

THE DEPARTMENT OF DEFENSE'S IMPLEMENTATION
OF THE INSTALLATION RESTORATION
PROGRAM: A PHASE I STUDY

By

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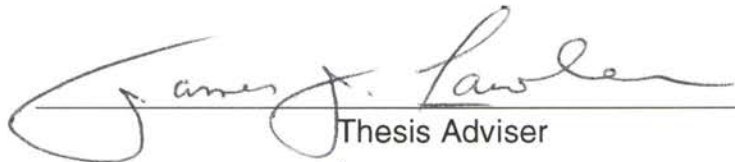
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LIST OF TERMS USED

ARAR - Applicable or relevant and appropriate requirements
ATSDR - Agency for Toxic Substances and Disease Registry

BDDR - Building Demolition and Debris Removal
BRAC - Base Realignment and Closure

CAA - Clean Air Act
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
COE - U.S. Army Corps of Engineers
CWA - Clean Water Act

DASD(E) - Deputy Assistant Secretary of Defense (Environment)
DERA - Defense Environmental Restoration Account
DERP - Defense Environmental Restoration Program
DOD - Department of Defense
DOE - Department of Energy
DOI - Department of Interior
DOJ - Department of Justice
DPM - Defense Priority Model
DSMOA - Defense and State Memoranda of Agreement

EDF - Environmental Defense Fund
EIS - Environmental impact statement
EO - Executive Order
EPA - Environmental Protection Agency

FFA - Federal Facilities Agreement
FFCA - Federal Facilities Compliance Act
FFER - Federal Facilities Environmental Restoration Dialogue Committee
FS - Feasibility Study

GAO - General Accounting Office

HARM - Hazard Assessment Rating Methodology
HRS - Hazard Ranking System

IAG - Interagency Agreement
IG - Inspector General
IRA - Interim Remedial Action
IRP - Installation Restoration Program

MEPAS - Multimedia Environmental Pollutant Assessment System

NASA - National Aeronautics and Space Administration
NAS - National Academy of Science
NCP - National Contingency Plan
NEPA - National Environmental Policy Act
NOAA - National Oceanic and Atmospheric Administration
NPL - National Priority List
NRC - National Research Council

ODASD(E) - Office of the Deputy Assistant Secretary of Defense (Environment)
OER - Office of Environmental Review
OHW - Other Hazardous Waste Operations
OMB - Office of Management and Budget
OSWER - Office of Solid Waste and Emergency Response
OTA - Office of Technology Assessment
OU - Operable unit

PA - Preliminary assessment
POLs - Petroleum, oils and lubricants
PRG - Preliminary remediation goals
PRP - Potentially responsible party

RCRA - Resource Conservation and Recovery Act
RD/RA - Remedial design/Remedial action
RI - Remedial investigation
RMA - Rocky Mountain Arsenal
ROD - Record of Decision

SACM - Superfund Accelerate Cleanup Model
SARA - Superfund Amendments and Reauthorization Act
SI - Site investigation
SOP - Standard operating procedure
SWDA - Solid Waste Disposal Act

TERC - Total Environmental Response Contract
TRC - Technical Review Committee
TWG - Technical Working Group

USDA - U.S. Department of Agriculture

CHAPTER I

INTRODUCTION

"We must work ... to create an environmental ethic in the Department of Defense" (William H. Parker, former Deputy Assistant Secretary of Defense (Environment), 1989).

The United States Department of Defense (DOD) is widely acknowledged as the largest single producer of hazardous waste in the United States, perhaps in the world. A 1988 *Frontline* documentary reported DOD generated more hazardous waste than the five largest U.S. chemical companies combined (WGBH, 1988). Of the 1,232 facilities currently listed on the National Priority List (NPL), 122 are under the direct or indirect control of DOD (59 Fed. Reg. 27989). DOD is responsible for nearly ten percent of the total NPL and eighty-one percent of the Federal facilities on the NPL.

There have been numerous General Accounting Office (GAO) studies of DOD's hazardous waste policy, it has received attention in the popular press, and been the subject of hearings before a variety of congressional committees. But the studies and hearings have usually been targeted at finding a better "bean counting" method. There has not been a study which looks at the issue from a more theoretical viewpoint based in the implementation literature.

What is needed is an examination of the implementation on a more basic level. To accomplish that, it is best to start with a simple implementation model to first gain an understanding of the program as a whole. The purpose of this study is to do a background investigation of the Installation Restoration Program (IRP) using top-down models presented by Edwards (1980) and Van Meter and Van Horn (1975). The models will serve as the basis for the examining the factors influencing implementation of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) by DOD. If we can first understand what is happening with DOD's implementation of CERCLA, wiser decisions can then be made about the next step using more detailed studies. This study will examine the implementation of DOD's Defense Environmental Restoration Program (DERP) to determine whether the implementation has been purposely slowed and the intent of the mandating legislation, CERCLA, changed by the Department, or whether changes in the program are the result of the factors that commonly impact implementation of policies.

As the "environmental decade" of the 1970s began, Congress passed the first of a range of environmental legislation, the National Environmental Policy Act (NEPA) of 1969, requiring federal agencies to consider the environmental effects of their activities. NEPA was unprecedented at the time of its passage. Called the "most far-reaching environmental statute ever enacted," (Larson, 1980: 75), it received little opposition and "massive legislative support that is normally given only to measures of the utmost gravity" (Rosenbaum, 1977: 118). Larson (1980) contends the measure passed so easily because Congress did not believe it would be controversial.

NEPA sought to address the environmental problems caused by the actions of federal agencies (Andrews, 1976). The new controls were imposed by NEPA, in part, because federal agencies were among the worst environmental

offenders (Mazmanian and Nienaber, 1979). Notable in their apparent lack of regard for the environment were the Atomic Energy Commission (now the Nuclear Regulatory Commission and the Department of Energy (DOE)), the Forest Service, Department of Interior, Department of Transportation, and DOD.

The fact is, most federal agencies were established to carry out a particular mission. For many years, even after NEPA's passage, it was DOD's contention that the primary mission of the department was to protect the nation and our allies from aggression, not to protect the environment. In 1978, President Jimmy Carter issued an executive order in which he directed the military to comply with all the nation's environmental laws, but he failed to specify how the order would be enforced and the military virtually ignored it (Shulman, 1993). In 1984, a Virginia base commander went so far as to tell a neighborhood group, "We're in the business of protecting the nation, not the environment" (Shulman, 1993: 38). Ten years later, a member of the House Armed Services Committee, in his dissenting comments in the committee's report of the National Defense Authorization Act for FY 1994, said "We must be concerned with environmental cleanup..., but there are people and institutions that would not be satisfied until we spend the entire DOD budget on environmental causes" (Congress, House of Representatives, 1993a: 496).

However, as the condition of the environment has become a greater concern to the citizens of the U.S., DOD has become increasingly aware that it can no longer ignore the environmental problems for which it is responsible. Even before CERCLA became law in 1980, DOD had begun to take tentative steps toward correcting its environmental problems. DOD officials have testified that the Department's efforts to identify and clean up some of its sites began as early as the 1970s (GAO, 1991b).

Many agencies which had facilities with substantial hazardous waste problems, most notably DOD and DOE, were reluctant to have another federal agency oversee their remediation efforts. In 1984, in what may have been an attempt to circumvent the Environmental Protection Agency's (EPA) authority, DOD requested and received authority to set up a separate account in its budget known as the Defense Environmental Restoration Account (DERA). This account was to receive an annual appropriation to be used exclusively for the restoration of sites on installations which had been identified as part of the Defense Environmental Restoration Program (DERP). DERA was initially a very small portion of DOD's total budget, its first appropriation in 1984 was \$150 million (GAO, 1991a), and it was generally regarded by environmental groups as simply a ploy to reduce the public outcry for action by DOD in the environmental arena.

Constant turf battles have taken place between DOD and EPA. Among the points of contention are questions of which agency should actually oversee the remediation projects and whether or not DOD is obligated to follow the same set of regulations to which private sector businesses are subject. A continuing problem has been DOD's willingness to use "national security" to withhold information from both EPA and the public.

The reauthorization of CERCLA in 1986 required all federal agencies to inventory the sites for which they were responsible, and to rank them using the Hazard Ranking System (HRS), making them subject to being added to the NPL in a separate section known as the Federal Facilities List. Like the NPL, the Federal Facilities List is amended each year listing what are regarded as the "worst" hazardous waste sites in the U.S. The complete list is published annually in the *Federal Register*. Just as in the private sector, to be listed on the NPL usually results in adverse publicity for a military installation. Unlike the

private sector, however, listing a DOD site on the NPL does not entitle the installation to Superfund money for removal, remediation or restoration activities. Those activities must be carried out using funds in DERA.

The prevailing attitude for scheduling remediation and restoration activities at DOD has been "worst first". This has also been the cause for local concern, as each community wants to have the sites which affect it remediated as quickly as possible. The "worst first" scheduling may leave sites without any action taken for a number of years, again resulting in adverse publicity for specific installations and for DOD's efforts in general.

Although in the early 1980s, DOD had made, what seemed on the surface to be a commitment to cleaning up environmental problems, movement was slow, cover-ups frequent, and information from DOD regarding the program was difficult to obtain (Shulman, 1992). As the decade of the 1980s progressed, however, a new attitude began to take shape at DOD. In 1989, Secretary of Defense Dick Cheney sent out a five paragraph memo which said, in part, "This administration wants the United States to be the world leader in addressing environmental problems and I want the Department of Defense to be the federal leader in agency environmental compliance and protection. We must demonstrate commitment with accountability for responding to the nation's environmental agenda" (Shulman, 1993: 38). The Chief of Staff of the Air Force directed all base commanders to "make the environment a major responsibility of the position." There have been cases of base commanders being reassigned based solely on their lack of forward movement on environmental problems at their bases. The Army has produced documents for the use of its personnel, in what must be a change in the culture of the military regarding its environmental stewardship.

Recently, passage of the Federal Facilities Compliance Act of 1992 (FFCA) has closed some of the loopholes used by federal agencies including DOD. The act allows EPA and state agencies to assess fines and penalties against federal polluters. It sets aside the principle of sovereign immunity that had been used in the past to prohibit states from fining or suing the federal government. States are now able to sue and fine, as well as to collect on the costs of litigation. The law also puts aside the principle of the "unitary theory of the executive", often used during the Reagan administration, which prohibited one federal agency from suing another (Section 102(a)(3)). Although the act amends the Solid Waste Act (which is amended by the Resource Conservation and Recovery Act (RCRA) and the Hazardous and Solid Waste Act (HSWA)), the fact that it removes the long held, and often used, concept of sovereign immunity has also served notice that Federal facilities will be treated under all environmental laws in the same manner as private sector facilities.

The environmental problems faced by DOD have not been simply a case of a mission-agency refusing to look outside the area for which it has traditionally been responsible. It is partially a case of a confused regulatory environment. Environmental problems are ones which have been created by a number of different factors, and a number of different agencies and actors, both internal and external to any one agency. In the case of a great many DOD installations, the problems have been created over the course of more than 100 years. Often, in congressional hearings, DOD officials have complained of the confused regulatory environment in which they must operate. It has been described by some as a moving target (Congress, House of Representatives, 1991).

The General Accounting Office (GAO) has identified at least ten laws and associated regulations and guidance regarding the environment at the Federal level, and there are 50 sets of state laws and untolled numbers of local laws with

which any installation commander may have to comply. Carnes (1982: 37) characterized EPA's hazardous waste regulations as the "most complex and voluminous ever promulgated by the federal government." To add to the confusion, it is not unusual for environmental laws to have conflicting or overlapping compliance requirements (GAO, 1992).

Like cleanups in the private sector, DOD site cleanups are slow, expensive, and subject to numerous other problems. The traditional DOD investigation phase, for example, may take more than ten years (Toney, 1992: 90). Members of Congress have been critical of the time it takes to do site characterizations (Congress, House of Representatives, 1987; Ray, 1992) and that the state of technology is outdated, insufficient, or nonexistent. Environmental research and development efforts at DOD, although mandated by the Superfund Amendments and Reauthorization Act (SARA), have been modest (Gaydosh, 1992).

It is fair to say that the remediation of hazardous waste sites at federal facilities is an enormous economic and technical undertaking. Federal agencies own about one-third of the nation's land area (Raynes and Boss, 1993). Environmental cleanup of 24,000 sites on federal facilities may cost as much as \$400 billion (EPA, 1993). The federal government is now spending about \$10 billion annually to clean up hazardous waste at federal facilities.

A 1990 EPA report projected that the non-EPA federal share of total annualized pollution costs would increase by more than one hundred and forty percent between 1987 and 2000, primarily as a result of the cost of military and nuclear waste cleanups by DOD and DOE (EPA, 1990: vii). In terms of Superfund expenditures alone, DOD and DOE are expected to account for about thirty-five percent of the total over that time period (EPA, 1990: 4-4). The remediation at the Rocky Mountain Arsenal in Colorado alone may run as much as \$1.5 billion (Shulman, 1993).

Because DOD has virtually no internal capacity to do cleanup on its own, it must rely on contractors (Ray, 1992), which has associated problems. Issues of contractor indemnification and liability have complicated the application of innovative technologies, and increased costs. The method of contracting the cleanups has also been troublesome. As the operator of Air Force Plant #44, Hughes Aircraft was liable, under the joint, strict and several liability established by CERCLA, for groundwater contamination at the facility (Congress, House of Representatives, 1987). If Hughes had been responsible for pollution at a private sector site, it would have been responsible for paying the cost of the cleanup, not making a profit from it. But at Air Force Plant #44, Hughes was awarded a contract by the Air Force to remediate the groundwater. In March, 1993 the Army Corps of Engineers (COE) issued a Total Environmental Response Contract (TERC) solicitation. The TERC process is an attempt to reduce contracting problems associated with environmental remediation. TERC represents the first federal contracting strategy which allows individual contractors to handle a cleanup from beginning to end (cradle-to-grave).

DOD, like any number of entities responsible for environmental contamination and remediation, is dealing with an area about which relatively little is known. It has not been such a long time ago that many were convinced that the earth acted as a kind of natural filter. It seemed reasonable to simply dump wastes onto the soil surface, let them percolate through the subsurface geology where they would eventually be rendered harmless. The synergistic effects of chemicals in a laboratory setting are not well understood, and when the complexity of subsurface geology is added in, the problems (and their solutions) become even more of a scientific mystery.

In addition to the scientific complexity of the hazardous waste problem, we add the complexity of the legal system that has been set up, in sometimes less

than a clearly thought out manner, the implementation of those laws and regulations, and then, in the case of DOD, we must also consider the structure of the service agencies and the "corporate culture" of DOD itself.

The success of implementation is, to a very large degree, a subjective matter. A great deal depends on who does the judging. It would not be unreasonable to expect several people, or groups, to view the same program and its implementation and come to far different opinions on its success. If a program has not delivered what target groups perceive to be the service they expected, implementation can be said to have failed. But implementation is not a "pass/fail" proposition. As will be seen in the review of the literature, policies are in an almost constant state of evolution. Policy often contains vague or contradictory language which is then subject to agency interpretation. The disposition of agencies toward a policy, or part of a policy, can have an enormous impact on what gets implemented, how quickly it is implemented, and whether goals are met. The resources which are made available to an agency for implementation and the time which they become available can play an important role in success or failure.

It would be neither fair nor accurate to speak of DOD's problems with CERCLA without acknowledging, and exploring some of the problems with the entire Superfund program. Because the IRP must be consistent with the program prescribed in CERCLA, it is important to look at the "controlling" program.

Implementation literature will serve as the framework for this study. This particular case of policy implementation is unique in that it is not the usual case of a federal policy being passed along to state and local governments for implementation. Instead, this is an instance of two federal agencies (DOD and EPA) both attempting to implement what appear to be parallel programs

simultaneously. It is also unusual in that a small, regulatory agency (EPA) is trying to compel a large, old and very powerful Cabinet-level agency (DOD) to comply with the statutory requirements of CERCLA/SARA.

To combine such complex legal and technical problems as those associated with remediating hazardous waste sites with such a large and complex organization as DOD is to invite massive problems. Although there has been some progress, there have also been problems, delays, and explanations that would make any "spin doctor" proud. The purpose of this case study is to look objectively at the program, to point out the implementation obstacles, both internal and external, that DOD faces in making a hazardous waste remediation policy work for the Department, and to look to the future.

CHAPTER II

LITERATURE REVIEW

Introduction

"People...appear to think that implementation should be easy; they are...upset when expected events do not occur or turn out badly," (Pressman and Wildavsky, 1973: xii).

Policy implementation, it sounds simple enough, yet it is one of the more complex problems studied in the field of political science. It is also a relatively young field of study (Fox, 1987; Goggin, et al., 1990a), and understanding is not as mature as in the policymaking process. Until the early 1970s, implementation was taken for granted. In fact, it was often viewed as a leftover of the decisionmaking process (Browne, 1980). The focus was on how a bill became law and the application of the law was supposed to be the automatic result of established agency procedures (Fox, 1987). However, in 1973, Jeffrey Pressman and Aaron Wildavsky would dramatically alter that focus.

One of the earliest, and perhaps most famous, of the implementation studies is presented in a book by Pressman and Wildavsky entitled *Implementation*. It is the lengthy subtitle of the book, *How Great Expectations in Washington are Dashed in Oakland or Why It's Amazing that Federal Programs*

Federal Programs Work at All, This Being the Saga of the Economic Development Administration as Told by Two Sympathetic Observers Who Seek to Build Morals on a Foundation of Ruined Hopes, which may best sum up the popular view of the federal government's ability to do anything.

This chapter will review the policy implementation literature of the past twenty years.

Implementation: The Achilles Heel of Program Management

Implementation, according to Pressman and Wildavsky, is difficult under the best of circumstances. To study it requires "...understanding that apparently simple sequences of events depend on complex chains of reciprocal interactions" (Pressman and Wildavsky, 1973: xvii). This seemingly straightforward and simple process is one involving a number of steps, a number of participants whose preferences must be taken into account, and a number of separate decisions that are all a part of the greater whole (Pressman and Wildavsky, 1973).

In the 1970s, the vast majority of the Great Society programs were viewed as failing to meet expectations. It was during that time that scholars began to suggest that nothing works in the public sector and nothing can get done in government (Ferman and Levine, 1987). Ingram and Mann (1978: 158) said that the picture of implementation put forth by Pressman and Wildavsky was so conditional and uncertain that "reviewers of policy should be pleasantly surprised at whatever indicators of positive policy impact can be discovered."

Pressman and Wildavsky believe that expectations were misplaced. "Expectations about new governmental programs violate common everyday

experience. People who regularly deal with inanimate objects such as computer programs would never expect a new one to run the first time. 'Debugging' is not something done on a rare occasion when things go wrong but is an expected part of making a program work" (Pressman and Wildavsky, 1973: 113).

Fox (1987) suggests that the time frame of early implementation studies may have contributed to the negative tone. Pressman and Wildavsky's study came out as the country was embroiled in the Watergate scandal, dealing with the end of the Viet Nam War, and the economy was poor. Most of the studies were looking at Lyndon Johnson's Great Society programs that were still not mature enough for researchers to determine what their eventual results would be and if there would be unintended consequences as a result of those programs. As with Franklin Roosevelt's New Deal programs of the Depression era, on which the Great Society was based, no one was sure what would work so a flurry of programs was launched which often proved to be redundant or overlapping (Fox, 1987: 137). Many observers are disappointed when governments have problems implementing programs that are supposed to eliminate deep-seated societal problems. Palumbo and Calista (1990) suggest that the failure of the early studies to consider that the process involved more than just governmental agencies officially responsible for carrying out a program was a major shortcoming.

Early work in the field focused on how a law became a program (Bardach, 1977) and why performance fell short (Ingram and Mann, 1978; Pressman and Wildavsky, 1976; and Sabatier and Mazamania, 1980). What researchers probably did not realize was that their studies suffered from taking place much too early in the process. Implementation is not simply a matter of carrying out legislative intent (Yanow, 1990). Goggin, et al. (1990), now believe that what appears to be a failing program, given time to adapt to the prevailing

environment, may in fact be a success. Sabatier (1986) points out that longer frame time studies produce a less pessimistic evaluation of governmental performance. Implementation takes a long time, much longer than sponsors hope and longer than a "reasonable man" might expect (Bardach, 1977). These studies assume that problem definition and policy design were clear and unambiguous which would result in speedy implementation. This is seldom true given that definition and design are the products of the bargaining and compromise that characterize any political activity (Palumbo and Calista, 1990).

Implementation as Policy

There have been, and continue to be, a wide variety of descriptions of implementation offered by researchers. Pressman and Wildavsky (1976: xxi) describe implementation as, "...a process of interaction between goals and actions geared to achieving them." Implementation is seen as a game by Bardach (1977: 57), who describes it as a "process of assembling the elements required to produce a particular programmatic outcome, and the playing out of a number of loosely, inter-related games" in which elements were withheld or added to the program assembly process. Sabatier and Mazmanian (1980: 540) describe implementation as "the carrying out of a basic policy decision, usually made in a statute...." Ideally, they say, the policy decision would identify the problem to be addressed, objectives to be pursued and would structure the implementation process. Marcus (1980b: 4) defines implementation as "...actions taken to achieve objects set forth in prior policy decisions. The process of implementation involves a stage of receiving instructions that is prior to the stage of actually carrying out these instructions." Edwards (1980: 1)

characterizes implementation as "...the stage of policymaking between the establishment of a policy...and the consequences of the policy for the people who it affects." Clearly, they believe that once the policy had been written, it should be a straightforward process to implement it quickly and without change. Ripley and Franklin (1982: 9) describe implementation as "...involving many important actors holding diffuse and competing goals and expectations who work within a context of an increasingly large and complex mix of government programs that require participation from numerous layers and units of government and who are affected by powerful factors beyond their control." Goggin (1987: 27) describes implementation as "an integral part of political decision making. It is a series of goal-oriented decisions and actions that take place in the context of public bureaucracies."

Berman (1980) contends that it is not the purpose of implementation analysis to determine if policy goals are "fit and proper" or to analyze how they are chosen, its purpose is to study why authoritative decisions do not lead to expected results. He argues that analysis of implementation should focus on results and should examine intentions "only insofar as they are relevant to outcomes" (Marcus, 1980: 13). However, researchers in the late 1980s came to the conclusion that to try to divorce policy implementation from its formulation and design was not appropriate (Palumbo and Calista, 1990). Ten years later, Yanow (1990) would point out that implementation success or failure could not be confined to post-legislation factors alone. Implementation is affected by what happens after the legislative phase and by what transpired before and during policy drafting as well. For some, implementation was viewed as a technical, almost mechanical process. There was a criticism that observers often ignored the impact of whatever occurred after the enabling act's passage and equated implementation with simple distribution. Almost as if there was a clerical sorting

system which automatically assigned the benefits that the law specifically provided (Browne, 1980).

In the view of Ingram and Schneider (1988), implementation is not just a mechanical process, but one which also adds values by changing, adding to or deleting from the blueprint of policy. Later, in work done by Goggin, Bowman, Lester and O'Toole (1990), implementation would be characterized as a series of administrative and political decisions and actions that take place across time and space. It is seen as a very complex process, taking place mostly in an intergovernmental, bureaucratic setting. Ferman (1990: 50) says that "implementation should be seen as the final distillation in a political process whose major feature is competition." Later, Stoker (1991) would enlarge on that concept in his definition of implementation as not only a means to an end, but also a process with a strategic dimension, providing opportunities for participants to pursue self-interest. Implementation, according to Stoker, is a paradox, because it seeks to secure the cooperation it needs to implement policy when the actual act of implementing empowers potential adversaries (Stoker, 1991: 4). This is clearly a much broader and less mechanical view of the process of implementation than perceived by earlier researchers. "Implementation is not and cannot be seen as purely technical" (Palumbo and Calista, 1990: 6). The process is best seen one of continuous problem solving.

Studying Implementation as a Process

To study implementation is clearly a very involved undertaking. There are those who believe that the questions in implementation are so complex and so subtle that implementation research teaches us little (Palumbo, 1987). Linder

and Peters (1987a) contend that all the research shows is that implementation cannot be taken for granted in a complex policymaking environment.

Early studies most often used the case study approach. They allowed researchers to focus on the complexity of implementation (Goggin, et al., 1990a). Case studies proved useful because they provided detail rich, case specific accounts. In fact, Palumbo (1987) says case studies are the methodology best suited to implementation studies. Goggin, et al. (1990a), have labeled these early studies "first generation." They point out that the studies shifted research focus to how a law became a program; showed how complex and dynamic implementation is; emphasized the importance of the policy subsystem and the difficulty it creates for coordination and control; identified factors that appeared to account for programmatic results; and diagnosed "treatable" pathologies that sometimes afflict implementing actors. Unfortunately, the case studies failed to systematically identify or analyze the factors that were critical in the implementation of public policy (Edwards, 1980). They are also criticized as "...atheoretical, case-specific and noncumulative, and pessimistic [the government always fouls up]" (Goggin, et al., 1990a: 13). Because the studies were noncumulative, they are less helpful in differentiating among types of implementation outcomes, specifying causal patterns associated with the outcomes, the frequency with which the patterns occur, and the relative importance and unique effects of independent variables (Goggin, 1987).

Goggin, et al., (1990a) also describe what they term "second generation" studies. In these studies analytical frameworks are developed to guide research on policy implementation. Models based on a hierarchical "command and control" theory seek to predict future behavior and compare what actually happened with what was supposed to happen (Goggin, et al., 1990b). Predictor variables of policy form and content; organizations and their resources; and

people, their talents, motives, predispositions, and interpersonal relations, are the focus of these studies (Goggin, et al., 1990a: 14). Second generation studies view implementation as variable, recognizes that implementation is more successful in some cases than in others, and seek to explain implementation success or failure. Studies of this type also take the importance of time periods into consideration. The shortcoming of second generation studies, according to Goggin, et al., (1990b) is that they fail to look at interstate variations and the model fails to determine which variables are more important than others.

Goggin, et al., (1990b) have also described what they call "third generation" studies. This generation of implementation studies is much more data intensive than first and second generation studies and so might also be viewed as more "scientific." Third generation studies seek to "shed new light on implementation behavior by explaining why the behavior varies across time, policies and units of government, and by predicting the type of implementation behavior that is likely to occur in the future" (Goggin, et al., 1990a: 171).

