A COMPARATIVE CASE STUDY OF U.S. AND U.S.S.R. ENVIRONMENTAL POLICIES AND HOW THEY RELATE TO TRANSBOUNDARY POLLUTION ISSUES FACING THE COMMONWEALTH OF INDEPENDENT STATES

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Submitted to the Faculty of the Graduate College of the Oklahoma State University in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE May, 1994

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OF INDEPENDENT STATES

Thesis Approved:

ii

Dean of the Graduate College

ACKNOWLEDGMENTS

I wish to express sincere appreciation to Dr. Joel Jenswold for his encouragement and assistance with this project. His indepth knowledge of the Soviet Union and the field of comparative politics was invaluable in conducting this study.

I would also like to thank Dr. David Nixon for his contribution in the field of international relations. Taking political science courses from both Dr. Nixon and Dr. Jenswold allowed me to broaden the scope of my studies.

Further appreciation is offered to Dr. Mathews who allowed me to extend this exercise beyond the traditional boundaries of environmental science.

Additional thanks go out to my wife and family for supporting me in my endeavors. Without the love and continuing financial support of my mother and father this project could not have been achieved. I extend my sincere thanks to all of these people.

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CHAPTER I

INTRODUCTION

Significance

In 1984, methyl isocyanate gas leaked from a Union Carbide plant in Bhopal, India: 2000 people were killed and 200,000 were injured in what is considered the worst industrial accident in history ("Union Carbide's Inquiry Indicates Errors Led to India Plant Disaster," New York Times-March 21, 1985). In 1986, an explosion at the Chernobyl nuclear reactor in the Soviet Ukraine, released radioactive material into the atmosphere which traveled as far as the United States. This nuclear accident was the first with officially reported radiation deaths ("6 At Chernobyl Die of Radiation, Burns, Soviets Announce," Washington Post-May 13, 1986). Later that year fire hoses used to combat a Swiss warehouse fire washed thirty tons of chemicals into the Rhine River ("Poison Silt Pulled Out of Rhine," Chicago Tribune-November 18, 1986). These catastrophic events with acute hazardous consequences and other more chronic, potential hazards such as ozone depletion, climatic change, acid rain and fragmentation of rain forests, have brought about an increase in concern of environmental issues, both domestically and internationally.

Faced with the enormity and urgency of such international environmental problems, the world has experienced a political awakening. Although environmental issues are not new to international relations, world leaders increasingly have moved environmental issues from the periphery to the center of their political agendas (Harvard Law Review 1991,1487).

Transboundary pollution issues, specifically 'acid rain', have become the focus of concern between the U.S. and Canada and between the former Soviet Union (U.S.S.R.) and Finland, as well as Eastern Europe and the former U.S.S.R. Disputes over transboundary pollution give credence to the argument that pollution is not restricted to national borders. Some previous attempts to negotiate bilateral and multilateral agreements concerning transboundary pollution across U.S./Canadian borders have proven to be unsuccessful in creating new restrictions. The Memorandum of Intent between the United States and Canada Concerning Transboundary Pollution, August 1980, represents an example of an unsuccessful attempt to negotiate a bilateral agreement. The negotiation of bilateral and multilateral agreements is a difficult process, and many such agreements do not lead to significant change in environmental conditions. Such agreements can be categorized as regime activity.

Structural functionalists Kenneth Waltz and Susan Strange suggest that regimes and related activities may have little or no impact on future outcomes (Strange and Krasner, 1983, 346). Other authors such as Stephen D. Krasner in *International Regimes*, offer detailed definitions of regimes and related activities, and a collection of varying theories which differ on the significance of such activity as to its impact on future outcomes.

Krasner includes four distinct aspects: implicit or explicit principals, norms, rules, and decision making procedures "around which actors expectations converge in a given area of international relations". Several regime theories have been recently published which argue that international cooperation may have a more significant role in shaping the future than suggested by Susan Strange and Kenneth Waltz. This study is timely in its address of regime theory and its potential application to the recent breakup of the former U.S.S.R., and the potential environmental problems associated with a multinational perspective of this region.

This thesis deals with the environmental problems and policies of the U.S. and the former U.S.S.R. Since the end of World War II, these two regions have played a significant role in the development of the world industrial complex, providing some historical and empirical data for investigation. A comparison of U.S. and the former U.S.S.R. environmental policy reveals contrasting goals and philosophies which developed from two very different political/economic systems. Yet for a selected period 1980-1989, an examination of sulfur dioxide emission data indicates a paralleling of reduction trends in sulfur dioxide emissions.

This study examines the political/economic systems of the U.S. and the former U.S.S.R. and the development of their respective environmental policies, in an attempt to investigate an apparent correlation between policy and system, and to suggest that "effective policy" requires central authority (i.e., the U.S. federal government). An argument that U.S. sulfur dioxide emission reductions between 1980 and 1989 show a correlation to the implementation of environmental policy is proposed and supported. However, in the case of the former U.S.S.R., this relationship cannot be established. The reduction in Soviet sulfur dioxide emissions can be better explained by the effect of other variables. The centralized control of the former U.S.S.R. did provide the mechanism to deal with widespread environmental disasters; however, with the reconfiguration (15 separate sovereignties) of this region, these environmental problems now fall under the category of transboundary pollution.

Methodology/Design

A comparative case study is utilized as a basic design in order to address a theoretical problem. A foundation is constructed and supported by some basic premises about U.S. policy. A similar investigation is done for the former U.S.S.R. and the two

cases are compared. Conclusions derived from these investigations are then applied to a potentially unsolved set of problems which may have theoretical relevance.

Sulfur dioxide emission data is referenced as a measuring device in an effort to establish volume trends, for a specific period (1980-1989), in the respective regions. An attempt is made to establish a link between policy and system, which leads to a secondary level of inquiry. This secondary level of inquiry or second phase, utilizes a program evaluation technique to investigate a possible relationship between a strong central authority and effective environmental policy. Inferences derived from this phased inquiry are applied to the potential transboundary problems facing the independent states of the former U.S.S.R.

Phase I

Environmental policies are initiated and implemented by a governmental process and involve considerable investment for both industry and government. Though these processes differ in the U.S. and the former U.S.S.R., they are responsible for the ultimate policy, or lack there of, for their respective states. Therefore, by definition political/economic systems are intrinsic to the analysis of environmental policies. The initial phase of this study attempts to chronicle the historical roots of environmental movements and relate "them" to the political/economic systems which spawned those movements and resulting environmental policies for the U.S.

Phase II

A second level of inquiry attempts to refine the conclusions reached in phase one. This part of the study deals with the history of the U.S. air pollution policy beginning with concern over rising pollutant emissions during the 1950s. Government efforts to

deal with this perceived problem led to the issuing of quasi-primacy to the states. After operating for more than a decade under this format, the government decided that more federal control was needed to address the problem of air pollution abatement. The infusion of strong federal controls is evident in the Clean Air Act Amendments of 1970 (CAAA of 1970). Following its implementation, emissions declined, which could be interpreted as the result of effective policy implementation. The objective of this secondary inquiry is to investigate a possible relationship between strong federal control and effective policy implementation for the U.S.

Coal is a primary fuel source for the U.S. and the former U.S.S.R. The burning of coal is the single greatest contributor to sulfur dioxide emission volumes. In the U.S., during the decade following the implementation of the CAAA of 1970, coal consumption was found to be continually increasing along an established upward trend, yet sulfur dioxide emission data reflect a significant decline. Analysis of emissions data prior to the enactment of the CAAA of 1970 indicates sulfur dioxide emissions had increased by 43% over the prior decade, yet coal consumption data reflected a decline (Figure 1, Table III). These data do not reflect the expected outcome. Why? In interpreting these results an argument is proposed based on the hypothesis that the CAAA of 1970 were responsible for the significant reduction of sulfur dioxide emissions despite increased coal consumption. It is further posited that the CAAA of 1970 represent an example of "effective" environmental policy. The history of the CAAA of 1970 is investigated and reveals a correlation between strong federal control and "effective policy", supporting the earlier contention that effective policy requires a central authority. Other explanations for this unexpected outcome are investigated and found to be wanting. Though some critics focus on nonattainment of deadline goals (for mobile emission sources) set by the act (Finley and Farber 1992, 101), there does appear to be a strong correlation between the CAAA of 1970 and a significant decline (greater than 5%) in sulfur dioxide emissions, following its enactment.

Thus, the foundation of the argument is constructed on the following premises:

- ♦ That policy is a function of a political/economic system.
- ◆ That "effective policy" requires a central authority (e.g., the U.S. federal government).
- ♦ That a reduction in U.S. sulfur dioxide emissions from 1980-1989 was a result of the implementation of environmental policy i.e. the CAAA of 1970.

Phase III

A similar investigation into the historical roots and philosophies of Soviet environmental policies is outlined. An observed paralleling reduction trend in sulfur dioxide emissions is discussed and analyzed.

Comparative Analysis

The policies and systems of these two industrial giants are then compared and contrasted in order to provide insight to potential environmental problems facing the independent states of the former U.S.S.R.

The command and control practices of the former U.S.S.R. are characterized as being the cause of many of the environmental problems in this region. Having a central authority may be a facilitating and necessary component of effective environmental protection yet, it is not sufficient to overcome destructive practices absent ecological reform and economic incentives. However, certain events since 1972 indicate that greater concern over environmental issues was developing. Events such as the 1972 U.S. - Soviet Bilateral Agreement on Cooperation in the field of

Problem Statement

The Regional Dilemma

Environmental disasters created by years of unregulated industrialization in the former Soviet Union have been inherited by the newly independent states. No longer are these areas confined within the borders of a single country; rather, many of these contaminated areas cross several borders creating transboundary issues. An investigation of Soviet policy suggests that the reduction in sulfur dioxide emissions in the former U.S.S.R. was not caused by the implementation of effective environmental policy, rather by reduced consumption induced by several contributing factors and therefore, the observed reduction trend may be a temporary phenomenon. The political/economic framework of the former U.S.S.R. is now non-existent. Though not exemplary in its attention to environmental matters, this form of government was not restrained by the problems associated with transboundary governance.

The region once known as the U.S.S.R. is strewn with environmental disasters. Significant pollution incidents vary, from groundwater contamination, to shrinking surface water reservoirs, to air pollution. The one common element is that they are not geographically uniform. This presents an interesting dilemma for the respective governments of these newly established sovereign states, which now compete for resources as international actors. As briefly mentioned, previous coalition attempts at solving transboundary pollution problems have proven to be ineffective at resolving pollution problems. Several issues must be addressed, not the least of which involves the delegation of responsibility. Discussions relating to responsibility for remediation, across sovereign boundaries open up a Pandora's box full of related questions. One such question is that if environmental contamination is to be remediated, who is going to pay for the clean up? Ukrainians are probably not going to be too interested in financing the cleanup of groundwater contamination in Georgia. The role of financier

is generally played by a central government. With 15 newly established government bodies, coordination will be difficult. The absence of a central authority could prove to be a significant detriment to efforts involving not only the cost of cleanup, but the entire scope of environmental activities including policy making, implementation, monitoring, enforcement and coordination. Without a central authority, bilateral and multilateral agreements would seem to be the remaining option to dealing with the severe and isolated environmental problems of this region.

As was mentioned earlier, however, international cooperatives may not be an effective measure in dealing with transboundary pollution problems. The Memorandum of Intent Between the United States and Canada Concerning Transboundary Pollution, may have resulted in the desired outcome for the U.S., yet no agreement was produced and the problem as perceived by Canada remains. Are bilateral and/or multilateral treaties the answer to this problem?

Sovereign desires and the goals of individual countries pose significant problems for efforts to establish collective international schemes or regimes to deal with transboundary pollution problems (Lipschutz 1991, 46). Multilateral agreements, which carry similar baggage as do bilateral agreements, may prove to be an option for the states of the former U.S.S.R. in dealing with transboundary environmental problems yet, structural functionalists suggest that power bases will dictate outcomes irrespective of cooperative agreements. Some discussion is aimed at describing various forms of regime activity and methods of international cooperation commonly used to address transboundary issues.

One of the goals of this study is to focus attention on the potential transboundary environmental problems facing this region. The thesis does not attempt to solve this problem, though it does address the relevance of the relationship of system and policy which could affect the outcome of any proposed solution.

Some evidence, "such as" attempts at international cooperation, domestic reforms, new agencies, the emergence of grassroots organizations, suggests that the potential for constructing a more western-like approach towards environmental policy was gaining momentum until . . . the breakup!

The game has changed with the emergence of the independent states. No longer is there a command and control form of government from which most of the problems can be derived; indeed with the demise of this political structure also went the momentum that had been gathering towards environmental reform, and a key element which may have facilitated that reform, a central authority. The absence of a central authority presents a considerable problem for environmentally conscious members of the former Soviet Union, if the aforementioned premises are to be accepted (policy is a function of system and effective policy requires a central authority). Whether a governing coalition will emerge from this region is not known. Attempts at bilateral and multilateral agreements by others have given rise to debate as to the effectiveness of treaty law. Based on this investigation, some form of central authority may be needed in order to finance, implement, enforce and coordinate necessary environmental policies that address the mounting pollution problems of this region.

Confederation of Independent States

Political Framework

The Commonwealth of Independent States emerged from a growing desire of the Soviet Republics to break away from a central authority, Moscow. On December 8th, 1991 three Republics (Republic of Belarus, Russian SFSR, and Ukraine) signed a multilateral economic agreement in Minsk which essentially began the reconfiguration of the former Soviet Union. On December 23, 1991 these three Republics were joined

in Alma-Ata by eight more in signing a declaration on commonwealth. Two days later President Mikhail Gorbachev resigned.

Though all fifteen of the former republics of the U.S.S.R. have not joined this alliance, for the purpose of this paper the problems discussed are not aided nor frustrated by the inclusion or exclusion of the non-signing parties from the discussion. The major environmental disasters discussed relate to those republics which have aligned themselves with the Confederation of Independent States, (C.I.S.). Thus, for the purpose of efficiency, further reference to the independent states of the former U.S.S.R. will be denoted by "C.I.S." and will refer to those states which have aligned themselves so.

The break-up of the former U.S.S.R. represents a flight from central control which was facilitated by regime activity and has yet to put forth a comprehensive plan for dealing with transboundary pollution issues. Though economic and security issues are more salient during the infancy of this new configuration, the environmental problems of the region must ultimately be addressed. Whether these problems can be effectively dealt with under regime-guided activity in the absence of a central authority is the question.

International Cooperation

Regime Theory

Steven D. Krasner provides a collection of views on the relevance of regime activity on behavioral outcomes in *International Regimes*, 1983. Bilateral and multilateral international treaties are by his definition, forms of regime activity. The breakup of the Soviet Union was facilitated by such regime activity and it is likely that future collective economic and security issues will be directed by similar forms of

Strange is whether these activities really alter future behavioral patterns or are events and behavior controlled by power-based motives. Transboundary environmental issues pose a different problem for regime theorists than do issues of money, trade and security. Though money, trade and security topics may remain more salient for the immediate future, the seriousness of this region's environmental problems will not allow them to be ignored indefinitely.

International Environmental Law

One method of dealing with transboundary pollution problems is through customary international law. This form of international policy making has its drawbacks, especially when dealing with environmental problems. Many obstacles exist in the area of assigning state liability and dealing with a divergence of multi-state interests. The dearth of case law adds to the list of difficulties in resolving disputes via the system of international law.

Treaty Law

Treaty law, a common method for addressing multi-state interests, provides an option that is also burdened with flaws. Many treaties are hampered by their tendency to represent institutional ad-hocracy. Minimum standards are often promulgated by the treaty process which tends to support negotiated consensus, and thus reflects the lowest common denominator. This process is further hindered by administrative delays. The average five-year time frame it takes for the treaty process to run its course is ineffectual when addressing problems with immediate irreversible consequences.

Cooperation and Compliance

Once the decision is made to cooperate, the issue of compliance becomes a difficult problem for participants. Punitive sanctions are almost never provided in the text of international agreements. Signatories generally endorse actions that they were prepared to take in the absences of any agreement.

Special Characteristics of Environmental Problem

The uncertainty of scientific evidence and the elements of time present problems which may not be prevalent in negotiations concerning money, trade and security. Many environmental problems are unique in nature and negotiators may not have the benefit of historical evidence on which to base their decisions. Potential dangerous consequences may result from inaction, yet exorbitant costs may be required for remediation based on evidence which may or may not accurately reflect a physical condition.

The Convention Protocol Approach

The difficulties with customary law and treaty law have inspired alternate approaches to environmental problems. The convention protocol approach has emerged as one such alternative. This method segregates the negotiation of separate issues into separate agreements (issue linkage). Problems with free riders (states who participate in the rewards of the agreement without contributing to the cost) may be somewhat relieved by this process, however the issue of holdouts (states who participate in the convention for the political rewards of reaching an agreement but do not join in the protocol and accept a shared burden of cost and responsibility) is not engaged. Linking

issues to a specific agreement appears to be the most positive aspect of this new approach.

Do Environmental Agreements Constitute a Different Kind of Regime?

The issue of whether to act on uncertain scientific evidence, the element of assessing aesthetic damage or loss, and the potential irreversible nature of some environmental problems, like a deteriorating ozone layer or global warming, provide a few characteristics which distinguish environmental agreements from those concerning issues of money, trade or security. In some cases the architect of a particular environmental problem (e.g. Stalin) is no longer present and assessing liability presents a problem. Often these problems are inherited by unsuspecting recipients, unlike issues of money, trade and security where responsibility may be more tangible.

Conclusion

The Current State of the Environment of the C.I.S.

Nuclear contamination, bacterial and viral contamination, loss of organic matter from once highly productive soils, the shrinking of the Aral Sea, and atmospheric, groundwater and surface water pollution have created a massive ecological problem in the region once known as the U.S.S.R. Efforts to address these problems in the past have been minimal. Though some areas have been designated as catastrophes, there are many sites which could still support life with proper remediation.

With a shortage of available capital and production slumping, this region faces ecological disaster. While money, trade and security issues are on the front burners these environmental problems continue to become worse. The Republics of the newly

reconfigured C.I.S. must deal with the issue of funding a major remediation project soon or the relevance of more "pressing" interests may take a backseat to survival. This study promotes the U.S. CAAA of 1970 as an example of effective environmental policy supported by a central government, a free market system, and an underlying goal of mutual existence of man and nature. Though these parameters may not be sufficient to deal with all the problems facing the C.I.S., it is the conclusion of this study that they are necessary.

