and lax enforcement). Instead, the states were responsible for establishing new disposal capacity to handle waste on a regional basis. The selected solution therefore had to do with only part of the real problem.

Results

Congress, by most accounts, easily qualifies as an organized anarchy. Congress is organized with the purpose of processing streams of problems and proposals through a political process to come up with policies for implementation by the agencies under the direction and control of the Congress, the President, the federal Judiciary, and/or the states. During any individual session of Congress, there is a fairly clear and stable structure of organization (committees and subcommittees) and power (leadership for both parties, leadership and assignments for committees and subcommittees, and the current rules established by the controlling leadership). Over the course of many Congresses, membership and power relationships do change, often significantly. But even within a session of an individual Congress, the structure and power available may not mean much, as individual Senators and Representatives must juggle floor, committee, subcommittee and state or district duties together with political concerns, such as fundraising and campaigning for re-election.

As a proxy measure for this ambiguity, consider that in Congress, participants do not so much drift as rush from one decision to the next. In the 17 Congresses starting in January 1969 through December 2002 (Library of Congress, 2004a), the House and Senate were in session for a total of more than 69,500 hours. During that time, members introduced for consideration and action some 262,569 measures, of which, 213,538 (81.3 percent) were bills, or an average of just more than three bills introduced per hour. Of the bills introduced, 35,275 (or 16.5 percent) were placed on the chambers' calendars and/or were reported for action, for a rate of one about every 2 hours. In the end, some 9,425 bills became public laws, while a smaller percent became private laws. This means that 26.7 percent of measures reported/placed on calendar, or 4.4 percent of all

those introduced, became public laws—which is a rate of about one every 7.4 hours. How can these numerous, complex and competing issues be dealt with in such a short amount of time?

The answer lies in leadership: Congress is, after all, *organized*. This is true even if that organization is only a partial control on the inherent chaotic condition within the halls. There generally is very little consensus about what issues should be on the agenda, especially the more limited decision agenda. Table 1 illustrates the process in relations to the stages of the multiple streams framework, and comparative statistics to demonstrate the overwhelming complexity of the situation in Congress. Instead of unregulated chaos, the House and Senate leaderships, including the committee leaders and other influential members, make selections based on a variety of factors to determine which issues will be granted the valuable commodity of Congress' attention and limited time. This leadership allows Congressional resources to be focused, because faced with 535 competing individuals of legally equal rank, each offering up an average of almost 29 measures for consideration and action during each two-year Congress, it would be unlikely that anything important would ever be accomplished. The demands on Congress require that leadership be exercised in deciding which problems will be considered. Without leadership, Congress would be faced with a new proposal roughly every 15 minutes, with little time for any members to even begin to understand or debate before hurrying to a vote and proceeding to the next measure introduced.

Congressional leadership, however, faces the same problem as any individual member: how to select the problems—out of the ten thousand or more measures that are currently introduced during each Congress—that will receive attention; and out of those, which ones will actually be presented to the body-as-a-whole for approval or rejection. That is, which issues will be placed on the agenda, and which will make it to the decision agenda?

Roughly three-quarters of all measures reported or placed on the Congressional calendar die, either because they are voted down, or because they are never called for a final vote. They have made it onto the agenda, but they don't survive on the decision agenda. Under such conditions, and constrained by competing duties and imperatives, individual members of Congress will have little time to learn about each issue or formulate preferences. Instead, they will likely rely on review and recommendation by their own staff, the opinions of other members, the recommendations of their political party's leadership in their chamber, or their own personal and political ideology. Because members serve on committees, they may spend considerably more time and effort on some issues and virtually none at all regarding others. Hence, even if a member is familiar in general with the issue, it is not likely that any individual member has a clear idea of a bill's specifics when it comes time to cast a vote.

Through hearings and other processes internal to Congress, the recommendations for possible solutions will likely come from outside interest groups, which in our pluralistic society, would likely include federal agencies, the administration, and private organizations of various sorts with interest in the particular topic.

In the case of LLRW, the issue had first moved onto the Congressional agenda during 1975, when problems with leaks at several of the disposal sites became apparent (Business Week, 1976). Table 2 illustrates some key developments in LLRW in relation to the stages of multiple streams policy development. This is an example of a focusing event drawing Congressional attention and moving the issue onto the agenda. Even before that, the utilities realized that their new nuclear power plants would be generating waste, and as experience increased, the operators realized that they were generating more waste than initially predicted (Mullarkey et al, 1976). This is an example of indicators suggesting a worsening condition. In

response, Congress placed the issue on its agenda by initiating policy-formulation activities. This included activities such as investigations by its accounting and auditing branch, the General Accounting Office (GAO, 1976; GAO, 1978; GAO, 1980) and convening hearings in various committees, such as the House Committee on Government Operations, Subcommittee on Conservation, Energy and Natural Resources (Congressional Information Service [CIS], 1976; CIS, 1977). During 1975, the President and Congress directed the Department of Energy, Nuclear Regulatory Commission and the Environmental Protection Agency to begin investigating various aspects of the nuclear waste problem and develop improved procedures and regulations. This administrative review and development represents the implementation phase, given that the agencies were already implementing prior waste policies. This investigation would lead to improved regulations and procedures for dealing with waste generated by both commercial generators and the nuclear weapons complex, *under prior policy*, as well as reports to the President and Congress that would be used in future policy development.

During the period 1974 through 1979, the number and severity of trends and focusing events increased. In relation to LLRW, three of the six disposal facilities were found to be leaking, and for various reasons, were permanently closed by the NRC or the states where they were located. In April 1978, when the last of the three closed, the governor of South Carolina took steps to reduce the volume of waste accepted at the Barnwell site, saying “We will not be the repository of low-level wastes from all over the country,” (Chemical Week, 1978). This marked the beginning of entrepreneurial activity by the governors of the three remaining sited states. Over the next two-plus years, the governors and other officials, including members of the Congressional delegations of South Carolina, Washington and Nevada took steps to limit the volume of wastes accepted, challenged the existing system of regulation and enforcement in

order to reduce risks, and lobbied for a change in the existing system to create a more equitable distribution of disposal capacity. The temporary closure of the Richland and Beatty facilities in 1979 focused attention on the potential disruption to medical research, diagnosis and treatment, as well as to other segments of the nuclear industry, that could occur if no disposal capacity was available. This development seems to have been the event that finally put the LLRW issue on the decision agenda: following hearings on this possibility in early November 1979, new legislation was introduced and placed on the Congressional calendar for 1980.