It is important to note that although Goggin, et al., have elected to place generational labels on various types of implementation studies, it does not necessarily follow that first and second generation studies are obsolete and third generation studies the only logical way to proceed. Researchers have been exploring implementation on a systematic basis for only twenty years, and there is still little or no agreement on the best way to proceed. Case studies are still used, and the knowledge gained from second generation studies continues to yield important insight into how the process of implementation works. "There is a collective ignorance about why the implementation of public policy happens the way it does. ...and because we don't understand the general characteristics, we don't really know how to make implementation better" (Goggin, et al., 1990a: 8). One thing is clear, "any observer looking on the implementation of public

policy in the United States and expecting to find order, timely performance, and achievement of clearly stated goals would be severely disappointed" (Ripley and Franklin, 1982: 2).

Implementation Theory

In this fairly "messy" field of study, few things have been settled. One that has, although not universally so, is the rejection of what might best be called the "classical theory of implementation." Using this theory, one would assume that an agent is chosen by the policymaker, using some technical criteria, to carry out a policy. The policy is communicated to the agent in a series of specific instructions which are formulated at the top of a pyramid and passed down the chain of command. The agent then implements, or carries out, the specific instructions according to the policy guidelines specified by the policymaker without discretion (Burke, 1990; Fox, 1987). The continued use of this rational-comprehensive model results in studies overplaying unilateralism, too high and too narrow expectations (Fox, 1987). The rational model implies implementation is an orderly process, that outcomes are predictable, and that not only does the bureaucracy know what it is doing, but does what it is told (Marcus, 1980a). The model assumes that good decisions require clear goals and that unintended consequences can be minimized (Fox, 1987; Marcus, 1980a).

An area in which there is long-standing disagreement among researchers is direction--that is, whether to study implementation from the top-down or bottom-up. The top-down approach, which is best seen in the rational-comprehensive model, is connected to the notion that democratically elected officials have the lead role in deciding policy (Fox, 1987). Top-down analysis starts with policy

decisions by government officials and then asks to what extent were the actions of the implementing officials and target groups consistent with the policy decision; to what extent were the objectives attained over time; what principal factors affected policy outputs and impacts; and how was the policy reformulated over time on the basis of experience (Sabatier, 1986; Thompson, 1984).

Sabatier found the top-down approach is useful in making preliminary assessments and where there is a dominant piece of legislation structuring the situation (Sabatier, 1986). Yet he is also critical of the approach, saying that those who use the method exclusively are preoccupied with effectiveness of specific programs and the ability of elected officials to guide and constrain the behavior of civil servants and target groups. Palumbo (1987) dismisses the approach because it assumes that the goals and perspectives of those at the top are the only legitimate ones. He believes it is in error to consider deviations from instructions handed down the chain of command as dysfunctional. The models using this method have a tendency to ignore or underestimate the strategies used by street-level bureaucrats to get around a policy or divert it to their own purposes (Sabatier, 1986). Top-down approaches value compliance over cooperation (Stoker, 1991).

At the other end of the direction controversy are those researchers who use the bottom-up approach. Sabatier (1986) describes this method as useful where there is no dominant legislation but large numbers of actors without power dependency or when one is primarily interested in the dynamics of different local situations. Supporters of the bottom-up approach believe that street level workers may be able to find more efficient ways of meeting organizational goals and objectives (Palumbo, 1987). These researchers are less concerned with the extent to which a formally enacted policy decision is carried out and are more concerned with accurately mapping the strategies of the actors concerned with a

policy problem (Sabatier, 1986). The bottom-up approach, according to its proponents, allows consideration of strategic initiatives coming from the private sector, street-level bureaucrats, local implementing officials, or other political subsystem actors (Lipsky, 1978; Sabatier, 1986). Linder and Peters (1987), however, argue that governance is not about negotiation, an important principle in the bottom-up approach, but the legitimate use of authority. Bottom-up approaches, they say, counsel we should only do what is possible, and label the approach as too conservative (Linder and Peters, 1987). Bottom-up approaches focus on conflict resolution (Stoker, 1991).

Among the models based on these approaches are ones by Lipsky, a bottom-up advocate, in 1978 and Thompson (1984) who developed a model of overhead control using the top-down approach. The problem with exclusive reliance upon either approach is that they each assume that implementation occurs mostly either at the top when policymakers formulate the policy or mostly at the bottom where street-level bureaucrats are charged with the policy's implementation. There are very few cases of implementation that occur in so pure and environment.

As Ingram and Schneider (1988) point out, there is also disagreement about the starting point for implementation studies. Some (Sabatier and Mazmanian) begin with policy formulation as a given and move forward through through the action of implementation. Goggin (1987) says implementation begins with the law's enactment. Pressman and Wildavsky (1973) caution that implementation should not be divorced from policy. There is no point in having good ideas if they cannot be carried out. "Implementation must not be conceived as a process that takes place after, and independent of, the design of policy" (Pressman and Wildavsky, 1973: 143). Thus, it should prove useful to briefly examine the issue of policy formulation.

Policy Formulation

"Policy is what governments choose to do. Implementation is what they actually do" (Marcus, 1980a: 3). What governments promise when they create a policy is not identical to what happens when the policy is implemented. A policy or program is a way of dealing with public problems that involves some sort of concrete action (Larson, 1980).

Policies consist of directions for a performance, a set of explanations intended to control behavior and to produce certain predicted results (Love and Sederberg, 1987). Policies are made for a variety of reasons. They may show concern for the political problems of key constituents, demonstrate the influence of elected officials over government agencies, attempt to change the behavior of agencies and individuals, or to produce socially desirable outcomes (Elmore, 1987). Rein and Rabinovitz (1978) point out that programs also have an exchange value, that is, new programs are valued as a medium of exchange for politicians, bureaucrats and interest groups. Government programs in the U.S. are often a response to an weakness or inability of the private sector to supply necessary goods or services (Larson, 1980). However, "...a policy is not effective until it is administered and how it is administered will determine how effective it will be" (Rosenbaum, 1977).

Implementation can be triggered by one or more of several authoritative decisions including an act of Congress, Presidential executive order, or administrative decisions made by civil servants in federal, state or local bureaucracies (Goggin, 1987). Larger goals are most often written into legislative acts passed by Congress; smaller goals are in guidelines and regulations issued by administrative agencies (Larson, 1980).

The triggering mechanism with which we are most familiar is an act of Congress. The passage of a statute that directs an agency to formulate and promulgate regulations for a program which has survived the political process. It is not unusual for the problems associated with implementation to begin in the language of these statutes.

Often, statutes have policy failure built in because they are so flawed that it is unlikely that the purposes or positive effects will be realized and unintended negative consequences are also certain to occur (Ingram and Schneider, 1988). Palumbo and Calista (1990) point out that there is nearly always a gap between the promise and performance of a policy. One reason is that much of the legislation that is passed is largely symbolic (Palumbo and Calista, 1990). Bardach (1977) maintain that policy mandates may be vague because of the pressures placed upon government to do something about what is perceived as an urgent social problem even though no one quites knows what to do. It is common for the language of a statute to be purposely vague, sometimes for political reasons, sometimes for lack of time during passage, and sometimes because the means to the end are not well understood (Rein and Rabinovitz, 1978). Yanow (1990) attributes legislative ambiguity to the system itself, it is the result of the compromise which is necessary to gain passage. The problem with vague language is that it forces administrators to deal with not only the literal meanings, but on their own interpretation of legislative intent (Larson, 1980; Yanow, 1990).

It is an unfortunate fact that the vague language also leaves us with laws which are less likely to be implemented successfully (Goggin, 1987). The "gap" (between policy intentions and outcomes) metaphor popular in criticisms of implementation studies may actually be the result of multiple meanings from the vague statutory language (Yanow, 1990).

Flawed statutes and programs produce defective implementation, and hinder the ability to achieve desired outcomes, according to Ingram and Schneider (1988). They also point out that there is no model statute and that different approaches are needed depending on the problem and the legislative environment.

Although a several researchers (Pressman and Wildavsky, 1973; Bardach, 1977; Rein and Rabinovitz, 1978; Edwards, 1980; Sabatier and Mazamania, 1980; Ingram and Schneider, 1988) stress the importance of clear statutory language, others question how authoritative the statutes actually are. Lipsky (1988) is among those who fault the vague language for implementation failure and says that statutes usually only provide sketchy implementation instructions since the language is not only vague, but often general and contradictory.

Linking Policy Formulation to Policy Implementation

Sabatier and Mazmanian (1979) identified a list of six variables which they believe necessary for effective implementation. The first two of their variables are explicitly related to the policy formulation process. After doing a number of studies, they found that the conditions serve as a useful checklist of critical factors to understand variations in program performance. Those factors are: clear and consistent objectives; adequate causal theory; process legally structured to enhance compliance by implementing officials and target groups; committed and skillful implementing officials; support of interest groups and sovereigns, and changes in socioeconomic conditions which do not substantially undermine political support or causal theory. The relative importance of the factors varies, although one, implementing agency support, is most consistently

critical (Sabatier, 1986). They also note a flaw in their earlier work which placed an emphasis on clear and consistent objectives. They found that most, if not all, programs have partially conflicting objectives. If the factor were singularly critical, virtually no program would be successfully implemented. Larson (1980) points out that program goals are seldom static, but will continue to evolve over time in response to pressure for more realistic implementation.

Rein and Rabinovitz (1978) also present a list of "crucial environmental conditions" that they believe influence the implementation process. Their list includes goals saliency, complexity of the process itself, and the nature and level of available resources. Legislation can be classified in terms of how clear it is about what it wants to accomplish, whether stated purposes are to be accomplished immediately, whether it is largely symbolic, and how urgent sponsors feel its implementation is compared with their other goals. Ambiguous, symbolic, low-saliency programs are likely to be implemented in a very complex, circular manner; programs with goals that are clear, instrumental and urgent are generally more centrally and hierarchically implemented (Rein and Rabinovitz, 1978: 326). Much like the importance of the number of decision points in the earlier Pressman and Wildavsky study, Rein and Rabinovitz find that implementation is a function of the number of levels, the number of agencies and the number of participants who have a say in the process. Another aspect of complexity described by Rein and Rabinovitz is the nature of the policy environment. "In the absence of uniform, coherent objectives and overriding principles, an environment overcrowded with various legislative mandates may create a situation where the multiplicity of programs may cancel each other out" (Rein and Rabinovitz, 1978: 328). Finally, they point out that resources do not always take the shape of direct outlay of expenditures. Implementation is

affected by whether or not the type and level of resources required for action are available.

Goggin (1987) postulates nine policy design features that, if present, would increase the likelihood of prompt implementation. Those features are: absence of welfare stigma; consistency with existing beliefs and practices; absence of threat to existing power arrangements; a technically, economically and politically sound underlying theory; a law that is clear; benefits that are perceived as health rather than welfare; a law with inclusive eligibility requirements; a single source of funds; and a law with provisions for rewards and/or penalties.

Implementation Structure

The structure onto which implementation is imposed has been the subject of many studies (Pressman and Wildavsky, 1973; Mann, 1981; Palumbo, 1987; Stoker, 1991; Love and Sederberg, 1987; Calista, 1986; Marcus, 1980; Ferman and Levine, 1987). It is important to remember that policy must be implemented by organizations whose performance is already governed by internal and external directives including authorized structures and procedures as well as its fundamental character and capabilities (Love and Sederberg, 1987). Seldom will an entirely new organization be developed to implement a policy. Calista (1986) believes that policymakers are relatively unconcerned about anticipating how organizations affect implementation. This may be because policymakers are more likely to subscribe to the top-down view of implementation and assume that cooperation will be induced by command (Stoker, 1991).

Implementation usually is not carried out by a single organization, and bureaucracies by their very nature are likely to be very complex. O'Toole and

Montjoy (1984) point out the complexity of implementation in interorganizational situations. The complexity has been steadily increasing due to the sheer number of organizations which may be involved in a single policy's implementation. Goggin (1987) found a linear relationship between the size and heterogeneity of the organizational set and the extent to which implementation may be delayed or modified. O'Toole and Montjoy, as have many others, note that increasing complexity creates a situation where implementation is prone to more delay, and is less likely to be successful because monitoring and enforcement are more difficult and recalcitrant agencies are less visible to policymakers (O'Toole and Montjoy, 1984). Stoker (1991) contends that the problems inherent in implementation of national policy due to the government's complexity are no accident. According to Stoker, the U.S. government has been disabled by design through the system of checks and balances on power written in the Constitution and the stalemate that frequently is seen to occur is actually functional.

Most often implementation is viewed as a problem of organization. The essence of effective implementation in this view is to design an instrument to achieve objectives identified by policymakers. This view equates governmental effectiveness with federal authority and control of the implementation process (Stoker, 1991). This top-down viewpoint implies that implementation is an order.

Interorganizational complexity and conflict are often used as complementary explanations for implementation failure (Stoker, 1991). Pressman and Wildavsky believe that when there are a "large number of clearance [or decision] points manned by diverse and independent participants the probability of a program achieving its goals is low" (Pressman and Wildavsky, 1973: 110). In a slightly more optimistic view, Goggin (1987) maintains that the more complex the relationship among the transacting organizations, the more

likely implementation will be delayed and the policy modified during implementation. However, in Stoker's "regime perspective" the complexity does not necessarily undermine implementation, but serves to expand the number of participants which helps induce cooperation (Stoker, 1991).

Love and Sederberg (1987) also look at the presence of informal organizational structures as they impact implementation. These informal organizations can serve to reinforce or undercut formal operations. A policy that challenges these organizations is more likely to meet implementation difficulties (Love and Sederberg, 1987).

Implementation involves a variety of actions. Agencies must acquire resources (personnel, land, equipment, raw materials, money), interpret and plan (expand statutory language into directives, regulations and program plans and designs), organize activities by creating bureaucratic units and routines, and extend benefits or restrictions (doing whatever represents the tangible output of a program) (Ripley and Franklin, 1982).

Another variable in implementation is people. The actors are almost too numerous to mention, but too important to overlook. "Just about anyone can get into the implementation game. Jerseys for players are free..." (Ripley and Franklin, 1982: 10). In reviewing the fifteen major clusters of potential implementors identified by Ripley and Franklin, it does appear that just about anyone can play. They see the actors falling into five groups over the three levels of government (federal, state and local). The categories they identified are: executive officials and organizations (chief executives and staffs), legislative officials and organizations (legislators and staffs), bureaucratic officials and organizations (departments, agencies and civil servants), nongovernmental individuals and organizations (companies, labor unions, interest groups), and judicial officials and organizations (Ripley and Franklin,

1982). Any of these actors can be involved in any policy over time, adding to the complexity of implementation.

Goggin also categorizes implementing actors. He identifies them as policymakers, policy managers, and consumers and provider advocates (Goggin, 1987). Because the policymakers are usually elected officials they operate on a short-run view and they are looking for the more immediate impact of passing bills than of the longer-term problem of implementing them properly (Goggin, 1987; Edwards, 1980). The consumers and provider advocates, who could include both the public and press, are not especially concerned with implementation, but are more concerned with policy impact (Edwards, 1980). Yet poor, incomplete or delayed implementation can have a significant role in a policy's impact. These attitudes are a reflection of the politics (which are often described as defensive) of the implementation process. Actors seem to be more concerned with what they in particular might lose than what everyone in general might gain (Bardach, 1977).

Equally important in the success or failure of policy implementation is the disposition of the organizations and actors who are charged with the implementation. Implementors must know what to do, how to do it and have the capability to do it, and the desire to carry out policy (Edwards, 1980). Regardless of the resources available to implementors and the support for a policy from other sectors, if agencies and their personnel are not favorably inclined toward a policy, its implementation is likely to be seriously delayed or unsuccessful (Browne, 1980). Program goals are achieved more easily when policy implementors share the views of policymakers (Larson, 1980).

The political environment in which regulatory agencies operate affects their behavior (Wilson, 1980). Bureaucrats and agencies tend to respond to incentives that will lead to growth in their roles, budgets or numbers (Mann,

1980a). If a program threatens an agency's long-range goals or well-being, it will probably die quietly (Larson, 1980).

Sabatier and Mazmanian believe that the continued support of sovereigns is also important in successful implementation. The support could take the form of oversight or changes in the agency's fiscal and legal resources (Sabatier and Mazmanian, 1980). Connected to support of sovereigns is constituent support. Because sovereigns (policymakers) are likely to be motivated by those things that are likely to get them re-elected, programs which are viewed by their constituents as important, are the ones in which they are likely to remain interested (Ferman and Levine, 1987).

Given that implementation involves a number of actors with various connections to various organizations, it is clear that coordination is another vital element. Mann (1981) says that coordination is difficult to achieve because there are few in the hierarchical chain of command who are willing to make hard decisions. Lack of coordination is likely to result in a patchwork policy with each agency moving in its own direction, negotiating only when conflicts are severe enough to impede progress toward its chosen goal (Mann, 1981).

Coordination assumes that non-zero-sum games will predominate interagency decisionmaking (Burke and Heaney, 1975). Given that implementing agencies are likely to act in a manner which is in its own best interest, non-zero-sum games are not likely to take place with any regularity.

Bardach (1977) believes insufficient coordination is practically a universal complaint. It is attractive, he says, because it appears to cost so little. Pressman and Wildavsky (1973) caution that everyone wants coordination on their own terms. They define coordination as "getting what you don't have like compelling federal agencies and component parts to act in a desired manner at the right time" (Pressman and Wildavsky, 1973: 134). It is a definition which

might be more appropriate for coercion. Stoker (1991) contends that coercion can play a role in inducing cooperation. Goggin (1987) goes a step further, saying that programs with provisions for coercion are more likely to be successful in their implementation. However, coercion also has disadvantages. Coercion is costly, the authority to enforce is incomplete, it may alienate implementation participants, and federal policy formulators may not have the stomach to use coercive power (Stoker, 1991).

Molnar and Rogers (1982) identify several coordination strategies. They believe that mutual adjustment was the most common model. It is fundamentally a voluntary political act that is not always perceived by potential participants as more efficient or desirable. A second strategy is termed "exchange" in which agencies contract with private organizations or individuals to perform specific services. They find exchange to be a more effective form of coordination when agencies deal with each other over extended periods of time and on more than one issue. The third strategy, alliances, has three different forms. In alliances, networks are formed where actors grant power to each other. The intensity of participation varies from issue to issue. The problem with alliances is that as interdependence increases, more communication and more decisions are needed which increases both the difficulty and cost of achieving coordination. They label the three types of alliances "pooled," "sequential" and "reciprocal." Their fifth coordination strategy is the corporate model in which there is a reliance on authority, hierarchy and administrative reform to achieve coordination.

While a variety of researchers have shown that coordination is an important factor in successful implementation, its ability to overcome all implementation pitfalls should not be over-estimated. As Molnar and Rogers (1982) point out, coordination is a process of adjustment and not a mechanism for resolving

fundamental differences in values or perspectives. Even the best coordinated implementation process can still result in patchwork policy if the agencies involved have significant disagreement on the purpose or intent of a policy.

Implementation cannot occur without some sort of plan. Since most researchers agree that statutory language is usually vague, implementors are not always able to determine if policymakers had a strategy in mind. According to Mann (1981), strategies are decided, whether deliberately or inadvertently by those in the process who create the program, describe the structure, prescribe the method of funding, establish constraints on procedures, impose requirements for reporting and coordination, or invite public participation. In his view, there really is no distinction between policymaking and policy implementation (Mann, 1981).

Goggin, et al., (1990b) contend that the style adopted by implementors is a function of the form of the policy message. They find that messages which are clear, consistent, frequently repeated and actually received by implementors are more likely to see a straightforward style of implementation chosen. Goggin, et al., (1990a) actually describe four styles of implementation: defiance, delay, strategic delay and compliance. What distinguishes each of these from the others is what happens as a policy being implemented is modified. In defiance there is not only delay, but policy modifications which "hurt" the policy. The delay strategy is perhaps the most benign as implementation is only delayed, but no policy modifications take place. Strategic delay involves delay which allows implementors the opportunity to do something that will improve the chances of a successful implementation. Compliance involves neither delay nor modification.

Berman (1980) describes two types of strategies, adaptive and programmed. The adaptive strategy is appropriate where goals and, perhaps, means of a policy are unclear. Implementation under this strategy more closely

resembles problem solving with the principals fashioning policy by supplying information, grant consent, responding to change, and otherwise contributing to the process of evolution. A programmed strategy, on the other hand, is useful when clear goals exist, lines of administration are clear, and incentives have been specified to encourage principals to contribute to achieving a predetermine solution (Berman, 1980). Adaptive strategies clearly have characteristics consistent with bottom-up approaches; programmed strategies reflect a top-down approach. Berman goes on to identify a set of characteristics which he deems important in determining the appropriate strategy. These factors include: scope of change (small changes are not necessarily easier or large ones more difficult); uncertainty of technology or theory; agreement over goals; institutional setting (are units tightly or loosely connected, do relationships change, are they close and well-understood); and the stability of the environment (unforeseen events can cause large problems).

Bardach describes delay in implementation as "a synonym for effective resistance or obstruction which is purposive in that it serves the interests of the purposes of some parties" (Bardach, 1977: 180). In a slightly less cynical moment, he also points out that some delays are not contrived, but just happen. Program delay is often difficult to distinguish from program failure, according to Pressman and Wildavsky (1973). They say it is difficult to know whether, if after a delay of several years a favorable decision is made, to count the program as a success or failure. Goggin, et al., (1990a) contends that states adopting the implementation strategy known as strategic delay in order to develop more complex organizational structures and then address the policy problem have done better in output terms.

Implementing Implementation

Implementation is not a one step, linear process. All its stages are interdependent. "The process is not a graceful, one-dimensional transition from legislation to guidelines to auditing and evaluation--it is circular or looping," (Rein and Rabinovitz, 1978: 322). Thompson (1967) describes a model of sequential interdependence that is not symmetric. The importance of each link is related to its position in the process. The earlier it is in the sequence, the more critical it is. Thompson's model implies that federal agencies are the most important implementation participants.

Rein and Rabinovitz go on to describe the three major phases that they believe implementation proceeds: guideline development; resource distribution and oversight. Guideline development is not just interpretation of legislation. In the process of developing guidelines are numerous decisions about how to make a program work. Resource distribution covers a range of activities from appropriation to authorization to release of funds. The matter of timing, that is when funds become available, can be as important to implementation as the amount of the funds. Oversight can take one of three forms: monitoring; auditing or evaluating. It is important to note that no matter how well oversight mechanisms are at the beginning of a program, eventually they wear down. This loosening of oversight may be due to lack of attention at the oversight agency or could be a matter of agency capture by those groups they are supposed to oversee.

Larson (1980) also describes three phases of implementation that differ slightly from those of Rein and Rabinovitz. He calls his phases interpretation (where the program is translated into guidelines and regulations by the agency responsible for implementation), organization (when departmental units assume

responsibility for putting the program into operation), and application (the provision of services becomes an established routine performed by an agency).

Sabatier and Mazmanian (1980) have formulated still another list of stages in the implementation process. Each stage can be thought of as an endpoint or dependent variable, but each is also an input into successive stages. Their stages are: policy outputs (decisions) of implementing agencies; compliance of target groups with those decisions; actual impacts of agency decisions; perceived impacts of those decisions; and the political system's evaluation of a statute in terms of major revisions (or attempted revisions) in its content.

Evolution of a policy is bound to occur during implementation. Stoker (1991) says that it is not possible to determine implementation outcomes in advance and that policy must necessarily evolve as it moves through the implementation process. That evolution should be expected to reflect the interests and priorities of those positioned, in both formal and informal organizations, to express their desires. Bardach (1977), however, believes that renegotiation of goals could consist of trimming, distorting or preventing them or adding to them in a way that eventually makes them unsupportable--what he terms "piling on."

Ripley and Franklin (1982) also believe that the policy process is continuous and offers opportunities to raise old and new issues thereby offering many points of access to influence outcomes. In a real sense, decisions are never final, they are all appealable, amendable and reversible. It is reasonable to assume that even a program with clear, realistic goals will undergo some changes as the program is implemented (Larson, 1980).

Just as the disagreement about where the starting point is for implementation studies, there is similar disagreement about where the studies should end. Ripley and Franklin (1982) say that implementation has no clearcut

endpoint. Goggin (1987) believes that implementation is complete when services are delivered to at least fifty percent of those eligible. Some are concerned with whether the agency complied with the directives in the statute, others on whether the goals of the statute were achieved and still others on the effects of the statute as implemented (Ingram and Schneider, 1988). Attempts to judge the success or failure of a policy to fulfill the outputs and outcomes anticipated by policymakers have frequently served as an endpoint.

Like with most things associated with policy implementation, there is disagreement on what the product of implementing a policy should be. Stein (1984: 126) says, "Policy implementation is comprised of two elements: compliance and impact." Compliance is the actions of individuals directed at achieving specific policy objectives. Impact is the long-term effect of enacted policies focusing on nonstatutory variables.

Others have identified outputs and outcomes as the products of policy implementation. Outputs have been defined as what government does (build things, spend money, issue regulations) (Marcus, 1980a; Fox, 1987). They have also been described as the extent to which programmatic goals have been satisfied (Goggin, et al., 1990a: 34) Outcomes are the ultimate impacts of government action, the changes in the larger societal problem that the program is intended to rectify (Fox, 1987; Goggin, et al., 1990a; Marcus:1980a). Ideally, according to Marcus, government performance should be evaluated in terms of outcomes, but they are harder to measure and measurement is often confused by the existence of unintended consequences (Marcus,1980a: 11). Fox (1987) also identified policy impacts as even longer-term results that may be remote and aggregated with the results of several programs.

Ingram and Schneider (1988) argue that implementation should not be assessed in terms of compliance or achievement of pre-specified outcomes, but

in terms of "value-added" to policy design during the implementation process. A method of assess implementation success proposed by Linder and Peters (1987) is to evaluate policy performance and attempt to determine if there were real changes in the specified condition as a result of programmatic interventions. Ripley and Franklin (1982) say that successful implementation facilitates desired program performance and impact. However, they also point out that the notion of success in implementation has no single widely accepted definition and might include things such as the degree of compliance or the smoothness or lack of disruption.

The third generation "communications model" put forth by Goggin, et al., (1990) dismisses the single point in time success/failure measurement of implementation and instead looks at the status of implementation over the life of a program using periodic measurements.

