

Generating Waste:

Out of the Garbage Can and into the Waste Dump?

The Misapplication of Federalism in Radioactive Waste Policy Implementation.

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## *Abstract*

*In the waning hours of the 1980 legislative session, Congress gave up on passing a comprehensive radioactive waste management bill that would have addressed all of the nation's radioactive waste, and instead approved a policy to resolve what appeared at that moment to be the most pressing part of the radioactive waste issue: the disposal of commercially generated low-level radioactive waste (LLRW). Far from being an exercise of Congressional power dictated to the states, the new law represented Congressional acquiescence to a demand for returning power to the states. Almost 25 years (and a significant amendment to the law) later, the new policy generally cannot be described as a success, yet neither is it a complete failure. The ambivalent state of the policy largely derives from the law's ambiguous origins, which carried over into its implementation. This study extends implementation research by extending the Multiple Streams framework of agenda setting and policy selection to address the developments in the implementation phase of the policy cycle.*

## *Introduction*

### National Low-level Radioactive Waste (LLRW) Policy

On its face, the Low-Level Radioactive Waste Policy Act (LLRWPA) of 1980, and its 1985 amendments, would appear to be an instance of Congress coercively imposing a policy on the states. To the contrary, the policy expressed in these acts represented federal deference to the wishes of states officials and interests, who were using this issue ostensibly to resolve a mutual problem (declining disposal capacity for LLRW) through a system designed to address another problem (the decline of federalism and a need to reassert states' rights). Once this policy was adopted, implementation required the coordination and cooperation—with the ever-present threat of federal coercion to ensure progress—of organizations in both the public and private sectors at the national, regional, state and local levels. Although taking longer than intended, this cooperation for the most part occurred. Yet the policy expressed in this legislation is

widely regarded to have—so far—been a failure, to the point that some participants have pronounced the system implementing the policy dead, or nearly so (American Ecology 1998; Ortziger, Klebe and Corpstein, 1998; Ortziger, Klebe and Corpstein 1999).

Although some legislation is periodically introduced to either revise the policy or kill it outright, Congress has not yet shown an interest in revisiting the issue, and the entrepreneurial activities on behalf of the states that pushed the issue onto the national and Congressional agenda roughly 30 years ago has not again materialized. Lacking a significant crisis, it appears unlikely that the policy will go away any time soon—and so will remain an ambiguous example of implementation.

Throughout this article, in the interest of simplicity and not being repetitive, uncited material about the historic developments related to LLRW are taken directly or derived from Paine (2003) and Paine (2004). See these originals for full citation of the historical information discussed in this text.

### The theoretical basis for policy implementation studies

Implementation studies as a distinct field of research and theorizing in political science and public administration is only near its 32nd birthday, if measured from the first significant work on the topic, Pressman and Wildavsky's 1973 book *Implementation*. Since that time, hundreds and perhaps thousands of studies have been undertaken and research articles penned about implementation. By the early 1990s, it was common for writers to complain that there was no theoretical center to the studies, and that perhaps there never would be. Goggin and his compatriots (1990) classified the then-existing

studies into three groups (see also deLeon 1999, deLeon and de Leon 2002, Jordan 1995, for example. First came the initial wave of research, which consisted primarily of case studies of individual or small groups of instances of implementation, mostly written with a “top-down” perspective. That is, written with the concern of policymakers (legislators and executives) in mind.

The second generation of studies followed one of two tracks, either maintaining the top-down approach, or using the increasingly popular “bottom-up” perspective, which argues that policy is not “implemented” until it is actually being carried out, so that it is the “street-level bureaucrats” (Lipsky, 1977) who actually are policy implementers. The question of whether or not implementation at the street level is successful is a more difficult question to answer, as it relies on the motivations and resources of the actual implementers and virtually ignores the intentions of decisionmakers higher up the bureaucracy.

The “third generation” concept of implementation studies is now almost half as old as the field itself, and has diversified considerably from Goggin’s initial description. As described by Goggin and others, the third generation was an attempt to find a way to synthesize the top-down and bottom-up perspectives into a single unified theory, and would rely on much stricter “studies crafted to achieve an ambitious and difficult goal: theory building and validation based on more rigorously scientific, quantitative (both comparative and longitudinal), hypothesis testing,” (Goggin et al 1990).

