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CONSTITUTING THE INTERNATIONAL NUCLEAR ORDER:

BUREAUCRATIC OBJECTIVITY AT THE IAEA

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Abstract

This dissertation examines the role of ideologies of knowledge for the legitimization of international treaty verification at the International Atomic Energy Agency's Department of Safeguards. Political legitimacy—and thus the organization's effectiveness in carrying out its mandate—I argue, depends at the IAEA on the felicitous performance of "technical independence:" the making of judgments ostensibly free from political considerations. I argue further that what undergirds this performance is the regimentation of verification practices by an epistemic ideology of bureaucratic objectivity. Under this Weberian ideology, the bureaucracy is imagined to be capable of producing impartial technical knowledge through a rationalistic, rule-bound system of procedures by which individual bureaucrats are turned into disinterested actors, their threatening subjectivities contained by process. I show that the ideological success of bureaucratic objectivity provided the political conditions of possibility for the implementation of an international system to control the spread of nuclear weapons. But bureaucracy imagined as a neutral form, I contend, also permits the maintenance of a global nuclear hierarchy of "haves and have nots" and indeed, naturalizes this distinction as technocratic legal fact.

The IAEA's Department of Safeguards verifies nuclear material and nuclear activities in individual states as part of its obligations to the 1970 Non-Proliferation Treaty, which carved up the world into states permitted to possess nuclear weapons and states who forswear weapons in exchange for the promise of nuclear power. In the early 1990s, the discovery that Iraq had clandestinely pursued a nuclear weapons program produced a crisis of confidence in IAEA safeguards. Since then, the IAEA has transformed its safeguards system with additional legal instruments, technical tools, and a more expansive analytic methodology that purports to

evaluate the “state as a whole.” This methodology has, in recent years, been criticized by member states who worry that the inclusion of more qualitative knowledge invites politicization, and who insist on maintaining an “objective, technical” basis for evaluating state compliance with safeguards agreements. The political legitimacy of the IAEA Secretariat, grounded in technocratic neutrality, is threatened when the organization’s expertise is no longer considered authoritative.

The study is based on 18 months of fieldwork at and around the IAEA headquarters in Vienna, Austria, as well as archival research at the IAEA archive and the US National Archives. Through observation of inspector training courses, a mock inspection, and interviews with inspectors, analysts, managers, translators, and support staff I examine the nuclear safeguards project to illuminate the ways in which these actors negotiate the technopolitical tensions of their everyday work. By bringing a semiotic analysis of bureaucratic practices to bear on questions of knowledge production and expertise as articulated in the history and social study of science, this work theorizes the production of knowledge as a fundamentally communicative enterprise. In considering the practices, objects, and discourses of the IAEA’s multilingual and multinational nuclear bureaucrats, this work contributes to understanding the core possibilities of organizations in international governance, and reveals bureaucratic strategies for negotiating the boundaries of epistemic ideologies in moments of crisis.

Chapter 1: Bureaucratic Objectivity: Making Apolitical Knowledge

> The *definition of the alternatives* is the supreme instrument of power; the antagonist can rarely agree on what the issues are because power is involved in the definition. He who determines what politics is runs the country, because the definition of alternatives is the choice of conflicts, and the choice of conflicts allocates power. (Schattschneider 1960, 66) emphasis original)

1.1. Introduction

It is an overcast Tuesday morning in July in Vienna. Ribbons of rain are slipping down from the sky and cool air is breezing through the open windows of my apartment. Yesterday, a storm front brought an end to a prolonged heatwave during which foreign ministers and officials from the US, Russia, China, France, and Germany accomplished the bulk of their final negotiations for a "deal" with the Islamic Republic of Iran on the long-standing issue of the Republic's nuclear program. After multiple extensions of the final deadline for coming to agreement throughout the spring, this morning news reports start pouring in that a final deal has been reached and that a press conference is set for noon following a closing ministerial meeting at International Atomic Energy Agency (IAEA) headquarters in Vienna's UNO-City. The IAEA's Secretariat (specifically, its Department of Safeguards) will be verifying the technical terms of the negotiated agreement. Reporters had been camped out under a great white tent outside of the Palais Coburg, a former aristocratic residence turned luxury hotel in Vienna's central district. During the days of greatest heat, the Austrian Foreign Ministry arranged to bring the reporters ice cream as a friendly reprieve from the brutal temperatures (Grulovic, Charbonneau, and Irish 2015). At the nearby Marriott Hotel lounge, observers, commentators, and hangers on whiled away the time until the next announcement by exchanging the latest gossip. Negotiators spent long hours discussing the remaining details which, according to news

reports were on a time-line for lifting the UN Security Council-issued arms embargo on Iran (Robertson, Labott, and Amanpour 2015). In the rising din of the online chatter around a final deal, comments from Israel begin to appear on my Google news feed.

The negotiations of the agreement have once again moved the IAEA into the spotlight of the international news cycle, a place with which the organization is not entirely comfortable. Its communications with the news media are rare and terse. Its Twitter account publishes only the most boilerplate press announcements on all subjects other than what the news media, the world is currently interested in (Fukushima, Iran, etc.). On the IAEA's website, the "News Centre" page is not usually the place to find updates on anything recent or time-sensitive.[1] Even within the organization, big news events (excepting the FIFA World Cup, of course) are not usually commented on amidst the quotidian activities of the Secretariat's staff. Only the exceptional array of diplomatic vehicles parked around the UNO-City's fountain (a usually car-free zone) can raise the awareness that something important (and most often "politically" important) must be going on or that someone important is paying a visit, which might be discussed briefly during a coffee break until the topic moves on to more important matters such as who's getting a promotion and whose contract is coming to an end.

But even when the organization is drawn into world politics due to its verification task, it insists that its role is merely and entirely technical, in that its task is to measure, count, and calculate the quantity and quality of nuclear material in a state. Indeed, most practitioners and observers of nuclear governance consider that it is the organization's technical expertise and demonstrated competence in measuring, counting, and calculating the quantity and quality of

[1] The IAEA has expanded its Office for Public Information in recent years and has made efforts to make its web presence more relevant for people seeking information. https://www.iaea.org/newscenter

nuclear material in a state that lends its voice legitimacy as an important actor in the constellation of organizations and legal agreements that make up the non-proliferation regime.[2]

Many practitioners, stakeholders, and observers agree that the greatest threat against the organization's legitimacy (and the success of non-proliferation efforts) is its perceived politicization. According to this narrative, the IAEA is a "technical" organization that has only recently been threatened by the influence of certain member states attempting to exert pressure on the Secretariat's (safeguards) work. In this narrative, the legibility of the IAEA as a technical organization, is ideally stable and self-evident. I argue, however, that the IAEA is constituted as a technical organization through a process of discursively producing a boundary between the "always threatening to merge" technical and political domains of governing nuclear technologies. Through this process, the production of the boundary is concealed, the boundary is imagined as stable, and the IAEA appears to merely be carrying out its mandate as a technical organization.

Throughout the history of nuclear technology beginning with nuclear weapons the problem of the technical/political has been defined by two, seemingly, opposing concerns: first, nuclear technologies (and ideal-typically the atomic bomb) are recognized (by practitioners as well as scholars) as fundamentally "political" technologies in that they are firmly bound up with a nation-state's aspirations and interests. This is what Gabrielle Hecht terms "technopolitical" - technologies devised for furthering political aims (Hecht 1998). At the same time, though, there exists (primarily among practitioners) an understanding that "politics" can be extracted from the purely "technical" aspects of nuclear science and technology, with the consequence that in this

[2] See the publications of the Arms Control Association, Arms Control Law, Arms Control Wonk, Carnegie Endowment for Peace, Institute for Science and International Security for commentary on the IAEA and its work.

way, technology, imagined as free from politics, a neutral form, can provide solutions to political problems. This strange conceptual loop in which one must separate the technical from the political in order to address the problem of the political possibilities of technology is the basic idea underlying the international control of atomic energy, which eventually became known as nuclear safeguards. Indeed, separating the technical from the political questions of nuclear safeguards was the subject of all considerations of the matter beginning even before the US dropped the first atomic bomb on Hiroshima. The technical questions concerned the technical feasibility of an international inspection and control system, and the political questions concerned its global acceptability/palatability.

The establishment and maintenance of a boundary, however fragile, between technical and political matters has been the fundamental task of the IAEA, and is the subject of this dissertation. In the modest literature on the IAEA, some scholars have shown that debates about this boundary and the insistence by diplomatic actors on the Agency's technical capacity is usually strategically deployed to advance national interests[3]. Others, closer to the world of practitioners, see the boundary as already extant and merely threatened by the introduction of politics extraneous to the Agency's work in the organization's policy-making bodies (Scheinman 1987). The technical capacity of the organization is either assumed as extant (if threatened) or dismissed as an appearance that is the product of political maneuvering. Neither of these perspectives allow for an understanding of how the organization came to be constituted as technical, how it performs this expertise, and how, specifically, its legitimacy can be threatened. Indeed, the insistence on a distinction between technical and political realms is posited on the

[3] See Hecht (2006a).

possibility of a discourse of neutrality, which is, in turn, a political project to advance an ideology of ostensibly apolitical (or value free) technocratic knowledge production (F. Fischer 1990).

1.2. Making nuclear boring

In this dissertation I argue that the work of constituting the boundary between the technical and political aspects of nuclear technology is an ideological project achieved in the everyday bureaucratic practices of the Secretariat staff. Indeed, the organization's success in dampening proliferating fears surrounding nuclear weapons (Masco 2014) derives from having turned the international control of nuclear technology into a thoroughly boring, bureaucratized process. Who would have imagined that the international control of nuclear technologies—originally a spectacular endeavor for a spectacular threat—would be handed over to a bunch of bureaucrats? A side effect of the affective politics of terror produced by the "nuclear revolution" (Masco 2014, 17) was the engagement of an apparatus that would render non-military nuclear projects banal.

The spectacle reemerged with the negotiations for an agreement with Iran that was achieved July 2015. But for all the excitement surrounding the successful accomplishment of a historic agreement to control Iran's nuclear program (with the objective of preventing the nation's progress towards developing a nuclear weapon of its own), and for all the intensity of the work of the "Iran Task Force" within the organization that has been accomplished and is yet to come, the verification of this agreement will soon submit to the intentional monotony that it was designed to perform just as the story of this agreement will become submerged in the river

of news items as other, more exceptional stories take its place.

In his address following the announcement of the successful agreement, President Obama pointed out that this deal was not built on trust but on "verification," updating Reagan's signature phrase "Trust, but verify" upon signing the Intermediate Range Forces (INF) Treaty in 1987 for a more skeptical age (Hoffman 2009, 295). This is an indication of the interpretive paradigm into which the parties involved are slotting the agreement. Verification is understood by political actors to be a process of evaluating the truth of a claim; it is an effort to ascertain the truth value of facts about the world with respect to representations made about that world. Verifiability as a quality and activity rest on an assumption that there is an objective world that can be accurately ascertained through technical means. Verifiability is preferable to relying on unstable trust between nations. Obama assures his listeners that the agreement is a technocratic (and therefore apolitical) undertaking based on the tried and true safeguards practices of the International Atomic Energy Agency. Verification does not need to rely on verbal assurances of compliance because it can be carried out by the impersonal practices of counting and measuring. Indeed, attempts by journalists to capture the work of IAEA inspectors turn into a snooze fest of an article (Brumfiel 2015).

This is a story about the ability of bureaucracy to accomplish its stated aims (of the international control of nuclear energy), despite its inefficiencies. While most qualitative studies of bureaucratic organizations take as their object the confounding contradictions, the unintended consequences, and the unfortunate victims of bureaucratic functioning, this work considers the aspirations for a bureaucracy to solve the most exceptional problem of controlling the spread of nuclear weapons while enabling the spread of nuclear energy technologies, and traces these

aspirations as they are felicitously translated into bureaucratic practice. Through this lens, I show that the suffocating boredom that bureaucracy is accused of producing is the precondition for a widely acceptable international inspection system. The bureaucracy is the organizational form through which the unstable boundary between the technical and the political that afflicts nuclear things can be constituted as stable and predictable. Making nuclear boring (most of the time) is the great achievement of the IAEA with implications for how geopolitical order and the nuclear hierarchy are naturalized. But how was this achievement made possible?

1.3. Achieving technical authority

The IAEA, despite the limitations of the non-proliferation regime, is considered by most observers of its work to be a successful and functioning organization. It has, by and large, been effective at verifying the Non Proliferation Treaty which is considered to be the most successful arms control treaty in legal history.[4] In contrast to early Cold War fears of a world with upwards of twenty nuclear weapons states, that currently only 8 states possess nuclear weapons capabilities is seen as an accomplishment in which the International Atomic Energy Agency shares (Scheinman 1987, 272). "Horizontal proliferation," the spread of nuclear weapons to additional nation states never reached the dramatic scenarios envisaged by Cold War security strategists. (This is in stark contrast to "vertical proliferation," the increases in nuclear weapons arsenals by individual states). Of course, the color of one's judgment on this state of affairs depends on one's orientations towards nuclear weapons in general. Thus some argue that nonproliferation has been far more successful than nuclear weapons disarmament efforts while

[4] Success is measured by the high number of signatories and the low number of violations.

others are satisfied with the status quo as long as arsenals are maintained and modernized and no additional states join the "nuclear club." There is thus no collective agreement on what a "stable" nuclear world looks like.

The political and programmatic influence of the legally authorized nuclear weapons states (France, Germany, Russia, UK & US) at the IAEA has always been substantial. These states contribute large portions of the organization's budget and also provide substantial support in the shape of "Member States Support Programmes" in the various areas of the IAEA's work. Thus, this is one way in which the IAEA is imagined to be open to politicization. The other accusations of politicization are directed at what is perceived as the undue introduction of extraneously political matters in the affairs of the policy-making bodies. Not surprisingly, this claim is usually made against anti-hegemonic political arguments (for example, seeking to address Israel's nuclear weapons program).

Against these accusations of politicization, the Secretariat maintains adherence to a principal of "technical independence" which describes the unbiased technical competence and legal judgment by which the IAEA's missions can be made globally acceptable—to a vast international audience. It is thought to be independent, too, from state's interests. Lacking a mandated enforcement mechanism, the IAEA's ability to persuade the international community of the technical independence of its evaluations is a matter of war and peace, most recently illustrated by global controversies about nuclear programs (Iraq in 2003, Iran, and North Korea). This persuasion takes place not only through the careful crafting of high profile reports by the Director General, but also through the everyday bureaucratic work of the engineers, chemists, physicists, and lawyers (among others) who contribute to the verification effort. "Technical

independence" is a collective effort that is highly regimented within a structured bureaucratic apparatus. The quotidian regimentation of safeguards work through a set of rules and procedures works to produce this kind of work as technical and politically neutral. This work examines how bureaucratic practices, material objects, and discourses constitute the boundary against the politics that always seem to be encroaching upon the Agency's work. In this way, it considers "technical independence" as the production and performance of a type of authority specific to the IAEA.

1.4. Authoritative knowledge

The IAEA's political legitimacy (in the safeguards arena) hinges on its convincing performance of technical authority, which is established through the everyday bureaucratic actions of the staff of the safeguards department. With "convincing performance" I don't mean to imply that the IAEA's work is insubstantial or a facade, but rather that its bureaucratic practices are efficacious and consequential practices metapragmatically understood within higher orders of non-referential indexicality that privilege a bureaucratic form of knowledge production. In other words, the IAEA's bureaucratic practices exist within a discursive-ideological contextual surround in which the organization's performative utterances and practices are taken up as representative of or felicitous with ideas about technobureaucratic knowledge as authoritatively apolitical knowledge. This view of how political legitimacy is constituted differs from that of many scholars in the field of international relations.

In international relations, the political legitimacy of international organizations is attributed, roughly speaking, to state self-interests by realists, to international cooperation by

idealists, and to social and historical contingencies by constructivists. Constructivist accounts come closest to anthropological theories of social action, in contrast to realist and liberal (and their successors) accounts in which political action is largely theorized according to the billiard-ball (causal) model (Silverstein 2003a, 197). Most recently, Brown (2015) has given an account of how the IAEA has managed to establish its "nuclear authority" that rests on assumptions about states and organizations as relatively homogeneous entities supplying and demanding "policy partiality" and "authority." Even for those scholars who understand the IAEA's legitimacy to derive from its ability to produce impartial outcomes (through organizational practice, and even by creating the conditions for unbiased civil servants), these studies remain at a level of abstraction that again assumes that certain policy orientations or organizational actions will causally result in certain outcomes. Actors are homogeneous units, heterogeneity and internal tension is not considered other than in terms of conflicting interests.

STS scholars and anthropologists have studied the technopolitical and sociocultural effects of nuclear technologies with view to bringing nuance and scale to a field that often remains fetishized at the level of the nation-state. The effects of the nuclear age on the contemporary have been studied through the work and lives of nuclear weapons engineers (Gusterson 1998), the Manhattan Project's legacy in relationship to the New Mexican political, ethnic, and ecological context of the Los Alamos National Laboratory (Masco 2006), and the sociobiological legacies of nuclear weapons testing in Kazakhstan (Stawkowski 2016). It extends to nuclear power with studies on the effect of Chernobyl on notions of citizenship (Petryna 2002), on competing calculi for controlling risk in nuclear power installations (Perin 2006), as well as on the role of nuclear technologies in the construction of national identity (Hecht 1998).