Many researchers point out that success or failure is not simply a matter of the mechanics being correct. Pressman and Wildavsky (1973) say that implementation can neither succeed nor fail without a goal against which to judge it. Unrealistic goals can be just as bad according to Larson (1980). Although most policy analysts would agree that agreement on goals is a necessary part of successful implementation, Mann (1981) says that agreement is seldom achieved, even among the legislators who fashion goals. If a policy is inappropriate, it will probably be a failure no matter how well it is implemented (Edwards, 1980). In the short-run, Sabatier and Mazmanian believe that successful implementation is dependent on the strength of the statute and the ability of supportive constituency groups to effectively intervene in the process. In the long-run perhaps it will never be possible know without a doubt that a particular policy has been implemented successfully.

Conclusion

As is the case in most young fields of scholarly inquiry, there is great disagreement about implementation--when it starts, what it consists of, what elements are likely to lead to successful implementation and which to failure, even when it ends. There are nearly as many opinions as there are researchers in the field.

The apparent inability of many policies to meet the expectations of the public may be due as much to unreasonable expectations as to implementation failure. Several studies have shown that new policies, like most other new things, are likely to have kinks which must be worked out before they run smoothly. For that reason, the most reasonable way to view implementation is as a process of continuous problem solving.

Research has shown that the mechanics of implementation are affected by two sets of forces--those imposed upon the implementing agency by policymakers and those internal to the agency. Among the external forces are form of vague statutory language, conflicting statutes or lack of resources. Internal forces can take the form of agency structure, commitment to the policy or disposition of the implementors.

Perhaps the biggest lesson that anyone can take from the state of knowledge that currently exists in the field of implementation is that it is "messy." It makes little difference the approach a researcher may elect, it is still a process that lacks order, timeliness and clarity. However, as many researchers have pointed out, a messy process is not a failed process. Success is in the eye of the beholder. Often the constant readjustment which a policy is likely to receive during implementation actually results in a policy that better serves the purpose for which it is intended.

It is also clear that policies are not value free, nor are they perfect. They are the result of a political process and so policies are sometimes written with more political motives than with altruistic ones. Street-level implementors are just as likely as policymakers to attempt to bend a policy for their own motives.

Policy implementation is an endeavor that is best viewed in its sum rather than in selected parts.

CHAPTER III

RESEARCH SCOPE AND MODELS

Introduction

"Much of what appears to be the result of bureaucratic ineptitude, agency imperialism or political meddling is the result of the sheer magnitude of many ... tasks" (Wilson, 1980: 392).

The scope of this study is limited to the evaluation of the implementation of the IRP as it is used to guide the remediation of DOD facilities that are listed on the NPL. However, remediation efforts at DOD installations are not conducted solely in response to listing on the NPL. Each of the major environmental protection laws including RCRA, Clean Water Act, Safe Drinking Water Act, and Clean Air Act, have an impact on the hazardous waste/substance handling at DOD facilities. Those facilities are subject to the same permitting and compliance conditions required under the media-specific laws for private sector facilities. While those laws and DOD's ability and/or willingness to meet its environmental obligations under those statutes are important, the scope of such an investigation is too broad for an undertaking such as this.

This study differs from the majority of policy implementation studies in the literature. Most often, a statute is passed by Congress, authorizing an executive department to implement the policy. That department then passes

implementation responsibilities on to state and local governments.

Implementation of the policy occurs at sub-federal levels guided by the original statute and by the regulations promulgated at the federal level. Factors influencing implementation at the sub-federal level are numerous and vary from state to state, community to community, and election to election.

In this case, the statute was passed by Congress and given to an executive agency (EPA) to implement. However in the case of the IRP, implementation does not occur at the state and local level, but within DOD. Each of the service branches, Air Force, Army and Navy, are responsible for implementing their own IRP. Installations are then delegated responsibility for ensuring that the program is carried out on that level. State and local governments, while welcome to take part in decisions, have little input and can be overruled by the two federal entities involved.

Many policies provide a control mechanism through the funding process to direct implementation. If a state chooses not to implement a policy in the manner that, for example, the Department of Transportation deems appropriate, the Department may withhold federal highway funds from the state as a way to direct implementation. In the case of EPA, however, it does not control DERA funding and so really has little control over DOD's implementation.

Another factor which makes this study different is that DOD is an old, large, powerful Cabinet-level agency that has seldom had to answer for its actions. Pitted against it is a small, regulatory agency, EPA, that does not hold Cabinet level status. EPA lost what little influence it had and much of the public's confidence during the Reagan and Bush administrations (Mazmanian and Morell, 1992). EPA is also hampered in this case because it cannot hope to yield the influence over Congress that DOD does.

When an IRP investigation is started at a DOD installation a Phase I study is conducted. The Phase I study really amounts to a background check. It gives environmental restoration officials an idea of what has happened at the installation in the past and is primarily conducted through a records search. By conducting a thorough Phase I study, investigators are far better prepared to determine whether further investigation is warranted and how that investigation should be directed. This research study is similar to a Phase I investigation.

DOD is an agency that still releases information about its activities grudgingly. It has made broad use of secrecy allowed it under the aures of national security, even in the area of the environment. For that reason, this research study makes extensive use of the information about the IRP which is found in testimony before a number of Congressional committees, GAO reports and the Defense Environmental Restoration Program Annual Report to Congress. Like a Phase I IRP study, a search of a number of existing documents provides the logical place to begin.

In addition to the records search, this study also makes use of information obtained during meetings of the Technical Working Group (TWG) at Tinker Air Force Base, Oklahoma, over a two and one-half year period. As a condition to granting access to the TWG meetings, there was an agreement that no specific information from those meetings would be reported. There were also open-ended interviews conducted with members of the staff of the House of Representative's Committee on Government Operations, Subcommittee on Environment, Energy and Natural Resources; with a GAO staff member who has been extensively involved with DERP issues; and with a staff member in the Office of the Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health) at Bolling Air Force Base, D.C.

Previous studies of DOD's implementation of CERCLA/SARA through the IRP conducted by GAO and have tended to be "bean counting." Those studies have looked at whether DOD has met some quota of remedial investigations or signed the proper number of Interagency Agreements (IAGs). Investigations carried out by the popular press have focused on what DOD has failed to do in its environmental programs. Everyone seems to be looking at the end of the process and dismissing what happens during implementation. It is important to examine the implementation process in DOD to understand where the process is working and where it appears to be failing.

The implementation models developed by Edwards (1980) and Van Meter and Van Horn (1975), will be used in this study to identify and examine the factors influencing DOD's implementation of DERP.

Study Models

It is tempting to view each service branch as a state government and each installation as a local government. The temptation lies primarily in the fact that it would then be easy to place the implementation of this policy into one of the traditional models for study. However, this forced analogy is not really accurate. The external factors that would normally impact on actors at the state and local levels are considerably different than those influencing actors at the service branch headquarters and individual installation levels. For that reason, many of the implementation models are not suitable for use in this study.

The top-down model developed by Edwards (1980) has been selected for use as the basis for this study. His model is similar in many respects to one developed in 1975 by Van Meter and Van Horn. Sabatier and Mazmanian's

(1980) framework for implementation also contains the same basic variables. Although these models are among the earliest in the field, they provide a suitable approach for studying this implementation problem. All these model posit that the same basic factors, resources, bureaucratic structure, disposition, and communication, influence implementation. The durability and reliability of these variables is evident in that they are not only found in among the earliest models, but can be seen even in the "third generation" studies of Goggin, et. al. (1990a).

There is an ongoing controversy concerning the most suitable approach to study implementation, but the top-down approach has been shown to be appropriate in situations such as this. Sabatier (1986) points out that the top-down approach is suitable in policy implementation where a dominant piece of legislation structures the policy. In this case, CERCLA/SARA is clearly the dominant legislation. Although other legislation, RCRA and NEPA in particular, have some impact on DOD's IRP, those statutes are concerned with other aspects of hazardous waste and the environment. CERCLA/SARA provides the structure on which the IRP is patterned.

Top-down models value compliance over cooperation. Although Congress would surely prefer that DOD be cooperative in its compliance with CERCLA/SARA, it is compliance with the law that is clearly more important. While bottom-up models place more importance on conflict resolution (Stoker, 1991), the situation with DOD and its CERCLA/SARA compliance is a little different than what is found in the vast majority of implementation studies. There has been little attempt or interest in the past in resolving conflict through negotiation between DOD and Congress in this particular area. Again, compliance with the law and its intent to reduce the risk to human health and the environment from hazardous waste is most important.

It is the contention of Van Meter and Van Horn and Edwards that implementation is impacted by communication, disposition, resources, and bureaucratic structure and that each of the influencing factors exerts direct or indirect influence on each of the others. Van Meter and Van Horn's model is shown in Figure I, Edwards' model is shown in Figure II.

For the purpose of this discussion, the influencing variables have been grouped using Edwards' terminology. Each of the factors will be discussed in the next sections.

Communication

The entity responsible for implementing a policy must know what it is supposed to do and be able to transmit that information to appropriate personnel. If there is confusion at the top, that confusion will travel down the structure. Directions for implementation must be received by those responsible for implementation, at any level. Multiple layers of bureaucracy will filter any communication and can distort the message, sometimes unintentionally, sometimes on purpose. In both models, transmission lapses are points at which implementation failure may begin. Edwards says there is a fine line concerning the right amount of communication. Instructions that are vague or confused provide an opportunity for implementors to use their discretion; instructions that are too detailed do not allow implementors to adapt a policy to meet local needs. Van Meter and Van Horn contend that communication, and enforcement activities, that are too stringent can lead to goal displacement. Goal displacement occurs when an agency is more concerned with meeting procedural requirements than with policy goals.

Figure I
Van Meter and Van Horn's (1975) Model of Policy Implementation

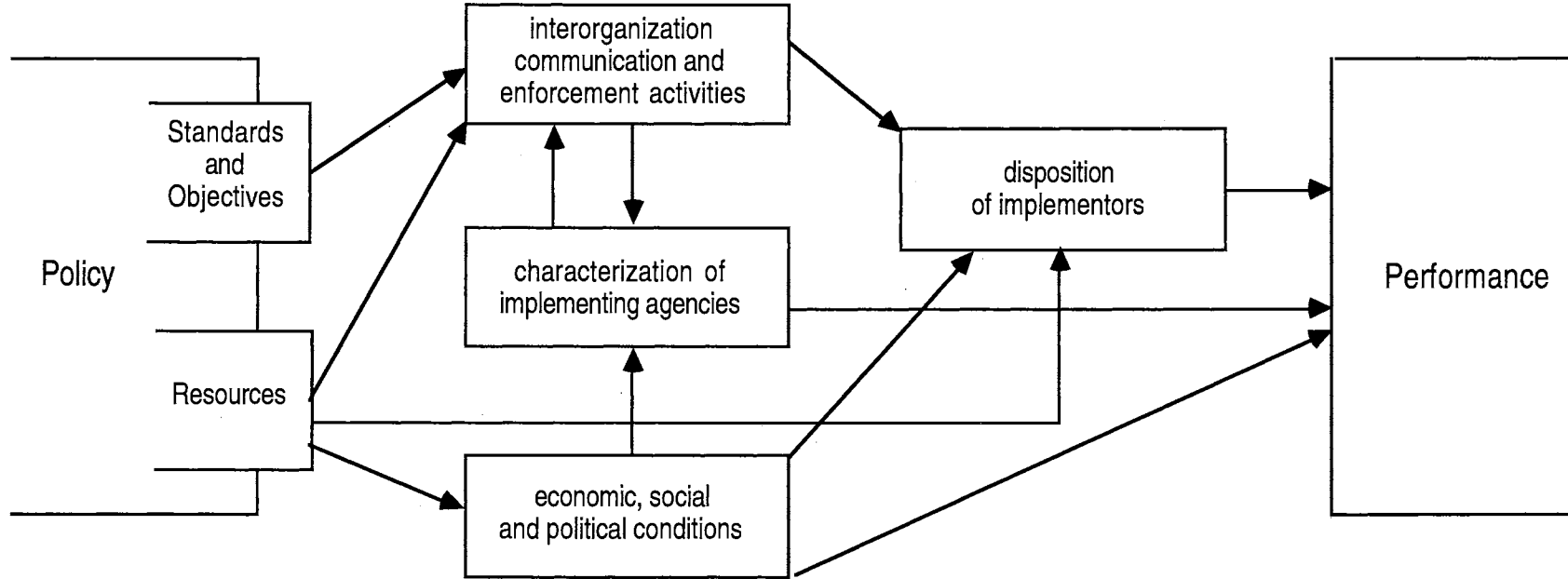
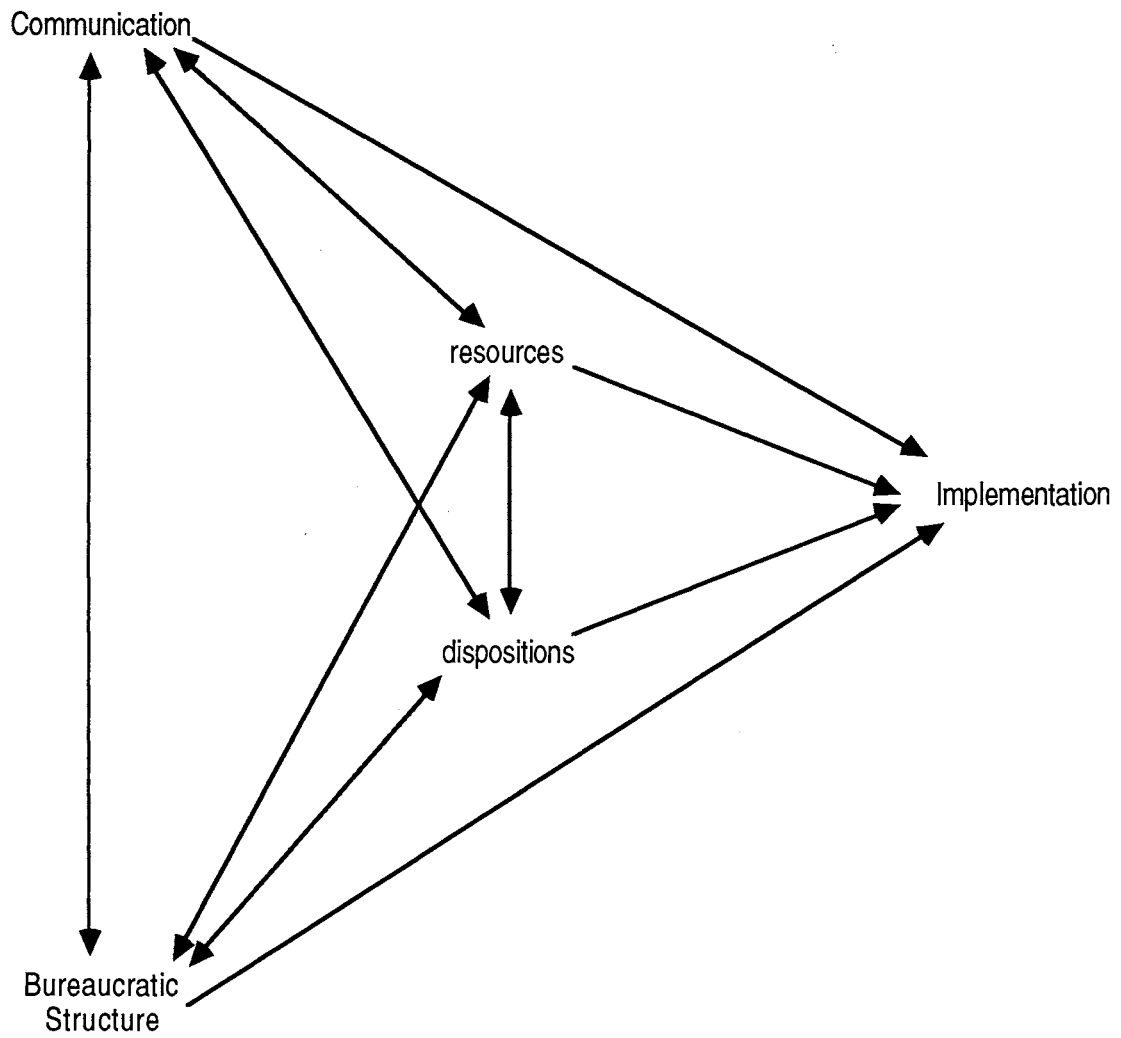


Figure II
Edward's (1980) Model of Policy Implementation



A number of researchers (Sabatier and Mazmanian, 1980; Sabatier, 1986; Lester, et al., 1987; Goggin, et al., 1990a) have included communication as part of their implementation models. Communication offers a means for policymakers to clearly deliver the intent of the policy to implementors, or it can allow them to offer a vague message that can be interpreted by implementing actors. In Edwards' model communication has a direct impact on the dispositions of implementors. His model also shows that communication and the bureaucratic structure of the implementing organization are closely linked. Van Meter and Van Horn show similar influences in their model.

Ideally, communication between policymakers and implementors is clear, consistent and direct. Seldom, however, does the ideal occur in the real world. The political nature of policymaking does not lend itself to clear or consistent communication. Communication is often cloaked in language that is politically expedient. It is not uncommon for policies, and so communication concerning them, to be in conflict with one another. Finally, communication is not always directly from policymaker to implementor, but can be carried out through a third party, such as the media or the courts. It is also important to note that simply because policymakers believe that, by whatever means, they have communicated their intent, it does not always follow that implementors have received that communication.

Resources

Without adequate resources, even the most clearly communicated policy cannot be implemented. Resources in Edwards' model include money, personnel (in sufficient numbers and with proper expertise), equipment, information, authority, or facilities. Van Meter and Van Horn's definition of

resources was much more limited, viewing resources as primarily fiscal support. Although funding can allow an implementing agency to purchase many of the resources it needs to work effectively, information, authority and the proper personnel are not always resources that can be purchased.

It is not surprising to learn that an inadequately funded program is difficult to effectively implement. After reading testimony before appropriation committees, it would be reasonable to assume that every program is woefully underfunded at the federal level and that the problem is compounded at the state and local levels. The argument can also be made, however, that funding is adequate, but unevenly distributed. There will never be enough money to fund every program to the maximum amount proponents would like. It is unlikely that we can ever reach agreement about what constitutes adequate funding. Funding can be a limiting factor in implementation. It is reasonable to assume that a program that is not funded will never be implemented. Because without funding, the most of the other resources which are necessary for successful implementation could not be obtained. A policy that is underfunded may still be implemented successfully, perhaps taking slightly longer or with reduced services.

Edwards points out that most people would be surprised to hear, and would be quick to disagree, that many implementing agencies are inadequately staffed to carry out the policies for which they are responsible. In areas as diverse and technical as environmental protection, it is particularly difficult to find personnel with sufficient training. It is equally difficult to keep those people in government service. Staff inexperience and turnover are frequently mentioned as causes of implementation problems.

Also among the resources necessary for successful implementation are authority and information. Edwards says that authority to regulate others is most

often lacking. Implementors may have formal authority, granted to them by statutory language, but may be constrained in their ability to exercise that authority. Authority may be inadequate for the task at hand, or if it is adequate, implementors may be hesitant to use authority for fear it would look like coercion. Inadequate authority may also result in agencies becoming "captured" by those groups they are supposed to be regulating. Capture can occur because, to gain compliance, agencies without sufficient authority may take on a service orientation.

A third resource, which is frequently overlooked, is information. Edwards refers to two types of necessary types of information--information about how to carry a policy out and information about compliance. Information and communication, of course, have a strong link. In a program involving the remediation and protection of the environment, such as CERCLA/SARA, it is critical that the implementing agency have technical information about how to reach goals established by the policy. If implementors have good technical information about the problem and solutions that have worked in similar situations then the agency does not have to start from scratch. Compliance information is also important in implementing environmental policy, not just to the regulating agency, but to policy implementors as well. Again, knowing what has and has not worked in similar situations allows implementing agencies to move forward more quickly.

In both models, resources impact not only the disposition of the implementors, but also communication and bureaucratic structure of the implementing organizations. While Edwards' model shows a direct link between resources and implementation, the linkage is indirect in Van Meter and Van Horn's model. Environmental conditions and disposition serve as intervening factors in their model. They also show resources having an impact on the

economic, social and political conditions which serve as another intervening factor in their model.

Dispositions

It is reasonable to assume that if implementors are favorably predisposed toward a particular policy, that policy is more likely to be implemented as policymakers intended. In these models, the disposition of implementors actually acts as a filter through which other variables must pass. Van Meter and Van Horn believe there are three parts of disposition: implementors' cognition or comprehension of the policy; the direction of their response (positive, neutral or negative); and the intensity of the response. Edwards says that most policies fall in a "zone of indifference," that is implementors have no strong feelings about a policy one way or another. Those policies, he says, are most likely to be faithfully implemented. It is when implementors have strong feelings, either positive or negative, about a policy that implementation is likely to be affected. When implementors have strong feelings, there is much better chance that they will use whatever discretion they have to influence the policy or in some cases to prevent a policy from being implemented at all.

The agency for which an implementor works and the disposition of the implementor are intimately linked. Particularly in the case of career civil servants, a part of the reason an individual works for a particular agency is because there is a match in the personal disposition of the individual and the agency's disposition. Agencies recruit new staff who share the "corporate" disposition. Agency staff develop a sense of ownership in what the agency does and are likely to protect that niche.

Policymakers, aware of a negative disposition toward a particular policy by the agency that would normally be selected to implement the policy, may elect to bypass that agency and direct another, more favorably disposed agency to implement the policy. A second option is simply to create a new agency. However, options such as these are not likely to be well received and are not frequently used. A third option is to offer incentives to implementing agencies and their personnel. Merit pay raises and promotions can have a definite impact upon the dispositions of implementors. However, as Edwards points out, incentives can also lead to goal displacement.

Bureaucractic Structure

Even when a policy has the support of the implementors, implementation can be impacted by what Edwards calls the bureaucratic structure of the agency assigned to implement the policy. Van Meter and Van Horn label this variable as characterization. They include competence and size of the staff, which Edwards included in resources, in this category. Both models would include degree of hierarchical control and formal and informal linkages with policymaking and policy enforcing bodies in this variable. Two additional features that Edwards associates with bureaucracies are standard operating procedures (SOPs) and fragmentation. According to Edwards, both have the potential to be obstacles to effective, efficient implementation.

SOPs are developed within a bureaucracy so that there will be uniformity within the organization. SOPs mean that every lesson does not have to be relearned every time by every employee. The intent of SOPs is to make the best use of the limited time and resources available. The problems with SOPs are that they become outdated, they may be inappropriately used, they discourage

innovative solutions. Edwards points out that SOPs can hinder implementation because they inhibit change and are ineffective in unusual circumstances. New policies are most vulnerable to SOPs because they require organizations to change. Kaufman (1971) says that the more a new policy requires an organization to alter SOPs, the less likely it is to be implemented as policymakers intended.

A second common feature of bureaucracies is fragmentation. There are a number of organization units with a number of different agencies that all have responsibilities for the same policy area. Fragmentation can occur both among agencies at the federal level, and between agencies at the federal and subfederal levels. Pressman and Wildavsky (1973), Sabatier and Mazmanian (1980), and Edwards (1980) among others, have shown that the more actors and agencies involved with a policy and the more interdependent they are, the less likely a policy is to be implemented successfully.

Fragmentation is not some sinister plan on the part of bureaucracies to carve and hold some small niche. The fragmenting is a result of Congressional actions which have created many separate agencies and provided funding for each of them to perform many of the same functions. In many cases, the niches being created are as much for congressional committees as for agencies. Fragmentation is also the result of very complex and wide-reaching policies, such as those in the environmental area, which are being enacted.

Edwards says that fragmentation makes coordination, interagency and intra-agency, difficult. Fragmentation leads to duplication, it means that limited resources must be stretched very thin, and makes a system which is so complicated that it is often ineffective.

Conclusion

DOD's implementation of the CERCLA/SARA program through the IRP does not fall into the same category as the majority of implementation studies done to date. IRP is a program that had been operating before it was mandated by SARA in 1986. IRP is not dependent upon the regulating agency, EPA, for its funding. NPL sites on federal facilities are not eligible to receive money from the Superfund for remediation. DERA receives its appropriations directly from Congress and DOD is responsible for allocating money from that account to appropriate environmental remediation projects at its installations. EPA, which makes the selection of remedies at federal facility NPL sites, has little else to say about the operation of the IRP. In the "normal" implementation scheme, EPA would have direct control over the DOD's implementation of the program, in part through control of program funding. In the "normal" implementation scheme, a department whose mission is national security would not be given an environmental policy to implement. Clearly, this is not a "normal" implementation scheme.

CHAPTER IV

CERCLA, THE IRP AND DOD

Introduction

"Toxic cleanup is a technically uncertain enterprise in which the costs are extraordinarily high, the benefits uncertain, and the source of financing subject to heated controversy" (Church and Nakamura, 1993: 17).

The Superfund program could certainly operate without DOD's IRP, but the IRP is highly dependent upon CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for its structure. For that reason, it would be foolhardy to attempt to understand the IRP without first having some knowledge of CERCLA. Both these programs are very involved and to have a full understanding of them is difficult, if not impossible. The NCP alone is more than two hundred pages, and there are thousands of pages of EPA external memos, guidance documents, legal precedent, policies and internal practices which also impact upon it. The regulations that put CERCLA/SARA into motion are not only lengthy, but are also under almost constant revision and interpretation by EPA and the courts. This chapter will provide a brief history of CERCLA, more specifically, the Superfund program, an explanation of the NPL

process, a discussion of the IRP, and a look at the types problems faced at DOD installations.

Superfund

In December, 1980 the federal government enacted CERCLA primarily to give EPA the authority to conduct investigations of abandoned and uncontrolled hazardous waste sites and to remediate those that were found to present an "imminent and substantial danger to the public health or welfare" (CERCLA §104(a)(1)) and considered to be among the worst such sites in the nation. The legislation, signed into law on December 11, 1980, by President Jimmy Carter, was passed largely in response to contamination at Love Canal in Niagara Falls, New York. The law would soon come to be known as "Superfund."