However, other trends have also emerged, with some studies keeping to the “top-down” and “bottom-up” dichotomy, while others have turned to consider the nature of the organizations involved and their relationships. Finally, there is also a thread of studies

that are looking at implementation through more symbolic approaches. Another way of looking at it is the original studies were focused on outcomes (and to some extent, with structure), while the later studies are turning to look at the process itself. (Yin, 1980; Ingram 1990; Matland 1995) Thus, the definition of “implementation” and what qualifies as a success or failure of a policy is thus by no means clear and settled.

From the top-down perspective, success or failure is easily determined: “Did policy ‘X’ achieve objective ‘Y’ by the date ‘Z,’ as we intended?” The criteria for success or failure is (supposedly) contained within the formulation of the policy itself, within the legislation or executive’s order. In the bottom-up and most other third generation approaches, the criteria for determining success or failure is problematic, for the most part contingent upon a great number of factors. In this study, I will primarily use the top-down approach because that is, I believe, the most appropriate system in this particular case.

The policy, while originating at a level “lower” than Congress, was endorsed by Congress, signed by the President, and created a brand new system that largely ignored whatever prior conditions and relationships there may have been in existence, which continued to operate in parallel. Thus, this policy situation differs from most, because most new policies must be implemented by existing agencies in addition to their prior duties. Since most of the participants agreed (apparently) with the policy formulation, and the new programs and staffing had few competing interests or duties, the means to approach implementation is indeed from a top-down perspective.

Even from a top-down perspective, the success or failure of a policy is rarely an either/or proposition; that is, there is a range of degrees to success, with most policies

succeeding to some extent while failing in other ways (see Rein, 1983, for a discussion). This is because very few policies are simple statements of single goals: in the case of LLRW, the policy involved a number of specific activities and decisions that different actors had to undertake. And, as with any governmental policy, success or failure depends to a large extent on the implementation of that policy; that is, how it is carried out by the agencies, administrators, and staff employed or enlisted by the government.

Certainly, in our federal government, with its separation of powers, the intention of Congress may be clear and concise, but if the Executive does not agree with the policy, it may work to ensure that policy is not implemented as intended. Even if the President and his appointed officials agree with the policy, there is still the problem of getting the bureaucracy and the affected stakeholders to behave as the policy intends. Thus, even the most poorly considered and convoluted law can be implemented as a resounding success, while even the simplest and clearest policy can become a catastrophic failure on implementation.

Especially in the top-down frameworks, it is axiomatic that the clearer and simpler the expression of a policy, the easier and more likely success in implementation (Sabatier, 1989, for example). Both the language of the policy and the intention and support of legislative and the executive branches set the general manner in which the policy will be implemented, requiring and encouraging some courses of action while prohibiting and discouraging others. It is also an axiom of implementation studies that the more cooperation and coordination needed between entities, the more difficult the implementation and the less likely success (Pressman and Wildavsky, 1984).

It must be noted here that a fourth tradition of studies exists, research that is generally highly abstract and primarily utilizes the principles of game theory and rational economics. It traces its origins back to the middle 1970s and the seminal work in the field by Eric Maskin. It is not widely discussed in the other three strands, but a good introduction is Jackson (1999).

The other literature and theory of concern in the present study is that concerning agenda setting and policy adoption, which has a rich and varied tradition of competing analytical frameworks that can contribute to understanding how and why decision makers in our society consider and adopt certain policies (see Sabatier, 1999, for a good summary of several of the current leading models), including diffusion networks, advocacy coalitions, punctuated equilibrium, institutional rational choice and others.

In recent years there has been a small and growing literature that seeks to extend these policy-setting models to explain the successes and failures of implementation (see Exworthy and Powell, 2004; Collins, 2002). In this paper, I join that tradition and argue that in order to understand this policy's apparent failure on implementation, we must understand why and how the issue came to be on the national and Congressional agenda, and the other factors that affected its development as the attempts at implementation progressed.

This is because the formulation of the issue and the selection and approval of the solution to a large extent foreclosed consideration and use of other policy options. With other alternatives off the table, implementation at the regional and state levels became disengaged from the problem the policy was ostensibly intended to fix, that is, the loss of LLRW disposal capacity. While any of the major policy-formulation or analysis models

can be used to describe the creation of the federal LLRWPA of 1980 and the Amendments Act of 1985, it is Kingdon's (1984, 1995) multiple streams framework, with its central (and in this case ironic) image of the garbage can that most clearly shows the origins of the policy's future mix of failure and success upon implementation. Elsewhere (Paine 2004) I discuss the potential for application of several different frameworks to the LLRW issue in particular.

The LLRWPA as an implementation failure...or success?