Nuclear energy has also been studied as a project of social progress (Schmid 2015), and has been central to motivating the global circulation of nuclear things (Hecht 2012). Most provocatively, these studies suggest that the nuclear referent is irreversibly entangled in the fabric of modern life with destructive consequences for our political institutions (Wills 2011), and that it has had a profound impact on what counts as authoritative knowledge in a context of proliferating of secrecy (Galison 2004; Masco, 2010; Wellerstein, 2010).

These studies all provide ample illustration for the claim that the nuclear is both unstable and hyper politicized, and reveal contestations over what constitutes nuclear things. Hecht has characterized this unstable "nuclearity" as a lying on a "technopolitical spectrum". She argues that what is considered nuclear is embedded in a historically contingent technopolitical framework that shifts over time and space: "nuclear ontologies have a history and a geography" (Hecht 2006b, 322). And while the Cold War is ostensibly over (or yet again beginning?), and the number of nuclear warheads has declined, the risk remains, and the behaviors (social, technical, political) acculturated over the decades remain encrusted, and are even mobilized for new political projects of anticipatory terror (Masco 2014).

In line with the above scholarship that seeks to understand the scalar impact of nuclear things in the world, this study attempts to draw connections between the micro level of social life and practice and the macro levels of social and political organization. It focuses on the Agency's knowledge production practices as an insight into how dominant ideas about technical knowledge shape understandings of the relationship between technical authority and political legitimacy. This approach provides a more nuanced account of the relationship between politics and administrative bureaucracy by breaking down the assumed homogeneity of social entities,

and by foregrounding the role that normative ideas about knowledge play in shaping the contours of social action. It also provides insight into the contradictions that accompany bureaucratic organization by enabling a closer view of the gap between the normative expectations about and the pragmatic effects of the nuclear bureaucracy's technical practices.

At the IAEA, nuclearity has been rendered banal by its enrollment into a bureaucratic structure, by its monitoring via rationalizing processes, and its description through a particular register of technocratic language. Even if the slippery nature of "the nuclear" occasionally disrupts the steady paper-pushing (in exceptional moments such as the accidents at Fukushima Da'ichi and the negotiation of an agreement with Iran), and exposes the constant work that goes into producing a rational bureaucratic process, the IAEA's role of managing nuclear fear and producing boring nuclear knowledge is still a central puzzle piece in the story about how the nuclear age has transformed our ways of being and knowing more generally (Masco 2008). This project contributes to the study of the technopolitical and sociocultural features of the nuclear age at multiple scales by bringing into view its central bureaucratic organ; the IAEA has produced an ever-shifting and dynamic epistemic paradigm of nuclear things that affects how we can think about it and imagine it.

Historians of science and science and technology studies scholars have as their central aim the investigation of scientific knowledge production. They have done so from varying perspectives and with varying aims but one of the recurring problems is understanding how certain types of knowledge come to be recognized as dominantly legitimate or naturalized as authoritative.[5] Their approaches and findings vary but in general they show that knowledge

[5] See for example Bloor 1991, Fleck 1979, Kuhn 1962, Shapin and Schaffer 1985, and Daston and Galison 2007 among others.

production is sociohistorically contingent and that ideas about legitimate knowledge also entail ideas about objects of knowledge, people, culture, and politics. Through such work concepts such as objectivity are shown to be historically grounded and relationally constituted. They have also become very astute to the role that the material and sign-carrying infrastructure of scientific activity plays in shaping how knowledge becomes legible to a community of scientists.[6]

Some have also investigated the role that translation plays as scientific knowledge circulates to policy makers and the public. Fischer (1990) has made an explicit critique of the ideological project that produces technocratic expertise as value-free or politically neutral. And Jasanoff (2007) has shown how political cultures and civic epistemologies in different nation-states influence the co-production of science and policy. One of the main contributions of these scholars of the social construction of knowledge has been to show that the notion of "objectivity" refers to a pragmatically shifting and contextually varied set of scientific practices. The STS literature, in particular, has made the important move of studying the processes of formation of experts and expertise in the context of public policy and vis-a-vis lay publics, in turn, showing the very present political stakes of various claims to expertise.

Sociologists and anthropologists, meanwhile, have long been interested in the social construction of authority. They have studied authority in a variety of settings including its role and function in political organization, in the family, as well as in the professions, in particular the authority enacted in the role of the expert. Sociolinguists and linguistic anthropologists have been particularly focused on the performance of authority through specialized registers of speech (as in law, medicine, finance, etc.), but also its enactment through other semiotic modalities

[6] As has been carried out by Latour 1979, Galison 1997, and Knorr-Cetina 1999 among others.

including ritual (Keane 1997), documents (Hull 2012), and specifically bureaucratic techniques (Inoue 2011). These authors have shown that the sociocultural efficacy of authority relies on its convincing interactional performance which entails objects and producers of as well as audiences for this authority.

The IAEA's bureaucratic voice of authority draws from and across several domains of technoscientific, legal, and political expertise. Its documents are drafted in multiple and distinct "voices," the internal technical evaluations differing in style, tone, and content from the Director General's report to the Board of Governors. But they must sometimes overlap and combine legal and technical arguments. This makes the IAEA an interesting hybrid with sui generis forms of communicating the authority and expertise described as technical independence. Scholarship of political and legal language provides a reference point for investigating the discursive intersections and overlaps of bureaucratic documents as well as the ritual enactment of authority.

As mentioned above, research on the sociocultural construction of expertise has shown that its successful deployment depends on the convincing performance of authoritative language. At the IAEA, this performance may take place through the processual production of persuasive documents, day to day interactional encounters, as well as the ritual display of legal forms. The law and its practitioners have received much scholarly attention demonstrating the mechanisms by which legal language translates everyday relations into an orderly legal discourse (Matoesian 2001; Mertz 2007; Justin B. Richland 2008). Socialization into this legal discourse rests upon western universalizing assumptions about the transparency of language, which parallels the apparent transparency of scientific knowledge – with the effect of perpetuating social hierarchies (Bauman and Briggs 2003). Research on speech in courtrooms has shown that culturally

dominant ideas about the transparency of language tend to disadvantage individuals whose sociocultural speech styles do not conform to these notions (Haviland 2008, Berk-Seligson 2009). This raises important questions for an international and multilingual organization, the members of which represent a wide diversity of speech styles. It carries the potential for misunderstandings and miscommunication but also for the enrollment into a standard diplomatic discourse.

Linguistic transparency is less obviously potent or relevant in political discourse, the poetic and culturally salient qualities of which have also been commented upon extensively (Parkin 1984; Keane 1997; Silverstein 2003a). Political discourse, unlike legal or technical discourse, has the unique requirement and expectation of maximal flexibility. Instead of firming up meaning in order to produce certainty, political and diplomatic speech must be capable of presenting one meaning while also remaining open to other possible interpretations; the diplomat must prevent the foreclosure of options. Studies of political discourse have all in one way or another paid attention to the effects of language ideologies (Silverstein 1979; Woolard and Schieffelin 1994; Irvine and Gal 2000), particularly in structuring a political economy of linguistic interactions (Irvine 1989; Gal 1989). Some speakers are seen to be more persuasive than others, which is judged by various, mostly unconscious intuitions about linguistic efficacy. I am interested in asking how these analytics continue to apply in "international" and cross-cultural settings and how they might be used to investigate the specific interdiscursive practices of organizations (which produce technical independence) and the interactional elements of highly structured speech events.

Discourses of the nuclear constitute historically specific and culturally particular

metaphor systems (Lakoff and Johnson 2003) and can be profoundly seductive (C. Cohn 1987; Gusterson 1998). Part of the IAEA's task could be seen as a large scale attempt to bureaucratically rationalize the language of the nuclear and to strip it of its seductive tendencies. The nuclear lingua franca acts as a stabilizing bridge between different registers of expertise, and as a boundary against the encroaching political domains of nuclear governance. This dissertation describes how and when the IAEA's bureaucratic voice is apprehended to be authoritative. I show how views of authoritative knowledge vary within the organization how the nuclear lingua franca contains or exceeds the multitude of languages within.

By applying the analytical insights from the semiotic study of authority and expertise to a focus on knowledge production practices, this study seeks to enrich both literatures. A rigorous theorization of the semiotic modalities of knowledge production can contribute to understanding how processes of mediation shape notions of authoritative knowledge. In a way, semiotic analysis opens another "black box" of knowledge production by unpacking dominant ideas about forms of representation that often hinge on transparency and immediacy.

1.5. Epistemic ideology

This dissertation studies the historical construction and contemporary performance of authoritative knowledge at the International Atomic Energy Agency. The organization's perceived efficacy in contributing to a political goal (that of the nonproliferation of nuclear weapons) is deeply reliant on the convincing display of its "technical" authoritativeness. In the world of my informants (held by a community of IAEA bureaucrats, diplomats, policy wonks, international relations scholars, etc.), the organization must convincingly display not only

technical content but also the absence of "politics." This notion about the kinds of technical knowledge the IAEA can authoritatively produce is an epistemic ideology. An epistemic (or knowledge) ideology is an active, sociohistorically specific ideological formation that mediates knowledge production and its representation in a particular context, for a particular community of practice.

As has been widely argued and shown in the literatures on the social and historical study of science and knowledge (Carr 2010, etc.) expert knowledge is mediated materially which includes spoken language and bodily hexis (Parkin 1984; C. Cohn 1987; Mertz 2007), two-dimensional graphic representations including reports (Harper 1998; Riles 2000; Brenneis 2006), files (Latour 2010), charts, tables, images, numbers (Porter 1996), but also three-dimensional objects and artifacts, such as specimen samples, measurement instruments, and work tools (Latour 1979; Knorr-Cetina 1999; Galison 1997). With epistemic ideology, I want to explore how semiotic ideologies regiment the normative and conventional correspondence of certain genres of knowledge with the forms of their representation. Before I elaborate on this concept, I want to briefly point to what I see are limitations in the existing literature.

In their innovative book, *Objectivity*, Daston and Galison (2007) show transformations in the notion of "objectivity" through their investigation of scientific atlases. They identify three distinct modes of "objectivity" which are revealed in three distinct modes of representing objects of scientific knowledge in such atlases. Along with these three distinct modes of representation Daston and Galison also identify associated "epistemic virtues" of the knowledge producer. In this way they show that objectivity is not only a mode of knowledge production but also a disciplining of the knowledge object (knowing that) in representation as well as of the

knowledge producer's epistemic habitus (knowing how). The investigation of the material practices of knowledge production has long occupied historians of science and STS scholars; indeed, these analyses have revealed the rich mediation of the thought world in scientific material practice.

However, despite many and varied attempts to theorize the legitimation of knowledge, there have been few attempts to offer a systematic theoretical account of the authoritativeness of knowledge on the basis of its mediation. Peirce understood semiosis to be fundamentally about the communication of knowledge. Semiosis is a process by which humans pragmatically orient towards shared understanding about the world. According to Parmentier, "the semiotic theory of C.S. Peirce…is an attempt to explain the cognitive process of acquiring scientific knowledge as a pattern of communicative activity in which the dialogic partners are, indifferently, members of a community or sequential states of a single person's mind" (Parmentier 1994, 3). But the central role in scientific knowledge projects of the various sign-processes that Peirce describes remains largely unremarked upon in the above-mentioned literature. For the purposes of my argument, the relationship between what counts as authoritative knowledge and how that knowledge is represented (mediated, communicated) in order to be recognized as authoritative remains undertheorized in the historical and social study of science.

I would like to posit, then, that there is an important relationship between authoritative knowledge and authoritative ways of representing that knowledge, and that this relationship is governed by conventionalized understandings of what authoritative knowledge "looks like" which I call epistemic ideology.[7] An epistemic ideology is an active sociohistorically specific

[7] I want to acknowledge an unpublished paper by Eli Thorkelson in which he elaborates an argument for a notion of epistemic ideology that has inspired some of my thinking on the subject. I'd like to note that I found it by

ideological formation that mediates/governs/regiments the production of knowledge, the epistemic virtues of knowers, and the conventionally appropriate forms of representing that knowledge (how knowledge is made, why knowledge is made, what knowledge is legitimate, how knowers should be) in a particular context, for a particular community of practice. In other words, an epistemic ideology mediates what kinds of knowledge (personal, procedural, propositional) could be recognizable as authoritative and how to felicitously represent the formal expressions of these kinds of knowledges in a representational economy.

Epistemic ideologies can be understood as a sub-category falling under the overarching analytic category of semiotic ideology (Keane 2003). Semiotic ideologies are ideological formations that regiment normative ideas about signs and what counts as signs[8]. Indeed, in order for the IAEA's reports to become legible as technically authoritative they must be indexical of technical authority within socially regimented orders of indexicality. Hull (2012) also recognizes that "graphic ideologies" are a specific set of semiotic ideologies but wants to highlight that they "include notions specific to graphic representation" (Hull 2012, 14). He makes his argument for graphic ideologies as a way to focus on the specific ideological regimentations of graphic space that are relevant for the material he analyzed at the CDA in Pakistan. Similarly, I propose epistemic ideology as a way to foreground the ideological presuppositions about technical and procedural knowledge that I see operating in how bureaucracy is mediated at the IAEA which occurs specifically through particular modalities of representation (embodied practice, artifacts,

doing a google search for "epistemic ideology," and I want to thank Eli for an enriching discussion on the subject.

[8] The expansion of ideologies to semiotic systems more largely was effected as an attempt to include the materiality of semiosis, particularly for instances of non-linguistic semiosis. Some would argue that spoken language already has material qualities and that thus language ideology already encompasses material semiosis. Including non-linguistic sign systems in analyses of ideological regimentation seems to me a productive move.

and discourse). Through the regimentation of multiple modalities of representation by an epistemic ideology of bureaucratic objectivity, the organization's knowledge is naturalized as authoritatively recognizable in particular discourses and non-discursive practices and object-signs.

A quality effect shared by ideologies and media is that of erasing their own existence and processes of naturalization. Ideologies make social facts appear, precisely, as a self-evident facts, concealing the process of this fact's construction. Social facts appear to be transparent. Similarly, conventionalized media are able to render the effects of mediation invisible. This is something which Mazzarella has called the "politics of immediation" and this effect also turns on an idea of transparency that erases the mediating form. Indeed, Western language ideologies combine erasure and transparency by naturalizing language as giving immediate access to the world. Language ideology is thus a kind of semiotic-media ideology that naturalizes the effect of transparency or direct access between an object in the world and its representation to the point that the representation is accepted as a stand-in for the knowledge-object itself.[9]

This effect of naturalization is also produced by systems of authoritative knowledge; the knowledge produced by and within such a system is self-evidently legitimate or valid. This is not to say that there are no disputes or controversies within and across communities of knowledge production. Certainly, these occur frequently, but I would argue that these conflicts rarely dispute the premises of the community's knowledge production practices, largely because they are naturalized as self-evident and immutable.[10] We can thus observe that epistemic and semiotic

[9] See also Richland (2013) on "jurisdiction."

[10] Note that "authoritative" knowledge can only be "authoritative" from specific perspectival viewpoints. There are hegemonically authoritative knowledge from the standpoint of which, knowledge that does not conform is not considered authoritative. See Ginzburg (1980) for a treatment of a long-running distinction in social value

ideologies are "laminated" onto each other (so that authoritative knowledge fact A can only achieve its full authoritative effect when it is represented in the corresponding authoritative knowledge form A) concealing their mediation and naturalizing their relationship. Accordingly, incongruous effects can also be achieved by combining ideologically (conventionally) non-corresponding knowledge contents and forms. Barth has made an attempt at describing an anthropology of knowledge that moves in this direction in which the

> criteria of validity that govern knowledge in any particular tradition…arise through the effects on action of the constraints embedded in the social organization—the distribution of knowledge, *its conventions of representation*, the network of relations of trust and identification, and instituted authority positions of power and disempowerment. But they are also *affected by constraints that arise from the properties of the medium in which the knowledge is being cast, which affect the ideas that can be conveyed through forms of representation that are felicitous, limited, or impossible for those ideas in that medium*. (Barth 2002, 3, emphasis mine)

The felicitous performance of bureaucratic expertise ("technical independence") through adherence to epistemic ideologies of bureaucratic objectivity provides the basis on which the IAEA's contribution can be judged epistemically authoritative and ergo politically legitimate by the so-called international community that pays attention to the organization's work. In other words, I posit that there exist expectations among social actors about how a technical bureaucracy should function, and more specifically, about the kind of knowledge it should produce. These expectations structure and shape the technical bureaucracy's functioning. Adherence to these expectations through the convincing performance of representational forms ideally results in the successful uptake of the organization's authority in technical matters. The representational forms become iconic indexes of authority itself, variously in the body of the

between intuited, conjectural forms of knowledge as opposed to systematic and rationalized forms of knowledge and the relations of power that mediate this distinction.

expert or the issued report. However, as we will see, the normative idea of one coherent totalizing order is fictional; there are only attempts at coherence, embedded in nested indexical orders (Silverstein 2003a), to constitute the order as total and complete. The following chapters will investigate these efforts at producing a coherent knowledge ideological regime; these are frequently challenged due to the diversity of actors involved in creating and running the International Atomic Energy Agency.