As mentioned earlier, LLRW was not the only radioactive waste issue seeking placement on the Congressional agenda. The commercial reprocessing of spent nuclear fuel was temporarily banned by President Ford in 1975, and President Carter made the ban permanent in 1977, shortly after taking office. This created a new problem: the nuclear industry had expected to begin reprocessing spent fuel in the late 1970s. Without reprocessing, the temporary storage pools at the existing—and future—nuclear power stations would be inadequate for long-term storage. While disposal of high-level radioactive waste (the leftovers of reprocessing) had been anticipated, no disposal facility had yet been sited. With the ban in place, alternative storage options would have to be developed.

The problem of millions of cubic feet of radioactive mining and mill tailings at thousands of sites around the American west also needed to be resolved. The waste contained the radium and other radioactive decay products separated from uranium. Some of the waste predated World War II and the beginnings of the nuclear age, dating back to the early 20th Century and the radium mining craze. The vast majority, however, had been created since 1941 to provide uranium for the atomic weapons program, and later, the nuclear power industry. They were,

however, essentially unregulated, and presented significant hazards to local populations and future generations.

Also related to nuclear weapons research, development, testing and production were huge quantities of waste distributed at hundreds of Department of Energy and Department of Defense facilities, including spent nuclear fuel awaiting reprocessing, high-level waste from prior reprocessing, and low-level radioactive waste. All these issues became linked in October 1977, when Maryland's Senator Charles Mathias, Jr., and Vermont's Rep. James Jeffords introduced the Nuclear Waste Management Act, which would have created a federal Nuclear Waste Management Authority to handle all radioactive waste in the nation, regardless of its origin, meeting EPA-set health and safety standards under an NRC license (Humphries 1977; CIS, 1977). Other measures were introduced between 1978 and 1980 dealing with various aspects of the waste issue and proposing various solutions (Library of Congress, 2004b), but none progressed to the decision agenda. In early 1980, however, President Carter, responding in part to pressure from Congress and industry, proposed his own comprehensive radioactive waste package. While this version never advanced, more hearings were held and comprehensive waste bills were reported to the floor of both the House and the Senate for inclusion on the calendars. The Senate debated and approved their version in July 1980, while the House did not bring their version to the floor until December. Considerable differences existed between the two versions that could not be resolved during the waning days of the first lame-duck session in decades. The key issue hanging up agreement was the question of a state veto power over siting of a national repository for spent nuclear fuel and high-level radioactive waste, an issue that surfaced again and again in the floor debates (Congressional Record, 1980a). With time running out, sponsors in both houses huddled and developed a compromise: dropping most of the bill's provisions and

passing only the LLRW portion as a separate matter. This surprising decoupling of LLRW from the rest of the radioactive waste issues allowed Congress to approve at least part of the needed legislation. Sponsors agreed that the rest of the bill would be reintroduced early in the next session (Congressional Record, 1980b). In the end, it took until December 1982 for Congress to pass the rest of waste management act.

In the radioactive waste debate, the issue of federalism and states rights arose in at least two different contexts: first, as a needed balance between the growing power of the federal government and its agencies (specifically the Department of Energy) in determining where and how spent nuclear fuel and HLRW would be stored or disposed of; and second, as the underlying reason for the LLRW compact system. The states, over the prior five years, had argued repeatedly that the record of the DOE, NRC and other federal agencies in dealing with radioactive waste was less than stellar. States, being closer to the facilities where waste was produced and stored or disposed than the federal government, inherently had a greater interest in ensuring safe and proper operation of the facilities. Thus, the argument ran, states should have a veto power, which could be overridden only by Congress, to balance the federal agency's power. In the case of LLRW, since states had been involved in the regulation of LLRW since 1962, it was argued that they should take the lead role in resolving the disposal problem on a regional basis. The federal agencies (NRC, DOE and EPA) would provide support for the state initiative by promulgating and helping enforce standardized regulations regarding classification, packing, shipment and disposal of the waste. States and compacts at their own option could impose stricter disposal standards than those of the federal government.

The question of federalism, states rights, and the growing power of the federal government had been themes developing throughout the 1970s (Footlick and Cook, 1975; U.S.

News and World Report, 1979; Mathews et al, 1979; The Economist 1980). One specific origin of the debate was the program started under President Nixon that sent grant money directly from the federal government to county and municipal governments, bypassing the states, which had traditionally administered all such grants. The National Governors' Association, the National Conference of State Legislatures and other groups represented state interests in opposition to this policy. Many were concerned about the growing size, budgets and regulatory authority held by federal agencies, and the debate raged in the public media as well as in Congress. The issue often impinged on floor debates and committee hearings, so it was not overly surprising that states' rights was the key for LLRW policy. Federalism and radioactive wastes, of course, were only two of the issues confronting Congress during the latter half of the 1970s. Table 3 presents a few of the issues in Congress during the 1980 session, while Figure 1 illustrates the decision making options confronting Congress, and Figure 2 illustrates the multiple streams framework during the same period.

Certainly, the states' rights/federalism issue could be considered as one component of the political stream, part of the "national mood." Other indicators of national mood might include the energy crises, inflation and recession, unemployment, growing poverty, and the movement of jobs overseas. There were few pressure-group campaigns related to the LLRW issue. Most of the pressure was in the form of the brinkmanship played by the governors of South Carolina, Washington and Nevada, and the resulting concern expressed by generators to members of Congress. There is scant evidence that the generators of LLRW favored a state-based versus a national solution, even in the statements made before Congress. As for turnover in the administration and Congress itself, there was little evidence that this change in itself was influential in 1980. In fact, in spite of knowing what changes were in store (Reagan assuming

Presidency, Republicans taking control of Senate), the legislation sponsors agreed to reintroduce the comprehensive waste legislation in the new Congress, apparently fully expecting quick resolution of the differences between the House and Senate despite the change in control (Congressional Record, 1980b).

For Congress, passage of the LLRWPA of 1980 “resolved” the issue. However, with President Carter’s signature, the new law pushed LLRW upwards on the agendas of all 50 states, the District of Columbia, Puerto Rico, and the federal DOE and NRC. The DOE created an office to monitor the development of the compacts and to provide technical information and advice to those states that would be constructing. The NRC continued to develop and update regulations, some in conjunction with the EPA and the Department of Transportation, to provide a better and safer basis for the processing, packaging, transportation and disposal of LLRW. The states, some of which had been engaged in informal compact discussions before the policy act passed, now started negotiating in earnest. In addition to establishing compacts, the individual states that would be siting the disposal facilities needed to become Agreement States with the NRC, and pass legislation and develop regulations to implement their siting programs.