Was the LLRWPA and its amendment a failure or a success? The purpose of the act was to create additional disposal capacity for commercially generated LLRW (initially by 1986, amended to 1993). In that, the policy clearly did not succeed. And, as we near a quarter-century since the act's initial passage (and more than 30 years since the issue's emergence on the policy agenda of the states and the Congress), it still has not succeeded. At the same time, the act has not expired, been rescinded, nor been simply abandoned, and so it is still possible that future developments could change this assessment—new capacity could still be created under this system. In this respect, the act is a provisional failure, if you will.

In the act and its amendments, Congress laid out the primary method for implementation: mandated voluntary cooperation by the states in forming interstate compacts to oversee the creation and operation of the new disposal capacity. This did indeed occur, with 44 of 52 jurisdictions (the 50 states plus the District of Columbia and Puerto Rico) entering into 10 regional compacts for LLRW management. The remaining



jurisdictions are independently responsible for disposal of any waste generated within their borders, either by creating their own disposal capacity or by contracting for access with other disposal sites. The compacts were formed and approved by Congress, host states selected, and site-selection and development projects undertaken. In this regard, the policy was implemented successfully.

In all, there were 14 declared host states (that is, states where the new disposal capacity was to be created). Two of the three disposal facilities operating in 1980 are still operating: one is open only to the generators of the host compact, and a second compact with which it has signed an access agreement, while the other site remains open to the rest of the nation at least until mid-2008, although for only a limited volume of waste. After that time, it will likely be operated only for generators in the three states within that compact.

Of the remaining states and compacts with designated host states, most at least started efforts to find locations within their borders for new disposal sites. Four of these siting processes proceeded so far as to result in the identification and characterization of new potential disposal sites, in California, Illinois, Nebraska and Texas. Again, a measure of success.

However, siting processes in all states have been halted until indefinite future times, and all four of the characterized sites have been abandoned (even though two of the sites could still be developed if future governments took action to do so). Thus, provisional failure. To the possible positive side, Texas may be approaching the point of designating a site and starting construction within a few years, while other states are considering options for creating new capacity during the next several decades.

At the same time, entirely outside of the compact system, another disposal site has been created. While this site has been approved to accept LLRW from outside the compact within which it operates, its operator has yet to start accepting commercial LLRW. Currently, it only accepts high-volume, very low activity wastes, which are primarily from the cleanup of contaminated land and decommissioned facilities and is not appropriate for disposal in normal LLRW facilities.

Through the implementation of the intent expressed in the act and its amendments, the policy is clearly not a total failure, but it is also by no means an unqualified success. So, what is the cause these mixed results? The answers, I propose, lie in the objectives and constraints contained in the policy itself, and in forces that operated outside of the institutional framework created under the policy, but nonetheless affected policy implementation.

### *LLRW, Multiple streams, and the Congressional Garbage Can*

As originally developed by Kingdon, the multiple streams 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; Exworthy and Powell, 2004, Avery 2004), 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; Scheberle, 1994).

To varying degrees, these writers also extend the model from policy formulation through enactment. Collins (2002) and Exworthy and Powell (2004), are among the few examples where researchers extend this framework (or any other of the policymaking frameworks) 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 selected solution, the framework is also key to understanding why the states' attempts to implement the policy have experienced only mixed success.

The LLRW issue meets the criteria for application set out by Kingdon (1995) and Zaharaidis (1999). I address the fit of the model to the situation elsewhere (Paine, 2004), and summarize that reasoning here. First, it is possible to draw a line around the LLRW issue as it stood in the 1975-1986 time period in order to separate it systemically and conceptually from other radioactive wastes and other issues involving nuclear power. The framework allows the analyst to approach as the unit of analysis either a system or a separate decision

Second, the LLRW issue was (and is still) ambiguous, meaning that there are multiple ways of considering the situation or phenomenon, and there is no clear hierarchy of responsibility for actors wishing to deal with the problem. 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, including in this case, states' rights and federalism.

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), 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 disagreement. In fact, Congress' action reflected the logic of limited time and the ambiguous reasoning, in that a partial policy solution to the radioactive waste problem was considered 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 domestic and international issues that Congress was seeking to address during the second session of the 96<sup>th</sup> Congress, most of which were complex and entirely unrelated to LLRW.

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 (as

well as a particular solution) 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 problem of federalism and states' rights is quite significant, and that particular framing of the issue set the direction for LLRW waste policy through its implementation.