Superfund is unique in several ways. It was the first, and only, program designed expressly for environmental cleanup in all media (OTA, 1989). Superfund is also unique because it provides EPA with a wide range of policy tools. The agency can issue orders (either judicial or administrative) directing private parties to clean up a site, can levy large fines and treble damages for noncompliance, can offer incentives for privately funded cleanups, may issue grant release of liability, or can act in a public works mode initiating and funding federally directed cleanups. The application by Superfund of retroactive, strict, joint and several liability to environmental problems is unique among the industrialized nations of the world (Church and Nakamura, 1993). Yet, Church and Nakamura point out that joint and several liability is not explicitly in either the original statute nor either of the two reauthorizations, but is a result of judicial decisions, most notably *U.S. v Chem-Dyne Corp.* 572 F.Supp. 802 (S.D.

Ohio, 1983). CERCLA also broke from EPA's traditional regulatory scheme where it set standards, issued permits based on those standards and then monitored them for permit compliance (Cohen and Tipermas, 1983).

Superfund has another interesting feature, implementation planning was started before the legislation was enacted. The process, known as the preimplementation planning project, is notable not so much as a planning tool, but as a bureaucratic tactic for establishing an area of distinctive competence for the Superfund staff (Cohen and Tipermas, 1983). Staff believed that by engaging in this proactive planning effort, it would be able to rapidly and effectively implement the legislation as soon as it was passed. Cohen and Tipermas suggest that the mindset may have been influenced by EPA's problems with RCRA's implementation. If the agency were able to quickly implement CERCLA, it would regain credibility it had lost with RCRA. Although the staff was successful in staking out "turf", Superfund's implementation has been far from rapid and without controversy.

The title of CERCLA suggested that strong and decisive action would be taken under the authority of the law (Mazmanian and Morell, 1992). The original philosophy of Superfund, according to former EPA assistant administrator Eckhart C. Beck was, "shovels first, lawyers later" (Cohen and Tipermas, 1983: 44). But the reality of what Superfund has been able to accomplish has led many to be less than gracious in their description. Church and Nakamura (1993: ix) said, "[Superfund is] America's unique statutory scheme to use the more draconian elements of tort law to compel private business and public entities to clean up hazardous waste sites."

It was Congress' intent that most cleanup work would be paid for, if not conducted by private parties. In order to accomplish remediation of those sites for which viable potentially responsible parties (PRPs) could not be found,

Congress authorized a \$1.6 billion Hazardous Substances Response Trust Fund, commonly referred to as the "Superfund" to be used by EPA. CERCLA set a policy of "the pollutor pays" upfront by financing the trust fund primarily through taxes on the production of certain chemical feedstocks and crude oil.

CERCLA directed EPA to draft a national contingency plan for the removal of oil and hazardous substances and to establish procedures and standards for responding to releases of hazardous substances, pollutants and contaminants. As part of that plan, EPA was to establish a national list of the highest priority facilities, include sites (at least one from each state), which presented the greatest danger to public health or welfare or the environment. The National Priorities List (NPL) is often referred to as the Superfund list.

Superfund can be used to perform emergency removals in cases of imminent endangerment, but in general the fund is used to do more routine remediations for which there is no private entity to pay. To be eligible for cleanup using Superfund the site must be included on the National Priority List (NPL). The NPL published on May 31, 1994 included 1,232 sites (59 Fed. Reg. 27989). The Congressional Office of Technology Assessment (OTA) has estimated that as many as 10,000 sites could eventually be included in the NPL and require cleanup (Congress, House of Representatives, 1989).

Superfund started out as a short-term, crash cleanup effort. Everyone assumed that in five years the problems would be solved (Congress, House of Representatives, 1993b). As debate on CERCLA's first reauthorization began in 1985 the controversy surrounding the program's shortcomings was clear (OTA, 1989). The Superfund program is one which was started with a great deal of public attention and expectations that were unrealistic. When Superfund began, it was generally assumed that dangerous sites would be identified, characterized, remediated, and made available for use in a relatively short

period of time. The \$1.6 billion trust fund CERCLA established appeared adequate. What no one realized was the huge problem that would be uncovered. The number of sites eligible for listing on the NPL grew very quickly, the problems being encountered turned out to be technically very difficult, and no one really bothered to mention any of this to the public, who continued to have a high expectation of success from this program.

In October 1986, CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA). SARA increased the trust fund to \$8.5 billion, made the law applicable to federal facilities, and added sections on public participation and cleanup standards, including a preference for permanent remedies. Concern about cost over health risks had led to the practice of redisposal as a preferred cleanup technology in early Superfund remediations, In the mid-1980s, however, many Resource Conservation and Recovery Act (RCRA) landfills were found to be leaking and the toxics "shell game" intensified public skepticism about the reliability of Superfund cleanups (Mazmanian and Morell, 1992).

The 1986 amendments mandate the use of permanent remedies (CERCLA §121(b)(1)) that protect human health and the environment, are cost-effective and use state-of-the-art technologies. SARA also significantly reduces the discretion which EPA enjoyed in Superfund's first five years. SARA's cleanup provisions are designed to structure and limit EPA's discretion to prevent arbitrary, unprotective decisions (EDF, 1988). The amendments specifically incorporate the toughest standards promulgated under other major federal environmental laws for cleanups. By complying with all applicable or relevant and appropriate (ARARs) standards, Congress believed it could minimize the role of politics in cleanup decisions, and cleanups should fully protect human health and the environment (EDF, 1988).

The Environmental Defense Fund (EDF) had high praise for Congress following SARA's passage, saying that it had provided the nation with a strong statute and a process that would work if only the will existed. Interestingly, Mazmanian and Morell (1992) claim that Congress failed to provide any real direction regarding the hotly debated issue of "how clean is clean?" They point out that CERCLA/SARA actually say little about the issue, an omission that undoubtedly exists because Congress realized that precise quantitative risk assessments are impossible. In fact, Congress did not require Superfund sites to be restored to pristine, or even background conditions, nor was the use of "best available technology" required if it was more costly. On the other hand, EDF was very critical of EPA's implementation of SARA. It was EDF's contention that the agency's principal concern in implementing SARA was that the program "afford maximum flexibility for decision makers rather than maximizing protection and permanence in the cleanup process" (EDF, 1988: 16).

CERCLA Process

To be eligible to use the trust fund for remediation, a site must first be placed on the NPL. CERCLA Section 105(8)(A) requires that the NCP define criteria be used to determine priorities among releases or threatened releases for the purpose of taking remedial or removal actions. The criteria are based on relative risk, population at risk, hazardous potential of the substances at the facility, potential for contamination of drinking water supplies, direct human contact, destruction of sensitive ecosystems, and other factors. EPA developed the Hazard Ranking System (HRS) to implement CERCLA's requirements. Using HRS, sites are scored for possible inclusion on the NPL. Sites with an

HRS score equal to or greater than 28.50 (out of a possible 100) are proposed for listing on the NPL. The HRS is a screening device that allows EPA to do quick rankings using available data. Generally, EPA conducts a Preliminary Assessment (PA) and a Site Inspection (SI) at a site to evaluate it. The PA and SI are low-cost initial data gathering efforts designed to provide data for HRS scoring (52 Fed. Reg. 11514).

The cutoff score of 28.50 has no technical basis, but is an arbitrary number selected in 1982 by EPA because it came as close to possible to providing the "at least 400 sites" required by CERCLA for the first NPL (OTA, 1989; Congress, House of Representatives, 1993). The use of a second decimal place implies that the score has numerical precision, even though there is no technical basis for taking the score even to the first decimal place. OTA has suggested a more limited use of the HRS as a binary decision tool--either a site poses a significant environmental problem which may require cleanup, or it does not (OTA, 1989).

While the HRS cannot make fine distinctions from site to site, it does serve as an aid in early site decisions based on limited information. Despite the appearance of an objective ranking system, the factors used in HRS scoring contain enough subjectivity to allow political variables to affect the final determination (Church and Nakamura, 1993). OTA found that HRS scores have little impact on the speed of cleanup. Study sites with similar HRS scores waited thirty-nine, five, and three months for work to begin (OTA, 1988). The HRS score serves no other official purpose except to make the decision to list a site on the NPL.

When SARA broadened EPA's enforcement authority, it also called for a revision of HRS to make it more comprehensive and more accurate in addressing relative risks (Walters, 1993). A revised HRS was promulgated on December 12, 1990. The revised HRS kept the ground water, surface water and

air pathways of the original system, dropped direct contact and fire and explosion pathways, and added a soil exposure pathway. The revised system considers acute health effects and carcinogenic and chronic noncarcinogenic effects. Impact on sensitive environments was broadened to include not only wetlands, but areas designated by federal and state authorities. The revisions require more data which allows the scoring to produce a more accurate reflection of relative risks (Walters, 1993). The additional data requirements have lead to questions about the use of HRS as a screening tool since it now takes longer to complete scoring.

The process through which an NPL site proceeds is uniform and statutorily mandated. The process is outlined in Figure III. Once a site has been placed on the NPL, a Remedial Investigation/Feasibility Study (RI/FS) is conducted, followed by the signing of a Record of Decision (ROD) that details the Remedial Design/Remedial Action (RD/RA), and once a site has been certified as remediated it is delisted. The process is lengthy and expensive. On average it takes takes forty-three months from the time EPA becomes aware of a site until it is placed on the NPL. It takes another twenty-eight months from listing until the start of the RI/FS, thirty-eight months until issuance of the ROD, eighteen months for remedial design, and to complete a remedial action requires an average of twenty-five months. The entire process, on average, takes more than eight years at a cost exceeding \$30 million (Elliott, 1992; Church and Nakamura, 1993). On site construction work usually only takes about three years. An estimated seventy percent of the time is spent on legal and bureaucratic items including study and assessment, review, negotiation, compiling the ROD and design work (Elliott, 1992). The process can be even longer. At the Lipari Landfill (New Jersey), eleven years elapsed before any work was done and that

was nearly twenty years after officials first discovered toxic chemicals were leaking into ground water (Mazmanian and Morell, 1992).

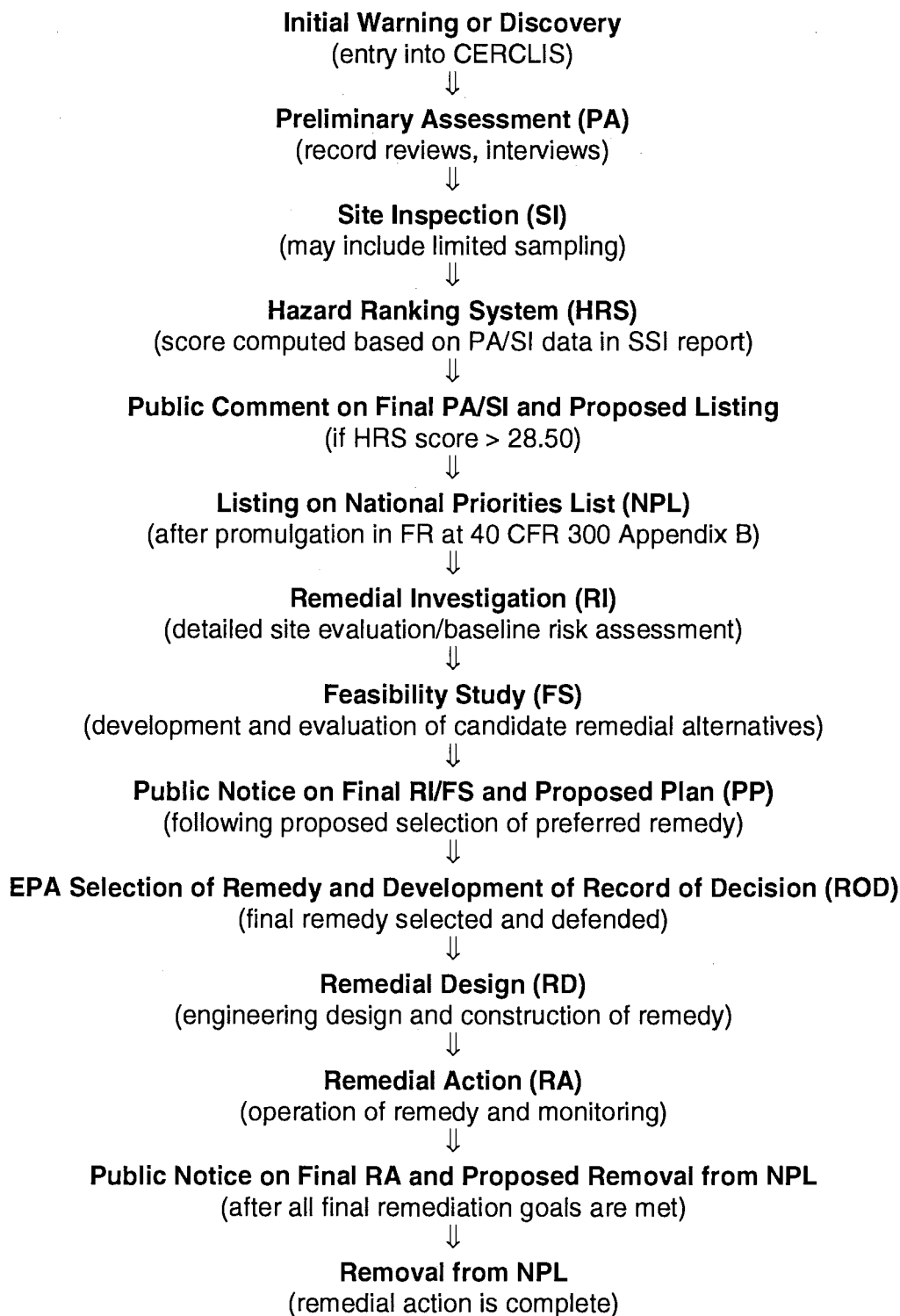
The Defense Environmental Restoration Program

Federal agencies were officially appraised of their environmental responsibility when Congress passed NEPA in 1969. Although federal agencies were forced to comply with requirements for environmental impact statements, usually through citizen suits, the agencies continued to show little concern over past hazardous waste practices.

When faced with regulatory agency action due to surface and ground water contamination at the Weldon Springs (Missouri) Chemical Plant and the Rocky Mountain Arsenal (RMA) (Colorado), the Army instituted the Installation Restoration Program (IRP) as a pilot project in 1975 (Anderson and Couture, 1984). DOD issued guidance for all the services (Air Force, Army and Navy) to undertake this sort of program in 1976, but the Air Force and Navy programs did little until 1980 (Congress, House of Representatives, 1988a). In June of that year, the IRP became DOD's official program for priority ranking, investigation and cleanup of inactive sites on military installations contaminated by hazardous waste (Hoard and Lyons, 1989). It is interesting to note that nearly twenty years later, both of the Army's original IRP "priority tasks" remain on the NPL. The Rocky Mountain Arsenal is widely regarded as having the potential to be the costly and most technically difficult of any NPL remediation to be attempted.

The Defense Environmental Restoration Program (DERP) was established in 1984 to "promote and coordinate efforts for the evaluation and cleanup of contamination at Department of Defense (DOD) installations" (DOD, 1992),

Figure III
CERCLA Remedial Action Process



SARA essentially codified that program, statutorily mandating DERP. At the same time it created a transfer account called the Defense Environmental Restoration Account (DERA). Policymakers believed that DERA would provide increased management flexibility and responsiveness because it allowed more flexibility in allocating resources. DERA is a "no year" transfer account that allows funds to be deposited in any appropriation account or fund to carry out environmental restoration. The account ensures a smooth transition between fiscal years because funds can be obligated over an extended period of time (Congress, House of Representatives, 1988a; Parker, 1990).

DERP has two major components, the Installation Restoration Program (IRP) and Other Hazardous Waste Operations (OHW). IRP investigates potential contamination at DOD installations and formerly owned or used properties in the United States, its territories and possessions. If contamination is found, cleanups are conducted under the IRP. IRP is the largest component of DERP, receiving the vast majority of the DERA funds each fiscal year. It is important to note that neither the IRP nor DERP is limited to use at NPL sites, but are used only to cleanup *inactive* hazardous waste sites on military installations (Hoard and Lyons, 1989). Research, development and demonstration programs are conducted under OHW to improve remediation technology and reduce the amount of waste generated. There is a third, small component of DERP known as Building Demolition and Debris Removal (BDDR). BDDR demolishes and removes unsafe buildings and other structures at DOD installations. The program is little used, although there were some projects conducted under the program in fiscal year 1991, the first since fiscal year 1987 (DOD, 1992).

DERP is managed by the Office of the Secretary of Defense with policy direction and oversight by the Deputy Assistant Secretary of Defense

(Environment) (DASD(E)). Each service branch is responsible for program implementation. SARA provides continuing authority for the Secretary of Defense to carry out the program in consultation with EPA. Executive Order 12580 (January 23, 1987) assigned responsibility to the Secretary of Defense for carrying out DERP within the framework of CERCLA and SARA.

The Defense Appropriations Act provides primary funding for DERP at active military installations. DERA funding is limited to projects addressing cleanup or control of contamination from past activities (prior to January 1984) and cannot be used to upgrade or replace systems or equipment (Base Commander's Guide). The Base Closure Account provides funding for work at bases scheduled for closing under Base Realignment and Closure (BRAC).

The IRP conforms to requirements of the NCP and uses EPA guidelines to conduct investigations and remediation work. For federal facilities site discovery usually occurs when an installation is placed on the Federal Facilities Hazardous Waste Compliance Docket. SARA Section 120 directed EPA to establish the Docket that contains information regarding federal facilities that manage hazardous waste or from which hazardous substances may be or have been released. The Docket is updated every six months and contains information submitted under RCRA Sections 3005, 3010, and 3016 and CERCLA Section 103. The last update of the Docket on November 1, 1993, contained 1,946 federal facilities (58 Fed. Reg. 59791). The Docket provides a picture of the possible universe of federal facilities that may require remediation. But because the information is provided on a facility basis and because each facility can have one or hundreds of sites, the information is sketchy.

DOD has eighteen months after an installation is placed on the Docket to perform a Preliminary Assessment (PA). The PA is an *installation-wide* study to determine if sites may present a hazard to human health or the environment.

Available information is used to identify the source, nature, extent and magnitude of actual and potential hazardous substance releases. A Site Investigation (SI), which includes sampling and analysis, is conducted to determine the existence of actual *site* contamination. The information is used to evaluate the site and to determine appropriate response action. A site found to be uncontaminated goes no further in the IRP process. As with private sector sites, data gathered in the PA/SI is used for HRS scoring. Sites scoring 28.50 or higher are proposed for listing on the NPL. As of May 31, 1994 there were 150 facilities in the Federal Facilities Section of the NPL, 122 under the authority of DOD. The current Federal Facilities Section of the NPL is shown in Table 4.1.

Full investigations of contaminated sites are conducted during the Remedial Investigation/Feasibility Study (RI/FS). More extensive sampling and analysis is done to characterize the nature, extent and significance of contamination. The purpose of the RI is to determine the risk posed to the general population from the contamination present. The FS evaluates each remedial action alternative for the site against the same nine criteria used in a private sector CERCLA remediation project.

After an agreement is reached with EPA and/or appropriate state authorities on how to clean up the site, the Remedial Design/Remedial Action (RD/RA) phase begins. At this time detailed design plans for the cleanup are prepared and implemented. Remedial Actions or Interim Remedial Actions may be taken at anytime during the process if necessary to protect the public health or to control contaminant releases. Reports of each stage of the IRP are available to the public through Public Affairs Offices at the installation. Public meetings and hearings also take place during the process.

Table 4.1
National Priorities List for Uncontrolled Hazardous Waste Sites--
Federal Facilities Section, May 1994

State	Site Name	City/County
AK	Adak Naval Air Station	Adak
AK	Eielson Air Force Base	Fairbanks N Star Borough
AK	Elmendorf Air Force Base	Greater Anchorage Borough
AK	Fort Richardson	Anchorage
AK	Fort Wainwright	Fairbanks N Star Borough
AK	Standard Steel & Metals Salvage Yard (DOT)	Anchorage
AL	Alabama Army Ammunition Plant	Childersburg
AL	Anniston Army Depot (SE Industrial Area)	Anniston
AL	Redstone Arsenal (Army/NASA)	Huntsville
AZ	Luke Air Force Base	Glendale
AZ	Williams Air Force Base	Chandler
AZ	Yuma Marine Corps Air Station	Yuma
CA	Barstow Marine Corps Logistics Base	Barstow
CA	Camp Pendleton Marine Corps Base	San Diego County
CA	Castle Air Force Base	Merced
CA	Edwards Air Force Base	Kern County
CA	El Toro Marine Corps Air Station	El Toro
CA	Fort Ord	Marina
CA	George Air Force Base	Victorville
CA	Jet Propulsion Laboratory (NASA)	Pasadena
CA	LEHR/Old Campus Landfill (DOE)	Davis
CA	Lawrence Livermore Laboratory (Site 300)	Livermore
CA	Lawrence Livermore Laboratory (DOE)	Livermore
CA	March Air Force Base	Riverside
CA	Mather Air Force Base	Sacramento
CA	McClellan Air Force Base (GW Contam)	Sacramento
CA	Moffett Naval Air Station	Sunnyvale
CA	Norton Air Force Base	San Bernardino
CA	Riverbank Army Ammunition Plant	Riverbank
CA	Sacramento Army Depot	Sacramento
CA	Sharpe Army Depot	Lathrop
CA	Tracy Defense Depot	Tracy
CA	Travis Air Force Base	Solano County
CA	Treasure Island Naval Station-Hun Pt An	San Francisco
CO	Air Force Plant PJKS	Waterton
CO	Rocky Flats Plant (DOE)	Golden
CO	Rocky Mountain Arsenal	Adams County
CT	New London Submarine Base	New London
DE	Dover Air Force Base	Dover
FL	Cecil Field Naval Air Station	Jacksonville
FL	Homestead Air Force Base	Homestead
FL	Jacksonville Naval Air Station	Jacksonville
FL	Pensacola Naval Air Station	Pensacola
FL	Whiting Field Naval Air Station	Milton
GA	Marine Corps Logistics Base	Albany
GA	Robins Air Force Base (Lf#4/Sludge lagoon)	Houston County
GU	Andersen Air Force Base	Yigo
HI	Naval Computer & Telecommunications Area	Oahu
HI	Pearl Harbor Naval Complex	Pearl Harbor
HI	Schofield Barracks	Oahu
IA	Iowa Army Ammunition Plant	Middletown

State	Site Name	City/County
ID	Idaho National Engineering Lab (DOE)	Idaho Falls
ID	Mountain Home Air Force Base	Mountain Home
IL	Joliet Army Ammunition Plant (LAP Area)	Joliet
IL	Joliet Army Ammunition Plant (Mfg Area)	Joliet
IL	Sangamo Electric/Crab Orchard NWR (DOI)	Cartersville
IL	Savanna Army Depot Activity	Savanna
KS	Fort Riley	Junction City
KY	Paducah Gaseous Diffusion Plant (DOE)	Paducah
LA	Louisiana Army Ammunition Plant	Doyline
MA	Fort Devens	Fort Devens
MA	Fort Devens-Sudbury Training Complex	Middlesex County
MA	Hanscom Field/Hanscom Air Force Base	Bedford
MA	Materials Technology Laboratory (Army)	Watertown
MA	Natick Laboratory Army Research, D&E Center	Natick
MA	Naval Weapons Industrial Reserve Plant	Bedford
MA	Otis Air National Guard/Camp Edwards	Falmouth
MA	South Weymouth Naval Air Station	Weymouth
MD	Aberdeen Proving Ground (Edgewood Area)	Edgewood
MD	Aberdeen Proving Ground (Michaelsville LF)	Aberdeen
MD	Beltsville Agricultural Research (USDA)	Beltsville
MD	Patuxent River Naval Air Station	St. Mary's County
ME	Brunswick Naval Air Station	Brunswick
ME	Loring Air Force Base	Limestone
ME	Portsmouth Naval Shipyard	Kittery
MN	Naval Industrial Reserve Ordnance Plant	Fridley
MN	New Brighton/Arden Hills/TCAAP (Army)	New Brighton
MN	Twin Cities Air Force Base (SAR Landfill)	Minneapolis
MO	Lake City Army Ammunition Plant (NW Lagoon)	Independence
MO	Weldon Spring Former Army Ordnance Works	St. Charles County
MO	Weldon Spring Quarry/Plant/Pits (DOE)	St. Charles County
NC	Camp Lejeune Military Reservation	Onslow County
NE	Cornhusker Army Ammunition Plant	Hall County
NH	Pease Air Force Base	Portsmouth/Newington
NJ	Federal Aviation Admin. Tech. Center	Atlantic County
NJ	Fort Dix (Landfill site)	Pemberton Township
NJ	Naval Air Engineering Center	Lakehurst
NJ	Naval Weapons Station Earle (Site A)	Colts Neck
NJ	Picatinny Arsenal	Rockaway Township
NJ	W.R. Grace/Wayne Interim Storage (DOE)	Wayne Township
NM	Cal West Metals (USSBA)	Lemitar
NM	Lee Acres Landfill (DOI)	Farmington
NY	Brookhaven National Laboratory (DOE)	Upton
NY	Griffiss Air Force Base	Rome
NY	Plattsburgh Air Force Base	Plattsburgh
NY	Seneca Army Depot	Romulus
OH	Feed Materials Production Center (DOE)	Fernald
OH	Mound Plant (DOE)	Miamisburg
OH	Wright-Patterson Air Force Base	Dayton
OK	Tinker Air Force Base (Soldier Creek/Bldg. 3001)	Oklahoma City
OR	Umatilla Army Depot (Lagoons)	Hermiston
PA	Letterkenny Army Depot (PDO Area)	Franklin County
PA	Letterkenny Army Depot (SE Area)	Franklin County
PA	Naval Air Development Center (8 areas)	Warminster Township
PA	Navy Ships Parts Control Center	Mechanicsburg
PA	Tobyhanna Army Depot	Tobyhanna
PR	Naval Security Group Activity	Sabana Seca

State	Site Name	City/County
RI	Davisville Naval Construction Batt Center	North Kingston
RI	Newport Naval Education/Training Center	Newport
SC	Savannah River Site (DOE)	Aiken
SD	Ellsworth Air Force Base	Rapid City
TN	Memphis Defense Depot	Memphis
TN	Milan Army Ammunition Plant	Milan
TN	Oak Ridge Reservation (DOE)	Oak Ridge
TX	Air Force Plant #4 (General Dynamics)	Fort Worth
TX	Lone Star Army Ammunition Plant	Texarkana
TX	Longhorn Army Ammunition Plant	Karnack
TX	Pantex Plant (DOE)	Pantex Village
UT	Hill Air Force Base	Odgen
UT	Monticello Mill Tailings (DOE)	Monticello
UT	Ogden Defense Depot	Odgen
UT	Tooele Army Depot (North Area)	Tooele
VA	Defense General Supply Center	Chesterfield County
VA	Langley Air Force Base/NASA Langley Center	Hampton
VA	Marine Corps Combat Development Command	Quantico
VA	Naval Surface Warfare-Dahlgren	Dahlgren
VA	Naval Weapons Station-Yorktown	Yorktown
WA	American Lake Gardens/McChord Air Force Base	Tacoma
WA	Bangor Naval Submarine Base	Silverdale
WA	Bangor Ordnance Disposal	Bremerton
WA	Bonneville Power Administration Ross (DOE)	Vancouver
WA	Fairchild Air Force Base (4 waste areas)	Spokane County
WA	Fort Lewis (Landfill No. 5)	Tacoma
WA	Fort Lewis Logistics Center	Tillicum
WA	Hamilton Island Landfill (Army/COE)	North Bonneville
WA	Hanford 100-Area (DOE)	Benton County
WA	Hanford 1100-Area (DOE)	Benton County
WA	Hanford 200-Area (DOE)	Benton County
WA	Hanford 300-Area (DOE)	Benton County
WA	Jackson Park Housing Complex (Navy)	Kitsap County
WA	McChord Air Force Base (Wash Rack/Treat)	Tacoma
WA	Naval Air Station, Whidbey Island (Seaplane)	Whidbey Island
WA	Naval Air Station, Whidbey Island (Ault)	Whidbey Island
WA	Naval Undersea Warfare Station (4 areas)	Keyport
WA	Old Navy Dump/Manchester Lab (EPA/NOAA)	Manchester
WA	Port Hadlock Detachment (Navy)	Indian Island
WA	Puget Sound Naval Shipyard Complex	Bremerton
WV	Allegany Ballistics Laboratory (Navy)	Mineral
WV	West Virginia Ordnance (Army)	Point Pleasant
WY	F.E. Warren Air Force Base	Cheyenne

programs. At a minimum, the report must include: an accounting of the progress in reaching interagency agreements between Federal agencies and EPA for NPL sites; specific cost estimates and budgetary proposals for each IAG, a report on the progress of RI/FSs for NPL sites; and a report on the progress of RAs. SARA Section 211 added further requirements including: identification of

the number of sites contaminated with hazardous substances at each

CERCLA Section 120(e)(5) also establishes annual reporting requirements to Congress by Federal agencies regarding the progress of their cleanup installation; the status of response actions underway or contemplated at each site; and cost and budgetary data on response actions. DOD provides an annual report to Congress which also serves as its communications tool to the public. It is DOD's belief that the report provides important information on the nature and extent of contamination of DOD installations and gives a clear indication of the progress the Department has made in remediating those problems.