1.6. The study of bureaucracy

The study of bureaucracies has largely been the purview of sociologists, who focus on contemporary organizations (Simon 1997; Stinchcombe 1990), and historians (Chandler and Cortada 2000; Skowronek 1982), some of whom have expanded the scope of what counts as bureaucracy by examining the governance structures of pre-modern sovereigns (Bielenstein 2009; Vismann 2008). Anthropologists began becoming interested in bureaucracy in the late 1970s (Britan and Cohen 1980), and more recent studies have followed the move to the material to focus on the paper artifacts produced by bureaucrats.[11] Much of the scholarship on bureaucracy has focused on the ways that bureaucratic organizations often do not meet expectations of efficiency and rationality (Herzfeld 1992), as well as fail to achieve the objective they were created to meet (Hetherington 2011; Hull 2012) and, indeed, produce effects that stand in opposition to their task (Scott 1998; Gupta 2012). Graeber (2015) recently asked why, despite insistence to the contrary, does bureaucracy nevertheless hold a covert appeal. He writes "bureaucracy appeals to us…precisely when it disappears: when it becomes so rational and

[11] See Hull (2012) for a masterful review.

reliable that we are able to just take it for granted that we can go to sleep on a bed of numbers and wake up with all those numbers still snugly in place" (Graeber 2015, 164). For the larger part of its existence, the IAEA has been able to appeal to its audience by disappearing.

This dissertation is an attempt to write against prevailing scholarship (curiously close to "common-sense" about bureaucracy) that reveals bureaucratic organizations to be ineffectual, bureaucrats uncaring or self-interested, and the general bureaucratic project (from the ideal-typical perspective) to be a failure. Here I will consider an organization whose mission has, by and large, been successfully fulfilled, whose bureaucrats are generally committed to carrying out their tasks faithfully, and whose inefficiencies are not apprehended to be substantially preventing it from achieving its purposes. This story, as much as it is enmeshed in the mostly predictable power struggles of nation-states, is about the aspirations of bureaucracy and how inspired bureaucrats attempt to achieve them.

The impetus for this orientation towards the aspirations of bureaucracy and its achievements derives from ethnographic, methodological, and theoretical considerations. First, the IAEA as ethnographic object is unlike most bureaucratic organizations studied by anthropologists in that it is neither a state bureaucracy, nor do its bureaucrats directly serve citizens. As an international organization, its primary stakeholders (or customers/clients?) are the member states. The clients hold some measure of direct power over the bureaucracy. This fact may make the organization more responsive to client criticism. On inspection, inspectors do meet and interface with citizens of the member state, but mostly in a situation of mutual aid in the inspection task. The state regulators and the power plant operators have an interest in aiding the inspector's work and the inspector has an interest in not impeding the power plant's

operation. There is not an asymmetrical relationship of petitioner to bureaucrat. Second, works on the arbitrary indifference of bureaucrats draw on data from the interactions between bureaucrat and petitioners as well as the bureaucrats' handling of the files. Due to confidentiality restrictions, I was not able to attend inspections (if these are taken as the equivalent practice to bureaucrat-petitioner interactions) or witness the production of safeguards reports.[12] Instead, my research focused on the training of inspectors and internal transformations in safeguards practice. Training courses provide important sites for the socialization of new inspectors into a specialized register so that they could participate meaningfully in this micro-society (Schieffelin and Ochs 1986; Michel and Wortham 2009). These sites also allow for the investigation of explicit discourses on the efficacy of the organization, its perceived shortcomings, and how to remedy them. Third, the IAEA's characteristics as an international bureaucracy that is not service-oriented but rather produces knowledge about the world requires a shift in the theoretical framework in order to investigate it. This is explicitly not a study in the anthropology of the state, a literature into which most studies of bureaucracy fall. Rather, this project seeks to consider the IAEA as a project in organizational knowledge production on a global scale. This perspective reintroduces the question of the recognition of political legitimacy through the production of technical expert authority, and does not assume that these are given a priori.

Reading the IAEA as an aspirational bureaucracy should not be taken to mean that the organization is not beset by the contradictions and inefficiencies that we understood as characteristic of most bureaucracies, especially public ones. Neither should it be taken to mean

[12] The confidentiality measures surrounding safeguards practices at the IAEA derive from the history of nuclear technology development which was highly nationalized and competitive. An important condition for the acceptance of intrusive inspections was that inspectors would be carefully vetted and that all information about the state's nuclear facilities would remain confidentially with the IAEA.

that the staff are ever satisfied with its functioning. Rather, the focus on the promise of the organization's objective and the promise of ideal-typical bureaucratic functioning helps to enlarge and complicate the picture of how bureaucracies actually do work. It can serve as a way to understand why the bureaucratic form persists despite the overwhelming evidence of its shortcomings. In other words, it can help to explain prevalent ideologies of bureaucracy, and how they contribute to concealing bureaucracy's perceived ill effects. For the prototypical account of bureaucracy's ideal-typical characteristics and promises, let us turn to Weber.

1.7. Weber's bureaucracy and bureaucratic objectivity

Weber is well-known for developing the concept of the ideal-type in the social sciences. His description of bureaucracy should be understood as an abstraction, highlighting a set of common elements to the phenomenon of bureaucratic organization in the modern world. In a way, Weber's description of bureaucracy serves neatly as a blueprint for a generalized ideology of bureaucracy (or ideal-type). Weber defines three different bases for claims to "legitimate domination": rational, traditional, and charismatic. He argues that legal-rational authority is superior to the other expressions of authority (traditional, charismatic) because it is based on "rational grounds": "resting on a belief in the legality of enacted rules and the right of those elevated to authority under such rules to issue commands (legal authority)" (Weber 1978, 215).

The contrast he draws is supposed to show that legal/bureaucratic authority is more rational than other forms and thus better fit for the administration of mass society.

> The type of rational, legal administrative staff is capable of application in all kinds of situations and contexts. It is the most important mechanism for the administration of everyday affairs. For in that sphere, the exercise of authority consists precisely in administration. (Weber 1978, 217).

The rational grounds for political legitimacy support legal authority (Weber 1978, 215) and legal authority is most efficiently carried out through bureaucratic administration. Weber highlights the versatility and near universal applicability of bureaucratic administration, indeed its superiority:

> Experience tends universally to show that the purely bureaucratic type of administrative organization—that is, the monocratic variety of bureaucracy—is, from a purely technical point of view, capable of attaining the highest degree of efficiency and is in this sense formally the most rational known means of exercising authority over human beings. It is superior to any other form in precision, in stability, in the stringency of its discipline, and in its reliability. It thus makes possible a particularly high degree of calculability of results for the heads of the organization and for those acting in relation to it. It is finally superior both in intensive efficiency and in the scope of its operations, and is formally capable of application to all kinds of administrative tasks. (Weber 1978, 223)

One of the chief benefits of bureaucracy is how reliably predictable and consistent its results are promised to be. This makes it particularly attractive to the "heads" of the organization who are likely to prefer predictable order to unpredictable chaos, which is assumed to facilitate the task of managing power. Bureaucracy thus has a tendency of making itself indispensable to leaders because it seemingly produces the most reliable and predictable knowledge. Weber's theory of rational authority can be seen to foreground a conception of authority through knowledge production. This is an important concept for the modern nation-state in which political legitimacy is based on the rational administration of state affairs through bureaucratic-technical knowledge production. Indeed, Weber argues that putting knowledge at the center of bureaucratic administration in the modern nation-state produces the system's rationality. Contrary to charismatic and traditional forms of authority, "bureaucratic administration means fundamentally domination through knowledge. This is the feature of it which makes it specifically rational" (Weber 1978, 225). Weber's theory of bureaucracy is a theory about

knowledge and power that posits that administrative knowledge production (as in a bureaucracy) secures the rational ground for a specifically modern legal authority. In other words, the rationality achieved by the bureaucracy provides a scaffolding on which to hang claims to legal authority. “Bureaucracy has a 'rational' character: rules, means, ends, and matter-of-factness dominate its bearing” (Weber 1958, 244). But how precisely does the bureaucracy achieve this rational character?

> [Bureaucracy’s]…specific nature…develops the more perfectly the more the bureaucracy is 'dehumanized,' the more completely it succeeds in eliminating from official business love, hatred, and all purely personal, irrational, and emotional elements which escape calculation. This is the specific nature of bureaucracy and it is appraised as its special virtue. (Weber 1958, 215–16)

The bureaucracy’s rationality is achieved through the “dehumanization” of the organization. By eliminating all “elements which escape calculation,” the bureaucratic organization creates the conditions under which ultimate rational efficiency can be practiced. In another piece, Weber elaborates on how the bureaucracy acquires its specific nature. He describes a number of qualities that concern the conduct, structure, and practices of the administrative body, and which he identifies as contributing to its rationality. (1) The rule boundedness of business conduct is based on technical rules or norms that requires specialized training of the staff. (2) There exists a hierarchical division of labor based on the specifically defined mandate of organization and its sub-units; the staff is separated from the means of production. (3) All administrative acts must carried out in writing “even in cases where oral discussion is the rule or is even mandatory” (Weber 1978, 218–19).

The “dehumanization” of the bureaucracy is achieved in a number of steps. Rule-based conduct by specialized experts who have been socialized into the organization’s logics and

practices (Point 1) is thought to simultaneously produce calculability and impersonality.[13]

> Bureaucratization offers above all the optimum possibility for carrying through the principle of specializing administrative functions according to purely objective considerations. Individual performances are allocated to functionaries who have specialized training and who by constant practice learn more and more. The 'objective' discharge of business primarily means a discharge of business according to *calculable rules* and 'without regard for persons'. (Weber 1958, 215)

Bureaucrats themselves become professionalized as experts who know their domain of action intimately and act according to the rules and procedures of the organization (objectively) without regard for persons (that is, without favor or disfavor).

In a second step, the carefully defined structure and hierarchy of the organization, as well as the official's separation "from ownership of the means of administration and without appropriation of his position" (Weber 1978, 221) (Point 2) ensures the disinterestedness of the official in his conduct. Furthermore, Weber notes that the official is "subject to strict and systematic discipline and control in the conduct of the office" (Weber 1978, 221). This serves as a mechanism to ensure adherence to the objective discharge of business.

Finally, the focus on files and documents (Point 3), which is an often quoted part of Weber's essay on bureaucracy, is relatively underdeveloped by Weber himself. While he writes that the "the management of the modern office is based upon written documents ('the files')" he also argues (against a "naive Bakuninism") that the "discipline of officialdom" becomes the basis of all order and would ensure continuity even if all the files were destroyed (Weber 1958, 229). It thus seems that files, though important, are not essential to bureaucratic discipline. However, I posit that, as Hull (2012) has shown, the production and management of files provide a disciplinary mechanism for the official's behavior because document and file practices produce

[13] Key qualities for nuclear safeguards inspectors.

evidence (among other things) to which the official is held accountable (or which he creatively evades).

To summarize, the bureaucracy's characteristics in terms of structure, conduct, and practices effectively provide for the calculability, disinterestedness, and accountability of a rationally functioning organization. These characteristics also provide the conditions under which the rationally functioning organization can produce optimally objective knowledge in a bureaucratic mode. This ideal-type of knowledge production has been characterized as administrative or bureaucratic objectivity. Lynch et al. (2010) in their fascinating work on the history of DNA fingerprinting (in criminal trials) argue in a long footnote that the pluralization of scientific objectivity by historians of science allows administrative objectivity to overlap with categories such as "mechanical objectivity" (Daston and Galison 1992) but that it is

> founded in ideals of bureaucracy rather than of science and technology. It is no accident that the norms of science, which Robert K. Merton (1973) first formulated in the 1940s, overlap with the properties of Weber's ideal-type of bureaucracy. Whether or not they describe actual conduct, variants of Weber's and Merton's formulations recurrently appear in normative talk and writing about science and modern life. (Lynch et al. 2010, 136–37)

For the authors, of interest is the way that "administrative operations stand proxy for the reliability and validity ascribed to" science (Lynch et al. 2010, 1337).

I would like to push this further and argue that bureaucracies are imagined to be capable of a particular form of disciplined knowledge production that can be described by the term bureaucratic objectivity. Indeed, bureaucratic objectivity even functions as an epistemic ideology with sets of discourses, practices, objects, and embodied virtues by which the organization's knowledge production is regimented. Weber's ideal-typical characterization of bureaucratic administration aligns closely with an epistemic ideology of bureaucratic objectivity. That the

bureaucracy handles, produces, and administers knowledge makes it, for Weber, rational. Bureaucratic objectivity is seen to be met under the conditions that the organization is carefully structured, that business is carried out according to fixed rules, and that those who carry out the business are experts in their domain without personal or political bias. It is a technical-rational-administrative objectivity. Bureaucratic objectivity is an epistemic ideology comprised of a set of epistemological stances and assumptions about the capacity for a bureaucratic organization to produce rule-based knowledge with impartial outcomes that are outside the realm of political influence. In the following section, I will describe how the epistemic ideology of bureaucratic objectivity can be ethnographically recognized and achieved.

1.8. Achieving bureaucratic objectivity

Here I would like to bring into conversation two sets of literatures that have mostly been traveling parallel to each other by making them speak to the notion of bureaucratic objectivity as an epistemic ideology. The subject of truth and knowledge-making has been the domain of historians of science and STS scholars who have demonstrated the historical and cultural contingencies that shape epistemological paradigms of truth and forms of legitimate knowledge (Kuhn 1962; Merton 1973; Shapin 1994). These works critique the idea that facts simply exist in the world and that an objective view from nowhere is possible. Rather, “facts” or “objective” knowledge about the world is constructed by a laborious and painstaking process which is then largely concealed in the final product lending it an appearance of autonomy (Fleck 1979; Latour 1979). According to prevalent ideologies of facticity and truth, the robustness of a given fact is thought to inhere in the fact itself, not in its persuasively self-evident form or the social authority

of the presenter of the fact or a whole host of other contextual conditions.

This essentialized notion of objective immediacy has been interrogated and critiqued by scholars with as divergent approaches as taken by Daston and Galison (2007) and Latour (1987). Daston and Galison illustrate how different epistemic paradigms of objectivity require different visual technologies for representing knowledge while also disciplining the knower to insert or extract herself from the knowledge. They crucially develop the notion of epistemic virtues to describe the sets of qualities required of the knower within each particular epistemic paradigm.

Latour, in his attempt to open the "black box" of scientific statements searches for their conditions of production in order to trace how a hunch eventually turns into a statement of fact. In this project, he pays particularly close attention to the role that the objects of scientific inquiry and the materiality of the laboratory plays in participating in the construction of scientific knowledge (Latour 1993). Knorr-Cetina discovers that different scientific disciplines are organized and oriented differently, which she attributes in part to the experimental objects and instruments (Knorr-Cetina, 1999).

In developing a concept of epistemic ideology we can take cues from the history of science and STS that remind us to look out for epistemic virtues (such as rule-bound discipline) and the role that objects and instruments play in shaping and disciplining knowledge production. This literature also attempts to address the role of language and other forms of representation. Both Daston and Galison and Latour demonstrate that the successful circulation of knowledge relies on "proper" forms of representing and communicating it. And while Daston and Galison develop a rudimentary vocabulary of the visual pragmatics of scientific representations, Latour's account of the linguistic transformations of scientific knowledge suffers from folk-ideological

conceptions of linguistic transparency and function. In a similar vein, most works on the rhetoric of science fall woefully short of successfully accounting for the social force of scientific or, more broadly, expert language.

It is an insight of the linguistic anthropological literature that the sociocultural salience of expert knowledge is a function of processes of making such expert languages (registers) socially legible and portable (Carr 2010). Expert discourses are not independently, objectively "expert". They must be made recognizable and reproducible as such. Semiotic analysis has shown that this is achieved by processes of enregisterment (Agha 2005), entextualization (Bauman and Briggs 1990; Silverstein and Urban 1996), and ritual figuration (Silverstein 1976). The "voicing" of scientific knowledge as a recognizable register and practice of expertise occurs thanks to metapragmatic frameworks that direct attention to contextualizing cues in the pragmatics of the utterance. In this way, utterances in expert registers presuppose and entail the epistemological and ontological assumptions of the particular discipline, which are discursively regimented and expressed. Communication across disciplines can lead to difficulties because epistemic and discursive practices across communities of practice are regimented by differing metapragmatic frameworks.[14]

In an organization like the IAEA, which requires the expertise and collaboration of social actors with varying types of expertise as well as different native tongues, the possibility for misunderstanding is quite real. It is thus necessary for the organization to provide official translations of documents across the official languages, Arabic, English, French, Mandarin Chinese, Russian, and Spanish. While a certain kind of transduction (Silverstein 2003b) across

[14] See Dumit (2004) for an interesting discussion of the use of PET scans in a court of law, which also unfortunately undertheorizes folk ideologies of representation.

expert registers might be occurring on a smaller scale. Due to the varying levels of English competence, the working language of the organization could be described as a kind of "pidgin" English (Galison 1997). But, in the written form, the organization has developed a bureaucratic lingua franca around the governance of nuclear things. The IAEA's "house style" of writing characterized by turgid legalese and a technical lexicon has adapted to accommodate the constraints that arise from needing to combine the expertise of engineers with that of lawyers with view to creating a document that meets the expectations of the member state audiences. Chapter 5 shows how various types of expert knowledge (technical, legal, and bureaucratic) are made commensurate and legible through discursive processes that render the bureaucratic voice of authority recognizable as such. It investigates the orientations of writers and translator towards what they perceive as the "right" kind of language use.

