HARD PROBLEMS, SOFT ANSWERS: IMPACT OF EPISTEMIC COMMUNITIES ON US-RUSSIAN NUCLEAR COOPERATION

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To the individuals whose stories are found in these pages.

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ABSTRACT

Despite the unpredictable situation of the post-Cold War era, the United States and Russia pursued three types of cooperative programs related to nuclear nonproliferation and arms control in the 1990s. Although they showed promise, many of these initiatives eventually faltered. Their failures have often been attributed to high-level politics and changing national interests. Research has focused less, however, on where the spirit of cooperation originated. This study looks at the role of the network of scientists and strategists—labeled by Haas (1992, 2) and Adler (1992, 101) as an "epistemic community"—in supporting cooperative programs. Focusing on the development of scientist engagement programs and lab-to-lab initiatives, the evidence indicates that the transnational epistemic community defined early national interests and points for cooperation during the chaotic time following the dissolution of the USSR, but its influence was later tempered by the Russian scientists' loss of resources and bureaucratic interests that exacerbated existing divisions in the community. The findings confirm Haas' argument that epistemic communities are most effective during chaotic periods (described by Kingdon (1984, 166) as "policy windows"). In this case, transnational contacts made prior to the end of the Cold War were one of the biggest factors in the programs' initial successes.

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CHAPTER 1

INTRODUCTION

In 2012, the year that Sen. Richard Lugar celebrated the 20th anniversary of his most significant legislation, he lost his Republican primary election to a hardline candidate. A moderate from Indiana, he had spent much of his political career fighting for increased nuclear security and cooperation with Russia. The story created a day's worth of news for the general public, and remained fodder for political junkies for the rest of the week. For those who work in the obscure world of nuclear issues, the ramifications of his defeat continue to be felt.

Sen. Lugar's legacy can be found in the programs that defined U.S.-Russian nuclear relations following the Cold War. In the early 1990s, policymakers in the United States came to see the new idea of "cooperative threat reduction" as a response to escalating concerns about the security of Russia's nuclear arsenal. Senators Sam Nunn and Richard Lugar developed legislation to aid Russia in securing its arsenal and help its scientists no longer needed in its weapons complex find other employment. The two countries also joined in negotiations for a Comprehensive Test Ban Treaty (CTBT) and attempted to maintain the momentum of the bilateral Strategic Arms Reduction Treaty (START) with the ratification of START II. Although heralded as steps towards more positive nuclear relations than those seen during the Cold War, many of these programs and initiatives faltered in the late 1990s. START II was never implemented, and the CTBT was has yet to enter into force. The failures of these initiatives have often been attributed to domestic and international politics and changing national interests. Research has focused less, however, on from where the spirit of cooperation originated.

The outsized impact of Sen. Lugar's forced retirement reflects not only his position as a staunch supporter of cooperative efforts on nuclear security, but also the small, insular nature of the group of experts concerned with such matters. The idea of arms control, which has grown to

be a globally acknowledged (albeit not universally accepted) norm, began with a cadre of scientists who were part of the U.S. nuclear weapons program. Over time, engagement spread the norms throughout the network of individuals who worked in nuclear science in the U.S. and Russia. Consisting of scientists and strategists, the group that accepted the arms control norm held shared beliefs about the causes of war and the effects of technology on the arms race—namely, that too many nuclear weapons create dangerous situations. Moreover, these arms control supporters desired for nuclear adversaries to cooperate.[1] This network of knowledge-based experts is more succinctly defined as an epistemic community, whose members share not only technical expertise but also norms and causal beliefs about how their knowledge should be applied.[2]

Researchers have looked at ways the U.S. nuclear epistemic community influenced the development of arms control norms and their acceptance in policymaking in the 1960s and 1970s. Emanuel Adler's work identified how contact between American and Soviet scientists, through conferences such as those sponsored by the Pugwash Conferences, helped spread these norms to the Soviet Union, and created a nascent transnational epistemic community.[3] However, there has been little follow-up work since Adler's initial research on this phenomenon in nuclear history despite the changing relationship between the United States and the Soviet Union and the eventual end of the Cold War.

I propose that the U.S.-Russian nuclear epistemic community defined early national interests and points for cooperation during the chaotic period following the dissolution of the

[1] Emanuel Adler, "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Nuclear Arms Control," *International Organization* 46, no. 1 (1992).
[2] Peter M. Haas, "Introduction: Epistemic Communities and International Policy Coordination," *International Organization* 46, no. 1 (1992).
[3] Adler, "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Nuclear Arms Control."

U.S.S.R., but bureaucratic tensions and the diminishing resources of the Russian scientists later tempered its influence. As relations normalized, the U.S.-Russian nuclear epistemic community was no longer one of the sole sources of contact between the two countries. While the community's role was pivotal in maintaining stability in US-Russian nuclear relations during a period of high uncertainty, its impact decreased as time—and diplomacy—progressed.

At a theoretical level, an epistemic community's ability to influence policy hinges on decision makers' willingness to listen. Echoing Peter Haas' observation that experts influence policy when its creators look outside their current set of inputs for advice on how to deal with new problems, the research identifies the most opportune moment for such impact and its effect on organizational structures.[4] Therefore, I hypothesize that the community is more likely to have a large impact during periods when decision makers find themselves unable to predict the future or readily comprehend the present—a proposition previously explored by Haas.[5] These "paradigm shifts" leave a state's organizations unable to function smoothly, since their processes were designed for a different state of affairs. Once the organizations have internalized a new understanding of reality and developed a new set of processes, the epistemic community's role in continuing change decreases. Any guidance its members gave during the period of uncertainty, however, may be reflected in the organizations' new functions.

The research is presented chronologically. Chapter two consists of the literature review, outlining previous work on epistemic communities and explaining how this case study will contribute to the current understanding of social advocacy networks. Chapter three describes the U.S.-Russian nuclear nonproliferation and arms control epistemic community, including the shared beliefs that define the community's membership. Chapter four examines reasons for the

[4] Haas, "Introduction: Epistemic Communities and International Policy Coordination."
[5] Ibid

community's initial effectiveness establishing cooperative programs, while chapter five focuses on why the community could not prevent the programs' decline. The final chapter considers final conclusions and suggestions for future research.

Methodology

Through interviews and archival research, I conducted a case study analysis of the impact of US and Russian epistemic communities involved in three types of cooperative nuclear programs: government-to-government, laboratory-to-laboratory, and arms control initiatives. A case study allowed me to research in-depth the ways epistemic communities operate in an attempt to determine channels of impact, while also giving me the flexibility for the potential identification of new models or theories involving these communities' operation. The case of U.S.-Russian nuclear cooperation during the 1990s is particularly well-suited to a case study analysis for several reasons: 1) treaties, agreements, and other programs provide readily identifiable outcomes of cooperation between the two countries, 2) the nuclear epistemic communities can be clearly defined due to the specific type of knowledge needed to understand nuclear issues, and 3) it is a modern case with many public records and individuals willing to sit for interviews.

Data Collection

Archival Research

The primary sources of data for the project were archives of interviews, policy analyses and evaluations, and articles. In the United States, the Department of Energy's national laboratories have interviewed many key scientists about their involvement in the U.S. nuclear community, and videos of these discussions are available on the Internet and by request. Records of Government Accountability Office (GAO) evaluations of Nunn-Lugar and CTR, and U.S.-

Russian negotiations and treaties were obtained through libraries, the National Defense University, and government websites.

For Russia-related information, records of interactions in newspapers and nuclear-related journals and magazines proved useful. Because of the strength of U.S. civil society and my lack of Russian language skills, more data was available for study from a U.S. perspective. Currently, former laboratory directors involved in the early collaboration are collecting stories from the Russian (and U.S.) scientists who worked in the cooperative programs.[6] Recognizing the lack of information on the Russian experience available to English-speaking audiences and hoping to restart some of the programs, the book intends to provide the perspective of both countries' participants.

The majority of the research was archival, and therefore provides the foundation for my conclusions. It gave the interviews historical context, and consistent observations over a multi-year period (a longitudinal framework) within which to identify changes in norms and impacts on policymaking. In order to counter potential bias and increase sample size, a variety of records (letters, policy briefs, treaties, videos of interviews, records of negotiations) from several types of sources, (government, academia, laboratories, newspapers, and NGOs) were examined. The diverse perspectives of the resources created multiple lines of sight, a methodological approach to minimize bias in qualitative studies.

Limitations to this portion of the research lie in my lack of Russian language skills and the unavailability of available data regarding negotiations and programs. Without a working knowledge of Russian, I assumed the potential for mistranslations and miscommunications for

[6] Beth Duff-Brown, "Renewing Ties among American and Russian Nuclear Scientists," *FSI Stanford News* 2012.

pieces translated from Russian to English. For those accounts originally written in English, I attempted to take into account the pieces' audiences and agendas.

There is the strong possibility that data on negotiation and program specifics that I was unable to obtain exists only in a restricted format. Because of the national security implications of the topic, I assumed that documentation of internal deliberations remains restricted, though some of this potential bias could be mitigated through interviews or Freedom of Information Act requests (FOIA).

Interviews

Interviews were a primary source of material that provided additional data for analysis of how ideas change over time. I conducted interviews with members of the US nuclear epistemic community and policymakers. Although I reached out to members of the Russian community, I received only sporadic interest and no positive replies.[7] Building on my contacts within the community, potential subjects were recruited using the snowball technique—each subject was asked whether they knew anyone who might be helpful, and I reached out to these subjects with the explicit approval of those who recommended them. The interviews provide depth to the archival analysis, and do not represent a statistically significant sample of the group being studied.

These semi-standardized interviews added texture to the archival analysis of the epistemic community.[8] A total of eleven interviews were conducted, each lasting approximately 45 minutes. However, depending on the subject's schedule, they ranged from thirty minutes to over an hour. All eleven interviews were with individuals associated with the U.S. community.

[7] I examine the lack of Russian perspectives in interview subjects more in-depth later in the chapter.
[8] Bruce L. Berg, *Qualitative research methods for the social sciences*, 7th ed. (Boston: Allyn & Bacon, 2009).

The interviewees were coded based on their current affiliation within the nonproliferation community: federal government employee, nongovernmental organization, academia, and national laboratory. A second table was created showing the breakdown of their former affiliations to demonstrate movement within the community. The coding allows the reader to see which individual made specific claims without revealing their identity, building a more complete picture of the interview subject and giving claims context. A table with complete coding of interviewees is located in Appendix A.

The interviewees were guaranteed confidentiality, and all remarks were treated as "not for attribution" to encourage individuals to speak candidly. Because the interviewees' emotional reactions and biases were pertinent to the project's aim to describe the epistemic community's shared norms, the project was classified as human subjects research. The American University Institutional Review Board there approved the research methods.

Interview questions asked participants about their experiences the government-to-government programs, laboratory-to-laboratory efforts, and arms control negotiations during the 1990s, and were designed to elicit beliefs and perceptions about nuclear cooperation and the success or failure of certain programs. I drew additional meaning from the interviews based on my interpretation of tone, emotion, and non-verbal cues by the participants. Interviews took place between January and April 2012, in person and by phone. The in-person interviews were conducted for the large part in Washington, D.C. Each respondent was asked whether they knew individuals who might be willing to contribute to the project. The majority of individuals provided at least one additional lead.

I was able to overcome the high knowledge barrier that can prevent access to the community by drawing on my professional experience with nuclear proliferation. Prior work in

contexts unrelated to the project helped me gain credibility with the respondents, which allowed for more substantial interviews. Some of my professional contacts who knew that I had accepted a position within the nonproliferation field upon graduation used this information to solicit interviews on my behalf, though I avoided this behavior personally. Based on Berg's model of dramaturgical interviews (in which the process is seen as a form of social performance), I designed the interviews to take advantage of this professional common ground.[9] I tried to reinforce my appearance as an insider by taking notes by hand and forgoing the use of a recorder (which would have made me look more like a reporter).

Limitations of what conclusions can be drawn from the interviews parallel, in some respects, the previously articulated limits on archival research. Without Russian language skills, the risk of failing to identify strictly domestic influences in Russia was high. This problem in archival research was compounded by the fact that I was unable to find Russian individuals willing to sit for an interview. Many of the Russian individuals involved in cooperative efforts at the time were older than their U.S. counterparts. Twenty years later, those individuals that are still alive can be difficult to track down, and those I was able to find either did not respond to my requests for an interview or politely declined. The lack of Russian voices leaves a significant silence in my research, which I attempted to fill with interviews conducted by others at an earlier time.

For those individuals that I did interview, many had been or at the time of the interview were privy to restricted information, the nature of which I was unaware, leaving the possibility for blind spots in my analysis. These limits were unavoidable and would affect any unclassified

[9] Ibid.

research on this subject. The study's conclusions are also limited by its small scale, which could be remedied with continued research.

As policymakers are forced to deal with highly technical issues like climate change and weapons of mass destruction, they increasingly rely on experts for advice. This advice can reflect normative and causal beliefs, which are then expressed in the policy that is created. In the case of nuclear weapons, epistemic communities have historically demonstrated a strength that transcends national borders, despite the highly classified nature of nuclear weapons work. Furthermore, unofficial, semi-official, and back-channel diplomacy can allow governments to explore more creative options than what would be possible in official negotiations, which carry high pressure and risk. Countries with advanced scientific capabilities—such as the United States and Russia—have generally undervalued the role scientific exchanges and collaboration can play in improving relations.

This research looks to contribute to the academic community's understanding of how epistemic communities affect international policymaking through a case study of US-Russian relations following the collapse of the Soviet Union. Specifically, it examines how the U.S. and Russian nuclear communities put pressure on their governments to expand the possibilities for cooperation. It will not be a program evaluation of cooperative programs. In examining such programs and negotiations, this research aims to serve as foundational work for further study of the modern operations of epistemic communities, including their creation and how they are affected by increasing globalization.

CHAPTER 2

EPISTEMIC COMMUNITIES

The conceptual framework for this research applies the idea that epistemic communities—loose networks of professionals acting in an advocacy capacity—have influence over policy creation. Coming from the constructivist tradition, the concept assumes that social reality is, at some level, shaped by those observing or involved with it. The idea of epistemic communities evolved as a response to ongoing questions about how decision makers learn and how new ideas are created, disseminated, and incorporated into policy. It takes the approach that experts can have a large impact on policy since they are the ones instructing policymakers; in other words, "scientific advisors are not philosopher-kings, but they seem to be standing ever closer to the throne."[10]

The Model

In 1992, the journal *International Organization* dedicated its winter issue to the study of epistemic communities. In it, Peter Haas outlined the defining characteristics of an epistemic community and its area of influence.[11] He wrote that an epistemic community "is a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area."[12] In addition, network members share several key beliefs beyond their professional training: 1) normative and principled beliefs of how their community members should act, 2) causal beliefs, stemming from

[10] Ernst B. Haas, Mary Pat Williams, and Don Babai, *Scientists and world order : the uses of technical knowledge in international organizations* (Berkeley: University of California Press, 1977). P 13

[11] Haas was not the first to coin the term "epistemic communities." John Ruggie pioneered the concept in his 1975 article in *International Organization*, borrowing from Michel Foucault's concept of the "episteme" to refer to the dominant ways of viewing social reality. Epistemic communities, in his research, consisted of the interrelated roles that grew up around such epistemes.

[12] Haas, "Introduction: Epistemic Communities and International Policy Coordination." P 3

their analysis of practices contributing to a set of important problems in their field and which then establish a basis for determining policy actions, 3) shared notions of validity, or how concepts are evaluated for validity in their area of expertise, and 4) a common policy project, or a set of common practices linked with a set of common problems their expertise is uniquely able to address.[13]

Epistemic communities are different from other groups based on their shared beliefs and knowledge bases. They are separate from social movements because these communities share causal beliefs and knowledge bases in addition to norms and interests. The groups are distinct subsets of professions and disciplines because they share norms and interests and not simply knowledge bases. Finally, members of congressional or bureaucratic coalitions do not have to share any of the above in order to belong to said group, distinguishing epistemic communities further from sub-state actors.[14] Some researchers argue that they are a subset of "communities of practice," or groups that are bound by a shared desire to learn and apply a common practice.[15] Others have identified them as separate phenomena, saying that epistemic communities exert an authority that goes beyond simple knowledge dissemination to knowledge validation.[16]

Developing effective legislation on technical subjects requires the specific expertise of (often highly-educated) individuals. The experts' interpretation of these issues (which policymakers do not necessarily understand because of the level of technical education required) influences the direction of policy. These communities can cut across institutions, leading to

[13] Ibid.
[14] Ibid.
[15] Etienne and William Snyder Wenger, "Communities of Practice: The Organizational Frontier," *Harvard Business Review*, no. January-February (2000).
[16] Nathalie and Catherine Thomas Lazaric, "The coordination and codification of knowledge inside a network, or the building of an epistemic community: the Telecom Valley case study," ed. Wilfred and Luc Soete Dolfsma, *Understanding the Dynamics of a Knowledge Economy* (Cheltenham, UK and Northampton, MA: Edward Elgar, 2006).

unexpected forms of policy coordination.[17] As Diana Crane found in her study of transnational scientific groups, the shared causal beliefs of the individuals proved to be more important in predicting outcomes than the channels they used to operate—acting as "invisible colleges" that supported international goals.[18] This further supports Haas' argument that epistemic communities can impact policy creation and coordination in spite of different organizational forces from the institutions.

From an empirical perspective, the study of an epistemic community's effectiveness focuses on the creation, diffusion, selection, and incorporation of new ideas into policy. It assigns (often international) policy cooperation as its dependent variable, and sees idea acceptance as a political process.[19]

Critiques

The idea of epistemic communities has been criticized from both normative and empirical positions. Some have argued that even if such communities did exist with the influence Haas attributes to them, such a phenomenon would be worrisome because it would mean that a small group of non-elected individuals had gained disproportionate influence over policymaking.[20] Others have dismissed the communities as a result, not driver, of historical events. Notably, William Zartman disagreed with the causality proposed by Haas, saying "Experience, as opposed to distant observation, shows that the much-vaunted epistemic community is a result rather than

[17] Haas, "Introduction: Epistemic Communities and International Policy Coordination."
[18] Diana Crane, "Transnational Networks in Basic Science," *International Organization* 25, no. 3 (1971).
[19] Claudio Radaelli, "The role of knowledge in the policy process," *Journal of European Public Policy* 2, no. 2 (1995).
[20] Lawrence Susskind, *Environmental diplomacy: negotiating more effective global agreements* (New York: Oxford University Press, 1994).

a motor of environmental negotiations."[21] He classified epistemic communities as being simply one type of coalition.