DOD has established a priority ranking for IRP activities with the highest priority given to sites that represent the greatest public health and environmental hazards. The priorities are: removal of imminent threats from hazardous or toxic substances or unexploded ordnance; interim and stabilization measures to prevent site deterioration and achieve life cycle savings; and RI/FSs at sites either listed or proposed for listing on the NPL and RD/RAs necessary to comply with SARA (DOD, 1992).

DOD anticipated that there would be many cleanups that would occur simultaneously. Current estimates range from more the 120 sites currently on the NPL and 1,000 or so "lesser sites" (Ray, 1992) to more than 7,300 sites (Hushon and Read, 1992). DOD has also announced a goal of initiating remedial action at all sites by 2000 with cleanup efforts expected to peak in the mid- to late-1990s (Hushon and Read, 1992: 251).

DOD has a long-standing policy of cleaning up the "worst" sites first, and in an attempt to establish a priority order for those cleanups, the Defense Priority Model (DPM) was developed. A critic of the "worst first" strategy calls it a "luxury that private industry is not allowed" (Shulman, 1992:45). Envisioned as a

decision aid at all levels, DPM uses more detailed data gathered in the RI to produce a numerical score from zero to 100 based on the relative risk to human health and the environment posed by the site. The use of the RI data, DOD contends, makes the DPM a better model than EPA's HRS which uses only information gathered during the PA/SI. DPM's initial development was completed in fiscal year 1989 and after receiving comments from EPA, the states, environmental organizations and the public, it underwent further refinement. The notice for comment on DPM appeared in the *Federal Register* on November 18, 1987, the notice of plans to implement appeared on October 20, 1989.

DPM considers the hazard (characteristics, concentrations and mobility of contaminants), the pathway (potential for contaminant transport via surface water, air and soil) and the receptor (the presence of potential human and ecological receptors). DOD believes this risk-based approach provides more recognition of the importance of protecting human health and the environment and objectively identifies those sites which should receive priority in funding (DERP Annual Report). The risk-based approach has been established as an operating principle and DOD now includes DPM in Federal Facility Agreements (FFAs) for site cleanups with EPA and in Defense and State Memoranda of Agreements (DSMOAs) for reimbursing states for technical support services during site cleanup (Hushon and Read, 1992: 251). The ODASD(E) also uses DPM for assessing quality in fund distribution based on risk (Hushon and Read, 1992). DOD's on-going commitment to DPM is also evident with the establishment of a support network with a user hotline and large scale personnel training programs in the method throughout DOD.

DOD commissioned the National Research Council of the National Academy of Sciences Committee on Remediation Action Priorities to review

DPM, and a preliminary report was released in 1993. The study used the three federal systems (EPA's HRS, DOD's DPM and DOE's Multimedia Environmental Pollutant Assessment System (MEPAS)) to score five sites that had previously been scored with MEPAS (Hushon, et al., 1993). DPM and HRS, which are both used for relative risk prioritization, were found to provide fairly consistent relative ranking of the sites. The report indicated that the correlation reflected the fact that both models recognize similar potential impacts and ranked them accordingly (Hushon, et al., 1993: 170). The NRC's preliminary study does not advocate the use of any particular ranking system, and points out that each can be useful when combined with other site information in an agency's decision making process.

Shulman (1992) contends that DOD knew that everyone would want the problem in their own backyard to be cleaned up first. He believes that the Pentagon used DPM and the NAS/NRC's study to provide it with an "airtight scientific method to rank the contaminated lands" it could justify to Congress and the public (Shulman, 1992: 44). In its response to comments on DPM (54 Fed. Reg. 43194), DOD responded that DPM was intended only as an internal prioritization tool, not as a "yes" or "no" decision tool regarding cleanup process or degree. Because DOD has not yet found itself in a position of being unable to fund all the cleanup projects it had in a particular year, DPM has not yet been used as a prioritization tool. Results of DPM site scoring have been used to present an "average" site description in the Annual Report to Congress.

Presently, IRP sites must be scored using DPM to receive DERA funding for RD/RA. There were 782 sites scored with DPM from Fiscal Year 1989 to Fiscal Year 1992 (Hushon and Read, 1992). Some states have opposed DPM because they wanted some DERA funding for their state to use as it saw fit; others said each state should get some number of sites funded regardless of the

relative health hazards (Congress, House of Representatives, 1991c). EPA has been opposed to the use of DPM because of concern that it would disrupt interagency agreements (IAGs) (GAO, 1991; Raynes and Boss, 1993). The future use of any of the priority models may depend on whether they can be coordinated with IAGs. Although EPA has objected to the use of DPM, GAO reported that EPA had failed to develop its own priority model and cited it as a shortcoming of the agency's federal facility program (GAO, 1991b).

The Base Closures and Realignment Act (BRAC) has resulted in more than 130 bases being marked for closure and about seventy others for realignment. BRAC regulations require consideration of environmental consequences of disposal and reuse of installations scheduled to be closed (Kimmell, 1993). The need for accelerated cleanups at bases scheduled for closing has placed additional pressure on DOD's hazardous waste programs (Rose, 1994). Because investigation and, in some cases, remediation must occur before property can be transferred from DOD or used for other purposes, it was necessary for DOD to establish a procedure to handle those installations. Congress provides funding through BRAC accounts for environmental restoration at bases scheduled for closing, using the same protocol used at other IRP sites. BRAC restorations conclude with the preparation of a Statement of Conditions which serves as the notification required by CERCLA/SARA Section 120(h) and is attached to the deed of transfer.

Perhaps the biggest problem originally associated with BRAC facilities is the stipulation that all remedial actions must have taken place before the installation could be transferred to the new owner (Kimmell, 1993). The National Defense Authorization Act of 1991 required that a Task Force be created to find ways to improve federal-state coordination of environmental responses at these bases. Representatives of the Department of Justice, EPA, General Services

Administration, National Governors' Association, National Association of Attorneys General and various environmental organizations made up the task force. In October, 1992, the Community Environmental Response Facilitation Act allowed uncontaminated or remediated parcels to be transferred. The act also made it possible to transfer parcels even while clean up activities were ongoing (Kimmell, 1993: 566). Another 1992 statute, the National Defense Authorization Act requires that DOD indemnify new owners against future pollution problems created during DOD's ownership of the installation.

In July 1993, the President announced a plan to reinvest in communities and create jobs where installations are being closed. The plan calls for a team of DOD, EPA and state regulatory agencies at each installation who will be empowered to run the cleanup program. Parcels of land with no contamination or contamination below cleanup levels will be identified quickly and made available for transfer. The cleanup teams have been directed to conduct bottom up reviews of all schedules and plans to speed up planning, construction and installation of cleanup remedies (GAO, 1994). The Fast Track Cleanup Program will be used at more than 100 installations scheduled to close. DOD hopes to apply the lessons learned in the program and apply them at active installations (Williams, 1994).

The Environment and DOD

It is often assumed that the hazards present at DOD facilities are somehow more exotic or dangerous than those that might be found at a private sector facility. Fuel and solvents account for problems at sixty percent of facilities, toxic and hazardous waste (heavy metals, explosive compounds, residue from

chemical munitions, caustic cleaners, and paints and strippers) at thirty percent of the facilities.

In a speech in 1990, a former Deputy Assistant Secretary of Defense (Environment) (DASD(E)) said, "Two factors that distinguish DOD from the private sector are the size and complexity of its installations" (Parker, 1990: 26). DOD contends that military sites are larger, contain more operable units, are the result of a large number of industrial processes that have taken place at the installation, and may include a number of military-unique compounds ranging from pyrotechniques and explosives to propellants. Sites may be contaminated with radioactive waste (which is usually the case at DOE sites and is often found at DOD sites), and they are more likely to be operational (EPA, 1992; GAO, 1991a). In addition, many DOD installations have been in place and operating for more than one hundred years. All these factors are true, and do serve to complicate the process and slow characterization and remediation efforts. However, several of these factors can also be found in private sector Superfund sites. A brief examination of each of these "differences" will be helpful in determining what is and is not different about a DOD NPL site.

It is fair to say that DOD installations are larger than the normal NPL sites. DOD bases more closely resemble small towns than the typical industrial plant generally see in the private sector (Congress, House of Representatives, 1991c). A sample of installation sizes, including the largest and smallest installations, drawn from site descriptions in the DERP Annual Report to Congress, FY 93 is presented in Table 4.2. DOD is a huge landholder. The department has more than 1800 installations and controls more than twenty-five million acres.

DOD frequently points out that it one of its installations is likely to account for more operable units and would be found at a private sector site. But part of

the reason DOD has more operable units is because installations have elected to break the process up into areas of contamination which are "easier and more efficient" to remediate. In hearings before congressional subcommittees, various DOD officials have stated that the "usual number" of operable units is from two to twenty (Congress, House of Representatives, 1991d).

Table 4.2
Selected Installation Sizes

Installation	Size
Alabama Army Ammunition Plant	2,200 ac
Camp Lejeune	151,000 ac
Camp Pendleton	125,000 ac
Fridley Naval Industrial Reserve Ordnance Plant	83 ac
Hamilton AFB	2,100 ac
Letterkenny Army Depot	19,520 ac
Robins AFB	8,855 ac
Rocky Mountain Arsenal	17,280 ac
Tinker AFB	4,277 ac

DOD installations are more likely to have a wide variety of activities that have contributed to the hazardous waste problems found on base. There are fire-fighting activities; refueling activities; maintenance activities on aircraft, various sorts of naval vessels, motor vehicles, artillery pieces; there are activities involving the preparation of ammunition; and there are the more common activities such as landfilling municipal waste, sewage treatment, street repair, building maintenance, and hospital operations. It is unlikely that an

assortment of activities as broad as this would have contributed to the problems associated with a private sector NPL site.

While there are some compounds that are unique to military operations on DOD installations, not all of the problems which have placed DOD installations on the NPL are mysterious or unique (Ellis, 1992; Hushon and Read, 1992). Hushon and Read analyzed the frequency of site types at DOD installations. The result of that analysis is presented in Table 4.3.

Table 4.3
Frequency of Site Types by Year

Site Type	% FY 91	% FY 92
Landfills	17	25
Spills	40	21
Underground Storage Tanks	11	20
Above Ground Storage Tanks	3	2
Impoundments	8	9
Fire Training Areas	9	11
Waste Piles	3	6
Sites with Enclosed Structures	2	2
Contaminated Groundwater (no source)	7	4

(Hushon and Read, 1992: 255).

Hushon and Read report that most Army sites are landfills, with a larger proportion of surface impoundments and waste piles, and a relatively small proportion of spills, largely due to the fact that Army operations are less fuel intensive. Landfills are also the largest category of sites reported by the Air Force; nearly one-third of the Navy's sites are underground storage tanks.

The frequency of pollutants reported at DOD sites also indicates that the problems are similar to those faced at civilian sector facilities. There are three basic groups of pollutants: petroleum, oils and lubricants (POLs); solvents; and heavy metals (Hushon and Read, 1992). A GAO study found that the majority of all DOD and private sector waste sites contain petroleum products or petroleum-related products such as solvents (GAO, 1994). The frequency of reported pollutants is shown in Table 4.4.

Table 4.4
Frequency of Pollutants at DOD Sites

Pollutant	Frequency
Benzene	127
Toluene	126
Lead	120
Ethyl Benzene	96
Xylene	95
Trichloroethelyene	92
Arsenic	70
Tetrachlorotheylene	67
Methylene Chloride	61
Cadmium	53
Chloroform	47
Zinc	45
Vinyl Chloride	44
Barium	44
Chromium(VI)	44
Trichlorethane, 1,1,1-	42
Mercury	39
Bis(2-Ethylehexyl) Phthalate	37
Nickel	37
Napthalene	35
Manganese	35

(Hushon and Read, 1992: 256)

Landfills usually have the broadest range of pollutants ranging from heavy metals to volatile solvents, pesticides and radionuclides (the more exotic of the contaminants to be found at DOD/DOE installations). Surface impoundments generally contain heavy metals and solvents; POLs and solvents are found in fire training areas. Spills are usually POLs, waste piles often contain heavy metals, some solvents and POLs. POLs are found in both above and underground storage tanks. Enclosed structures usually contain POLs, solvents and heavy metal chromium. Groundwater contaminants are often the solvents trichloroethylene and perchloroethylene and POLs.

DPM was used to score about 230 sites in FY 1992. The scoring indicated that the most common type of DOD sites continue to be landfills, spills and surface impoundments. Ground water was found to be contaminated at about eighty percent of the sites (DOD, 1993: 3). DOD attributes the high level of ground water contamination to the fact that DOD sites are old and contamination has had time to move to the ground water.

DOD installations, and so their NPL sites, are likely to be operational. For a private sector site to be on the NPL usually means it is "uncontrolled" and likely to be abandoned by its owner/operator. DOD says that because federal facilities provide specialized service to the public, government agencies cannot voluntarily cease operations without adversely affecting the public (Lotz, 1989). Also, because these are operating facilities, there is the risk of exposure during remediation to both military and civilian personnel, which also makes the cleanups more difficult (Congress, House of Representatives, 1991c).

Just as in private sector NPL remediations, the IRP process is slow and costly. Law Environmental found that the IRP process takes from four to five years to complete at a cost of about \$750,000 per site (Karably and Smith,

1992). In a GAO analysis of the process at McChord AFB (Washington), officials found that the twenty-five documents prepared between July 1988 and August 1991 often required multiple versions incorporating EPA and state comments. Each version cost \$20,000 to \$50,000. Reports and other documents required for the RI/FS cost \$3.1 million and took more than thirty-seven months (GAO, 1994).

In its 1988 study, OTA cautioned about considering every Superfund site to be unique. While it is true that site-specific differences exist, the failure to note common site characteristics, common cleanup problems, common solutions and experiences also means the program is unable to improve by using past experiences. DOD has also come to recognize that it is not time or cost effective to reinvent the process on every cleanup. This is particularly important as funding becomes more difficult to obtain. "In many cases there are readily recognized, proven solutions of treatment, remediation and restoration. The experience level...means there are near-generic solutions to most waste problems" (Ellis, 1992: 528).

In addition to "generic" solutions, DOD is also considering phased remedies. It has become clear that for many problems current technology is inadequate, but to spend time and money on studies just to give the appearance of moving forward makes no sense. By use of phased remedies, DOD can take care of some problems and contain others until the technology to completely remediate becomes available.

Conclusion

Superfund and the IRP were both programs operating in a complex environment that was hastily devised in response to public demands for cleanup of inactive hazardous waste sites. Like any program, Superfund and the IRP have both seen a great deal of "tinkering" in attempts to make them better able to respond to the problems they were designed to solve. Early in the programs it was important for EPA and DOD to get a handle on what the problem was, and so early administrative requirements were established for that purpose. As it became clear that the problem was larger and more complex than policymakers had imagined, it also became clear that moving the programs from study to moving dirt quickly was essential. But, as with most things political, changes were incremental and slow and resulted in a program that was really not satisfactory for anyone.

Among the latest efforts by EPA to make Superfund work better for cleaning up, instead of just studying, NPL sites is the Superfund Accelerated Cleanup Model (SACM). SACM is an effort to streamline some of the requirements of Superfund so that cleanups can get underway quicker to reduce risk from sites to human health and the environment. DOD is hopeful that SACM will become fully operational because it is in line with the IRP focus on stabilizing sites by removing contaminant sources and stopping further migration of ground water plumes before sites are completely characterized.

The goal of both the Superfund program and the IRP is to reduce the risk to human health and the environment posed by inactive hazardous waste sites. Unfortunately, both programs have suffered from administrative redundancies, unreasonable expectations, and a complicated legal environment that have all contributed to losing sight of the goal.

CHAPTER V

IRP IMPLEMENTATION: ARE THE TOOLS AVAILABLE?

Introduction

"Superfund's implementation can be characterized as a case of 'environmental gridlock' with slow or nonexistent implementation" (Lester, 1988: 63).

There is no dispute over the fact that neither CERCLA nor DERP have had trouble-free implementations. Opinions concerning the programs' implementation range from the Lester's view of just short of failure to slightly more optimistic ones usually expressed by implementors at EPA and DOD. In some ways the problems with the IRP implementation have been CERCLA/SARA implementation problems, but a great number of the IRP implementation problems belong to that program alone. Despite well documented problems and years of studies, bureaucratic delays and interagency disagreements continue (Slear, 1993). The delays and disagreements have been blamed on everything from a system that "emphasizes the restoration process rather than its final objectives" (Slear, 1993: 6) to a statute that is purposely vague and virtually incomprehensible.

In this chapter the implementation of the IRP will be examined using variables from the Edwards (1980) and Van Meter and Van Horn (1975) models.

Communication

In virtually every model of policy implementation communication is a vital element. If a policy has not been communicated adequately, there is little or no hope for it to be implemented as envisioned by policymakers. Yet, communication problems seem to be among the most consistent problems in virtually every implementation failure.

Pressman and Wildavsky (1973) contend that implementation can neither succeed nor fail without a goal against which to judge it and Goggin (1987) has said that implementation is complete when services are delivered to at least fifty percent of those eligible. To be able to judge whether or not a policy has been implemented and is complete are both highly dependent upon communication. CERCLA/SARA has suffered from communications problems not only between policymakers and implementors, but also between policymakers and the public. These communications failures have resulted in goals that have not been clearly defined for either the implementors or the public and service delivery that is difficult to judge.

In the case of CERCLA/SARA and IRP implementation, the earliest of the communication problems occurred when the original CERCLA legislation was passed. When the law was enacted, Congress assumed, and so communicated to the public, that this would be a quick cleanup program funded by a trust fund. The industry responsible for the environmental damage, primarily chemical feedstock companies, would be taxed to establish the trust fund and those

responsible for contamination would be responsible for paying to remediate the problems. Taxpayers would not have to shoulder the burden for these cleanups.

The Superfund Program Management Manual, written by EPA to provide program guidance, provides this definition of Superfund's purpose, "The focus of the Superfund program is to maximize the protection of human health and the environment through fast and effective cleanup of priority hazardous waste sites and releases" (EPA, 1990a: ES-1). According to this definition, Superfund will attempt to *maximize* protection at *priority* sites, not *eliminate* risk from *every* hazardous waste site which is what the public perception of the program seems to be. SARA encourages "bean counting" by establishing specific numbers of RI/FS and RA to be started. While policymakers were communicating a statute that would reduce risk to the public, they were communicating to implementors to begin as many studies as possible. While remediations cannot take place without studies first being conducted, if implementors are rushing to meet numbers goals, it is difficult to begin remedial design and construction which will ultimately reduce the risk.

As several studies have pointed out (Pressman and Wildavsky, 1973; Van Meter and Van Horn, 1975; Sabatier and Mazmanian, 1980; Edwards, 1980; Goggin, et al., 1990b), it is not unusual for statutes to contain vague language. CERCLA/SARA certainly contain not only vague but inconsistent language. Superfund's broad objective is to cleanup inactive hazardous waste sites, but its underlying objectives are potentially inconsistent. Superfund is also supposed to apply appropriate cleanup remedies, at a minimum cost to taxpayers, while expeditiously accomplishing cleanups with minimum transaction costs (Church and Nakamura, 1993). The statute is precise about who should pay and who should be consulted in determining what should be done, but the requirement

about what should be done is operationalized as a process rather than a performance standard.

Early in Superfund, more attention was paid to short-term costs and budgets than to the total program, and that, unfortunately, was also communicated to the public. Sustaining support for a program that was supposed to be "quick, clean, and not paid for by taxpayers" but that quickly became "long, dirty, and paid for by taxpayers" has been difficult.

According to Wagner and Benson (1992) the legislative history of SARA indicates that Congress fully intended to develop a consistent compliance strategy that would ensure appropriate cleanup programs for the nation's Superfund sites. Congress further intended that the program be developed and implemented as quickly as possible. The original statute contained enormous flexibility that SARA was supposed to eliminate. Yet policies promulgated by EPA still make it possible to select very different kinds of remedies that offer different levels of environmental protection and have them be acceptable to the agency (Congress, House of Representatives, 1989). Church and Nakamura (1993) say that Congress defined a process rather than a set of standards. This allowed policymakers to satisfy many political objectives at the same time. The requirements continued to provide EPA with wide discretion in deciding what cleanups should be. Congressional intent may have appeared to lean toward reducing flexibility, but the statute did not clearly communicate that intent. And, as others have found, imprecise communication of goals allows implementing agencies to use discretion in implementing the policy. OTA has also reported that there has been insufficient flow of information nationwide allowing the selection of remedies which have failed elsewhere (OTA, 1988).

In addition to problems associated with poor communication of the purpose of Superfund to the public, is the larger problem of failed, or at least, faulty

communication between Congress, EPA, and DOD. It would appear clear that Congress intended for federal facilities to be included in the Superfund program with the addition of Section 120 by SARA. Section 120 (a)(1) states, "Each department, agency, and instrumentality of the United States (including the executive, legislative, and judicial branches of government) shall be subject to, and comply with, this chapter in the same manner and to the same extent, both procedurally and substantively, as any nongovernmental entity,...."

Subcommittee hearings also seem to make the intent of Congress clear, DOD was supposed to be conducting those activities specified under CERCLA/SARA that would result in remediation of hazardous waste sites. However, when some of that testimony is examined, it is easy to see that Congress and DOD have not been communicating well. In a statement before the Senate Subcommittee on Superfund and Environmental Oversight, Senator Frank R. Lautenberg (D-NJ) said, "We should go after Federal agencies with as much vigor as we do private polluters, and we should hold Federal facilities to no less a standard. Unfortunately, the Administration [Reagan] has given them special treatment" (Congress, Senate, 1988: 2).

The communication failure is seen clearly in the following exchange between subcommittee chair Mike Synar (D-OK) and Carl Schafer, DASD(E) during a 1987 hearing before the House Subcommittee on Energy, Environment and Natural Resources.

MR. SYNAR: What have you done? What have you done in this area? Tell us what you've done. Give me some things you've done.

MR. SCHAFER: The policies are emanating from my office, and those policies are resulting in derivative policy being issued by the services. Part of the problem is that this program does not fit especially well over the decentralization that is--

MR. SYNAR: Mr. Schafer--

MR. SCHAFFER: [continuing] That is necessary.

MR. SYNAR: [continuing] I don't want to hear that. What are you doing? Tell me. Tell me what you're doing. Don't tell me about the problems you are encountering. Tell me what you are doing to overcome this problem.....

MR. SCHAFFER: We are doing everything that we can. We have issued policies--

MR. SYNAR: What?

MR. SCHAFFER: [continuing] From my office on each and every one of these subjects.

MR. SYNAR: Policies?

MR. SCHAFFER: Yes, sir. That's my function.

The Congressman wants to hear that DOD has been able to remediate a site, to significantly reduce risk posed by a particular site, something tangible that has been done. The DASD(E) clearly believes that his office is doing everything that could possibly be expected of it--it is writing policy. It appears that both participants in this conversation believe that what they are saying is clear and reasonable. It obviously is not clear or reasonable to either side.

In hearing after hearing, EPA officials and members of Congress have said it is their intent to treat federal facilities in the same manner as any private facility. Federal facilities, however, are not treated the same as private facilities. There is a separate subpart of the NCP, Subpart K, which is supposed to serve as a "roadmap" to the NCP for federal agencies. In the preamble to the proposed rule for the NCP in November 1988, EPA said it planned "to finalize Subpart K as expeditiously as possible" (53 Fed. Reg. 51396). Yet in July 1994 the subpart has yet to be promulgated in a final rule.

