Conclusion

One purpose of part I of this book was to explain the strategic regulatory plan for the implementation of the UST provisions of HSWA. The Introduction and chapter 1 discussed at length the problems of policy formulation, the tendency of separating policy formulation from implementation, and why policymaking is rarely strategic. Chapter 2 outlined a seven-step model for the development of a strategic regulatory plan: (1) problem recognition, (2) identification of parties, (3) historical analysis, (4) situational analysis, (5) strategic regulation formulation, (6) ex ante review, and (7) ex post review/revision. Chapter 3 expanded on the most significant component of the model, strategic regulation formulation, by introducing a conceptual framework for selecting regulatory devices. Based on the conditions in the regulated community, regulating agency, and outside arena, regulatory devices were thought to occupy varying positions on cost and coercion continua. Different rates of compliance would be achieved depending on which devices were chosen and the overall government effort. Chapter 4 analyzed the strengths and weaknesses of alternative regulatory mechanisms, particularly with respect to the management of USTs. From the start, the long-range objective of the model was the development of a program to achieve a high rate of compliance and improved environmental quality.

Part II applied each step of the strategic regulatory planning model to the MTBE problem. In an effort to explain the emergence of nonstrategic regulatory planning, chapters 5 to 7 examined the reformulated gasoline (RFG) requirements mandated by the 1990 Clean Air Act. Using MTBE contamination as a primary unintended consequence, it was suggested that even science-based policy can be problematic if broader

strategic objectives are not clearly understood. Chapter 5 examined the environmental impacts of MTBE in gasoline and its prevalence as a groundwater pollutant. Chapter 6 explored the RFG provisions of the Clean Air Act in an effort to determine why strategic failures occurred. The failures we identified included bureaucratic insulation between regulators working on air quality and regulators working on water quality, a failure to assess the discrete impacts of introducing MTBE into the environment, resistance to emerging evidence of MTBE contamination, and confusing the unique chemical properties of MTBE contamination with the traditional problem of leaking underground storage tanks. Finally, chapter 7 analyzed how the MTBE problem might have been avoided had policymakers followed the strategic regulatory planning model introduced in this study. The strategic model would have permitted regulators to respond more effectively to the MTBE problem as a national concern. The model would have assisted in defining the MTBE problem comprehensively, mitigating MTBE contamination while preserving air quality benefits. In addition, considering the initial 1991 regulatory negotiation that framed the regulatory process, a collaborative process could have been established to work through the strategic response. Finally, the process should work toward the development of a national program that fully accommodates the successes that have occurred across the many affected states.

Part III applied each step of the model to the UST problem. In order to comprehend fully how the different steps of the model were applied, chapter 8 executed steps 1 through 4, in essence, the background work needed to design an effective program for regulating underground tanks. The seriousness and general dynamics of the UST problem were pointed out in this part of the study. Chapter 9 then applied the fifth and sixth phases of the model. Within this context, the framework for the selection of specific regulatory mechanisms (from chapter 3) and the evaluation of various regulatory devices (in chapter 4) were followed. The ex ante review highlighted several potential problems that could hinder the effectiveness of the overall strategic regulatory plan. Step 7, the ex post review/revision stage of the model, was carried out in chapter 10. Based on data collected thus far, the UST program has been a significant influence on the behavior of target groups and must be considered successful.

This chapter ties together several loose ends and offers an analysis of the MTBE and underground tank cases. It begins by discussing a number of general principles of strategic regulatory planning and then assesses the MTBE issue. The study then reviews and evaluates the components of the UST regulatory program, with particular attention paid to the use of liability insurance. This is followed by the limitations of the study and its potential application to other policy areas. Finally, the value of adopting a design perspective in the development of public policy is discussed.

Strategic Regulatory Planning

The strategic approach to policy formulation and implementation, as explained in this study, leads directly to a set of identifiable steps for government officials to follow in structuring effective regulatory programs. The strategic approach places a heavy emphasis on the motivation, resources, and interdependencies among affected parties. In addition, it requires close examination and comprehension of regulatory goals and objectives as set forth by a legislative or other governmental body. In the best-case scenario, substantial interaction occurs between those who are writing laws and those who must execute them. All too frequently, however, this does not happen. The model presented in this study seeks to fit the selected regulatory plan with both the environment from which it is authorized or enforced and the environment from which compliance must result. Only by creating the best possible fit between the plan and these environments can the behavior of the target group be modified most efficiently and effectively and at the least cost.