Another line of critique questions the extent to which epistemic communities can change the minds of decision makers, reducing their capability to effect major policy changes. Lawrence Susskind has argued that a national government will not accept advice from expert communities that deviates too far from its national interests, while Karen Litfin found that policy actor's receptivity to ideas was a function of his or her perceived interests.[22] These theories downplay to role of epistemic community, shifting the study of organizational learning behavior back to an institutional level.

Some scholars find Haas' original model to be incomplete but not unsalvageable, instead failing to address how epistemic communities interact with other organizations and groups.[23] Since 1992, only a few studies have looked explicitly at how to change or apply the epistemic community model to make it more a more effective tool of research. Researching the role of advocacy coalitions in creating legislation for the European Union's Common Market, Anthony Zito found that a complete analysis required the use of a broader framework that took into account other coalitions of scientists beyond epistemic communities.[24] Others have pointed to the need to apply the concept to theories of how policymakers learn in order to understand when epistemic communities are effective. In particular, Claire Dunlop applies Haas' model of epistemic communities to a typology pioneered by Mocker and Spear, theorizing that epistemic

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[21] I. William Zartman, "International Environmental Negotiation-Challenges for Analysis and Practice," *Negotiation Journal* 8, no. 2 (1992).
[22] Susskind, *Environmental diplomacy: negotiating more effective global agreements*. Karen Litfin, *Ozone Discourses : Science and Politics in Global Environmental Cooperation,* New York: Columbia Press University, 1994. P 181
[23] Claire Dunlop, "Epistemic Communities: A Reply to Toke," *Politics* 20, no. 3 (2000).
[24] Anthony R. Zito, "Epistemic communities, European Union governance and the public voice," *Science and Public Policy* 28, no. 6 (2001).

communities have the largest impact in situations where the learner (policymaker) has low control over the learning objectives and content.[25]

Researchers such as James Sebenius have proposed that the approaches of studying epistemic communities offered by Haas and Adler are insufficient, treating cooperation as a binary phenomenon and ignoring the potential for suboptimal cooperation. Sebenius concludes that the negotiation-analytic approach—which treats policy creation as a negotiated process rather than a game-theory outcome—is better suited for drawing conclusions about when epistemic communities can be effective, noting that he defines epistemic communities as a "distinctive de facto natural coalition of 'believers' whose main interest lies not in the material sphere but, rather, in fostering the adoption of its policy project."[26] Sebenius says these epistemic communities work by changing the perceived "zone of possible agreement" in which the negotiating parties are willing to make concessions.[27]

Generally, the critiques of Haas' theory argue that while there is merit to the idea that experts can have a disproportionate impact on policy, it is not as large of an impact as Haas posits. They point to external factors as limiting what these communities can accomplish. While external factors do appear to play a substantial role, epistemic communities have not been studied thoroughly or rigorously enough to determine the limits on what they can change. The "truest" cases of epistemic communities—very small groups of experts in obscure fields, who are motivated to try to influence the policymaking process—are rare. Zito's and Dunlop's arguments that more research is needed not only in a broader framework, but also in how policymakers

[25] Claire A. Dunlop, "Policy transfer as learning: capturing variation in what decision-makers learn from epistemic communities," *Policy Studies* 30, no. 3 (2009).
[26] James K. Sebenius, "Challenging Conventional Explanations of International Cooperation: Negotiation Analysis and the Case of Epistemic Communities," *International Organization* 46, no. 1 (1992).p 364
[27] Ibid.

learn, would help answer the questions of what the limits of epistemic communities are. Haas' general argument—that small groups of experts can change policy in large ways—is supported by John Kingdon's theory on what makes policymakers open to new ideas. He identifies "policy windows," or a point where an opening for new views to enter either the problem stream or the policy stream is created, often due to an external crisis.[28] The uncertainty created by the new problem leaves policymakers unsure of how to find a solution, creating an entrance point for experts.

Epistemic Communities in Arms Control

U.S. nuclear policy has already been the topic of one study on epistemic communities. In the 1992 special volume of *International Organization*, Emmanuel Adler analyzed how the U.S. epistemic community concerned with nuclear arms control transmitted their norms to higher levels of policymaking, eventually overturning the competing notion put forward by structural realism that deterrence was stable. According to Adler, the U.S. nuclear arms control community shared common beliefs about the causes of war, the effects of technological change on the arms race, and the need for nuclear adversaries to cooperate.[29] The community members put pressure on the individuals in charge of determining U.S. security policies and practices, which in turn affected negotiations with the U.S.S.R. and led to agreements such as the 1972 Anti-Ballistic Missile Treaty (ABM). The Soviet Union learned about the arms control norm both through many official and unofficial channels.[30] Adler acknowledges that scientist-to-scientist programs, through such institutions as the Pugwash Conferences, were enormously helpful.[31] He also

[28] John W. Kingdon, *Agendas, alternatives, and public policies* (Boston: Little, Brown, 1984). P 166
[29] Adler, "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Nuclear Arms Control."
[30] Ibid.
[31] Ibid.

argues that the success of epistemic communities is contingent on the state of technology, the distribution of power in the international system, domestic institutional structures and procedures, and historical events.[32]

Much of the existing literature about the nonproliferation and arms control epistemic communities was published before the implementation of cooperative threat reduction in the 1990s, precluding an assessment of the significance of these activities. This research will address that gap, providing insight into how epistemic communities continue to interact with organizations and influence policy. Expanding on Dunlop's critique, this research focuses on identifying under what conditions communities have the largest impact. It complements both Haas' and Dunlop's findings that situations with high uncertainty leave room for a disproportionately large impact by experts, and further investigates how internal divisions within epistemic communities during such time periods affect which ideas are translated into policies.

[32] Ibid.

CHAPTER 3

THE US-RUSSIAN NUCLEAR EPISTEMIC COMMUNITIES

The first step in my research was to examine the US and Russian nuclear policy networks to see if they continued to resemble an epistemic community since Emanuel Adler's work on the U.S. arms control community that existed from the early 1950s to the late 1960s. Investigating the years from 1991 to 2000 will describe what the community looked like, where its members were located within society, and internal divisions within the larger transnational group. These findings will then be evaluated against Haas' four criteria of an epistemic community to see how closely the community adheres to the definition. Haas defined an epistemic community as a network of individuals that shared norms, causal beliefs, notions of validity, and a common policy project.[33] The group shares a common view of the policy problem, its causes, and its solutions, and is motivated to action by the individuals' shared belief that they should intervene. Examining how closely the network of U.S. and Russian scientists and strategists adhered to Haas' definition sheds light on how they were able to coordinate and influence policy.

Ideas, Norms, and Beliefs in Nuclear Policy

At the beginning of the 1990s, the nuclear policy communities in the United States and Russia contained several fundamental beliefs about how nuclear weapons technology should be treated. Not all members of the communities held all of the beliefs, though they were not mutually exclusive. While Emanuel Adler's identified norm of arms control continued during this time, other norms such as cooperation and nonproliferation came to the forefront as the political relationship between the two states shifted.

[33] Haas, "Introduction: Epistemic Communities and International Policy Coordination."

Foundation

The basis for nuclear strategy is in some ways "imaginary." While a nuclear strategy takes into account hard facts, such as an adversary's arsenal, location, and military strengths, the international community has extremely limited experience with nuclear war. Norms that have evolved to deal with the uncertainty posed by a world with nuclear weapons are not, at their core, falsifiable.[34] For this reason, governments have looked to the individuals who design such technology (as well as those who would use them) for guidance on how they can (or should) be used.

Adler notes that in the 1950s, two groups of thought converged to support arms control initiatives. Identified by Robert Levine as "analytical middle marginalists," the first group considered clashing national interests to be the root cause of conflict and did not see disarmament as a viable option.[35] Instead, they focused on avoiding the misperceptions that could upset a delicate stability. The second group he called "moderate antiwar marginalists," who believed that increasing armaments increased international tensions (therefore, reducing nuclear weapons could reduce international tensions). They also saw the Cold War as a transitional period in which nuclear weapons guaranteed peace as grievances appeared, though they were not convinced the U.S.S.R-U.S. relationship's balancing act would continue to bring stability.[36] These groups agreed that arms control was better than an uncontrolled arms race, which led to their support for reducing American and Soviet nuclear arsenals bilaterally.

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[34] Adler, "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Nuclear Arms Control."
[35] Robert A. Levine, *The arms debate* (Cambridge,: Harvard Univ. Pr., 1963). Pp 61 and 80-90
[36] Adler, ibid.

A more fundamental agreement between these two groups, however, was on the need for cooperation. Implementing arms control agreements implicitly demands at least some level of cooperation and transparency. The importance of cooperation increased during the post-Cold War period. Describing the role of arms control initiatives during and after the Cold War, one interviewee, A2, said the difference as between them was one of signaling.[37] During the Cold War, he argued, arms control treaties were one of the few ways the two countries could communicate directly and signal hopes for peace. In the post-Cold War environment, he felt that the cooperative programs working to secure the Russian arsenal absorbed the signaling function.

The concept of cooperation has deep roots in the scientific community at large, which appears in the U.S. national laboratory system as well. Research projects are often collaborative efforts that can cut across institutions and countries. Within the U.S. national laboratory system, scientists will participate in joint projects with foreign nationals. A RAND study of international cooperation in research and development (ICRD) reported that in 1997 the Department of Energy spent $183 million on ICRD on fission, fusion, electricity, renewables, and fossil fuels, with the majority of the research taking place within the agency's national laboratories. Approximately 60% of the research was on fission or fusion (topics which can have implications for nuclear weapons research). The collaborative research was conducted through bilateral and multinational efforts.[38] Cooperation allows scientists to pool resources and gain access to expertise and equipment they lack in their own laboratories and institutions.

A closely related value to cooperation is transparency, also prized within the scientific community. Researchers present at conferences and in journals to attain peer review and

[37] Interview with State Department official, March 1, 2012.
[38] C.S. Wagner, A. Yezril, and S. Hassell, "International Cooperation in Research and Development," (Science and Technology Policy Institute, RAND, 2001).

disseminate new knowledge generally. Without transparency, experiments cannot be replicated nor results falsified. Further, the creation of new scientific knowledge depends in part on knowing what approaches have already been tried. Publishing results of research serves the dual purposes of verifying findings and promoting further innovation. For example, though Soviet scientists were unable to present their research at the 1965 Megagauss-I conference, they submitted abstracts on their pulsed-power program. This type of research looks at how to use magnetic fields to contain and compress plasmas—a component of the thermonuclear fusion process. These abstracts generated intense interest from US scientists working on similar issues. This curiosity to know how other researchers were handling common obstacles laid the foundation for future collaboration, as U.S. scientists jumped at the chance to visit Russian laboratories as the Cold War reached its end.[39]

National security science pits the scientific tradition of transparency against by the need for secrecy on sensitive activities, and secrecy often wins out. As the study of atomic physics pivoted from university-based studies to government laboratory weapons research, scientists hotly debated whether their work should be kept secret, reflecting the tug-of-war between priorities.[40] The major part of the argument was settled when both the United States and Russia created their programs in secret. Despite the trend to compartmentalize and restrict information on nuclear weapons research, U.S. and Russian scientists have managed to collaborate on both unclassified studies and more sensitive issues such as nonproliferation and nuclear materials.[41]

Outside of basic beliefs in cooperation and (at least limited) transparency, many in the U.S. and Soviet nuclear communities generally believed that access to the specific technology

[39] "Side-by-side as equals-a round table," *Los Alamos Science* 1996.
[40] Richard Rhodes, *The making of the atomic bomb* (New York: Simon & Schuster, 1986).
[41] "Side-by-side as equals-a round table."

and knowledge required to build a nuclear weapons program should be limited to the countries who were already permitted such programs under the Non-Proliferation Treaty. Reasons for supporting nonproliferation varied; some scientists saw it as a patriotic duty, while others saw it as a first step towards disarmament.[42] More commonly, scientists perceived a danger in allowing nuclear technology to spread unchecked. Definitions of nonproliferation varied—some policymakers, depending on their perspective within government, found the sharing of sensitive dual-use nuclear technology to allies acceptable (such as Japan in the case of the United States and Iran in the case of Russia).[43]

Importantly, the nonproliferation norm existed in both the Russian and American communities by the 1950s and 1960s. The Nuclear Non-Proliferation Treaty (NPT) came into force in 1968, a treaty that struck a "grand bargain" between nuclear and non-nuclear weapons states. In exchange for agreeing not to pursue nuclear weapons, the nuclear weapons states would provide assistance in peaceful nuclear endeavors and pursue good-faith negotiations on disarmament.[44] This became the cornerstone of the emerging nonproliferation regime, which was also visible in the creation of the International Atomic Energy Agency (IAEA) in 1957. The IAEA, a United Nations organization, was charged with both verifying that nuclear material in peaceful programs was not diverted for military use and with promoting the peaceful

[42] Keith Krause and Andrew Latham, "Constructing non−proliferation and arms control: The norms of Western practice," *Contemporary Security Policy* 19, no. 1 (1998). George; Perry Shultz, William; Kissinger, Henry, and Sam Nunn, "A World Free of Nuclear Weapons," *Wall Street Journal*, January 4 2007.
[43] Matthew Fuhrmann, "Taking a Walk on the Supply Side," *Journal of Conflict Resolution* 53, no. 2 (2009); Dong-Joon Jo and Erik Gartzke, "Determinants of Nuclear Weapons Proliferation," *Journal of Conflict Resolution* 51, no. 1 (2007).
[44] George Bunn, "The Nuclear Nonproliferation Treaty: History and Current Problems," *Arms Control Today* 2003.

applications of nuclear technology. Both the Soviet Union and the United States were party to these organizations and agreements.[45]

Among the cooperative programs implemented in the post-Cold War period, some were created with the political intent of preventing underpaid WMD experts in the former Soviet Union from providing their services to the highest bidder. However, research conducted by Sharon Weiner indicates the threat may have been different than previously thought. Nuclear expertise was solicited in the form of "$500 physics questions"—Russian scientists would receive requests from foreign individuals to answer certain physics or engineering questions in exchange for money.[46] U.S. individuals who had worked closely with their Russian counterparts, however, noted that the majority were very patriotic and cautious about the dangers of nuclear technology.[47] Studies conducted by Valentin Tikhonov for the Carnegie Endowment for International Peace and Deborah Yarsike Ball and Theodore Gerber for Lawrence Livermore National Laboratory (LLNL) indicated that while an appreciable minority of experts may have considered selling their services to foreign governments, the massive migration feared in the early 1990s did not materialize.[48] This conclusion was directly corroborated in some of my own interviews; A2 agreed that "the seeds" of nuclear security and nonproliferation norms were already present at the time the programs began.[49] Although this evidence cannot speak for all

[45] David Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: International Atomic Energy Agency, 1997).
[46] Sharon K. Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*, Belfer Center studies in international security (Cambridge, Mass.: MIT Press, 2011).
[47] Ibid. P 104
[48] Valentin Tikhonov, "Russia's Nuclear and Missile Complex: The Human Factor in Nonproliferation," (Washington, DC: Carnegie Endowment for International Peace, 2001)., Deborah Yarsike Ball, and Theodore P. Gerber, "Russian Scientists and Rogue States: Does Western Assistance Reduce the Proliferation Threat?," *International Security* 29, no. 4 (2005).
[49] Interview with State Department official, March 1, 2012

cases, it does reflect the existence of nonproliferation norms prior to increased contact between the communities.

Despite the end of the Cold War, belief in complete nuclear disarmament continued to be considered a more extreme value among the community, and was often associated with the peace movement. Though nuclear weapons states (NWS) committed to taking steps towards disarmament under the NPT, it was considered to be a cautious process with an indeterminate completion date.[50] However, many individuals within the epistemic community saw nuclear weapons reductions as a strong possibility—particularly following the hard-won successes of the Gorbachev era. Once the Cold War was over, a group of community members from both science and policy circles began to see the two countries' arsenals as too large for the present circumstances.[51] There was also the hope among some epistemic community members (particularly in government) that more headway could be made on multilateral negotiations such as those on a complete nuclear test ban.[52]

These norms were strongly present in the US and Russian nuclear epistemic communities during the 1990s. Cooperation had been valued by US and Russian scientists since before the end of the Cold War, as seen in the successful Joint Verification Experiments in 1988 that were designed to help the two countries develop verification measures to help ratify the 1974 Threshold Test Ban Treaty.[53] While other competing norms existed during this time period that

[50] Thomas R. Rochon and David S. Meyer, *Coalitions & politial movements : the lessons of the nuclear freeze*, Exploring political behavior (Boulder, Colo.: L. Rienner, 1997).
[51] Avis Bohlen, "The Rise and Fall of Arms Control," *Survival* 45, no. 3 (2003). P 26
[52] Matthew and Michael Levi Hardiman, "History of the Comprehensive Nuclear-Test-Ban Treaty (CTBT)," Federation of American Scientists, http://www.fas.org/nuke/control/ctbt/review99/history.htm.
[53] Siegfried Hecker, "Adventures in scientific nuclear diplomacy," *Physics Today* 2011.

saw cooperation with the Russians (or, conversely, cooperation with Americans) as dangerous, these were eventually passed over by policymakers.[54]

Who

The nuclear community's core in both countries consisted of physical scientists and strategists. The scientists were considered the experts on what technology can or cannot accomplish. Within the government, their access to the policymaking process could range from serving as advisors to high-level officials and elected representatives to conducting research or developing technology for government agencies. Outside of the government, nuclear scientists worked within civil society to lobby decision makers like other special interest groups. The strategists, whose specialties lay in understanding the political and military implications of nuclear technology, constituted the other element of the community's heart. Relying on their ability to navigate the "nexus" of science and policy, they advised leaders on the political implications of technology. B1 described his expertise as being able to communicate with scientists and translate it into policy.[55] The science and policy portions of the community fed each other knowledge to create new perceptions of threats, interests, and potential.

A distinguishing feature of the U.S. portion of the nuclear epistemic community was its small size. Members encountered one another as they spoke at or attended the same debates, panels, and conferences, or worked together at the same institutions. They cited each other's work and collaborated on editorials in forums such as *Foreign Policy* and *Foreign Affairs*, and saw each other quoted in publications such as *Arms Control Today.* It was common, for example,

[54] Patrick Tyler, "US Strategy Plan Calls for Insuring No Rivals Develop a One-Superpower World: Pentagon's Document Outlines Ways to Thwart Challenges to Primacy of America," *The New York Times*, March 8 1992.
[55] Interview with former State Department official (B1), March 5, 2012

that interviewees recommended I talk to the same individuals (particularly former or current officials considered to be advocates of or heavily involved in nuclear cooperation).