Linguistic anthropologists have not stopped at language for their semiotic analysis. Starting with Keane (Keane 2003; Keane 2005), anthropologists have brought attention to the fact that materiality also plays an important role in semiosis. The attention to the materiality of social and cultural life is not new to anthropology, indeed, it has been one of the central investigative foci in the anthropological tradition. But, excepting Munn's seminal work on Gawa (Munn 1976) it has only recently been brought under the rigorous lens of semiotic analysis. Hull's work (Matthew S. Hull 2003; Hull 2012) has been most explicitly concerned with the role of documents as material-semiotic objects in a government bureaucracy.

The bureaucracy's knowledge production processes have most thoroughly been studied through the role of documents and files. Weber's functional conception of bureaucratic files has been called into question by work that shows how documents are not only "instruments of

bureaucratic organizations, but rather are constitutive of…even the organizations themselves," sometimes with less-than-official functions and outcomes (M. Hull 2012, 253; Harper 1998). Hull shows that Pakistani bureaucrats circulate and mark files in such a way as to minimize individual responsibility. Harper (1998) and Riles (2000) both note the ritual role of completed documents, their content needing to be made "just right" for maximum efficacy. Harper argues that documents are vehicles by which the International Monetary Fund presents and justifies its work. In her analysis of the formal qualities of the document production process at a UN conference on Women's Rights, Riles makes the argument that the denotational content of the document itself was largely irrelevant from the perspective of the participants (Brenneis 2006). Rather, its language had to fit certain expectations of UN-officialness. Both of these authors note the role that documents play in providing a material basis for the bureaucratic display of competence.

Continuing in this vein, Latour (2010) and Hull (2012) address the representational capacity of documents by analyzing them as mediating objects between bureaucratic actors and the world they attempt to bring into being. In this way, the formal and material qualities of documents are constitutive of the bureaucratic work of which they are also vehicles. The study of media technologies (such as writing, files, and archives) in the constitution of the state has given great insight into how legal authority is enacted and the kinds of knowledge that can be produced (Messick 1992; B. Cohn 1996; Vismann 2008; Burns 2010). Media studies scholars have looked at the material qualities of different modalities of representation such as paper (Gitelman 2014), the mp3 digital audio file format (Sterne 2012), and of course, images.

But the semiotic study of material things has suffered from a lingering subject-object

distinction prevalent in western—and indeed anthropological (despite our best intentions)—thought. Indeed, even Hull sometimes seems to, and does, oppose the material to the semiotic at the same time as he tries to argue for their necessary conflation/identity, as Nakassis (2013) has pointed out.

With this work I want to show that semiotic analysis can be applied to analyze the multiple, and entangled, semiotic-material modalities of social action through which epistemic ideologies are achieved. These communicative modalities include not only discursive but also non-discursive technical practices as well as the objects and artifacts through which social action is mediated. Key semiotic functions and processes (enregisterment/register formation, entexualization, iconization, shibboleths, second order indexicals, etc.) that have shown how language ideology (Woolard and Schieffelin 1994) works in everyday discourse[15] can also be applied to show how epistemic ideologies are mediated through and by these multiple modalities.

For Peirce, semiosis is about communicating knowledge, and as both historical and social studies of science as well as linguistic anthropology has shown, knowledge is not only communicated through spoken and written language, it also speaks through the ways we do things and the objects we interact with. This work looks at epistemic ideology as semiotically mediated through multiple modalities of representation. I show the disciplining of inspectors' bodies and minds into particular epistemic virtues and practices through an analysis of the training course for new inspectors (chapter 3). Then I interrogate how objects as distinct as security seals, inspector manuals, and databases mediate epistemic ideologies about the IAEA

[15] See Agha (2005) for enregisterment, Bauman and Briggs (2003) and Silverstein and Urban (1996) for entextualization, Irvine and Gal (2000) on iconization and erasure, Silverstein (2003a) on second order indexicality and metapragmatic function (Silverstein 1993), Nakassis (2012) on citationality.

and sometimes even come to embody and reveal contradictions (chapters 4 and 5). And then I return to discourse to present an investigation into how the processes of writing and translation at the IAEA reveal local orientations towards the communicative capacity of texts as objects (chapter 6).

By focusing a lens on the epistemic ideology of the bureaucracy, this work seeks to illuminate the processes by which the bureaucratic form has become so widely spread and accepted as an apparently neutral structure for administering a wide variety of projects. The following section reads Weber's account of bureaucracy as not only ideal-typical but as an ideology for how the modern nation-state governs through administrative knowledge production.

1.9. Bureaucracy as ideology

In his famous essay on bureaucracy, Weber allows his smooth presentation to only be interrupted once by a counter-point relegated to a footnote. After singing the praises of "the very large, modern capitalist enterprises [that] are themselves unequalled models of strict bureaucratic organization" in perfect adaption to the demands of "the capitalist market economy," (Weber 1958, 215) of a quick reaction time to the increasing pace of "public announcements, as well as political and economic facts," Weber notes that "the optimum of such reaction time is normally attained only by a strictly bureaucratic organization*" (Weber 1958, 215). The asterisk leads to the following caveat at the bottom of the page: "*Here we cannot discuss in detail how the bureaucratic apparatus may, and actually does, produce definite obstacles to the discharge of business in a manner suitable for the single case." This statement indicates that Weber was well aware that the bureaucracy can also, sometimes, create obstacles to its own stated objectives, but

preferred to focus on describing how the bureaucracy's structure and practices succeeded at achieving the organization's aims. This strikes me as a first hint that Weber was not merely describing an ideal-type but actively fell under the spell of the ideology of bureaucracy he was elaborating.[16]

There is another interesting moment where Weber seems to be in thrall of the ideological effects of the ideal-type to the point where it becomes impossible to imagine alternatives. After stating that "modern forms of organization" are identical with the "development" and "spread" of bureaucratic administration, indeed he argues that it is at the "root of the modern Western state", he then goes on to bring up examples that don't fit the pattern he has described (Weber 1978, 223). But he quickly nips any rising doubt in the bud when he goes on to state the impossibility of administration being carried out in any other way.

> However many forms there may be which do not appear to fit this pattern, such as collegial representative bodies parliamentary committees, soviets, honorary officers, lay judges, and what not, and however many people may complain about the "red tape," it would be sheer illusion to think for a moment that continuous administrative work can be carried out in any field except by means of officials working in offices. The whole pattern of everyday life is cut to fit this framework. If bureaucratic administration is, other things being equal, always the most rational type from a technical point of view, the needs of mass administration make it today completely indispensable. The choice is only that between bureaucracy and dilettantism in the field of administration. (Weber 1978, 223)

Here, Weber is falling prey to the bureaucracy's own ideological force field that presents bureaucratic administration as the *only possible* form of governance for the modern western state. Indeed, by joining bureaucracy to the root of the modern western state, he makes them mutually constitutive. He cannot imagine that the "pattern of everyday life" could adapt to a

[16] In chapter 2, I describe the political and institutional effects of ideological enchantment with bureaucracy at the IAEA.

different framework. And indeed, this failure of the imagination is widespread.

While historical studies of bureaucracy show that governance through bureaucratic administration is not necessarily a phenomenon exclusive to modernity (Crooks and Parsons 2016), it might still be argued that the ideology of bureaucracy gains much of its centripetal power with self-conscious efforts to create truly international forms of governance[17]. Colonizing projects had already contributed to the spread of Western bureaucratic form and practice across the globe (Raman 2012; Peers and Gooptu 2012), and the Marshall plan had reshaped the European administrative landscape with vision and practice from the United States in the aftermath of WWII (Arkes 2015). Bureaucratic administration through the League of Nations (Pedersen 2015) and the United Nations (Farazmand 2009) contributed to consolidating the aspirations for rational bureaucratic governance on a global scale.

The bureaucracy's ideological effect is that it presents itself as a neutral, standard, transposable form of organization, despite the fact of its historically changing forms and regionally unique histories. By the mid-1950s, bureaucracy is a familiar and recognizable organizational form (Merton 1952). Despite common critiques of bureaucracy, this organizational form continued to be employed in the management of large-scale and complex issues of governance. Bureaucracy had not yet gone out of fashion. Rather, it was multiplying.

In response to the devastation of World War II, from 1945-1950, numerous international organizations were founded. The UN, UNESCO, IMF, WHO, etc. were all started to address issues of global governance in a post-war order. Graeber argues that the mushrooming of international organizations was precipitated by a US desire to administer.

[17] Here, I focus on bureaucracy in public administration at the expense of bureaucratic administration in the private sector.

> The Americans in particular were much more concerned with creating structures of international administration. The very first thing the United States did, on officially taking over the reins from Great Britain after World War II, was to set up the world's first genuinely planetary bureaucratic institutions in the United Nations and the Bretton Woods institutions—the International Monetary Fund, World Bank, and GATT, later to become the WTO. The British Empire had never attempted anything like this. They either conquered other nations, or traded with them. The Americans attempted to administer everything and everyone. (Graeber 2015, 13)

After the failure of the League of Nations it became clear that all the great powers needed to support efforts at international governance. And the US was instrumental in getting these organizations off the ground. Their promise was great. Bureaucratic objectivity could bring about the orderly governance of a post-war order. The capacity of nuclear technology to be used for both military and civilian applications—that is, the problem of "dual-use"—was the newest matter that required the attention of nation-states acting together. Given this background where bureaucratic organizations are widespread in state governance, their suitability to the administration of international affairs had already been tested with the founding of a number of international organizations a few years earlier, and the global enthusiasm for an international nuclear pool and assistance agency was high, bureaucracy—from the perspective of the diplomats and statespeople who are charged with addressing the problem of nuclear technology's dual-usability—is the ideal type of organizational form for the nuclear problem.

Indeed, it came to be seen as the only possible type of rational organizational form for administering any kind of complex system in the Cold War (Erickson et al. 2013, 46–47). "Bureaucracy has become the water in which we swim" (Graeber 2015, 4). Graeber notes the hegemonic universalism of the bureaucratic form, in particular, the way in which bureaucratic administration has become equated with a rationality to which there is no alternative except irrationality. He argues that this fact has resulted in the shrinking of alternative political

imaginaries outside of bureaucracy. Indeed, bureaucratic efficiency has become a benchmark for measuring progress and development. Ferguson (2008) has also noted that the effective running of bureaucratic organizations is a litmus test for the success of a state.[18]

Instead of lamenting the hegemonic force of bureaucratic administration, this work investigates the mechanisms by which bureaucracy sustains its persuasive and pragmatic power. By investigating the ideological processes that continue to produce bureaucratic objectivity as a desirable way for an organization to create knowledge, this work seeks to break down some of the reifying tendencies to which analysts of bureaucracies (including Weber himself) tend to fall prey (Hoag 2011). The ideological mechanisms by which the bureaucracy's expertise are defined can also serve to delimit the boundaries of that expertise, and define what lies outside of the organization's competence.

1.10. Overview

In Chapter 2, "A critical genealogy of nuclear safeguards," I sketch the historical specificity of nuclear technology by describing early responses to its risks, consider the role of bureaucracy and systems engineering in providing ideological foundations for a control organization to manage nuclear anxieties, and analyze the controversies surrounding the constitution of a boundary to separate technical and political domains in the early years of the IAEA. Critics of safeguards were primarily concerned with discriminatory inspections and resented the breach of sovereignty that international inspections would entail. Global political acceptance of international safeguards was made possible by ensuring that safeguards inspectors

[18] Ferduson (2008) points out a common argument about the failings of the African state that identifies the African's inability to properly inhabit and perform Western bureaucratic structures.

would act as bureaucrats. I anchor this claim to Weber's ideal-typical concepts surrounding bureaucratic functioning and show that the organization's main epistemic mode is one of bureaucratic objectivity. This mode enables the mechanistic and rationalized application of technical systems knowledge and functions as an epistemic ideology. The IAEA's source of authority derives primarily from bureaucratic objectivity but it has not gone unchallenged. The discovery of Iraq's clandestine nuclear weapons program in the early 1990s triggered soul-searching and significant transformations in the safeguards system. However, these transformations have also been criticized. The crux of the chapter interrogates the project of nuclear safeguards as a fundamentally *bureaucratic* undertaking: why is the control of nuclear technology so boring, how did safeguards become conventional? And how has the organization's legitimacy been challenged?

The following chapters explore the tensions between the old and new models of safeguards by looking at the practices, objects, and discourses seen as the semiotic system of the IAEA's bureaucratic objectivity.

Chapter 3, "Practices: negotiating the technopolitical" begins the four-chapter exploration into the semiotic system of the IAEA's practices of bureaucratic objectivity. Here, I first examine how one learns to become an inspector through an analysis of ethnographic material collected on the three-month introductory course that all new inspectors must take in order to begin their work. In view of the tensions produced by a changing safeguards regime I pay particular attention to competing visions of the ideal inspector as expressed by instructors and taken up by freshman inspectors. In a second moment, I explore critiques of the transformed safeguards system, in particular, critiques of "analysis" as dangerously introducing "subjectivity" into the

verification system. The tension introduced by analysis is define in the introductory safeguards course by the instructors' demands of students that oppose an adherence to procedure to the importance of thinking for oneself. I then further examine internal attempts at bureaucratizing qualitative knowledge production as a response to these critiques through the development of administrative guides and procedures. I conclude with a short foray into how safeguards inspectors themselves locate the constitution of a boundary emerging to distinguish the technical and political aspects of the organizations This chapter shows that bureaucratic objectivity is a difficult paradigm to adhere to and that safeguards practice diverges from this ideal while it at the same time tries to uphold its virtues.

Chapters 4 and 5 carry out a treatment of the notion of epistemic objects through two distinct examples of bureaucratic artifacts that seem to embody and materialize principles of bureaucratic objectivity.

Chapter 4, "Objects: the seal," focuses on the security seals used in safeguards verification measures. These semiotic technologies assist in the inspector's work of accounting for nuclear material between inspections. They are intended to provide assurance that a sealed entity has not been tampered with, or provide evidence that tampering has occurred. The seal's semiotic affordances are multiple and depend on who is reading it and to what end. For example, the seal can be a symbol of the organization's purpose and authority within the member state where it is being applied. Alternatively, it can also present as an indexical icon of the state's commitment to the international nonproliferation regime depending on whether it is intact or not. Within the seal are bundled a set of qualisigns that become conventionally legible in different moments throughout the seal's bureaucratic career. I explore the ways in which the seal

materializes bureaucratic objectivity, and, in turn, the Agency's legitimacy in its form, how it is managed and enrolled into a system of bureaucratic accountability, and how it contributes to understanding safeguards as a semiotic system.

Chapter 5, "Objects II: the manual" considers a second example of bureaucratic artifactuality and in, particular, the process and effect of its transformation. The epistemic object that is the focus of this chapter is the now-defunct "Safeguards Manual," a previously paper-based two-binder reference collection of all relevant processes and procedures for safeguards inspectors. Several years ago, as part of a quality management-inspired attempt to move towards digitizing, the formerly paper based manual was integrated into an internal document management system called "document manager." I analyze the organizational role and epistemic importance attributed to the manual by "old guard" inspectors who lament the manual's "disappearance." And I contrast this view with that of a newer generation as well as of the defenders of the rationalization process. I ponder how the intergenerational tension articulates the epistemic consequences entailed by this change in medium, and I analyze both the manual and the document manager for their semiotic affordances with view to bureaucratic knowledge production. Both the manual and the seal show how bureaucratic artifacts authorize the bureaucratic knowledge production process at the organization, in particular, how they are perceived to uphold the bureaucratic objectivity that the IAEA is understood to function under.

In Chapter 6, "Writing and translation: producing the IAEA's civil voice," I consider how language at the IAEA is regimented into particular registers that have developed due to the constraints attached to specific genres of textual production. I begin with a consideration of how the high-profile safeguards reports are written through a collaborative process that involves many

different actors with different backgrounds and in different positions. I then move on to a discussion of the processes of interlingual translation at the IAEA (including the translation of incoming correspondence, safeguards documents, and the production of summary records for official meetings) and the different kinds of translative regimentation that is accorded across a variety of text genres. Comparing these two locations of textual production shows that language use and writing are governed by a shared folk ideology of language in which discourse is seen as consequential and efficacious. But this common folk ideology of language nevertheless does not result in the same types of documents. Rather, the varied practices of writing and translation at the IAEA are carefully attuned to distinct types of textual genres, and are regimented in different ways in order to achieve the maximally efficacious result that is appropriate for the text genre at hand. I argue that texts in translation are either transformed to produce a normatively civil voice that upholds an aspiration of equitable contribution across heterogeneous actors in international governance, or they are carefully and faithfully re-produced in order to uphold standards of evidence in the realm of legal compliance within the safeguards regime.