If this is to be accomplished, policymakers must educate themselves about the dynamics of the regulatory issue in question. It is critical, for example, that policymakers closely research the characteristics of the target group involved, as well as the relevant social, economic, and political circumstances that surround the daily activities of the target group. The conditions in the regulatory agency also deserve careful consideration. Full knowledge of the strengths and weaknesses of available regulatory mechanisms can help avoid costly mistakes and delays in the long run.

In this case, policymakers must determine at the outset how much compliance is required to lead to improved environmental quality. The

setting of compliance objectives at different points in time before the plan has been implemented can provide benchmarks for later policy evaluation and modification. Failure to reach predetermined compliance goals can be used by agency officials to justify requests for additional resources or legislation to increase compliance rates.[1]

These requirements for strategic regulatory planning underscore the need to obtain the most accurate data and information available on critical variables. Admittedly, it is difficult to project, for example, what type of technology is likely to be developed in response to regulatory requirements or how many marginal businesses will be forced out of existence by a particular rule. Often it is difficult to measure and understand certain variables. However, policymakers ought to be encouraged to estimate as accurately as possible the impact of key factors on the regulatory process and compliance. Although regulatory impact analyses (RIAs) require the federal government to assess the economic benefits and costs of regulations, they do not provide an assessment of the probability of compliance. Policymakers need to assess the capability of regulated parties to comply and should identify the positive and negative incentives that will be needed to motivate compliant behavior. They should also identify the resources and institutional capability that is needed to generate and deploy these incentives. Some policymakers assume that as long as a rule is formally promulgated and a few violators are punished, compliance will automatically follow. This is not the case most of the time.

This study is not advocating massive data collection efforts. Rather, it is urging that policymakers develop meaningful links to the real world and methods of measuring the impact of their policies on that world. Modest record keeping and the maintenance of realistic program indicators are critical in tracking program progress. Management should travel to the regulated sites and talk to people who have suffered from negative environmental impacts as part of this process. The real world may be summarized in a spreadsheet, but its full dimensions are best perceived firsthand.

Management information systems must be augmented by direct exposure to the regulatory environment. Admittedly, uncertainty increases as the issue becomes more complex.[2] An aim of strategic planning is to

reduce uncertainty as much as humanly possible and thereby escape major long-term errors. However, neither people nor institutions learn without making mistakes. The purpose of small-scale pilot projects and crafting strategies is to learn from small mistakes as soon as possible, and thus avoid making serious errors later. To be sure, the federal government spends millions of dollars on testing new military equipment for exactly this reason. It also makes sense to experiment with different approaches in the areas of social and environmental regulation.

One of the most significant characteristics of strategic regulatory planning is that it is a dynamic, tactical, and evolutionary process. The evolutionary nature of the approach, where improvement over previous actions is desired, will require policymakers to return to the model on many occasions. The structure of the model is simple and flexible enough to permit this activity until compliance goals are fulfilled. Despite careful preparation, however, problems are bound to arise during implementation. A well-coordinated but modest evaluation and feedback system, once in place, can help temper the negative impact of unforeseen difficulties and can lead to reasonably quick modifications in program design. Multiple but moderate efforts at data and information gathering therefore remain a crucial and ongoing exercise throughout the life of the regulatory program.

Strategic regulatory planning can be likened to coaching a football team. At the college and professional levels, successful coaches prepare extensively for each game. Offensive and defensive players learn the tendencies of the opposing team based on past records, scouting reports, and films of previous games. A game plan is formulated to take full advantage of the strengths of the coach's team and the weaknesses of the opposing team. Similar to chess, tactics and plays are decided on ahead of time. Once the game begins, substantial and rapid adjustments are made to counter unforeseen behavior. Regardless of whether the team wins or loses, further study and additional modifications are made before the next game and during the course of the season.

In both football and regulatory policymaking, improvement is continuously sought. Several vantages are used to make midcourse corrections during the game itself. Coaches in the press box high above the field of play observe patterns of behavior on the field and communicate

their observations to the head coach on the sideline. Reports from players on the field on what is working and not working are factored into play selection. Different approaches are attempted to test the reaction of the opposition. As in football, the strategic regulatory approach requires policymakers to design comprehensive game plans, replete with well-thought-out tactical options, prior to taking the field. However, these plans must be flexible enough to allow for prompt responses to changing conditions.