On the fringes of the nuclear policy community in the United States were the policymakers who work exclusively on nuclear issues. When narrowed to those who work on nuclear nonproliferation or weapons-related issues, the field became even smaller. Because of the small size of the community, these individuals were also fluent in the community's politics and inner workings. These individuals were often well-known within the epistemic community because their positions in the government made them ideal channels to implement new ideas. Furthermore, it was common for individuals specializing in nuclear nonproliferation and arms control to move between the private sector, public sector, and academia. Of the eleven interviews I conducted, for example, all the individuals except three had experiences both in and out of government, as illustrated in Appendix A.

These policymakers also played a dual role as adopters and promoters of new ideas. Because their expertise lay in nuclear issues, they had the task of convincing their organizations to adopt a new approach. When B2 was asked what his reaction was to the idea of cooperative threat reduction when it was introduced to him in his position as a government official, he said that he "knew it would be a tough political battle, but it was bold, creative policy."[56] This individual, who now does considerable work in the think tank community, played the dual roles, working in both Congress and the State Department before moving into the NGO community. After being convinced of the policy approach's potential, he went on to implement its programs and advocate for continued cooperation.

[56] Interview with former State Department official, February 10 2012.

While the core of the community is easy to identify, it is more difficult to determine the edges of the group. Generally, the line can be drawn between those who work exclusively on nuclear-related issues and those who do not. Policymakers who work on nuclear issues are on the fringes because they often hold broader organizational interests that may conflict with the epistemic community's goals. Despite being on the edge of the group, policymakers who work on nuclear issues are also some of the crucial links through which new ideas are channeled. These first adopters are therefore still considered a part of the community because it is common for them to hold positions in think tanks, academic institutions, or with contractors before or after leaving government positions.

Where

As discussed in the previous section, members of the community can be found in various government agencies, NGOs, private corporations, academic institutions, and national laboratories. As Adler notes, a community's influence can be amplified through its concentration in certain organizations, and the nuclear epistemic community was no exception. By identifying where members were located, researchers can trace pathways of influence or make determinations about whether individuals had access to the decision making process.

Laboratories and institutes in both countries were created explicitly for nuclear weapons development. In the United States, the 17 DOE laboratories are charged with conducting research on "strategic scientific and technological capabilities," though not all of these institutions work on weapons or even counter-WMD issues.[57] This federal research system contains the original weapons laboratories created during the Manhattan project, later becoming

[57] "Laboratories: The Office of Science Laboratories," Office of Science, Department of Energy, http://science.energy.gov/laboratories/.

integral parts of the weapons development complex. The U.S. weapons complex extends beyond the laboratories to production facilities (such as those at Rocky Flats, Wheldon Springs, Pantex, and Y-12), but in this case I focus just on the laboratories, which were the hubs for cooperative efforts with Russian weapons complex. The three weapons laboratories, Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratory (SNL), have played substantial roles in making connections with Russian laboratories, though the smaller national laboratories involved with nonproliferation or counter-WMD research have helped implement cooperative threat reduction programs as well.[58] Two of the laboratories—LLNL and LANL—have overlapping missions, a deliberate feature to encourage competition and higher quality research. There is a rivalry between all of the laboratories as they compete for resources, though the smaller laboratories often resent the three weapons laboratories.[59]

In Russia, the nuclear weapons complex was anchored by ten closed "nuclear cities," whose existence was officially acknowledged in 1992. As described in Appendix B, the cities worked on all stages of nuclear research and production. During Cold War, these cities were largely cut off from the outside world given their classified status, and remain difficult to access today. Some of the other research institutes contributing to weapons development, such as the Kurchatov Institute, are located outside of the closed cities. The research and production complex Russia inherited was based on the establishment of research institutes, which during the Cold War had become large and sprawling and contained redundant capabilities.[60]

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[58] Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*.
[59] Ibid.
[60] Oleg; Cochran Bukharin, Thomas; and Robert Norris, "New Perspectives on Russia's Ten Secret Cities," (Washington, DC: Natural Resources Defense Council Nuclear Program, 1999). Loren R. Graham, *Science in*

The U.S. and Russian nuclear research and production facilities have a history of secrecy. Though the cities located near U.S. labs have no access restrictions, they were sited in desolate locations and remain "company towns," with identities closely tied with their nuclear mission. For example, Richland, Washington, hosted the Manhattan Project's plutonium production reactor; in a moment of town pride, one local high school's mascot became the "bomber," with a logo featuring a mushroom cloud. Though some criticize the Richland High Bombers as insensitive, the town has stubbornly refused to change it.[61] As noted by C2, these similarities have facilitated a feeling of kinship between the US and Russian cities, further demonstrated by the sister-city partnerships between Snezhinsk and Livermore, and Sarov and Los Alamos.[62]

The government agencies that directed these research complexes also were major forces in the creation of nuclear policy. In the United States, the primary organizations were the Department of Energy, the Department of State, and Department of Defense. The Department of Energy oversees the national laboratories, and is responsible for providing technical expertise and innovation in nuclear technology. The Department of State, which is charged with negotiating treaties on arms control, nonproliferation, and cooperation, has also played an increasing role in nuclear policy, particularly after the Arms Control and Disarmament Agency (ACDA) was folded into its organization in 1999. The Department of Defense, which handles military and intelligence issues, also had a large role in nuclear policy—particularly in nuclear weapons strategy creation. These three agencies handle the bulk of the nuclear weapons policymaking process, though other agencies (such as the Nuclear Regulatory Commission, the

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Russia and the Soviet Union : a short history, Cambridge history of science (Cambridge ; New York: Cambridge University Press, 1993).

[61] Blake Hume Rodman, "Bomb's Away: February 1991," *Education Week* 1991.

[62] "Nuclear Cities News," (Center for Energy & Environmental Studies, Princeton University and the Russian-American Nuclear Security Advisory Council (RANSAC), 1999).

Department of Health and Human Services, and Department of Commerce) are consulted as necessary.

In Russia, the organizations in charge have undergone several changes since the collapse of the Soviet Union and reforms undertaken with building new governments. Arguably the largest change was the initial break-up of the complex following the establishment of Kazakhstan, Belarus, and Ukraine as independent states. During the Cold War, parts of the Soviet nuclear weapons complex were located in these states, and after independence they were born with nuclear powers. Though issues created from this development will be mentioned as it applies to other negotiations, for the sake of scope they have been excluded from analysis.

In the Soviet Union, the Ministry of Medium Machine Building (Minsredmash) was responsible for most aspects of nuclear power research and production, and had authority over the nuclear institutes within the closed cities. As the government began the process of downsizing the weapons complex, in 1989 Minsredmash was combined with the Ministry of Nuclear Power and renamed the Ministry of Atomic Energy and Industry of the U.S.S.R. Following the collapse of the Soviet Union, the institution was renamed the Ministry of Atomic Energy (Minatom).[63] In 2004, Minatom was reorganized into the Russian Federal Atomic Energy Agency, and was transformed in 2007 into the Rosatom Nuclear Energy State Corporation.[64] Because this research focuses on the 1990s, Minatom will be the agency discussed in the paper.

Russian nuclear weapons policy, like that in the United States, is also under the purview of the Ministry of Defense (MOD). Besides being responsible for weapons' deployment, storage,

[63]Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*.
[64] "History of Russian Nuclear Industry," State Atomic Energy Corporation "Rosatom", http://www.rosatom.ru/wps/wcm/connect/rosatom/rosatomsite.eng/about/nuclear_industry/history/.

and transportation, MOD also oversees other military applications of nuclear power.[65] The Federal Atomic Inspectorate (Gosatomnadzor, or GAN) was at the time the independent civilian regulatory agency. In 2004 it was reorganized into the Federal Service for Environmental, Technological, and Nuclear Oversight (Rostekhnadzor). Following another administrative reorganization in 2008, it was placed under the supervision of the Ministry of Natural Resources and Ecology.[66] Similarly to the United States, various agencies have stakes in the policymaking process, and others may be brought in depending on if the issue is related to nuclear power, medical applications, or commerce. Intelligence communities in both countries also affected the process, though the clandestine nature of this work makes it difficult to determine how many members of the nuclear epistemic community reside in such spheres.

Outside of the government laboratories, nuclear scientists and strategists are often located in academic institutions with substantial science, engineering, and political science programs. U.S. universities that pioneered nuclear physics research, such as the University of California at Berkeley, still have strong ties to the nuclear community today.[67] Particularly during the 1990s, Harvard University's Belfer Center, Princeton University, and the Massachusetts Institute of Technology were recognized hubs for the discussion of nuclear policy, drawing on the presence of luminaries such as Ashton Carter and Frank Von Hippel.

Many of the Russian scientists and strategists working in the weapons complex in the 1990s graduated from the same universities—such as the Moscow State Institute of International

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[65] Jason D. Ellis, *Defense by other means : the politics of US-NIS threat reduction and nuclear security cooperation* (Westport, Conn.: Praeger, 2001). P 60

[66] Heikki Reponen, "Russian Nuclear Reactors" (paper presented at the NKS NordThreat Seminar, October 30-31 2008). Cristina Chuen, "Radiological Materials in Russia," (2004), http://www.nti.org/analysis/articles/radiological-materials-russia/; ibid.

[67] Rhodes, *The making of the atomic bomb*.

Relations (MGIMO) or the Moscow Engineering Physics Institute (National Research Nuclear University) (MEPhI)—though university affiliation was not as important as other institutional affiliations.[68] A larger, more prominent organization was the U.S.S.R. Academy of Sciences, a network of research institutes sponsored by the government but not under the control of other ministries.[69] The Academy of Sciences, whose prestige granted its members some political cover to push new ideas on science policy, also served as a point of contact for Western research organizations.[70] Its current manifestation, the Russian Academy of Sciences, has continued to work with its U.S. counterpart, the National Academy of Sciences, to facilitate track II workshops and joint projects.[71] Recent examples include their joint work on the problems posed by spent nuclear fuel storage, the threat of radiological terrorism, and even the hurdles to U.S.-Russian cooperation on nuclear nonproliferation.[72]

Civil society institutions, particularly in the United States, also served an important role for epistemic community members. These autonomous institutions are thought to affect the health of democracies; they indicate citizen participation and trust that allows governments to

[68]Russian Center for Policy Studies (PIR Center), "Report of the Russian Center for Policy Studies (PIR Center) on the Implementation of Recommended Actions of the 2002 UN Study on Disarmament and Non-Proliferation Education, July 2008-July 2010," (Moscow: PIR Center, 2010)., Graham, *Science in Russia and the Soviet Union : a short history*. P 174

[69] Graham, *Science in Russia and the Soviet Union : a short history*., PIR CENTER

[70] Andrey Allakhverdov and Vladimir Pokrovsky, "Kremlin Brings Russian Academy of Sciences to Heel," *Science* 314, no. 5801 (2006).

[71] Glenn E. Schweitzer and National Research Council, *Scientists, Engineers, and Track-Two Diplomacy: A Half-Century of U.S.-Russian Interacademy Cooperation* (The National Academies Press, 2004).

[72] U.S National Academies Committee on U.S-Russian Cooperation on Nuclear Non-Proliferation; and Development Russian Academy of Sciences Committee on U.S-Russian Cooperation on Nuclear Non-Proliferation, Security, Cooperation; National Research Council, *Overcoming Impediments to U.S-Russian Cooperation on Nuclear Non-Proliferation: Report of a Joint Workshop* (The National Academies Press, 2004).
Committee on Opportunities for U.S.-Russian Collaboration in Combating Radiological Terrorism et al., *U.S.-Russian Collaboration in Combating Radiological Terrorism* (The National Academies Press, 2007).
Committee on the Scientific Aspects of an International Spent Fuel Repository in Russia et al., *An International Spent Nuclear Fuel Storage Facility -- Exploring a Russian Site as a Prototype: Proceedings of an International Workshop* (The National Academies Press, 2005).

overcome collective action dilemmas.[73] On the U.S. side, these institutes ranged from Pugwash (noted for arranging U.S.-Soviet unofficial dialogues) to research organizations such as the Carnegie Endowment. Some, such as the Arms Control Association, produced monthly publications designed to showcase new ideas and discussions of current problems—which editors hoped would draw the attention of legislative staffers and executive branch officials. Scientist-specific organizations, such as the American Association for the Advancement of Science (AAAS), the Union of Concerned Scientists, and the Federation of American Scientists provided additional forums for scientists to vocalize support for policy approaches.

In Russia, however, a different story reigns—the history of totalitarianism has left a dearth of civil society institutions.[74] A few think tanks dealing with nuclear issues have appeared in Russia since the fall of the Soviet Union—in 1994, for instance, the Carnegie Endowment opened the Carnegie Moscow Center, which has been heavily involved with nuclear issues like its parent institution.[75] The Center for Policy Studies in Russia (PIR Center), a nongovernmental think tank based out of Moscow, initially focused solely on WMD proliferation issues. Its weekly publication, *Yaderny Kontrol*, presented Russian viewpoints on nuclear topics. Even these organizations, however, had explicitly Western audiences; *Yaderny Kontrol*, for example, was published in English as well as Russian.[76]

Qualifications as an Epistemic Community

[73] Robert D. Putnam, Robert Leonardi, and Raffaella Nanetti, *Making democracy work : civic traditions in modern Italy* (Princeton, N.J.: Princeton University Press, 1993).
[74] James L. Gibson, "Social Networks, Civil Society, and the Prospects for Consolidating Russia's Democratic Transition," *American Journal of Political Science* 45, no. 1 (2001).
[75] "About the Carnegie Moscow Center," Carnegie Moscow Center, http://carnegie.ru/about/?lang=en.
[76] "PIR Center's 15th Anniversary," PIR Center: The Russian Center for Policy Studies, http://pircenter.org/index.php?id=2939.

As stated earlier, Haas' definition of an epistemic community looks at four qualities: norms, causal beliefs, shared notions of validity, and a common policy project.[77] The description of the community in the preceding pages shows that the epistemic community profiled by Adler existed in the 1990s as well. Taking each component of Haas' definition, I will show how the network of nuclear scientists and strategists in Russia and the United States extended beyond a professional network.

1) *Normative and principled beliefs, which provide a value-based rationale for community action.*

As described in the first section of this chapter, community members held principled beliefs about cooperation, and to a lesser extent, limited transparency. Nonproliferation was generally supported based on members' experiences working on matters of national security. More explicitly, what separated the network from the larger pool of scientists and strategists was a belief that scientists (or those with technical expertise) should have input into policy creation. The existence of organizations such as the Federation of American Scientists and the Union of Concerned Scientists indicates a belief among some members of the scientific community that scientists should advocate for specific approaches over others. Jeremy Stone, president of the Federation of American Scientists from 1970 to 2000, details in the documents he donated to the American University archives the debate over scientific responsibility: should scientists "go public" if the executive branch refuses to listen? He further asked himself: "Should working scientists asked to express their opinion on a technical subject throw in policy views, opinion, or analysis? Only if it is well thought out."[78] When the Cold War ended, these norms directed that

[77] Haas, "Introduction: Epistemic Communities and International Policy Coordination."
[78] Jeremy J. Stone., Personal Papers available thanks to American University Archives and Special Collections.

the network of scientists should provide policy recommendations alongside their technical expertise.

2) *Causal beliefs, stemming from their analysis of practices contributing to a set of important problems in their field and which then establish a basis for determining policy actions.*

Also discussed previously, the community shared causal beliefs about nuclear strategy in general. Levine (and later Adler) noted that members held beliefs about the drivers of conflict that led them to support reducing tensions through arms control measures.[79] These ideas were still present in the community at large at the end of the 1980s. Dr. Siegfried Hecker, former LANL director, describes one of his first experiences at the lab, writing, "I was struck by the words of Norris Bradbury, J. Robert Oppenheimer's successor as director of the laboratory: 'We don't build bombs to kill people; we build them to buy time for the leaders of the world to find other ways of solving the world's problems.'"[80] Bradbury was emphasizing the defensive aspect of nuclear deterrence—peace can be assured if the threat of a nuclear retaliatory strike can make an attacker think twice before commencing hostilities. The offensive, however, is equally important to the concept. In order for nuclear deterrence to work, the country in possession of the nuclear capability must be able to convince other countries that it is willing to use them. The U.S. and Russia, for example, reserve the right to use nuclear weapons in a first strike capacity—i.e., to repel a conventional (or non-nuclear unconventional) attack or threat. Though this policy is considered to make deterrence more effective, it also increases the threat to other countries' security. Bradbury hoped that nuclear weapons would never be used again, and might instead be a path to peace. For those who agreed with Bradbury, once the Cold War was over, the perceived need for tens of thousands of nuclear weapons disappeared. Cooperation provided an avenue to

[79] Levine, *The arms debate*. Pp 61 and 80-90
[80] Hecker, "Adventures in scientific nuclear diplomacy."

decrease the number of weapons to create more stable bilateral relations. All of the individuals I interviewed expressed that at the time they began working on nonproliferation and arms control initiatives, they felt they were working on something important.

Many of the Russian scientists also carried the same sense of patriotism and caution. Glenn Schweitzer, the founding director of the International Science and Technology Center (ISTC) in Moscow, testified before Congress in 1996 that most of the nuclear weapons specialists in Russia were fiercely loyal, and proud that they had played a role in preventing a nuclear war. While there was a cause for concern that economic desperation would drive some specialists to sell their knowledge outside Russia, the core of Russia's nuclear weapons scientists was not likely to proliferate information or technology.[81] As Sharon Weiner argues, this notion runs counter to the conventional wisdom at the time, but Schweitzer's arguments were confirmed in many of interviews with U.S. scientists who had worked closely with their Russian counterparts.[82] Though the transnational community did not have the same idea of which countries should be considered "rogue states," nonproliferation principles were present on both sides of the national divide. Nuclear weapons were seen as exacerbating a tense situation—even if the individuals believed that the weapons contributed to peace, all recognized the danger they posed.

3) *Shared notions of validity, or how concepts are evaluated for validity in their area of expertise.*

For the nuclear expert community, validity is grounded in the scientific method and the real capabilities of technology. The physical world for some scientists is easier to understand than politics, since its motions are expressed in laws followed by all the elements of the system.