CHAPTER II

THE HISTORY OF U.S. ENVIRONMENTAL MOVEMENTS

American Environmental Policy

The evaluation of U.S. environmental policy within this section utilizes a version of Henry P.Caulfield's elite theory to explain the evolution of political movements and resulting environmental policies. This method identifies the historical development of environmental movements with the leadership of certain contributors from both the scientific community and the political arena. Key to this theory is the concept of existing "perceived policy problems" which provides the opportunity for leadership. Though much has been written on the subject of the primary determinants of environmental movements, the usage of an elitist approach to history is helpful in chronicling the major events and personnel, which contributed to the environmental movements that now form the basis for American policy.

The origin of American environmental policy dates back to the early nineteen hundreds during the administration of Theodore Roosevelt. Perceived policy problems concerning natural resources spawned two distinct schools of philosophy. The views of Gifford Pinchot, a member of Roosevelt's "Kitchen Cabinet" while holding a subordinate position in the Department of Agriculture, inspired the development of the conservationist movement. The initial concerns over "sustained yield forestry" stemmed from a perception that private stripping of the forests of Michigan, Wisconsin, and Minnesota for timber without provisions for re-seeding and other management, was a major public problem. Pinchot, a Yale graduate, who studied forestry at Nancy in France and later became the head of the U.S. Forest Service within the Department of Agriculture, was the link between the intellectual, scientific founders of the conservation movement and President Theodore Roosevelt.

He, along with W. J. McGee who worked for the U.S. Geological Survey, John Wesley Powell, and Frederick Newell, were part of the scientific elite, and together they formulated four basic doctrines for what was to become the conservation movement:

- Conservation is not locking up resources; it is their development and wise use.
- Conservation is the greatest good, for the greatest number, for the longest time.
- ♦ The federal public lands belong to all the people.
- ♦ Comprehensive, multiple-purpose river basin planning and development should be utilized with respect to the nation's water resources.

On some issues the conservationist views of Pinchot and his followers stood in direct opposition to the *preservationist* movement led by John Muir, president of the Sierra Club, which was founded in 1892. Preservationist concerns primarily over the use of natural resources led to the establishment of Yosemite Valley as a California state park in the 1860s, Yellowstone National Park in 1872, to authorization by the Congress of Rock Creek Park as a wild-land park in Washington D.C. in 1980, and to enactment of the Antiquities Act of 1906. Though early attempts by preservationists to thwart conservationist activities were relatively unsuccessful, the movement gained strength during the Truman and Eisenhower administrations when Congress overrode presidential vetoes of federal water pollution legislation. Coinciding with the election of John F. Kennedy, the somewhat narrowly defined doctrine of the preservationist movement was absorbed into broader movement which included many of the principles of the conservationist doctrine such as wise use, greatest good, the land belongs to all

people and multiple use. This evolvement represents the beginning of the modern environmental movement.

During the Kennedy/Johnson administrations (1961-1968), the environmental movement began to take shape in the form of new water resources policies. Though early attempts by Republican factions to develop natural resources were consistently opposed by Democrats, Kennedy was committed to federal hydroelectric power development. In a message to Congress in February of 1961, Kennedy stressed the need for a new set of comprehensive river basin plans, the establishment of river basin planning commissions, and research for saline and brackish water conversion. His message urged Congress to propose specific measures for strengthening federal involvement in the area of water and air pollution controls, problems not perceived by Pinchot and his followers. Policies pertaining to public forests remained consistent with traditional practices adopted by the conservation movement. With respect to ocean resources, he urged the development of offshore exploration of oil and natural gas and the establishment of a national program of oceanography.

Much of Kennedy's initial message to Congress did not represent a radical departure from traditional conservation ideology; however in the section entitled RECREATION, he outlined four policy thrusts, one of which would later be clearly identified with the environmental movement.

Kennedy's four policy thrusts:

- (1) Urged the Congress to enact a wilderness bill.
- Urged the Congress to establish seashore and shoreline areas such as Cape Cod, Padre Island, and Point Reyes to improve both the quality and quantity of public recreation opportunities.
- (3) Instructed the secretary of interior to take the lead in:

- a. formulating a comprehensive federal recreation lands program.
- b. surveying where additional national parks, forests, and seashores should be proposed
- c. ensuring that sufficient land be acquired around federally financed reservoirs for recreation purposes
- d. establishing a long-range program for planning and providing open spaces for recreational facilities in urban areas.
- (4) Directed the secretary of interior to take the lead in ending interagency conflicts and in developing a long-range wildlife conservation program.

Kennedy's instructions to the secretary of interior outlined in (3):

"... was the most important part of the special message, leading to transformation of preservationism into environmentalism and to enactment of much legislation in the 1960s and 1970s"

Caulfield 1989, 28.

Caulfield cites two literary contributions to the environmental movement during this time frame. In *Silent Spring*, published in 1962, Rachel Carson warns of a world without birds if continued misuse of pesticides remains unchecked. Another work, *The Quiet Crisis*, written by Secretary of Interior Stewart L. Udall, and published in 1962, deals with ecology from a preservationist point of view.

On September 4, 1964, President Johnson signed both the Wilderness Act and the Land and Water Conservation Fund Act into law. These two acts, according to Caulfield, formed the building blocks of environmental legislation. The Eighty-eighth Congress, from January 9, 1963 to October 3, 1964, was labeled the "conservation Congress" (Caulfield 1989, 31). Legislation including the Clean Air Act of 1963 (CAA), the Wilderness Act of 1964, the Land and Water Conservation Fund Act of 1964, the Highway Beautification Act of 1965, the Water Quality Act of 1965, the Air Quality Act of 1967, and the Wild and Scenic Rivers Act of 1968 all reflect a shift in

policy from the traditional approach to development, to themes dominated by aesthetic and ethical values which place a new significance on environmental quality (Caulfield 1989, 34).

The policies of the Nixon/Ford administrations were generally consistent with programs of the sixties in terms of the emphasis on environmental quality, though concerns of water and air pollution issues as well as problems associated with the disposal of hazardous and toxic wastes became more evident. The passage of the National Environmental Policy Act of 1969 (NEPA), provided procedural guidelines for inter-agency activity. Environmental legislation inacted during the Nixon/Ford administrations includes: the National Environmental Policy Act of 1969 (NEPA), the Endangered Species Act of 1969, the Clean Air Amendments of 1970 (CAAA), the Water Quality Improvement Act of 1970, the Federal Water Pollution Control Act of 1972 (FWPCA), the Coastal Zones Management Act of 1972 (CZMA), the Federal Insecticide, Fungicide and Rodenticide Act of 1972 (FIFRA), the Marine Protection Research and Sanctuaries Act of 1972 (MPRSA), the Endangered Species Act of 1973, the Safe Drinking Water Act of 1974 (SDWA), the Federal Land Policy and Management Act of 1976 (FLPMA), the National Forests Management Act of 1976, the Resource Conservation and Recovery Act of 1976 (RCRA), and the Toxic Substance Control Act of 1976 (TSCA).

President Carter faced steeply rising energy costs which facilitated a need for growth in this area. Though he remained true to the environmental movement (i.e., his emphasis on a balanced multiple-use policy (FLPMA of 1976) and the issuance of special directives concerning the restriction of import or export of exotic organisms, promotion of flood plain management, prohibition of off-road vehicles in areas where environmental damage might occur, and protection of wetlands, he was criticized by many for his energy development program. Environmental legislation enacted during the Carter administration included the CAAA of 1977, the CWA of 1977 the Surface

Mining Control and Reclamation Act of 1977 (SMCRA), the Outer Continental Shelf Lands Act of 1978 (OCSLA), and the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA). The pendulum began to swing back toward a more growth oriented approach and less emphasis on the protection of aesthetics with the election of Ronald Reagan in 1981.

The Reagan administration attempted to reverse the tide of environmental legislation that had received bipartisan support since the early sixties. Reagan had been elected by a substantial margin, on a platform that de-emphasized federal government involvement. His selection of James Watt as Secretary of the Interior and Anne Burford as the head of the Environmental Protection Agency, both known for their conservative positions, was perceived by the environmentalists as a step backwards in their movement. Severe cuts in the budget for the EPA and related projects were forthcoming and sent a clear message to environmentalists that Reagan intended to constrict spending activities (Vig and Kraft 1990, 4). In June of 1981, Reagan was severely criticized by Gaylord Nelson, former senator, chairman of the Wilderness Society, and the national leader of the first Earth Day, for his reversal on environmental themes. Former Assistant Secretary of the Interior under Presidents Nixon and Ford, Nathaniel Reed, had also publicly berated the Reagan stance. This criticism evidently had widespread support as the Reagan administration attempted to back off its first term position by appointing William Ruckelshaus as EPA director in 1984. James Watt was also relieved of his duties in favor of James Clark as Secretary of the Interior, a move according to Caulfield, directed at appearing the environmentalists. Political scientists Norman Vig and Michael Kraft have analyzed environmental policy during the Reagan years and conclude that there has been an increase in positive popular identification with environmental issues; however, few legislative advances have been made since 1980, with the exceptions of the Hazardous Substances and Waste Act of 1984 (HSWA) and the Superfund Amendments and

Reauthorization Act of 1986 (SARA). Policies of the Bush administration, "the environmental president", have shown little deviance from those of the second term of Ronald Reagan. The conservation and environmental movements that have shaped American policy appear to agree on the main objective of "a sustainable relationship between man and his environment", though the areas of consensus are limited as compared to the issues of divergence. Several areas of divergence are briefly outlined below:

- Object of concern: the conservation movement focuses on the wise use of natural resources, whereas the environmental movement had as its object of concern a more ideological view of the biosphere including man himself.
- ♦ Economic growth: though no administration has opposed the desirability of continuous economic growth, both positions differ in their views concerning the potential problem of "running out of resources". Many conservationists espouse that future technological advances will allow for a switch to alternative sources. Conversely, some environmentalists concentrate on methods of curtailing growth by proposing population management arguments.
- ♦ Multiple-use sustained yield of renewable resources: a prime doctrine of the conservationist movement; the environmental forces would prefer, considering that the emphasis of multiple-use is focussed on timber harvest of federal lands, a more respectful attitude towards wildlife and recreational uses of these lands.
- ♦ Pollution and chemical poisons: the conservation movement did not address problems concerning air and water pollution, toxic and hazardous wastes, and chemical poisoning as they were not perceived to be serious problems until the late 1960s.

(Caulfield 1989, 49).

The environmental movement has responded to these issues by directing attention to the issue of risk (to the quality of life). Risk assessment and cost benefit analysis are intrinsic to codified environmental regulations which legislate the balance of both economic and environmental considerations. Though industrialists would argue that not enough consideration is given to economic ramifications of policy, many environmentalists believe, that if the risk is high that cost benefit analysis should not be part of the decision making process at all.

American environmental policy has been forged from two different ideologies. Most conservationists are intent on forging policy which will facilitate economic growth. Many environmentalists are concerned that unrestricted growth will be detrimental to the environment and some are intent on curtailing or even reducing growth. The rate at which environmental laws have been inacted has been reduced through twelve years of Republican administration. Many believe that this situation will change with President Clinton. Caulfield's view, that environmental movements are bipartisan, along with the persistence of congressional gridlock (Vig and Kraft 1990, 103), might suggest that future changes in current policies will be minor and slow in coming. The relative importance of specific acts and structures, their similarities and divergence from U.S.S.R. counterparts, are discussed in a later chapter.

CHAPTER III

THE (U.S.) CASE FOR A STRUCTURAL RELATIONSHIP

Environmental Policy and the U.S. Political/Economic System

As discussed earlier, U.S. environmental policy has emerged from two different movements: the conservationist movement and the preservationist movement. Early stimulus for these movements evolved over concern by the preservationists that recently achieved technical capacity to develop large scale hydro-electric power facilities would lead to a monopoly of unconstrained private utilities. However, during the 1960s and 1970s pollution issues dominated movement agendas. Though these two movements diverge on many issues, they are both guided by a common set of ecological principles. Given the nature of our governmental system, a republic, laws and regulations promulgated through the legislative process are intended to reflect the will of the people. This system intentionally, via the bill of rights, provides a great deal of protection for the rights of those holding the minority opinion. Many environmentalists, would argue that one of those rights is to have access to a pollutionfree environment. Most conservationists, concerned with growth opportunities, suggest that the idea of a pollution free environment is not realistic and further, is not a legislated right. Some conservationists may support a goal of a pollution free environment, but remain concerned that a radical progression towards such a goal would create costly restrictive controls inhibiting industrial development. The solution to this ongoing debate is provided by the will of the people, through their elected representatives and their subsequent appointees in the form of rules and regulations governing activities which may constitute a hazard to human health and the environment. Injunctive and punitive relief penalties and incentive programs provided by U.S. environmental acts form a liability regime established to promote compliance

of these rules and regulations. Most related activity falls under the jurisdiction of the Environmental Protection Agency (EPA), which after administrative efforts to resolve regulatory violations have been exhausted, has at its disposal the U.S. judicial system as an enforcement agency. Severe penalties consisting of fines which may reach \$50,000 a day to incarceration for criminal violations of environmental regulations are being enforced.

The system's liability regime not only addresses compliance action, but provides, through a set of federal regulations, rules for corrective action or remedial cleanup for releases of hazardous waste and hazardous constituents (RCRA corrective action program). For hazardous waste sites named to the National Priorities List, and slated for clean up under CERCLA, liability is "joint and several". Companies with deep pockets, which have contributed only small amounts of waste to problem sites, can be held responsible for the entire cost of cleanup. Potentially responsible parties argue that this approach is punitive and claim that too much of their money and money provided through the "Superfund" is wasted on legal fees and not the cleanup of priority sites. Superfund which amended CERCLA and increased the amount of funds available for cleanup, is up for reauthorization in 1993. Some changes can be expected as the effectiveness of the current system has been subjected to criticism. So far work has been completed on only about 150 of more than 1,200 priority cleanup sites while taxpayers have spent more than \$9 billion and industry considerably more.

The scope of environmental protection was enlarged to include government agencies by the procedures specified in the National Environmental Policy Act of 1969 (NEPA) which requires an Environmental Impact Statement (EIS) to be filed and approved prior to the beginning of "major Federal action significantly affecting the quality of the human environment" (42 U.S.C.A. § 4332 (c)).

In response to industry protests concerning the punitive nature of environmental regulations, some efforts have been launched to address economic considerations in the

regulation of ambient air quality. Incentive programs which allow certain limits on pollutant emissions to be legally exceeded by virtue of a system based on tradeable emissions permits were inacted in 1990 (CAAA of 1990). Further, more and more tax incentives are being proposed for the use of environmentally safe products. In a market system money talks, and in the U.S. system violators will be prosecuted. The environmental movements of the conservationists and the preservationists have forged the policies that exist today. While it is true that there are extremist factions, such as the "deep ecology movement" which professes the rights of rocks, their influence is not reflected in current policy. Legislative trends toward more regulation developed in the seventies were softened during twelve years of Republican administration (Reagan/Reagan/Bush). With the Democrats campaigning on an environmentalist platform, having taken control over the executive branch as of January 1993, there is increasing speculation that a rejuvenation of such activity may occur. However, with the multitude of laws promulgated from 1961 to 1981 few areas were left unregulated. Policy adjustments in this system are always in flux to some degree, based on the partisan balance of power; however, in Caulfield's view, political movements tend to be bipartisan, and from this perspective, drastic new restrictions would not appear to be forthcoming, especially in what is perceived by some economists as a slow growth advance from a depressed domestic economic market.

The principles of democracy and a free market economic system are reflected in American environmental policy. Major issues are often complicated with many legitimate points of view. Some are debated for years, and generally resulting legislation reflects the outcome of such debate. Not all of one movement's platform is adopted or excluded. The system of checks and balances provided by the U.S. Constitution is designed to prevent one branch of government from becoming too dominant. Existing policies are intended to reflect the will of the people as constructed by their elected representatives. Opportunity for adjustment of these policies is only an

election away. Though some would argue that there are not distinct differences between successful candidates of both parties, there does appear to be a party alignment toward some issues such as environmental regulation. As attitudes change, so do the policies of this country. Seldom is everyone satisfied with the outcome of this process, yet the voice of legitimate protest is rarely excluded from the process. The Bill of Rights ensures that the minority opinion is protected and most policies incorporate the needs of those parties that are under represented. Those groups representing radical factions may disagree, yet often these opinions are aired in preliminary legislative debates. Though early divisions between the preservationists and the conservationists led to the formulation of modern environmental policy today the debate is probably more accurately couched between industrialists and environmentalists. Mainstreamers from both parties find common ground in respect to providing an environment where man can live in harmony with his environment, yet the methods and cost of this goal continue to be at issue. Through such conflicts the shape of American policy takes form.

Though the freedoms of the American political system allow for healthy debate and consensus, policy is not forged from political input alone. The free-market economic system which America employs is equally responsible for the environmental policies that govern U.S. citizens and industry. Policies which inhibit the growth of the American economy to the point of bankruptcy, such as the curtailment of oil and gas development and auto emission standards, are often vigorously opposed by the business community. The proponents of sustained yield growth and those who favor a more ideological approach to man and his environment wish to see America prosper. Social scientists often measure the ability for a nation state to prosper by its manufacturing base. N. D. Kondratieff plotted trends in production and prices from which he constructed a "long wave" model. Long waves studies have also been promoted by Earnest Mandel and most recently by Joshua Goldstein. Policies too restrictive to

allow this base to thrive and grow will certainly be construed by industry as self-destructive. The quality of life approach taken by the environmentalist factions towards clean air and water, can also be applied to the economic components of people's lives. Some would argue that the quality of life is partially based on the enjoyment of certain material possessions, for example, the ability to drive to work instead of ride a horse or walk. Many feel that the ability to print a book for millions to read as opposed to only a selected few is an improvement on the quality of life. The list of products provided by modern technology is endless. Opponents may point out that the quality of life is not greatly enhanced by the hoola hoop or Mickey Mouse watches, yet the argument is clear, and most people, however committed to principle, are not prepared to step backward into the stone age. Thus, the economic component of the quality of life must receive the appropriate attention. The result is an attempt to balance the need of protecting America's industrial base and the need to protect the quality of its air, water, soils and the general health of its human population and their environment.