The perspective taken in strategic regulatory planning runs counter to some of the tenets of incremental policymaking. In contrast to incremental policymaking, strategic regulatory planning necessitates the collection of substantial amounts of data and information regarding the circumstances surrounding a given issue. Rather than being disjointed and remedial, strategic regulatory planning emphasizes rapid institutional learning. Lessons learned are factored into policymaking as rapidly as possible. In a sense, incrementalism is the operation of cybernetic mechanisms until they fail. Strategic planning is the search for new cybernetic mechanisms and new standard operating procedures before they fail. Small-scale experiments are tried in the hope of replacing old standard operating procedures with new, more effective ones. It is not remedial; rather than trying to remedy failures after they occur, an attempt is made to head off expected failures before they occur. The process is characterized by continuous feedback, evaluation, and correction, with progress (i.e., increased compliance) as the objective. In this sense, policymakers are urged to set realistic goals and attempt to build slowly effective ways of reaching those goals. They are encouraged to move toward solutions rather than away from problems, but are not encouraged to believe that a single master plan can ever be used to accomplish a broad aim. The literature and practice of urban planning rejected comprehensive planning because the results were typically large-scale, inhumane housing projects and superhighways that destroyed communities. Yet planning and goal-seeking behavior can take place within the fabric of an organic entity. A series of well-thought-through, small-scale developments can create a city of beauty and human scale. It is therefore possible to take small steps in the direction of predetermined goals, and that is precisely what strategic regulatory planning is designed to do.

In summary, strategic planning requires policymakers to take a tactical approach in developing regulatory programs and to link policy formulation with implementation. They are encouraged to study the entire playing field carefully before deciding on a course of action. The crafting of good public policies necessitates consideration of all facets of the problem without prejudice. Thus, strategic regulatory planning incorporates positive aspects of rational policymaking and incrementalism. The model introduced in this study, while far from being perfect, encourages policymakers to do exactly that.

Employing Outside Organizations

As demonstrated in this study, the involvement of neutral, outside organizations can greatly enhance the strategic planning process.[3] In 1984, the National Academy of Public Administration (NAPA), working closely with EPA, was able to assemble an outstanding panel of professionals and skilled research staff to analyze objectively the various aspects of the UST problem and offer a comprehensive plan. The influence of ideology, individual power brokers, and interest groups, normally substantial in incremental decision making, was kept at a minimum. Deliberations were generally smooth and productive, leading to key insights and prudent policy decisions. When examining EPA's behavior in the MTBE case, one is struck by the narrowness of the perspective taken and the need to listen to outside voices and beyond the beltway analysis.

Some might find fault with employing outside research bodies to craft public policy for the government. One could argue, for example, that the extensive use of research organizations in policymaking is an elitist attempt to circumvent the will of the people.[4] After all, members of these organizations are not elected by the public or appointed to their positions by elected officials. The model outlined in this study, however, encourages policymakers to seek the views of all concerned parties and to consider them in the formulation of a regulatory program. As this study maintains, public support is essential in achieving compliance with UST regulations. It is no less an issue in MTBE regulation. This will frequently be the case in other areas as well.

MTBE Regulation

One of the criticisms commonly heard about EPA is that its medium-specific orientation results in stovepipe thinking that focuses on a single issue to an extreme degree. However, EPA is not simply organized by environmental media. It is also organized geographically, with most of its staff in regional offices. It also includes functional units in enforcement, international affairs, and policy analysis—to name only a few of these nonmedia offices. Still, the agency's success has been built on its ability to focus narrowly on specific sources of pollution and specific targets of pollution such as air, land, and water. The MTBE problem is a classic case of cross-media environmental pollution. A solution to an air pollution problem is the cause of a water pollution problem. In essence, the organizations concerned about protecting groundwater from EPA's Office of Water or from its underground tank office need to deal with an environmental problem that resulted from the actions of another unit of EPA.

Like a drug with untested side effects, one wonders if the cure is worse than the disease. Is MTBE the wrong way to reduce air pollution? Probably so, which raises the questions: What steps could EPA have taken to learn this before allowing MTBE to be added to gasoline? Is the only mechanism the incremental one of waiting until a problem is created for another part of the agency and trust that it will react if the problem becomes serious? Obviously, this study is based on the premise that strategic planning might have prevented the emergence of this problem. Moreover, with the problem identified, strategic thinking could allow policymakers to address this issue and develop a program to protect the nation's air and groundwater simultaneously, while allowing people to continue to drive their SUVs to the market.