Why let nuclear technology (that most dangerous thing of macho modernity) be controlled and watched over by bureaucrats? By posing a question to destabilize what has been normalized I interrogate the naturalness and self-evidence of bureaucracy in examining the ideology of bureaucratic administration. I tell a story about bureaucracy, its appeals and promises for a problem of deeply politicized knowledge. I show how the development of bureaucracy's structure and its epistemic practices allow for the apparent disentangling of technical and political, and I develop an argument about the constitution of a boundary through an epistemic ideology of bureaucratic objectivity. By applying semiotic analysis to questions (so familiar to

science and technology studies) about epistemic practices and virtues, I show how bureaucrats manage the tensions of technopolitical knowledge production in the things they do, the tools they use, and the words they choose. This is to illuminate how knowledge is produced organizationally, and to better understand the significance of agreement in making boring the everyday of international governance. In contrast to the study of international relations which focuses primarily on political disagreement and the slow wrangling towards agreement, an anthropological perspective can introduce new questions by highlighting matters of agreement and asking why.

Chapter 2: A Critical Genealogy of Nuclear Safeguards

2.1. Introduction

Since the turn of the century, the International Atomic Energy Agency (IAEA) has shown itself to be a uniquely important institution in the arena of international politics. It received the Nobel Peace Prize in 2005 after resisting US political pressures to contribute to a case for another war in Iraq by thoroughly and sanguinely carrying out nuclear inspections based on technical methods and presenting an informed expert conclusion about the absence of a nuclear weapons program in Iraq. At that time, the Agency's technical judgment was not heeded by US and coalition forces, with disastrous consequences. More recently, right-wing calls for military intervention in Iran have been forestalled by the patient efforts of negotiators of an agreement to curb Iran's ostensibly civilian nuclear program. The IAEA is a key actor in verifying the agreement and again has the opportunity to perform its technical competence for the political goals of nuclear non-proliferation. This recent agreement has also brought to the fore the continuing political relevance of controlling nuclear technology for a global audience. Seen from the year 2015, the IAEA appears to be a mature technical organization with a clear mandate and a competent and professional bureaucracy to carry out its functions. The historical narrative that is perpetuated about the Agency tends to gloss over the false starts, uncertainties, controversies, and contradictions that have surrounded the efforts to control nuclear technology globally. These stories, while acknowledging the development and iterative expansions of the IAEA's safeguards system, have a tendency to naturalize these developments as the inevitable march of progress. Perusing the IAEA's website one is tempted to assume that the IAEA emerged directly from

Eisenhower's "Atoms for Peace" speech given in 1953. I want to step back from this narrative in order to critically interrogate it with the aim of revealing aspects of the safeguards story that have been heretofore overlooked.

This chapter presents a critical genealogy of nuclear safeguards as a way to illustrate the contingencies of their development and counteract a narrative of inevitability. It will mobilize the concepts introduced in the previous chapter—epistemic ideology and bureaucratic objectivity—to tell the "history" of the development of the IAEA, and more specifically, that of nuclear safeguards inspections with an eye to the ideological aspirations for bureaucracy that lay beneath the more explicit "politics" of controlling nuclear technologies. The biggest problem for the international control of nuclear technology lay in the fact that it could be used for both military and civilian purposes. Specifically, the issue was how to restrict the military side while encouraging the development of the peaceful atom. This "dual-use" problem vexed the politicians and statesmen who were trying to find a solution. It appeared intractable because the political aspects of nuclear technology (its prestige for a state, its bomb potential) was difficult to disentangle from the technological basis at the same time as it seemed imperative.

Against this assumption that nuclear is an inherently political and politicized technology, Gabrielle Hecht has argued that the ontological status of nuclear things is not fixed but depends "on history and geography, science and technology, bodies and politics, radiation and race, states and capitalism. Nuclearity is not so much an essential property *of* things as it is a property *distributed among* things" (Hecht 2012, 14). Hecht uses this notion to discuss the process by which the IAEA's Board of Governors determined which type of nuclear material would become subject to safeguards. At the IAEA, fully "nuclear" things are those things which can be most

fully applied for nuclear weapons use. While practitioners of nuclear regulation at the IAEA or in member states would likely not agree with Hecht's provocation, which purposefully conflates a nuclear thing's capture by a regulatory apparatus with its ontological recognition as a nuclear thing, "nuclearity" denaturalizes the presupposed divide between technical and political domain by pointing out the work that goes into stabilizing nuclear things as objects of control.

Indeed, how the international control of nuclear things became possible is a central question of this chapter. Allan McKnight, an Australian national, was the International Atomic Energy Agency's first Inspector-General (the role is now titled Deputy Director General) of safeguards from 1964-1968, a period during which the first aspects of a safeguards system were developed. In 1971, he wrote an intelligent history of the development of "Atomic Safeguards" for a series commissioned by United Nations Institute for Training and Research (UNITAR). In that volume, he writes about the negotiations of the IAEA statute,

> At the same time it was urged, even by defenders of control, that it must not be rigid, formal or bureaucratic; that it must keep abreast of scientific and technical development; and that much would depend on the manner in which it was implemented. It is interesting to speculate that this constant line produced over the years a timidity and lack of positivism in the lAEA Secretariat. (McKnight 1971, 56)

McKnight was obviously critical of how the Secretariat had developed in its first fourteen years and implies that it could have been otherwise.[1] The quote reveals that the actors themselves were clearly aware that the form of the organization would structure its possibilities for achieving international control: the building of an institution is thus a form of "worldmaking" (Goodman 1978). Like McKnight this chapter will also consider the history of nuclear

[1] After his time at the IAEA, McKnight moved on to imagine other alternatives; in 1978, the UK United Nations Association published a draft World Disarmament Treaty composed by him.

safeguards, but it will foreground off-hand comments, such as the one McKnight cites above, about how the details of an international control system were supposed to work in practice.

Through a narrative focused on the ideological and bureaucratic contours of knowledge production, I argue that the promise of international nuclear safeguards could only be realized on the basis of the assumption that the organization that carried it out would function according to the principles of bureaucratic objectivity. With this I refer to an epistemic ideology comprised of a set of epistemological stances and assumptions about the capacity for a bureaucratic organization to produce rule-based knowledge with supposedly impartial outcomes. Once the technical feasibility of safeguards can be made bureaucratically accountable through the set of practices governed by bureaucratic objectivity, inspections become politically acceptable.

In this chapter, I will consider the positions and aspirations that simultaneously enable (1) widely shared disavowal of bureaucratic rigidity and (2) widely shared agreement on administrative organization. Despite insistence from the very beginning of the IAEA statute negotiations that nuclear safeguards inspections must not be carried out in a rigid "bureaucratic" manner, this is precisely what was achieved in the twenty years following the creation of the organization. Indeed, I argue that the agreement on the formation of an administrative organizational apparatus provided the necessary foundation for subsequent substantive agreement on rather more controversial "political" matters. Laying a stable organizational foundation began the process of stabilizing the unstable boundary between the technical and political aspects of nuclear technology that so concerned the negotiators. Making visible widely shared agreement (as opposed to focusing exclusively on disagreement), it becomes possible to also begin to reveal what this agreement conceals. In other words, the promise of bureaucratic

objectivity also entails submission to concealed ideological effects. This epistemic ideology contributes to consolidating the hierarchical structure of the nuclear order through the relentless activities of bureaucratic administration. The nuclear order is thus, I will argue, inscribed in the boundary between the technical and political through the purposively and performatively boring everyday of nuclear bureaucrats.

The first section of this chapter begins by introducing the dilemma posed by nuclear technology and describing the immediate post-War proposals for control. I examine four periods during which the international control of nuclear technology was debated and negotiated in national and international fora, ultimately—but not obviously—leading to the founding of the IAEA and the negotiation of the first Agency safeguards system. These periods include 1) early attempts to control nuclear technology (1945-1947), 2) Eisenhower's Atoms for Peace program, 3) the negotiation of the IAEA statute, and 4) early attempts to develop the IAEA's nuclear safeguards system. I will close with a look at the recent controversies that have called into question the IAEA's legitimacy. By conjuring the context and setting of each episode, I will show that the incremental improvements of the safeguards system were not the result of inevitably progressive technological determinism or even inevitably progressive political sagacity, but were rather the contingent outcomes of particular historical situations with structurally limited avenues of action and aspiration.

In a second section, I trace the development of the bureaucrat-inspector from the early 1960s leading up to the Non-Proliferation Treaty's entry-into-force in 1970. At this point in the chapter, I step back for an interlude that considers the role of bureaucratic objectivity in consolidating the global nuclear order. I end by narrating the most recent and most significant

challenge to the IAEA's authority which occurred with the discovery of Iraq's clandestine nuclear weapons program in 1991. Since then, the organization has carried out a conceptual re-orientation of its inspections paradigm which have entailed considerable changes in methodology as well as epistemology. I consider the controversies stemming from these changes as a struggle between competing epistemic ideologies—one that privileges an idea of technical independence versus another that promises the benefits of a holistic, qualitative approach to safeguards—and show how attempts to transform the IAEA's rigid bureaucracy into a "flexible" one were met with great resistance.

These changes have also led to controversies about the IAEA's status as a technical organization and the limits of its legitimacy, fundamentally destabilizing the boundary between the technical and political domains of the organization's work. However, the fissures in the technical-political boundary have also contributed to destabilizing entrenched power arrangements among member-states. Some states have taken advantage of changing epistemic paradigms to critically interrogate the established order and question assumptions about the bureaucracy's objectivity. These controversies are being lived out in the daily work lives of the Agency's staff, and their entailed uncertainties are sources of anxiety and occasions for struggle between competing visions of the Agency's sources of technical authority. The three subsequent chapters will illustrate how these competing visions of nuclear safeguards expertise—which I call technical independence versus holistic safeguards—are worked out in the practices, objects, and discourses of the IAEA.

2.2. International Control of Atomic Energy

Summary

All efforts towards the international control of nuclear technologies have attempted to separate the technical from the political problems of implementation. In this section, I will consider the approaches taken to address this problem in two early proposals for international control. I will then contextualize the disagreements on safeguards during the IAEA's statute negotiations with an exploration of the stakes and purposes of Eisenhower's Atoms for Peace speech and the US bilateral nuclear sharing program. Finally, I will show how agreement was eventually achieved among negotiators as the bureaucratic structures of the organization began to take shape on paper.

Early proposals for international control

At the end of the Second World War, there was an attempt to respond to the destruction of the war by restoring and improving international order through the building of international organizations. Nuclear weapons were seen as a radically new and unique destructive power but they were also compared with the ruination caused by conventional warfare. The future of nuclear weapons development remained esoteric but the promise of the civilian applications of nuclear energy conjured optimistic visions. Early attempts to control nuclear technologies were abandoned by competing states choosing bomb power over control even as the United Nations defined the control of atomic energy as one of the earliest imperatives on their work agenda. The bitter post-war end of the US and USSR wartime alliance and internal US fears about the spread of nuclear weapons knowledge led to a clamp down on cooperation and increased the fierce guardianship of nuclear secrets (Wellerstein 2010).

Developers of the first atomic bombs were aware of the consequences of their invention for humanity. The scientists, many of whom ultimately advocated world government as a way to ensure world peace, were the first to call for the control of nuclear energy in some form (Wittner 1993, 61–63). The aim was to curtail the destructive potential of nuclear weapons while allowing for the development of nuclear technology for civilian and peaceful purposes. In late September 1945, a conference in Chicago convened physicists and social scientists to discuss the possibilities for the control of atomic energy. While some scientists had argued for the abandonment of the nuclear weapons project *in toto*, they were well aware that the knowledge of this development could not be suppressed or stopped from circulating and that some form of control should be pursued. US government scientists who argued for the international control of atomic energy through the consolidation of research activities into international scientific centers, held sway with this view in the final version of the Acheson-Lilienthal report published in 1946 (Mallard 2008).

This report is remarkable in that it lays out a detailed proposal for an international control agency that takes seriously the issue of knowledge production and the type of work that control would entail. The authors of the report argue that a successful control agency would require the productive enrollment of top scientists at nuclear research centers. They cautioned against an exclusive police-like function of the control agency, arguing that such functions would not attract the best and the brightest. Rather, control and the promise of the benefits of nuclear energy research should be tightly intertwined. The authors describe a mini sociology of agency enforcement officers:

> The difficulty of recruiting enforcement officers having only a negative and policing function, one of prohibiting, detecting, and suppressing, is obvious. Such

> a job lacks any dynamic qualities. It does not appeal to the imagination. Its future opportunities are obviously circumscribed. It might draw the kind of man, let us say, who was attracted to prohibition squads in years past. Compare this type of personnel with those who could be expected to enter a system under which it is clear that the constructive possibilities of atomic energy may also be developed. Atomic energy then becomes a new and creative field in which men may take pride as participants, whatever their particular role. They are in "on the ground floor" of a growing enterprise. Growth, opportunities, future development—these are the characteristics, let us say, of the field of air transport that have made it possible for the airlines to attract a high grade and youthful personnel. (Lilienthal, Acheson, and U.S. State Department 1946, 25)

The authors of the report pit two different figures against each other: the nuclear scientist and the nuclear policeman. They identify the nuclear policeman with the narrow-minded and moralistic anti-alcohol crusaders of the 1920s. In their preference for the youthful, imaginative nuclear scientist, they articulate that the problem of controlling nuclear energy must be solved by harnessing the innovative energy of scientists. In 1946, the field of nuclear energy promised a plethora of innovations. Thus, the agency would need to remain cognizant of new developments in order to be able to control the boundary between the military and the civilian applications of these technologies. The best type of person to carry out the control of cutting-edge technology would have to be at the forefront of research.

However, even if such a system were set up, additional "human factors in inspection" would present difficulties for the control agency. The authors write, "[the] presence of a large number of 'foreigners' necessarily having special privileges and immunities inquiring intimately and generally into industrial and mining operations would be attended by serious social frictions" (Lilienthal, Acheson, and U.S. State Department 1946, 18). (At this point, the authors vastly overestimate the number of inspectors and inspections required for adequate inspections in the hundreds per plant.) Nevertheless, they figure that an intrusive inspection system (as it must be in order to be effective), would be politically problematic and also susceptible to abuse.

> But official questioning of the good faith of a nation by concrete action of inspectors among its citizens is another matter and would tend to produce internal as well as external political problems. A somewhat similar problem is involved when a government (or its officials or employees) interferes with the functions of inspectors or molests or threatens them personally, or bribes or coerces them, or is accused of doing any of these things. Such incidents could not be avoided. (Lilienthal, Acheson, and U.S. State Department 1946, 18)

The authors predicted one of the major critiques against the IAEA's safeguards system proposed ten years later. That of "foreign inspectors" entering sovereign nations. In order to stabilize the political aspects of international control against the scientific and technical elements, the report argued against a control agency whose primary function was to police. Indeed, according to the report a successful control agency would have to employ the most promising young scientific talent in order to stay one step ahead of technological development. This position reveals an internationalist vision of science that tries to minimize the political problems by emphasizing the scientific and technical promise of nuclear energy.

Later that same year, the US and the USSR presented two proposals for the control of atomic energy at the United Nations. The US plan was presented by financier-cum-presidential advisor Bernard Baruch and was loosely based on the Acheson-Lilienthal Report. It proposed international research and development of atomic energy and the eventual elimination of nuclear weapons. This plan was not acceptable to the USSR and they responded to this proposal with a plan of their own presented by Soviet diplomat Andrei Gromyko. This plan also proposed international research and control but demanded the dismantlement and destruction of nuclear weapons prior to the establishment of an international control and development agency.

The UN's Atomic Energy Commission (UN AEC), which had been established at the UN General Assembly's first meeting in January 1946, produced three reports on the "Scientific control of atomic energy." The authors of these plans and reports showed themselves acutely

aware of the potential difficulties of controlling atomic energy, in particular, of the necessity to separate political from technical matters. McKnight writes that

> The Committee was careful to state that as "a broad exploration of the technically possible methods of controlling atomic energy…would inevitably lead to the consideration of problems of a non-technical or political nature, which would have to be taken into account in a system of control…it was decided to limit ourselves to the scientific and technical aspects of the question." (McKnight 1971, 32)

While the "non-technical or political" problems of controlling atomic energy always loomed in the background, the Committee attempted to decouple these tenacious technopolitics (Hecht 1998) of atomic energy by focusing on the "scientific and technical aspects" of controlling the technology. Their studies led the Committee to conclude "we do not find any basis in the available scientific facts for supposing that effective control is not technologically feasible" (McKnight 1971, 33). The Committee's technical recommendations had the effect of removing the barrier of technical feasibility from the prospect of international control. For these historical actors, the technical problems always seemed easier to solve than the political ones. In the early reports on the control of atomic energy, the technical and implementation difficulties included (1) the dual usability of nuclear technologies for weapons as well as for civil applications, (2) the near impossibility of keeping secret the physical principles of nuclear fission, and (3) the challenge of developing an inspection system that would not exclusively be based on a policing function. On the "political" side, the difficulties included (1) fears of espionage by foreign inspectors, (2) the potential for discrimination against countries less advanced in nuclear technology who would be reliant on more advanced countries for aid and assistance, and (3) the potential breaches of sovereignty suggested by an intrusive inspection system.