The nature and the history of the legislation severely constrained the states and compacts. Although they were called upon to “manage” LLRW generated within their borders, the “framing” of the issue and its solution was intended to create regional disposal capacity. The delegation of authority to manage the waste, however, did not clarify the problem for the states. State agencies, and more specifically, the state legislatures, found that the LLRW issue was still ambiguous, and being organized anarchies themselves, found themselves while holding hearings and developing legislation and regulations confronted with the same ambiguities that had

confronted Congress. There were a variety of options to pursue, and no clear way to determine which option was the best.

Other management alternatives—such as long term storage of waste, segregated disposal of waste streams, and application of volume reduction technologies and procedures—had been discussed during the hearings that had led up to the adoption of the LLRW policy, but were not clearly outlined as options for the compacts. Given the significant time constraints under the law (compacts had to be formed and disposal facilities opened by January 1, 1985), many states felt they did not have time to investigate these other options. Indeed, alternatives such as volume reduction could be mandated only through NRC regulations. In other words, possibly valid management options were placed outside the control of those responsible for waste disposal management. Walters (1975) and Staw and Ross (1989) provide investigations of the consequences of the foreclosure of options. Foreclosure prevents decision makers from adapting to changing conditions in the future. Since the LLRWPA mandated creation of regional facilities, based on the assumption of continuing growth in LLRW volumes, when that growth halted, and then reversed (as it did in the middle 1980s), there was no provision to adapt to the changing conditions. Declining volumes are important because the reduction in volume greatly increased the costs of the planned facilities, both for the states and the generators who would be paying for disposal.

The decline in disposal volumes was a result of two primary factors. First, the clearer definition and classification of LLRW, and the application of stricter NRC regulations on the processing, treatment, packaging and disposal of the wastes increased costs for generators. While volume reduction was not mandated, waste form and packaging were, and the costs involved in meeting those requirements tended to support a move by generators to reduce the volume

needing disposal. (Paine, 2003; Ortziger, Kelbe and Corpstein, 1998; Ortziger, Klebe and Corpstein, 1999) These regulatory changes were requested by Congress well before the policy act in 1980, and indeed, were mostly in place between 1981 and 1984. Second, the sited states began to increase the fees required for disposal. This accelerated with the passage of the LLRW Policy Amendments Act in 1985, which set forth a series of milestones along with increasing surcharges on waste disposal, and eventual denial of access if the milestones were not met on schedule. Both of these developments increased the cost to generators for disposal (the total cost of which includes not just placing the waste in the ground, but all the steps up to disposal). The result was increasing costs for generators, and an incentive to find ways to reduce overall disposal costs. Generators responded to these economic incentives by reducing the volume of waste requiring disposal (via better process planning, segregation of contaminated from non-contaminated wastes, and utilizing waste compaction and concentration techniques and technologies), reusing some items and materials that otherwise would have been disposed of (via cleaning and other treatments), and utilizing recycling where appropriate. These two developments and the generators' response were entirely outside the realm of control of the states and compacts attempting to establish new disposal capacity, but impacted their siting and facility design options. Initial plans were based on estimates created during the early to middle 1980s, while waste volumes were still high. The application of volume reduction in the face of rapidly rising costs caused the growth to slow, and then reverse. (Manifest Information Management System, 2003) This change represents the kind of chaotic development typical of complex, ambiguous systems. The focus of the policy and its inflexibility in the face of changing conditions led to a situation where states and compacts could not justify completion of new

facilities because the cost of disposal would be prohibitively high (Nuclear Waste News, 1992; GAO, 1992; GAO, 1995; GAO, 1999; Ortziger, Klebe and Corpstein, 1998).

Conclusions

Policy entrepreneurship took advantage of both trends and events (in some cases creating the events) that helped place the LLRW issue on the Congressional agenda during the 1970s, culminating with its move onto the decision agenda and the approval of the LLRW Policy Act of 1980. The states and federal agencies implemented the program, resulting in the formation of regional interstate compacts for waste disposal, although several states chose not to join compacts. In part, these state decisions were the result of remaining ambiguity in the issue, including reluctance to become a host for a radioactive waste disposal facility. At least five of the roughly 14 siting programs established under the policy act got as far as naming a site before halting. No additional disposal capacity has been constructed, and two of the three remaining sites are still in operation.

In 2003, there were 10 LLRW compacts in existence with 44 member states. The six other states, plus Puerto Rico and Washington, D.C., are “go it alone” states (Nuclear Regulatory Commission, 2000). Two states have been kicked out of compacts, and one withdrew voluntarily. That state and another original “go it alone” state have separately formed new compacts. Part of the original justification for the compact system was the proposed “regional compactness” of having neighboring states band together to deal with the issue. However, five of the compacts are formed of non-contiguous members, thus undermining the “regional” rationality for the plan.

The exclusive focus of the LLRWPA and its 1985 amendments on formation of compacts and creation of additional disposal capacity constrained the states (as well as the federal agencies involved) in their approach to the issue. However, since siting efforts began to fail in the early 1990s and waste disposal volumes dropped to a small fraction of their peak, and have largely remained at low levels, a number of states and other organizations have suggested doing away with the compact system in favor of more market-based solutions (American Ecology 1998; Ortziger, Klebe and Corpstein, 1999). In addition, a third disposal facility is in the process of entering the equation, although it is currently outside of the compact system. Envirocare of Utah operates a disposal facility for chemically hazardous and slightly radioactive (high-volume, low-activity) wastes in the northwestern part of the state. It has applied for and been granted state licenses to dispose of traditional “containerized” LLRW, although accepting such waste will require construction of a special facility at the site, which the company has not yet done. The sited states and the other compacts have not objected. The facility has available capacity to handle the nation’s commercial LLRW waste for at least a century (Paine, 2003).

Congress has refused to revisit the LLRW issue, however. This can be explained through the multiple streams framework as a case where the issue is low, and remains low, on the Congressional agenda because there are no negative trends and no immediate crises or focusing events that would push the issue higher on the agenda. In short, while the LLRW policy may not be working as intended, it also isn’t much of a problem, and therefore requires no further application of time and attention by Congress.

References

Albrecht, S. L., and Amey, R.G. (1996). The Siting of Radioactive Waste Facilities: What are the effects on communities?" *Rural Sociology*, 61, 649-673.