Economics also play a role in the effectiveness of the installed liability regime which regulates compliance and corrective action. The laissez-faire nature of America's free-market is driven by the capitalistic principle of maximizing profit. Regulatory policy uses its ability to attack that profit base in order to affect compliance and induce proper management practices which negate the necessity for corrective action. Hazardous waste cleanup operations can run into the billions of dollars. Thrifty managers are quite aware of the severe financial penalties associated with sloppy operations. Those companies who do not pay due regard to federal regulations often find it difficult to compete for any length of time. The competitive nature of business in the capitalist system promotes excellence. Granted, some companies cheat and take short cuts, but those businesses which operate outside the law face enormous penalties if caught and are generally dissuaded from continuing renegade operations. More over the successful companies which do adhere to America's environmental

policies often provide research dollars either voluntarily through tax-free contributions or simply in the form of corporate income tax.

The environmental policies of the U.S. are clearly a function of America's political/economic system, a system always in flux, yet a system always guided by the consensus of the American people. That American environmental policy is the product of the American political/economic system, is not a giant leap in logic, however it does provide the basis for some generalization which may prove useful when inquiring about future solutions to current problems facing the C.I.S. To determine the relative effectiveness of a particular policy it is necessary to identify the goals and activities of the policy and develop measurable indicators which allow for comparison with a time when the policy was not in force.

Air pollution, a common problem for the people and governments of the U.S. and the former U.S.S.R., provides an area for comparison which may allow illustration of the aforementioned observations about the U.S. environmental policy and how it works.

CHAPTER IV

U.S. AIR POLLUTION POLICY

Regulatory History

The Clean Air Act (CAA) was originally passed in 1955 and was designed with the intent of enhancing the quality of ambient air. Although the name "CAA" has been maintained, the act was replaced by the Air Quality Act of 1967. Amendments adopted in 1970 require the EPA to set ambient air quality standards: control emissions from stationary, mobile, and new stationary sources. The Amendments also require the control of hazardous air pollutants. The 1977 amendments adopted a standard basis for rulemaking regarding criteria for national ambient air quality standards, new source performance standards, fuel and fuel-additive provisions, and aircraft emission standards. The act was amended once more in 1990. The key provision, of these amendments, Title IV, was directed at the problem of acid rain and provided for allocated allowances which could be banked or sold by emitters. The CAA is referenced as [PL 84-159; 42 USC 7401 et seq.; ER 71:1101].

In 1955 Congress offered technical and financial assistance to the states in response to the problem of air pollution. Research efforts were expanded in the 1960s by amendments which authorized federal agencies to intervene directly to abate interstate pollution, control emissions from new motor vehicles, and to exercise powers of supervision and enforcement of state controls. An evaluation of these efforts at the end of the decade revealed unsatisfactory results (pollutant emissions were continuing to rise), which prompted Congress to enact the CAAA of 1970 (Finley and Farber 1992, 100).

The CAAA of 1970 sharply increased federal authority and responsibility. The Act addressed four areas: National Air-Quality Standards, Stationary Source Regulations,

State Implementation Plans, and Mobile Source Emissions Standards for automobiles and trucks. The standards and regulations that are derived from the CAAA of 1970 have reflected the U.S. air pollution policy until amended in 1990.

National Air-Quality Standards

The EPA was directed by the Act to determine the maximum permissible ambient air concentrations for pollutants it found to be harmful to human health and the environment. Standards were established for at least seven pollutants: particulates, sulfur oxides, carbon monoxide, nitrogen oxide, ozone, hydrocarbons, and lead. The agency was to set up two types of National Ambient Air-Quality Standards, described below, without consideration of the cost of compliance.

Primary Standards - to protect human health with an adequate margin of safety to vulnerable segments of the population (i.e., infants and the elderly).

Secondary Standards - to maintain visibility and to protect buildings, crops, and water.

Stationary Source Regulations

The EPA was to set maximum emission standards for new sources (plants and factories) called New Source Performance Standards. New sources must comply with National Ambient Air Quality Standards as well as the new threshold standards under the following procedures:

♦ State enforcement of standards on industry by industry basis.

- ♦ In setting standards, EPA was to take into account the costs, energy requirements, and environmental effects of its guidelines.
- ◆ EPA was to issue control technique guidelines for existing dischargers.

State Implementation Plans

States were required to create a State Implementation Plan by 1979 indicating how they would achieve federal standards and guidelines to implement the act fully by 1982.

Mobile Source Emission Standards (for automobiles and trucks)

The Act created a detailed but flexible timetable for achievement of auto and truck emission controls. For automobiles, a 90% reduction of hydrocarbon and carbon monoxide emissions was required by 1976. The administrator of the EPA was authorized to grant extensions of these deadlines for approximately one year.

Hypothesis

If sulfur dioxide emissions were reduced during the decade following the implementation of the U.S air pollution regulations (CAAA of 1970), then a possible relationship exists between emission reduction and the effectiveness of policy. Extraneous factors (agents other than effective policy) must be controlled in order to conclude that effective policy was responsible for the reduction in emissions. These factors include, decline in high sulfur coal production and or consumption (prime

source of sulfur dioxide), availability of capital, shift to alternative fuels, voluntary implementation of environmental technology.

Data/Theory

Statistics taken from the Statistical Abstract of the United States 1992 published by the U.S. Department of Commerce from 1980-1989 indicate a significant increase in coal production and consumption during the decade following the implementation of the CAAA of 1970 (time frame allows 10 years for implementation). Increases in other economic indicators taken from the same source such as gross domestic product, gross national product, personal income, and disposable personal income suggest a period of significant industrial growth. Therefore, a decrease in sulfur dioxide emissions would not be the expected outcome, barring intervention of some other agent.

If a decline in sulfur dioxide emissions during a period of heavy production, consumption and industrial and economic growth, and no other agent provides a more reasonable explanation for this relationship could be demonstrated, then the hypothesis may have merit.

Sulfur dioxide emissions data are graphed for the periods before and after the implementation of the CAAA of 1970 to provide a visual comparison. These data are plotted in a time series which indicates the dates of significant air pollution legislation, in order to relate the emissions trends to legislative events. Coal consumption is a key element or extraneous factor which could be the determining factor to a decline in emissions if it could be demonstrated that consumption was also in decline.

Total fuel consumption and the individual components (petroleum products, natural gas, nuclear power, hydro-electric power, and thermal power) are plotted for similar reasons. Regional distribution of emissions are also graphed in order to reveal any geographical anomalies in volume.

Variables

- U.S. sulfur dioxide emissions data (1980-1989), (1960-1969).
- U.S. pollution control regulation (1980-1989), (1960-1969). (presence or absence of CAAA of 1970).
- U.S. coal consumption (1980-1989), (1960-1969).
- U.S. petroleum products consumption.
- U.S. natural gas consumption.
- U.S. nuclear fuel consumption.
- U.S. hydro-electric power consumption.
- U.S. thermal power consumption.

Policy Evaluation

The initial phase of a policy evaluation generally begins with the identification of the policy goals and activities. In this case, the activities are contained in the administrative rules and regulations of the CAAA of 1970 and are directed towards the goal of pollution abatement.

The second phase deals with the development of measurable indicators of goal attainment. Sulfur dioxide emissions, a problem directly associated with wet deposition or acid rain, are compared in a time series for the periods prior to and subsequent of the enaction of the CAAA of 1970.

Activities (CAAA of 1970)

Increase of federal authority and responsibility, i.e.:

Section 107: States were given primary responsibility for assuring air quality but were no longer given a choice as to whether they would meet this responsibility. For the first time states were required to attain air quality of specified standards within a specified time period.

Section 109: Established National Ambient Air Quality Standards.

Section 110: Within 9 months after promulgation of an NAAQs, the state was required to submit to EPA a plan designed to implement and maintain that standard within its boundaries.

Section 111: Established New Source Performance Standards - to reflect the best available control technology taking into consideration the cost of compliance.

Section 112: Provided uniform national emission standards for hazardous air pollutants.

Primary Standards: designed to allow an adequate margin of safety in order to protect public health.

Secondary Standards: designed to protect public welfare (structures, crops, animals, fabrics, etc.)

Note: Creation of the EPA in 1970: combining pre-existing units from various federal departments contributed to the effectiveness of the CAAA.

Goals (CAAA of 1970)

Though the time frame goals for compliance with mobile source emissions were constantly extended and have not been achieved, the primary goal of pollution abatement for sulfur dioxide emissions has been significantly furthered. Sulfur dioxide emissions for the decade prior to the enactment of the CAAA of 1970 showed a 43% increase over the previous decade. (Allowing ten years for implementation) the next decade indicated an 8% reduction in sulfur dioxide emissions. This reduction occurred during a period of extensive growth in consumption and production of coal.

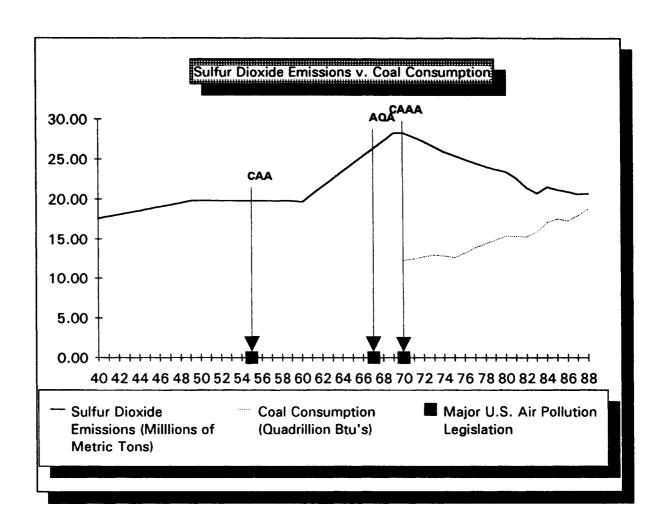


Figure 1. U.S. Sulfur Dioxide Emissions (1940-1988) v. Coal Consumption (1970-1988)

Figure 1 indicates the rise and fall of sulfur dioxide emissions over time, from 1940 to 1988. Coal consumption data is also plotted for a more recent period from 1970 to 1988. The arrows indicate the enactment of major U.S. air pollution legislation. Quasi-primacy (states which had lead on enforcement but in which the federal government reserved the right to intervene) was given to the states in 1955, via the Clean Air Act during a period of slowly rising emission volumes. After twelve years of states administered policy and skyrocketing increases in sulfur dioxide emissions, the government stepped in to regain control with the enactment of the Air Quality Act in 1967. This measure was quickly followed in 1970 by restrictive legislation entitled the

Clean Air Act Amendments. A noticeable decline in sulfur dioxide emissions following the implementation of the CAAA of 1970 is evident from this graph. Not insignificant is the steady rise of consumption of coal during this period. This rise in coal consumption contradicts the expected outcome and provides compelling evidence for ruling out a major extraneous factor which could potentially negate the validity of the alternative argument.

Coal consumption figures are based on total consumption. No effort was made to distinguish between different grades nor sulfur content. It should be noted however, that most of the low sulfur produced in this country comes from west of the Mississippi River. In 1970 production from this sector amounted to only 9% of the total coal produced (Annual Energy Review 1991, Energy Information Administration). This figure rose to 30% by 1980 and to a level of 39% by 1990 (Id.). This increase is in part due to the relative ease of surface mining predominant in the west as compared to sub-surface mining techniques use in the east (Id.). This shift can also be attributed to enviornmental concerns over the use of high-sulfur coal (Id.). These numbers suggest that further study is necessary to determine a possible cause and effect realtionship between a shift in low-sulfur coal production and a reduction in H_2SO_4 emissions coinciding with the enactment of the CAAA of 1970. Should such a relationship be found it would only strengthen the contention of this study i.e., that the motivation for the shift was induced by the act.

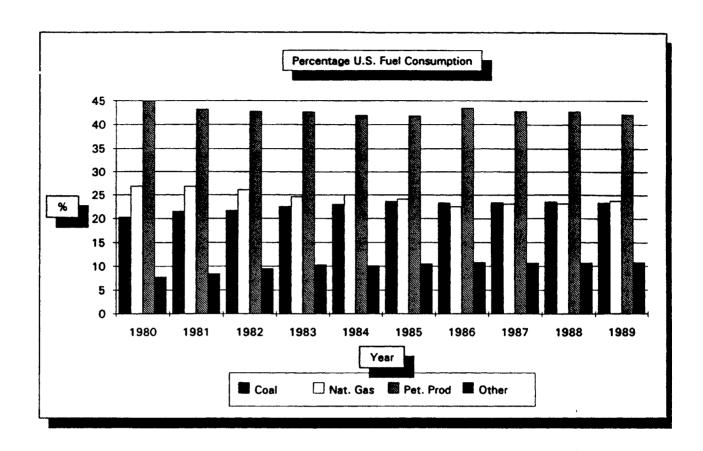


Figure 2. Percentage U.S. Fuel Consumption (1980-1989)

Figure 2 shows the percentage of U.S. fuel consumption for each period. While natural gas consumption and petroleum consumption show marginal declines, coal consumption is increasing during this period. The margin of increase may not seem significant for this time frame, yet over a longer period (several decades) this increase is seen as a continuation of an established trend. The other category includes hydroelectric power, nuclear fuel, and thermal generated power.

The usage share of these alternative fuels shows a slight increase. There appears to be no anomaly in the trends reflected by the plots of these fuel variables, with the

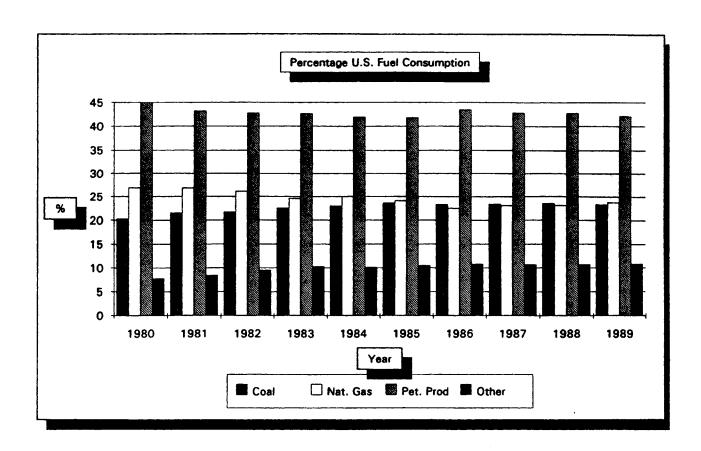


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exception of coal consumption exhibiting an increase in its share of the total consumption of U.S. fuel. This increase is significant in light of observed decreases in sulfur dioxide emissions during this same period.

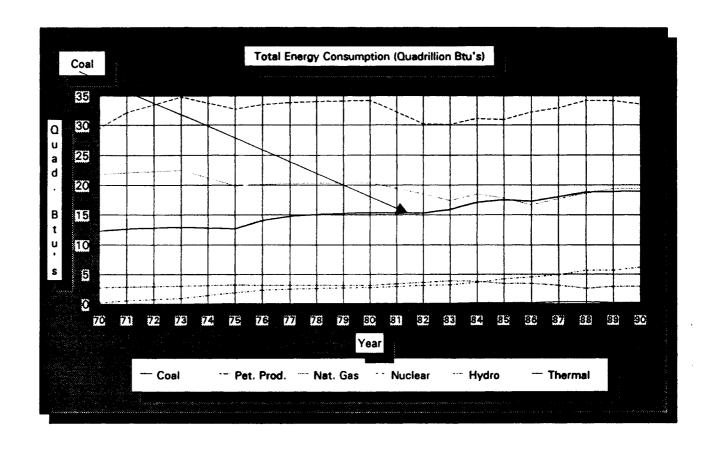


Figure 3. Total U.S. Energy Consumption (1970-1990)

Figure 3 depicts the total U.S. energy consumption, by volume, for the plotted variables over an extended time. The long-term increase in coal consumption since 1940 is highlighted for emphasis.

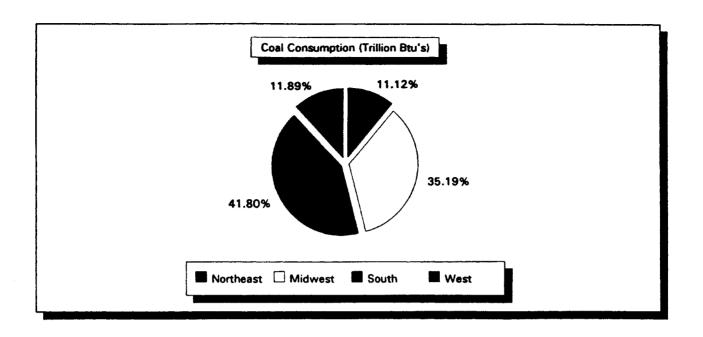


Figure 4. Percentage U.S. Coal Consumption by Region (1989)

Figure 4 shows a geographical distribution of U.S. coal consumption for 1989. What does not appear evident is a disproportionate share of consumption from the Northeast which is a manufacturing center.

Political Movements

Henry P. Caulfield, in his essays on *The Conservation and Environmental Movements* emphasizes the bipartisan nature of political movements. This theory may be accurate and does have support from other political scientists, namely Norman Vig and Michael Kraft, (however, Caulfield does not relate to the vigor with which enforcement of existing laws is applied). One curious, extraneous factor which could have a bearing on the outlined argument is the influence of the political party in office

during the enforcement of existing laws. During the Reagan administration (1980-1988) a realignment of priorities took place, especially with environmental legislation (Vig and Kraft 1990, 33). The pro-environmentalist attitudes, which prevailed during the seventies and that produced the bulk of existing environmental legislation on the books today, was not looked on favorably by the Reagan administration. Reagan professed to have been elected on a mandate which prescribed less government involvement in people's lives. As a consequence of this attitude, he directed a number of policies which were designed to limit the activities of the EPA, i.e., cutting the budget to the bone and the installation of key personnel (persons not aligned with a proenvironmental stance) into major roles which determined the outcome of environmental activities. There was a definite attempt to thwart the activist movement towards environmental legislation, yet sulfur dioxide emissions continued to decline during the eighties (Vig and Kraft1990, 33).