It is difficult to know whether MTBE contamination could have been anticipated by a strategic planning process, but it is clear that MTBE policy was developed without the benefit of strategic thinking. It was a policy formulation process dominated by interest group politics and characterized by large-scale adoption of a new technology without the benefit of pilot-testing. At this point, the regulatory process requires the development of a substitute for MTBE. The search for this substitute and

an approach to implementing this policy could benefit from a strategic planning process similar to the one developed for leaking underground storage tanks in the mid–1980s.

The Difficulty of Regulating Successfully

Clearly, it is difficult to regulate successfully 100 percent of the time. Several factors affect the ability of regulators to mitigate fully specified problems to the extent statutory goals and objectives might suggest. The regulatory process itself becomes a factor. This, in no small part, is influenced by the separate roles played by Congress and implementing agencies within the executive branch. Congress creates enabling legislation, which provides the statutory framework for problem solving—thereby establishing mandates, standards, and time lines—and assigns implementation authority to a relevant executive agency. Only then do implementing agencies initiate promulgation of regulations. Thus, from the start, implementing officials are hamstrung. Statutory requirements and expectations are often insulated from the realities that implementing officials face on the ground. While most would acknowledge the competitive interest-based bargaining that occurs during the legislative process, a similar process of competing interest-based lobbying takes place during implementation. Chapter 5 discusses the interest-based lobbying and negotiation during the initial implementation of the oxyfuel and reformulated gasoline (RFG) programs.

The public policy literature identifies several factors affecting regulatory success. Information asymmetry is a major problem in technical areas of regulation. The more complex a problem is, the more information is segmented among stakeholders, scientists, and regulators. The different levels of knowledge that may be held by regulatory participants will often result in improper assumptions about the utility of any particular policy tool or in ignorance about a policy tool's negative consequences. The MTBE case study illustrates this well. The support of the National Resources Defense Council and other environmental groups during the RFG regulation negotiation could occur only as a result of their limited knowledge of MTBE's potential for polluting aquifers. In addition, if knowledge is segmented (meaning that no one regulatory

participant possesses all of the available knowledge), gaps in alignment between regulatory tools and specified problems will necessarily occur. The broad consensus that MTBE was a win-win solution in early 1991, and the late validation that MTBE was indeed a serious problem, could occur only as a result of the unequal and segmented knowledge that was present in regulatory discussions. EPA's units on air pollution and water pollution had different information, which, if combined, would have brought regulators in the agency to different conclusions.

Successful mitigation assumes target equipment or behavior can be regulated under existing statute. The early UST regulatory framework, for example, had limited legislative authority. Chapter 8 discusses EPA's early attempts to mitigate leaking USTs, an effort hampered by a lack of jurisdiction. Prior to 1984, federal legislation did not allow adequate regulation of USTs. The Resource Conservation and Recovery Act (RCRA) regulates tanks that contain hazardous wastes but not tanks with petroleum or hazardous products. The Clean Water Act requires owners of very large underground tanks (those with a capacity greater than 42,000 gallons) to take certain measures to prevent corrosion and to test tanks periodically. This requirement, however, applies only to tanks that may serve as a direct source of pollution into navigable waters. Since underground containers generally damage groundwater and affect only surface water as a nonpoint source of pollution, the Clean Water Act has not been used to regulate most of them.

The Superfund legislation authorizes EPA to respond whenever hazardous substances are released into the environment. The law has not been used to respond to leaks from oil tanks because petroleum is not defined as a hazardous substance under the act. In addition, Superfund has not been used to prevent most leaks or to set tank standards since its primary function is environmental cleanup. The Safe Drinking Water Act of 1974 ensures that contaminants entering public water systems do not endanger human health. EPA has set maximum levels for contaminants in drinking water, but such standards pertain to tank leaks only when drinking water is directly affected.

After several attempts to rectify the statutory limitations of existing programs, Congress passed the Hazardous and Solid Waste Amendments (HSWA) in November 1984 to regulate USTs. In the decades since, there

has been a gradual process of developing and implementing more effective tank regulations. HSWA required EPA to set standards for new tank design and installation, leak detection, spill control, leak cleanup, and tank closure. In addition, the Leaking Underground Storage Tank Trust Fund provided federal resources to clean up leaks when tank owners refused to act and provided funds for the cleanup of abandoned tanks when owners could not be identified.