Another excellent example of communication between policymakers and DOD is seen in the NPL listing policy. EPA does not, as a general rule, list private sector sites on the NPL if cleanup is proceeding under a RCRA authority, but the policy does not apply to federal facilities (Congress, House of

Representatives, 1993b). In the initial NPL promulgation, EPA announced that RCRA land disposal units that received hazardous waste after July 26, 1982 (the effective date of RCRA land disposal regulations) would generally not be included on the NPL. In a revised policy statement on June 10, 1986, the agency said sites which could be addressed under the expanded RCRA Subtitle C (Hazardous and Solid Waste Amendments) corrective action authorities would generally be deferred from listing. EPA went on to say that it had determined that the great majority of federal facilities that could be on the NPL have RCRA-regulated hazardous waste management units within their property boundaries and if the deferral policy were applied only a few federal facilities would be placed on the NPL. It was the opinion of EPA that Congress had indicated its intent for federal facilities to be addressed under CERCLA Section 120(e) and so the deferral policy was not appropriate for federal facilities.

EPA agrees that CERCLA Section 120(a)(2) directs Federal agencies to comply with the same baseline requirements applicable to private sites. Yet EPA goes on to say that the section does not require all policies and requirements applicable to private and Federal sites be identical (54 Fed. Reg. 10520). EPA points out that Congress has set out specific requirements that apply only to Federal facilities including the Federal Agency Hazardous Waste Compliance Docket, the notification required before Federal agencies may transfer property, and the entire IAG process:

GAO has identified other instances in which Federal facilities are treated differently than private sector ones. In the private sector a site that scores 28.50 or higher on the HRS is subject to inclusion on NPL, but at a DOD installation EPA scores four to six of what appear to be the worst contaminated sites and combines the scores for the installation's composite score (GAO, 1994). Both DOD and EPA officials told GAO that the majority of DOD's NPL installations are

not large enough or badly contaminated enough to be considered Superfund sites and would go undetected in the private sector (GAO, 1994). By requiring DOD to consider minor sites on NPL installations, GAO found seriously contaminated sites on non-NPL installations are allowed to worsen while those on the NPL installations receive priority access to DOD resources.

When DOD installations have attempted to comply with Superfund regulations regarding risk assessment for contaminated areas, they have again been frustrated to learn that, although the communicated intent is to treat Federal facilities no differently than private ones, they are not treated the same. At McChord Air Force Base, for example, although the site being assessed was an industrial area and that activity is expected to remain ongoing, the installation was told to assume condominiums would be built on the site, children would play on it and drinking water would come from a shallow aquifer. EPA required McChord to use the scenario for the risk assessment, but may or may not require the installation to cleanup to residential levels (GAO, 1994). In the FY 1992 DPM scoring of 230 sites, DOD reported that most sites scored less than 30 on a scale of 0 to 100, with scores ranging from 1 to 67. DOD contends that the scores are an indication that the majority of DOD sites do not present great risks.

A major communication problem, particularly between EPA and DOD, has been in regard to RCRA/CERCLA overlap. EPA's current policy toward federal facilities is to re-evaluate cleanups conducted under one authority, CERCLA by another authority, RCRA, which means a site closed out under CERCLA can be reopened under RCRA. Particularly at the installation level it is unclear which process governs, who is in charge and whether an installation will be subject to both processes and controlled by the state and EPA regulators at the same time. In an attempt to simply skirt the issue, Lewis D. Walker, deputy assistant secretary of the Army for environment, safety and occupational health, testified

that the Army has tried to focus on a solution-oriented approach and not worry about who is in charge. "We just try to find a level of cleanup that is protective of public health and safety" (Congress, House of Representatives, 1993a: 669). It appears that the Army has elected to give it their best shot and hope for the best. However, a better communicated policy concerning overlap of the two statutes would prevent wasted time and money. The intent of NPL listing is to characterize and remediate those sites as negotiated in the IAG and described in the ROD, and then to delist the sites. Yet some EPA regional officials have insisted upon keeping all sites under the CERCLA process as long as possible because, "the site could be more seriously contaminated than originally thought" (GAO, 1994: 11).

Poor communication is not just an interagency problem. The DOD IG conducted an investigation of DERP in 1986 and reported that nearly every installation commander and staff interviewed indicated that they believed they were not receiving adequate guidance and support (DOD, IG, 1986). Inadequate guidance is the result of insufficient, inconsistent and unclear communication. Four years later, lack of guidance was again cited as a problem in a 1990 IG report (DOD, 1990).

In the 1990 DOD IG report, the practice of disseminating policy to the field by the ODASD(E) through annual and periodic memoranda was cited as problematic. The IG found the practice to be result in policy which is incomplete, untimely and lacking in clarity (DOD, IG, 1990). ODASD(E) had issued more than forty policy memoranda, but there was no current list. Managers in the field have no way of determining if they have all the policy guidance or if the guidance they have is current.

There is little doubt that some of the intra-agency communications problems are the result of the complicated bureaucratic structure which exists within DOD. That structure will be discussed later in this chapter.

Communication is a critical variable in the success or failure of policy implementation. Unfortunately it is also a variable which is relatively easy to manipulate. It is not at all difficult for policymakers to enact a statute which says one thing, for it to be interpreted to say another, and to be implemented with still another interpretation.

From the time the original CERCLA legislation was enacted, the communication regarding the policy have been muddled. The political process encourages garbled communication when policymakers are dealing with an issue that is large, complex, technical, and emotionally charged. While policymakers may be able to enact legislation which appears to provide the basis for solving a problem like the one that spawned Superfund, appearances can be deceiving. A policy that is communicated poorly at the beginning is unlikely to be implemented as policymakers intended, because they probably were not sure what they did intend. It is easy to see that in CERCLA/SARA and the IRP. The problem policymakers thought they were tackling turned out to be something much bigger. Intent, communication and action have become increasingly complicated and the public demand to do something has resulted in the implementation of a policy that may, though incremental changes,

Perhaps the early environmental efforts in both DOD and the private sector were half-hearted because officials subscribed to the "attention cycle" described by Downs (1972). In this two-stage cycle there is a preproblem stage in which a highly undesirable social condition exists but it has not yet captured public attention. There are experts who write about the problem, but only other experts read their work. Then the problem is discovered by the public, usually because

of some dramatic event like Love Canal. In the second stage of the cycle there is an almost euphoric enthusiasm about society's ability to solve the problem, or at least do something effective, in a relatively short period of time. Answers appear in the form of new legislation (policy). However, rarely can the problems be solved easily, leading to public frustration, then to disillusionment and eventually a decline in public interest and lowered support for governmental action.

Environmental issues have not followed Down's cycle. The inability to quickly solve the problems associated with inactive hazardous waste disposal has certainly lead to public frustration, but in this case there has been an escalating demand for answers. The issue of hazardous waste cleanup has remained in the public interest because it is an issue that threatens almost everyone. Much of the blame can be attributed to small, well-financed groups, and in the case of DOD, one that is easily identifiable, well-exposed with wealth and power. It clearly was a tactical error for DOD to assume it could avoid or divert attention in the environmental arena.

There has been one undertaking at DOD installations which does appear to have helped communications, at least between individual installations and the state and local areas directly affected. Each installation that has sites in the IRP process has formed a Technical Review Committee (TRC). The TRC is a committee that reviews and comments on actions and proposed actions with respect to releases or threatened releases at a site. Committee membership may include base personnel, representation from EPA, appropriate state and local authorities, and representatives of the community. The guidance for establishing TRCs, recommended representation, and the general role of the committee is different for each service branch.

Resources

Resources, as Edwards points out, are not limited to money, but can also include personnel in sufficient numbers and with proper expertise, equipment, information, authority, or facilities. It would not be unreasonable to assume that most people in the U.S. would contend that DOD has not only adequate, but extraordinary resources at its disposal. Officials at DOD, of course, would be quick to correct that faulty impression. Somewhere in between those two extremes is the more accurate representation of the resources DOD has available.

Personnel, Equipment, Facilities

DOD estimates that it has more than five thousand people who are dedicated, full-time to environmental activities (Parker, 1990). That seems like a large number of people working in the environmental area of an agency whose primary mission is not environmental protection. However, because DOD employs about five million people, both military and civilian, the environmental workforce represents only one of every one thousand DOD employees (Shulman, 1992). In the 1990 IG investigation of DERP, most commands and installations perceived inadequate staffing as a problem (DOD, IG, 1990). However, the report goes on to point out that only about one-third of the installations visited had conducted a staffing study and so installation commanders were unable to determine even base line staffing requirements.

The workforce is largely under-trained, in part because the field of environmental restoration is relatively new and is changing at a rapid pace. It has been difficult for DOD to attract and maintain its civilian staff because they

are recruited heavily by civilian consulting firms that do much of the contract work for DOD. Working in the environmental area has not been the way to get ahead for career military personnel. In 1991 Congressional testimony, officials from each of the services stressed their intent to make environmental positions more attractive in terms of grade, promotion possibilities, and training for both the military and civilian sector employees (Congress, House of Representatives, 1991c). In one interesting plan, a retired military officer has suggested that instead of down-sizing the military, some portion of force should be converted into an "environmental army" (Drucker, 1993). After training in the latest environmental restoration techniques, the force would combine its new expertise with the military's long proven ability to quickly move massive amounts of materiel and personnel and would tackle environmental problems virtually around the world. It is an intriguing notion. Given today's situation, it is fair to say that DOD does not have adequate personnel or the inclination to act on such a radical plan.

Another personnel problem that faces DOD in its environmental efforts is that military personnel are usually stationed at an installation for a short period of time, from one to two years. That results in an almost constant turn over of personnel who leave just about the time they are getting a good handle on the situation. The rotating in and out of personnel also reduces the opportunity that regional EPA officials and installation personnel can develop working relationships.

DOD has virtually no internal capacity to conduct its own remediation efforts, other than those as simple as removing barrels (Ray, 1992). It must rely almost exclusively on contractors. It is not unusual to learn of a DOD military hardware contractor who has overcharged, failed to meet contractual obligations, or engaged in some other fraudulent activity, and the same is true in

the environmental field. Surprisingly, GAO contends that "government contracting procedures are designed to obtain the best quality for the best price" (GAO, 1994: 25). However, because the procedures are time consuming, GAO says, DOD is often forced to use shortcuts to save time to obligate year end funds. Attempting to write these quick contracts leads to increased costs and disagreements with contractors over what needs to be done which in turn leads to inadequate contractor performance (GAO, 1994). Reliance on contractors has also lead to some rather interesting situations like the one at Plant 44 in Tuscon, Arizona. The plant was operated by Hughes Aircraft Company for the Air Force. When the plant was found to have contaminated groundwater, Hughes was not held liable and was awarded a contract to do the remediation. The reliance upon contractors is not especially unusual in hazardous waste site remediations. Very few companies who are responsible for cleanups actually have in-house ability to accomplish the task.

Information

Information is an interesting resource which is linked to communication. Edwards believes that implementors must have information about how to carry a policy out and about compliance. In the earlier discussion of communication, it is clear that in the case of the IRP neither type of information is adequate. There does not appear to be much intra-agency flow of information regarding remediations that have been successful or failed so that lessons learned can be applied elsewhere. The lack of flow could be a consequence of DOD's bureaucratic structure. Inadequate information regarding compliance is due in large measure to the vague nature of the statute and to complicating factors of statutory overlap. The 1990 IG investigation of DERP points out that frequently

two or more components have installations within a few miles of each other with the same environmental problems, for example the Army, Navy and Air Force in the Seattle/Tacoma, Washington area, but they do not work together, share information, technology, contractors, or priorities (DOD, IG, 1990).

Authority

Authority has presented a large obstacle in the implementation of the IRP. DOD believes that it has been granted the authority to conduct operations within its fences as it deems appropriate. EPA, on the other hand, contends that CERCLA has granted it the authority to not only oversee, but to give final remedy approval even if it is not the remedy DOD selects. EPA has broad authority under CERCLA to issue administrative orders to protect public health and the environment from an actual or threatened release from any facility, including a federal facility. The Department of Justice (DOJ) imposed its view on EPA that the "independent exercise of order authority directed toward a federal agency in most instances is impermissible and probably unconstitutional" (Congress, Senate, 1988: 74). During the Carter administration, EPA had thought of suing federal facilities, but was dissuaded by the Office of Management and Budget (OMB) and DOJ. That clash led to EO 12088 which provides that each agency is responsible for taking all necessary actions for the compliance of its own facilities with federal pollution control laws (Congress, House of Representatives, 1984).

Another authority issue has been what the appropriate role of the states' environmental regulators is in DOD remediations. DOD believes, and would prefer, that the role of the state be as interested spectators. It would also appear that it is a role that EPA intended for the states. While DOD and EPA

must enter into IAGs before any remedial action at an NPL site can begin, states do not have to be a party to the IAG. Once DOD and EPA have reached an agreement, it really matters very little whether the state concurs or not.

Authority in the form of budget control has also been granted to DOD through DERA. That authority has not gone unchallenged, however. At the same time Congress was going on record in support of DOD's position that the worst sites should be cleaned up first, it was directing DOD to do specific cleanups through earmarking of DERA funds. The habit was unfortunate because usually the projects for which funds were earmarked were lower priority sites and resulted in higher priority sites going unremediated. DOD has managed to eliminate DERA earmarking by use of DPM to establish priorities and maintain its policy of addressing the worst sites first (Congress, House of Representatives, 1991c).

Funding

It often seems that for DOD money is no object. The total budget for DOD, in recent years, has usually been between fifteen and eighteen percent of the entire federal budget with only entitlement programs taking a larger portion. The environmental effort at DOD has also been the recipient of large appropriations. In fact, until recently, DERA received appropriations at nearly the level of request every year. Under present budget pressures, the test for DOD in its environmental programs will not be, "...how much have you spent in environmental programs? Rather, the test will be 'how much have you actually cleaned up' (Ellis, 1992: 527). Unfortunately, environmental programs at DOD are going to be expensive. For example, estimates to clean up the Army's Jefferson Proving Ground in southeast Indiana range from \$5 billion to \$13

billion (Slear, 1993). The \$13 billion figure is three times greater than the entire DOD environmental budget for 1992.

Budgets are very important in DOD. According to Kanter (1979) the military services pay close attention to their budgets. Budgets, he says, define the Pentagon's national security mission, organizational objectives of the services and the outcomes of interactions among participants with different program priorities. Robert McNamara said, "Policy decisions must sooner or later be expressed in the form of budget decisions on where and how much to spend" (Kanter, 1979: 4).

An indicator of that an environmental ethic has been taking hold of the way federal agencies, not just DOD, do business is seen in the dramatic increase in environmental projects proposed by federal agencies. In Fiscal Year 1987 about 540 projects at an estimated cost of \$600 million were proposed, in Fiscal Year 1991 the numbers had jumped to more than 4000 projects at an estimated cost of about \$3 billion (Parker, 1990).

EO 12088 requires all federal agencies to request "sufficient" funds in their budget submission to OMB to meet all their environmental obligations. EPA reports that federal agencies have generally been successful in obtaining sufficient funds to carry out all such obligations, as well as some additional essential activities. Although not legally required, DOD and DOE, for example, have both initiated extensive RI/FS investigations at non-NPL sites which are essential in managing a comprehensive cleanup program (EPA, 1993).

There have been criticisms that Superfund spending, in general, has been inefficient (Shulman, 1992; Slear, 1993; GAO, 1993; Congress, House of Representatives, 1989; Congress, House of Representatives, 1993b). Critics point to money spent on nonpermanent remedies, on cleanups that do not address immediate or near-term risks, and too much money spent on program

management and administration. Among the biggest criticisms is the amount of money going to contractors due to a system that has developed many layers of contractors eating up more and more of the money. It is interesting to note that Superfund's requirements for extensive public involvement, mandated by Congress, are a big contributor to the increase in administration and its associated costs.

Another source of inefficient spending at DOD comes when DOD obtains contracting support services from DOE. In those instances twenty-six to thirty percent of the funds are expended for contract management overhead by DOE, the DOE prime contractor, and the regional subcontractors (DOD, IG, 1990). Figures from the 1990 Inspector General's (IG) investigation show that for a period from Fiscal Year 1987 through the first half of Fiscal Year 1989, the Army, Navy and Air Force transferred about \$135 million to DOE with overhead costs of between \$35 million and \$40.5 million (DOD, IG, 1990: 33). The IG report recommended that DOD make use of its own contracting services unless it was not timely or cost-efficient.

At DOD, funds are appropriated to DERA, which is administered by DASD(E). DERA funds are then allocated to the individual services. Cleanup funds are allocated to installations through Army and Air Force major commands, Navy funds are administered by the Navy Engineering Field Divisions (GAO, 1994). Under current funding procedures DOD installations must obligate DERA funds in the fiscal year they are received.

DOD does not have consistent methods and measures for environmental funding. There are ten different Navy and Marine accounts, twelve Air Force accounts, and twelve Army accounts from which environmental funding may be allocated (National Defense, 1993). At the DOD level, the funds are administered centrally in three other accounts. An Environmental Budgeting

Task Force has been established to work out a plan for a more coherent, unified method for planning, programming and budgeting the funds.

Over the past several years, Congress has also made it clear that while it supports environmental restoration at DOD facilities, it does not wish to provide unlimited funding. Congressional committees have begun to question the manner in which DOD makes its cost estimates and how it sets priorities. The Congressional mood appears to be one of being willing to appropriate the money, but not without tighter controls and better management at DOD. There also continues to be concern at DOD that the budgeting process makes it difficult to find money to fund cleanups ordered by states or EPA within thirty to sixty days. Federal agencies are constrained by federal procurement laws and the system is unsuited for responding to emergencies (Strand, 1993). Officials have also reported that when funds are received in the latter part of the fiscal year it is difficult to get project planning, analysis and contracting accomplished in a short period of time (GAO, 1994).

The budgets trends for DERA and DOD from Fiscal Year 1984 to Fiscal Year 1994 are shown in Table 5.1.

While DOD budgets have decreased since 1989, the appropriations for DERA have continued to increase. Until the appropriations process for FY 1993-1994 Congress had funded DOD's cleanup program very near the level requested by DOD (GAO, 1994). Appropriations committees have expressed concerns that while operations and maintenance (O&M) budgets have failed to keep pace with inflation, DERA funding has grown fifty percent (Congress, House of Representatives, 1991b).

Table 5.1
DERA and Total DOD Budgets
(\$ million)

Fiscal Year	DERA Funding	DOD Budget
1984	150.0	227,413
1985	314.0	252,748
1986	360.6	273,375
1987	377.2	281,999
1988	404.0	290,361
1989	502.2	303,589
1990	601.1	299,287
1991	1065.0	273,292
1992	1562.4	298,400
1993	1962.3	289,399
1994	2180.2	280,600

Contributing to the Congressional displeasure with the trend in DERA funding, has been DOD's inability to develop a reliable estimate of costs for remediations. The first estimate published in the FY 1986 *Defense Environmental Restoration Program Annual Report to Congress* estimated that total costs for IRP would be from \$5 billion to \$10 billion for 400 to 800 sites over a ten year period. In the FY 1987 report the estimate had been increased to \$11 billion to \$14 billion with expenditures peaking in FY 1994 or 1995 in a program that would run through 2010. The FY 1991 report estimated a total IRP cost of \$24.5 billion with peak expenditures coming in FY 1998 or 1999. DOD's inability to develop accurate cost estimate are due to several factors. Not all the sites DOD will ultimately have to remediate have yet been identified; characterization studies are not complete for all the sites; some installations may require more

extensive cleanup than anticipated; and the timing of cleanups is not clear (GAO 1991b).

Appropriations committees have started to make stiff cutbacks in appropriations requests for DERA. The Senate Appropriations Committee, in the report on the 1994 DOD Appropriations Bill cut the Navy's request for studies by nearly \$50,000,000 (Congress, Senate, 1993b). "The committee continues to be concerned about excessive expenditures on study efforts.... Each service can apparently cite instances where an environmental problem was identified, a remediation plan developed and restoration action completed expeditiously. However, these cases appear to be the exception rather than the rule" (Congress, Senate, 1993b: 100). The House Committee on Armed Services urged DOD to make the transition from study to remediation and to "push dirt instead of pushing paper" (Congress, House of Representatives, 1993a: 11).

Disposition

Historically, the military has been reluctant to comply with environmental laws that might force it to change mission-oriented activities including training and weapons tests (Shulman, 1992). In 1984 when a base commander told neighborhood group that DOD was in the business of protecting the nation, not the environment, he was expressing an opinion with which many in DOD would have agreed. There are, however, historical references to the contrary.

An article written in 1989 by a career Army (infantry) officer, makes the case that military commanders have responsibility for protecting the environment in both peacetime and war that date to Plato (Drucker, 1989). In Plato's

Republic, Greeks were admonished not to ravage the country or destroy the houses. The Old Testament commands that only nonfood producing trees be used for military construction (Deuteronomy 20: 19-20). Hugo Grotius, regarded as the father of international law, in *The Law of War and Peace* (1625) presented a set of moral rules for military commanders that were intended to limit or prevent damage to the environment. In modern times, Protocol (I) Additional to the Geneva Convention of August 12, 1949 explicitly requires combatants to limit environmental destruction. The language is vague enough to allow considerable environmental damage, however, ruling out only the most extreme forms of environmental damage. It also fails to recognize any inherent worth of nonhuman species (Drucker, 1989). The Convention on the Prohibition of Military of Any Other Hostile Use of the Environmental Modification Techniques (the Enmod Convention of 1977) requires signatories to refrain from engaging in environmental modification techniques with widespread, long-lasting or severe effects. Drucker points out that what is important is the implicit concept in these accords that the environment is a neutral party in war. Drucker also points out a commander in peacetime has a general responsibility to protect the environment as an agent of the state.

In the mid-1980s, DOD appeared to be getting the environmental religion. Secretary of Defense Dick Cheney's landmark 1989 memorandum directed DOD to make meeting environmental standards a command priority at all levels. General Merrill A. McPeak, the Air Force Chief of Staff issued a memorandum in April 1991 making every member of the Air Force responsible for "proper attention to the environment" (Memorandum--Environmental Leadership Memorandum, April 17, 1991).

In September 1990, Cheney held the first ever meeting of Pentagon officials, environmental activists, government regulators and representatives

from industry to discuss DOD's environmental problems. Remarks made by Cheney to open the meeting were notable because it was the first time that a Secretary of Defense had made the environment a priority (Shulman, 1992). But at that same meeting, Admiral David E. Jeremiah, vice-chairman of the Joint Chiefs of Staff, characterized environmental concerns as a "screen to mask hidden political agendas" that could be viewed as anti-military (Shulman, 1992: 119). He said that environmental regulators had to recognize the fact that war and preparations for it are inherently destructive and environmental programs would always take second place to fighting and winning in combat. Although Cheney had told the audience that the military mission was not an excuse to ignore the environment, Jeremiah cautioned that the defense program should not be held for ransom by a "few local demagogues" (Shulman, 1992: 119).

The opposing positions of Cheney and Jeremiah show the intense internal battle in DOD and demonstrate that change will not come easily. It may well require a generational change before attitudes about the importance of the environment are recognized in DOD. Most senior military officials were never exposed to environmental issues in their military training. There is a gap between career-military and civilian attitudes which can be seen more clearly at installation levels. At that level the majority of in-house environmental workers are civilians who focus exclusively on environmental cleanup and compliance. That focus frequently puts them at odds with military counterparts who are responsible for a variety of military activities that conflict with environmental priorities. The pollution problems at DOD installations have evolved because environmental considerations have always taken a back seat to the larger mission of making weapons and running military installations (Satchell, 1989).

There is a tendency in the Pentagon to postpone decisions, to keep the options open and to avoid conflict (Kanter, 1979). Kanter goes on to explain that

in DOD the budget cycle tends to force decisions. Although there has been the perception of a growing awareness to promote sound environmental practices at DOD, most of the improvements have come in response to budgetary direction (Congress, House of Representatives, 1991c).

In a 1988 report to Congress, GAO said that when things were emphasized by top management they tended to get more attention at the installation level. When environmental cleanup is not a major mission for an agency, it is difficult to hold the attention of senior officials and cleanups tend to be inconsistent (Raynes and Boss, 1993). Congress has certainly had its doubts about the commitment of the Secretary of Defense to environmental leadership. "DOD is largely incapable of coming to grips with serious policy and funding issues associated with environmental legislation until it is too late to take effective action to address these concerns" (Congress, House of Representatives, 1991c). Often, DOD has not helped its own cause. In former Secretary of Defense Les Aspin's first policy speech (February 11, 1993), he identified five areas of emphasis for DOD. Last in his list of priorities was the environment and maintaining adequate funding for DOD's environmental programs (Berry, 1993).

DOD has tried to give itself a better public image. And in image making timing can be everything. In 1984, EPA Administrator Ann Gorsuch was reported to believe that "the Defense Department has been doing a difficult job far better than it has been given credit for" (Congress, House of Representatives, 1984: 246). In 1992, a deputy for natural resources in the ODASD(E) told a gathering of the National Association of Environmental Professionals, "...caring for the environment is a mission of the military of which most citizens are unaware. Nonetheless, this commitment will continue to be reflected in the way DOD does business..." (Boice, 1992: 87).

However, the way DOD does business is not always in the best interest of its neighbors. In the case of DOD and DOE, the national defense missions of facilities are seen as paramount. Those missions often, but not always, require a high degree of secrecy regarding the precise nature of the activities taking place. Installation activities are kept within the 'fence.' In 1989, two Air Force lawyers wrote an article describing the military's application of sovereign immunity and national security to environmental issues. "One might expect that due to the unique status of the military in our society, environmental laws would, like the public, stop at the installation gate, leaving the Department of Defense free to concentrate on military matters" (Anderson and Lee, 1989: 42).

Former DASD(E) Thomas Baca has said, "DOD went about its business with little public scrutiny; sovereign immunity prevailed. We were the Department of Defense" (Slear, 1993: 5). Yet during hearings in 1985, the director for environmental policy in the Office of the Assistant Secretary of Defense (Acquisitions and Logistics) denied that DOD would attempt to hide environmental problems under the guise of classified information (Congress, House of Representatives, 1985). SARA has reduced the use of national security exemptions and allows them only on a site-by-site and instance-specific basis.