Summary

Though some environmentalists have been critical about the effectiveness of the U.S. air pollution policy (Finley and Farber 1992, 101), most of this criticism has been confined to the extension of deadlines for the implementation of mobile source emissions restrictions. Based on this analysis, those aspects of the CAAA of 1970 which dealt with sulfur dioxide emissions have proven to be effective in reversing the trend towards increasing emissions. Following the implementation of the act, emissions declined 43% from the decade preceding its enactment. During this time the American economy grew at a fast pace. Coal consumption, a major factor in the emission of sulfur dioxide, maintained a steady increase. Other energy sources made modest declines in the percentage of their consumption. Political influences, stemming from the Reagan administration, were far from being activist in support of

environmental legislation. There does not appear to be any reasonable explanation as to why sulfur dioxide emissions declined during a period of expansion other than the influence of the CAAA of 1970. The significance of this relationship can be expressed more scientifically by the use of statistical analysis; however, based on the examination of a number of potential extraneous factors and graphic representation of the same, it appears that a significant relationship does indeed exist between the implementation of the CAAA of 1970 and declining sulfur dioxide emissions. As pollution abatement is the primary goal of U.S. air pollution policy, it would seem fair to suggest that on this count the program has enjoyed a modicum of success.

CHAPTER V

THE HISTORY OF RUSSIAN ENVIRONMENTAL MOVEMENTS

Environmental Policy in the U.S.S.R.

Similar to the treatment employed to chronicle U.S. environmental policies, an historical approach associated with elitist contributions is used to outline movements within the former U.S.S.R. The references cited, however, are varied and may not reflect the continuity of Caulfield's analysis. Environmental problems have existed throughout Soviet history, yet analysis of environmental concerns can be divided into two differing periods (Schap 1988, 389). This view is supported by Goldman (1972) and Pryde (1972). These scholars concur on the existence of an historical division of conservation attitudes between the tsarist era and the post-revolutionary rule of Lenin and Stalin, but not necessarily on its cause. The historical views of Schap, Goldman, and Pryde provide the basis for the following discussion of early U.S.S.R. environmental movements from the late 1600s to the time of the Goldman (1972) and Pryde (1972) publications.

"In the early years of Russian tsarism, conservation was a very pragmatic affair, and quite limited in scope" (Pryde 1972, 2). Decrees regulating the killing of wildlife comprised the majority of early legislation, as hunting was both a main form of recreational activity (for the nobility) and an important economic activity. According to Pryde, Peter the Great (1682-1725) was a notable exception in that he demonstrated an appreciation for a long-range national policy, rather than the subjective, crisis approach which was the established norm. He had a particular interest in forest preservation and implemented a restrictive system of regulations controlling timber harvest. His concern for wildlife led to decrees protecting sable, elk and beaver, and the abolishment of avaricious fishing practices, to include controlling pollution in St

Petersburg's waterways. "All of his conservation measures were enforced by extremely harsh penalties" (Pryde 1972, 4).

The conservation measures of Peter the Great were short-lived however, as the tsars of the latter part of the eighteenth century did not share his regulatory views concerning the use of natural resources. In 1782, Catherine the Great rescinded Peter's forest management regulations; however, a somewhat greater respect for wildlife after his death can be attributed to his policies. Catherine's decrees in 1763 banning hunting from March 1 to June 29 to allow for reproduction cycles is evidence of Peter's influence.

The turn of the century brought about the beginnings of industrialization and as natural resource utilization greatly increased so did wasteful exploitation of these resources. Elk populations drastically decreased and the forests continued to be harvested without regulation. Gully erosion and soil degradation problems associated with rapid deforestation in lightly forested regions (central and southern European Russia) prompted Catherine the Great to enact the Forest Protection Law of 1788. Hunting bans remained unchanged until 1892, when they were updated, but even then no provisions for restricting activities on privately owned property were adopted. Legislation regulating fishing on the Ural River, stimulated by a severe decline in freshwater fish in certain areas, was inacted in 1803, as were methods of fishing in 1828, and protection of spawning areas in 1835. Based on a dearth of conservation legislation, government concern during the nineteenth century would appear to be negligible. The tsarist era held the common belief that "man is the owner and selfbenevolent dispatcher of all the wealth of his environment" was consistent with the absence of regulation, thus a contributing factor to the continued exploitation of natural resources (Pryde 1972, 5). Concern for conservation in this region emerged in the form of private citizens' associations composed largely of scientists interested in natural history. The first of which, the Moscow Society of Naturalists, was established in

1805. After a fifty-two year hiatus, the Committee on Acclimatization of Animals and Plants formed in 1857, followed by the Entomological Society in 1859, natural history societies in Moscow in 1863 and in St. Petersburg and Kazan in 1859. Most of these societies were essentially scientific associations rather than conservation organizations, yet during the early 1900's and, partly due to the contributions of St Petersburg botanist I. P. Borodin and Moscow zoologist G. A. Kozhevnikov, the scope of such associations was expanded to include a much broader range of conservation problems (Pryde 1972, 8). Though not evident from governmental involvement, a conservation movement was gaining momentum prior to the revolution.

"After 1917, the management of Russia's natural resources was carried out within a totally new context. Though civil liberties were constrained, people could own land during the tsarist era, yet after the revolution natural resources became the exclusive property of the Soviet state (Pryde 1972, 14). Though there was acknowledgement of the deterioration of environmental conditions in the newly established Marxist state, these conditions were thought to be the result of a capitalist economic system that had existed prior to the revolution. Many believed that socialist management would restore proper natural resource utilization.

During the early years of U.S.S.R. power, numerous decrees were set forth concerning natural resource management policies. Conditions were severely deteriorating, partially due to the destruction associated with civil war and resulting famine. A breakdown of transportation systems fostered massive timber harvests to provide a source of fuel. The effects of these activities prompted reforestation measures and resolutions aimed at protecting urban parks and green belts in 1920. Other steps were taken to promote wildlife conservation and the advancement of agricultural activities with respect to erosion control and irrigation methods.

land and water resources of the country and was passed on October 27, 1960. The governmental structure during the sixties and seventies dictated that conservation issues be controlled by administrative agencies. These agencies had the responsibility of managing a given resource, such as the Ministry of Fisheries, which had the responsibility for ensuring that "sustained yield" practices were utilized by fishing enterprises (Pryde 1972, 17). These agencies were established at the state level (U.S.S.R.) as well as the republic level. However, there was a noticeable absence of any coordinating body which could integrate the conservation practices of various agencies representing different resources into a comprehensive environmental policy. According to Soviet conservationist Bogdanov, "The branch inspection services, because of their narrowly departmental approach, have not provided in full the necessary control over conservation, especially since many of them have acquired economic and production functions that distract them from their principal duties" (Pryde 1972, 22). Despite these functional difficulties, Soviet awareness concerning domestic environmental problems was growing.

Soviet attention to international cooperation concerning environmental issues is evidenced by the signing of a bilateral environmental agreement between the U.S. and the U.S.S.R. On May 23, 1972 the U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection signed by President Nixon and Politburo chairman Nikolay V. Podgorny, outlined plans for cooperative work in eleven major areas of environmental protection: prevention of air pollution, prevention of water pollution, prevention of pollution associated with agricultural production, enhancement of the urban development, protection of nature and the organization of preserves, protection of the marine environment from pollution, influence of environmental changes on climate, earthquake prevention, arctic and subarctic ecological systems, and legal and administrative measures for the protection of environmental quality (Bear and Elkind 1990, 41).

A variety of all-union state committees and ministries as well as private research institutes participated in projects that evolved as a result of the bilateral agreement. The first signs of a coordinating body associated with environmental concerns appeared in the form of the State Committee on Hydrometeorology, known as the Hydromet. The Hydromet interfaced with the Council on Environmental Quality (CEQ) and the international offices of the Environmental Protection Agency (EPA) on international issues addressed in the agreement until 1988. On January 17, 1988, the Soviet Communist Party's Central Committee and the U.S.S.R. Council of Ministers established by decree Goskompriroda, which was given the authority and responsibility of control over all areas of environmental protection. At the time, this act represented the single most significant commitment taken by the U.S.S.R. toward establishing a comprehensive environmental policy (Bear and Elkind 1990, 42). Its establishment was quickly followed by the formation of a second environmental organization: the Supreme Soviet's Committee on Questions of Ecology and the Rational Use of Natural Resources. This ecology committee had a varied membership including trained environmental specialists, and representatives from grass roots movements.

The most influential of these grass roots movements was the Socio-Ecological Union. Though eager to work with state agencies, most public environmental movement organizations do not wish to be incorporated into the existing establishment (Altshuler and Mnatsakanyan 1990, 28). There has, however, been a recent attempt by the Green Movement of the U.S.S.R., one of the last public associations to be formed, to unite all grass roots organizations under one umbrella (Altshuler and Mnatsakanyan 1990, 28).

Environmental movements are shown to have early beginnings prior to 1917; however, there does appear to be a significant increase in concern in the post-revolution era. Numerous causal variables could have contributed to this phenomenon, yet the intent of this section is to chronicle and not to analyze. Historical development within

this section is confined to the former Soviet Union. Noticeably absent from the above synopsis is any mention of perestroyka or glasnost. These terms are introduced in the section concerned with an analysis of the U.S.S.R. political/economic system. The significance of these doctrines is associated with a change in the political/economic structure. These system changes referred to as of "the Gorbachev reforms" can certainly be correlated to the emergence of grass roots organizations but are not identified with the development of any specific environmental movement.

The potential hazardous consequences derived from polluted air is of common concern to the U.S and the U.S.S.R.. An examination of sulfur dioxide (SO₂) emission data in the next section allows for an opportunity of comparative analysis.

Environmental Policy and the U.S.S.R Political/Economic System

The centralized control, intrinsic to a socialist form of government, does not allow environmental movements from the bottom up; these issues, if addressed, are the concern of the ruling elite. "The Soviet Union is a society that is controlled in every significant aspect by a ruling elite. The ruling class exercises ultimate authority over the use of resources and the distribution of final goods" (Schap 1988, 393). Concerns of the pre-revolution elite were limited to the protection of fisheries, game species, and timber harvest. Stalin's focus on rapid industrialization, however, led to significant internal environmental problems. "These problems lingered and were often given inadequate attention, the failings were blamed on ministerial mismanagement and complacent bureaucrats" (Pryde 1972, 17). "The agenda of the Soviet conservation movement" (from the top down) "which began in the 1960's was based on the standard maxims of the efficient and conserving use of natural resources. In general, the rationale for this was not based primarily on ecological principles, but rather on making the national economy more efficient and productive" (Pryde 1972/Pryde1988, 556).

These significant problems created by rapid industrialization during Stalin's reign make up the U.S.S.R. environmental agenda today. Atmospheric problems, such as conventional air pollution (industrial emissions and motor vehicle exhausts) are compounded by problems associated with the acidification and deposition (i.e., acid rain and 'arctic haze', and occurrences of pollution concentrations in high latitudes). Worldwide concern over the Chernobyl accident stimulated a need to re-examine all aspects of the nuclear power program of the U.S.S.R. The termination of the proposed Krasnodar plant in 1987 may be evidence of this re-examination. The unregulated disposal of toxic wastes have caused extensive water pollution problems, many of which may be irreversible such as the rivers and lakes along the Kola Peninsula and the Bug, Dnyestr, Danube, and Don rivers, which have toxic concentrations measured at ten times the maximum permissible concentration (MPC) (Environment Vol.32, n 2, March 1990). Global concerns for preserving biodiversity are often motivated by a desire to preserve aesthetics, but the primary concern of the U.S.S.R. on this issue is the potential loss of significant genetic information contained within the disappearing species. This concern is focused on the potential use of genetic information in developing food, medicine, and raw materials for future human needs (Myers 1983/Pryde 1988, 559).

The reform of economic and political institutions (perestroyka) initiated by Mikhail Gorbachev accelerated a decentralization of fiscal power that was already occurring (Berkowitz and Mitchneck 1992, 3). Further, a new openness toward western societies (glasnost) allowed for a greater flow of information into and out of the U.S.S.R. The implementation of this policy, though, resulted in uncovering of misinformation practices being carried out by the central authorities, especially in the area of statistical data. Not only was published data falsified by the central authorities, but the data submitted to them was also manipulated (Turnbull 1991, 13). Thus, reliance on data published by the central authorities of the U.S.S.R. prior to Gorbachev reforms may be

highly suspect. The relaxing of "command and control" has created new freedoms for the people of the U.S.S.R., an example of which is the emergence of grass roots environmental groups which have surfaced and begun to vocalize public opinion concerns from the bottom up (Altshuler and Mnatsakanyan 1990, 28). On the other hand, the Gorbachev reforms have not been without opposition within the ranks of the central authorities, as seen by the attempted coup d'état August, 1991. As in the case of the U.S., policy adjustments are always in a state of flux dependent on the partisan balance of power, and in the U.S.S.R. the policy adjustments affected by the Gorbachev reforms threatened the system.

Since the attempted coup, Boris Yelstin has risen to power as the central figure of the Republic of Russia. As this study is being conducted his power base is subject to erosion by hardliners. Whether he will survive is a question, and, if so, under what circumstances. Political and economic stability of the entire region is an unknown. Needless to say, environmental issues are not as salient as more basic power based problems related to who will rule and in what capacity. Though the largest of the republics, Russia is only one of 15. Whether a similar struggle for power will occur in the other republics is another question left unanswered at this time. The environmental problems of the region have not gone away and will ultimately have to be addressed.

A comparison of U.S. and Soviet policies and systems may provide some insight to how these problems might be resolved.

CHAPTER VI

COMPARATIVE ANALYSIS

U.S. and Soviet Political/Economic Systems

A comparison of the political/economic systems of the U.S and the U.S.S.R. reveals some obvious differences. The ideological difference between a republic form of government and a socialistic form of government provides a basic division. Further contrast is provided by the fundamental differences in the free market system as employed by the U.S., and the centralized command and control system utilized by the U.S.S.R. Policies derived from these differences reflect substantially different goals. Environmental policies resulting from converging movements in the U.S. are based on an ecological principle of developing a sustainable relationship between man and his environment. The U.S.S.R. environmental movement, however, is predicated on the principle of conservation of resources for the purpose of making the national economy more efficient and productive. The fact that all resources are the exclusive property of the Soviet state helps to explain this principle. The state ownership of the means of production resources and state principles of efficient productivity are united and form a relationship that is a function of that system.

U.S. policies originated from public concern of environmental problems. This type of bottom up representation has not been allowed in the U.S.S.R. The U.S. policies are supported by a liability regime which provides economic incentives to enhance compliance. Though incarceration acts as a deterrent for criminal activity, the concern over potential financial loss or savings determined by compliance regulations is derived from basic market principles. The absence of comprehensive regulations in the U.S.S.R. limits any discussion of compliance, however, the functional difficulties

encountered by the narrow departmental approach of the branch inspection services may be a contributing system factor.

The cost of administering an environmental protection program is considerable. In the U.S. these funds are provided by the people via federal taxation. Similar revenue raising methods have been utilized in the U.S.S.R., but a significant decentralization of taxing power occurred between 1985 and 1990 (Berkowitz and Mitchneck 1992, 3). The transfer of this power to the *oblasts* (territories) and city levels was accompanied by the responsibility for financing operations of public facilities. The decentralization of taxing power resulted in confusion and consequently the use of experimental methods which failed to follow proper procedures. Ultimately, the collection of insufficient revenues could not meet budget requirements and services were reduced (Berkowitz and Mitchneck 1992, 3). In this way, an unintentional reduction of consumption (conservation by confusion) was furthered. To say that this was all part of a grand scheme to reduce sulfur dioxide levels would be not be accurate.

Though under consideration prior to the break up, the U.S.S.R. had no national law mandating an environmental impact analysis. Government projects, motivated by the principle of enhancing national productivity, have recently been criticized for omitting what is now considered to be a necessary process. Requiring federal agencies to conduct a study on the effects of "major federal action significantly affecting the quality of the human environment" and to formally submit an Environmental Impact Statement (EIS) has become the cornerstone to U.S. environmental policy. This policy was one of the main features of the National Environmental Policy Act (NEPA) of 1970 in the U.S. Its function has been recently praised by Soviet environmentalists as being crucial to controlling potentially disastrous projects before they are implemented. The shrinking Aral Sea is an example of a government project which has resulted in an "ecological calamity" (Kotlyakov 1987/Pryde 1988, 560).

The system of checks and balances which are ingrained in the U.S. political system is noticeably absent from the Soviet system. Unrestricted activity legislated by a ruling elite has created many of the environmental problems confronting the former Soviets. Though a centralized authority is advantageous in coordinating policy and raising revenues, without checks on the authority of a singular faction, policies may not represent the will of the people.

The difference in respective political ideologies, governmental framework, economic philosophy, and the individual goals professed by these two superpowers, has precipitated vastly different policies and methods, yet with similar results in terms of air pollution abatement (sulfur dioxide emissions).

U.S. - U.S.S.R. Air Pollution: Sulfur Dioxide Emissions

The emission of sulfur dioxide (SO₂) from industrial sources can undergo oxidization in the atmosphere to form sulfuric acid (H₂SO₄). Snow or precipitation causes these acids to be deposited on the earth's surface at a great distance from the point source in some cases depending on prevailing wind patterns. This process is known as "wet deposition" or acid rain and is an environmental problem of global concern, particularly to the U.S. and U.S.S.R. because of the size of their respective industrial complexes (Cooper 1983, 55).

Initial authority for regulating air pollution in the U.S. was created by enactment of the Clean Air Act of 1963 and subsequent amendments in 1970, 1977 and 1990. The Amendments of 1970 established standards based on a determination of maximum permissible ambient air concentrations for seven pollutants: particulates, sulfur oxides, carbon monoxide, nitrogen oxide, ozone, hydrocarbons and lead. These National Ambient Air Quality Standards were to be established without consideration of the cost of compliance Sec 109, CAAA 1970. Further, the act directed the EPA to establish

maximum emission standards for new sources (plants and factories) called New Source Performance Standards. These "threshold" standards were to be established using an industry by industry basis and were to take into account the costs, energy requirements, and environmental effects of their implementation Sec. 109, CAAA of 1977. Liability for compliance was *strict* and the responsibility of the owner/operator. Monitoring emission activity was among the responsibilities of the agency.