American Ecology. (1998). *American Ecology chairman calls for repeal of federal LLRW policy*. [Company press release, September 3, 1998.]

Amey, R.G., Albrecht S.L., and Amir, S. (1997). Low-Level Radioactive Waste: Policy Failure, Regional Failure? *Regional Studies: The Journal of the Regional Studies Association*, 31, 620-630.

Blankenau, J. (2001). The fate of national health insurance in Canada and the United States: a multiple streams explanation. *Policy Studies Journal*, 29, 38-55.

Marice, A.A. (1993). The Low-Level Radioactive Waste Policy Act and the Tenth Amendment: A "Paragon of Legislative Success" or a Failure of Accountability? *Ecology Law Quarterly*, 20, 267.

Bremen, S. S., and Visocki, K. (1992). In Search of Equity: Development of a Regional System for Managing Low-Level Radioactive Waste in the United States. *Forum for Applied Research and Public Policy*. Retrieved March 15, 2004, at www.secompact.org/speeches/

Business Week. (1976). New alarms about old nuclear wastes. *Business Week*, February 2, 1976 [Industrial edition]. Retrieved March 2, 2004 from <http://web.lexis-nexis.com/universe>

Chemical Week. (1978). Squeeze on wastes. *Chemical Week*, April 12, 1978. Retrieved March 2, 2004, from <http://web.lexis-nexis.com/universe>

Coates, D., and Munger, M.C.. Interstate Compacts Can't Solve Collective Bads Problems: The Case of LLRW.

Coates, D., Heid, V., and Munger, M. (1994). Not Equitable, Not Efficient: U.S. Policy on Low-Level Radioactive Waste Disposal. *Journal of Policy Analysis and Management*, 13, 526-538.

Cohen, M.D., March, J.G., and Olsen, J.P. (1972). A Garbage Can Model of Organizational Choice. *Administrative Science Quarterly*, 17, 1-25.

Congressional Information Service, Inc. 76 CIS H 40137. Hearing index retrieved March 9, 2004, from <http://web.lexis-nexis.com/congcomp/>

Congressional Information Service, Inc. 77 CIS H 44151. Hearing index retrieved March 9, 2004, from <http://web.lexis-nexis.com/congcomp/>

Congressional Record. (1980a). [July 29, 1980: 20135-20138; July 30, 1980: 20360-20367; December 3, 1980: 31924-31946]. Washington, D.C.: Government Printing Office.

Congressional Record. (1980b). [December 13, 1980: 33961-33967; 34129-34132] Washington, D.C.: Government Printing Office.

Dodson, A.L. (1998). Interstate compacts to bury radioactive waste: a useful tool for environmental policy? *State and Local Government Review*, 30:2, 118-128.

Economist, The. (1980). Governors demand their rights. *The Economist*, August 30, 1980. Retrieved March 17, 2004, from <http://web.lexis-nexis.com/universe>

Elson, P.R. (2002). Advocacy and Third Way Politics: Canada and the UK. *Third National Forum for the Public Policy and Third Sector Initiative: Advocacy, Engagement and Consultations: the Voluntary and Government Sectors*. [Presented October 25-26, 2002.] Retrieved March 15, 2004, at www.queensu.ca/sps/thirdsector/conferences/elsonpresentation.doc

English, M.R. (1992). *Siting low-Level Radioactive Waste Disposal Facilities: The Public Policy Dilemma*. Quorum Books.

Footlick, J.K., and Cook, W.J. (1975). Return of the Posse? *Newsweek*, May 26, 1975. Retrieved on April 1, 2004, from <http://web.lexis-nexis.com/universe>

General Accounting Office. (1976). *Improvements needed in the land disposal of radioactive wastes—a problem of centuries*. GAO/RED-76-54. Washington, D.C.: General Accounting Office.

General Accounting Office. (1978). *Statement of Monte Canfield, Jr., Director, Energy and Minerals Division, Before the Subcommittee on Nuclear Regulation, Senate Committee on Environment and Public Works*. Washington, D.C.: General Accounting Office.

General Accounting Office. (1980). *The problem of disposing of nuclear low-level waste: where do we go from here?* EMD-80-68. Washington, D.C.: General Accounting Office.

General Accounting Office. (1983). *Regional low-level radioactive waste disposal sites—progress being made but new sites will probably not be ready by 1986*. GAO/RCED-83-48. Washington, D.C.: General Accounting Office.

General Accounting Office. (1992). *Nuclear Waste: Slow Progress Developing Low-Level Radioactive Waste Disposal Facilities*. GAO/RCED-92-91. Washington, D.C.: General Accounting Office.

General Accounting Office. (1995). *Status of Commercial Low-Level Waste Facilities*. GAO/RCED-95-67, May 5, 1995. Washington, D.C.: General Accounting Office.

General Accounting Office. (1999). *Low-Level Radioactive Wastes: States are not Developing Disposal Facilities*. GAO/RCED-99-238. Washington, D.C.: General Accounting Office.

Hayden, F.G., and Bolduc, S.R. (1997). Political and economic analysis of low-level radioactive waste. *Journal of Economic Issues*, 31, 605-613.

Hill, J.S., and Weissert, C.S. (1995). Implementation and the irony of delegation: the politics of low-level radioactive waste disposal. *The Journal of Politics*, 57, 344-369.

Humphries, H. (1977). [Dateline: Washington. The Associated Press, October 10, 1977.] Retrieved March 1, 2004, from <http://web.lexis-nexis.com/universe/>

Hunold, C. (2002). Canada's low-level radioactive waste disposal problem: voluntarism reconsidered. *Environmental Politics*, 11:2, 49-72.

Kearney, R.C., and Smith, A.A. (1994). The low-level radioactive waste siting process in Connecticut: Anatomy of a failure. *Policy Studies Journal*, 22, 617-630.

Kingdon, J. W. (1984). *Agendas, Alternatives and Public Policies*. New York: HarperCollins. [Second edition published 1995].

Kunreuther, H., and Easterling, D. (1996). The Role of Compensation in Siting Hazardous Facilities. *Journal of Policy Analysis and Management*, 15, 601-622.

Library of Congress. (2004b). [Bill Summary and Status: search “radioactive waste” and “low-level radioactive waste.” For 93rd through 100th Congresses.] Retrieved March 10, 2004, at thomas.loc.gov/cgi-bin/bdquery

Library of Congress. (2004a). [Resume of Congressional Activities, for 91st through 107th Congresses.] Retrieved March 30, 2004, at thomas.loc.gov/cgi-bin/bdquery

Lorendahl, B.A. (1991). Ambiguity and choice in processes of region development and company location. *Scandinavian Journal of Management*, 7, 251-269.