[81] Permanent Subcommittee on Investigations, Committee on Governmental Affairs, *Global Proliferation of Weapons of Mass Destruction, Part II*, 2, March 13, 20, 22 1996.
[82] Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*. P 103-4

When the members of the U.S. and Soviet laboratories first met for joint experiments in 1988, the participants marveled that they shared the same "language" of science. Atoms move the same way in Russia as they do in the United States, and participants noted that could share these views of how the world worked. The key relevant elements of the scientific method for these purposes are empiricism and falsifiability. Not only must claims be grounded by empirical claims in order to be valid, but the results of tests must be able to be replicated. For this reason, policymakers and politicians are often looked down upon for ignoring or misstating scientific evidence. In the Senate debate about whether to ratify the Comprehensive Test Ban Treaty, for example, the testimony of the three laboratory directors from LANL, LLNL, and SNL was held up by opponents as proof that testing may be necessary to maintain the U.S.' nuclear stockpile. The next day, the directors issued a joint statement reiterating that this was not their expert opinion.[83] A major part of the community's dialogue centers on improving communication between policymakers and scientists. Being able to "speak science" is highly valued, as illustrated by B1's description of his expertise as being able to communicate to both groups.[84]

4) *A common policy project, or a set of common practices linked with a set of common problems their expertise is uniquely able to address.*

The nuclear expert community sees the danger of nuclear technology in the hands of a malicious actor to be the common problem, and sees potential for technical solutions. Because the core of the community is linked by a common set of skills and understanding—nuclear physics, engineering, and related sciences—there is a belief that these skills can be applied to the problem this technology has created. Nonproliferation, therefore, has been the largest common

[83] "Joint Statement by Three Nuclear Weapons Laboratory Directors on the Safety and Reliability of the U.S. Nuclear Weapons Stockpile: C. Paul Robinson, Sandia National Laboratory; John C. Browne, Los Alamos National Laboratory; C. Bruce Tarter, Lawrence Livermore National Laboratory," *Department of Energy News*, October 8 1999.

[84] Interview with former State Department official, March 5, 2012.

policy project in the nuclear epistemic community since the end of the Cold War. Once the Soviet Union ceased to exist, the U.S. nuclear community no longer had an "evil empire" to work against. Instead, U.S. and Russian policymakers found the fear of "loose nukes" and "brain drain" created a common enemy, allowing the two countries to more comfortably implement cooperative measures. The former enemy scientists could now work together to solve common problems. This feature reinforced the transnational aspect of the nuclear epistemic community.

As described above, groups of U.S. and Russian nuclear experts fit the definition of a transnational epistemic community during the 1990s. It appears to have been a descendant of the group Adler described as existing in the 1950s through the 1970s. The community still resided in the same institutions, arguably since there had been relatively few changes in the responsibilities of these organizations. For institutions that were driven by the Soviet or American threat during the Cold War, the collapse of the Soviet Union meant they had to find a new "threat" to influence their actions. The community members who resided in these institutions at the time were able to take advantage of this uncertainty, since they knew where they could influence the policymaking process.

CHAPTER 4

INITIAL SUCCESS IN UNCERTAIN TIMES

The American and Russian governments established high-profile, nuclear-focused cooperative programs in the years following the collapse of the Soviet Union. These were not, however, the first programs of their kind—unofficial links between nuclear scientists stretched back decades and joint research on verification technology occurred prior to 1991. This chapter describes the various cooperative nuclear initiatives and arms control agreements begun between 1988 and 1996, and examines the factors leading to their initial successes. These programs are described as three broad activities: lab-to-lab initiatives, government-to-government programs under the Nunn-Lugar (later Cooperative Threat Reduction) legislation, and arms control agreements.

Several similarities appear in each story. First, the idea of establishing cooperation between the two countries on nuclear issues appears prior to 1991. The Nunn-Lugar legislation was heavily influenced by networks of academics, strategists, and Washington think tanks, while the lab-to-lab programs grew out of contacts made during joint experiments between US and Russian labs in the late 1980s. Arms control negotiations, which had been an important measure of US-USSR relations during the Cold War, continued after the Soviet Union ceased to exist.

Second, the individuals in the U.S.-Russian epistemic community used these previously-developed ideas to point their governments in new policy directions. For the Nunn-Lugar legislation and the lab-to-lab initiatives, members of the U.S.-Russian epistemic community offered cooperation as an answer to their governments' hesitation of identifying new national interests and countering the perceived threat of "loose nukes." Arms control negotiations, which had gained momentum in the late 1980s, took advantage of the new bilateral relations to make headway on previously-stalled talks on a Comprehensive Test Ban Treaty and further reductions.

Finally, many of the programs were developed on very similar time spans, which point to a possible "policy window" as described by John Kingdon, where an opening for new views to enter either the problem stream or the policy stream is created, often due to an external crisis.[85] D1, who was heavily involved in the lab-to-lab program, made it clear during the interview that the lab-to-lab and Nunn-Lugar/Cooperative Threat Reduction programs began as different efforts, though they would later merge under the latter's funding.

Cooperative Nuclear Initiatives

Lab-to-Lab

The lab-to-lab initiatives were programs developed by the U.S. and Russian weapons complex to conduct joint research on unclassified topics. Driven by scientists from both countries, these programs were based on mutual scientific curiosity. Although they eventually were put under the heading of the Cooperative Threat Reduction initiative, these programs came about because of low-level governmental cooperation supported by high-level leadership.

The history of lab-to-lab predates the end of the Cold War. The U.S. and (at the time) Soviet scientists first became interested in each other through research publications in the 1960s. John Shaner, a retired scientist who worked at Los Alamos National Laboratory (LANL), noted in an interview with *Los Alamos Science* that they "referenced each other's work, and since we were working on similar problems, we had a pretty good idea of the quality of work on both sides."[86] Starting in late 1957, the Pugwash conferences brought scientists from the Soviet Union, United States, and other countries together to discuss issues like arms control. The Soviet-American Disarmament Study Group, another forum that grew out of the Pugwash conferences, focused on arms control measures and primarily included scientists and

[85] Kingdon, *Agendas, alternatives, and public policies*.
[86] "Side-by-side as equals-a round table."

policymakers from the American Academy of Arts and Sciences and the Soviet Academy of Sciences.[87] These groups served as two of only a few open channels of communication and led to informal contacts that influenced the creation of norms and development of arms control initiatives such as the Anti-Ballistic Missile Treaty.[88] Cooperation continued through mid-1980s when the Natural Resources Defense Council (another NGO) and the Soviet Academy of Sciences managed to overcome bilateral tensions between their respective countries to build seismic monitoring stations on each other's territory.[89]

At the same time the NRDC-Soviet Academy initiative was underway, the United States and Soviet Union were meeting in Geneva for the Nuclear Testing Talks (also known as the Geneva talks). The talks aimed to develop verification technologies and procedures for the Threshold Test Ban Treaty.[90] Both weapons complexes sent scientists to provide substantial technical advice, including many individuals who would later become important players in initiating the lab-to-lab programs. The Soviet technical team, for example, was led by Viktor Mikhailov, who would go on to lead Minatom from 1992-1998. In 1988 the countries conducted the Joint Verification Experiments, taking on-site yield measurements at each other's nuclear weapons test sites.[91] This was the first time that the laboratories were able to make substantial contact with their counterparts.

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[87] Bernd W. Kubbig, "Communicators in the Cold War: The Pugwash Conferences, the U.S.-Soviet Study Group and the ABM Treaty; Natural Scientists as Political Actors: Historical Success and Lessons for the Future," in *Peace Research Institute Frankfurt Report* (1996).
[88] Kai-Henrik Barth, "Catalysts of Change: Scientists as Transnational Arms Control Advocates in the 1980s," in *Global Power Knowledge: Science and Technology in International Affairs*, ed. John Krige and Kai-Henrik Barth (Chicago: University of Chicago Press, 2006).
[89] Ibid.
[90] "Side-by-side as equals-a round table."
[91] Irvin R. Lindemuth, "U.S.–Russian Nuclear Cooperation and the CTBT," *The Nonproliferation Review* 16, no. 3 (2009).

Participants would later look back at these experiments as critical to the future collaboration between the labs. D1, at the time a LANL scientist, said that after many years of seeing the Soviet scientists as the enemy, the first interactions he had with the Soviet delegation "made me recognize how like us these people are....[they were] scientists first and foremost, and patriots next. Just like us."[92] The first talk of further, substantial cooperation took place at the dinner following the experiment at the Nevada Test Site. D1 was present at the dinner, and said that members of the Russian delegation suggested joint research. His memories were corroborated by stories from others present at the experiments, who noted that Vadim Simonenko, a scientist from Snezhinsk (then known as Chelyabinsk-70, one of the secret cities) was particularly keen on doing joint underground scientific experiments at the time.[93] D1 said he was struck by how different the world had become, considering that their countries had spent so many years in fear of each other.[94]

Despite overtures to continue substantive cooperation, leadership at U.S. labs claimed there was not enough political traction to make such joint projects possible. The labs and secret cities continued to communicate indirectly through the Geneva Talks forum as well as direct correspondence, and included visits arranged by Mikhailov of U.S. scientists to Arzamus-16 in 1990. One LANL scientist, in a 1996 interview, described having "extensive discussions" at the 1991 IEEE Pulsed Power Conference with scientists from Arzamus-16, Phillips Laboratory, and LLNL about whether collaboration was truly possible.[95] LANL submitted a plan for establishing cooperative efforts to the National Security Council, but it never received a response.[96]

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[92] Former national laboratory staffer, Interview by author, April 5 2012.
[93] "Side-by-side as equals-a round table." P 14
[94] Former national laboratory scientist, Interview by author, April 5 2012.
[95] "Side-by-side as equals-a round table." P 15
[96] Lindemuth, "U.S.–Russian Nuclear Cooperation and the CTBT."

The beginning of the Soviet Union's collapse in late 1991 changed the high levels of the U.S. executive branch's attitude and gave the U.S. and Russian laboratories' efforts new traction. D1 remembered a meeting in late 1991 at which DOE Secretary Admiral Watkins asked U.S. laboratory leadership what should be done about the possibility of a "brain drain" from the Russian weapons complex, saying that President George H.W. Bush was concerned about the potential threat. D1 suggested that the United States go ask the Russian laboratory directors what it would take to keep their scientists from seeking better (weapons-related) jobs outside of Russia. According to D1, Watkins, along with DOE Chief of Staff Polly Gault, wanted the exchange to occur before Christmas, which he took as a sign of their eagerness to see the outreach occur.[97]

In February 1992, the outreach took place in the form of lab directors' exchange visits. Directors Vladimir Belugin and Vladimir Nechai (Arzamas-16 and Chelyabinsk-70, respectively) visited LANL and LLNL, followed by a reciprocal visit by Directors Hecker and John Nuckolls (LANL and LLNL, respectively) to Arzamas-16 and Chelyabinsk-70. From that point forward, the labs discussed seriously areas for future collaboration, and in October 1992 the first lab-to-lab contracts for two experimental series of experiments were signed between LANL and Arzamas-16 (more specifically, the laboratory located within the secret city, the All Russian Research Institute of Experimental Physics known as VNIIEF).[98] In September 1993, the first U.S.-Russian lab-to-lab experiment was performed at VNIIEF. The experiments soon

[97] Former national laboratory scientist, Interview by author, April 5 2012.
[98] Irvin R. Lindemuth et al., "The VNIIEF/LANL Collaboration: Ten Years of Scientific Benefit to the Russian Federation and the United States," in *Ninth International Conference on Megagauss Magnetic Field Generation and Related Topics* (Moscow and St. Petersburg, Russia2002).

picked up LANL scientist Stephen Younger's description of the endeavor as scientists "working side-by-side as equals."[99]

As the next step in the growing lab-to-lab cooperation, the laboratories' leadership negotiated and signed contracts that expanded collaboration. The experiments carried out under the contracts were unclassified and made use of each laboratory's strength.[100] In 1994, the lab-to-lab umbrella contracts on scientific conversion activities was signed by Hecker and Belugin, and proposals were made to broaden the scope of activities to Nuclear Materials Protection, Control, and Accounting (MPC&A)—an area which focused on securing nuclear materials and facilities.[101] A few months later, Charles Curtis, the under secretary in charge of national security programs at the Department of Energy, supported the cooperation's expansion to include MPC&A, allocating $2 million from that year's budget. He would later negotiate with the Department of Defense to take over the MPC&A responsibilities (in exchange for funding) under the Nunn-Lugar legislation. In 1996, the lab-to-lab initiative converged with the government-to-government programs (known as the Nunn-Lugar/Cooperative Threat Reduction programs) discussed later in the chapter.[102]

The lab-to-lab initiatives would grow to include other U.S. and Russian laboratories. LLNL and the All-Russian Institute of Technical Physics (known as VNIITF) located at Chelyabinsk-70 would eventually embark on similar joint work, while once under the Nunn-Lugar title these two labs would be joined on the U.S. side by Sandia National Lab, Oak Ridge National Lab, Brookhaven National Lab, and Pacific Northwest National Lab. Between 1994 and

[99] Lindemuth, "U.S.–Russian Nuclear Cooperation and the CTBT."
[100] Stephen Younger et al., "Lab-to-Lab: Scientific Collaborations between Los Alamos and Arzamas-16 Using Explosive-Driven Flux Compression Generators," *Los Alamos Science* 1996.
[101] "Side-by-side as equals-a round table."
[102] Ellis, *Defense by other means : the politics of US-NIS threat reduction and nuclear security cooperation*. P 108

1996 seven more Russian labs would be added, including institutes in Moscow and those from secret cities formerly known as Obninsk, Sverdlovsk-44, Mayak, Tomsk-7, Kraxnoyarsk-26.[103]

Government-to-Government

The second set of cooperative initiatives developed in the immediate aftermath of the Soviet Union's collapse was the government-to-government initiatives, which originated in the U.S. Congress. These programs sought to address the same problems the lab-to-lab programs were addressing, namely strengthening nuclear security in the former Soviet Union and countering the potential "brain drain" caused by un- or underemployed weapons experts. The government-to-government programs were more commonly known by their initial legislation's name—Nunn-Lugar programs—after the two U.S. senators who sponsored the bill. In contrast to the lab-to-lab initiative, policy-oriented members of the epistemic community located in Washington, DC, pushed the Nunn-Lugar legislation. As described below, the U.S. members of the community were its primary drivers, and it operated in a more top-down fashion than the laboratories' efforts.

The Nunn-Lugar legislation was not the first attempt by members of Congress to provide aid to the crumbling Soviet Union. While visiting Budapest for a conference, Senator Sam Nunn (D-GA) was invited to visit Moscow to meet with Gorbachev (with whom he had talked on a number of occasions) and other officials immediately following the failed coup. Meeting with the leader in the Kremlin, Nunn asked Gorbachev directly about whether he had kept command and control of Soviet nuclear forces during the coup attempt. He was unsatisfied with Gorbachev's answer, saying "It seemed to me that either he was not himself clear about the status of command and control of nuclear weapons during that crucial period, or he was not

[103] Ronald Auguston, John Phillips, and Debra Daugherty, "Russian-American MPC&A: Nuclear Materials Protection, Control, and Accounting in the Russian Federation," *Los Alamos Science* 1996.

comfortable discussing the matter candidly with me."[104] Following this meeting, Nunn decided that something needed to be done to prevent potential nuclear disaster.

In August 1991, Nunn and Representative Les Aspin (D-WI) offered a measure that would appropriate $1 billion from the defense budget for humanitarian assistance and weapons security in Russia. The Aspin-Nunn proposal was faced with both House and Senate Republican opposition, and was later withdrawn following a lack of White House support and growing anti-foreign aid sentiment seen in the special election of Harris Wofford (D-PA), who ran on the platform of "America first."[105]

Nunn would revive the idea in a slightly different format a short time later. Just after the legislation was withdrawn, he and Senator Richard Lugar (R-IN) met for an informal briefing on nuclear weapons security in the Soviet Union in light of the political upheaval ongoing at the time.[106] Dr. Ashton Carter of the Harvard University Center for Science and International Affairs (CISAC) led the briefing, the subject of which was his center's recent study, *Soviet Nuclear Fission: Control of the Nuclear Arsenal in a Disintegrating Soviet Union*. He concluded that the instability could have grave consequences for the safety and security of the Soviet nuclear arsenal, particularly if it divided into autonomous republics.[107] Also present at the meeting, according to its participants, were John Steinbruner of the Brooking Institution, William Perry (at the time at Stanford, studying the USSR's military-industrial complex), and David Hamburg,

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[104] Sam Nunn, "Changing Threats in the Post–Cold War World," in *Dismantling the Cold War : U.S. and NIS perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*, ed. John M. Shields and William C. Potter, *CSIA studies in international security* (Cambridge, MA: MIT Press, 1997).
[105] Weiner, *Our own worst enemy?: institutional interests and the proliferation of nuclear weapons expertise*.
[106] Richard Combs, "U.S. Domestic Politics and the Nunn-Lugar Program," in *Dismantling the Cold War : U.S. and NIS perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*, ed. John M. Shields and William C. Potter, *CSIA studies in international security* (Cambridge, Mass.: MIT Press, 1997).
[107] Kurt M. Campbell, F. Kennedy School of Government Center for Science John, and Affairs International, *Soviet nuclear fission : control of the nuclear arsenal in a disintegrating Soviet Union* ([Cambridge, Mass.]: Center for Science and International Affairs, John F. Kennedy School of Government, 1991).

the president of the Carnegie Corporation of New York. The latter two were credited with having arranged the meeting. The briefing was a success, reinforcing Nunn's conviction that the United States should act to prevent the possible proliferation. Afterwards, Carter and some of Nunn's and Lugar's staff members—Robert Bell, Ken Meyers, and Richard Combs—remained in the office to draft initial legislation.[108]

Two days later, on November 21, 1991, the two senators brought together a bipartisan group of sixteen senators at a working breakfast to hear Carter's briefing.[109] Nunn and Lugar used the breakfast to gather support for their new legislation, and a week later the Nunn-Lugar amendment passed the Senate by a vote of 86 to 8. Aspin built the necessary support in the House of Representatives, and the legislation passed shortly thereafter.[110] Formally known as "The Soviet Nuclear Threat Reduction Act of 1991," the plan allowed DOD to transfer $400 million a year from its existing budget for it (DOD) to use on types of projects specified in the act. Congress also required that to ensure US funds were not misspent, the proposed recipient had to fulfill six criteria related to the money's end use.[111] These "certifications" were Congress' primary form of oversight of the program, though they were left deliberately vague in order to leave room for political maneuvering.