Acid deposition in Western Europe is dominated by sulfur dioxide. While little is known about the acid rain that falls in the interior of the U.S.S.R., dominance of sulfur dioxide in country-wide emission statistics makes it extremely likely that sulfur dioxide similarly dominates the acidification of precipitation in many regions of the Soviet Union.

Cooper 1992, 38.

Soviet legislation provided a legal basis for strict monitoring, and this task has been given to the newly established Goskomprirdoda, whose functions, though distinctly different, can be compared to the EPA. Among a host of other responsibilities, it was assigned with the task of monitoring and publishing data on natural resources and the environment (Thornton and Hagan 1992, 24). Data on sulfur dioxide emissions is provided from a collection of sources which credit Goskomprirdoda and its predecessor the State Committee on Hydrometeorology (Hydromet).

Table I

<u>U.S. National Ambient Air Pollutant Concentrations: 1980 to 1988</u>

[Data Represent annual composite averages of pollutant based on daily 24 hr. averages of monitoring stations.]

(National Air Quality and Emissions Trends Report, 1988, Feb. 1990.)

Pollutant	Unit	1980	1981	1982	1983	1984	1985	1986	1987	1988
Concentration										
СО	ppm	8.52	8.25	7.86	7.77	7.72	7.03	7.00	6.64	6.56
03	ppm	0.14	0.13	0.13	0.14	0.12	0.12	0.12	0.13	0.14
SO2	ppm	.011	.010	.010	.009	.009	.009	.009	.008	.008
TSP	mg/m ³	64.2	60.3	50.1	49.7	51.2	48.8	48.6	49.7	50.5
NO2	ppm	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Pb	mg/m ³	0.61	0.48	0.49	0.39	0.35	0.23	0.13	0.10	0.08

Table II

U.S. National Air Pollutant Emissions: 1940 to 1988

[In millions of metric tons, except lead in thousands of metric tons]
(National Air Quality and Emissions Trends Report, 1988, Feb. 1990.)

Year	PM	SOx	NOx	VOC	СО	Pb
1940	23.1	17.6	6.9	15.2	82.6	(NA)
1950	24.9	19.8	9.4	18.1	87.6	(NA)
1960	21.6	19.7	13	21	89.7	(NA)
1970	18.5	28.3	18.5	25	101	204
1980	8.5	23.4	20.9	21.1	79.6	70.6
1981	8	22.6	20.9	19.8	77.4	56.4
1982	7.1	21.4	20	18.4	72.4	54.4
1983	7.1	20.7	19.3	19.3	74.5	46.4
1984	7.4	21.5	19.8	20.3	71.8	40.1
1985	7.1	21.1	19.8	20.1	67	21.1
1986	6.8	20.9	19	18.3	63.1	8.6
1987	7	20.6	19.3	18.6	64.1	8
1988	6.9	20.7	19.8	18.6	61.2	7.6

Table III

U.S. National Air Pollutant Emissions: 1940 to 1988 [% Change]

(National Air Quality and Emissions Trends Report, 1988, Feb. 1990.)

	PM	SOx	NOx	VOC	СО	Pb		
1940	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)		
1950	7.8	13	36	19.1	6.1	(NA)		
1960	-13	-0.5	38	16	2.4	(NA)		
1970	-14	44	42	19	13	(NA)		
1980	-54	-17	13	-16	-22	-65		
1981	-5.9	-3.4	0	-6.2	-2.8	-20		
1982	-11	-5.3	-4.3	-7.1	-6.5	-3.5		
1983	0	-3.3	-3.5	4.9	2.9			
			0.0	4.3	2.9	-15		
1984	4.2	3.9	2.6	5.2	-3.6	-14		
1985	-4.1	-1.9	0	-5.9	-6.7	-47		
1986	-4.2	-0.9	-4	-4.2	-5.8	-59		
1987	2.9	-1.4	1.6	1.6	1.6	-7		
1988	-1.4	0.5	2.6	0	-4.5	-5		

Table IV

Sulfur Dioxide Emissions in U.S.S.R. 1989

[thousand tons per year]

	<u>IIASA</u>	<u>Krop</u>
Region		
Karelia	740	59
St.Petersburg	401	120
Baltics	432	289
Belorus	521	368
Ukraine	3037	1933
Moldovia	146	164
Other Russia	4041	<u>1210</u>
	9318	4143

Data: (IIASA) International Institute for Applied Systems Analysis; L. I. Kropp,
Sulfur and Nitrogen Oxide Emissions from Soviet Electric Power Plants and Large Boiler Units, 1991.

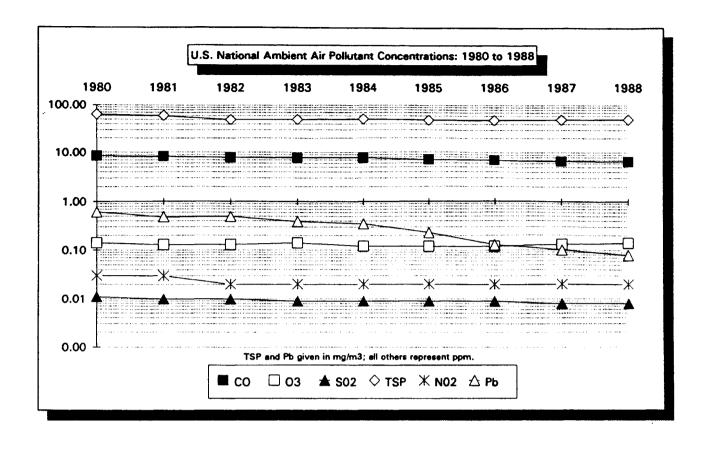


Figure 5. U.S. Ambient Air Pollutant Concentrations: 1980 to 1988.

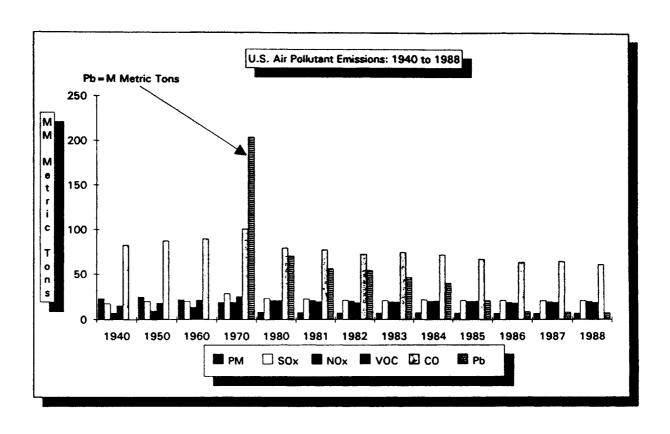


Figure 6. National Air Pollutant Emissions: 1940 to 1988. (No figures are available for Pb prior to 1970)

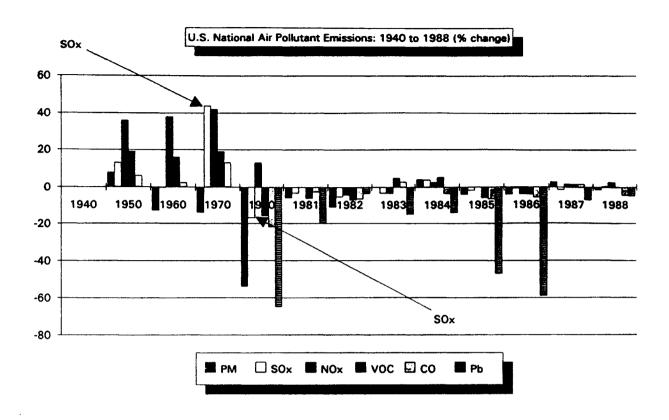


Figure 7. National Air Pollutant Emissions % Change from prior year.

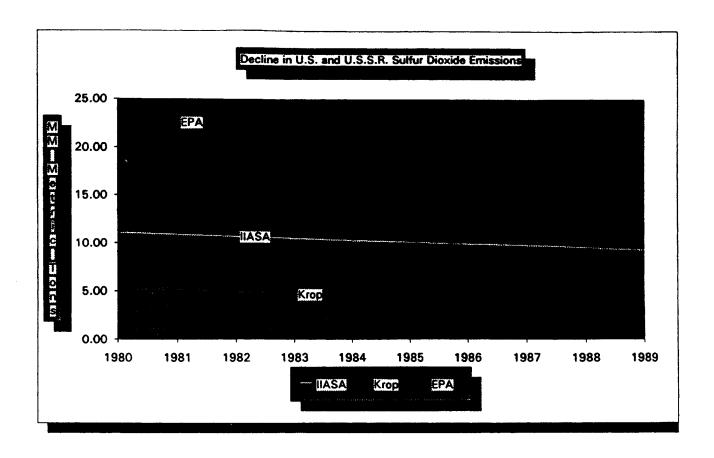


Figure 8. Decline in U.S. and U.S.S.R. Sulfur Dioxide Emissions.

Table and Figure Description

Table I includes concentrations levels of several air pollutants. Data on sulfur dioxide concentration levels reflect a steady decline from 1980 to 1988. This relationship is shown graphically in Figure 1 on page 36.

Table II lists U.S. air pollutant emissions for almost 5 decades. An increase in sulfur oxide emissions can be tracked up to 1970 when emissions began to taper off.

This same data is referenced in Table III, only for percent of change from the prior year. Table I and Table II are graphically represented in Figure 2.

Table IV lists sulfur dioxide emissions for the major republics of the former U.S.S.R. during the 1980s. The lack of empirical data for earlier periods in the U.S.S.R. is an inhibiting factor for making a detailed study. Access to more comprehensive sources may become available at a later date. Supplemental data is provided by excerpts from *Transboundary Pollution: Sulfur Dioxide Emissions in the Republics of the U.S.S.R.*, C. Cooper, 1992.

According to Soviet statistics, emissions of sulfur dioxide have dropped dramatically since the early 1980's from a peak of 20.2 million metric tons SO_2 in 1983 to 16.8 million metric tons in 1989. In the United States, emissions of sulfur dioxide from stationary sources declined rapidly in the early 1980's, although in recent years emissions have increased slightly. While Soviet statistics show a 16% decline in sulfur dioxide emissions between 1980 and 1989, the United States experienced an 8.5% decline in sulfur dioxide emissions during the same period.

Cooper 1992, 48.

Have Environmental Policies Affected Emissions Declines?

Sulfur dioxide emissions have contributed to the problem of acid rain in both the U.S. and the U.S.S.R. Each nation entered into an agreement [U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection] signed on May 23, 1972, indicating a will to engage in policies designed to abate certain environmental concerns, air pollution being number one on the list of eleven areas of study. Both nations have demonstrated efforts to comply with these intentions, as is evidenced by legislative controls enacted since that agreement which include monitoring capabilities. Sulfur dioxide emissions, a key variable in evaluating ambient air quality and a common problem which has stimulated policy adjustments for both the U.S. and

the U.S.S.R., is used as a measuring device in anticipation of being able to show a relationship between policy and a decline in emissions of a dangerous pollutant. A review of pertinent available sulfur dioxide emissions data for the period from 1980 to 1989 reveals sufficient evidence to conclude, that there has been a significant (greater than 5%) paralleling decline trend during this period. The argument put forth is predicated on this decline trend being stimulated by the implementation of environmental policies.

In order to support this conclusion alternative causes must be evaluated and eliminated. For the U.S.S.R., statistics indicate a significant decline, but the causal variable is not necessarily environmental policy. Therefore this statement does not coincide with the proposed conclusion of the hypothesis.

The Case for the U.S.

During the years from 1981 to 1989 (the Reagan years) the U.S. experienced a period of economic growth and expansion in the industrial sector. For example, percent of production represented by coal increased from 28.7% to 32.3%, percent of consumption increased from 20.3% to 23.3%, gross domestic product increased from \$11,892 to \$21,196, gross national product increased from \$12,042 to \$21,213, and personal income was up from \$9,948 to \$17,705 (U.S. Energy Information Administration, Annual Energy Review 1992). This period also represents a decade in which extensive environmental legislation and regulation, specifically the CAA of 1963, the CAAA of 1970, the CAAA of 1977, were being enforced. The U.S. experienced economic growth under conditions of comprehensive restrictions and yet sulfur dioxide emissions were significantly reduced? Considering that the U.S. industrial complex is fueled primarily on coal, which is responsible for sulfur dioxide pollution, this combination of growth under restriction would appear to be convincing

evidence supporting a relationship between a decline trend in sulfur dioxide emissions and the effectiveness of U.S. environmental policies, at least so far as they pertain to ambient air quality.

Support for this relationship is provided by several variables: the volume of legislation concerning environmental regulation, and the punitive and economic incentives provided by a liability regime. These variables can be seen as an outgrowth of the political/economic system employed by the U.S.

The republic nature of the political system and the market base of the economic system represent system functions which have facilitated the variable contributions. The taxing authority provided by a central government represents another function of this system which has facilitated the emergence of environmental policy. If we accept these correlative relationships, then the argument makes sense for the U.S. case.

Summarily, that the enaction of U.S. environmental policy (CAAA of 1970) is responsible for the decline in U.S. SO₂ emissions. Further, that such policy is a product of a representative form of government which governs in a market driven society subject to a central taxing authority.

Based on an evaluation of readily available U.S. statistical data, such extraneous factors as a decrease in consumption of sulfur based coal, a decrease in production of sulfur based coal, a decrease in the availability of money, a decline in the cost of implementing abatement technology, a shift towards voluntary self initiative, etc. are not applicable and can be ruled out as contributing variables to the observed phenomenon.

The Case for the U.S.S.R.

The absence of enforced restrictions on sulfur dioxide emissions during this period would tend to rule out effective regulation, yet emissions were significantly reduced.

The answer goes back to the guiding principle of conservation. Eighty percent of the sulfur dioxide emissions from stationary sources in the U.S.S.R. are the result of fuel combustion. As a result of the discovery of the Urrengoi natural gas fields in the early 1980s providing significant new reserves, natural gas consumption dramatically increased. Though decisions were made to comply with the 1979 United Nations ECE Convention on Long Range Transboundary Air Pollution which required a 30% reduction in sulfur dioxide emissions, the shift to alternative fuel sources was motivated by the newly discovered resources and the opportunity to raise capital by exporting oil (Cooper 1992). This shift in usage represented an 80% increase by 1989 and accounted for 40% of the entire fuel balance in that year. This change coupled with a greater reliance on lower sulfur coal has contributed to the reduction in overall sulfur dioxide emissions. Conservation of resources, a key element in the U.S.S.R. environmental goal, was partially accomplished, unintentionally, by the decentralization of taxing authority, which through inefficiency reduced available revenues, causing fuel consumption in the cities to be reduced (Berkowitz and Mitchneck 1992, 9). Though conservation of resources is intrinsic to the goal of U.S.S.R. environmental policy, this policy is predicated on enhancing economic productivity and not reducing overall consumption. Unlike the U.S., the U.S.S.R. did not enjoy the same economic growth during the eighties. Reduced consumption and a massive shift towards alternative fuel sources appear to be more responsible for the decline in sulfur dioxide emissions than effective policy. The decline in pollutant emissions may therefore be a temporary phenomenon, and if productivity resumes, so might consumption and the further reliance on sulfur based coal. Without effective abatement controls and enforceable pollution regulation, conditions will inevitably deteriorate (Cooper 1992, 39).

Consequently the decline in emissions was not caused by policy, rather resulted from a decline in consumption triggered by a shift to alternative fuel sources coupled with a decentralization of the government's taxing authority. A stand-down of the

military during this time also contributed to the decline in consumption. Though similar results were achieved by these occurrences, they should not be interpreted as a designed policy.

Therefore, as reduced sulfur dioxide emissions do not reflect a correlative relationship with effective environmental policies the argument does not follow for the outlined conditions existing in the former U.S.S.R.

That American air pollution policy was instrumental in reducing sulfur dioxide emissions in the U.S., despite growing consumption, is a key element in this thesis. The responsible variable is the presence or absence of the CAAA of 1970. This legislation provided the necessary restrictions and enforcement authority to change the existing trend of rising sulfur dioxide emissions. A prerequisite for this legislation is the political/economic system employed by the U.S. Correspondingly, the policies of the U.S.S.R. are a reflection of its political/economic system. Contrasting some system variables may allow enhancement of the pre-stated hypothesis.

Systems Theory

Systems theories emerged in the 1950s as an analysis tool in comparative politics studies, mainly due to the work of David Easton, Gabriel Almond, and Karl Deutsch. Application of systems theory can take many forms. Some efforts attempt to deal with concepts and generalizations designed for immediate application. Some analysts such as (Laszlo, Levine, and Milsum 1974) have concentrated on solving problems in order to "plan for and to control the system so as to perform in a socially good way. John Mcleod in his "System Simulation, Behavioral Science, System Theory-and Simulation" 1974, combined systems theory with simulation techniques in order to address problems facing present and future societies. Others, Abramson and Inglehart 1970, Farace and Donohew1965, Gregg and Banks 1965, and Teune and Ostrowski 1973,

have attempted to analyze political systems by measuring empirical data. Systems theory as it relates to the environmental policies of the U.S. and the former Soviet Union must address the arena of comparative politics and international politics. Two approaches have been identified with these areas of study: general systems theory and structural functionalism (Chilcote 1984, 144).

General systems theory, which is most closely associated with the work of David Easton, develops a framework that is ahistorical in its orientation, holistic in its approach, and emanates from a natural and physical science point of view. This approach is generally associated with the discipline of political science. Structural functionalism strives to be holistic, but tends to lean towards ahistorical and middle-range analysis. The works of Gabriel Almond and Talcott Parsons represent the theory of structural functionalism, which is more closely associated with the discipline of comparative politics than with political science.

The Eastonian framework has been criticized on several issues. One such issue is its attention to boundary. Its focus on the political aspects of a system are not distinguished from the economic and social contributions to that system which may have substantial independent input. Easton's theory has also been criticized by elementarists on his avoidance of the contributions of the human element (Singer 1971, 8).

Almond's structural functionalist approach to systems theory parallels the Eastonian framework but distinguishes itself in several areas. Structural functionalism is derived more from the disciplines of anthropology, economics, and sociology rather than the natural and physical sciences. Critics tend to focus on an inability of structural functionalism to deal with social change and an implicit preference or bias for Western so-called democratic systems.