These ambitious and sophisticated early attempts at controlling atomic energy were stalled after only a few years. The Atomic Energy Act of 1946 severely tightened restrictions on the sharing of nuclear information. In 1949, the USSR tested its first nuclear weapon (a 22 kt implosion type Plutonium device) which seemed to confirm more pessimistic views that proliferation was inevitable. The UN AEC became defunct in 1949.

Atoms for Peace and IAEA statute negotiations

When the USSR tested its first nuclear device in 1949, the Cold War began in earnest and was ratcheted up throughout the 1950s as an increasing number of nuclear tests were carried out in the atmosphere. Both superpowers were developing weapons delivery systems that could reach the farthest corners of the globe. Nuclear weapons had transformed from esoteric and rare bombs to frightening mega-weapons, their new delivery systems seemed to promise the possibility of global destruction. The release of civil defense films in the US such as the famous "Duck and Cover" in 1951 contributed to producing public fears of nuclear annihilation (Masco 2008). In 1952, the UK tested its first nuclear device which signaled the spread of this technology beyond the superpowers. At the same time, post-colonial movements in the global south questioned the hegemony of the global north.

It is in this context that Eisenhower's "Atoms for Peace" proposal must be read. The new US president was trying to turn the terrifying atom into the friendly atom (Hewlett, Holl, and Anders 1989; Chernus 2002). Eight years after having severely tightened restriction on sharing nuclear information with the Atomic Energy Act, the US changed this policy of restriction to a policy of greater openness in the field of the civil applications of nuclear energy in 1954. The newly elected President Eisenhower had given a seminal speech at the UN General Assembly on

December 8, 1953 in which he proposed an atomic development agency that would, among other things, “provide abundant electrical energy in the power-starved areas of the world” (Eisenhower 1953). Representatives of poorer nations were enthusiastic about this promise of a high-tech development organization bringing the prestigious atom to their nations and their people out of poverty. In the IAEA’s history of itself, the speech, which was dubbed “Atoms for Peace” by journalists, is widely seen as the symbolic birth moment for the organization. Atoms for Peace was the name of the bilateral nuclear sharing program eventually launched by the US as a result of the speech, and the phrase was also adopted by the IAEA as its slogan.

The prospect of spreading nuclear technology across the globe, and the potential risks that this involved, considerably raised the stakes for a workable international control system. In the mid-1950s, the current, relatively stable and effective, system of international nuclear safeguards was not entirely conceivable. The political landscape was fractured and pitted the states that had nuclear weapons against those with the potential for developing them, and against those who had the most to gain from nuclear assistance through Atoms for Peace. No country was happy to accept controls, but some had more options to resist them than others. A nearly universal nuclear safeguards system was far from being a conceivable reality in 1955. It was not only a politically difficult goal, it was also technologically uncertain.

The technological uncertainty began with the feasibility of launching a nuclear sharing program as Eisenhower envisioned it in his speech. In the wake of the speech, which had been accompanied by an extensive propaganda campaign by the USIA, the international response to the proposal was largely enthusiastic, even if some representatives to the UN were skeptical of the depths of American benevolence. Nations were eager to sign up for the program and the

pressure was on the US government to deliver quickly. This was a problem as the USAEC nuclear reactor program was far from commercial viability. Indeed, the speech came as a surprise to most of the members of the AEC who had not been informed of the president's plans. As Osgood has argued, the speech was mainly intended as a propaganda tool in the Cold War, and not much thought had been given to actually carrying out such a program (Osgood 2006). Mara Drogan deftly shows that the AEC was taken by surprise and that a plan for implementing "Atoms for Peace" had to quickly be improvised. Internal studies were hurriedly commissioned and the results were not promising (Drogan 2015). A Department of State report showed the economic infeasibility of nuclear power for most of the potential recipients and the AEC's staff knew that commercial nuclear power was still several years away.

As the months went on, the international community was growing increasingly impatient with the US deferral of Eisenhower's promise (and there was a fear that it would be revealed as the bald propaganda move that it was). The AEC came up with a paternalistic compromise plan that was presented as the inevitable technological progression of a country's accession to nuclear power. Recipient states could get research reactors (limited in output) from the US, and once they displayed sufficient competence they could apply to receive a power reactor as well. In reality, a research reactor was not necessary or practical for the development of nuclear power, as the two reactor types are built for entirely different purposes. Nevertheless, by offering research reactors the US tried to fulfill the intense desire of nations wishing to associate themselves with the prestige that was indexed by nuclear technology at the time. At the same time, government bureaucrats were studying the feasibility of safeguarding the technology and nuclear material that would be exported in bilateral sharing agreements. Initial studies estimated

that up to fifty "auditors" would be needed to sufficiently ensure that none of the material was diverted to military purposes.[2]

From a political perspective, the prospect of sharing nuclear technology was a welcome idea, but the notion of controls on the technology was seen as highly undesirable by the policymakers who assumed that other nations would not be willing to accept them. And indeed, the fractured political landscape shows how different groups of states devised different strategies for protesting controls. While it was US policy to require safeguards controls for any bilateral nuclear sharing agreement, concessions were made with strategically significant partners.[3] And while the US officially supported the IAEA and an international control system they seriously jeopardized the success of such a system by promoting the creation of a European Atomic Community (EURATOM) and agreeing to their system of self-inspection instead of insisting on bilateral safeguards.

Other problems with the Atoms for Peace bilateral sharing program included that the proposal was economically also undesirable. Calculations for the success and potential earnings of nuclear power plants were based on "guesstimates" as precise figures about the technology and its outputs were not available (Young 1998). America's conventional energy producers had to be convinced that nuclear energy would be profitable while not threatening existing energy markets. At the same time, international competitors, such as the UK and Canada, entertained the idea of not including controls and thus making their products more interesting for countries

[2] These estimates are still far higher than the safeguards system that was eventually developed because they had not yet imagined some of the crucial concepts that would greatly minimize the inspection effort while still providing assurances of peaceful use.

[3] For example: Belgium received preferential treatment because the country was thought to have important uranium reserves in its colonies. At the time, uranium was thought to be a scarcer resource than further prospecting revealed it to be.

seeking to avoid controls. This emerging market for nuclear energy was unsurprisingly unregulated at this time and presented an obstacle to US policy goals of preventing the spread of nuclear weapons. The bilateral sharing that began with Atoms for Peace set in motion events that eventually led to the founding of the IAEA. But it also fundamentally destabilized the prospects of an effective international safeguards system run by the IAEA by introducing competition in a market before it could be regulated by common agreements to require safeguards.

This intensely fraught political context shows the great difficulties involved with getting the IAEA off the ground: (1) the US State Department was not optimistic that international control could be achieved, (2) there was no norm yet against acquiring nuclear weapons, (3) there was an assumption that technologically capable states would eventually develop nuclear weapons, (4) US support of the European atomic community based on self-inspections (EURATOM) made international and universal control seem far less likely, and (5) commercial nuclear energy production was not yet viable. Given these conditions, the success of the negotiations to found an international atomic agency to engage questions of peaceful nuclear sharing and control was surprising.

Nevertheless, two factors contributed to this diplomatic achievement: (1) great enthusiasm for a nuclear aid organization, and (2) confidence that bureaucratic administration could ensure non-discrimination. First, the initial enthusiasm for Eisenhower's promise of a great industrial aid organization was difficult to quell. Western participants in the negotiations condescended to the diplomats from the poorer nations who would be potential nuclear aid recipients, characterizing their hopes for the transformative power of the atomic energy agency

as naively unrealistic[4] (despite the fact that Eisenhower's speech had made precisely such transformative promises). However, these over-optimistic imaginaries of the potential for the proposed aid organization were crucial for the international acceptance for a "technical organization" and built the political commitment to seeing it become reality. In the mid-1950s, emancipatory politics were flourishing and post-colonial nations were asserting their power vis-à-vis former colonial rulers and other hegemons. The negotiation of the IAEA's statute became a prime stage for the configuration of different political alignments and the organization provided the Non-Aligned Movement an important venue for political action. As the negotiations for the IAEA statute went on and their success became palpable, critics of intrusive inspections relented. Forland writes, "The belief in the benefits of nuclear energy made recipient countries willing to accept the conditions attached [i.e. safeguards] to receiving help from the International Atomic Energy Agency" (Forland 1997, 90).

Secondly, many nations expressed concerns that this new agency would produce discrimination by only requiring international controls from states that requested assistance. This would effectively exempt from control those states who were able to develop nuclear technology indigenously or with the help of friendly donor countries willing to export nuclear technology without controls (as described above). These concerns about discrimination in the uncertain future of nuclear controls needed to be addressed by building a trustworthy and confidence-building bureaucracy. In the following section, I show that the agreement that was reached on the administrative and organizational details of the organization provided a foundation for coming to further agreement on more controversial issues in the IAEA's statute, like safeguards.

[4] See Bechhoefer (1958).

Disagreements show contradictions of nuclear control

In 1957, the year that the IAEA's statute was agreed, the following events show how tense the international geopolitical climate was: The British exploded their first H-bomb. The Soviet Union successfully launched an intercontinental ballistic missile. The US conducted its first underground test. The UK tested its first successful thermonuclear weapon with a yield of 1.8 megatons and also experienced the first major accident at a nuclear site. Britain's Windscale nuclear complex was destroyed by fires sending radioactivity into the atmosphere and fueling concerns about radioisotopes in the environment. These events point out the escalating threat of nuclear technology for the planet. The bombs were getting bigger, they could be delivered across continents, and accidents turned citizens into targets.

The stakes for agreeing on the international control of nuclear energy were acutely heightened by these events but the sticking points were the same as predicted a decade prior. The main criticisms by the USSR, India, and other "lesser" powers during the statute negotiations are consistently dismissed (or treated derisively) by historians as ideological or politically motivated. Scholars and chroniclers of these negotiations (Bechhoefer 1959; McKnight 1971; D. Fischer 1997; Forland 1997) betray a bias that takes anti-hegemonic critiques as fundamentally invalid or distracting. I will critically consider their accounts and show that these critiques reveal important contradictions of the IAEA project and its actors within the historical context. The critics understood the project of the IAEA to be an international technical organization with the goal of promoting the exclusively peaceful use of nuclear technology and the prevention of the spread of the nuclear threat. The critiques address three points (1) disarmament, (2) sovereignty, and (3) discrimination.

The disarmament argument pointed out the contradiction of making an organization that only partially fulfilled the disarmament mission. States objected that the controls proposed would do little to nothing to prevent states who already possessed nuclear weapons to continue. They also pointed out that states that were close to developing a nuclear weapon would be allowed to benefit from assistance to their civil nuclear programs with their military program on the side (McKnight 1971, 23). These arguments were countered with the admission that IAEA safeguards were limited in scope but promised to provide "both technical and political experience in the application of disarmament controls" (McKnight 1971, 23).

The argument about sovereignty revealed that some sovereignties were deemed to be more worthy of respecting than others. It criticized inspection-based controls on the basis that such controls would breach the sovereignty of the state. The counter-argument that stated that safeguards were to be seen as an international agreement and thus necessarily entailed restrictions of sovereignty somewhat disingenuously ignores that only those states that would need assistance would have to submit to safeguards (Bechhoefer and Stein 1957).

The sovereignty argument, at its root, can be directly related to the third argument which is about discrimination. States criticizing control understood that this control system would only apply to those states with the need for Agency assistance. States with sufficient industrial and technological and scientific advancement would not need to submit to controls that were intended to prevent nuclear weapons development. Indeed, some of those states founded their own nuclear organization, EURATOM, which was based on self-inspections that were outside of international oversight. Without an accompanying arms control agreement, international controls would not prevent those states most likely to develop nuclear weapons to pursue them. In that

sense, safeguards were an easy way to keep the countries least likely and able to develop nuclear weapons from developing them while nuclear weapons states and nuclear weapons aspirant states remained free of such restrictions. The discrimination argument thus reveals that despite formal equality in international fora such as the United Nation, states are ordered in a geopolitical hierarchy and their positions enable or restrict their modes of action. Thus, claims by supporters of safeguards that these did not discriminate or impinge on sovereignty because they were simply adherence to a (supposedly neutral) contract, conceal the unequal distribution of power in the global political order.

Given these important criticisms that revealed the fundamental contradictions of the proposed International Atomic Energy Agency it is difficult to conceive how the statute was finally agreed upon. The uneven distribution of power among the nation-states contributed to great distrust between the negotiating parties. This hierarchy created concerns about discrimination and about the efficacy of nuclear controls as a disarmament measure. While the structure of the IAEA replicated aspects of this hierarchy, it also tried to provide a forum where nation-states could approach as formally equal members. Beyond the arrangements of the policy-making bodies, though, coming to agreement on the structure of the secretariat, the organization's administrative body, would serve as the foundation for coming to further agreement on more controversial issues. The acceptability of an international control agency that carried out safeguards also relied on another, less prominent confidence-building element: bureaucratic administration.

Agreement: the bureaucracy engenders trust

One of the sources for insight into the process of negotiating the IAEA statute is a short

paper by a member of the US delegation at the conference of the statute. Bechhoefer's brief account is unsurprisingly sympathetic to and even laudatory of US policy throughout the negotiations. He describes the controversial issues and indeed, most of his account is about points of contention, but the careful reader might be struck by a small mention of agreement among all the delegates within an ocean of disagreement:

> Perhaps the most important feature of this phase of the negotiations [initial draft developed with the 8 member negotiating group in spring 1955] was putting into writing the comparatively non-controversial organizational details which are necessary to the establishment of any international organization. (Bechhoefer 1959, 51)

It was relatively easy to agree on the mundanely administrative aspects of founding an international organization. "This greatly facilitated the subsequent discussions among a wider group of states making it possible thereafter to concentrate on fewer points" (Bechhoefer 1959, 51). The accomplishment of agreement on "comparatively non-controversial organizational details" comes in response to what Bechhoefer describes as the "main problem" of this first stage of negotiations.

> The main problem was to create a workable organization. It was clear that the agency must have at least three organs, 1) a framework for meetings of the membership as a whole which is described in the agency Statute as the General Conference, 2) a board of governors to be responsible for day-to-day operations, and 3) a secretariat and staff. (Bechhoefer 1959, 49)

Bechhoefer characterizes the comparatively non-controversial agreement on the formal structure of the organization as the foundation on which further, more difficult, agreement was made possible. The first step taken to "create a workable organization" was to provide for a division of labor between the technical and political domains of international nuclear control. This division of labor is enforced as the organizational distinction between the IAEA's Secretariat and its policy-making bodies. It creates an effect of stabilizing the technopolitical by

making it appear to belong to two distinct organizational domains: that of the Secretariat and of the policy-making bodies. Through the elaboration of administrative forms of governance and bureaucratic structures, the IAEA's Secretariat produces its work in the technical domain and has the potential to construct safeguards verification as a technical task with the development and implementation of formalized regimes of inspection activity and documentation. At the same time, the Board of Governors and the General Conference perform the political domain in their negotiation and approval of policy. The formal establishment of an organizational division of labor stabilizes the boundary between technical tasks and political work. Coming to agreement on these "organizational details" during the negotiation paves the way for the future negotiability of more controversial matters.

In contrast to some scholars in international relations and diplomatic history whose interest lies in the investigation of disagreement between states, anthropologists investigate the generally accepted, the naturalized, and normalized to uncover the hidden assumptions and expectations that uphold agreement. In the case of negotiating the IAEA's statute, the parties created the necessary trust and environment of compromise to reach agreement on controversial matters such as safeguards by laying a foundation of administration and organizational structure that inspired confidence. Settling the details of the organization's structure helped to begin stabilizing the unstable boundary between the technical and political aspects of controlling nuclear technology globally. The elaboration of administrative and organizational details thus provided the platform from which the actors could begin to imagine the bureaucratic activity that would carry out the Agency's statute. The bureaucratic and administrative infrastructure of the IAEA Secretariat contributes to constructing the political domain of international diplomacy

surrounding the rights to nuclear technologies and rights to access as separate from the technical implementation of international legal agreements that govern these rights. In order to have a "workable organization," the negotiators needed to agree on the separation of the technical from the political through what probably seemed to them the mundane administrative details that would define the functioning of the Agency. As soon as the IAEA was made recognizable as a bureaucratic organization, negotiation of more controversial matters became easier.