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[108] Ashton Carter, "Origins of the Nunn-Lugar Program" (paper presented at the The Presidential Conference on William Jefferson Clinton: The "New Democrat" from Hope, Hofstra University, November 10-12 2005).
[109] Weiner, *Our own worst enemy?: institutional interests and the proliferation of nuclear weapons expertise*. Combs, "U.S. Domestic Politics and the Nunn-Lugar Program."
[110] Ellis, *Defense by other means : the politics of US-NIS threat reduction and nuclear security cooperation*. Combs, "U.S. Domestic Politics and the Nunn-Lugar Program."
[111] The six criteria were: (1) prospective recipients had to make a "substantial investment" of their own resources for dismantling or destroying WMD, (2) the recipient had to forgo any military modernization program that exceeded "legitimate" defense requirements, (3) the fissile material or other weapons components removed from old weapons could not be reused in new weapons, (4) recipients had to "facilitate" US verification of any weapons destruction carried out with US assistance, (5) states had to comply with "all relevant" arms control agreements, and (6) recipients must observe internationally recognized human rights. Further discussion of the criteria can be found in Chapter 4 of Ellis, *Defense by other means : the politics of US-NIS threat reduction and nuclear security cooperation*.

B2 and B5 worked in Congress at the time as legislative assistants for senators heavily involved with the development of Nunn-Lugar. They both had a sense of how dramatic the changes were. B2 said, "Everyone involved knew they were engaged in something important," while B5 said that the "...opportunity of mutual cooperation and drawdown...was a whole new world" and had a feeling of "changing the dynamic [of the relationship] to one of a cooperative nature not based on nuclear weapons."[112] B2 attributed the success of Nunn-Lugar to several factors. He noted that experts such as Carter and his colleagues at the Harvard group helped increase knowledge level, while the issue was also re-messaged as less about humanitarian issues and more about defense. Aspin would move over to the Clinton Administration as Secretary of Defense in 1993, providing a source of support from the executive branch despite his short term.[113]

Finally, B2 pointed to the various kinds of expert and intelligence briefings, along with delegations to and from Russia, which helped create a better understanding of to what the appropriation would be supporting.[114] One example, as highlighted in the Washington Post, was Viktor Mikhailov's visit—at the time the Soviet deputy minister of atomic energy and industry—to ask the Senate Arms Control Observer Group for help securing some of the USSR's tactical nuclear weapons. Mikhailov threw startling numbers at the Senate members, saying that there were inadequate facilities to store tactical nuclear weapons marked for dismantlement, estimating it would take about $300 million to store the weapons beforehand and another $500 million to store the fissionable material after the weapons are disassembled. He said Gorbachev's military

[112] Former State Department official, Interview by author, February 10 2012.
Former legislative assistant, Interview by author, March 6 2012.
[113] Former State Department official, Interview by author, February 10 2012.
[114] Ibid.

adviser told him there is no money to store or dismantle the nuclear weapons, and asked for U.S. help.[115]

In March 1992, Lugar, Nunn, Carter, Perry, Hamburg, and Senators John Warner and Jeff Bingaman visited the former Soviet Union to see the situation. As the Soviet Union collapsed, the new governments faced economic crises, and could not afford to maintain the vast weapons complex built during the Cold War. Following the trip, they managed to add additional authority for Nunn-Lugar to extend funding beyond transportation, storage, safeguarding and destruction of nuclear and conventional weapons.[116] The defense authorization bill passed in October 1992 aimed to counter the potential proliferation of weapons-related expertise, defense conversion, and military-to-military contacts between the United States and states of the former Soviet Union (FSU). It also included support for the creation of the Science Centers.[117]

The variety of programs covered under Nunn-Lugar (or as it came to be called by the mid-1990s, Cooperative Threat Reduction) continued to grow, but for the purposes of this paper only the two that were based on the concept of "scientist engagement" will be examined: the International Science and Technology Center (ISTC), and the Initiatives for Proliferation Prevention (IPP). MPC&A, as described in the context of lab-to-lab, was initially under the purview of DOD but transferred to DOE control in 1996. The laboratories provided expertise crucial for implementing the programs even before MPC&A was under DOE control.

[115] Don Oberdorfer, "First Aid for Moscow: The Senate's Foreign Policy Rescue," *The Washington Post*, December 1 1991.
[116] Combs, "U.S. Domestic Politics and the Nunn-Lugar Program." P 45
[117] Weiner, *Our own worst enemy?: institutional interests and the proliferation of nuclear weapons expertise*. P 81

International Science and Technology Center

In November 1991, Russian Foreign Minister Andrew Kozyrev proposed an international fund for scientific research be established to prevent former Soviet weapons scientists from leaving. The lab-to-lab efforts ongoing at the time were considered complementary by U.S. officials, since it was recognized that it would take time to establish a fund or center. The first multilateral talks in Moscow in February 1992 resulted in an agreement to found the ISTC, with the support of not only Russia and the United States, but also twelve European Community (EC) members that agreed to contribute up to 20 million ECU ($22 million).[118] By the end of February, Japan had also agreed to support the initiative and other Western countries had expressed interest. In late November, the United States, EC, Japan, and Russia signed the "Agreement Establishing an International Science and Technology Center."[119]

Ratifying the agreement was an issue for Russia. While the high-level leadership of the Ministry of Foreign Affairs and Minatom, backed by President Boris Yeltsin, supported ratification, members of the Supreme Soviet were suspicious.[120] The main issues were quickly distilled into tax status, property rights, privileged status of foreign personnel, and the risk of compromising secret information pertaining to national security, as well as its minor status compared to other pressing economic problems.[121] When Yeltsin dismissed the parliament in October 1993, the agreement still had not been ratified, so he signed a provisional protocol that

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[118] Adam R. Moody, "The International Science Center," in *Dismantling the Cold War : U.S. and NIS perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*, ed. John M. Shields and William C. Potter (1997).
[119] Ellis, *Defense by other means : the politics of US-NIS threat reduction and nuclear security cooperation*.
[120] Glenn E. Schweitzer, *Moscow DMZ : the story of the international effort to convert Russian weapons science to peaceful purposes* (Armonk, N.Y. :: M. E. Sharpe, 1996).
[121] Moody, "The International Science Center."
Ildar A. Akhtamzian, "The international science and technology center: Bureaucratic games," *The Nonproliferation Review* 3, no. 1 (1995).

would allow the center to open. The provisional protocol entered into force in March 1994 after Russia gave official notification that it had completed the necessary internal review.[122]

The partnership of countries established the International Science and Technology Center in Moscow to facilitate collaborative research by matching teams of former Soviet weapons experts with Western partners. The short-term goals were to provide funding to underemployed or unemployed scientists with some income and to begin the process of integrating them into the global scientific community. Long-term, the goal was to help them find jobs outside the weapons complex.[123] In the early-1990s, scientists in the weapons complex faced dire economic conditions—they could go months with little to no pay, and few legal prospects to recoup their lost wages. According to the ISTC, 30,000 individuals participated in its projects between 1994 and 1999.[124] The ISTC became an important (and sometimes primary) source of funding for institutes. From 1994-1998, ISTC funded over $33 million worth of projects at VNIIEF and VNIITF.[125] The Department of State (DOS) provided oversight of American funding since the center's founding.

Initiatives for Proliferation Prevention

The Initiatives for Proliferation Prevention (IPP) was a scientist engagement program that grew out of DOE instead DOS, which normally handles diplomatic initiatives. When it appeared that the ISTC effort was about to stall in 1992, the U.S. labs asked for permission to serve as a stop-gap measure, offering short-term research contracts to provide income for Russian scientists. This measure was the foundation for the Industrial Partnering Program (whose name

[122] Schweitzer, *Moscow DMZ : the story of the international effort to convert Russian weapons science to peaceful purposes*.
[123] Weiner, *Our own worst enemy?: institutional interests and the proliferation of nuclear weapons expertise*.
[124] "Annual Report of the ISTC," ed. International Science and Technology Center (Moscow1999).
[125] Weiner, *Our own worst enemy?: institutional interests and the proliferation of nuclear weapons expertise*. P 172

would later be changed to the Initiatives for Proliferation Prevention).[126] Like the Science Center, the short-term goal of the IPP projects was to keep scientists employed, while the long-term goal was to divert them away from weapons-related work. Russian scientists were paired up with (primarily) Western companies, and since DOE managed the program singlehandedly, it focused on partnerships with American firms.[127] Because IPP did not have a tax exempt status, projects were channeled through the ISTC or the Civilian Research and Defense Fund (CRDF), a U.S.-based non-governmental organization.[128]

Initial Successes

Like the lab-to-lab programs, members of the epistemic community had already established the idea of promoting cooperation before the dissolution of the Soviet Union—a foreign policy crisis—occurred. When congressional leaders came to experts with questions on what their next move should be, they were presented with a set of actions based on ideas of nonproliferation and cooperation, reinforced by Russian officials as well. The influence of Ashton Carter and the Harvard group was pivotal, and in later years well-known. NGO staffers and national laboratory scientists facilitated contact between the two countries.

At first glance, the lab-to-lab and government-to-government programs appeared to be following the same goal: preventing proliferation, helping Russia downsize and secure its weapons complex, and growing cooperative relations. They do share an approach that contrasted interactions: all of the cooperative programs focused on a common problem, attempting to avoid the zero-sum quality that haunted the countries' bilateral relations. Both approaches also recognized the importance of keeping the Russian scientists employed.

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[126] Ibid. P 197
[127] Hugh Casey, "The New Independent States Industrial Partnering Program," *Los Alamos Science* 1996.
[128] Weiner, *Our own worst enemy?: institutional interests and the proliferation of nuclear weapons expertise*.

However, even from the beginning, the government-to-government track was more threat-driven than the lab-to-lab programs. The former developed from the idea that the world was facing the threat of "loose nukes" and "brain drain." Both governments used this as acceptable political cover for cooperation on issues as sensitive as nuclear weapons-related technology. For the labs, however, the initiative to cooperate was based more on camaraderie than on threat. Some individuals who have worked on the programs for years will say that the Russian scientists were (largely) unlikely to sell their services to the highest bidder given their intense patriotism. Even A2, a State department official, described the scientist engagement programs as efforts to "hold scientists over" until Russia could absorb them back into society—he said he never doubted that the country would eventually find a use for them.[129]

Arms Control

Arms control negotiations, which had long been the primary form of strategic signaling between the two countries, went through a period of significant progress following the Soviet Union's dissolution. Towards the end of the Cold War, the two sides had begun a long series of intense bilateral negotiations on arms control, which resulted in the Strategic Arms Reduction Treaty (START) and the Intermediate-Range Nuclear Forces Treaty (INF). The START negotiations began in 1982, and despite several stalls as the countries' relations waxed and waned, the delegations were able to work out significant reductions and methods for verification and information sharing. On July 31, 1991, Bush and Gorbachev signed START, a treaty that would go on to survive the political chaos and implementation challenges that followed. The U.S. and Russian governments focused on two arms control agreements during the early 1990s: the START process and the Comprehensive Test Ban Treaty (CTBT).

[129] Department of State official, Interview by author, March 1 2012.

START II

The negotiations for START II began in January 1992 after then-President George H.W. Bush, Sr. and then-President Boris Yeltsin each proposed further reductions in strategic offensive forces beyond the START limits agreed to in 1991. Using the momentum of recently-concluded START negotiations, Bush outlined a plan in his State of the Union Address wherein the United States would reduce its submarine-launched ballistic missiles (SLBMs) by one-third and convert some of its strategic bombers to carry only conventional missiles if Russia would eliminate its multiple independently targetable reentry vehicle (MIRV) warheads, which are essentially multiple warheads on one missile. The next day Yeltsin countered with a proposal that both countries reduce their total number of nuclear warheads to between 2,000 and 2,500.[130]

Given the historical difficulty in negotiating arms control agreements, START II was negotiated relatively quickly. In February 1992 Russian Foreign Minister Andrey Kozyrev and U.S. Secretary of State James Baker agreed at a meeting in Moscow to attempt to reach a new agreement for further reductions, but they were unable to resolve their differences. The next month in Brussels the two representatives met to discuss the issue, and while again they were unable to come to an agreement, Kozyrev said that Russia would consider eliminating MIRV'd intercontinental ballistic missiles (ICBMs) but would seek limits on MIRV'd SLBMs. At a May meeting in Lisbon, Baker noted that the sides' disagreements were not just about limits, but about the mix of types of weapons.

At a meeting in Washington in June, it was reported that Russia was willing to agree to the higher warhead totals sought by the United States (4,700 instead of 2,500), but the parties

[130] Amy F. and Mark Lowenthal Woolf, "START II: Central Limits and Force Structure Implications," in *CRS Report for Congress* (Congressional Research Service, 1993).

could not agree on sublimits or reductions to MIRV'd warheads.[131] A few days later Baker and Kozyrev met again in London, reporting that they had made progress but that the presidents themselves would have to conclude the negotiations over the final issues. On June 17, Bush and Yeltsin signed a Joint Understanding in which the United States agreed to reduce its forces to 3,500 warheads and halve the number of warheads carried on its SLBMs, while Russia agreed to eliminate all of its MIRV'd ICBMs.[132] Final details were agreed upon on December 30, 1992: in addition to the Joint Understanding, Russia agreed to reduce its deployed arsenal to 3,000, with allowances to modify 105 SS-19s (a type of missile) to carry only one warhead instead of its previous six, and to use 90 SS-18 silos for a new single warhead ICBM. Yeltsin and Bush signed the final treaty on January 3, 1993.[133] ICBMs and SLBMs are considered "strategic" nuclear weapons—they are used to target sites, such as cities, military bases, and missile silos—that can travel long distances. The types covered in START II carried multiple warheads, making them even more destructive. Since the treaty could not enter into force until after the first START agreement, the debate over START II ratification was delayed until 1995.

Comprehensive Test Ban Treaty

A complete nuclear weapons testing ban has been one of the oldest goals on the arms control agenda, and is considered a serious first step towards global disarmament. During the Cold War, negotiations on a complete testing ban were unable to move forward due to interests by United States and Soviet Union to continue improving and increasing their stockpiles. After 1991, however, these factors were no longer as politically defensible, and pressure mounted on

[131] Amy F. Woolf, "Strategic Arms Reduction Treaties (START I & II): Verification and Compliance Issues," (Washington: Congressional Research Service, 1996).
[132] Amy F. Woolf, "START and Nuclear Arms Control: Chronology of Major Events 1982-1992," in *CRS Report for Congress* (Washington: Congressional Research Service, 1992).
[133] Woolf, "Strategic Arms Reduction Treaties (START I & II): Verification and Compliance Issues."

nuclear weapons countries to move forward with negotiating a complete testing ban. The Soviet Union and France were the first to begin nuclear testing moratoria in 1990 and 1992, respectively, while the U.S. Congress agreed to a ten-month testing ban in 1992, with the possibility of extending it until 1996.[134]

A Comprehensive Test Ban Treaty (CTBT), the next step to these moratoria, was negotiated in the Conference of Disarmament, a U.N. forum which at the time consisted of 61 members (a number which included all of the states that possessed nuclear weapons—both NPT nuclear weapons states and nuclear weapons states outside the treaty). Australia and 127 cosponsors introduced the treaty as a resolution to the U.N. General Assembly to circumvent last-minute opposition by India, and in September 1996 the General Assembly passed the resolution 158 to 3. India (see June 20, 1996), Bhutan, and Libya voted against it, and Cuba, Lebanon, Syria, Mauritius, and Tanzania abstaining[135]

The success of the CTBT negotiations marked a high-water point in the arms control negotiations of the 1990s, and represented an impulse by the political leadership in both countries to change their bilateral relations. While the formal treaty negotiations took place in the Conference on Disarmament, significant bilateral talks between the U.S. and Russia were necessary to reach agreement. In April 1993, Yeltsin and Clinton agreed to the multilateral format.[136] The two largest issues for nuclear weapons countries in the multilateral negotiations quickly became whether they could maintain their stockpiles without further testing and whether verification measures were strong enough to detect any cheating. Meanwhile, the Clinton administration and Yeltsin government continued to work out the definition of "testing,"

[134] Jonathan Medalia, "Comprehensive Nuclear-Test-Ban Treaty: Background and Current Developments," in *CRS Report for Congress* (Washington, DC: Congressional Research Service, 2008). P 2
[135] Jeremiah D. Sullivan, "The Comprehensive Test Ban Treaty," *Physics Today* 51, no. 3 (1998).
[136] Alexei Fenenko, "Russia and the Future of CTBT," *RIA Novosti*, November 3 2010.

agreeing in 1995 at a bilateral New York summit that it would be a "zero-yield concept"—i.e., any experiment that produces a self-sustaining, supercritical reaction.[137] This bilateral side agreement was necessary for CTBT negotiations to be successful.

In exchange for Yeltsin agreeing to this definition, Clinton promised that the United States would work with Russia to ensure the latter's stockpile safety and security and in matters regarding CTBT monitoring and verification. He issued Presidential Decision Directive/NSC-47 (PDD-47), which outlined the agreement and the types of assistance the U.S. would provide, recognizing that

> *...such a program with Russia can only take place in the overall context of positive United States-Russian relations and should be conducted consistent with other U.S. assistance and cooperative programs to maximize U.S. influence and support U.S. interests. Therefore, the pace and scope of U.S. cooperation will continue to be governed by our ongoing evaluation of the evolution of Russian foreign and defense policy.*[138]

Clinton placed primary responsibility for cooperation with DOE, and limited the cooperation to unclassified work.[139] The agreement was striking in that the two countries came to an agreement on core issues on the basis of technical cooperation, a course of action that would have not been possible only a few years prior.

Catalysts for Change

Cooperative programs dealing with issues related to nuclear weapons and arms control accelerated during the 1990s. The fall of the Soviet Union erased many of the threat perceptions that had driven both countries' security policies for the preceding five decades, leaving a blank

[137] William Clinton, "Presidential Decision Directive/NSC-47," ed. The White House (1996).
[138] Ibid.
[139] Ibid.

slate for policymakers. In surveying the three types of nuclear cooperation—lab-to-lab, government-to-government, and arms control agreements—seen during this time period, several common factors affecting their success become apparent.

First, the norms behind CTR, lab-to-lab, and the arms control agreements existed prior to 1991. Whether it was the Joint Verification Experiments, Carter's study on Russian forces, or arms control goals, the ideas that took hold during this time had been developed before the actual crisis occurred. As D1 said, cooperation did not gain traction until the highest levels of government in the United States were looking for ways of understanding the new situation.[140] In Russia, policies such as *glasnost* that were put in place during the 1980s gave scientists and laboratory leadership the chance to reach out to the international community before the end of the Cold War, and was a practice they continued once the Soviet Union collapsed.