This thesis relates system to policy and yet deals with system as being a multidisciplinary collection of activities. The inclusion of economics as a basic function of the system requires analysis which does not directly coincide with the Eastonian framework. Some attention is also given to an analysis of goals and the importance of the desires or "will of the people" which could be classified as social input or be a reflection of a political culture.

The Almond framework which does include an economic component in its basic framework offers an alternative model, but, as critics point out, it may be deficient in relating to social change. For this reason and to avoid any additional preference for Western systems, strict adherence to the Almond framework is also rejected. At the risk of committing the error of being selective, this study relies on a comparison of variables which discriminate the basic differences between the U.S. and Soviet political/economic systems. Those variables are listed in Table V and are discussed in the subsequent passage.

Table V
System Variables

Political ideology	U.S. Democracy (individual rights)	U.S.S.R. Socialism (state rights)
Political Structure	Republic (representation)	Totalitarian (power based)
Goals (environmental)	Coexistence (man & envir.)	Efficiency (use of nat. res.)
Economic System	Free market (profit based)	Central planning (function based)
Property (means of production)	Private ownership	State ownership

Variations in the Political Systems of the U.S. and the Former Soviet Union

Ideology

The political ideology of the U.S. is expressed in its attention to individual rights. The freedoms provided by the Bill of Rights in the U.S. Constitution are unique in terms of political structures. Great focus is placed on the rights of the minority opinion. Protection of the minority opinion is ingrained into U.S. environmental policy. For example, "action levels" or safety standards are often geared towards protecting the most sensitive members of the population (infants and elderly). Though these groups may constitute more of a non-political minority such as can be associated with an ethnic minority, their voice is a collective minority opinion concerning elements of risk. Policies represent the current political culture of the populous and as that culture undergoes changes in attitudes so do the policies of government. Conversely, in the former U.S.S.R. the ideology professed is more concerned with the rights of the state insofar as it embodies the rights of the collective or polity. The transformation of the Soviet society during its adherence to the philosophy of Marxism/Lenninism can be characterized as an attempt to manipulate an ideology through a political system. Government was used as an instrument of radical social change in a form of "revolution from above," making all unregulated forms of revolution from below illegitimate (Comparative Politics class notes: Jenswold 1993). The concept of revolution from above prohibits input from the people outside the ruling elite. Thus, any policies directed at environmental management or protection reflect not the will of the people, rather the will of those who occupy power positions within the ruling elite.

Political Structure

Political ideologies represent a system of ideas which require a functional vehicle with which to further those ideas. In the U.S. that vehicle is a Republic, which provides, through competitive elections, a measure of accountability to the masses. The role of interest groups provides a vehicle by which the people are further represented. Though similar functions are performed by different structures in different governments, a key difference in the structures of the U.S. government and that of the former U.S.S.R. lies in representation. The multitude of environmental legislation enacted during the 1970s was a reflection of the desires of the people of the U.S. to protect the environment from what was perceived as a threat. However, threats to the environment in the former Soviet Union occurring during the reign of Joseph Stalin were far greater than any recognized problems in the U.S., yet there were no attempts to initiate policies to deal with these ecological calamities. This failure to respond to environmental problems reflects either a posture of unawareness or the desire of the ruling elite. Disagreement with Stalin's programs was not a healthy position to assume, and a movement to bring about enhanced awareness or even a desire to pursue environmental protection was not allowed to be openly voiced. Such desires did become evident during Gorbachev's presidency and give rise to the idea that such concerns with the environment may have always existed, yet were stifled because they were politically incorrect.

Authority in the Soviet system since the revolution rested with the Communist Party and the leadership of its Chairman, though under Stalin's "iron fist" rule the influence of the party could be considered nominal. Stalin's endorsement of the "anti-faction rule" put an end to any dissention which might have arisen from his opponents. With the passing of Stalin, the structure of the Soviet government did change. Government by committee in the form of the Supreme Soviet (Supreme Council) became the norm.

Though various individuals ascended to the top party position of chairman (Kruschev, Kosygin, Bresnev, Andropov and Cherneko) none ever achieved the stature of a Stalin and the real power of government lay in the hands of the Supreme Council. The Supreme Soviet was reconfigured in 1989 in favor of the Congress of Peoples Deputies (CPD) which elected a new Supreme Soviet. This was not a structural change, rather an infusion of a new membership. In 1989, a new office was created, the office of the President, which was filled by election of the CPD. Mikhail Gorbachev, then Chairman of the Communist Party, was elected president and was given authority to choose a cabinet and a supreme court, both of which had to be ratified by the Supreme Soviet. The cabinet could be dissolved by a two thirds majority of the Supreme Soviet and the CPD. In 1990 the Communist Party was officially stripped of any authority.

The separation of powers in Gorbachev's Soviet Union looked much more Western than in any preceding time, but there was no direct representation of the people. Without this representation, the U.S.S.R. remained a totalitarian system. In Democratic societies "outputs of regulation, extraction, and distribution are more affected by inputs of demands from groups" and these societies therefore have "a higher responsive capability" (Almond 1966, 28). Totalitarian societies, those with synthetic cultures (parades, banners, posters) who will not be satisfied with acquiescence, or an eagerness to utilize military to enforce allegiance, are societies which "by contrast are less responsive to demands and regulate behavior through coercion and extract maximum resources from their people". (Almond 1966, 28.)

The absence of any policy requiring a review of the environmental impact stemming from government activity in the former U.S.S.R. left all decisions relating to potentially environmentally damaging projects in the hands of the ruling elite.

Goals

The basic environmental goal of the U.S. is the harmonious coexistence between man and his environment, or phrased another way, to achieve a sustainable relationship between man and his environment. This goal has been forged from active and on going debate between two main environmental movements over many years. Though both the conservationist movement and the environmentalist movement maintain different platforms even today, it is their common ground which forms the basis of U.S. policy as reflected by environmental legislation.

Environmental goals in the former U.S.S.R. began to take shape in the 1960s and were "based on the standard maxims of the efficient and conserving use of natural resources. In general, the rationale for this was not based primarily on ecological principles, but rather on making the national economy more efficient and productive" (Pryde 1972/Pryde 88, 556).

The "efficient" and "conservative" use of natural resources espoused by early Soviet goals is a position not inconsistent with views held by American industrialists. U.S. environmental policy often references "wise use" or "sustainable yield". These terms are found in recent Soviet literature. The key difference here is that in the Soviet position, "use" refers to the state's use and not that of private industry. In the U.S. the ambition of industry is held in check by the interests of non-industrialists, and in the U.S.S.R. there were no effective non-industrialist (i.e., non-state) interests. The maintenance of an industrial base is of national concern and growth is a common goal, yet at what expense? A trade-off between business interests and ecological prudence is established by U.S. policy.

Goals are often greatly influenced by awareness and in the former Soviet Union there appears to be a noticeable lack of awareness about environmental concerns until recently during the Gorbachev era.

Property

The issue of property is central to the differences in the two systems. In the U.S. property is owned not only by the federal government but by private citizens and private corporations. Private ownership of the means of production is contrary to the Marxist influence on the former Soviet system. In Marxism/Lenninism, the state maintains ownership of the means of production or natural resources. Along with state ownership goes the responsibility of stewardship of those resources. Thus, the emphasis in regard to resources in the former Soviet Union was placed on the management of resources without consideration to the ill-effects manifested by the harvesting of such resources. Though efficiency was a Soviet goal, many projects during Stalin's reign were wasteful.

The political variables of ideology, structure, and ownership of property are systematically related in each case. The voice of the people is the thread which runs consistently through the fabric of the American political system. Conversely, the will of the State, the ruling elite, is the binding tie in the former Soviet political system. These differences in political variables are significant, yet greater divergence is noticeable in the respective economic systems of these two actors.

Variations in the Economic Systems of the U.S. and the Former U.S.S.R.

The U.S. employs a form of free market system which is based ideally on the concepts of functional integration, contractual relationships, and expanding interdependence of buyers and sellers seeking to maximize a profit. An important goal of the ideal free market system is that all obstacles to the operation of the price mechanism, including political obstacles, are eliminated. Prices were to be set by the forces of supply and demand. This concept is probably true in general for most

products, yet the government does play a role in price control through wheat subsidies and other forms of protectionism which allow fair criticism of a "pure" market analogy. The specific characteristics of a free market are dependent on its degree of openness and the intensity of competition among producers and sellers. Outside of certain hazardous chemicals (DDT) and illegal drugs (cocaine/marijuana), and politically oriented embargoes (Cuba-sugar/tobacco) the U.S. market is representative of an extremely open market providing intense competition for producers and sellers.

On the other hand, the former Soviet Union employed a command and control type economic system. In this system the economy was planned and controlled by the state's bureaucracy which coordinated planning for the division of labor. The lack of an effective common currency, caused by the inconvertibility of the ruble, led to problems with the general accounting system and ultimately yielded a giant barter system. The planned economy was highly inflexible and could not effectively deal with chronic high demand. Also missing from this plan was a system of quality controls. The Marxian value theory of labor was employed, whereby products were valued by the amount of labor it took to produce them. The extraction of profit by U.S. producers was considered by Marxists theorists as unjustified and merely represented unpaid labor. The practices of the Soviet bureaucracy proved to be extremely inefficient and economic reforms were forthcoming.

Early reform measures in the 1920s came in the form of the National Economic Policy (NEP). In 1965, a limited application of the Liberman Proposals were implemented by Kosygin and provided incentives for managers, quality controls, and overall better management. These reforms, however, had no long-lasting effect, as Bresnev feared alienation of his supporters and allowed the proposals to wither away. Andropov did resurrect some of Liberman's ideas, yet with Cherneko's rise to power there was a return to the stagnation of the Bresnev era. Major structural change did occur, though, with the leadership of Mikhail Gorbachev. In 1987 Gorbachev initiated

radical change with the creation of cooperatives and measures to encourage foreign investment and trade. These reforms essentially marked the abandonment of autarchy by the former U.S.S.R. The Gorbachev reforms included: decentralization by granting more autonomy of decision making on what to produce, assessment of a penalty for substandard goods (5% of price from workers bonus fund), 30% price bonus for quality, increased managerial control which allowed managers more freedom in budgetary decisions, and a local allocation of supplies. Problems still remained with administering these proposals. Supervision, bribery and insignificant impact were among the obstacles encountered. Though Gorbachev was committed to socialism, it was clear, by 1989 that the Soviet economy was drifting towards a more capitalistic system.

One of the cornerstones of U.S. environmental policy is the liability regime imposed by regulations. Most rules have penalties for non-compliance. A refusal to adhere to these rules would ultimately affect the economic productivity of any competing industry. Not only are there rules for compliance but there is a complex corrective action program in force for releases of many pollutants. Penalties for compliance violations can be expensive, up to \$50,000 per day for criminal violations, but the cost of remediation or corrective action, can run into the millions of dollars. The enforcement concepts incorporated by U.S. enviornmental policies are derived directly from the free market system. Incentive programs which deal with air pollution abatement are also targeted at the producers' ambition for profit. With the omission of profit motive in the Soviet economic system, no incentive to protect the environment exists other than the possibility of incarceration, yet the ruling elite are the decision makers and there is no precedent for internal policing on environmental issues. The authority has always been at the fingertips of the Soviet state's environmental planning agency, but the will to enforce and the absence of any comprehensive regulations to enforce invites investigation of other systems. The competitive nature of the U.S. free

market system allows for effective enforcement of protective regulations. The command and control practices of the former Soviet Union, at least prior to Gorbachev, espoused efficient use and conservation of resources, though waste and ecological calamity were more the norm. If the goals of the C.I.S. come in line with those of the U.S. which encourage the wise use and harmonious coexistence of man and his environment as opposed to efficient use and conservation of resources, and if there is a continuation of the former Soviet trend towards a capitalistic economy, then, a U.S.-styled liability regime might prove useful.

Conditions in the former U.S.S.R. were changed during Gorbachev's leadership, yet conversion to a capitalistic system and a more open society presented numerous difficulties. The reforms that Gorbachev sought may have been his personal downfall. As had been feared by previous party chairmans, radical change invited alienation. Not only was there political opposition by hardliners within the Supreme Soviet and the CPD, but the hardships of dealing with massive inflation that occurred overnight with the implementation of many of Gorbachev's reforms created alienation of the labor unions and consumers. Though he survived an attempted coup d`état in 1992, the end of Gorbachev's presidency and the Union was near. The breakup of the former U.S.S.R. into the Commonwealth of Independent States (C.I.S.) may have signaled the end of the cold war for the U.S. and it's allies, yet it leaves many unanswered questions concerning the environment of this region. Chapter VII gives an outline of the current political framework of the C.I.S. and poses the question of how this new collection of sovereign entities will deal with transboundary pollution issues.

CHAPTER VII

THE COMMONWEALTH OF INDEPENDENT STATES

Political Framework

The Commonwealth of Independent States was born in Minsk on December 8, 1991 when three Republics, the Republic of Belarus, the Russian SFSR, and the Ukraine entered into a multilateral agreement. The three Republics agreed to coordinate market reforms, use the ruble as a common currency, control the money supply, cut deficits, free prices, set defense spending, coordinate value added tax rates, and settle enterprise debts (Current Digest of the Soviet Press, Vol. XLIII, No. 49, 1991). This agreement essentially sounded the death knell for the former U.S.S.R. On December 23, 1991 these three republics were joined in Alma-Ata, by the Azerbaidzhan Republic, the Republic of Armenia, the Republic of Kazakhstan, the Republic of Kyrgyzstan, the Republic of Moldova, the Republic of Tadzhikistan, Turkmenistan, and the Republic of Uzbekistan in signing a declaration on commonwealth. The leaders stressed not only equality and unified control over nuclear arms but a commitment to common economic space and the fulfillment of Soviet obligations. The formation of the 11 member Commonwealth of Independent States officially ended the U.S.S.R. The initial organizational structure of the C.I.S. began with the creation of a supreme body of the Commonwealth, the "Council of Heads of State" as well as a "Council of Heads of Government". The C.I.S. endorsed Russia as the successor to the United Nations seat once held by the U.S.S.R. (and to its Security Council seat.) Minsk was selected as the residence for all C.I.S. administrative offices and the site for future meetings to discuss the details surrounding the abolishment of former Soviet laws and the formation of new agencies. On December 25, 1991 President Mikhail Gorbachev resigned.

The Minsk treaty and the subsequent addition of the Alma-Ata Declaration occurred quite rapidly, yet the death of the Union had begun some time before. The signing of the Treaty on an Economic Community on October 19, 1991 was a sure sign of things to come, Gorbachev would later cite 1985 as the beginning of the end. In his resignation address, Gorbachev outlined his dissention for the last time as a Soviet official. His position was firm on preserving the Union state. He was also committed to the idea that such a decision to disunite the state was one of such "scope that it should have been adopted on the basis of the free expression of the people's will" (The Current Digest of the Soviet Press, Vol. XLIII, No. 52, 1992). Gorbachev credited the command-bureaucratic system as the culprit in a society which was "doomed to serve ideology and bear the terrible burden of the arms race." He asserted that previous attempts at partial reforms had all failed, and that he felt it necessary to commit to large-scale fundamental change. Standing firm to his own policies, he cited the demise of the totalitarian system, new freedoms of religion, the press, elections, and human rights as positive results from his reforms. He essentially felt that his policies would continue to work if given enough time. Gorbachev's positions were summarized in his comments of November 25, 1991 following a speech to the CPD. After being questioned extensively by the CPD, he was asked:

Isn't it time to abolish the institution of the Presidency and the country's parliament, since under a confederal state both these structures are obsolete? He replied [No!] The center is necessary, since everyone realizes that the disintegration has to come to an end sometime. Life's realities demand the preservation of a Union, albeit confederal, state. After all, it is impossible to divide up economic, strategic, and legal space and it is also necessary to conduct a single international policy.

Current Digest of the Soviet Press, XLIII, No. 46, 1991.

It was this desire to maintain a central government that was Gorbachev's downfall. The primary goal of Minsk, according to Ukranian President Leonid Kravchuk, was to prevent a center "from ever again being in charge of our states."

The flight from a central government brought about unity in opposition to Gorbachev. Boris Yeltsin was somewhat sympathetic to Gorbachev's desire to maintain a central government yet, recognized this as a dangerous path. Yeltsin realized that some republics would fare better than others in division. Russia, he felt, would survive and certainly the more wealthy Ukraine, but he was concerned that future instability in other regions would require the guiding hand of a central government. In his eyes, Russia was to fill this role. The problem of a confederal state created much debate. Many felt that a confederation and a united state were incompatible and mutually exclusive. The question of governance without a center is yet unanswered in the C.I.S. and is the subject of inquiry for this study as it applies to environmental issues. With the reconfiguration of the former Soviet Union what were once national environmental problems have now become transboundary problems. One method of dealing with transboundary issues is the system of treaty law or Law of the Sea. Treaties by definition are a form of regime activity. The C.I.S. was formed by treaty and it is likely that future laws in this region will be framed by similar negotiations, as the members are all sovereign states. Chapter VIII explores the options of international cooperation via treaties and other forms of regime activity.

CHAPTER VIII

INTERNATIONAL COOPERATION

Regime Theory

The command and control structure of the former Soviet Union may have been ineffective at solving its environmental problems, but it did offer a governmental framework which had the authority to act on such problems within its borders. With the breakup of the Soviet Union into separate sovereign republics there is no existing governmental structure left to deal with transboundary issues collectively. Authority is now confined to boundaries, yet many environmental problems transcend sovereign boundaries. Republics independently addressing pollution problems which range across multiple boundaries could lead to incompatible remedies, confusion, and potentially unsatisfactory results. Generally, these issues require a certain degree of cooperation among those actors whose boundaries are contiguous to the area of contamination. To understand this problem some discussion of regime theory and international cooperation may be helpful.