Manifest Information Management System, 2003. [no longer available online]. U.S. Department of Energy, Idaho National Environmental and Engineering Laboratory.

Mathews, T., with Lubenow, G.C., Kasindorf, M., and Borger, G. (1979). The angry west vs. the rest. Newsweek. Retrieved April 1, 2004 from <http://web.lexis-nexis.com/universe>

Mostaghel, D. M. (1994). The Low-Level Radioactive Waste Policy Amendments Act: An Overview. *De Paul Law Review*, 43, 379.

Mullarkey, T.B., Jentz, T.L., Connelly, J.M., and Kane, J.P. (1976). *A survey and evaluation of handling and disposing of solid low-level nuclear fuel cycle wastes*. Washington, D.C.: Atomic Industrial Forum.

Nuclear Regulatory Commission. (2000). [Illustration of compacts]. Retrieved March 31, 2004, from www.nrc.gov/images/waste/llw-disposal/fig040.gif

Nuclear Waste News. (1992). Researchers call for new decentralized LLW system. *Nuclear Waste News*, December 3, 1992.

Ortciger, T.W., Klebe, M., and Corpstein, P. (1998). Modeling the impact of declining waste volumes for input to the economic and development strategies of the new LLRW disposal facilities for Illinois. Waste Management '98. Post, R.G., ed. Tucson, AZ: University of Arizona Board of Trustees.

Ortciger, T.W., Klebe, M., and Corpstein, P. (1999). Illinois Department of Nuclear Safety bridges over LLRW compact system problems with unique storage solution. Springfield, IL: Illinois Department of Nuclear Safety.

Paine, J.R. (2003). Modeling the NIMBY phenomenon: Why “Not in My Back Yard?” [Unpublished master’s thesis, the University of Illinois at Springfield, December 19, 2003.]

- Saunders, K. (2002). Nuclear Waste Dumps: a review of the United States Experience. Australian Conservation Foundation.
- Staw, B.M., and Ross, J. (1989). Understanding behavior in escalating situations. *Science*, 246, [October 13, 1989].
- Stout, Karen Evans, and Byron Stevens. The Case of the Failed Diversity Rule: A Multiple Streams Analysis. *Educational Evaluation and Policy Analysis*, 22, 341-355.
- Tano, M.L. (1999). *The nuclear regulatory commission's low-level radioactive waste disposal program and the trust doctrine*. Denver, CO: International Institute for Indigenous Resource Management.
- Tichenor, D.J. (2002). *Dividing Lines: The politics of immigration control in America*. Princeton, NJ: Princeton University Press.
- Travis, R. and Zahariadis, N. (2002). A multiple streams model of U.S. foreign aid policy. *Policy Studies Journal*, 30, 495-514.
- U.S. News and World Report. (1979). Challenges of the '80s: "last Hurrah" for old-time politics? U.S. News and World Report, October 15, 1979. Retrieved on April 1, 2004, from <http://web.lexis-nexis.com/universe>
- Wagner, J. (1998). That was then and this is now: an economist's wish list for the LLRW siting paradigm. *Natural Resources Journal*, 38, 635-649.
- Walters, C.J. (1975). *Foreclosure of options in sequential decisionmaking*. [Research report RR-75-012. Vienna, Austria: International Institute for Applied Systems Analysis.
- Weissert, C.S., and Hill, J.S. (1994). Low-level radioactive waste compacts: Lessons learned from theory and practice. *Publius: the Journal of Federalism*, 24:4, 27-
- Zahariadis, N. (1992). To sell or not to sell? Telecommunications policy in Britain and France. *Journal of Public Policy*, 12, 355-376.
- Zahariadis, N. (1995). *Markets, States and Public Policy: Privatization in Britain and France*. Ann Arbor: University of Michigan Press.
- Zahariadis, N. (1996). Selling British Rail: An idea whose time has come? *Comparative Political Studies*, 29, 400-422.
- Zahariadis, N. (1999). *Ambiguity, Time, and Multiple Streams*. Chapter 4, 73-93, in Sabatier, P.A. *Theories of the Policy Process: Theoretical Lenses on Public Policy*. Boulder, Colorado: Westview Press.

Zahariadis, N., and Allen, C.S. (1995). Ideas, networks, and policy streams: privatization in Britain and Germany. *Policy Studies Review*, 14, 71-89.

Table 1. Stages of Congressional Activity Related to Actors, Actions, and Historical Record of Congress

| Stage | Formulation: Pre-Selection | | Formulation: Agenda | Formulation: Decision | | Implementation |
|---------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------|------------------------------------------------|----------------------------------|---------------------------------------|
| Actors | All Senators and Representatives | Chamber Leadership | Committee Leadership and Members | Chamber Leadership | All Senators and Representatives | Federal Agencies and/or States |
| Action | Introduce Measures | Send Measures to Committees and Place on Calendar | Hold Hearings, Markups, Send Reports to Floor | Call Up Measures for Debate and Vote | Debate and Vote | Carry Out Activities Mandated in Laws |
| Record: Measures Bills Percent | 262,569 introduced 213,538 introduced 81.3% of measures | 35,275 on calendar or reported 16.5% of bills | | 9,425 enacted into Public Law 4.4% of bills | | |

* Total measures introduced in Congress and number of bills introduced; bills reported or placed on calendar; and public laws enacted between beginning of 91st Congress in January 1969 and end of 107th Congress in December 2002.