Second, the members of the transnational nonproliferation epistemic community knew how to take advantage of the policy window. In the United States, the laboratories could offer technical expertise, while academics briefed Congress on how to understand the political changes in regards to nuclear weapons policy. In Russia, the scientists were at first able to leverage their prestige gained during the Cold War on the government, with direct access to leaders such as Gorbachev and Yeltsin. The Russian Academy of Sciences, historically granted more freedom due to its high social status, could exert influence over the government through its technical expertise. Finally, the NGOs located primarily in the United States played matchmaker with their contacts in both countries, facilitating program development. As CTR continued to grow, prominent members of the NGO community at the time such as Ashton Carter (Harvard's CISAC), Kenneth Luongo (Union of Concerned Scientists), and Rose Gottemoeller (Carnegie

[140] Former national laboratory staffer, Interview by author, April 5 2012.

Endowment for International Peace) moved into government to oversee the programs. The epistemic community put pressure on the individuals and agencies they had access to, as seen in the working-level foundations of the lab-to-lab programs contrasted to the top-down approach for Nunn-Lugar and arms control negotiations.

Third, cooperation complemented arms control negotiations as a form of signaling between the United States and Russia. Though arms control negotiations continued to flourish, they were no longer a singular source of contact between the two countries, and no longer carried the same weight as they did during the Cold War. Lab-to-lab and government-to-government programs were not as high-profile and zero-sum as traditional arms control negotiations, making them less likely to fall hostage to other tense aspects of US-Russian relations. Several of the interviewees noted that despite the general volatility of other parts of the relationship, CTR programs continued. B4 recalled situations where bilateral relations were rocky because of ties between Russia and Iran, but the CTR programs were not affected.[141] He described the early 1990s as a "golden period," where the Russians even shared information with the United States on the extent of their nuclear cooperation with Iraq.[142] The Russians, meanwhile, saw implementation of new programs as evidence that the U.S. was committed to helping them.

The experts the governments called on for advice heavily influenced cooperation between the United States and Russia. Due to the governments' uncertainty about how they should evaluate their recent enemies, and what type of threats they should look for in the post-Cold War world, a relatively small group of individuals were able to make substantial changes to not only U.S. and Russian government agencies, but also the broader discourse of what bilateral relations should look like. Despite these initial successes, the programs would come under intense scrutiny

[141] Former Department of Energy official, Interview with author, February 24, 2012
[142] Former Department of State official, Interview by author, March 5 2012.

in the latter half of the decade. In the next chapter I examine the factors that decreased the impact of this epistemic community, and how the programs were affected by changing political and economic forces.

CHAPTER 5

END OF THE GOLDEN AGE

The cooperative programs and arms control initiatives implemented in the chaos immediately following the Cold War were held up as evidence of a new era. By the end of the 1990s, elements in both countries were against further work on programs such as the ISTC and the two arms control agreements signed after 1991 had failed ratification. The post-Cold War hopes for world peace had vanished, but understanding why the programs declined requires looking beyond the economic and political factors to how the epistemic community functioned during this period. The U.S.-Russian bilateral relationship concerning nuclear weapons was changed by the epistemic community's efforts, but preexisting divisions in the group—combined with the closing of the policy window—lessened further the group's impact on policymaking in the latter half of the decade.

Declining Cooperation

Cooperative initiatives on nuclear weapons security, nonproliferation and arms control began to stall towards the end of the 1990s. Although many of the programs continued to exist, they came under fire from both the U.S. and Russian legislative bodies. Caught up in financial and political turmoil, their decline marked the end of the post-Cold War "golden period."[143]

The lab-to-lab programs never achieved the level of cooperation the Russian labs . In 1994, for example, LANL spent a total of just under $3 million on collaborative activities, a number which dropped to $1.2 million by 1997.[144] VNIIEF in particular was eager to increase cooperation—in 1998 laboratory officials presented Stephen Younger, a LANL program director, with a list of 35 possible projects that LANL estimated would cost "at least $5 million

[143] Interview with former State Department official (B1), March 5, 2012
[144] Lindemuth, "U.S.–Russian Nuclear Cooperation and the CTBT."

for the VNIIEF side of the activities alone and involve 700 man-years of VNIIEF effort."[145] Despite interest from mid-level employees at LANL, in July 1998 a LANL.[146]

Some mid- and high-level government officials in Minatom had long been suspicious of U.S. commitment, fearing that a desire to cooperate was on paper only. Small laboratories in both countries resented the fact that the majority of the money went to VNIIEF, VNIIETF, LANL, and LLNL.[147] The lab-to-lab program continued to lose funding and support from DOE and higher levels of the US government in the second Clinton administrations, which accelerated once George W. Bush assumed the US presidency. Although collaboration was successful on pulsed-power experiments, it never materialized in other suggested areas, such as dynamic materials.[148] Signs that the program was no longer a priority for the United States included decreased funding (or, with what little funding was available, stringent conditions), lack of support from higher-level leadership in DOE and the executive branch, and the minimal number of meetings held between DOE and Minatom on the subject from 1998 onwards. Most programs are not designed to last forever, but the gradual demise of lab-to-lab collaboration soured laboratory relations, leaving all parties disappointed that it had not reached its potential. Toward the end of its life, lab-to-lab was described as a lop-sided relationship: money went to Russia, while the scientific information went to the United States, leaving both countries unsatisfied.[149]

The government-to-government programs also suffered setbacks, as measured by increased political pressure to restrict the programs' scope. In both countries, the legislative branch shifted to more hawkish leadership. The 104th U.S. Congress that began in 1995—the

[145]Ibid
[146]Ibid
[147]Weiner, Our Own Worst Enemy?, P 207
[148]Lindemuth, "U.S.–Russian Nuclear Cooperation and the CTBT."
[149] Non-Proliferation; and Russian Academy of Sciences Committee on U.S-Russian Cooperation on Nuclear Non-Proliferation, *Overcoming Impediments to U.S-Russian Cooperation on Nuclear Non-Proliferation: Report of a Joint Workshop*.P 88

first Republican-controlled Congress in forty years—made it increasingly difficult for the Defense, Energy, and State departments to implement CTR programs, arguing that Russia was failing to fulfill the six certifications that would allow the programs to be reauthorized. Representatives Robert Dornan and Gerald Solomon (R-NY) proposed "killer amendments" to the certifications in an attempt to further limit the Nunn-Lugar programs.[150] Hearings criticized the amount of money spent through the programs, where it went, and oftentimes argued that Russia no longer needed the money. Representatives such as Robert Dornan and senators like John Kyl argued that CTR programs were helping to rearm Russia either directly or indirectly.[151] Floyd Spence (R-SC), chairman of the House National Security Committee, said that some Nunn-Lugar projects were "not a proper use of defense funds, and all the more at a time when Russian strategic modernization continues…"[152] However, no one was able to point to a statistic or program—the critique was based on the idea that giving aid to Russia "freed up funds" for Moscow to spend elsewhere. The nonproliferation community answered this critique with the argument that if the aid were not given, Moscow would not spend its own money on raising security at its nuclear facilities or helping its scientists.[153]

By FY1995, Congress began placing ceilings on the core elements of the program to exert control over how the money was spent. In FY1996, both the House Armed Services Committee (at the time named the House National Security Committee) and the Senate Armed Services Committee initially proposed authorizing only $200 million of the $371 million requested. Eventually, the two committees agreed to a funding level of $300 million, with $65 million withheld until the president certified Russia was in compliance with the Biological

[150]Combs, "U.S. Domestic Politics and the Nunn-Lugar Program." P 89, 91
[151] Ibid. P 55
[152] Dunbar Lockwood, "The Nunn-Lugar program: No time to pull the plug," *Arms Control Today* 25, no. 5 (1995).
[153] Ibid.

Weapons Convention.[154] B2, B3 and B4 all noted the increasing pressure from legislative bodies, particularly their penchant for using cooperative threat reduction programs as a political football.[155]

At first, the Russian Duma was critical of the government-to-government programs. In 1992, the CTR umbrella agreements came under fire by prominent deputies such as Sergei Baburin, Gennadii Sayenko, and Mikahil Astafiev as contradicting the Russian Constitution and "violating Russian sovereignty." Others, such as the Committee Chairman to the Committee on Foreign Affairs of the Russian Parliament, Yevgenii Ambartsumov, argued that the agreements could allow the U.S. government to gain illegal access to important materials, avoiding Russian customs control.[156] Minatom, MOD, and Ministry of Foreign Affairs (MOF) officials eventually convinced the Duma of the programs' importance. While the Duma often opposed Yeltsin's government during the rest of the 1990s, it largely ignored or felt positively about the government-to-government programs for the rest of the decade. Even when rising anti-Americanism reached new highs in the 1990s, it generally left cooperative threat reduction to the executive branch.[157]

The majority of the opposition in the Russian government developed in the executive branch, as bureaucratic support eroded in the face of delays, mismanagement, and domestic politics on the part of the United States. Viktor Mikhailov, once a driving force behind cooperation, stated in 1995 that "If I had been asked, not as a Minister but as a scientist, whether

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[154] Ibid, p 53
[155]Interviews with former DOE and State Department officials
[156]Vladimir Orlov, "Perspectives of Russian Decision Makers and Problems of Implementation," in *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooperative Threat Reduction Program*, ed. John M. Shields; William C. Potter (Cambridge: MIT Press, 1996).P 86
[157] Dmitry Kovchegin, "A Russian Perspective on Cooperative Threat Reduction," in *Dismantling the Cold War: U.S. and NIS Perspectives on the Nunn-Lugar Cooeprative Threat Reduction Program*, ed. John M. Shields; William C. Potter (Cambridge: MIT Press, 1996).P 29

it was worth signing the agreements with the Americans, my response would have been 'no.'"[158] B4 confirmed the negative views from Minatom, noting the resentment apparent in projects involving the agency.[159] The Ministry of Foreign Affairs also grew skeptical of cooperative threat reduction programs, expressing dissatisfaction with how much funding reached Russian companies compared with the amount that went to U.S. companies.[160]

For reasons that extended beyond the political pressure, the government-to-government programs were only partially successful in achieving their goals in nuclear security and nonproliferation despite increases in their budgets and inclusion of greater numbers of institutions. The International Science and Technology Center, for example, had problems gaining access to Russian facilities and by 2003 the State Department began looking at ways of expanding its activities beyond Russia, recognizing that its usefulness with its original host was coming to an end.[161] C1 noted that by the time she worked at the center in the mid-2000s, the ISTC had lost major supporters within the Russian government, and that the current supporters did not have the leverage to improve the situation. Although she had previous experience working in Russia, she did not expect the level of bureaucratic inefficiency she found at the ISTC.[162] Her experience fit with reports at the time of declining importance of the ISTC, whose negotiated framework was never ratified by the Duma. In 2010, Medvedev decided to withdraw Russia from the ISTC, though as of 2012 Russia has not formally submitted its intention to the center.[163]

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[158]Orlov, "Perspectives of Russian Decision Makers and Problems of Implementation." P 92
[159] Interview with former DOE official, February 24, 2012
[160] Orlov, "Perspectives of Russian Decision Makers and Problems of Implementation."P 92
[161]Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*. P 191
[162]Interview with former State Department official, January 18, 2012
[163] Dmitry Astakhov, "Russia Pulls Out of CIS Scientific-Technological Program," *RIA Novosti* 2010; "International Science and Technology Center," Center for Nonproliferation Studies, http://cns.miis.edu/inventory/pdfs/istc.pdf

The experience of the Nuclear Cities Initiative (NCI) was indicative of the problems facing government-to-government programs. Designed to alleviate dire economic conditions in the Russian weapons lab system, NCI was the result of a 1998 agreement between DOE and Minatom to downsize the Russian weapons complex.[164] The program differed from IPP in that it was intended to engage nuclear weapons scientists within the closed nuclear cities, not only to help create permanent civilian jobs, but also to improve the general standard of living within the cities. NCI was conceived by the nuclear nonproliferation epistemic community beginning in 1995, involving individuals from Princeton University's Center for Energy and Environmental Studies (CEES), Zheleznogorsk, and the U.S.-based Russian-American Nuclear Security Advisory Council, as well as members of other U.S. and Russian labs.[165]

Although the program was put in place by 1998, it never gained significant political or organizational support in either country. According to B4, who was involved in the program's development and implementation on the DOE side, NCI was "fraught" from the outset. He noted that the original idea was to provide assistance during an economic crisis, and that by the time the money had been secured, the crisis had largely passed.[166] The program, which suffered from the influence of domestic politics, lack of access to secure facilities, and problems in the U.S.-Russian bilateral relationship, never expanded beyond its initial programs in three Russian cities. It was combined with IPP in 2002 under the Russian Transitions Initiative (RTI) and met its demise in 2003.[167] On the Russian side, the government was suspicious of why the Americans kept pushing for increased access to the still-closed cities. Fearing their sensitive information

[164]Ellis, *Defense by other means : the politics of US-NIS threat reduction and nuclear security cooperation*.P 181
[165]Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*. P 242
[166]Interview with former DOE official, February 24, 2012
[167]Weiner, P 282

would be compromised, the security apparatus resisted the U.S. government's attempts to expand the program.

Despite the challenges facing these government-to-government programs, they continued through the 1990s and 2000s to the present day. However, the initial eagerness and political support from legislative bodies and high-level leadership disappeared in the late 1990s, making implementation difficult. Studies from the U.S. Government Accountability Office, various think tanks, and academics have examined what made the programs successful or not successful, looking at a variety of factors that range from political to institutional.[168] Others have focused on how to create metrics for success. Many individuals in the field perceive the Cooperative Threat Reduction program (which was later expanded to include countries beyond former Soviet states) as having a mixed, though generally positive legacy.[169]

The third element of cooperation, arms control initiatives, was arguably the most resounding failure of the cooperative efforts. The table found below documents the fate of the arms control treaties the U.S. and Russia negotiated during the 1990s (also found in Appendix C).

[168] Hundreds of GAO reports on various aspects of CTR have been published since its inception, while Amy Woolf's analyses for the Congressional Research Services and the National Academy of Sciences' reports provide another source of substantial information on the programs' development. Support came from think tanks such as the Russian Center for Policy Studies (PIR), Center for Nonproliferation Studies, Arms Control Association, the Federation of American Scientists, and the American Association for the Advancement of Science.
[169] Non-Proliferation; and Russian Academy of Sciences Committee on U.S-Russian Cooperation on Nuclear Non-Proliferation, *Overcoming Impediments to U.S-Russian Cooperation on Nuclear Non-Proliferation: Report of a Joint Workshop*.

LIST OF RELEVANT ARMS CONTROL TREATIES IN 1990s[170]

Treaty	Period of Negotiations	Involvement by Epistemic Community	Ratification	Status
START	1982-1991	Moderate-High	Both countries-Yes	Implemented
START II	1992-1993	Minimal	Both countries-Yes	Never brought into force
Comprehensive Test Ban Treaty (CTBT)	(Most recent round) 1994-1996	Moderate-High	Russia-Yes, US-No	Observance without ratification
SORT	2001-2002	None	Both countries-Yes	Implemented

Despite initial agreements on START II and CTBT, neither treaty entered into force. START II, a bilateral treaty, succumbed to domestic politics in both countries. The treaty was not immediately considered for ratification because a provision in the treaty mandated that it could not be ratified until START (its predecessor agreement) entered into force. In January 1996, the U.S. Senate finally ratified START II with a vote of 87-4, a vote that was delayed by debates over whether to disband the Arms Control and Disarmament Agency (ACDA).[171]

On the Russian side, the Duma was charged with ratifying START II, but delayed debating it for several years, using it as a political tool to counter Yeltsin's agenda. The two countries negotiated a protocol in 1997 in hopes of dealing with some of the Duma members'

[170] Based on this projects analysis; dates and outcomes courtesy of the Center for Nonproliferation's Inventory of International Nonproliferation Organizations and Regimes.
[171] Non-Proliferation; and Russian Academy of Sciences Committee on U.S-Russian Cooperation on Nuclear Non-Proliferation, *Overcoming Impediments to U.S-Russian Cooperation on Nuclear Non-Proliferation: Report of a Joint Workshop*.

concerns about how the treaty would affect Russian strategic forces, agreeing to extend the elimination deadlines for certain weapons found in START II. Russia and the United States also agreed to begin negotiations on a START III Treaty after START II entered into force. B3, who was involved in the negotiation and ratification of the treaty through the Department of State, noted that it was a bad sign when the treaty had to be reopened for ratification—i.e., the Duma agreed to ratify the treaty on the condition that the U.S. ratify (after the fact) an "Extension Protocol" and the 1997 ABM Demarcation Agreements.[172] This opened the treaty to a new round of criticisms and politics in the U.S. Senate, since it required the same voting procedures as the treaty itself. The protocol failed to break the deadlock, however, and the Duma decided to put off the debate after the United States and Great Britain launched air strikes against Iraq in late 1998. START II was further jeopardized when the United States announced in 1999 that it would seek amendments to the 1972 Anti-Ballistic Missile Treaty between the United States and the Soviet Union, and after NATO began its intervention in Kosovo.

In 2000, President Putin expressed his support for START II and pressured the Duma to begin the debate. While he eventually won support for the treaty on April 14th, 2000, it was on the condition that Russia would withdraw from START II if the United States withdrew from the 1972 ABM Treaty. The US Senate, however, had made the Treaty's entry into force conditional on the US ratification of some of the 1997 amendments to the 1972 ABM Treaty. Clinton never introduced the amendments for the Senate's consideration because he thought they would be defeated, and the Bush Administration also declined to submit them. Instead, it announced in 2002 that the United States would withdraw from the ABM Treaty, and Russia responded with

[172] Interview with former State Department official, February 29, 2012.

the announcement that it would withdraw from START II, killing the treaty.[173] The failure of START II was not a surprise. The process had dragged out over years, and had been turned into a football by politicians. Its demise signaled the end of the most productive years of arms control agreements between Russia and the U.S., and reflected the frustration both countries had with each other.