Steven D. Krasner's *International Regimes* provides a collection of views of the definition and relevance of regimes in dealing with international issues (transboundary environmental issues). Robert Koehane and Joseph Nye note that international "agreements are often ad hoc, often one-shot arrangements" and that "the purpose of regimes is to facilitate agreements" (Keohane and Nye 1977,19). Robert Jervis adds that regimes exist as a "form of cooperation that is more than the following of short-run self-interest" (Jervis 1983, 173). Krasner's definition of regimes is more technical in its approach and identifies four distinct aspects: principals, norms, rules and decision-making procedures. Krasner distinguishes between regimes and agreements suggesting that regimes are more than temporary arrangements (Krasner 1983, 2). Krasner posits

that the stability of regimes can be weakened or strengthened by the coherency and/or consistency it holds with its principals, norms, rules, and decision-making procedures. If Krasner's position is applied to potential regime activity within the C.I.S., stability could be a problem, given the multi-cultural and multi-religious nature of the region.

Robert Keohane argues that international regimes facilitate nonhegemonic cooperation. He suggests that "intergovernmental cooperation takes place when the policies actually followed by one government are regarded by its partners as facilitating realization of their own objectives, as a result of a process of policy coordination" (Koehane 1984, 49). This form of agreement by non-objection reflects an activity state of cooperation. He contends that regimes reflect patterns of cooperation and discord over time and that by viewing acts of cooperation as long-term patterns of behavior rather than short-term isolated events, regime impact can be evaluated. The C.I.S. has not been in operation long enough to relate to long-term behavioral patterns, yet the concept of regime activity and whether it can have an effect on behavioral outcomes warrants discussion.

Some would argue that the "concept of regimes is useless and misleading" (Strange 1983, 337). The conventional structural functionalism positions held by Susan Strange and Kenneth Waltz propose that regimes are relative to international systems only in regard to distinguishing between distribution and relative capabilities among actors. Waltz suggests that states will act in their own self-interest, seeking at a minimum self-preservation and at a maximum world domination. States are constrained only by the actions of competing actors; therefore, for Waltz, behavior is a function of the distribution of power, and as this distribution changes so does behavior (Waltz 1979,118). Structural functionalism as professed by Strange and Waltz suggests that international agreements reflect merely those steps that the participating power brokers were prepared to take in the absence of any agreement.

Environmental issues will always take a back seat to power struggles which involve self-preservation. Some would argue that certain environmental issues carry such a high degree of risk that they are by definition issues of self-preservation e.g. global warming, ozone thinning, acid rain, pollution of the ground water, nuclear waste disposal. These issues however, are more salient in a stable environment. Given the current instability of the entire region of the C.I.S. it may be some time before these issues are seriously addressed. Ultimately perhaps the actors of this region will pursue egoistic self-interests and attempt to maximize their own utility function. It is difficult to imagine that self-interest in a stable environment could continue to ignore significant ecological disasters within or contiguous to its borders. The question is, how will these problems be addressed? International environmental law has emerged as a distinct academic discipline which offers an alternative to independent self-governed remedy selection (Harvard Law Review 1991, 1484).

International Environmental Law

International environmental law is composed of customary law, treaties, institutions, and extraterritorial application of domestic environmental law. Two obstacles are confronted in matters requiring the application of international law: states reluctance to cede sovereignty and conflicting state interests. The problems associated with assigning state liability based on international custom suggest inherent flaws within the system. Recent attempts to address the failure of international law to develop an effective state liability regime have turned to the codification of procedural duties and disclosure in treaties and international charters. This strategy substitutes procedural obligations for substantive norms. A similar function was initiated by NEPA on the state level (U.S.) Customary international law often fails to overcome the divergence of states' interests, especially when there exists a wide range of interests (C.I.S.). "A

rule of customary international law develops when states follow a constant practice under conviction that international law requires their conduct" (Harvard Law Review 1991, 1504). Though some customs are widely accepted and thereby could constitute a regime, the rules of customary behavior are rarely specified. Rather, emphasis is focused on vague duties which are absent of guidelines about what is acceptable behavior. Developing nations often regard attempts to apply transboundary international standards as a hindrance to their industrial growth.

The absence of case law reflects the unwillingness for states to enter into agreements which might subject their sovereignty to third-party adjudication.

The scarcity of noteworthy decisions and their limited precedential value have stifled doctrinal development and rendered an embryonic liability system unable to communicate expectations about the consequences of action or inaction to prospective polluting states.

Harvard Law Review 1991, 1501.

Though close attention has been paid by the international legal community to the issue of international liability for transboundary pollution, no operational system for adjudicating liability has emerged.

The International Court of Justice (ICJ) has heard only one dispute of note, the *Nuclear Tests* case, and international arbitration has entertained only a few notable cases, principally the *Trail Smelter*, *Lac Lanoux*, and *Gut Dam* arbitrations. No state even brought suit against the Soviet Union following the 1985 Chernobyl accident, although more than 20 states registered significant increases in radioactivity levels.

Harvard Law Review 1991, 1499.

International law follows the trend of domestic law in regard to its focus on liability. Enforcement of international law has proven moot in many cases, as agreements tend to be vague, general, and non-binding. A state's tendency to not cede sovereignty inhibits enforcement from being an effective deterrent for future violations.

In the absence of enforcement, liability regimes do not effectively address the problem of prevention, which is fundamental to environmental protection. Because of these problems prevention of environmental harms are generally associated with treaties.

Treaty Law

"A major flaw of most treaty-making is its ad hoc nature, or institutional adhocracy" (Sand 1990, 16). Multilateral conventions meeting at annual or biannual intervals may offer sufficient time and interaction to establish permanent working relationships, technical expertise, and mutual confidence, certainly essential ingredients in national lawmaking. Treaty-making is further handicapped in that standards adopted through negotiation and consensus will generally reflect the lowest common denominator or minimum standards. There is no way to impose ratification of an international treaty on an unwilling sovereign state. The most important drawback to the treaty method of environmental protection is the length of time it takes for a treaty to be drafted, adopted, and ratified. In a study by the United Nations Institute for Training and Research, the average "tempo of acceptance" is shown to be about five years. It is not unreasonable to propose that many environmental problems cannot be left un-addressed for five years.

The ad hoc nature, consensus tendencies toward the lowest common denominator, and the processes which can take years to implement, suggest that treaties may not fully satisfy Koehane's definition of an agreement facilitator. Further, the unspecified vagueness of customary rules, absent sufficient behavioral guidelines, combined with the dearth of case law, together with a problematic focus on liability, resulting in sub-optimal prevention incentives, indicate that the current system of international law may also be lacking as a viable solution to pollution control.

Cooperation and Compliance

Cooperation, coordination and collaboration have all been cited as methods of resolving problems with undesirable outcomes (Krasner 1985, 3). Robert Keohane argues that regimes facilitate cooperation. Arthur Stein utilizes game theory to illustrate how certain dilemmas can be resolved through coordination and collaboration (Stein 1983,118). Whether these cooperative measures are the results of actors pursuing the maximization of utilities, as is suggested by structural functionalists, does not alter the fact that certain dilemmas and political-economic atmospheres are more conducive to the utilization of these measures.

Robert Powell addresses the problem of absolute and relative gains, which he suggests divides the positions of neoliberal institutionalism and structural realism.

Powell constructs a structural model which evaluates the possible outcomes of the option of using force to solve a hypothetical dilemma. Certain constraints are built into the model which, according to Powell induce concern for relative gains.

Because the constraints in the model formally induce a concern for relative gains, the model may be used to examine how changes in these constraints affect the states' relative concern for absolute and relative gains and the feasibility of cooperation.

Powell 1991, 1304.

Powell, trying to bridge the gap between two schools of thought concerning regime relevance, concludes that when force is an option, that cost can be of great concern. The use of force if possible will be a more viable option if the cost of fighting is sufficiently low. Under these conditions cooperation collapses in the model. "But, if the use of force is no longer at issue" presumably because of too high a cost, "cooperation again becomes feasible" (Powell 1991,1305). Powell's notion that the prospects for cooperation are sensitive to the costs of fighting does not appear to be in

conflict with structural realism in that "changes in the cost of war do not affect the system's structure in Waltz's formulation" (Powell 1991,1305). This analysis would suggest that cost benefit calculations concerning the use of force would precede the establishment of an atmosphere conducive to cooperation and subsequent agreement. Once an atmosphere conducive to cooperation does present itself and subsequent agreements are enacted, the aspect of compliance becomes a problem for consideration.

"For a state, the decision to undertake treaty obligations is a consensual act. Although there are some obvious exceptions where states have signed treaties without a serious intention to comply, ordinarily the decision is made in good faith, presumably after a process, however imperfect, that weighs the costs and benefits of compliance" (Chayes and Chayes 1991, 311). Abram and Antonia Chayes point out that widespread compliance is arguably a function of treaty negotiation, reflecting the lowest common denominator of compromise. This would suggest that the treaty embodies only actions which the parties were prepared to take in the absence of agreement. The international community is often described as an anarchistic system which lacks any governing body (Powell 1991, 1306). Punitive enforcement concepts in such a system are not comparable to liability regimes of domestic governments. According to Chayes and Chayes an analysis of more than 100 existing treaties indicated that the text almost never provides for formal punitive sanctions. Further, that membership sanctions, which by contrast are often included in treaties, are almost never invoked to compel compliance (Chayes and Chayes 1991, 311). Treaties do contain provisions for expulsion and withdrawal of membership privileges for failure to meet obligations, especially for failure to pay assessed contributions. Many domestic legal systems have transcended the limitations of coercive enforcement by relying more on incentives to induce the desired behavior, especially in complex regulatory contexts (Chayes and Chayes 1991, 311). The application of an incentives approach to international

agreements is severely curtailed by the absence of any taxing authority, to relegate financing of incentives programs to the membership. Lesser developed countries may find it difficult to participate in a regime based on financial contributions. With domestic issues dominating the headlines in the U.S. and the former Soviet Union, funding for international institutions may become scarce. Robert Koehane is quick to point out that the role of the financier is generally assumed by a hegemon (Koehane 1984, 16). With the break up of the Soviet Union no hegemon has emerged to assume this role. Though Russia may become the dominant force in the region, talks have already begun between Georgian leader Edward Shevardnadze and Ukranian President Leonid Kravchuk aimed at forging a joint political front against Russia. "This is the beginning of the construction of new relations between the independent states,"

Shevardnadze said (Reuter, April 13, 1993).

Retaliation, or the concept of enforcement by reprisal is another mechanism which has been used to enhance treaty compliance (Chayes and Chayes, 312). Article 60 of the Vienna Convention on the Law of Treaties provides that "in the event of a material breach, the offended party may withdraw or suspend the operation of the treaty in whole or in part." Many bilateral treaty relationships are conducted on this basis, especially where parties are locked in continuing relationship. U.S. - Soviet arms control agreements suggest, however, that when political stakes are high enough, reprisal is not always an effective sanction. For example, the U.S. charged that the Soviets were deploying a mobile radar in violation of the Antiballistic Missile Treaty. Even though the treaty violation was unequivocal, efforts at reprisal were stymied by the inability of the U.S. to devise an appropriate, well-matched response to the violation. If success of international agreements is to be predicated on the existence of a cooperative atmosphere and unenforceable compliance, then there are many challenges to be met. Certain environmental issues which have special characteristics pose more problems to the current system of customary international law.

Special Characteristics of Environmental Problems

"Environmental agreements differ from many other types of agreements because they respond to scientific evidence of a problem" (Harvard Law Review, 1991,1529). The negotiating process is faced with conflicting demands of having to gather sufficient data to understand the problem and formulate effective solutions, and often having to act quickly enough to prevent the problem from becoming worse or even irreversible. The uncertainty of scientific evidence and the elements of time and cost can produce the dilemma of whether to act in the face of uncertainty or not to act at all.

The 1980 U.S.-Canada acid rain negotiations, which produced the Memorandum of Intent, was signed as a bilateral agreement to combat transboundary air pollution and to take interim measures to abate the problem. Canada asserted that in the absence of interim measures irreversible damage would be done. The U.S. contended that further research was needed and that limited funds were better spent on research than on costly regulation which would not necessarily solve the problem. Although the U.S. doubled its spending on acid rain research in 1983, negotiations broke down and no agreement was ever reached, nor interim measures ever taken.

A common method for dealing with uncertainty is the use of expected value calculations, which is estimating the magnitude of damage resulting from an environmental problem and multiplying that estimate by the probability that the damage will occur. Though an effective tool for repeated identical decisions as encountered in hydrocarbon exploration, many environmental problems demand a one shot solution.

For example, an oil company can decide many times whether to drill for oil. If it fails to strike oil on the first try, it can still be confident that in the long run it will make a profit if the expected value of the project is positive; conversely, if it decides not to drill and later research reveals a greater probability of striking oil, little has been lost -- the oil is still there. Unlike oil companies, states facing environmental problems are not repeat players. If states fail to

address problems such as global warming or the extinction of species, there will be no second chance to undo environmental damage.

Harvard Law Review, 1991,1531.

The difficulty in dealing with scientific uncertainty is compounded when attempting to evaluate damage done to environmental resources. U.S. government estimates of damage caused by acid rain are based on its effect on income derived from industries such as agriculture and lumber. Such estimates do not take into account non-economic damage to environmental resources, such as the loss of recreational use and aesthetic value. Difficulties in applying expected value calculations often lead to postponed negotiations in hopes that continued research will reduce the uncertainty (Harvard Law Review, 104:1531 1991). "Conflicting estimates of environmental damage result not only from scientific uncertainty, but also from politics" (Miles 1977, 159).

Bypassing the influence of special interest groups may require the use of nonpartisan objective research scientists in the form of non-governmental organizations. As is the case in security, trade, and money issues, states confronted with an adversarial relationship are reluctant to cede any authority to third party adjudication (Krasner 1984, 7).

Peter Haas differentiated between economic issues and environmental problems in 1989, when he argued that:

[I]n the domain of environmental and resource problems, the absence of historical experience and the lack of technical knowledge puts decision makers into a difficult position. Not only do they not understand the technical causes of such problems, theorists are unclear about the outcomes, costs, and benefits of any action they might take. As a result, unlike economic regimes in which a long standing body of consensual knowledge and relational rights does exist (even if it might be wrong), environmental and resource regimes are highly susceptible to influence and capture by groups that do possess the relevant knowledge and value systems.

Haas 1989, 384.

Another characteristic that distinguishes environmental agreements from other agreements is that they often involve global commons or shared resources. Because the management of such resources often requires international cooperation, problems of states refusing to cooperate known as holdouts, and states refusing to share the costs or free riders, both can render international agreements ineffective.

Negotiations in response to scientific evidence of an environmental problem are hampered by the uncertainty of that evidence and may breakdown or lead to inaction. Further, delays are not uncommon when negotiations involving evaluation of damage done to environmental resources are at issue. Decision makers involved in environmental agreement negotiations are inhibited by a lack of historical experience and technical knowledge and are susceptible to influence and capture by groups that do possess that relevant knowledge and value system. These, along with the tasks of measuring future resource value and subsequent judgment concerning decisions that could affect the availability of resources for future generations are special characteristics intrinsic to certain environmental issues. Problems associated with Law of the Sea (customary international law) and the special characteristics of certain environmental issues have led some negotiators to seek a different approach.

The Convention Protocol Approach

Proponents of the convention protocol approach suggest that it could reduce free rider problems by inducing states to enter into relatively costless agreements (the convention), as a prelude to more costly ones (the protocols). The assumption is that once states are parties to a convention, they will be under greater pressure to join protocols reached at subsequent conferences.

Unlike the comprehensive agreement pursued in the Law of the Sea negotiations, the convention protocol approach does not attempt to resolve all substantive issues in a single set of negotiations. It segregates the negotiations of separate issues into separate agreements. States first adopt a framework convention that calls for cooperation in achieving broadly-stated environmental goals. The parties to the convention then negotiate separate protocols, each containing specific measures designed to achieve those goals.

Harvard Law Review 1991, 1528.

Ozone negotiations culminating in the Montreal Protocol indicate that a cooperative framework can evolve out of the convention, which allows a state to reach an agreement quickly when new scientific evidence becomes available, a valuable tool when confronted with problems which may have an irreversible nature. Critics suggest that the appearance of improved speed in this approach is deceiving, because the relevant time frame begins with the start of convention negotiations, and lasts until the protocol enters into force. In this respect, the Montreal Protocol, which was negotiated in two years, is linked to the Vienna Convention for the Protection of the Ozone, which lasted four years, and the time taken (two years) until the Protocol entered into force, which totals eight years and does not represent a significant improvement over Law of the Sea type negotiations.

Another criticism of the convention protocol approach is related to hold-out problems associated with regulation of global commons. Under the convention protocol approach there is no requirement that a party to the convention must participate in the protocol. Thus, the possibility exists that an actor may join the convention to share in the political rewards of reaching an agreement without joining the protocol and incurring the costs of regulation. Further, hold-out problems might even be accentuated by the convention protocol approach, by precluding the solution of issue linkage. Though comprehensive agreements associated with the Law of the Sea type negotiations have been cited as a negative in arriving at successful agreements, issue linkage is facilitated by this process (Harvard Law Review, 104:1545 1991).

This issue of linkage is associated with an analysis of underlying levers of power in the world system posited by Susan Strange in her contribution to Steven Krasner's *International Regimes*. She suggests that "key bargains, underlying regimes reveal more about the real levers of power in the system." Strange cites three points regarding transnational transactions.

First, the bargaining partners often dispose of very different kinds of power; for example, one has the political power to refuse access to a market, the other the power to refuse to transfer technology. Second, each of them is vulnerable to a different kind of risk, as it might be of a palace revolution on one side or a corporate takeover on the other. So that, thirdly, the bargain struck is apt to consist of a highly variable mix of political and economic benefits conferred and opportunities opened up. Bargains will reflect both the positive goals the parties severally wish to achieve and the negative risks and threats from which they want to find some security.

Strange 1983, 346.

The significance of this type of bargaining and the necessity for issue linkage may lead to a modification of the convention protocol approach, though this approach does have some advantages over the Law of the Sea type of negotiation for environmental issues, it also has its limitations (i.e., it may induce would-be free riders to join an agreement, but it does not eliminate hold-out problems). The issue linkage discussion suggests that environmental agreements merely pose the same challenges as those encountered by negotiators involved in treaties concerning security, trade, and money.

Do Environmental Agreements Constitute a Different Kind of Regime?