In addition to meeting the framework's criteria for the formulation and selection of a policy option, this particular case can be used to extend the framework to discuss certain subsequent developments, that is, policy 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, substantially contributed to the subsequent implementation problems. This occurred through the foreclosure of options available for resolving the problem, specifically the dual nature of the problem: on the one hand, the prospect of running out of disposal capacity for LLRW, which would have broad economic effects on society; and on the other, the political issue of stigma and distributional equity in a context of interstate and state-federal relations.

My thesis is that this orientation—resolving an equity issue via a federally approved but state-driven program of regional cooperative development without overall control of the involved technology—caused the foreclosure of implementation 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. Developments largely

unrelated to efforts to create new disposal capacity, however, resulted in other structural changes in LLRW disposal economics and technology, greatly delaying the need for additional disposal capacity.

Another way of stating this is to suggest that linking the equity/federalism aspect of the LLRW disposal 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 suggest, *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 of disposal capacity to the states, with NRC and DOE support and monitoring. This effectively foreclosed other policy options that the federal government and/or states could have pursued (and in fact, in the matter of regulating and mandating the definition, processing, packaging, transportation and disposal form of waste) did pursue.

For example, if Congress had substantively addressed the issue rather than just passing its mandate on to the states, it would have realized that the rapidly increasing volume of waste, if its growth continued as projected, would quickly outstrip any and all available disposal capacity, even if all compacts had constructed disposal facilities ahead of schedule. In fact, the construction of between three and six additional disposal facilities (as proponents expected would be needed by 1990) would have represented a foreclosure of options (and sunk costs) if, as happened between 1980 and 1985, waste volumes began to level off or decline significantly.

A more realistic solution would have been to create policies that would have encouraged and reinforced a reduction in volume, sought to create one or two improved-technology disposal facilities to replace the three still operating, and allowed flexibility 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 did not affect the innovations that the private sector brought to bear on the waste problem (because the policy targeted a different group than the generators), but solidified a solution that could not readily adapt to changing conditions.

#### *Data Collection and Analysis*

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, processes 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. The system remains chaotic, that is, essentially unknowable in detail, despite the structure and exercise of power within the garbage can that 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, and more actors involved than can be easily modeled. 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 noted above, there are also:

- outside lobbyists—including those from federal agencies, the states, and the private sector—who keep pushing their problems and solutions toward leaders, other members, Congressional staff, and even other potentially interested parties;



- Congressional staff who may have interests of their own, or on behalf of their employer or constituents, and be pushing or pulling for various problems and solutions of their own; and,
- members of Congress, who certainly will be pushing and pulling for their own interests, trading support, and following the direction of party leadership, depending on how support or opposition will help them politically and financially (primarily for fundraising).

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

1. Events make the 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 hypothesis:

6. *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 target problem on implementation.*

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. That is, the solution must be sufficient and aligned with the various aspects of the problem—a concept enunciated by Sabatier (1989), for example, in his list of necessary criteria for successful implementation. As such, a problem and solution described in a given policy may not really match, because some aspects of either may have been overlooked.

Thus, the proposed solution may or may not resolve the targeted problem. Whether or not the problem and the solution align may depend on the amount of time and analytic resources available, as well as ideological perspectives that may limit full recognition and analysis of the situation. This of course relates to Simon's (1947) "bounded rationality," the fact that under all but the simplest of situations, humans don't have the time, information or mental resources to collect and analyze all relevant information. This contributes to the ambiguous nature of the garbage can.

In the case of technical problem of LLRW (rising disposal volumes and limited capacity), the linking by policy entrepreneurs 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 (the states) to solve the technical problem.

As such, rather than an actual policy to resolve a problem with waste disposal, the policy act became instead a largely symbolic gesture of the states reasserting their sovereignty from the federal government. From a practical standpoint, the framing and linking of the problem to the solution heavily constrained implementers: states were not responsible for finding a solution to the waste problem, which at the time included unclear definitions, inadequate regulations and lax enforcement, over which the states could exercise limited control.

Instead, the states were responsible for establishing new disposal capacity to handle waste on a regional basis because the states under the theory of federalism were in a better position to pursue a solution than the federal government. However, such a state-run system precluded the implementation of, for example, more purely market-based solutions that could have been pursued by private companies. Clearly, this is a mismatch.

### **Making the Agenda**

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 and local governments. 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 (or 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 much smaller number 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 (see end of article) 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, especially from the committees, 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.

INSERT TABLE 1 HERE

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, the states and other public-sector and public interest organizations, and private-sector organizations of various sorts with interest in the particular topic.