Alternate Explanations for Regulatory Failure

The regulatory failures illustrated by MTBE include bureaucratic insulation between regulators working on air quality and regulators working on water quality, a failure to assess the discrete impacts of introducing MTBE into the environment, resistance to emerging evidence of MTBE contamination, and confusing the unique chemical properties of MTBE contamination with the traditional problem of leaking underground storage tanks. These regulatory failures are due in large measure to a lack of strategic regulatory planning. Other possible explanations also exist and deserve consideration. Common explanations of the failures of effective policymaking might include, for example, interest-based bargaining and the resulting incrementalist tendencies of American democracy, the cultural baggage that is brought into the regulatory process, the conflation of public policy with economic markets, and, finally, the inherent limitations of policy designs.

Lindblom suggests that the pressure wrought by interest-based politicking constrains policymakers at both the legislative and regulatory levels to make small, incremental (branch) adjustments in policy rather than creative, bold, rational (root) realignments in our approach to problem solving.[5] The UST experience, like so many others, illustrates the point. Industry stakeholders targeted for regulation in the early 1980s argued intensively that not enough was known about the relationship between leaking tanks and groundwater contamination to warrant the immediate development of regulations. These stakeholders (e.g., the American Petroleum Institute and the Steel Tank Institute) formed a vocal ad hoc tank coalition that lobbied heavily and testified at congressional hearings that the problem needed further study before

Congress continued. Their objections, compounded by battles surrounding Superfund reauthorization and RCRA amendments for underground tank regulations, stalled the progress of the legislation.

Other studies suggest that American political culture creates a discomfort with regulating behavior and a preference instead for technical fixes.[6] In the early 1990s MTBE appeared to provide a virtually perfect fit for a technical fix that satisfied all major stakeholders, creating tremendous momentum. The culture of "better living through chemistry"[7] and "technology will rescue us" is consistent with incrementalism in providing an avenue of least resistance, allowing current behaviors to continue as we explore emerging and over-the-horizon technologies. Economists suggest that this dynamic is efficient to the extent it allows market-based solutions to respond to many problems the nation experiences.[8] However, when the problem itself is a result of market failure, policymakers often wait too long to intervene, making mitigation that much more difficult down the road.

Finally, policy design itself may be a factor in regulatory failure. Schneider and Ingram and DeLeon suggest that the structure and design of contemporary public policy discourages active citizen participation.[9] If pluralism is the self-correction that democratic policy environments rely on, then more participation enhances the likelihood of policy success. The regulatory failure surrounding MTBE was not a classic example of minimizing participation. In fact, the 1991 RFG regulation negotiation could be seen as a success in bringing different stakeholders together. However, as chapter 6 points out, the regulatory momentum resulting from the reg-neg consensus made it extraordinarily difficult for critical voices to be heard as the negative impacts of MTBE emerged.

Regulatory policy is always made in an environment of imperfect knowledge. The goal of strategic regulatory planning is to reduce that imperfection as much as possible. The strategic regulatory planning model would have allowed regulators to respond more effectively to the MTBE problem as it emerged as a national concern. The model may have allowed a more complex understanding of the MTBE problem, mitigating MTBE contamination while preserving air quality. The alternate explanations above are not mutually exclusive scenarios; each may have played a role to a greater or lesser extent. Nonetheless, whether the

absence of strategic regulatory planning is the primary cause of MTBE regulatory failure, a robust strategic approach would have caught the problem of MTBE contamination much earlier in the process. This would have changed the dynamic of the 1991 RFG regulatory negotiation substantially, slowing—if not halting entirely—the momentum toward MTBE adoption. In short, regulatory strategic planning, while not a silver bullet, is an important tool in the regulatory toolbox.

Finally, strategic regulatory planning is generalizable to other areas that require integrating science and policy. Any policy area that requires a meaningful linkage between complex technical data and regulatory processes would benefit from a strategic regulatory approach. This is especially true in policy domains where accurate risk analysis is essential.[10] The strategic regulatory planning process allows better control of complex data through a formal alignment between data and regulatory goals and objectives early in the regulatory process. Such a process enhances the likelihood of building consensus among diverse stakeholders through a narrowing of the universe of acceptable policy options. In short, it creates an opportunity for collaboration between regulators and target constituencies due to the increased clarity of an evidence-based approach.

The UST Regulatory Program

Throughout the construction of the strategic regulatory plan to control leaking USTs, policymakers kept in mind the size and diversity of the target group. They also remained cognizant of the deeply seated, anti-regulatory attitudes and the tight operating budgets common among small businesses. For the most part, EPA in the mid-1980s was unprepared to regulate such a population, primarily because the agency had few previous experiences dealing with small firms. From EPA's inception in 1970 until the mid-1980s, large corporations had received most of the agency's attention. Political concerns, limited funds, and personnel complicated attempts to develop a successful regulatory program. These factors forced EPA and NAPA planners to be inventive and somewhat experimental in their approach to resolving the UST problem.