The CTBT fared almost as poorly. The U.N. General Assembly approved the treaty in1996, but it was not until September 1997 that U.S. President Bill Clinton submitted the CTBT to the Senate for debate. It languished in the Senate Foreign Relations Committee, where Chairman Jesse Helms (R-NC) refused to allow the committee to consider it, saying that the treaty "from a nonproliferation standpoint, is scarcely more than a sham."[174] On September 30, 1999, under pressure from Senate Democrats, Majority Leader Trent Lott (R-MS) agreed to have a debate and vote by moving the treaty out of the Senate Foreign Relations Committee without its consideration.[175] The conditions of the vote, however, were that it would take place October 12—if the Democrats chose not to accept, it would not take place until the next Congress. After consulting the Clinton Administration, the senators accepted the deal. The following twelve days were filled with hearings and debate in the Senate Armed Services Committee and Foreign Relations Committee. The treaty lacked the required two-thirds of senators for ratification, despite the support of many military leaders, diplomats, and pressure from NGOs. The administration (and some moderate Republicans) tried to delay the vote, recognizing the impending failure, but was unable to reach an agreement with Republican leadership. On October 13, the CTBT was voted down in the Senate, 48-51 with one abstention. It has yet to

[173]Ibid, Woolf, "START and Nuclear Arms Control: Chronology of Major Events 1982-1992."
[174]Jonathan Medalia, "Comprehensive Nuclear-Test-Ban Treaty: Background and Current Developments," in *CRS Report for Congress* (Washington, DC: Congressional Research Service, 2011). P 2
[175] Ibid

reconsider the treaty, which currently remains on the Senate Foreign Relations Committee calendar.[176] The United States did not, however, resume testing—joining the ranks of the other NPT nuclear weapons states.

Russia delayed considering the CTBT until after the Senate's vote. In November 1999, only a month after the Senate's rejection, Yeltsin announced that he was submitting the treaty to the Duma for debate.[177] Yeltsin unexpectedly stepped down from his position at the end of 1999, handing over power to Vladimir Putin. Putin successfully motivated the Duma to consider the CTBT (along with START II and ABM), managing to gain votes from hesitant parties. On April 21, 2000, the Duma approved the CTBT in a closed vote, 298 to 74, with three abstentions. The overwhelming support was larger than that shown for START II. Russia deposited its articles of ratification on June 30, 2000.[178]

The ratification was considered a major success for the new government. Putin had accomplished what Yeltsin had promised by obtaining the CTBT's ratification. Further, Russia was in a position to leverage its ratification of the treaty over the United State's lack of support.[179] Some Duma members opposed the treaty on similar national security grounds as seen in the U.S. Senate. At the same time, however, the Russian government issued a new strategic nuclear weapons strategy—known as a nuclear doctrine—which was perceived as a more hardline posture than years past.[180]

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[176] Ibid
[177]Kalpana Chittaranjan, "State of the CTBT," *Strategic Analysis* 24, no. 3 (2000). P 487
[178]Medalia, "Comprehensive Nuclear-Test-Ban Treaty: Background and Current Developments.", P 7; Anya Loukianova, "The Duma-Senate Logjam Revisited," in *CSIS PONI 2011 Capstone Conference* (US Strategic Command, Omaha, NE: CSIS, 2011).
[179]Toby Trister; Akin Gati, Gump, Strauss, Hauer & Feld, L.L.P., "President Putin: The First Ninety Days," in *U.S.-Russia Relations* (Washington, DC: Center for Strategic and International Studies, 2000). P 43
[180]"Russia Toughens Nuclear Stance," *BBC News* 2000.

The decline of all three branches followed similar timelines—beginning in the mid-1990s, programs suffered from increased political opposition and questions about what they were supposed to be achieving. Not all of this can be blamed on international politics—interagency fighting was a significant factor in programs' developments, and many of the individuals interviewed for this project said that a lack of leadership was a hindrance in further implementation. Of the three branches, only government-to-government programs emerged from the decade in a recognizable form.

Two questions emerge from this picture. First, did the epistemic community have any role in the decreasing amount of cooperation? Second, why did the programs continue despite political forces that appeared to be against cooperation? The following sections will examine how pre-existing divisions within the community, the overall status of community members, and institutional interests influenced the development of cooperative endeavors.

The following section's primary focus will be on the lab-to-lab and government-to-government programs, which saw the greatest involvement of the epistemic community. The community supported arms control measures (particularly the CTBT) and saw government-to-government programs as a way to reinforce arms control measures,[181] but appeared to be less involved with the negotiation process than in the START negotiation. Because the CTBT was a prime example of how subgroup divisions can decrease the influence of the overall group, the treaty will be examined in the section on divisions in the community. However, the downward trend in arms control treaties will be largely treated as a reflection of the status of U.S.-Russian relations, since the ratification process was heavily scarred by domestic politics that outweighed any influence by the epistemic community.

[181] D. Lockwood, "Dribbling aid to Russia," *Bulletin of the Atomic Scientists* 49, no. 6.

A Divided Community

Once the government-to-government and lab-to-lab programs were established, the next challenge was to clearly define their specific goals. Recent work by Sharon Weiner suggests that for the government-to-government programs these goals were never articulated, leading to unclear objectives and criticisms of inefficiency. Looking at the issue through the lens of the epistemic community, the same problem can be seen in the goals the community had for the programs. Previously-existing divisions between scientists, policymakers, and along national lines were glossed over in the community's desire to increase cooperation between the two countries. Once the programs were developed, however, subgroup factions disagreed over their goals, which made the community less effective in shaping policy creation.

In the U.S. community, the largest difference could be seen in the different goals of scientists and strategists. For those working in the national labs, increasing cooperation was a way to fulfill their own curiosity about the work done by Russian scientists and to help fellow scientists they perceived to be in dire economic straits. While nonproliferation was an important factor that scientists also held as a goal of cooperation, the interest in cooperation was based primarily in sharing scientific pursuits.

This assertion comes from an analysis of the dialogue regarding lab-to-lab endeavors, types of programs advocated by the labs, and reactions of scientists to the idea of cooperation with former Soviet scientists. LANL scientists, for example, were initially interested in advanced technical research on projects such as pulsed-power. The lab-to-lab programs stemmed from a desire to combine the comparative advantages of the U.S. and Russian scientists in order to

advance existing knowledge in physics.[182] Furthermore, the US scientists (and some policymakers) did not share the same worry with other U.S. policymakers that Russian scientists would sell their services to other governments. Some U.S. scientists recognized that the Russian scientists shared the patriotism U.S. scientists had for their work, and were instead concerned about making sure their counterparts could survive.[183]

These concerns were found in government-to-government programs as well. NCI was originally proposed as a form of emergency aid, not a sustained effort to downsize the Russian weapons complex. The labs were well aware of such difficulties since many significant ties had been established between U.S. and Russian labs. Connections extended to the cities in which the labs were located—as mentioned previously, Los Alamos and Livermore were in sister-city relationships with Sarov and Snezhinsk. B4 described the creation of NCI as an effort by the lab and think tank community to provide help for Russian weapons experts located in closed nuclear cities. Other government-to-government programs were created with different goals in mind than the political cover they accepted. B1, commenting about the goal of State Department programs such as ISTC, noted that "The goal was to get the scientists through with sufficient funding (though not at a one-to-one level compared to their previous employment), and the assumption was that Russia would find use for them later."[184] Though this group saw the ultimate goal of such programs as strengthening the United States' national security, they placed just as much emphasis on signaling a positive change in relations and promoting further interactions as a way to create better mutual understanding.

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[182] Younger et al., "Lab-to-Lab: Scientific Collaborations between Los Alamos and Arzamas-16 Using Explosive-Driven Flux Compression Generators." P 51

[183]Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*., Interview with D1, former scientist at Los Alamos, April 5, 2012.

[184] Interview with former DOE official, February 24, 2012

Not everyone shared this view of the situation. In other think tanks, universities, and government agencies, the ultimate goal of nonproliferation was more strongly emphasized. This group saw the threat of "loose nukes" and "brain drain" as the primary drivers of the government-to-government program.[185] Any aid given to former Soviet laboratories by the United States or joint research conducted to make the Russian arsenal safer was first a national security action. Many NGO reports and articles written during this time reflect such goals.[186] The goals were not to pursue innovative research, though that would have been seen as a beneficial byproduct. Improving relations was a positive side effect as well, though not easily quantified.

A more significant divide grew between the U.S. and Russian members of the community, who entered into the cooperative programs with different expectations. The clearest example is seen in the decline of LANL-VNIIEF cooperation. Russian laboratories, which were expecting meaningful, extensive joint research on issues that required high levels of expertise, were disappointed to find that the U.S. government was unwilling to invest in such projects. Russian scientists were not looking to walk away from weapons work—instead, they were hoping to reenter the international community and maintain their high status in both domestic and international settings. As C1 noted, the most popular request at the ISTC was for funding to travel to international conferences, followed by requests for equipment.[187]

While the Russian government recognized that it needed help maintaining a safe and secure nuclear arsenal, it was not looking solely for aid. Towards the end of the 1990s, many Russian members of the weapons complex were disappointed with how the programs had

[185] Examples include the "Securing the Bomb" series of reports by Matthew Bunn, the Carnegie Endowment's reports on "brain drain," and the Center for Nonproliferation's work on nuclear terrorism. Maria Katsva's article, "Weapons of Mass Destruction Brain Drain from Russia: Problems and Perspectives (2000)" provides a thorough overview of the subject.
[186] Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*.
[187] Interview with former State Department official, January 13, 2012

developed.[188] B4 described how he did not realize how resentful many parts of the Minatom complex were about CTR until he was involved with a DOE program that worked with the Russian Navy. The project went smoothly, despite concerns about security, and took a shorter amount of time than the same project would have taken with Minatom.[189] As noted earlier, many parts of the Russian weapons complex saw government-to-government programs much as VNIIEF viewed the lab-to-lab projects: not as a collaborative effort, but one where money flowed from the United States to Russia, and technology and knowledge went from Russia to the United States.[190]

U.S. policymakers had different priorities. They saw the Russian system as too large for the current time period, in terms of both the needs of the Russian government and its ability to pay for it. Determined to reduce the threat of proliferation, programs were intended to help downsize the complex and redirect Russian scientists towards new (not weapons related) pursuits. Recognizing that the Russian labs were unfamiliar with free market forces, ISTC and IPP were supposed to help scientists make that transition. Many U.S. government officials became frustrated by a lack of access to nuclear-related facilities, citing the Russian government's interference as a major obstacle to creating effective programs.[191]

These fractures within the epistemic community played a role in the community's diminished impact in the late 1990s. Without a single, coherent message about the priorities for the programs, other competing policy factors (legislative bodies, defense sectors, and high-level leadership) could override members' suggestions. When the CTBT was before the Senate for

[188] Orlov, "Perspectives of Russian Decision Makers and Problems of Implementation."
[189] Interview with former DOE official, February 24, 2012
[190] Non-Proliferation; and Russian Academy of Sciences Committee on U.S-Russian Cooperation on Nuclear Non-Proliferation, *Overcoming Impediments to U.S-Russian Cooperation on Nuclear Non-Proliferation: Report of a Joint Workshop*. P 88
[191] Ibid

ratification, for example, the epistemic community seemed to be divided about whether it should be approved. Some felt that the CTBT was a verifiable treaty that would create a safer world. Others (including Sen. Lugar) felt that the technology was not advanced enough, nor the terms strict enough, to guarantee that the world would know if one of the states broke the agreement.[192] Testimony by laboratory directors from LANL, LLNL, and SNL appeared to conclude that the labs could not guarantee the safety, security, and readiness of the US stockpile without testing.[193] Although the directors immediately issued an open letter reiterating their support for the treaty's ratification, it left Congress with the impression that the experts did not have a unanimous opinion.[194]

Such divisions damaged relations between the countries at the working level. Some NGOs and individuals made efforts to determine how to repair damage and create more effective and modern cooperative programs. The National Academy of Sciences, for example, created working groups to identify what both countries thought went wrong, and what would be needed to engage on a more significant level.[195] Members of both governments, however, remained suspicious of what the other is seeking. The Russian labs did not believe that United States would seek joint research, and are instead looking to control their work and gain access to sensitive information.[196] Some US policymakers do not believe the Russian labs are willing to cooperate, and are instead looking for funding while the Russian military continues to strengthen

[192] "Statement by Senator Lugar (R-IN) in Opposition of the CTBT," *Lugar Press Release* 1999.
[193] "Joint Statement by Three Nuclear Weapons Laboratory Directors on the Safety and Reliability of the U.S. Nuclear Weapons Stockpile: C. Paul Robinson, Sandia National Laboratory; John C. Browne, Los Alamos National Laboratory; C. Bruce Tarter, Lawrence Livermore National Laboratory."
[194] Daryl Kimball, "What Went Wrong: Repairing Damage to the CTBT," *Arms Control Today* 1999.
[195] Non-Proliferation; and Russian Academy of Sciences Committee on U.S-Russian Cooperation on Nuclear Non-Proliferation, *Overcoming Impediments to U.S-Russian Cooperation on Nuclear Non-Proliferation: Report of a Joint Workshop*.
[196] Orlov, "Perspectives of Russian Decision Makers and Problems of Implementation."

its forces.[197] Such generalizations have been drawn from failed attempts at cooperation, affecting both parties' willingness to engage in further efforts.

Loss of Access

The second factor affecting the epistemic community's influence during this period was its members' loss of access to policymakers and political leaders. Nuclear issues faced obstacles in the late 1990s that were the result not only of political changes, but organizational ones that reduced the epistemic community's access. The Russian community was particularly plagued by this problem, which was a result of the Russian scientists' loss of status within the government and society.

In the Soviet Union, Russian scientists were held in high esteem. They received higher salaries, better benefits, and occupied an elite place in society in the form of the Soviet Academy of Sciences. At the end of the Cold War, the Soviet Union had the largest infrastructure of scientists in the world.[198] Though they were subject to the same pressures as other workers in the Soviet Union, their expertise was essential to the development of the country's nuclear arsenal. These scientists developed access to government leaders, particularly in the final decades of the Cold War. Gorbachev, for example, relied on Yevgeny Velikhov, a supporter of cooperation, for advice in scientific matters.[199] Velikhov and other members of the nuclear community enjoyed support for their cooperative programs, particularly because they fit with the spirit of *glasnost* and ran counter to the defense sector's agenda. When Yeltsin assumed power, the weapons complex was able to maintain its access due to the continued attention to nuclear issues and prior high standing within Soviet Union.

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[197] Combs, "U.S. Domestic Politics and the Nunn-Lugar Program."
[198] Graham, *Science in Russia and the Soviet Union : a short history*.
[199] Barth, "Catalysts of Change: Scientists as Transnational Arms Control Advocates in the 1980s."

Towards the second half of the 1990s, the Russian scientists and members of the weapons complex began to lose access to the policymaking process due to economic and political shifts. Russia went through severe economic hardship as the country transitioned to a free market model, and the weapons complex was particularly hard-hit. The government was unable to sustain its large collection of laboratories, which had previously been well-funded. Weapons experts went for months without pay, and when they were paid it was often a fraction of their previous salaries. VNIIEF, for example, saw its budget reduced to one-quarter of what it had been before the collapse, while the director of VNIITF committed suicide in 1996 in part because of his inability to pay employees.[200] Further, because the labs were isolated in closed cities, weapons experts who wanted to switch careers had to leave the nuclear cities, which had few prospects for employment. The joblessness in Russia at the time was high, making even these chances a poor option. An easy option, however, would be for the scientists to sell their expertise to states looking to build clandestine nuclear programs, who were known to be actively trying to recruit Russian scientists. U.S. policymakers became particularly concerned that the Russian scientists, with no other options, would choose this way to provide for their families.

Alongside economic hardship, the Russian members of the nuclear epistemic community faced objections from the country's security forces, who gained power during the 1990s. In 1986, an estimated 50% of the Politburo had been trained and worked as scientists or engineers.[201] Starting with Yeltsin's government and increasing significantly with Putin's appointments, members of Russia's security forces structure replaced technocrats in the

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[200] "Report of the Fourth International Workshop on Nuclear Warhead Elimination and Nonproliferaton," in *Fourth International Workshop on Nuclear Warhead Elimination and Nonproliferaton*, ed. Federation of American Scientists and Natural Resources Defense Council (Washington, DC1992).
Michael Gordon, "A Top Russian Nuclear Scientist Kills Himself," *The New York Times* 1996.
[201]Graham, *Science in Russia and the Soviet Union : a short history*. P165

policymaking process. Though these individuals—often called *siloviki*—were lumped together as one group, they did not act in unison or have a specific agenda.[202] Many, however, brought a deep skepticism of the West to the Kremlin and are considered by scholars and politicians have taken a more hardline policy on issues of national security. Since the beginning of cooperative efforts, they objected to the programs as vehicles of U.S. control and espionage. These two factors—economic and political—resulted in a loss of leverage and access for Russian members of the nuclear nonproliferation community. As advocates for cooperation were pushed out of government or retired, the group continued to lose influence at the highest levels of government.

U.S. government officials who implemented the government-to-government programs noted the Russian scientists' loss of status in interviews. C1 described how the situation at the ISTC grew more precarious as high-level supporters within the Russian government were pushed out. When asked how the Russian labs responded to worsening relations, she said that the scientists were the strongest advocates for the ISTC, but had no leverage. She then followed by saying that respect for science declined in post-Soviet Russia, and in Putin's process of centralizing the government, scientists were often left out. Without the support, it took all of the ISTC's efforts to simply maintain the status quo, which she saw as a limiting factor for the center's development.[203] A2, who worked on scientist engagement programs at the State Department, cited Russian strategic [high-level] leaders as the programs' strongest advocates. He said, "While the scientists fought for it, they didn't have the power to make decisions…the push from the highest levels of leadership was in many cases what led to agreements in

[202]Bettina Renz, "Putin's Militocracy? An Alternative Interpretation of Siloviki in Contemporary Russian Politics," *Europe-Asia Studies* 58, no. 6 (2006).
[203] Interview with a former State Department official, January 13, 2012

negotiations."[204] Yeltsin generally showed a strong commitment to government-to-government programs, while Putin was less interested in cooperation. Without resources or the ear of high-level leadership, the Russian nonproliferation epistemic community was unable to continue its influence over policymaking as seen in the early 1990s.