In the case of LLRW, the issue first moved onto the Congressional agenda during 1975, when problems with leaks at several of the disposal sites became apparent (Business Week, 1976). This is an example of a focusing event drawing Congressional attention and moving the issue onto the agenda. Table 2 illustrates some key developments in LLRW in relation to the stages of multiple streams policy development.

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 broader nuclear waste problem and develop improved procedures and regulations to resolve the issue. This administrative review and development represents the implementation phase, given that the agencies were already implementing prior policies. This investigation would lead to improved regulations and procedures for dealing with waste generated by commercial generators *under the existing policy*, as well as reports to the President and Congress that would be used in future policy development.

Of course, LLRW was not the only radioactive waste concern at the time: abandoned mill tailings, many dating back to the Manhattan Project during World War II, needed to be addressed; President Ford's proliferation-oriented ban on commercial nuclear fuel recycling was made permanent by President Carter in 1977, creating a new

class of permanent waste, unprocessed used reactor fuel; a comparatively small volume of existing high-level radioactive waste from early reprocessing efforts; and a variety of wastes generated and controlled by the DOE from the nation's huge nuclear weapons and defense reactor programs. Hearings during this period considered all of the waste issues together, with an eye toward creating a single uniform classification and management system.

During the period 1974 through 1979, the number and severity of trends and focusing events increased. 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 (some of whom were in leadership positions) of South Carolina, Washington and Nevada took steps to limit the volume of wastes accepted, challenge the existing system of regulation and enforcement

Insert table 2 here

in order to reduce risks, and lobbied for a change in the existing system to create a more equitable distribution of disposal capacity.



## **Matching Solutions to the Problem**

The bare-bones problem regarding LLRW was this: volumes of waste generated were rapidly growing and showed no signs of stopping, while at the same time, there was only limited disposal capacity available. From a pragmatic point of view, there were only three options: 1) reduce the amount of waste needing disposal, 2) increase the disposal capacity, or 3) both. The exact manner could be left to the markets in the private sector, be imposed by the government, or be some combination of private and public action.

In the Congressional LLRW debate, at least three broad alternative policies were discussed in committees and introduced in competing legislation. First, continuation of the then-existing system, whereby private industry was responsible for developing disposal capacity, under a joint program of state and federal licensure. Under this system, it would be entirely up to the private sector to create disposal capacity and find ways to reduce volumes. The second option was nationalization of LLRW disposal (as well as all other radioactive waste), either under the Department of Energy or under a new federal radioactive waste authority.

The federal government would then be responsible for finding ways to limit waste generation or create new disposal capacity. Finally, the third option considered was to allow the states to take control of the disposal capacity problem while the NRC and the agreement states continued to regulate the generation and disposal of the waste. All three options were considered as part of deliberations related to a comprehensive national radioactive waste policy act, which would deal with both commercial and defense wastes of all kinds.

The first two options were rapidly abandoned as serious contenders for Congressional policy: few in Congress or the administration seriously wanted to launch a new federal bureaucracy, and the Congressional delegations from the current host states—as well as the governors and other groups representing the states’ interests—made it clear that the status quo was unacceptable to them. Instead, they were actively pursuing the third policy option under the banner of states rights and renewed federalism.

The issue of federalism and states rights arose in at least two different contexts: first, as a 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.

In the case of LLRW, since states had been involved in its regulation 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 Political Environment: national mood, interest groups and entrepreneurs**

The question of federalism, states rights, and the growing power of the federal government had been themes developing throughout the 1960s and 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 attached to the debate over LLRW policy, because it was being attached to the debate over many issues. Federalism and radioactive wastes, of course, were only two of the issues confronting Congress at the time. 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 crisis, inflation and recession, unemployment,

growing poverty, the movement of jobs overseas, even the Iran hostage crisis and Soviet aggression in Afghanistan. There were few pressure-group campaigns related to the LLRW issue; those that did exist were primarily representing the interests of the nuclear power industry, private and public research and development organizations, and the medical community.

There was little national controversy, as most consumer and environmental groups also approved of the plan as it was formulated. 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 potential or actual change was influential in 1980, at least in regards to LLRW. In fact, in spite of knowing what changes were in store (Reagan assuming the Presidency, Republicans taking control of Senate), the legislation's sponsors agreed to reintroduce the

Table 3, figures 1 and 2

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).

### **Opening of the policy window**

The temporary closure of the Richland and Beatty facilities in 1979 focused national and Congressional attention on the potential disruption to medical research, diagnosis and treatment. In Kingdon's terms, it represented the opening of the policy window. The policy entrepreneurs representing South Carolina, Washington and Nevada stepped up their pressure at this time, threatening to close the three facilities permanently if no solution were mandated quickly.