2.3. The inspector becomes a bureaucrat

Summary

This section continues drawing the arc of the chapter which tries to show that the technopolitical is stabilized through bureaucracy. It contributes to the arc by showing us that safeguards begin to exist once described in a policy document, and start taking proper shape (and inspiring confidence) once rules, processes, and procedures are elaborated to define the activities involved. It is about how safeguards are established primarily by crafting documents defining their scope, developing activities to carry out what is promised in the documents, and hiring people who can help with drafting, writing, and building up the apparatus of safeguards activities. This is contrasted with aspirations during the negotiations that safeguards must not be rigid or bureaucratic. Under a regime of bureaucratic objectivity, safeguards can only take bureaucratic shape, can only become *real* when materially performed through the bureaucracy. In parallel, the inspector also begins to take shape as his tasks are defined in Vacancy Notices. I will begin by showing the stakes of developing a safeguards system and putting into perspective the work of the bureaucrats. Against the reluctance of much of the Board of Governors, the

safeguards staff attempts to create a non-discriminatory and effective safeguards system.

Safeguards are far from inevitable

In the official history of the IAEA released for its fortieth anniversary in 1997, David Fischer, a South African national and long-time staff member in the Director General's office, writes the following:

> The first session of the IAEA's General Conference took place in the halls of the Konzerthaus from 1 to 23 October 1957.The prevailing mood was a good deal more somber than four years previously when Eisenhower had launched the idea of an agency. The Hungarian and Suez crises still cast their shadows. There was less assurance about the early use of nuclear energy. US insistence on an American Director General presaged East/West strains and conflicts. Soon after the Conference opened, the Soviet delegate, Professor Vassily Emelyanov, startled the delegates and disconcerted NATO members by announcing the first flight in outer space around the earth — on 4 October 1957 — of a satellite, Sputnik-I or the 'travelling companion'. Sputnik-II followed a month later with a live dog, Laika, on board. (D. Fischer 1997, 59–60)

Sputnik was interpreted as an extension of the Cold War rivalry between the US and the USSR into space and was thus tightly linked to fears about a nuclear arms race. The conference opened with a speech by Austrian president Adolf Schärf who said:

> I agree with leading experts in the field of atomic energy when they note that the prevention of the total destruction of all life on the earth is no longer a technical or scientific problem but primarily a diplomatic and political one. Hence, we all must bear a share of a great responsibility. (IAEA Archive, audio records) [translation mine]

There seems little doubt about the high stakes and great promise of this new organization. Ralph Bunche, representing UN Secretary General Dag Hammarskjold, closed with the following words:

> I have said that this day, the first meeting of the general conference of the International Atomic Energy Agency, marks the culmination of a significant process of construction in the institutions created to serve the international life of our time. But the creation of this institution is also a beginning. The program which you will inaugurate now is a unique experiment in international

> cooperation that can result in greatly strengthening the prospects of peace as well as in great economic and social benefits to all nations. I would be the last to minimize the difficulties you face in bringing to fruition in the years ahead the hopes that the agency was created to serve. But I have faith that you will be sustained in your endeavors by the knowledge of how very much depends on your success. (IAEA Archive, audio records)

These three quotes help to conjure the context in which the IAEA's first general conference took place. The political achievement of agreement on the IAEA's statute was undermined by global political events that revealed the fragility of international cooperation and the ease with which conflict could erupt. The future progress of the Agency's work was squarely a diplomatic and political task since the technical questions had largely been resolved. Expectations for this young organization's progress despite its limited mandate included nothing short of world peace and economic development for struggling nations. At the end of the first General Conference, the small staff of the Secretariat that was housed in the Grand Hotel on Vienna's ring road had to begin the work of building up the organization under its mandate. The bulk of the staff was made up of translators and clerks responsible for typing, correcting, and replicating the documents required for the organization's work. A woman who had a long career as a secretary from the early days of the Agency's existence still remembers fondly the urgent excitement and enthusiasm with which the employees of the young international organization went about their important work.

Notwithstanding the enthusiasm of the staff, the prospects for the development of the IAEA safeguards system remained fragile. Fischer writes,

> Despite the importance that the negotiators of the Statute had assigned to the IAEA's safeguards, the 1957 Initial Programme of the Preparatory Commission (Prepcom) contained…only a rather perfunctory reference to this crucial aspect of the IAEA's work. The chief reason for the Prepcom's sparse treatment of the subject was the wide gap between the views of the West, the Soviet Union and several leading developing countries about the proper role, scope and coverage of

> IAEA safeguards. Hence the difficulty of forecasting with any degree of assurance what safeguards tasks the IAEA would have to undertake during its first years and what resources it would need. There was also relatively little discussion of safeguards at the first General Conference in October 1957 or during the first few meetings of the Board. (Fischer 1997, 243)

Fischer's narrative highlights that the lack of agreement among the most powerful actors involved with the IAEA was the reason why the PrepCom did not significantly plan for the development of safeguards in its "Initial Programme." The Board of Governors, the IAEA's chief policy-making body, was made up of representatives who largely disagreed.

> Wide differences of perception of the Agency's mandate now began to emerge, and they were exacerbated by renewed and growing East/West tensions. It was soon obvious that the path of the Board would not be smooth. Ralph Bunche…who represented the UN at the IAEA on a number of occasions, remarked that the Cold War raged more violently in the IAEA Board than in the UN itself. (Fischer 1997, 74)

Little progress was made on safeguards in the first few years of the Agency's existence. The first IAEA Bulletin notes:

> It was foreseen by the Preparatory Commission and confirmed by the Board of Governors that work on safeguards and the associated problem of inspection would be limited in the initial period of activities and in the absence of specific projects submitted to the Agency for review. In fact, the Department of Safeguards and Inspection is not yet fully established. The Director of the Safeguards Division was appointed at the end of July 1958. (IAEA 1958, 12)

In 1958, the staff of the safeguards division was made up of its director, four "professional" staff, and two "general" staff members, in other words, secretaries. The first designated Agency inspector, Carlos Büchler, an Argentine who joined in the summer of 1959, writes dryly in the companion volume to Fischer's official history, a collection of personal reflections of long-time staff members,

> That my experience might not be adequate for that task was a matter of some concern to me, but not for long. I soon discovered that of the five Professionals in the Division only one had direct experience in the areas mentioned above. We

> were, therefore, true amateurs. But since we had no materials or facilities to which we were required to apply safeguards, that did not constitute an immediate problem. (Büchler 1997, 60)

And even until late in 1959, the UN General Assembly debate on the IAEA produced these lines,

> Mr Armand Berard (France) observed that the Agency had not played its role as "a broker in nuclear materials." The result, Mr Berard said, had been that the control machinery provided in the Agency's Statute to prevent the diversion of materials to non-peaceful uses, had "remained a dead letter so far." (IAEA 1960, 22)

During initial discussions of safeguards in the Board of Governors, some member states voted to postpone the establishment of a division of safeguards and the hiring of any staff to begin crafting a control system. Impatient to get their nuclear program off the ground, Japan finally provided the impetus to start developing a safeguards system by requesting safeguards to be applied to nuclear material purchased from Canada. While the Board of Governors had a penchant for micro-managing the Secretariat's activities at first, and wanted to be deeply involved in the first proposals for specific safeguards, they realized that this kind of ad hoc, case by case, approval of safeguards for each state's facilities would quickly overwhelm their regular tasks (McKnight 1971, 47). The Secretariat began developing a set of "general safeguard principles entitled 'The Relevancy and Method of Application of Agency Safeguards' and another of detailed 'Draft Regulations for the Application of Safeguards'" (D. Fischer 1997, 246). Büchler describes this effort in his reflections with little confidence,

> The drafting efforts of the Safeguards Division were, by the time I arrived on the scene, well under way, and my contribution to that work was minimal. I felt frustrated at being involved in an exercise which was technically amateurish and the political success of which was totally unpredictable. (Büchler 1997, 48)

In order to realize the stakes of the safeguards project at this time in history, one must

remember that at this time the United States, under the influence of deterrence strategists, was establishing the so-called “nuclear triad,” which refers to a multi-pronged delivery means for nuclear weapons by air, submarine, and intercontinental ballistic missile. Establishing the nuclear triad was a move to the “always on alert” system with redundant global reach, and signaled a major escalation in the arms race. The USSR was testing weapons with ever greater yield, and France and China were also readying themselves to join the “nuclear club” thus expanding the number of nuclear weapons powers. At that moment, the possibility of halting the spread of the nuclear weapons threat was never as real as it was simultaneously seemingly impossible to achieve. We must be sympathetic then, to Büchler’s concern about the unpredictability of the political success of the safeguards system these bureaucrats were working to develop. And perhaps this cues us in to their effort to devise a system that would at the same time be maximally effective as well as maximally acceptable. At the very least, it would have to assuage member states’ fears of discrimination by promising freedom from political bias. This safeguards system would have to be as technically “objective” as they could make it. And, in spite of Büchler’s concerns that their efforts would not succeed, they also had to act “as if” they would. They would have to perform the system’s credibility before it even existed in order for it to become acceptable and real.

This initial set of principles, developed by the staff, was forwarded on to a committee chaired by Dr. Gunnar Randers, who was the director of the Norwegian Atomic Energy Institute (Institutt for Atomenergi) at the time (and thus likely seen as an impartial technical expert). The work of this committee resulted in the approval of the first document describing the IAEA’s first safeguards system which defines the principles and procedures for applying safeguards to

reactors up to 100 MW(th). The document was called “INFCIRC/26,” which was short for Information Circular, #26. Six months later, this document was followed by the approval of the “Inspectors Document,” which described the procedures by which the Board of Governors approved inspectors for work in specific countries as well as the rules of conduct for inspections. The first safeguards document quickly arrives at its limits and Randers is called upon to expand it. The new system (still in use for some states) was approved in 1965 and became known under its document handle, INFCIRC/66. It was largely replaced in 1970 by the safeguards system developed to fulfill the verification obligations of the Nuclear Non-Proliferation Treaty, known as INFCIRC/153.

The approval of these documents by the Board of Governors and the recognition of their approval by the General Conference are part of an elaborate institutional framework for authorizing organizational policies, guidelines, procedures, and activities. In this world, the safeguards system is brought into being through the drafting, revising, debating, and agreeing upon a document as the blueprint for imagined action. It entails a complex constellation of actors embedded in the organizational structure, working across technical and political boundaries to produce a compromise outcome. The Secretariat’s work must be received and revised by the Board of Governors whose final approval marks it as provisionally legitimate until the General Conference christens the document with its recognition. In the bureaucratic world of the IAEA, safeguards become a real entity on paper before the first inspection is ever carried out. The practice of safeguards has already begun with its birth as a set of bureaucratic rules and regulations.

The bureaucrat-inspector and the division of technopolitical labor

Throughout the 1960s, the division of safeguards hired new inspectors and began training its staff. In this process of building up a techno-bureaucracy we can also recognize an attempt to isolate the Secretariat from the political influence of the diplomats and thus achieve the Weberian promise of an objective bureaucracy. In order to remind ourselves of the features of the ideal-typical bureaucracy and to take a closer look at the ideal-typical bureaucrat, let us briefly review what Weber had to say about the bureaucrat and his work. He writes that bureaucrats are professionalized as "experts" who know their domain of action intimately and act according to the rules and procedures of the organization without regard for persons (that is, without favor or disfavor).

> Bureaucratization offers above all the optimum possibility for carrying through the principle of specializing administrative functions according to purely objective considerations. Individual performances are allocated to functionaries who have specialized training and who by constant practice learn more and more. The "objective" discharge of business primarily means a discharge of business according to calculable rules and "without regard for persons." (Weber 1958, 215)

In this vision of the ideal-typical bureaucracy, the structure itself is supposed to produce predictable outcomes according to impersonal, "objective" criteria. This is an epistemic ideology that I call "bureaucratic objectivity" in the previous chapter. The secretariat's staff are attempting to achieve bureaucratic objectivity through the organization's activities. Given the high geopolitical stakes outlined above, the achievement of the international control of nuclear technology can be assisted by its implementation in an ideologically bureaucratic and rational manner that will ensure that technical experts act according to calculable rules with predictable outcomes.

In the IAEA's division of labor, the "political" work is done by the policy-making bodies, whereas the "technical" and "administrative" work is carried out by the Secretariat. The buildup

of safeguards as a fundamentally techno-administrative activity helps to stabilize the border against the political areas of the IAEA's work. At the same time, the formation of the inspector *qua* bureaucrat also helps to dissipate fears about the inspector's potentially treacherous subjectivity (as was discussed by early advocates for control in the Acheson-Lilienthal report). By placing scientists and technicians inside a systematic rule-based organization, they are transformed into disinterested bureaucrats. The inspector's allegiances—his subjectivity and personhood—are restrained and contained by enrolling him into a system of calculable rules. The ideal-type inspector-bureaucrat is apolitical.

We can find evidence for shared expectations of inspectors as bureaucrats and for safeguards as administrative functions in the negotiations of the statute, the statute itself, as well as in the functioning of the IAEA of course. During the final conference in New York from 20 September to 26 October 1956, the Swiss brought forth four amendments. Three of them were concerned with limiting the rights of Safeguards inspectors 1) from infringing on the rights of private citizens in the inspected countries, 2) by allowing national inspectors to accompany Agency inspectors, and 3) to prevent the divulging of commercial secrets obtained during inspections (Forland 1997, 64–66). Fearing the worst of a human-based inspection system, the negotiators pushed to include statutory mechanisms that limited the opportunities for abuse of the inspector's position. The statute was amended to include provisions addressing the Swiss concerns, thus, carefully outlining the inspector's role within the bureaucracy.

The two paragraphs in Article VII that deal with recruitment in the statute show that bureaucratic principles of expertise and efficiency are expected to play a role in the process of selecting staff.

> Article VII
> C. The staff shall include such qualified scientific and technical and other personnel as may be required to fulfill the objectives and functions of the Agency. The Agency shall be guided by the principle that its permanent staff shall be kept to a minimum.
> D. The paramount consideration in the recruitment and employment of the staff and in the determination of the conditions of service shall be to secure employees of the highest standards of efficiency, technical competence, and integrity. Subject to this consideration, due regard shall be paid to the contributions of members to the Agency and to the importance of recruiting the staff on as wide a geographical basis as possible. (IAEA 1956).

"Efficiency" and "technical competence" are terms that remind the reader of Weber, and describe ideal-typical bureaucrats. But two other conditions point out a lingering anxiety about future staff. The inclusion of "integrity" as a descriptor for the staff indicates apprehension about their trustworthiness and the ability of the bureaucracy's rule-based system to produce impersonal bureaucrats. The expression "wide geographical basis" also points to the concern that the organization not be dominated by members of one national group or political bloc. It illustrates a desire (as with the other UN organizations) to have a truly international bureaucracy whereby the relative greater weight and influence of powerful nations can be balanced out by the distribution of nationalities among the staff. But this anxiety is not laid to rest with the statute. When the Board of Governors begins discussing the hiring of inspectors and the establishment of the Division of Safeguards in 1958, "geographical distribution" is discussed again indicating that the spread of nationalities among the staff continues to be a source of concern.

Early attempts by the Board of Governors to dictate the nationalities of inspectors (the USSR insisted on having a Soviet inspector on every inspection team), likely in an attempt to secure a perceived political advantage in the execution of safeguards inspections, are rebuffed by appeals to the technical expertise and professionalism of the staff. The inspector's role, his rights, and responsibilities become the subject of another document, which the Board puts before

the 5th General Conference in 1961 (GC(V)/INF/39). The document details the procedure for designating an inspector, as well as the rules governing an inspector's visit, rights of access and inspection, as well as the inspector's privileges and immunities (D. Fischer 1997, 259). "Designation" of the inspectors became the only way that the Board of Governors could directly impact the inspectors' work. Designation requires the Board of Governors to approve an inspector's assignment to work in a particular country. This allowed member states to deny inspectors access to their own country for any reason that did not need to be disclosed. South African delegate Donald Sole worked extensively on this rule for the selection of inspectors so that the apartheid state would "not be forced to subject itself to inspections conducted by Indians or black Africans" (Hecht 2006b, 46), but its appeal as an expression of state "sovereignty" was wide and supported by member states who wished to make a political point by not admitting inspectors who were nationals of a rival state or group of states (D. Fischer 1997, 457).

Through the drafting and approval of the policy documents on the safeguards system, the rule-based bureaucracy is slowly built up. McKnight, the first Inspector General, describes the safeguards documents as "directives" "for the executive administration of the IAEA safeguards function" (McKnight 1971, 43). Through these documents, the inspector's conduct is increasingly governed by specific regularized provisions. The IAEA takes shape as a Weberian ideal typical bureaucracy: "There is the principle of fixed and official jurisdictional areas, which are generally ordered by rules, that is, by laws or administrative regulations" (Weber 1958, 196).

As the IAEA grows, and the bureaucrat's position within safeguards is built up, the bureaucrats themselves begin to carve out the rules that would govern inspection practices. This mutual constitution of bureaucrat in bureaucracy is evident in the vacancy notices from the

period, which detail the types of activities that the inspectors were hired to carry out. The first tasks listed in each of the Vacancy Notices all point to the development and elaboration of safeguards as a bureaucratic system.