Source: Thomas.gov, *Resume of Congressional Activity*, 91st through 107th Congresses. Accessed March 30, 2004, at <http://thomas.loc.gov/home/resume>

Table 2. Year-by-year development of LLRW issue related to Multiple Streams framework stages.

| Year | Trend or Event | Agenda Activities | Decision Agenda Activities | Implementation |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1974 | = Radiation leak at Maxey Flats facility = Atomic Industrial Forum starts LLRW investigation panel | | | |
| 1975 | = West Valley facility closes due to radiation leak = Ford initiates Reprocessing ban | = GAO report on LLRW requested = radioactive waste hearings scheduled for early 1976 | | = DOE, NRC, EPA directed to investigate radioactive waste disposal issues, develop regulations and recommendations for Congress and President |
| 1976 | = Radiation leak at Sheffield facility =AIF releases LLRW report | = GAO report issued = radioactive waste hearings held | | |
| 1977 | = Carter makes reprocessing ban permanent = West Valley reports in media = Maxey Flats closed | = more waste hearings held = bills introduced advancing specific solutions | | |
| 1978 | = Sheffield closed = Media reports on Sheffield = South Carolina imposes disposal limits at Barnwell | = more waste hearings held = more bills introduced advancing specific solutions = GAO comments on several bills in hearings | = tailings act reported, enacted | = DOE, NRC, EPA present information in Congressional hearings |
| 1979 | = Three Mile Island accident = Governors shut Beatty, Richland facilities; South Carolina imposes stricter limits = Church Rock mill tailings accident = National Governors' Association task force on LLRW formed | = more waste hearings held = more bills introduced advancing specific solutions | | = States begin informal compact talks = DOE, NRC, EPA present information in Congressional hearings |
| 1980 | = Carter introduces 'comprehensive' radioactive waste legislation = State Planning Council on LLRW formed = Media reports on medical, research problems if LLRW disposal stopped | = more waste hearings held = more bills introduced advancing specific solutions = GAO report issued | = Nuclear Waste Policy Act (NWPA) put on calendar = NWPA debated = Floor debates, amendments, votes = LLRWPA passed | = DOE, NRC, EPA present information in Congressional hearings |
| 1981 | | = NWPA reintroduced | | = States begin formal compact discussion = States begin developing programs and legislation for LLRW siting programs = DOE begins to set up LLRW support program = NRC issues disposal regulations, under development since 1975 |

Source: Congressional and media reports.

Table 3. Sample of Issues in the Congressional Garbage Can—96th Congress, Second Session (1980)

| Jan. 28, 1980¹ | April 21, 1980¹ | Aug. 25, 1980¹ | Dec. 15, 1980² |
|------------------------------------------|------------------------------------------|-------------------------------------------------|----------------------------------|
| Counter Soviet Aggression | Taxes and tax relief | Taxes and tax relief | Defense spending increase |
| Punish Iran | Draft Registration | 1981 Budget, appropriations | 1981 Budget, appropriations |
| Inflation | Saturday Mail Delivery | 12 miscellaneous reauthorizations | School busing |
| Recession | SALT II ratification | Hazardous waste disposal | Hazardous waste disposal |
| Welfare Reform | Coal conversion | Energy mobilization board | Congressional pay raise |
| Health Insurance | Housing aid | Housing aid | Housing aid |
| Alaskan lands protection | Alaskan lands protection | Alaskan lands protection | Alaskan lands protection |
| Hospital cost containment | CIA Charter | CIA Charter | |
| Urban grants | Criminal Code revisions | Criminal Code revisions | |
| Education/jobs for underprivileged youth | Education/jobs for underprivileged youth | Education/jobs for underprivileged youth | |
| | Food Stamp abuses | Railroad deregulation | |
| | GI Bill | Partial deregulation of communications industry | |
| | Tax-free bonds | Disposal of nuclear waste | |
| | | Sale of nuclear fuel to India | |
| | | Pay increase for federal workers | |

1) U.S. News and World Report

2) Newsweek

Extended Endnote from Page 3

My own master's thesis (Paine, 2003) was a social-constructionist critique of the previous genre (technical approach), and the professional reliance on technical scientific information on geological, geographical, environmental, economic, and engineering in siting programs overall.

In my thesis, I used the history of the Illinois LLRW siting project to illustrate the internal inconsistencies and shortcomings of the particular rationalistic mindset that originated and attempted to implement the siting projects. This "technical rationality" perspective relied heavily on a traditional economic and political model of the rational "economic man," along with a Weberian organizational hierarchy of authority, and procedure under a highly concentrated republican form of decision making and implementation.

This technical perspective conflicted with the much more complex, and often sloppier, world of politics and social relationships within which siting projects must occur, that is, within the more general "community rationality" and more open, publicly-oriented government processes that have been developing in our culture over the past several decades.

As early as 1977, officials from South Carolina were already casting the LLRW problem in terms of regional equity, and the solution in terms of federalism and state initiative. This eventually came to be the approach in the national decision-making garbage can. Can the overall failure of this policy be traced to the initial framing of the problem and the solution that was selected for adoption? In preparing this paper, I considered several alternative models.

Institutional Rational Choice would appear unable to easily handle a subject of this magnitude, although in general it does appear to have at least some applicability to the problem.

The question of rational choice—of rationally behaving actors from an economic standpoint—does not appear to fit as well in this particular problem, however.

Congressional decision making is not strictly rational because in the ideal situation, as outlined by Adam Smith (1776) and extended by others, the individual would have complete information on the problem and all possible solutions, would incur no cost in acquiring that information or in processing it, and would experience no limits on his or her ability to calculate which alternative solution would give the maximum benefit.

As recognized by Simon and many others, these conditions are never met in the real world, even under the simplest of circumstances, and Congress—despite many assertions to the contrary—does exist in the real world. Therefore, members of Congress do not have complete information on every measure that is introduced and its alternatives; there are considerable costs associated with acquiring that knowledge; and members have severely constrained computational powers to determine which proposals are the best options to fill the public good most effectively and efficiently.

This applies not only to all the measures introduced, but also those issues selected for inclusion on the agenda, or even the much shorter decision agenda. Simon advances the concept of “bounded rationality,” but even “satisficing” may not be enough because on many, perhaps even most issues, an individual Senator or Representative may not be able to form a preference even based on “rules of thumb.”

The **punctuated equilibrium framework** does make the astute observation that in most policy domains, incremental change over time is the norm, with occasional interruptions during which significant changes to policy take place. I look at the issue in some detail here.

In the field of radioactive waste policy, between the discovery of naturally radioactive materials in 1898 and the Manhattan Project during World War II, there was essentially no regulation of radiation or radioactive materials in the United States. During the war years, waste materials from research and weapons production was handled via dispersion into the environment or burying in shallow trenches. Following the passage of the Atomic Energy Act of 1946, and its revision in 1954, the Atomic Energy Commission was responsible for the disposal of all radioactive wastes related to atomic energy and weapons production.

It was not until 1960 that the AEC decided to privatize LLRW waste disposal in the country. The next significant development was passage of the LLRW Policy Act in 1980, and its amendment in 1985. Since then, from a policy standpoint, there has been little change.