They were joined by representatives of the segments of the nuclear industry that would be negatively impacted if no disposal capacity was available. In the national media, this was primarily portrayed as medical research, diagnosis and treatment, academic research in the life and physical sciences, and industrial applications which could not be easily replaced, despite the fact that the nation's nuclear power reactors generated well over half of the volume and essentially all of the radioactivity contained in the commercial LLRW.

This development seems to have been the event that finally moved the LLRW issue on the decision agenda, and with it, the need to address all the radioactive waste, as these were still linked as a group in the Congressional discussion. Following hearings in early November 1979 on the possibility of all three facilities closing, new legislation was introduced and placed on the Congressional calendar for 1980.

**Problem identification, acceptable solution and conducive environment come together**

During the 1980 session, House and Senate committees each held hearings on their own versions of the proposed waste bills. The full Senate debated and approved its version in late July, while the House version continued in committee as the regular session came to its conclusion. Difficulty resolving a large number of issues, including the federal budget for the 1981 fiscal year, resulted in the first lame-duck session in decades.

Finally, as the session neared its completion just before Christmas, it became apparent that differences between the House and Senate versions of the full waste bill could not be resolved. In the metaphorical sense, the window was closing on this opportunity to act. However, entrepreneurial activity by the sponsors and the leadership resulted in both chambers agreeing to separate and approve the LLRW component from the comprehensive waste bill. President Carter signed the bill into law on December 22, 1980.

### **Moving the ambiguity to the states**

For Congress, passage of the LLRWPA of 1980 “resolved” the issue. However, with President Carter’s signature, the new law forcibly pushed LLRW upwards on the agendas of all 50 states, the District of Columbia, Puerto Rico, and federal agencies, especially the DOE and NRC. Implementation of the policy contained in the act now had to take place. 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 disposal facilities.

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, transporting and disposing of LLRW. This included developing regulations for the minimally acceptable disposal option, shallow land burial, which is the same system that had been used at all six commercial disposal sites. Agreement states that would host new facilities could adopt stricter standards than the NRC's, but not lesser. And, if states chose, they could select more advanced disposal technologies. The exact nature of those advanced technologies, however, was unclear because they were not specifically spelled out by the NRC or DOE, and because few of them had even been tested in anything beyond a small trial.

To this point, I have been talking of "the states" as if they were individually and collectively a unified block. This was and still is most certainly not the case. The National Governor's Association, a private organization created and operated by and on behalf of the nation's governors, was the prime mover behind the drive for LLRW policy. The National Council of State Legislatures, representing members and leadership of the states' legislative bodies, had also played a major role. However, even among the governors, state legislatures, and each state's Congressional delegation, there was some, primarily minor, disagreement about the best policy option. Further research could perhaps still demonstrate whether all the participants really understood the various perspectives on this ambiguous issue, or if because of its ambiguity, were simply going along with the technical experts and political leadership. The garbage can theory suggests that most did not understand in any detail nor have any great opinion on the options.

Still, once the LLRWPA was signed into law, the elected officials and the agencies they were responsible for, had to act. Either directly or through delegation to appointed officials, the states' governors had to undertake negotiations to join with other states in regional compacts. Some states had been engaged in informal compact discussions before the policy act passed.

The individual states that would become host states for the new disposal facilities needed to be Agreement States with the NRC. In many cases, this meant hiring managers and staff with experience in the field, and creating new offices and divisions, and in a few cases, entirely new agencies, to handle the implementation. The state legislatures also had to act by approving any negotiated compacts, by approving legislation to create or expand agency responsibilities to handle implementation of the act, and by approving agency budgets. The agencies, finally, had to develop and promulgate rules that would be compatible with the NRC and allow the states to carry out site selection and facility development activities.

While state legislatures are undoubtedly policy garbage cans similar to Congress, the whole of each state government can also be viewed in the same manner: in addition to the elected executive officials and the legislature, there are also a number of agencies, all of whom must compete for the attention of the elected officials and the delegation of authority and money from the other institutions of government. Simply because the federal government had mandated it and the governors and legislative leadership supported action, did not necessarily translate into immediate action by the legislatures or agencies. In the end, few states were anywhere near ready to begin site-selection or development activities by late 1985. Since the 1980 act had specified that access to the



existing sites would end on January 1, 1986, and that new disposal capacity had to be in operation by that time, this represented a renewed crisis. Renewed entrepreneurial activity by the governors, states and their Congressional delegations pushed the issue back onto the decision agenda during 1985.