The disposition of DOD toward implementing IRP is also evident in the slow pace of cleanups at its NPL sites. GAO has speculated that slow implementation is due to the low priority given to hazardous waste management and cleanup by both local commanders and higher commanders. In a 1988 study, GAO indicated that in those cases where priority attention was given to cleanups, efforts could be characterized as "pretty good" but where little or no priority was given, little progress was observed (Congress, House of Representatives, 1988d). In 1990, DOD's IG came to similar conclusions.

"When installation commanders are interested and involved, programs move along, projects are properly staffed and funded, priorities are established, and the installation enjoys good relations with the state and EPA" (DOD, IG, 1990: ii).

Slowly, the disposition of DOD toward environmental stewardship is becoming more positive. The Navy and the command at the Brunswick Naval Air Station in Maine decided to make environmental restoration a priority. Once that decision had been made, the project was broken into smaller sites to move remediation along more quickly, the public was brought into the decisionmaking process, and progress is being made (Helgerson, 1994). McClellan Air Force Base, California was the first Air Force installation to develop an environmental management program and to allow the program to have a say in decisions including procurement and planning (Shulman, 1992).

The Army has been particularly aggressive in changing its environmental disposition. Secretary of the Army M.P.W. Stone provided guidance on Army environmental management in a 1990 memorandum. Among other things, he directed that environmental considerations be integrated into all Army activities and that all Army installations meet or exceed environmental standards (Army, 1992). The Army has established the Army Environmental Policy Institute to provide long-range strategic planning for future environmental requirements. In 1994, the Army Research Office, Army Corps of Engineers and Army Materiel Command issued their first Army Environmental Quality Basic Research Initiative. Under the initiative it is anticipated that \$9 million to \$10 million in research grants will be awarded for basic and advanced development research in the area of environmental quality.

Bureaucratic Structure

The structure into which an implementation task is introduced is another important variable in most models. To say that the bureaucratic structures into which CERCLA/SARA and IRP have been placed are complicated would be quite an understatement. In this case there are two bureaucracies, EPA's and DOD's, which have an impact on the implementation process.

EPA

EPA was established by executive order in 1970 as an independent executive agency. It administers environmental statutes which in Congress granted explicit authority to achieve specific goals by specific dates, both of which were experiments in regulatory reform (Marcus, 1980a). This new regulatory scheme was devised to increase EPA's accountability to both the White House and Congress. Moving all the offices that took care of environmental problems to EPA also created more ready access to environmentally conscious interest groups, gave sympathetic officials a permanent niche closer to the top, heightened morale among public experts working in solutions to environmental problems and pooled expertise to improve the quality of action during implementation (Goggin, et al., 1990b).

At the headquarters, EPA is headed by an Administrator. The Assistant Administrator for the Office Solid Waste and Emergency Response (OSWER) oversees the Office of Emergency Response and Remedial Response and the Office of Waste Programs Enforcement, which houses the CERCLA Enforcement Division. In January, 1981 responsibility for federal facilities' compliance at EPA was transferred from the Office of Enforcement to the Office

of Environmental Review (OER) where it had been originally. The transfer was made, according to an EPA internal memo, because EO 12088 removed the enforcement option at federal facilities making compliance a function of liaison and negotiation (Congress, House of Representatives, 1984). The memo went on to say, "Although this may be perceived as a symbol of weakened intent, the Office of Enforcement and the Office of Environmental Review have agreed to transfer the necessary functions and resources back to OER,..." (Congress, House of Representatives, 1984: 248). The memo never explained why the move did not constitute a weakening of intent.

In February, 1991, EPA approved a reorganization creating a separate Office of Federal Facilities Enforcement (OFFE) within the Office of Enforcement. This reorganization was accomplished by consolidating the OSWER federal facility program with those functions previously assigned to the Office of Federal Activities (Congress, House of Representatives, 1991c).

The Federal Facilities Environmental Restoration Dialogue Committee (FFER) was established in April, 1992 by EPA as an advisory committee under the Federal Advisory Committee Act (EPA, 1993). The purpose of FFER is to provide a forum to identify and refine issues related to environmental restoration activities at federal facilities, and to develop consensus policy recommendations aimed at improving the decisionmaking process at federal facilities. FFER is made up of forty representatives of federal agencies, tribal and state governments and associations, and local and national environmental, community and labor organizations. Committee members are not asked to formally represent their agency or organization or to making binding commitments. The FFER membership is shown in Table 5.2. This committee serves only in an advisory capacity and has no authority to make binding regulations. It does have the ability to provide guidance which could either help to clarify some of the

communications problems which exist or could just add to those problems. FFER is young, but it issued an interim report last year making recommendations for improving the decisionmaking and priority-setting processes at federal facilities.

Table 5.2
FFER Membership

Agency	Representatives
EPA	3
DOD	3
DOE	3
USDA	1
DOI	1
NASA	1
NOAA	1
ATSDR	1
State government and/or state government associations	10
Native American/Tribal governments	6
Environmental/citizen/labor associations	10

EPA has divided the U.S. into ten regions each headed by a Regional Administrator. Offices of Federal Relations oversee the federal facilities' activities at the regional level. Although guidance is formulated at the headquarters level, it is at the regional level that the guidance is put into effect. Various researchers (Russell, et al., 1991) have found that regions enforce differently. Some regions are known as being more adversarial than others, some are known for being less process driven and more action oriented. Because the regions represent another layer of bureaucracy, they bring with them the associated problems with communication, disposition and resources

which serve to further complicate the implementation process. DOD NPL site decisions are directly impacted by the regions, because it is at that level that staffs are most likely to interact, installations sign FFAs and IAGs with EPA Regional Administrators, and it is those Regional Administrators who will make remediation selections in cases where an agreement cannot be reached between the installation and EPA.

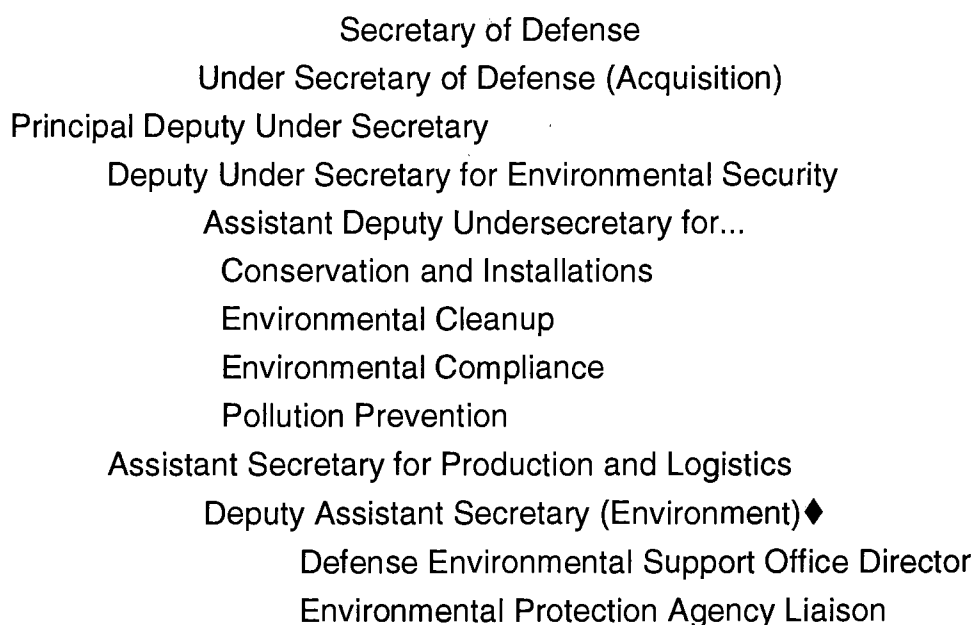
DOD

The bureaucratic structure of DOD is mind-boggling. Not only is there a kind of "central administration" function that is handled by the Secretary of Defense, but there are also separate structures within each of the service branches and no two are alike. To further complicate matters, DOD has no common chain of command or promotion structure (Kanter, 1979). There is virtually no activity or function that includes all DOD personnel. Because the services pre-date DOD as a formal organization, its structure was superimposed on ones which were already ongoing (Kanter, 1979). Each of the services is a "department" and amendments to the National Security Act require that all services be separately organized. Information processing, budget formulation and other functions are all organized in terms of the separate services (Kanter, 1979).

In 1981, EO 12316 assigned responsibilities among federal agencies for implementing Superfund. The order gave DOD complete responsibility for carrying out response actions for any release of hazardous waste or substances from DOD facilities or ships. SARA directed the Secretary of Defense to establish an office to oversee the environmental status of the military, but day-to-day responsibilities are relegated to individuals in each separate branch of the

armed services. Each branch is organized differently, oversees its own installations, and establishes its own separate directives and budget priorities (Shulman, 1992). Figures IV, V, VI, VII show simplified bureaucratic structures for environmental functions at DOD and the Departments of the Air Force, Army, and Navy.

Figure IV
DOD Structure



◆ Executive agent for administering DERP and DERA

Figure V
Department of the Air Force

Secretary of the Air Force
 Assistant Secretary for Manpower, Reserve Affairs, Installations and Environment
 Deputy Assistant Secretary-Environment, Safety and Occupational Health•
 Deputy Assistant Secretary for Hazardous Materials and Waste
 Assistant for Environmental Quality

- Service branch principal manager for DERP

Figure VI
Department of the Army

Secretary of the Army
 Assistant Secretary for Installations, Logistics and Environment
 Deputy Assistant Secretary for Environment, Safety and Occupational Health•
 Administrative Assistant to the Secretary
 Headquarters Services-Washington
 Environmental Support Group Director
 General Counsel of the Army
 Deputy General Counsel-Civil Works and Environment

- Service branch principal manager for DERP

Figure VII
Department of the Navy

Secretary of the Navy

Under Secretary of the Navy

Assistant Secretary for Installations and Environment

Environment and Safety Deputy•

Office of the General Counsel

Deputy General Counsel

Assistant General Counsel-Installations and Environment

Office of the Judge Advocate General

Assistant Judge Advocate General-Civil Law

Deputy Assistant Judge Advocate General for Environmental Law

Office of the Naval Inspector General

Deputy Inspector

Special Assistant for Environment and Navy Occupational Safety and Health

- Service branch principal manager for DERP

There are additional structures within the offices of the Chief of Staff of the Air Force, Chief of Staff of the Army, and Chief of Naval Operations. There are also differences in structure at the major command level, and at the individual installation level. In the Air Force, for example, the Air Logistics Command has elected to form separate Environmental Management offices reporting directly to the installation commander. In other Air Force commands the environmental function is in the base civil engineering organization, which may or may not report directly to the installation commander (Air Force, 1991). To further complicate a trip through this bureaucratic maze, is the structure at the

installation level. A single base may house multiple tenant organizations that answer to different major commands and even different service branches.

In Kanter's (1979) study of defense politics, two sources were identified as causes of a lack of control within DOD. The first, Kanter says, results from the delegation of tasks which diffuses influence and diminishes control because the behavior of bureaucratic subordinates cannot be completely directed. The second cause stems from the lack of a single policy process to define decisions and actions. Numerous decision streams within DOD are only loosely coupled. The lack of control within DOD is clearly enhanced by the bureaucratic structure, and seen primarily in the lack of a common chain of command. Also contributing to control problems is the combination of civilian and military officials at every level of DOD.

Conclusion

The process of policy implementation is one that is impacted by a great many factors, some more obvious than others. From the earliest of the studies, through the most recent ones, several variables have consistently been seen as vital to successful implementation: communication, resources, disposition and bureaucratic structure. With the possible exception of resources, DOD has experienced difficulties with each of these variables in its implementation of the IRP.

DOD has been attempting to implement a process that has not been clearly communicated by policymakers. The remediation of past hazardous waste disposal areas is an area of intense public concern and much disagreement. Both the lay public and scientists are unclear about the extent of the problem or the best way to correct it. The vastly different perceptions of risk in those two

communities has resulted in policymakers trying to write legislation that makes everyone happy, and in the end have created a quagmire.

Budget figures for DOD are so large that it seems virtually impossible for it to be lacking in resources of any kind. Money makes it possible for an implementing agency to purchase many of the resources necessary for successful policy implementation. DOD's IRP implementation has been no different. What it does not have, DOD buys, with the exception of authority. In the case of the IRP, authority has been an ongoing point of contention between the two implementing agencies, DOD and EPA.

Disposition is a variable that, in the ideal bureaucratic world, would not impact implementation. Policymakers would devise policy and give it to the implementing agency whose job it was to implement the policy as it was written. But the attitudes of not only the implementing agency, but individuals within the agency can have an enormous impact on whether a policy is implemented as written, with modifications or not at all. In this case, disposition may have as much to do with the question of who has authority over whom as it does about the "corporate culture" within DOD.

Policy implementation would be a simple process in a simple bureaucratic structure. Directives would be handed down the chain of command, from decisionmakers to street-level implementors who would deliver the service to the proper groups in a timely, efficient, effective fashion. Bureaucracies have become large, overlapping and confusing. In the case of the IRP, there are two major bureaucracies with which to contend.

It is clear that the IRP is not all that Congress or the public hoped it would be, nor is DOD completely happy with the process.

CHAPTER VI

IMPLICATIONS, POLICY RECOMMENDATIONS AND CONCLUSIONS

Introduction

"Reflecting a fundamental change, our national security strategy recognizes that environmental factors weigh heavily in protecting our Nation," (Livingston and Carlisle, 1993: 2).

The implementation of a policy is never an easy task. In fact, given the odds stacked against it, it is a wonder that any policy is ever implemented. Policy is frequently written by legislators who have little knowledge of either the problem the policy is to address, or the best way to go about solving the problem. Policies are often developed quickly in response to some perceived urgent need of the policymakers' constituencies. When policy is developed in a "knee-jerk" mode primarily to appease the public, there is inadequate consideration given about the best way to approach the problem, or on crafting a statute that will guide implementors.

In many ways, that is what happened with CERCLA. The law was enacted largely because of events at Love Canal (Barnett, 1994). The size of the problem that would be discovered in the years to follow was much larger than anyone could have imagined (Bowman, 1988). No one really knew how best to

address the problem. The regulations to put the law to work took longer to promulgate than Congress and the public would have liked. CERCLA had provisions for a sizable trust fund that seemed like such a great deal of money that it would surely take care of the problem. Just buying out neighborhoods or moving waste from one site to another were not permanent solutions to the risks posed by old hazardous waste dumps.

It is easy to imagine that sitting quietly by and watching all this was the Department of Defense. Officials at DOD knew they had problems at some of their installations because of past waste practices. There was an Army program in place as early as 1975 with the purpose of looking into that very kind of problem (Army, 1992). It is also easy to imagine that a "don't ask, don't tell" policy might have been in place regarding the issue. If DOD did not mention their problems, maybe the public and Congress would not notice them. Realistically, once the public was aware of Love Canal, it would only be a matter of time before everyone, even DOD, would have to step forward, be accountable, and remediate the environmental contamination for which it was responsible. As Congress, EPA and DOD have learned, it is easy to say remediation will take place, it is another thing entirely to actually implement such a program.

The purpose of this chapter is to examine the question, using implementation literature, of whether DOD's implementation of DERP and IRP can be labeled a success or failure. A model of the variables affecting DOD's implementation will also be discussed. Finally, policy suggestions regarding the issue will be presented.

Implementation: Success or Failure?

When looking at the IRP it is tempting to label it as a failure. It has been in place, in one form or another for nearly twenty years, the number of DOD installations on the NPL keeps getting larger, and none are coming off the list. However, it is not at all accurate to characterize the implementation of the IRP, or Superfund for that matter, as failed. Because a goal of the IRP is to remediate inactive hazardous waste sites, it is likely that there will be no clear ending point for this program. Without an endpoint, say Ripley and Franklin (1982), it is not possible to judge implementation as failed or successful.

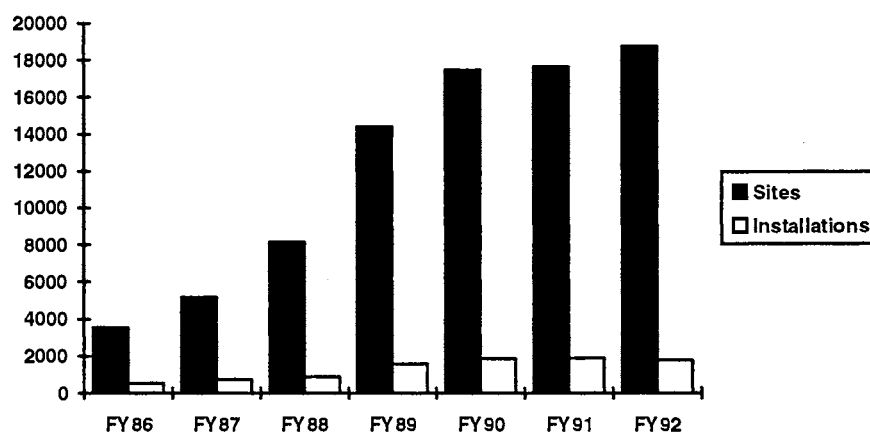
The CERCLA/SARA and DERP programs were designed to deal with problems that were poorly understood in a field using new and almost constantly emerging technologies. Reaching an endpoint may actually prove to be impossible. There are remediations being conducted right now that are using technology that is less than perfect, but it is all that is currently available. Although such cleanups may be advertised as "final and permanent," realistically, they are not. There is a little doubt that many of the sites that are considered remediated over the next several years, will have recurring problems and additional cleanup measures will have to be taken at some point in the future. The Superfund and IRP programs may never end.

To judge whether implementation of a policy has been successful or has failed really depends on where the judge stands. Congress is not satisfied with the implementation of either Superfund or the IRP. Both programs have spent huge sums of money and there have been very few sites cleaned up. EPA could not call the implementation completely successful, because it is clear that the program has not operated as well as it should, there have had to be mid-course

corrections (SARA), and there are likely to be more changes when the program comes up for reauthorization.

DOD has said that the program is working well. The purpose of the IRP, according to DOD, is to investigate potential contamination at DOD and formerly used properties, and, as necessary, to conduct site cleanups. Each year in its annual report to Congress, DOD points out the increase in the number of sites added to the IRP. Figure VIII shows the number of sites and installations added to the program from FY 1986 to FY 1992, as reported by DOD.

Figure VIII
IRP Sites and Installations
FY 1986 - 1992



Clearly, this is a program which has been able to identify potential areas of contamination at DOD installations. So in that respect, it has been a successful program.

There are those who believe that IRP is a case of failed, or at least very flawed, implementation because the authoritative decisions of the policymakers have not lead to the expected results. Policymakers tend to believe that policy will be implemented simply because they have directed it to happen. There is that body of literature that suggests that implementation is merely the act of putting a policy into motion. If viewed from the perspective of Ingram and Schneider (1988), the IRP, while not fully implemented, has actually been at least marginally successful. The implementation of the IRP has allowed DOD to develop an inventory of inactive hazardous waste sites, to eliminate those that do not pose a significant risk to human health and the environment, and to begin to prioritize the remediation efforts of those sites that do pose significant risk. The IRP has added value to the original policy, and that, according to Ingram and Schneider (1988) is an important part of implementation.

The process of policy implementation is one of continuous problem solving. Government promises to do something when it develops a policy. However, what the government actually does, although likely to resemble the promise, is the end product of implementation. Implementation is not carried out in a vacuum. Anything written by one human is likely to be understood differently by another. The making of policy is a political process, pure and simple. Were there no demand for action by interest groups of one kind or another, policymakers would probably not spontaneously draft policy. Nor is policy value-free. Policy is the result of compromise and negotiation. Policy may be drafted for one reason, interpreted with another reason in mind, and implemented for still a third reason. Everyone involved in each of the steps has added some nuance to the original, and even during implementation, regulatory agencies are still likely to be involved in negotiation and compromise during enforcement.

Those responsible for the implementation of the IRP have been engaged in problem solving, making changes to the system.

Van Meter and Van Horn (1975) believe implementation failure falls into three categories: capability, disposition and communications. Although the IRP cannot be characterized as a success or failure, it is instructive to view the problems with the IRP in using these three categories. It is not unreasonable to say that in its implementation of the IRP, DOD has experienced problems in all three categories. DOD has had some problems because of a lack of in-house capability, but those problems are not unlike what has been experienced in the private sector. Also, because DOD has received substantial appropriations to DERA, it has been in a position to purchase much of what it needed in terms of capability. This is not to say that DOD's in-house capabilities do not need to be improved or that it is always prudent to try to "rent" the capability by extensive use of contractors.

The two biggest problems at DOD appear to have been communication and disposition. Perhaps the most glaring of the problems in DOD's environmental programs in general have been in the area of disposition. DOD is a mission agency and its mission is not environmental protection. It is not a particularly valid argument, however. It is doubtful that a private entity responsible for remediation of its contamination at an NPL site would say that its corporate mission was environmental restoration. In 1970, NEPA made environmental protection the responsibility of every federal agency. Explicit in CERCLA/SARA is the responsibility of federal agencies for remediating contamination caused by past practices. DOD must realize that it is no longer a single-mission agency.

The bureaucratic structure of DOD and the disposition of the organization concerning IRP are strongly linked. Perhaps more so than in most other implementing organizations. Many individuals who work in civilian capacities at

DOD have come to those positions after serving in the military. The organizational mindset of DOD is very strong and loyalty, especially in the service branches, is intense.

It is fair to characterize the initial efforts in regard to environmental remediation at DOD as less than enthusiastic. The first projects at RMA and Weldon Springs were undertaken only after area residents threatened legal action. In fairness to DOD, however, the private sector did not rush to take on environmental cleanups at its facilities until forced to do so by CERCLA.

Problems with policy implementation may very well be the result of flawed language in the original statute, which can be compounded in regulations, agency guidance or practice. What makes this implementation different is that CERCLA was enacted in 1980, but an IRP had been started by the Army in 1976 and a program of sorts was in place in all the service branches by 1984. SARA codified the program in 1986. The implementation of the IRP was going on about four years before CERCLA was even written. After CERCLA's passage, DOD elected to use the NCP as a guide for the IRP, but was under no obligation to use that document as guidelines. Another complicating factor is that DOD does not have a single IRP, it really has three because each of the service branches has its own program. When SARA amended CERCLA, DOD became legally required to pattern the IRP after the NCP. The NCP has been under modification, refinement and clarification since it was first promulgated. The IRP has been undergoing similar changes. What we really have here is a mixture of two programs, both of which have gone incremental, sometimes haphazard changes.

There has always been concern at DOD that CERCLA/SARA has forced a structure on the IRP that is more concerned with process than outcome. The goal of remediating sites has been displaced by the requirement to meet some

target figure for studies or the number of RODs or IAGs signed. The concern over process, sometimes at the expense of outcome, is a frequent one voiced about all sorts of governmental policies. Some of that concern may be the result of a failure to understand the bigger picture of policy, or of inadequate communication from policymakers and oversight agencies.

Another of the problems with the IRP implementation is that it has been placed with an agency that, until the program started, had no experience in environmental remediation. Most of the time, Congress directs an agency with some knowledge of the area to implement a policy. Education policy, for example, is most likely to be given to the Department of Education to implement, not the Department of Commerce. To expect the Department of Transportation to implement foreign aid policy is not practical. Yet in the case of CERCLA, Congress directed, actually allowed, the Department of Defense to implement environmental policy. The imposition of a policy far outside the Department's usual sphere of expertise and responsibility and the oversight by EPA have both contributed to the disposition of DOD toward CERCLA/SARA.

This implementation does not fall neatly into any of the categories suggested by other studies. For example, the strategy adopted for both CERCLA/SARA and the IRP can best be characterized as adaptive. This strategy is more likely to be associated with bottom-up approaches. The bottom-up approach is not the style used in DOD whose command structure is an excellent example of top-down. Implementors elect the adaptive strategy when the policy goals and means to achieve them are unclear and implementors must take on the role of problem-solver. EPA and DOD have both been forced to become problem-solvers in the implementation of these programs.

The implementation of this program also fails to fit neatly into one of the style categories identified by Goggin, et al., (1990a). Because the policy

message has not been clear or consistent, IRP implementors have not been able to use the straightforward compliance style. The disposition of DOD toward the policy would also preclude use of the compliance style of implementation. Although there have been attempts to modify the policy by DOD and EPA, it would be incorrect to assume that any strategic delay has been employed in the hope that the modifications made would result in improved chances of successful implementation. The style DOD has adopted often appears to be defiant. But the attempts to modify the policy do not appear to with the intent to "harm" the policy or to stop it from being implemented at all. However, DOD's implementation delays are consistent with Bardach's (1977) notion that orchestrated delays serve the interests of the implementors.

O'Toole and Monjoy (1984) have noted that increasing complexity creates a situation where implementation is prone to delay and the situation the IRP is intended to address is certainly complex. Part of the complexity imposed on the implementation is due to the RCRA/CERCLA overlap. No matter how much everyone says federal facilities are going to be treated like private ones, in many respects it is simply not possible. The listing policy has created a situation where a site may be subject to both simply because a state wants direct involvement afforded it under RCRA but not CERCLA. This is clearly a case where intent is more important than process--a performance standard should be what implementors use not a design standard that specifies each little detail. The intent of the law should be the controlling factor, not whether a state gets to have control over some aspect of a remediation.

According to the FY 1992 DERP Annual Report to Congress, DOD is putting increased emphasis on stabilizing sites by removing contaminant sources and halting further spread of ground water plumes rather than waiting for a site to be completely characterized before beginning cleanup work. This

strategy is consistent with SACM which goes for increasing the rate at which human health and environmental risks are reduced and at minimizing IRP costs. SACM is another example of the incremental changes that the Superfund and IRP programs have undergone.

The phenomenon of fragmentation is often seen as a problem in many policy implementation efforts. Surprisingly, it does not appear to be a major issue here because there is not duplication of efforts between EPA and DOD. DOD is acting roughly in the same capacity as any private party involved in a cleanup. DOD cannot unilaterally make remediation selections, the selections are made with the approval of EPA, which continues to act as the regulator.

The stumbling blocks associated with the implementation of CERCLA/SARA by DOD have not been insurmountable, but they have been formidable. Particularly troublesome has been the disposition of DOD toward the policy. Because of the size and the specialized mission of DOD, it is an agency that is beyond coercion, especially by a regulatory agency like EPA. There are more and more attempts by DOD to project a more positive attitude toward environmental programs of all kinds. Directives issued by Chiefs of Staff at the Army and Air Force have been clear signals that the organizational mindset is changing and that DOD is becoming a more responsible environmental steward.