As discussed in this study, induced compliance forms the backbone of the regulatory plan recommended to EPA senior management. From the outset, the planners felt the EPA should eschew employment of traditional direct command-and-control mechanisms and adopt instead a carrot-and-stick approach to persuade gently owners of UST systems to obey the law.[11] Admittedly, the UST problem is perceived by some to be less serious and urgent than other contemporary environmental problems, like climate change or even the cleanup of abandoned toxic waste sites. While this makes it difficult for EPA to justify the appropriation of additional monies for enforcing UST regulations, it provided the agency enough time to implement the plan and make modifications. If the least coercive devices had failed to entice owners of USTs to comply with the law, policymakers could have returned to the model, retraced its steps, and selected more coercive devices. This process could be repeated until a satisfactory level of compliance was reached. Fortunately, as chapter 10 indicated, the strategy succeeded: the leaking tank problem has been substantially reduced over the past two decades.

Various circumstances surrounding the UST issue also led to the recommendation that EPA delegate most of the implementation and enforcement duties to state and local governments. This suggestion is in keeping with policies over the past two decades concerning other environmental problems, and it helped minimize obstacles to implementation associated with federal agency funding, staffing, and intervention. The strategy of delegating the program to the states was not without its faults. The fifty states and numerous local governments tend to differ significantly in the amount of resources they possess.[12] Depending on the politics and personalities involved, motivation to control leaking USTs varied across the country too. Furthermore, like many other environmental problems, USTs have been concentrated in large urban communities, thereby placing the greatest financial burden on these jurisdictions. Still, there has been widespread implementation of the program since its enactment. One reason for this is that most of the dollars spent to clean up leaking tanks and improve tank management was spent by the private sector. This occurred because of fear of liability and regulatory enforcement and out of a general sense that it was simply good management to keep valuable products from spilling into the environment.

Another reason for success is that EPA provided tank owners with the time to absorb the costs of upgrade into normal corporate capital planning. In fact, if anything, EPA bent over backwards to accommodate corporate needs. The program waited fourteen years to issue final regulations in 1998 and only then placed heightened stress on compliance with the regulatory deadline. The 1998 deadline was the one that EPA set as the deadline by which all USTs were to be replaced or provided with proper equipment. In the late 1990s, this deadline was frequently noted by administrators at OUST and by Congress, which had directed EPA to provide a detailed compliance plan.

Liability Insurance

As the planners recommended and Congress later mandated, owners of USTs must demonstrate an ability to finance abatement in the event a serious leak occurs. Since most operators of UST systems have limited financial resources and tank replacement and cleanup can be quite costly, external monetary aid is essential. A critical assumption of policy analysts who support the liability insurance requirement is that firms "have an incentive to cooperate with insurance company inspections and adopt recommendations which are made."[13] In addition, insurance allows policymakers to avoid the disadvantages normally associated with direct command-and-control mechanisms (e.g., increased staffing and higher costs).

The experience with insurance over the past two decades has varied significantly. In the 1980s and 1990s, tank insurance was either unavailable or too expensive. To meet the need for this insurance and allow their tank owners to comply with the law, most states developed state financial assurance funds. In essence, states "sold" tank owners a form of insurance that provided a method to pay the unanticipated costs of leaks and liability from leaking tanks. In the early twenty-first century, some of the state funds depleted their resources. However, there also was the reemergence of private insurance. Insurance companies began to see that the cleanup and liability costs of leaking tanks could be predicted, and therefore insurance could be priced and sold at a profit.

Limitations of the Study

As is always the case in social science research, this study has certain limitations. Perhaps most obvious, this study assessed the use of a strategic regulatory planning model involving only two environmental problems, MTBE contamination and leaking USTs. Exactly to what degree the regulatory programs and problem of MTBE and USTs could be transferable to other policy contexts is uncertain.

Two unique characteristics of the UST problem distinguish it from many other areas of environmental regulation. As already discussed, this was one of the first times that EPA has had to deal with an immense and varied target group. Our other case study, MTBE, involved much the same target group. The economic and political issues central to the MTBE and UST cases are likely to differ from those encountered in the regulation of a small number of large industrial firms. This requires researchers and policymakers to adopt a perspective that is sensitive to the dynamics and intricacies generally associated with the regulation of a large population. A regulatory program designed to modify the behavior of individual members of a large target group is likely to be different from one that primarily focuses on a handful of prominent polluters.