The relationships between the states were also ambiguous: since Compact-building is a voluntary affair and each state has equal legal rights, it became an uncertain process to negotiate an acceptable agreement. It quickly became apparent that the states that generated the most waste would become the host states: it also became apparent that most states—or at least the officials conducting the negotiations—were unwilling to easily accept the “stigma” of being a host state, and if they had to, would prefer to not include other states that generated significant volumes of waste within their compacts.

On this basis, several states (most significantly, Texas and New York) chose to “go it alone.” Texas has since joined a compact with two Northeastern states. Although some compacts were proposed to Congress by the end of 1981, that body did not take up its job of approving the compacts until the 1985 crisis that resulted in the amendments act.

The nature and the history of the federal legislation severely constrained the states and compacts in what they could do. Although they were called upon to “manage” LLRW generated within their borders, the framing of the issue and its solution in the law was specifically intended to create new regional disposal capacity, not reduce waste volumes or find other solutions. What’s more, the states had a specified timeframe within which to complete their task—five years, in the case of the original act, and an additional seven years under the amendments. 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 (for example, the final NRC regulations defining LLRW were not finalized until the passage of the amendments act at the end of 1985, and the question of other kinds of waste that might be disposed of at the same facility was not resolved for some time).

The state legislatures are similar to Congress, also organized anarchies, and found themselves during the early 1980s holding hearings, developing legislation and approving regulations while being confronted with the same ambiguities that had confronted Congress. There were a variety of options to pursue, no clear way to determine which option was the best, and very little time in which to complete the necessary activities.

Another constraint was that 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 Congressional hearings that had led up to the adoption of the LLRW policy, but were not clearly outlined as options for the compacts. Indeed, these were management options for the waste generators—primarily nuclear power generators, most of whom were private but state-regulated utilities.

Given the significant time constraints under the law (compacts had to be formed and disposal facilities opened by January 1, 1986), many states felt they did not have time to investigate these other options. However, some of these other alternatives could be and were being addressed through NRC's developing regulations, a process the states had no control over and only little input regarding. In other words, valid options for the overall

management of LLRW were placed outside the control of the states. And indeed, these federal regulatory constraints later contributed to the reduction in waste volumes.

Walters (1975) and Staw and Ross (1989) provide investigations into the consequences of the foreclosure of options. Foreclosure prevents decisionmakers 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, there was no provision to adapt.

The decline in disposal volumes was a result of two primary factors. First, the NRC, DOE and EPA issued a clearer definition and classification of LLRW, and applied new and stricter regulations on the processing, treatment, packaging, transportation, and disposal of the wastes. This served to increase waste treatment and disposal costs for generators. While volume reduction was not mandated, waste form and packaging were, and the costs involved in meeting those requirements tended to underwrite a move by generators to reduce the volume needing disposal. (Paine, 2003; Ortziger, Kelbe and Corpstein, 1998; Ortziger, Klebe and Corpstein, 1999) As mentioned before, these regulatory changes were requested 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. Together, these developments significantly 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 unit 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 other 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.

Consider a model generator in 1980, producing 100,000 cubic feet of waste a year (all numbers in this example are mythical, but representative, and I am using constant dollars to correct for inflation). Total disposal costs were typically less than \$25 per cubic foot (\$15 for packaging and transportation, \$10 for disposal), for a total of \$2.5 million to dispose of waste. During the 1980s, new NRC and DOT packaging and processing regulations went into effect, increasing the packaging and transportation costs to \$50 per cubic foot, while the sites charges increase to \$50 per cubic foot. Thus, the total disposal cost has increased four-fold, to \$100 per cubic foot. If the generator continued to dispose of 100,000 cubic feet per year, it would face a disposal bill of \$10 million.

However, many volume reduction techniques and technologies provide more than commensurate reductions in volume per dollar of cost. Let's say the generator selected reduction techniques and technologies that reduce their disposal volume to only 10,000 cubic feet per year, a 90 percent reduction, while adding another \$100 per cubic foot to the cost of processing and packaging. The result is a total disposal bill of (10,000 cubic feet times \$200 per cubic foot) only \$2 million a year: the generator in 1990 would be

spending 20 percent less to dispose of waste than in 1980, and be avoiding \$8 million in total disposal costs by pursuing volume reduction—a very significant investment.

One has to wonder, in the absence of the policy entrepreneurial activity that led to the LLRWPA and its amendments, if the disposal problem might not have “gone away,” in that waste volumes would likely have declined anyway in response to the costs created by the new regulations, and that the increased costs might have made creating new disposal facilities attractive enough to the private sector that new developments would have been forthcoming.