Thus, from a regulatory standpoint, several periods of relative inactivity can be seen, interrupted by irregular transformations of the field:

- equilibrium 1898-1942, ended by the Manhattan Project and the war;
- equilibrium 1942-1963, ended by the AEC's decision to privatize disposal;
- equilibrium 1963-1980, ended by the crisis that led to the passage of the LLRWPA;
- a new equilibrium 1981-1985, ended with passage of the Amendments Act of 1985 (as an alternative, the period between about 1977 and 1985 could be looked upon as a prolonged series of interruptions, or an equilibrium of relative disorder); and finally,
- an extended period of equilibrium during the period 1985-2004 as states initially formed compacts and attempted to site regional disposal facilities, and later, postponed facility siting and development in the face of political challenges on the state and local level, and changes in the dynamics of the LLRW industry itself.

While punctuated equilibrium does accurately describe the historical process, it does not offer a causal mechanism to explain developments or predict outcomes.

An obvious choice of framework for investigating this issue today would be the **Advocacy Coalition framework**. However, in the 1980s, the issue had not been around long enough (it only became a recognized “problem,” for certain states beginning about 1976) to meet the framework’s criteria. Now, approaching 24 years since the passage of the waste act, study of the structure and functioning of the coalitions related to radioactive waste over time would likely be productive. However, the process of investigating the various aspects of core beliefs and other features of the framework would require considerably more time, effort and expense than is available for the current project.

For this paper, I selected the **multiple streams framework** because the problem met the criteria set out by Kingdon (1995) and Zaharaidis (1999). First, it is possible to draw a line around the LLRW issue as it stood in the 1975-1980 time period in order to separate it systemically and conceptually from other radioactive wastes and other issues involving nuclear power, even though it is in reality not so separate.

In the original garbage can model, there was little sense of order or authority. However, Kingdon operates on the assumption that there is some order that controls agenda-setting within the garbage can. He clearly acknowledges that Congress does have order, but does not spend time elucidating it. I will go beyond the existing framework to suggest that there must be some order within Congress, because it is possible to identify an agenda, and the selection of problems and solutions for those problems as they rise and fall on the agenda. In Congress, there are two kinds of related order: structure and power, with the latter using the former to set and advance the overall agenda. The structure is the basic division between the House and Senate, and the

roughly parallel system of committees and subcommittees within and between the two bodies. Power, on the other hand, is the authority that the majority party holds by controlling leadership, and thus the procedural and structural aspects of each body. This extends down to the subcommittee level, so that subcommittee and committee chairs, selected by the leadership, decide which issues may or may not get attention. The relative powers of the floor leadership vis-a-vis the committee chairs, however, is not constant, leading to an ambiguous situation in which a chair may hold enough power to be able to block bills that his or her leadership may strongly support. Even when there is cooperation between the leadership and the chairs, because of the nature of the system, few floor leaders can fully control the members of their own parties, leading to situations where leadership may push an item up for decision, but cannot ensure that his own party will vote for it.

Because there are always so many issues competing for Congress' time and resources, some issues do not get considered until there is some event that pushes that item up onto the agenda and the decision agenda. In the case of LLRW, the issue had moved onto the agenda beginning about 1975, when problems with leaks at several of the disposal sites began to become apparent. Hearings, GAO investigations and reports, and other activities related to LLRW received Congressional attention beginning in 1976, often in combination with other radioactive waste issues, such as mill tailings and spent nuclear fuel.

Through concerted action, the governors of South Carolina, Nevada and Washington (in conjunction with the National Governors' Association and other organizations) managed to get the issue pushed up onto the decision agenda in 1979 and 1980. Congress acted, but then found the issue pushing up onto the agenda again five years later. While the compact solution has not resulted in the desired solution, and each year there are numerous calls for a Congressional

revisitation of the issue, the lack of any immediate crisis makes it unlikely that the issue will return to the agenda anytime soon.

The implications of this are somewhat obvious. Let me summarize: Congress grabbed out of the garbage can a solution that strongly and specifically favored a particular solution to the problem. This had the effect of pushing LLRW disposal and compact formation upwards on the agendas of the state legislatures, which responded by forming compacts and authorizing siting projects—although that took considerably longer than originally anticipated. While states and compacts apparently could have considered other alternatives (and most did choose to pursue more advanced disposal options than shallow land burial in earthen trenches), the fairly short timeline of the 1980 and later the 1985 acts severely constrained which options they could consider, effectively foreclosing consideration of any other options, or of considering how changing conditions within the LLRW industry might impact the compacting/siting process.

Because states were thus limited by the decisions in the federal garbage can and essentially pushed into supporting the option Congress had mandated (even if it was at the behest of the states), the states and compacts began to implement the policy as it was originally intended.

However, I would argue that a multiple-streams approach could also be applied to the overall problem of radioactive waste, of which LLRW is but one component, and to nuclear power, which is one of the primary sources of LLRW. Both radioactive waste and nuclear power are clearly much more separable as “systems” of entities and interactions. The framework, however, does allow the analyst to approach as the unit of analysis, either a system or a separate decision. The “resolution” of the LLRW issue—that is, the passage and implementation of the LLRW Policy Act of—certainly meets this model’s criteria for a unit of analysis.

Second, the LLRW issue was and is still ambiguous, meaning that there are multiple ways of considering a situation or phenomenon. Certainly, the implications are different when LLRW is considered separately as a system, or as a subsystem of either a more general radioactive waste issue, or as related to nuclear power, its primary source.

Nuclear power itself is a very ambiguous issue, with implications in public health, consumer issues, energy policy, environmental policy, national security, and other arenas. Indeed, repeatedly over the years, the impact of limits to disposal options for LLRW generated by research, product development and especially medical research, diagnosis and treatment proved important in the decision-making process. Interestingly, I could find no evidence to suggest that the utilities or other LLRW generators specifically supported any given over any other alternative, although deeper research might show such support. In essence, generators' desires were easily accessible, low-cost disposal sites. Whichever alternative that could ensure that was the option to gain their support. The solution advanced—the formation of regional compacts—was a solution from outside of the nuclear industry. It originated in a growing dissatisfaction with the federal government, and a perception of a weakening relationship between the states and the federal government. This ties in with the concept of national mood.

In the case of LLRW, the solution did not come from within the nuclear industry. In fact, it did not come from within any technical field. It came from the world of politics and federal-state relations. Congress had already suggested to the NRC and DOE that LLRW needed clearer definition and regulation, and work on the various issues related to generation, treatment, classification, packaging, shipment and disposal had started—largely in response to concerns expressed in the nuclear industry, during the early to middle 1970s. The industry—utilities, academic, medical and industrial researchers, health care interests, among others—expected a

regulatory solution to the problems that faced the industry, in partnership with the federal and state regulating entities. Obviously, because the problems and solutions were being pursued by the same groups in an arena (that is, the administrative agencies) that is not clearly a garbage can situation, the problem and solution streams were closely related.