Another distinct feature of the MTBE and UST issues is that a commercial product and not a waste is the central object of regulation. As previously explained, most of America's underground storage tanks are in gasoline stations. MTBE is an additive used in gasoline supplies, and it is in the economic self-interest of those selling gasoline to prevent leaks from occurring. Admittedly, the replacement of old, leaking gasoline tanks is very expensive in the short run, and this may cause some owners to ignore small leaks. Overall, however, the fact that it is a valued consumer good that is the subject of regulation may prove to be a strong incentive.

General Application

Policymakers should find the strategic regulatory planning model developed in this study applicable to many other environmental and policy settings. Although the model contains a definite structure and a series of steps that must be followed in chronological order, little in the approach

restricts its use to specific issues. The drawbacks of incremental policymaking discussed in chapter 1 are present in nearly every policy context. The model attempts to overcome these problems by encouraging policymakers to take a systematic and tactical but modest approach to the development of regulatory programs and to link policy formulation with implementation. In general, the model will be especially useful in addressing complex regulatory issues.

As discussed in the Introduction and chapter 1, policymaking in the United States tends to be done incrementally, and experimentation is generally avoided. Impatience among leaders and the public, the low priority given social regulation, and an intolerance for failure discourage the kind of policy testing necessary for solving many of society's ills. Instead, policymakers choose to play it safe and follow an incremental approach to problem solving. The strategic regulatory planning model developed in this study allowed EPA to adopt a new and experimental approach to managing leaking USTs. The results after nearly two decades, reported in chapter 10, speak for themselves and suggest that much can be gained from experimentation in policymaking. The MTBE case provides evidence of what happens when government develops new policy without thinking strategically.

Policymakers will probably find the strategic planning process helpful in such areas as education, health care, transportation safety, consumer product regulation, and occupational health and safety. These regulatory policy spheres tend to involve large target populations and intricate issues that require careful scrutiny. Although this investigation centered on two related federal environmental issues, state and local governments should also find strategic planning valuable in their work as well. While the model was applied at the start of a new regulatory program, nothing about the model necessarily prevents it from being adopted at any point in a regulatory effort.[14] As Mercer observes, "Strategy formulation and implementation should be a never-ending process of adapting to changing needs and capabilities."[15] It should be noted, of course, that much of the strategy of any public program is already included in its enabling legislation.

What is likely to vary significantly, however, is the applicability of the specific elements of the final UST program. Clearly, public policy problems have different features and often require different solutions. While

insurance might be an appropriate device for controlling leaking USTs, it is hard to see, for example, how it might be used to decrease flight delays by the nation's airlines. Also, some problems, such as sudden spills of toxic chemicals, pose a more immediate and serious threat to the environment and public health than do leaking USTs; undoubtedly, they require swift and direct government intervention. In addition, agencies and individual programs will nearly always vary in available funds and the quantity and quality of personnel. To a large degree, money and personnel dictate what policymakers can and cannot do. The clout of target groups can influence the contents of regulatory programs as well. Attempts to regulate the practice of attorneys and physicians, for example, are likely to receive stiffer and more effective resistance than efforts to regulate the business dealings of less powerful and less organized occupational groups such as gardeners or office messengers. Level of commitment and professional orientation are likely to differ between agencies and across issues. Moreover, outside experts hired to help design a program can have biases against employing certain regulatory approaches (e.g., market mechanisms). Finally, the role and influence of third parties is likely to deviate from one case to the next, thereby producing different solutions to particular problems.

The real contribution of this study is not so much in the specific features of the strategic regulatory approach as it is in the way the approach was applied to the UST program, especially when contrasted to its absence in the MTBE program. Unfortunately, the value of knowing how to design policies has been overlooked until recently. The next section examines the importance of policy design and discusses how such exercises can lead to the formulation of effective public policies.