DOD IRP Implementation Model

After making a Phase I review of DOD's implementation of the IRP, an implementation model combining and modifying those of Edwards and Van Meter and Van Horn, has been developed. The model is presented in Figure IX.

Each of the variables will be discussed in some detail. At this point, the model is not directly testable, but does provide a "snapshot" of how the system is working and where empirical studies might best be directed.

Environmental Factors

The environmental factors are social, political and economic factors that have forced decisionmakers to draft a policy. These factors are critical, because without the pressure exerted by the electorate, Congress would have little incentive to draft legislation. While the environmental factors have a direct impact on the policy, the impact they have on resources that are provided for implementing the policy is indirect. If the policy is drafted merely for political reasons and there is little hard core support for it by decisionmakers, the resources directed toward its implementation will be inadequate. If, however, the policy has the support of decisionmakers, is it more likely that adequate funding will be provided.

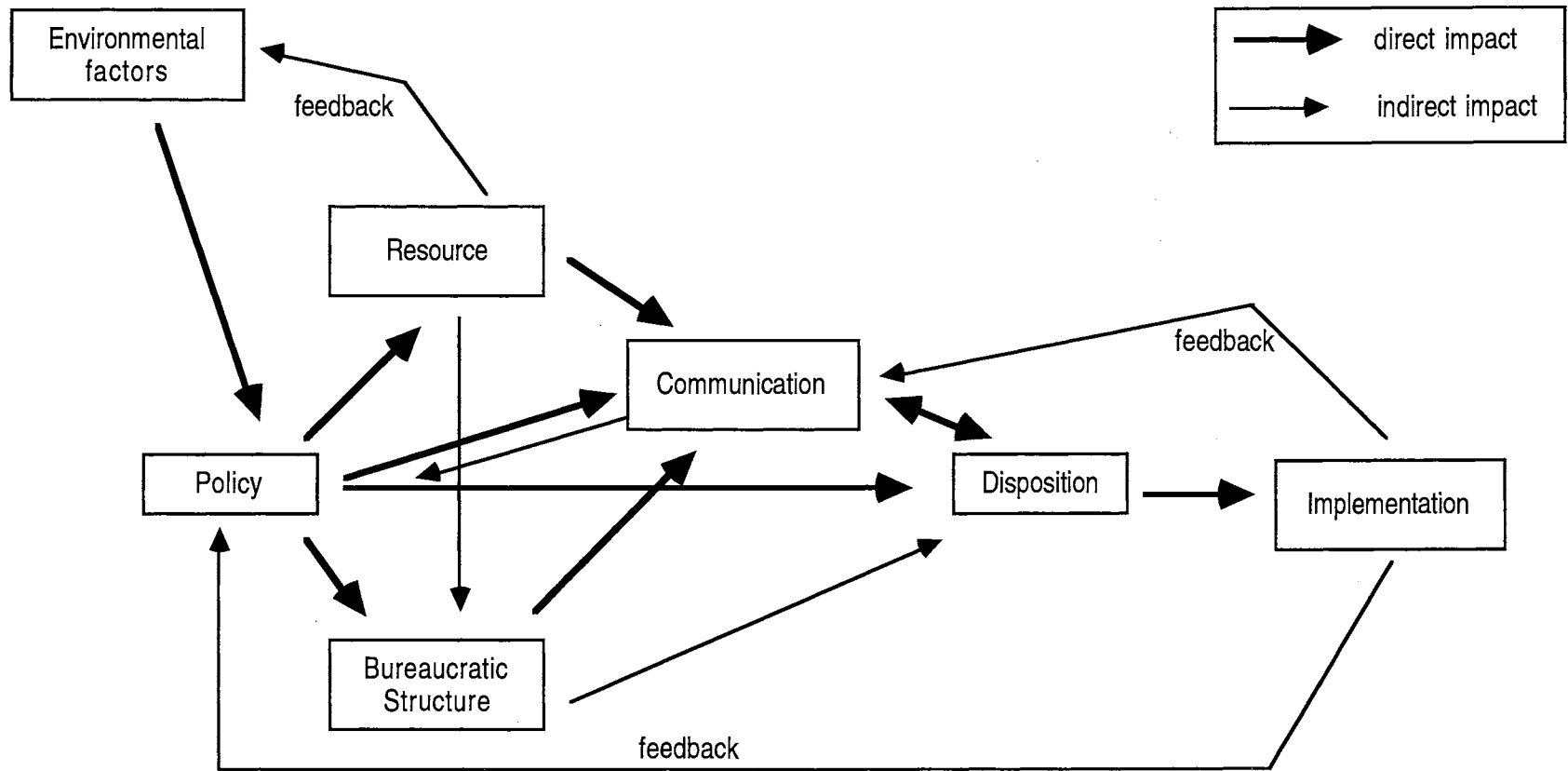
CERCLA was the result of pressure brought to bear on Congress by citizens in various parts of the nation who perceived they were at risk due to abandoned hazardous waste disposal sites. The concern of citizens was well documented by the media and there was significant political pressure brought to bear by interest groups for passage of CERCLA. The legislation came at a time when environmental activism was experiencing a resurgence. CERCLA may be unique in that it was the result of work done, not so much by well-established and funded environmental groups, but by people, primarily women, who until directly affected by improper hazardous waste disposal had not been active in the political arena. Citizen activism played a crucial role in the passage of this legislation.

Another interesting environmental condition impacting on DOD's IRP implementation has to do with what Stoker (1991) calls implementation's strategic dimension. In the mid- to late-1980s it was apparent that the threat from the Soviet Union was dramatically reduced and there were calls for downsizing the military and realizing a "peace dividend." Because the Pentagon does not want to be in a position which significantly reduces its size and budget, it needed to do something to try to maintain its position. One way to do that is through its environmental programs. The IRP has provided a tool for DOD to use to pursue its self-interest. The Pentagon can make slight reductions in the number of weapons systems and in manpower, but can realize increases in its environmental appropriations and not lose much ground. There is a peace dividend, but DOD gets to keep it and use it to cleanup environmental contamination at its own facilities. This may be a cynical notion, but given DOD's disposition toward environmental matters, it is not an unreasonable one.

Policy

The policy itself is an important variable in implementation. CERCLA was a law passed with great expectation that has yet to be matched in its ability to deliver cleanups. The law has frequently been criticized as being vague and inconsistent. Although SARA was supposed to have repaired many of the shortcomings of the original legislation, it continues to be plagued with problems.

Figure IX
DOD Implementation Model



When CERCLA was enacted policymakers thought they had drafted a statute that was clear and would be implemented quickly. They had gained valuable experience in drafting environmental law with RCRA and believed that they had provided language that was specific enough that EPA should have little or no trouble with implementation. CERCLA had the added "bonus" of being a program that would remain in the hands of the federal government. Unlike the majority of the laws for which EPA was responsible, CERCLA authority would not be granted to the states. But EPA was not the only federal agency that would be implementing CERCLA. Federal agencies would be responsible for running CERCLA-like programs for remediation at their own facilities. CERCLA had become the kind of complex program being operated in a complex bureaucratic setting requiring the participation and cooperation of a broad variety of actors that Ripley and Franklin envision in their working definition of implementation.

James Landis, regarded as the "father of administrative law", said that developing effective routines is a key to good administration. Superfund does not provide clear guidance that can be administered efficiently and predictably because the NCP has multiple factors to be weighed and balanced (Elliott, 1992). OTA has long been critical of a lack of framework in Superfund. "Without clear and well-supported [and communicated] cleanup goals the selection of cleanup technologies, ... cleanup performance will remain contentious" (OTA, 1985: 27).

Another issue to keep in mind when examining the impact of policy on the implementation in this case, is that there are really two policies at work. CERCLA/SARA codified DOD's DERP it was a preexisting program. Theoretically, the two policies were supposed to have been merged into a single objective by SARA, but in practice that has not occurred. DOD's implementation of the IRP resembles CERCLA/SARA, but still maintains a character of its own.

Resources

As has been pointed out by a number of researchers, resources are an important variable in the ability of an agency to fully and successfully implement a program. The trust fund established by CERCLA has proven to be inadequate and even the increases in the fund provided under SARA are likely to prove insufficient. Critics of the Superfund program have said that if less money were spent on litigation and more on "moving dirt" the fund might prove to be large enough. DERP is funded by a separate appropriation to DOD. As in private sector cleanups, DERP critics contend that if less money were spent on consultants and attorneys, DERA would not need to be funded at increasingly higher levels.

The size of DOD's environmental budget is a frequent target for critics. But, everything at DOD is big, so big that it is easy to assume the Department gets everything it asks for whether it needs it or not. For example, in FY 1992, the initial appropriation for DERA was \$1.33 billion, the DOE program received \$1.47 billion. That same year the EPA's Superfund appropriation was \$1.75 billion. At first blush, it hardly seems fair that the Superfund budget was only about sixty percent of the combined total for DOD and DOE. But it is important to note that EPA expects the majority of Superfund cleanups to be conducted and paid for by the private parties responsible for the contamination. Federal agencies like DOD must pay for cleanups out of their budget, cannot receive funds from the trust fund, and can expect very little cost recovery from private parties. Also, because of the method that EPA uses to score DOD installations for inclusion on the NPL, remediations of *every* inactive hazardous waste site at an installation uses DERA funds for restoration activities. This includes sites that, if held privately would probably not be discovered and if they were would

certainly not be included on the NPL. Because those sites are on a DOD installation, however, a far more costly set of guidelines regarding remediation must be followed. It would be highly unusual to find a private sector NPL site that covers hundreds of acres, but it is common in the case of DOD.

Table 6.1 shows the trend of DERA funding and the number of sites reported in the IRP. The second column under each category shows the percent of change in the figure from the previous fiscal year. In its annual reports to Congress, DOD indicates that the vast majority of funds, more than ninety percent, in DERA go into the IRP program. It is DOD's contention that the number of sites has leveled off because the "discovery" phase has probably found most of the sites necessitating the addition of only a very few each year. Discovery was the least expensive part of the program. In the early years of the program sites were added very quickly, but budget increases were smaller. Now, DOD is moving more and more of its sites into RI/FS and RD/RA phases which are considerably more expensive. It is reasonable, DOD says, to expect appropriations to increase to reflect this new phase of the IRP.

Until FY 1993, funding was appropriated at very nearly the level of DOD's request. That year, however, the initial DERA appropriation of \$1.2 billion represented a figure \$313 million less than DOD had requested. The FY 1994 appropriation of \$2 billion is \$347 million less than the request.

It does appear that Congress is beginning to make some cuts in DERA funding. Hearings before a variety of appropriations committees indicate that Congress is not satisfied with IRP's progress in actually remediating sites and in the past two years, there has been concern voiced that too much is being spent on environment by the Pentagon putting the national security at risk. DERA saw large increases in funding during two Republican administrations which put less emphasis on environmental matters. It will be interesting to continue to track

funding for this program during an Administration that has made the environment one of its key concerns.

Table 6.1
Comparison IRP Sites and DERA Funding

Fiscal Year	IRP Sites		DERA Funding (\$ million)	
	Number	% change	Funding	% change
1992	18,795	+6%	1562.4	+32%
1991	17,660	+1%	1065.0	+44%
1990	17,482	+17%	601.1	+16%
1989	14,401	+77%	502.2	+20%
1988	8,139	+57%	404.0	+7%
1987	5,165	+46%	377.2	+4%
1986	3,526	-----	360.6	-----

The levels of all kinds of resources have a direct impact on the communication variable, particularly in the case of the IRP implementation. As Kanter (1979) has pointed out, DOD is acutely aware of its budget position. If the Department perceives that it is receiving adequate funding for the IRP, then policymakers are also communicating the importance of the program, and in some respects, their approval of the program as it is implemented by DOD.

While it is possible for resources to have an impact on bureaucratic structure, the impact in this particular instance appears to have been indirect. The additional resources that became available to DOD through DERA are not available to fund additional positions, but must be used for cleanup.

Resources are also likely to have an indirect impact on disposition. An implementor who has adequate resources to implement a program is much more

likely to be favorably disposed toward the task. However, an implementor who has strong feelings about a particular policy and its implementation is not likely to change disposition either because of adequate resources or a lack of resources. In this case, both Congress and DOD agree that the program has been adequately funded, at least until the past two fiscal years. However, the funding available has not had a great enough impact upon implementors to affect significant changes in dispositions toward the policy.

Bureaucratic Structure

There have been researchers who believe that the more points of decision there are within a bureaucracy, the more difficult it is to successfully implement policy. Again, this case offers a slight variation on the bureaucratic structure variable because there are several structures working at the same time. There is the internal structure of EPA, both at the headquarters and regional levels. There is the internal structure of DOD, each of the service branches, and individual installations. None of the structures really mesh particularly well and there is a constant battle for supremacy, particularly between DOD and EPA. But, as confusing as it is for the outsider, the bureaucracy at DOD and the service branches has been in place for a long time, and seems to work relatively well.

Bureaucratic structure has a direct influence on the communication variable. When there are complex structures with which to deal, it is difficult to be certain that the proper communication is being sent and received. Both GAO (1985b) and the DOD IG (1990) have found that communication, even within service branches, regarding the IRP has been faulty.

There is also a direct link between bureaucratic structure and disposition in this case. When officials at higher levels of the bureaucracy have been favorably disposed toward the IRP, those below them also appeared to have a more favorable disposition toward the program. This may be especially true in the service branches simply because of the military chain of command and the duty to obey commands.

Edwards (1980) has pointed out that bureaucracies tend to recruit and retain those individuals who fit the agency personality. Again, this is particularly true in the case of DOD. Often, civilian officials at the Pentagon are retired military personnel. DOD is making an effort to keep individuals who "fit the model" through a scholarship and fellowship program that enables individuals to qualify to work in the field of environmental restoration. The program gives preference to current and former DOD employees, current or former members of armed forces or current or former employees of DOD contractors.

Communication

The communication variable has an important and direct impact on disposition. The variable itself is impacted by the policy, by resources and the bureaucratic structure. Problems with communication from one level the service branches to lower levels have been documented in studies conducted by GAO (1985b) and by the DOD IG (1990). There have also been well documented problems with communications between EPA and the Pentagon regarding the goal of the policy. There have also been communication problems between individual installations and members of affected communities. There have been instances in which DOD officials elected to use "national security" as a reason to

withhold information about the hazardous waste threats posed by individual installations.

Communication often has an indirect impact on the policy. When implementors are unable to understand the intent of a policy, they may adapt it to fit their own needs or interpretation. In some cases, communicating that back to the policymakers can result in policy modifications. It also has the potential to increase friction between policymakers and policy implementors. That has often been the case in the DERP and IRP implementation. DOD, Congress and EPA have somewhat differing interpretations and goals. The friction can often be seen in testimony involving Pentagon officials before oversight committees.

The policy, as has been said frequently, is not clear, there have been inconsistent messages regarding the policy from Congress, and there seems to be little recognition of the inability to communicate policy intent clearly. But not all the communications problems lie with policymakers. DOD has also managed some miscommunication of its own.

The best examples of this are seen in the DERP Annual Report to Congress. The report, required by SARA, gives the progress of the program over the past fiscal year. Each year there is a section showing the program status by military service. In Fiscal Years 1989, 1990, 1991 and 1992 this program status was not reported using the same categories two years in a row. The one consistently named and reported category is "Number of Sites." A category called "Number of Active Sites" was reported in FY 1992 and 1991. A category called "Response Complete" in FY 1992 had been "Closed Out" the previous year. In FY 1990 that same category was reported as "Sites Requiring No Further Action" and in FY 1989 was not reported at all. In the FY 1992 report, DOD added a fourth, new category "Site Close-Out." In the years prior to FY 1989, reporting was even less formalized. It has been a difficult task to track

the progress of the program from one year to the next using this data. But, by being able to shift categories, rename them, or delete them altogether, DOD is able to communicate whatever it needs for a particular situation by being the entity in control of the data.

A similar situation is found when trying to determine what the DERA budget is from one year to the next. The annual reports to Congress do report a budget figure, but trying to reconcile that number with one of several that can be obtained from the federal budget, or in reports from appropriations committees is an impossible task. Another factor that makes it difficult to determine funding levels is the number of accounts within service branches that receive DERA money. Again, however, it does offer DOD officials the option of using whatever budget number best suits their purpose. This is not to imply that the reporting is done with any sinister motives in mind, but it does make communication between DOD, the Congress and the public more challenging than is necessary.

Disposition

In the case of DOD's implementation of DERP and IRP, disposition is the funnel through which all other variables are filtered. The policy which CERCLA/SARA represents is certainly not one which falls into Edwards' (1980) "zone of indifference." Officials throughout DOD have strong feelings about the policy. The most often voiced concern is to what extent DOD is subject to environmental laws. Pentagon officials have strong feelings about how broad DOD's authority should be in remediation efforts, whether they really are subject to public participation requirements, and whether or not the state in which an installation is located really has any business telling DOD how to cleanup there.

It has not difficult to detect an almost defiant attitude on the part of Pentagon officials who are called upon to testify before oversight committees. Base commanders have made public statements concerning what is and is not the responsibility of the Department in regard to the environment. On the other hand, there have also been real efforts on the part of DOD to take on its environmental responsibility more enthusiastically over the past several years. DOD's efforts to appear more enthusiastic about environmental issues are evident in its large and diverse program. In addition to those activities undertaken by IRP, DOD has also established scholarship and fellowship funds in environmental restoration, made provisions for a grant program to higher education institutions for education and training in environmental restoration, the Army has a large grant program in for basic and applied environmental research. Section 120 calls for DOD to be active in research and development in the environmental field, and so, in some respects, these programs are also part of meeting the goals of CERCLA/SARA. While these programs are not particularly large in terms of budgets (\$7 million in scholarship funds, \$3 million in support to higher education and \$10 million for research), they still provide the opportunity for DOD to maintain control over some funds that might otherwise be lost to other agencies.

Implementation

Although the implementation of a policy is the ultimate goal, it does not signal the end of the process. As the policy is implemented, it is likely that implementors will find that the policy, to really be effective, must be changed. The feedback loop from implementation can effect changes in the policy itself or a more indirect feedback loop would go back to communication and from there to

environmental factors. The loop back to environmental factors would occur in those cases where implementation has a direct impact on the social, political or economic factors that started the process. It is also possible that implementing actors and interest groups impacted by the policy become allied and demand other policies, or changes to the original policy to more adequately serve their needs.

At this point in the implementation of DERP, it does not appear that the feedback loop has been effective in drastically altering the policy or in changing environmental conditions. DOD officials and members of Congress have expressed concern that the Department only appears to take an interest in changes in the statute after they have been passed. If DOD officials decide to be more proactive in the next CERCLA reauthorization, they may be able to include policy changes that will directly impact how DERP and the IRP are implemented in the future. Although the feedback loops in DOD's DERP implementation are not yet well formed, it is likely that during the next reauthorization of CERCLA, DOD will try to use the feedback loops more to influence the new legislation.

Policy Recommendations

Every policy undergoes some change during the implementation process. Policymakers are usually not able to anticipate problems which may arise during implementation, conditions leading to the original policy are likely to change, conditions within the implementing agency can lead to changes in the program. The implementation of CERCLA/SARA and DERP/IRP has been criticized frequently and nearly everyone has a plan that they believe will better serve the

purpose of protecting human health and the environment. While this study has not been for the purpose of redesigning the policy, the broad overview that it took does allow for some broad policy recommendations. Since each of the variables affecting implementation has been the source of some problems, recommendations will be made in each of those categories.

Policy

When CERCLA was written, Congress believed that it could pass legislation that would allow for quick remediation of inactive hazardous waste disposal sites. The experience gained in writing RCRA was supposed to have eliminated many problems CERCLA might encounter. That has not proven to be accurate. CERCLA has been just as confusing and complex as RCRA. Regulation was slow in being promulgated. The NCP is a massive document, and Subtitle K for federal facilities is still being written, six years after EPA said that it would be completed as quickly as possible (53 Fed. Reg. 51396).

CERCLA does not have its own specific set of cleanup standards, but instead makes use of ARARs from other environmental statutes, or negotiated standards may be used. After reauthorization the question of "how clean is clean" became a major obstacle for cleanups in both the private and public sector.

The next reauthorization of CERCLA should contain performance standards that allow individual cleanups to be negotiated to protect human health and the environment. Design standards are likely to continue to make CERCLA more dependent on process than on intent, which has been a major criticism of CERCLA. Performance standards require that the intent of the policy be met, but allows individual remediations to be tailored to the situation at hand.

Resources

Funding for DOD's IRP in the past has been regarded by most, even in DOD, as sufficient. There are indications that the funding may begin to experience some decreases, or flat-funding in the future. As more cleanups at DOD move into the RD/RA phase, it may very well be necessary to take more aggressive steps to develop a prioritization system to fund these projects. DPM has been developed and has undergone refinement over the past three years for the purpose of prioritization of projects under conditions of funding shortfalls. However, DPM prioritization is done on a service by service basis. That results in three sets of priorities. As funding shortfalls become a limiting factor in cleanup projects, a single set of priorities will be essential to meeting the performance standard of protecting human health and the environment.

The resource that has been more of a problem for DOD has been personnel. To be involved in the environmental field at DOD has not been attractive to either career military members or civilians employed by DOD. There are steps being taken in all the services to ensure that career advancement and pay scales for those individuals working in the environmental field in DOD are comparable to other specialities (Congress, House of Representatives, 1991c).

Another personnel related problem has been that DOD has not had the internal capacity to conduct most of the work associated with these cleanups "in house." It would be to DOD's advantage to have a centrally operated group, not attached to any particular service branch, that is able to do site investigations, implement sampling plans, and do other sorts of "routine" work at a variety of sites. Developing strong in house capabilities would allow DOD to reduce the

amount of work it must put out on contract and it would be able to spend more money on work that would lead to actually remediating sites.

Bureaucratic Structure

This variable is least likely to see any changes. The separate structure of the service branches is statutorily controlled. Ideally, DOD would make environmental restoration an activity that was centrally controlled, implemented and funded. Because of the importance of budgets to each of the services, however, this is not likely to occur.

Communication

A very big problem associated with this variable is that Congress and EPA have said that DOD and all the federal agencies, are to be treated in the same manner as any other entity involved in a Superfund cleanup. However, federal entities are not treated the same. There are, for example, different requirements for federal facilities, the listing policy is different for federal facilities. The way to correct this is simply to acknowledge that there are differences between federal facilities, especially those operated by DOD and DOE, and private sector NPL sites. Federal agencies should, of course, be held to the same performance standard in the remediation as a private entity.

The RCRA/CERCLA/NEPA integration matter should also be addressed. These statutes all have the same basic purpose, to protect human health and the environment, but each covers a slightly different segment of the problem. Until the overlap that occurs with these statutes is settled, DOD installations will be faced with the possibility of conducting the same cleanup project more than

once to satisfy the requirements of more than one statute. There will be overlapping requirements for citizen participation, public hearings, administrative records and other document reviews that serve mainly to escalate costs and slow progress.

Another of the communications problems to be addressed is the reporting by DOD of DERP/IRP progress. The Annual Reports to Congress are inconsistent and misleading. Also, because of the emphasis placed on "bean counting" by the statute, Congress, the public and DOD, there is the problem of breaking sites into a number of operable units more to increase the number of operations going on than to serve the remediation process. If a performance standard were put into place, the measure of program success would be when the exposed population experienced a significantly reduced risk from these sites.

Disposition

The attitude of an agency toward a policy is not something that can be legislated. No matter how well a policy is communicated and funded, no matter how conducive the bureaucratic structure is to its implementation, if an agency is not favorably disposed toward the policy, implementation will be difficult. As more military and civilian personnel at DOD receive early training in environmental matters and as older personnel, who are less inclined toward environmental matters, retire, there is reason to believe that DOD's disposition will change.

Conclusion

The remediation of environmental hazards may be among the most technically difficult undertakings facing us for the next several decades. Sadly, these projects might very well not be undertaken at all if statutory requirements did not exist. Unfortunately, the statutes are written in a political arena and the compromise and negotiation required to ensure passage often result in statutes that do not convey the clear intent of the policy. CERCLA is a statute that was written with the intent of cleaning up hazardous waste disposal sites that were no longer in use and so were not subject to requirements of other environmental laws such as RCRA. The policy has not been clearly conveyed to implementing agencies.

Although DOD began to identify those sites on its installations that might have been used for disposal as early as 1975, its efforts were superficial until SARA required federal facilities to comply with CERCLA in 1986. Like most of the projects DOD takes on, DERP and IRP have become large, expensive programs that have been the subject of congressional and public scrutiny. In an attempt to show how environmentally concerned it has become, DOD has started to involve itself not only in remediation, but in research and development and education. But even all this may have backfired. The program has been characterized in Congress as "100 miles wide and six inches deep" (Congress, House of Representatives, 1991: 335). And that could be a very large part of the problem with the IRP. It may simply be trying to do too much. The IRP would better serve the environment if it actually served as the cleanup program for sites, not installations, on the NPL. IRP currently covers 18,795 sites on 1800 installations. There are more than 10,000 active sites that the IRP has

responsibility for characterizing and possibly remediating. It is an enormous undertaking.

Implementation, under the best of circumstances, is difficult. It is subject to a number of variables, some internal to the implementing agency and some of which are outside its control. DOD's implementation of DERP is a case in point. Although DOD was not in the business of environmental protection, it took on its own environmental remediation program. Given the obstacles with the mandating statute, the Department has managed to do a credible, if not outstanding, job. Much of the criticism leveled against the DOD program is not unlike criticism of the Superfund program in general and private sector NPL cleanups. What makes DOD's program different is that it is done with the taxpayers' money and so it has an obligation, not only to conduct cleanups that protect human health and the environment, but that also make wise use of the public treasury.

By examining the implementation of this, or any program, throughout the process, it is possible to determine at which points there are problems and to correct them. After making a broad-based examination of the implementation of the DOD DERP and IRP, it is apparent that the program has not met all the expectations of policymakers, but it a program with some modification has been implemented and is functioning in a manner that does meet some of the intent of CERCLA. The inability to implement a program that meets the intention of Congress and the public is not solely the fault of DOD, but is the result of a number of factors both within the Department and external to it.

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