However, once Maxey Flats, West Valley and Sheffield were closed, the governors of the three sited states, especially Gov. Edwards of South Carolina framed the problem in an entirely different manner and suggested an entirely different kind of solution, one based not on economics or safety or best practices of the industry, but on politics and a notion of equity and anti-centralized governmental functions. This study was not sufficiently detailed to be able to determine if this framing was done with input or support from the industry, federal regulators, or other interested parties, or whether a state solution had been advanced for this or any other similar issues by others. This would then be an example of a solution from an entirely unrelated stream being linked to a problem from a different stream, or perhaps even a case of a solution looking to find a problem.

The LLRW policy decision took place in Congress, an arena which definitely meets the description of an “organized anarchy,” which are ambiguous decision-making situations characterized by the following three properties: fluid participation, problematic preferences, and unclear technology. I do not look into these properties here.

Third, the role of time in the resolution of the issue is paramount. “Who pays attention to what and when is critical,” Zaharaidis says (1999, pg. 75), and adds, “Time is a unique, scarce resource.” In the case of LLRW, with time running out in a Congressional session, policy entrepreneurs were able to decouple LLRW—about which most representatives and senators apparently agreed, perhaps because it was a comparatively minor problem for which an attractive

solution had already been advanced—from a comprehensive radioactive waste act (of which LLRW was a small part) and over which there was still considerable (but related) disagreement. In fact, Congress’ action reflected the logic of time and the ambiguous reasoning that a partial policy solution to the overall radioactive waste problem was better than no solution at all.

Finally, the decision situation can be easily separated conceptually into the three distinct streams that characterize this framework. First, in the problem stream, there was a set of issues that Congress was seeking to address during the second session of the 96th Congress, most of which were complex and entirely unrelated to LLRW, although we shall see a few did overlap.

Second, in the policy or “solutions” stream, there were a variety of available solutions for every problem, and several distinctive alternatives existed for radioactive waste in general, and LLRW in particular.

Lastly, in the politics stream, there were developments in the national mood, campaigns by interest groups to have the problem addressed, and the prospect of legislative as well as executive turnover.

That coupling occurred (and in the case of LLRW, a decoupling as well) between a problem, a solution, and political developments is easily demonstrated, as is the presence of policy entrepreneurs who worked to link the three together. Indeed, the coupling of LLRW to the issue of federalism is quite significant, and that particular framing of the issue set the direction for LLRW waste policy as it was adopted.

In addition to meeting the framework’s criteria for the formulation and selection of a policy option, I think this particular case can be used to extend the framework to discuss certain subsequent developments following the selection of a policy option for implementation.

In short, the framing of the LLRW crisis as a question of equity between states, with a need to be resolved as an issue of federalism, caused the subsequent failure of the overall policy through the foreclosure of options available for resolving the initial problem, which in this case was of a dual nature: on the one hand, the prospect of running out of disposal capacity for LLRW, which could have broad effects on society (although these effects were not clearly defined or calculated—or even calculable); and on the other, the political issue of stigma and distributional equity.

My thesis here is that this orientation—resolving an equity issue via a federally approved but state-driven program of regional cooperative development—caused the foreclosure of options that resulted in the expenditure of more than \$650 million over the ensuing two decades, and did not result in any additional disposal capacity being opened, which was the primary purpose of the act. Indirect effects of the policy, however, resulted in other structural changes in LLRW disposal, which cannot now be accommodated under the mandated system. However, as there is no immediate crisis, there does not appear to be a means for the issue to rise on the issue agenda for resolution.

Another way of stating this is to suggest that the equity/federalism formulation of the problem was an example of the “wrong-problems” problem (Downs and Larkey 1986), wherein government’s failure to successfully resolve a particular problem can be traced to a lack of political will (or I would add, finesse) to address hard issues and provide the necessary technology, resources and delegated authority required for effective resolution. In this case, Congress merely relinquished control of the problem to the states, with NRC and DOE support and monitoring. This effectively foreclosed other policy options that might have otherwise mitigated the problem.

For example, if Congress had really addressed the issue, it would have realized that the rapidly increasing volume of LLRW generation, if continued as projected, would quickly outstrip any and all available disposal capacity, even if all states had constructed disposal facilities. In fact, the construction of between three and six additional disposal facilities (as proponents expected a need for a total of six to nine facilities by the year 1990) would have represented a foreclosure of options, as waste volumes began to decline after 1983, and precipitously after 1985.

A real solution would have been to create policies that would have caused a reduction in volume, sought to create one or two better disposal facilities to replace the three existing ones, and to deal with the different classes of LLRW in different manners, thus keeping as many alternatives open as possible. Injecting the states into the process foreclosed the possible innovations that the private sector could have brought to bear on the problem, especially as disposal costs were in reality beginning to rise sharply.

From the privatization of the LLRW industry in 1960-1963 to 1980, the state and federal governments exercised no role in the selection or siting of disposal facilities: the Atomic Energy Commission (which later became the Nuclear Regulatory Commission) and the states jointly exercised regulatory control over applications to construct and operate disposal facilities presented by private firms interested in providing this service to the growing nuclear power and radioactive materials industries (especially, the industrial, research, medical users of radioactive materials). It was up to these private firms to identify possible disposal sites, acquire financing, and undertake the procedural steps necessary to receive a license to operate such a facility. Eventually, three firms did this for six facilities across the U.S. An effort to site a seventh facility

by one of these firms was abandoned in the face of state resistance and escalating costs. It is not clear whether other siting efforts were ever undertaken.

The six sites were distributed across the nation:

Beatty, Nevada;

Richland, Washington;

Maxey Flats, Kentucky;

Sheffield, Illinois;

West Valley, New York; and

Barnwell, South Carolina.

There is no easily accessible information suggesting that anyone was dissatisfied with this arrangement until the Maxey Flats, Sheffield and West Valley sites were closed in the 1974-1978 timeframe. After that those facilities were closed, the governors of Nevada, Washington and South Carolina began a campaign that hinged on the argument that their states were being unfairly targeted as host states for waste, and were becoming the “dumping grounds” for the nation’s radioactive waste.

The solution, as they presented it in forum after forum, was for other states to develop their own waste sites, something that the states themselves had not done up to that time. Eventually, that call was connected to the Federalism solution of Congressional mandate, and state action through regional compacts.