The U.S. epistemic community also lost some of its access to the policymaking process, though not to the same degree as its Russian counterpart. As Congress continued to scrutinize the ongoing cooperative efforts, it also grew skeptical of the national laboratories, particularly following the espionage charges leveled against Wen Ho Lee, a Taiwanese-American scientist at Los Alamos National Laboratory. Furthermore, the arms control community lost the Arms Control and Disarmament Agency (ACDA) in 1999 when the Clinton Administration moved into the State Department. ACDA had become increasingly marginalized and weak during the 1990s, but its dismantlement meant a loss of an independent agency that worked specifically on arms control issues. Senator Jesse Helms (R-NC), claimed credit for dealing the final blow when he refused to take up the Chemical Weapons Convention until the adminstration had committed itself to reorganize the foreign affairs bureaucracy.[205] Its employees were absorbed into the State Department, DOD, and DOE, breaking apart a network that could focus its energies on arms control. Without an independent agency, these arms control experts had to compete with other non-arms control priorities in their new departments. These changes lessened the influence of the US epistemic community, which faced Congressional resistance in furthering cooperative efforts.

The epistemic community's loss of access and influence went beyond loss of political support for the programs. In the case of Russian scientists, economic conditions and an aging

[204] Interview with State Department official, March 1, 2012
[205] Jack Mendelsohn, "Clinton Annouces Reorganization Plan, ACDA to Lose Independent Status," *Arms Control Today* 1994.

demographic meant that the community had less leverage over the policymaking process. In both the United States and Russia, reorganization and changes in political leadership left supporters of cooperation out of power as well. These factors added to the decreasing effectiveness of cooperative programs, since experts' advice was not heard, let alone heeded.

Organizational Interests

Despite the problems encountered by cooperative programs and the increasingly difficult bilateral relations between the U.S. and Russia, cooperation on nonproliferation and engagement continued. The majority of the chapter investigated how the epistemic community lost influence over the programs' development—the other part of the analysis requires examining what forces drove the cooperation during this time. Recalling Kingdon's "policy windows," the second part of the theory proposes that eventually the "window" will close, at which point any changes will be preserved by institutional forces.

In the case of government-to-government and lab-to-lab programs, organizational interests exerted influence in two phases: the implementation of the programs and ensuring their continuation despite a loss of high-level support. CTR was a new idea—government institutions did not know how cooperation should be pursued or how its goals could be quantified. Faced with uncertainty, the institutions used their existing strengths (not necessarily new approaches) to fashion goals and metrics. As different institutions such as DOD, Minatom, and DOE were charged with overseeing cooperation, they adapted the programs to suit their own expertise and interests. DOE, for example, based its government-to-government programs out of the national laboratories, focusing on technological fixes to proliferation threats. The State Department, on the other hand, was more interested in scientific engagement, which resembled the diplomatic efforts it employed in other situations. The programs were specific to the agencies that designed

them, reflecting a phenomenon in which institutional interests override the programs' original intent.[206]

The institutional influence had two significant consequences for the lifespan of the programs. The programs were sluggish and unable to respond quickly to changing political situations, since they were governed by bilateral agreements and strict legislative oversight. Second, the programs continued past the point of their ostensible goals—although the economic crisis in Russia was largely over by the end of the 1990s, cooperative efforts continued through much of the 2000s. A2 said he saw the scientist engagement programs reaching their limits in the early- to mid-2000s, when Russia was beginning to get back on its feet. He described a need for exit strategies, but said that many people saw it as something that should never end—"It is a hard call to know when you are done."[207] When programs such as ISTC began to come to a close, the U.S. institutions who had overseen them began looking to replicate the programs in non-FSU states. At this point, however, the programs had to be restructured, since the goals were different—in this case, there was no collapse of a nuclear power necessitating a rapid response.

The protection provided by government institutions continued once political leaders moved away from supporting cooperative programs. B4 noted that although Congress was increasingly critical of such efforts and bilateral relations soured over issues with NATO and the Balkans, cooperative programs never stopped.[208] By this point, however, the epistemic community no longer had control over how their idea was implemented.

This lack of control was eloquently articulated in an interview with B5, a former congressional staffer who also worked on nonproliferation issues in think tanks and as a

[206] For an in-depth look at how organizational interests influenced government-to-government programs, see Sharon Wiener's book, Our Own Worst Enemy?.
[207] Interview with State Department official, March 1, 2012.
[208] Interview with former DOE official, February 24, 2012.

contractor. She pointed out that many of the individuals in the United States who worked on the initial development of Nunn-Lugar had, by the present day, known each other for years—they had formed strong professional relationships, and were often "attending each other's holiday parties." Rising from the ranks of mid-level staffers and researchers, many had moved into the highest levels of government—particularly in the Obama administration. Despite their long-standing the relationships, she noted, these leaders appeared to have little ability to mitigate interagency battles and organizational politics. In her opinion, institutional interests had won over professional ties.[209]

Adverse Interactions

All of these factors played a role in what forms the cooperative efforts took by the end of the 1990s, including contributing to the programs' decline as well as its continuing presence. As Kingdon's theory predicts, the institutions that implemented the programs adopted them into their structures, ensuring that they continued even if they lost high-level support. B5 said that the mid-level actors recognized the importance of the programs even when their leadership did not, implementing them to the best of their ability despite increasing pressure from Congress and certain parts of the Russian bureaucracy.[210] The arms control treaties, which were contingent on political-level support, failed. The next arms control treaty concluded after START was the Strategic Offensive Reductions Treaty, which lowered the limits for deployed strategic warheads to 1700-2200 for each state without verification measures.[211] Both countries could determine for

[209] Interview with former Congressional staffer, March 6, 2012.
[210] Ibid
[211] "Treaty Between the United States of American and the Russian Federation on Strategic Offensive Reductions (SORT/Treaty of Moscow)," Center for Nonproliferation Studies, http://cns.miis.edu/inventory/pdfs/sort.pdf.

themselves what types of missiles they would deploy. C1 referred to SORT as a "press release with signatures," a far cry from the gains in the early 1990s.[212]

The government-to-government programs grew to reflect the goals and expertise of the implementing institutions, which were no longer uncertain about their interactions with the other country. The Russians came to expect the United States to not fulfill its promises completely and to demand access to many of its facilities. In turn, the United States expected the Russian government to make access difficult and argue over taxes on imported equipment. Without the uncertainty, the government institutions no longer looked to the epistemic community for advice on what to do.

The epistemic community further decreased its influence through internal divisions, which were compounded by a loss of status and access. The community's disagreements about the primary goals and methods of cooperation made its recommendations about implementation less potent than its members' original, unified advice. Further, the members no longer served as the primary points of contact between the two countries, since relations were slowly normalized following the end of the Cold War. In both Russia and the United States, the epistemic community was unable to overcome institutional interests once the immediate crisis passed.

[212] Interview with former State Department official, January 13, 2012.

CHAPTER 6

CONCLUSION

The sudden surge of cooperation seen between the United States and Russia following the long freeze of the Cold War was by no means brought about solely by a small group of people. Though it is difficult for some within the nuclear community to remember, relations between the two countries extend far beyond weapons of mass destruction and deterrence. However, this research finds that a small group of committed individuals did have an outsized impact on policy creation during this turbulent period due to preexisting relationships and a ready response to their governments' questions.

The story of government-to-government, lab-to-lab, and arms control agreements during the 1990s is an example of what advocacy groups may—or may not—accomplish during a crisis. The nuclear nonproliferation and arms control communities in both countries had agreed before the end of the Cold War that they wanted to see more cooperation and collaboration between the two countries. It was a moment when cooperation, not conflict, was used as a strategy to enhance national and international security. Sharing beliefs about scientific responsibility, an interest in discovery, and the threat of proliferation, individuals in both countries influenced their high-level leaders to pursue scientific cooperation, a radical departure from previously hostile relations. These experts then used their contacts in the other country to launch talks and pilot programs that were scaled up into the government-to-government programs with budgets averaging $300-400 million a year through the end of the early 2000s, where this research roughly ends its analysis.[213]

[213] Amy F. Woolf, "Nunn-Lugar Cooperative Threat Reduction Programs: Issues for Congress," in *CRS Report for Congress*, ed. Congressional Research Service (Washington, DC: Congressional Research Service, 2002).

The epistemic community's success in convincing its governments to put cooperative programs in place support Haas' theory and previous research conducted on such groups. The governments sought out the experts' advice during a period of extreme uncertainty (creating a "policy window" as described by Kingdon). The group, which had a previously-established goal of promoting cooperative programs, knew how to leverage their relationships and access to policymakers to effect change through briefings, visits from delegations, and publications. Most importantly, the epistemic community had existed prior to the crisis—extending, in various forms, back to the 1950s—which helped its members to recognize the opportunity to see their agenda adopted when the Cold War ended.

Taking the knowledge of epistemic communities a step beyond the current research, the story of the nonproliferation and arms control community's efforts in the 1990s provides evidence of the limits of such groups' influence. As Kingdon predicts, the "policy window" closed when the institutions once again knew what to expect from the U.S.-Russian relationship and how their processes could meet political expectations. At this point, institutional interests displaced the epistemic community's agenda. Organizational theory looks at how institutions approach and process problems. Organizations have to create structured procedures to deal with a wide variety of problems. When a completely new type of problem is thrown into the organization, it has to adapt its procedures to address the issue. In the case of the U.S.-Russian epistemic community, the scientists offered ideas for the new procedures to handle the problem. Once the organizations accepted the cooperative approach, they adapted it to suit their own needs and strengths.

This was seen in the way the organizations carried on those programs that fit their expertise and current knowledge. The Department of Energy, for example, ran the cooperative

programs that dealt with converting and securing facilities—leveraging its technical strength found in the laboratories. It ended up abandoning the programs that extended outside its scope, such as the Nuclear Cities Initiative. Even the Initiatives for Proliferation Prevention, which was heavily focused on developing technology, struggled. B4 suggested that it was difficult for the DOE to cultivate private-sector involvement in the program—something Sharon Weiner points to as one of the downsides of the program. Because the department relied on the national laboratories, it had a difficult time engaging businesses to pair with the Russian scientists.[214]

Anecdotally, this was also illustrated in the interview with B5. A former Congressional staffer, she noted that all of the major leaders in the nonproliferation community today worked together in the 1990s to make the government-to-government programs a reality. With such strong ties between these individuals—both personal and professional—she said that she would have expected the interagency battles decline. However, she said that it has only gotten better at the margins, due to problems of both personality and bureaucratic behavior.[215] Despite its initial influence, the community was unable to overcome organizational behavior (and the accompanying territorial battles).

In the specific case of the nuclear community, pre-existing internal divisions and loss of status further decreased its members' influence. However, the programs that had been firmly adopted by the most powerful institutions continued to operate once political support disappeared.

Several implications emerge from the story of nuclear cooperation between Russia and the United States, along with avenues for future research. The first is that epistemic communities can exert significant influence over policy creation, though only under certain conditions (over

[214] Weiner, *Our own worst enemy? : institutional interests and the proliferation of nuclear weapons expertise*.
[215] Interview with former Congressional staffer, March 6, 2012.

which they may have some control). There must be political traction (often in the form of a crisis), and the window will only last a short period of time. The second implication is that once the existing institution or government adopts the new idea, the epistemic community will be hard-pressed to maintain control over the implementation of the idea. At this point, institutional interests become the driving factor, and organizational theory becomes a more appropriate explanation for how programs continue to develop.

Thirdly, for epistemic communities, the level and types of access to the decision-making process play a role in their effectiveness. The Russian members of the epistemic community saw their influence decrease with changes in their economic status and political shifts within the government. They lost access to the policymaking process as individuals were pushed out of high-level positions and could no longer promote their agenda for cooperation since they were focused on financial survival. The epistemic community in the United States became the primary force arguing for cooperation, but even their capacity for influence was limited by a skeptical Congress and changing administrations.

These limits point to areas for further research. Understanding how these groups position themselves within societies and in relation to policymaking organizations will clarify how special interests shape policies. Epistemic communities appear to be most powerful in the early stages of policymaking. Identifying the point that epistemic communities lose their influence in the policy creation process will shed light on how organizations change their momentum to include new ideas. It could also show members of other epistemic communities how to focus their energies on passing along new ideas, instead of aiming to more directly shape organizational behavior.

The U.S.-Russian nuclear nonproliferation and arms control community became a stabilizing factor in the countries' bilateral relations. It provided a recognizable method of communication that both countries were inclined to trust because they had few other options. It was particularly influential because there had been limited contact between the two countries prior to the end of the Cold War. As the countries began to establish contact on various levels of government and in different industries, the nonproliferation community was no longer needed to communicate messages about the broader state of relations between the United States and Russia. Distilling this dynamic into a general principle, this research predicts that transnational epistemic communities are more potent when there is limited contact between the involved countries, since they serve as one of the few forms of communication. This conclusion suggests that in the nuclear field, transnational epistemic communities (if they exist) should be more effective policy tool when engaged with countries such as Iran and the Democratic People's Republic of Korea (DPRK), as opposed to Pakistan. For example, Dr. Siegfried Hecker, a former director of LANL, has been an important player in the U.S.-DPRK relationship through his "science diplomacy" efforts—trying to engage the country through scientific channels. Given his familiarity with the regime, in November 2010, the DPRK government chose to reveal to him the advanced state of their plutonium production plant known as Yongbyon.

Finally, when scientist engagement is done for the sake of engagement, it is less effective than when there is a common problem on which participants can work together. Another reason participants in the first lab-to-lab initiatives were satisfied with the experience was because the in-group had been redefined to include Russians and Americans on the same side, with the problem of security and the nebulous ghost of "terrorism" on the other. To a much smaller extent, U.S. and Russian scientists positioned themselves on the same side (with the U.S. and

Russian policymakers on the other) in the process of establishing the programs, because the policymakers were perceived as standing in the way of cooperation. Once programs like NCI and ISTC started to unintentionally reinforce the U.S.-Russian divisions (sometimes simply by failing to keep a common problem in focus), trust started to break down.

Avoiding this problem requires that scientist engagement programs focus on shared problems, not the scientists themselves. In nonproliferation, for example, there is a strong interest in trying to divert scientists from military applications of their expertise to commercial enterprises. If these programs make redirecting these scientists as their explicit goal, however, they are unlikely to be successful, since the programs cannot redefine the in-group and out-group. Instead, this research suggests that they would be more successful if programs focused on tackling common problems—such as technical answers to border security, or developing new vaccines for highly contagious diseases—because it allows scientists of all nationalities to contribute towards a solution while allowing norms to transfer quietly between countries. The proliferation of technical expertise is becoming a pressing issue given advances in travel and communication. Studying epistemic communities offers new areas of research in norm creation and transmission that could provide insight to such proliferation concerns.

Half of the individuals interviewed for this project were asked what they wished they had known when they began their work in the government-to-government, lab-to-lab, and arms control initiatives in the 1990s. Their answers reflected not only their optimism at the end of the Cold War, but also the need for closer work between individuals with policy and technical backgrounds. B1 said that he did not think at the time that the positive relationship they were creating was reversible—the partnership ultimately was weaker than he perceived it to be. B2 remarked that these were all new ideas, and therefore a steep learning curve was to be expected.

He mentioned that the novelty of the program made it difficult to launch: reactions, lack of good model, sharp learning curve, all came into play.

The simplest explanation came from D1, a former scientist who had been forced to learn political science in his positions in laboratory management. Noting that technical solutions are only a part of the answer, he reduced the relationship between technical and policy problems to a single sentence: "Hard problems are easy, soft problems are hard, and soft problems are the ones that matter."

The story of how the relationship between scientists and policymakers produced an explosion of cooperation following the end of the Cold War is one example of how "hard problems" can provide the foundation to find the solutions for "soft problems." Through detailing the rise and decline of U.S.-Russian cooperation on nonproliferation issues, I have aimed to show how transnational groups can affect policies beyond their normally limited area of control. Further research on how epistemic communities operate could consider investigating the overlap of organizational and negotiation theories, which offers explanations of decision-making processes among individuals and organizations. While political leaders and prominent members of the epistemic community initiated the cooperative programs between Russia and the United States, it was ultimately the mid-level bureaucrat that adopted, developed, and protected these efforts to change their countries' bilateral relations. When high-level political leadership's support for the programs declined, it was the mid-level managers and leaders of the various government organizations who fought to protect the cooperative programs, which made up substantial portions of their budget and their work.

This research focused on the epistemic community in the world of nuclear nonproliferation because it involved an insular group that worked on a relatively obscure issue.

However, epistemic communities can be found wherever a significant amount of expertise is required to understand an issue in order to craft policy. In today's world, these communities can be seen in as different of fields as cybersecurity and climate change. Understanding how they function can help us better understand how we will find solutions to new problems.

APPENDIX A

INTERVIEW SUBJECTS

Current Institutional Affiliation

Current Government	Current NGO	Current Lab	Current Academic
A1	B1	C1	D1
A2	B2	C2	
A3	B3		
	B4		
	B5		

Previous Institutional Affiliation

Former Government	Former NGO	Former Lab
C1	A1	D1
B1	A3	
B2		
B3		
B4		
B5		

Interview subjects were coded based upon their current institutional affiliation, though previous institutional affiliation has been included based upon its relevance to the research.

APPENDIX B

RUSSIA'S CLOSED NUCLEAR CITIES[216]

New name	**Former code name**	**Nuclear weapons activities**
Sarov	Arzamas-16	Nuclear weapons R&D, serial production of nuclear weapons
Snezhinsk	Chelyabinsk-70	Nuclear weapons R&D
Lesnoy	Sverdlovsk-45	Serial production of nuclear weapons
Zarechny	Penza-19	Serial production of nuclear weapons
Trekhgorny	Zlatoust-36	Serial production of nuclear weapons
Ozersk	Chelyabinsk-65	Plutonium production, production of HEU, plutonium, and tritium components of nuclear warheads
Seversk	Tomsk-7	Plutonium production, HEU production, production of HEU and plutonium components of nuclear warheads
Zheleznogorsk	Krasnoyarsk-26	Plutonium production
Zelenogorsk	Krasnoyarsk-45	HEU production
Novouralsk	Sverdlovsk-44	HEU production

[216] Bukharin, "New Perspectives on Russia's Ten Secret Cities."

APPENDIX C

LIST OF RELEVANT ARMS CONTROL TREATIES IN 1990s[217]

Treaty	Period of Negotiations	Involvement by Epistemic Community	Ratification	Status
START	1982-1991	Moderate-High	Both countries-Yes	Implemented
START II	1992-1993	Minimal	Both countries-Yes	Never brought into force
Comprehensive Test Ban Treaty (CTBT)	(Most recent round) 1994-1996	Moderate-High	Russia-Yes, US-No	Observance without ratification
SORT	2001-2002	None	Both countries-Yes	Implemented

[217] Based on this projects analysis; dates and outcomes courtesy of the Center for Nonproliferation's Inventory of International Nonproliferation Organizations and Regimes.

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