The LLRWPA targeted the behavior of the states regarding a specific set of actions, specifically, those involving creation of more disposal capacity. However, the regulatory and economic costs and benefits were still aimed at those who would bear the cost of disposal no matter what solution had been selected: the generators of radioactive waste. Faced with rapidly increasing disposal costs, the generators pursued methods for reducing their expenses. But there was no linkage between their behavior and the behavior of the states and compacts. Generators had incentives to reduce their volumes for disposal, even without the compact system. The prospect of being forced to use a regional compact appeared likely to impose even higher costs than faced under the existing system.

For the states and compacts, however, these incentives meant nothing. The states’ primary concerns were building safe, reliable and leak-proof facilities to replace the existing three disposal sites. These for the most part were not proposed to be simple landfills, but highly engineered long-term storage facilities. As such, the estimated costs to build and operate were indeed higher than the currently operating facilities.

For example, a state might commit to building a facility to meet strict safety and emissions standards at a cost of \$5 million a year to build and operate. Generators in the compact up to 1980 had been generating at least 500,000 cubic feet of waste each year, and were projecting that amount to increase in the coming decades. Thus, the projected unit cost facing the generators would be around \$10 per cubic foot for disposal alone. But the \$5 million a year cost to the state must be paid regardless of the volume disposed of. If generators, responding to the incentives caused by the regulations, increased their processing and reduced their volumes to just 50,000 cubic feet per year, the cost increases to \$100 per cubic foot.

The plans for new disposal capacity under the act and its amendments were based on estimates created during the late 1970s and early 1980s, while waste volumes were still high and rising. Compounding the problem was the slow reporting of waste generation and disposal volumes at the operating sites. It was not clear until the later 1980s that the volume of waste for disposal had peaked in 1980, declined slightly for several years, and then declined more significantly after 1986.

The focus of the policy on replacing disposal capacity could not adapt to changing circumstances, which led to a situation where, by the middle 1990s, the states and compacts could not justify completion of new facilities because the cost of disposal would be prohibitively high, in some cases, more than \$1,000 per cubic foot, a level that would threaten the economic viability of all but the richest of the generators (Nuclear Waste News, 1992; GAO, 1992; GAO, 1995; GAO, 1999; Ortciger, Klebe and Corpstein, 1998).

Thus, ironically, the result of mandating the creation of new disposal capacity in the states, if implemented at the time and as originally envisioned, might have been to force smaller generators (clinics and hospitals, laboratories, research facilities and the like) out of business altogether—which was the prospect that served as the impetus for elevating the issue onto the Congressional and state agendas in the first place, during the latter 1970s.

## **Conclusion**

Was, or is, the LLRWPA and its amendments an implementation failure or an implementation success? That the act and amendments were implemented, there can be little doubt: programs were started, people were hired, budgets were appropriated and spent, site selection and development activities took place; in all, more than \$650 million is estimated to have been spent, mostly by the states, on implementing the act. The policy goal desired by the states and Congress in 1980 and 1985 was not achieved, so it appears to be a failure, and an expensive failure at that.

Those responsible for implementation took all (or at least most) of the steps required under the policy, so it appears to be a success, albeit an expensive success. Those responsible for implementation found enough discretion to delay implementation when it became clear that changing conditions were subverting the stated need: a failure from the top-down perspective, but a success from the bottom-up and contingency perspectives. The institutional structure that was created remains operational, although at

a much-reduced level, and so may yet carry out the initial objectives, although it may be many years later than planned.

But what of that other objective, the objective of showing the federal government that the states should and could handle this particular problem? The answer is even more ambiguous. Since it does not have a clear technical resolution, it is unlikely to have a clear political resolution, either: the states took control of site selection and development, while the federal government (in cooperation with the agreement states) maintained regulatory control over the creation, packaging, transportation and disposal of waste.

The result: ambiguous. Since 1980, the federal government has succeeded in “devolving” many responsibilities to the states; yet the states remain fearful and distrusting of a federal government that still has and exercises considerable power and continues to grow larger and more influential. Even taken as a simple symbol of states’ rights, the policy is not an unambiguous success, certainly not one of the most significant achievements of the modern era.

Whether a success or a failure, however, the case demonstrates what can happen to policy between inception, approval and implementation. When viewed through an analytic lens such as the Multiple Streams framework, we can see how the initial framing and linking of problem, solution and acceptance can tilt policy away from stated or intended purpose.



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