Policy Design

Cohen and his colleagues argue that policymakers normally take a "garbage can" approach to public policymaking.[16] This approach is characterized by an overreliance on intuition and trial and error, as well as by loose connections between problem recognition, problem analysis, and solution generation. Inputs into the decision are dumped into a "garbage can," and policymakers decide which pieces to retrieve when

it suits them. In such an environment, there is little in the way of coordinated problem solving, and decision making tends to be judgmental and unpredictable. In many cases, this results in the development of misdirected and ineffective public policies. In the field of environmental policy, this is often caused by political and scientific uncertainty. As Bressers and Rosenbaum observe, "Many of the most formidable difficulties confronting environmental policymakers arise from the pervasive interplay of uncertain science and political judgment at virtually every stage of the policy process. So much of the scientific research essential for resolving policy conflict and for crafting appropriate policy is unavailable, ambiguous, or preliminary that scientific judgment frequently becomes highly contingent and tentative, almost inevitably contentious."[17]

In an effort to correct this mode of operation, several researchers have called for increased reliance on policy design. Dryzek defines policy design "as the process of inventing, developing, and fine-tuning a course of action with amelioration of some problem or the achievement of some target in mind."[18] Ingraham adds that it is "a process in which causal links between problem and solution are systematically explored."[19] This suggests that "analytical attention will be directed to cause and effect at an early point in formulation activities, and that it be informed and guided by a broad explanatory framework."[20] In essence, policy design attempts to avoid the capricious manner in which choices are made. Instead, it tries to instill order and intelligence in policymaking. These principles were closely adhered to in the development and application of the strategic planning model in this study.

Most existing design methods were developed for employment in formal design tasks in architecture, engineering, urban planning, and product design.[21] The idea of applying such methods to solving social problems was first suggested in the planning literature. Architects and others in the applied sciences associated with urban design were concerned about the organizational problems of modern cities. As Linder and Peters explain, "The basic idea was to externalize the process of creating solutions to insure both its rationality and manipulability."[22]

Several studies, including this one, adopt the design perspective in their analysis of policy formulation at the federal level.[23] Other research

primarily addresses the theoretical issues involved in the application of the design approach to the development of public policy.[24] In each instance, the focus has been on systematizing the process of policy formulation to overcome both the prejudices of policymakers and the preferences of most researchers for studying implementation and evaluation.

Important benefits can be gleaned from the policy design process. In Linder and Peters's view:

> Whether the problem is an architectural, mechanical or administrative one, the logic of design is fundamentally similar. The idea is to fashion an instrument that will work in a desired manner. In the context of policy problems, design involves both a systemic process for generating basic strategies and a framework for comparing them. Examining problems from a design perspective offers a more productive way of organizing our thinking and analytical efforts. Systematic attention to design will not only enhance the performance of the alternative eventually chosen, but also expand the opportunities for serious consideration of innovative strategies.[25]

They later add:

> Establishing a logical procedure for designing policy instruments not only reduces the likelihood of errors but also makes explicit the thinking that goes into the development of each design. Complex problems, then, can be reduced to manageable proportions by clarifying basic design requirements and developing plausible strategies for their solution.[26]

A number of obstacles may hinder direct and literal application of design methods to the policy context. Many of these obstacles exist because of the fundamental differences between the applied sciences (e.g., architecture and engineering) and the social sciences. Measurement techniques, for example, are better developed in the applied sciences than in the social sciences. Similarly, it is often difficult to operationalize and quantify certain variables and concepts in policy analysis. In addition, due to economic and political issues, goals are frequently ambiguous or are merely symbolic. Engineers who design and build bridges cannot and do not operate under these conditions. Furthermore, while the human element is not ignored in the applied disciplines, it plays a far more central role in public policymaking. Due to the unpredictable nature of human behavior, the error term in the equation is likely to be larger in the social sciences than in the applied disciplines. In addition, senior bureaucrats may feel confused or even threatened by this new strategy and resist its full-fledged adoption. Finally, policymaking in the United

States is highly departmentalized and often involves different branches of government, different levels of government, and competing bureaucracies.[27] This makes the necessary coordination of policy design efforts difficult, if not impossible.

Most research in the area tends to overlook these problems. Dryzek's work, however, is a notable exception. He explains that "design is no simple matter, and contains numerous pitfalls for the unwary. My contention is that difficulty is no excuse to eschew cogitation. Rather, as the level of hazard in public policy increases, the "fit" of policies to their environment becomes progressively harder to accomplish; hence one must think harder about how to achieve it."[28]

Following Dryzek's line of thought, this study has developed a strategic planning model to address a complicated problem, the regulation of leaking USTs. Despite the complexity of the issue, an effort was made to develop a regulatory program in a rational and methodical fashion. A great deal more research and experimentation is required before the design perspective can be widely adopted in public policymaking. Indeed, the MBTE case demonstrates the difficulties of applying a design perspective to policymaking. Additional information about which aspects of design can be fully exploited and which facets cannot be cleanly grafted needs to be gathered. This study represents a first step in this direction.