Difficulties with procedural elements and the ratification process do not appear to be selective toward any particular problem. One argument is, however, that in light of Powell's analysis of the cost of fighting being a prelude to cooperation, that certain environmental issues can be differentiated. It would appear that in matters involving

security, trade, and money, that the cost of fighting is a more relevant criteria than in ecological matters. Though the oil fires and oil dumping that occurred in the U.S.-Iraqi conflict ("the Mother of All Wars"- S. Hussain 1992) could be posited as an argument to the contrary, these acts were not a prelude to conflict, but a continuation of an existing conflict. Environmental issues become more salient during periods of stability and thus, may be surrounded by an atmosphere more conducive to cooperation which is not predicated on the cost of going to war. Cost benefit analysis concerning compliance issues, however, would appear to be a common problem for most treaty negotiations.

Investment, risk, and reward parameters on issues of security, trade, and money are often established with the aid of a vast amount of historical data. Certain environmental problems may require the infusion of much capital over a long time based on limited scientific evidence. The parties that bare the costs may or may not have anything to do with the parties which cause the effects. Few dollars would ever be invested in security or trade based on uncertain scientific evidence which may or may not yield the desired results at an unknown cost. The very uncertainty of the unknown consequences is a distinguishing characteristic which allows an environmental issue to be brought forth for discussion. The potentially irreversible nature of some environmental problems such as the ozone hole over Antarctica (see Montreal Protocol) may be a distinguishing motivator for regime activity. Confronting one shot solutions without the benefit of historical evidence and the aspect of unknown consequences pose problems not evident in negotiations concerning trade and money. Evaluating damage to recreational sources, including the loss of aesthetic value, present problems for environmental negotiators not common to other regimes.

Certainly difficulties with hold-outs and free riders are frequent problems facing most international agreements. Efforts to deal with these problems affecting environmental agreements are being facilitated by alternative regime activity, such as

the Montreal Protocol. This approach may be adopted by negotiators dealing with security and trade issues and lessen the distinction.

International environmental agreements, whether they are designed along the lines of the Law of the Sea negotiations or the Montreal Protocols, do seem to have special characteristics which distinguish them from regime activity surrounding issues of security, trade, and money. Whether such agreements can have any effect over behavioral outcomes for the C.I.S. is a question for hindsight. It is clear that in dealing with transboundary pollution issues these methods offer a viable option for addressing serious problems. Though the methods discussed are all subject to criticism on some basis, they or some variation thereof may be applicable models for relations among the C.I.S. states. The applicability of any method for dealing with international cooperation will depend largely on the future direction of the governments, economies, and the wills of those members.

CHAPTER IX

CONCLUSION

The Current State of the Environment in the C.I.S.

On January 22, 1992, A. Yablokov, the Russian state advisor on the environment and public health, outlined in a written statement details that suggest that the situation in Russia is close to being a national catastrophe. Yabolkov's report identified districts in the Volga region, the Kuznetsk Basin, Central Yakutia, the Amur region, Krasnoyarsk Territory, and the Kola peninsula as areas that should be added to Chernobyl and the Southern Urals as officially declared environmental disaster areas. He cites technological disasters such as pipeline ruptures and earthquakes being caused by the pumping of water and oil out of the ground, of which 7-20% (tens of millions of tons) is lost back into the groundwater. Yabolkov references new data indicating a rapid declining rate of average life expectancy for most Russians. He also draws attention to the scope of radioactive contamination, citing 120 nuclear tests including more than 20 in the Volga basin and 12 in the Yakutia. Yablokov points to unknown nuclear contamination in the Kara Sea stemming from a nuclear reactor (from the ship Lenin) which was buried there along with other nuclear waste (Current Digest of the Soviet Press Vol. XLIV, No. 3, 1992).

A separate state report on the condition of the environment and the population dated October 7, 1992 states:

[T]he bacterial and viral contamination of virtually all of Russia's major rivers, including the Volga, Oka, Kama, Don, Kuban and Ob Basins, is tens and hundreds of times greater than the permissible magnitude.

Russia's air above all in the cities, is affected to the same degree. Only 15% of city dwellers breathe air that meets hygienic normatives. Some 50 million people are affected by a whole bouquet of harmful substances in concentrations 10 times the maximum allowable concentrations...The total

amount of waste that has accumulated in Russia is estimated at 50 billion tons, to which another 4.5 million tons is added annually. More than 250,000 hectares of land are buried under waste.

Current Digest of the Soviet Press Vol. XLIV, No. 41., 1992.

Sustainable agriculture in the black soil regions, which once contained 12 to13% organic matter, is on the decline with recent soil samples indicating organic matter content down to 6 or 7%. Natural productivity has been cut in half due to collective farming methods which over-use various chemicals. Moldavia and the Ukraine have been harshly criticized by Yablokov for irresponsible use of pesticides which he claims will have long-term dangerous consequences (Environment, Vol. 32, No.2, 1990).

The shrinking or drying up of the Aral Sea has been attributed by non-Soviet Baltic states to the cotton orientation of the former Soviet economy. Soviet decisions to develop a cotton industry can be viewed as a decision which affected the global environment (Environment, Vol. 32, No. 2, 1990). Ruben Mnatsakanyan (department of geography at Moscow State University) suggests that ecological problems such as the Aral Sea and improper management of the natural gas industry, which may lead to leaks contributing to global warming, are problems that require international control over national decision making and should be treated as no less important than problems of transboundary pollution, a challenge to sovereignty not likely to succeed.

Mnatsakanyan supports an international constitution for the environment patterned after the U.S. Bill of Rights to protect nature and guide human behavior in nature.

The Chernobyl nuclear power accident in April of 1986 caused the evacuation of 186 towns, 14 of which were recently evacuated again. The death tolls estimates have ranged from 6 to 30,000 and the truth may never be known. Nuclear fallout was detected in many non-Soviet countries long before the Soviets admitted to the occurrence of the accident. The land surrounding the reactor may be contaminated for 20,000 years (Environment, Vol. No.2, 1990).

The highest degree of atmospheric pollution in 1988 was observed in 68 cities, mainly in the Ukraine, in Kuzbass, the Caucasus, east Kazakhstan, and near the Ural Mountains . . . almost 5 million tons of sulfur dioxide are released annually into the atmosphere in the continental Soviet Union.

Valantin Solkolsky, Deputy Chairman, State Committee of the Soviet Union for Environmental Protection, 1990.

The scope of the ecological disasters inherited by the C.I.S. is vast. Many of the cited problems have gotten worse since their first reporting. Whether decisions on internal difficulties of the former Soviet Union should be treated as transboundary issues has become moot with the breakup of the Union. Many of the referenced disaster areas range across multiple sovereign boundaries. One of the first acts of the newly formed Council of the Heads of States and the Council of the Heads of Government was to submit proposals on the abolition of the structures of the former Soviet Union. New coordinating agencies to replace those disbanded would be proposed by these same authorities. Will the ill-fated bureaucracy that doomed the great experiment be duplicated? Would state organizations such as the infant Goskomprioda, which had control over environmental matters for the former Union, remain intact or would this authority revert to the control of the individual republics? These questions have not as yet been answered. The format for the Treaty on an Economic Community laid out several protocols:

Chapter I. Basic Principles.

Chapter II. Entrepreneurship.

Chapter III. The Movement of Goods and Services, and Prices.

Chapter IV. The Monetary and Banking System.

Chapter V. Finances and Taxes.

Chapter VI. The Labor Market and Social Guarantees

Chapter VII. Foreign-Economic Relations and Foreign-Currency Policy.

Chapter VIII. The Legal Regulation of Economic Activity.

Chapter IX. Institutions of the Economic Community.

Chapter X. Agreements.

Chapter XI. Associate Membership in the Economic Community.

Chapter XII. Concluding Provisions.

The only mention of funding for ecological problems is found in Chapter V. Finances and Taxes, Article 24.

Within the framework of the Economic Communities budget the following funds are to be created:

[A] fund for emergency situations and for eliminating the consequences of major natural disasters and catastrophes, such as Chernobyl, the Aral Sea, the earthquake in Spitak, and others...The budget of the Economic Community is formed from the dues paid by its members, which are set in fixed amounts. The amounts of these fixed dues and the procedure for forming them are to be determined by a special agreement among the members of the Economic Community. The budget of the Economic Community cannot be in deficit.

Treaty of the Economic Community, Chapter V. Finances and Taxes, Article 24., Oct. 22, 1991, 2.

To keep the budget from being in deficit and to pay for the remediation of the suggested national disasters may be a monumental task for a commonwealth with limited resources. The Treaty, however, does not address the financing of ongoing environmental expenditures such as monitoring, enforcement, adjudication, research, and administration. This treaty does provide a financial center, but, as has been suggested, the success of any bilateral agreement may be based on the ability of the membership to fund the cost of doing business.

Today all the republics, without exception, are in the grip of a growing production slump. It is expected that national income for the country as a

whole will fall by 15% in 1991. The most important reasons for this are the rupture of economic ties, the violation of commitments for output deliveries, and the lack of coordination among republics' actions. The population of the various republics and regions-people who were not very rich to start with, to put it mildly- has to pay for the isolation of those areas and will keep on having to do so. At this time not one of the sovereign states has the budgetary resources to make up for these losses.

I. Demchenko, October 14, 1991.

It would appear from language in the Economic Community Agreement that the bulk of environmental control has been left to the governments of the individual republics. If we accept the U.S. environmental policy as an example of successful policy, then the structure of the government apparatus which allowed it to be successful is one of interest. The success of the CAAA of 1970 was predicated on strong federal control, in other words a central government. The relegation of authority to the individual states in 1955 to deal with a growing air pollution problem was proven to be mistake because pollutant emissions continued to rise. Only new legislation calling for strong federal control allowed the abatement of that problem. This federal control was not based on voluntary contributions by members of a treaty oriented regime, rather a constitutional union, the very thing that Gorbachev fought for and lost. The taxation power of central control can provide the necessary collection mechanism to fund environmental protection much more effectively than a treaty based on voluntary contributions; however, neither method may be effective if sufficient funds are not available. Many problems facing the republics of the C.I.S. are those which may affect non-Soviet republics who have considerable interest in solving those problems. This interest by outside nations might provide a partial financial solution to the lack of available funds, yet it brings the issue of sovereignty into play.

In signing any international treaty, we thereby acknowledge that the commitments we are assuming are of a higher order than our domestic commitments. After the treaty is signed, work is done to bring domestic

legislation into conformity with the accords that have been reached. Otherwise there would be no point in having international agreements.

Current Digest of the Soviet Press, Vol.XLIII, No. 41, 1991.

The question of funding is a major issue for environmental protection and cleanup because it may set the tone for the structure of all related activities. Whether the members of the C.I.S. can pay for environmental protection necessary or not is a question.

David Schap, associate Professor at the College of Holy Cross, cites several theories which agree that greater concern for environmental issues has emerged in recent Soviet history. He suggests that the Soviets once acted out of ignorance when "engaging in environmentally destructive activities". He attributes the abandonment of such practices to "higher income in the Soviet Union," drawing a parallel with a similar occurrence in Western countries. Another theory cited by Schap is that "Western ecological policy had a demonstration effect which sparked greater Soviet ecological concern" (Schap 1988, 389). The fact that greater concern has developed is well represented with the emergence of a new awareness which has spawned agency creation and activity (Goskomprioda), bilateral agreements (U.S. - U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection, 1972), and community outrage through grass roots organizations. Though the impact of this awareness can be criticized because of its lack of results evident by the state of ecological crisis which still exists, this new awareness is a beginning, a beginning which may be somewhat stifled by the breakup of the Union. The association of this change in Soviet concern with higher income and the demonstration effect of Western policies is a relevant issue. Western policies like the U.S. environmental policy are founded on different principals. The harmonious existence between man and his environment presents a different slant than the former Soviet goal of efficient development of natural resources. Western policies are enforced and maintained by a liability regime which

emphasizes a market rational. Incentive programs also focus on capitalistic logic. The different goals and economic strategies of the West are guided by the framework of a strong central government which is representative of the people. If the republics of the C.I.S. are inclined to look towards the West for an example to follow in dealing with their environmental problems, this may be a good place to start. Regime activity has spawned a new economic agreement which may encounter significant problems when being implemented. The founding of the C.I.S. is another example of regime activity. It may be the destiny of this region to be guided in the future by treaties and protocols for economic purposes and collective security, though dealing with environmental issues (transboundary) on this basis may not produce the desired outcome.

Certainly the stability of the region will determine the saliency of this issue. Self preservation is a fundamental goal of any sovereign nation whether bilateral or multilateral agreements exist. Survival, however, may someday be focused more on butter (air, water, food) than guns. It is the conclusion of this study that U.S. policy merits the role of a good example of effective policy and that this effectiveness is predicated on a non-destructive goal of coexistence, a market economy, and a strong representative central government.

The U.S.S.R. and the U.S. are not the only areas facing environmental problems. The European Economic Community provides an excellent area for future study and comparison. Industrial activity and a host of regime related issues present in this region could provide the basis for enlarging the scope of this study.

REFERENCES CITED

- Almond, Gabriel and G. Bingham Powell, Jr. Comparative Politics: A Developmental Approach, (Boston: Little, Brown and Co., 1966).
- Altshuler, Igor I. and Ruben Mnatsakanyan. "The Changing Face of Environmentalism in the Soviet Union", (Environment, Vol 32, N 2, March 1990).
- Annual Energy Review 1991, Energy Information Administration, Washington D. C.
- Bear, Dinah and Jonathan Elkind. "Law: Soviet -U.S. Cooperation", (Environment, Vol 32, N 3, April 1990).
- Berkowitz, Danial and Beth Mitchneck. "Fiscal Decentralization in the Soviet Economy", (Comparative Economic Studies, ed Susan Linz, Vol. XXXIV, No. 2, 1992).
- Caulfield, Henry P. "Environmental Politics and Policy-The Conservation and Environmental Movements: An Historical Analysis", (Chap. 2, 1989).
- Chayes, Abram and Antonia Handler Chayes, "Compliance Without Enforcement: State Behavior Under Regulatory Treaties", (Negotiation Journal, July 1991).
- Chilcote, Ronald H. Theories of Comparative Politics, (Westview Press, Inc., Boulder, CO., 1981).
- Cooper, R. C. "Acid Rain: A Review of the Phenomenon in the EEC and Europe" (Environmental Resources Limited, New York: Unipub, 1983).
- "Transboundary Pollution: Sulfur Dioxide Emissions in the Republics of the U.S.S.R"., Ed. Susan J. Linz, (Comparative Economic Studies, Vol. XXXIV, N. 2, 1992).
- Demchenko, I. "The Economic Treaty Is No Hindrance to the Sovereignties" (Current Digest of the Soviet Press, Vol.XLIII, No. 41, 1991).
- Feshbach, Murray and Alfred Friendly, Jr. Ecocide in the USSR, (New York, Basic Books, 1992).
- Goldman, Marshal I. The Spoils of Progress: Environmental Pollution in the Soviet Union, (Cambridge: The MIT Press, 1972).
- Goldstein, Joshua S. Long Cycles "Prosperity and War in the Modern Age", (Yale University Press, Ann Arbor, Michigan 1988).

- Harvard Law Review "Developments In The Law-International Environmental Law", (Vol. 104:1484, 1991).
- Haas, H.P. "Do Regimes Matter: Epistemic Communities and Mediterranean Pollution Control", (International Organization Vol. 43, 1989).
- Jervis, Robert. "Security Regimes", (Krasner ed., 1983).
- Koehane, Robert O. and Joseph S. Nye. Power and Interdependence, (Boston: Little, Brown, 1977).
- Koehane, Robert O. After Hegemony "Cooperation and Discord in the World Political Economy", Princeton University Press, Princeton, New Jersey, 1984).
- Kondratieff, N.D, "The Long Waves in Economic Life", (Review of Economic Statistics 17, no.6, 1935:105-15).
- Krasner, Steven D. ed., International Regimes, (Ithaca: Cornell University Press, 1983).
- Mandel, Earnest. Long Waves of Capitalist Development, (Cambridge: Cambridge University Press, 1980).
- "Memorandum of Intent Between the United States and Canada Concerning Transboundary Pollution", (August 1980, 32 U.S.T.).
- Miles, A. "The Structure and Effects of the Decision Process in the Seabed Committee and the Third United Nations Conference on the Law of the Sea", (International Organization, 31.1977)
- National Environmental Policy Act of 1969, (42 U.S.C.A. § 4332 (c)).
- Powell, Robert. "Absolute and Relative Gains in International Relations Theory", (American Political Science Review, Vol. 85, N.4, December 1991).
- Pryde, Philip R. Conservation in the Soviet Union, (Cambridge: University Press, 1972).
- ______. "The Future Environmental Agenda of the U.S.S.R"., (Soviet Geography, Vol. 29, N. 6, June 1988).
- Sand, Peter H. "Innovations in International Environmental Governance", (Environment, Vol. 32, 1990).
- Schap, David. "Property Rights and Decision Making in the Soviet Union: Interpreting Soviet Environmental History", (Economic Inquiry, Vol.XXVI, July 1988).

- Singer, David J. "A General Systems Taxonomy for Political Science", (General Learning Press, New York, New York, 1971).
- Stein, Aurthur. "Coordination and Collaboration: Regimes in an Anarchic World", (Krasner ed. 1983).
- Strange, Susan. "Cave! Hic Dragones: A Critique of Regime Analysis", (Krasner ed. 1983).
- Thornton, Judith and Andrea Hagan. "Russian Industry and Air Pollution; What Do the Official Data Show?", Ed., (Susan J. Linz, Comparative Economic Studies, Vol. XXXIV No. 2, 1992).
- Turnbull, M. Soviet Environmental Policies and Practices: The Most Critical Investment, (Dartmouth Publishing Co., Vermont, 1991).
- United States Energy Information Administration. Annual Energy Review, 1992.
- Vig, Norman and Michael Kraft. "Environmental Policy in the 1990's: Toward a New Agenda", "Presidential Leadership: From the Reagan to the Bush Administration", Ed. (Vig and Kraft, Congressional Quarterly Press, Washington, D.C. 1990).
- Waltz, Kenneth. "Theory of International Politics", (Reading, Mass.: Addison-Wesley, 1979).
- Yablokov, A. "Environment/Resources", (Current Digest of the Soviet Press, Vol. XLIV, No. 3, 1992).
- "The Changing Face of Environmentalism in the Soviet Union" (Environment, Vol. 32, No.2, 1990).

VITA 1

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