> -Participate in the elaboration of safeguards practices for various types of nuclear facilities;
> -Prepare, or contribute to the preparation of, manuals and other documents on such practices;
> -Assist in the development of technical methods to facilitate the implementation of safeguards and in bringing these methods to the point of practical application;[5]

The second safeguards system, INFCIRC/66, was approved in 1965 and thus the task of the professionals in the safeguards division was to provide for the technical and practical implementation of the safeguards principles elaborated in the policy document. These principles provided for the accounting of nuclear material at designated nuclear facilities. Inspectors were tasked with realizing safeguards principles as rule-bound practices, and with making the practices pragmatically accessible and pedagogically transmittable through their translation into "manuals and other documents on such practices." The bureaucratic regimentation of safeguards inspections also promises their reproducibility across nationalities and generations.

A document discussing one of the first training courses organized for inspectors shows the emergent nature of the safeguards system in practice. McKnight, who is then the head of the Division of Safeguards, writes "As with the seminars themselves, the preparation of papers will be a 'rolling process'. For example, any paper 'Instructions to inspectors' can scarcely be written until we have discussed Item 2 – 'Inspection procedures.'"[6] The policy documents combined with the a glimpse into the day-to-day activities of safeguards inspectors on the job show a

[5] Vacancy Notice 108/66, P-4 position, March 11, 1966, Box 14464, SAF/121, IAEA Archive.
[6] McKnight, Allan. "Internal Seminars in Department of Safeguards & Inspection," December 13, 1964, 1964-1969 letters and draft programs, SAF/121, IAEA Archive.

bureaucratic organization being built up and its work carried out through the production of documents and manuals to further guide the work of inspector-bureaucrats and to provide for their training.

Peering into these archives reveals assumptions about the functioning of bureaucracy. In light of the geopolitical stakes mentioned at the beginning of this section, the role and importance of bureaucratic administration at the time becomes clearer. Bureaucracy's rule-bound systematicity promised to capture and contain inspector subjectivities and render impartial the global administration of technical assistance and nuclear safeguards. The international control of nuclear technology through safeguards inspection (defined as the accounting and control of nuclear material at designated nuclear facilities) became embedded in an international bureaucracy, the structure and functioning of which promise non-discrimination, rule-based procedures, and impersonal accountability.

Bureaucracy despite itself

If we remember McKnight's caustic comment at the beginning of the chapter, the inevitability of safeguards as a thoroughly bureaucratized practice is thrown into relief, and its irony becomes crystal clear. The negotiators professed to want anything but "rigid bureaucratic" inspections. But the safeguards system was built to reflect all the features of a rigid bureaucracy: it relies on collective authorship and it promises non-discrimination through its rote proceduralism, impersonal rules, and calculable outcomes. It responds to concerns of politicization by assuring a systematic machine of objective outcomes. The ideal-type bureaucrat cannot be corrupted because he is dedicated to the bureaucratic organization above all.

The bureaucracy exerts a centripetal force. It is too easy to see it as an ideal-typical

organization because that is how it presents itself (Hoag 2011). It is its ideological effect. Part of this effect is the simultaneity of its ideal-type and its aberration. The ideal of the perfect, efficient bureaucracy is constantly undermined by how people understand bureaucracies to work in practice. Weber himself acknowledged this gap when he noted that the bureaucracy's system sometimes produced unintended outcomes.[7] Why do we persist in spite of this? Anthropologist David Graeber argues for the existence of a profound and powerful "bureaucratic utopianism" that continues to enchant the modern world.[8]

> [Bureaucracy] enchants when it can be seen as a species of what I've called poetic technology, that is, one where mechanical forms of organization, usually military in their ultimate inspiration, can be marshaled to the realization of impossible visions: to create cities out of nothing, scale the heavens, make the desert bloom. (Graeber 2015, 164)

Or even, control the threat of nuclear weapons. In this imaginary, the bureaucracy promises the rational fulfillment of seemingly impossible goals. It can harness irrational politics through the rule-based application of technical means, and, in this way, provides relief from the political contentiousness of nuclear technology. Once it begins, however, this technocratic utopia acquires a momentum of its own and can be difficult to realign with the original aspirations of its creators. Next, I discuss how the bureaucracy's centripetal force also contributes to normalizing the prevailing nuclear order as the only possible one, and curtails the imagination of alternatives.

[7] In a footnote to a discussion about how the capitalist market economy makes excellent use of strict bureaucratic organization, Weber notes "Here we cannot discuss in detail how the bureaucratic apparatus may, and actually does, produce definite obstacles to the discharge of business in a manner suitable for the single case" (Weber 1958, 215).

[8] Graeber's book (2015) is a stimulating provocation about the development of "bureaucratic capitalism" and a critique of the limits to political imagination produced by this hybrid mode of rationality.

2.4. The ideological effects of bureaucracy

Summary

Now that it has been established that the epistemic ideology of bureaucratic objectivity contributes to stabilizing the boundary between the technical and political domains of the nuclear program that creates so much anxiety, we can move on to consider what kinds of orderings this stabilization might conceal. I argue that the bureaucracy's ideological effect is to make the nuclear order seem self-evident. In other words, the nuclear bureaucracy naturalizes the nuclear order. The administration of safeguards as a merely technical field is first developed in the 1960s, but is only truly established with the negotiation and implementation of the Nuclear Non-Proliferation Treaty (which opens for signature in 1968). The treaty's requirements end up producing distinct legal agreements. The division between nuclear weapons states and non-nuclear weapons states created by the treaty are thus mapped onto IAEA legal agreements that, in turn, determine particular sets of safeguards practices. The distinction between NWS and NNWS thus becomes a merely technolegal distinction at the IAEA, and is reinforced in this reality through the daily inspection practices of the safeguards inspectors. In other words, the hierarchical nuclear order becomes an entirely technically objective and mere bureaucratic fact.

Conjuring arms control during the arms race: a set of contradictions

I spent the previous section arguing that the IAEA's establishment provides for the stabilization of the technical and political as separate domains. But this narrative of stability should be understood as primarily building a basis from which further stability could be constructed. The 1960s were still a time full of uncertainty and the threat of nuclear weapons and nuclear war were more palpable than in the decade previous. The IAEA helped to build up some

confidence in the possibility of the international control of nuclear technology (by building up a safeguards system and growing the organization that would be responsible for it). But there was no order yet in this increasingly nuclearized world. France and China both exploded their first nuclear devices in the first years of the 1960s, and there were no global mechanisms in place yet to prevent those capable from also developing nuclear weapons. During the 1960s, several countries seriously considered starting nuclear weapons programs. The list includes Sweden, Switzerland, and Australia, and is surprising from today's perspective. In 1963, Secretary of Defense Robert McNamara, submitted a memorandum to President Kennedy entitled "The Diffusion of Nuclear Weapons with and without a nuclear test ban" in which the likelihood of various states to develop nuclear weapons programs are described, and different policy options considered.[9] The memo concludes:

> Even with unrestricted testing, the number of new nuclear countries during the next decade is not likely to be large. It probably will be a good deal smaller than the potential number able to produce weapons. Beyond about ten years, however, there are likely to be many more nuclear countries unless some effective action is taken.[10]

Consequently, the US pursued a variety of policies to prevent the further spread of nuclear weapons including bans on nuclear testing. A few months later in 1963, the US signed the Partial Test Ban Treaty prohibiting all nuclear weapons test except underground. Two years earlier in 1961, the Antarctic Treaty that provided for the demilitarization of the Antarctic, had entered into force. In 1967, the Treaty of Tlatelolco declared Latin America and the Caribbean a

[9] To the memo is attached a table listing "nuclear weapons capabilities" of sixteen nations. After several columns evaluating the nations' industrial and military capabilities, the final column estimates the nations' "motivation to make decision" from high to low. Five nations are estimated to have a "moderate" to "high" motivation to develop nuclear weapons.

[10] "U.S. Defense Secretary Robert McNamara to President John F. Kennedy, 'The Diffusion of Nuclear Weapons with and without a Test Ban Agreement,' Memorandum," February 12, 1963. Document no. NP00941. Digital National Security Archive (DNSA).

nuclear weapons free zone. That same year, the Outer Space Treaty, among other things, prohibited the use of space for weapons testing.

The Cuban Missile Crisis in October 1962 had clearly alerted the world to the dangers of nuclear brinkmanship made possible by always on alert nuclear weapons capabilities. These always on alert nuclear weapons collapsed time and space and effectively turned nuclear weapons into a "perpetual menace" (Walker 2011). The decade's uncertainty and anxiety about nuclear weapons thus also spurred several attempts to limit the number of nuclear weapons states in the world. These efforts resulted in the entry into force of the Treaty on the Nonproliferation of Nuclear Weapons (NPT), which is considered by most policy wonks and historians (despite violations) the most successful arms control treaty in existence. The 1960s were a decade of contradictions: the number and size of nuclear weapons was increasing as was the number of nuclear weapons powers. At the same time, the number of states committed to stopping the spread of nuclear weapons grew until the end of the decade the NPT became the first global treaty to curb their spread.

The nuclear order as bureaucratic technolegality

The NPT, which opened for signature in 1968 and went into force in 1970, finally solved the uncertainty of nuclear weapons proliferation by creating a limited class of states that were legally permitted to possess and develop nuclear weapons,[11] and another class of states that voluntarily agreed to give up on the ability to have nuclear weapons in return for the asserted right to develop nuclear technologies for peaceful purposes. (It is a bit strange to be given a right that you already had, if not formally.) The NPT also created a third class of states, outside of the

[11] According to the Treaty, "a nuclear-weapon state is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967."

treaty, that have, as the treaty's universality has expanded, become in effect unrecognized (and thus unauthorized, from the logic of the NPT) nuclear weapons possessing states (currently, India, Pakistan, and Israel. DPRK is a withdrawn NNWS signatory). The treaty creates a hierarchy of "nuclear haves and have nots" that many states (including signatories) see as discriminatory. The treaty's Article 7 is supposed to balance out the sacrifice of the non-nuclear weapon state signatories by requiring the nuclear weapon states to "pursue negotiations in good faith" toward reductions in nuclear arsenals and disarmament.

The IAEA played and continues to play an important role in verifying the NNWS commitments to the treaty. It has also played a significant role in effectively turning the hierarchical nuclear order of "nuclear haves" and nuclear have nots" into a mere technolegal regime. The three different groups of states created by the NPT, the NWS, the NNWS, and those outside the treaty each entered into distinct legal agreements with the Agency. These different legal agreements determine the scope and purpose of safeguards activities in a country. There are three agreements that dictate different inspections regimes, and one agreement that is more limited. The largest number of states, the NNWS, signed the safeguards agreement developed for the purposes of verifying the NPT. These agreements are known as INFCIRC/153-type or "Comprehensive Safeguards Agreements" (CSA) and they cover all nuclear material and activities in peaceful use in the country. NWS signed "Voluntary Offer Agreements" with the Agency which place some or all of their peaceful nuclear activities under safeguards. States outside of the NPT remained under the INFCIRC/66 agreement regime whereas states with very limited quantities of nuclear material (for example, medical radioisotopes for use in hospitals) signed "Small Quantities Protocols" (SQP).

At the training course for newly hired inspectors, the different legal agreements provide the conceptual structure for understanding the different types of inspections that are carried out (and the types of verification techniques that may be applied). In addition, in the department of safeguards, the divisions that carry out inspections are also organized in a way that groups certain states together according to the agreement that governs their relationship with the IAEA. These legal agreements thus structure the way that safeguards are administratively conceptualized and implemented within the IAEA. They are bureaucratically consequential in that they determine the bureaucratic verification processes that are set into motion for each state and thereby provide for the administrative stabilization of the nuclear order within the IAEA. In other words, at the IAEA the political stability produced by the Nonproliferation Treaty is translated into the bureaucratic stability of nuclear safeguards, where a particular safeguards agreement determines a particular safeguards verification regime. In this way, the IAEA contributes to transforming the abstract political nuclear order (the NWS are also the five permanent members of the UN Security Council) into the materially graspable stability of a technolegal regime.[12] A byproduct of this has been to render the nuclear order inert, unchallengeable. The 1974 explosion of a nuclear device by India, presents a confirmation and not a contradiction to the inertness of the regime. India, despite being a non-signatory to the treaty, argued that this explosion fell under the NPT exception of a "peaceful nuclear explosion" (PNE).[13] The state of India's insistence of compliance with the NPT is curious given their non-

[12] Here the technolegal regime refers to the set of ordering logics and organizing principles (both legal and technocratic) that determine the status, rights, and responsibilities of a set of defined actors that are party to a legal agreement.

[13] PNEs were a short-lived exploration into the industrial non-military uses of large-scale nuclear detonations, see (Anderson 2010; Kaufman 2012).

signatory status. It reveals that the NPT quickly became an important international legal standard and political framework or, in the register of international law, a norm.

India, with its "old" INFCIRC-66 type agreement, and its status as "illegitimate" nuclear weapons possessor is an example of the limitations of the pre-NPT IAEA's safeguards regime. Ultimately, this first safeguards agreement is not able to prevent states from developing nuclear weapons. The NPT's adoption and the IAEA's role in treaty verification work together to produce (1) the political categories (NWS, NNWS, treaty outsiders) for a nuclear order in which everyone has a place (even outside of the regime) and (2) the technolegal categories (defined by different safeguards agreements) for carrying out the administration of the political regime and thus effectively rendering it to appear more stable in the boringness of bureaucratic day to day implementation than it could be without such practices.

I have shown that the bureaucracy spreads itself over the political order like molasses, holding it in place with paper trails. But what can we see if we turn this hardened clump around? What do see if we look at the "underside" of the IAEA-NPT conglomerate? We see that the epistemic mode of bureaucratic objectivity which governs the logics of IAEA implementation conceals historical oppositions in the 1960s. The main opposition, which effectively is also a contradiction, is the simultaneity of state nuclear weapons development and efforts towards nuclear arms control. With the IAEA, nuclear technology was stripped of its dangerous aura and enrolled into a thoroughly boring routine. In other words, global nuclear anxieties were assuaged because many nuclear things (such as nuclear technologies and radiation standards and measurements) would now become controlled by an international administrative apparatus. Concealed underneath the appearance of international cooperation and agreement was the

consolidation of power positions and the early structure of a global nuclear order. Let us not forget that in 1955, the year following his inspirational speech which sparked the negotiations for an atomic control agency, Eisenhower's *New Look* national security policy made nuclear weapons the cornerstone of US defense strategy which led to the doctrine of "massive retaliation" (Brodie 1959, 248) and plutonium production at the Hanford site doubled (K. L. Brown 2013, 180).

As mentioned earlier, nuclear weapons development was greatly accelerated globally and the risks of nuclear war became palpable. The arms race thus took place at the same time as nonproliferation efforts. The negotiation of the IAEA statute as well as the negotiation of the NPT, contributed to directing focus away from the arms race between the superpowers—even as the PTBT and other "disarmament" measures were agreed—by concentrating international efforts primarily on preventing the spread of nuclear weapons to additional states.[14] While some states were pressing to include disarmament measures in these efforts to globally control nuclear technology, the US (and its allies) successfully kept the question at bay, often with the argument that technical and political aspects of nuclear technology shouldn't be mixed. This had the result of removing any responsibility for disarmament verification from the IAEA, and preventing the "imaginary" of the IAEA as a disarmament organization. Thus, the IAEA contributes to naturalizing the nuclear order of NWS and NNWS through its safeguards focus on non-proliferation. It consolidates this order as self-evident by its adoption of a framework of technolegal distinctions based on a set of political distinctions.[15] The self-evidence of the nuclear

[14] The spread of nuclear weapons to additional states was termed "horizontal proliferation," whereas the accumulation of additional nuclear weapons in a state already possessing such weapons was termed "vertical proliferation." The IAEA and the NPT are thus primarily focused on preventing "horizontal proliferation."

[15] Of course, the categories of states defined in the NPT are also effectively "legal" categories in that the

order, and the IAEA's technobureaucratic role in it, while always a subject for debate among insiders concerned with such things, was only truly challenged in the early 1990s with the discovery of Iraq's clandestine nuclear weapons program at the end of the Gulf War.

2.5. Challenges to the IAEA's legitimacy reveal cracks in the nuclear order

Summary

By telling again a limited) narrative of the last 25 years of challenges to the IAEA safeguards regime, I will argue that these challenges not only show the limitations of the IAEA's mandate (the focus on diversion) but also expose the contradictions that developed through the naturalization of the nuclear order as a technolegal regime. The first contradiction lies in the attempt to designate as a technical activity the outcome of a highly political process. The second contradiction declares the safeguards process non-discriminatory despite the structural and legal distinctions that create three separate categories of states.

Member state concerns with and attempts to reveal the politicization of the new safeguards methodology called the "state level concept" (which entails considering the industrial and scientific infrastructure of a state in addition to its nuclear facilities and activities) can be read as an effort to locate the political in persons and practices, when it has been "part of the furniture" all along. It is possible to argue that "subjective" knowledge or "individual judgment" is politicized because there are epistemic ideologies that reflect this logic, in particular, the one that governs the IAEA's functioning. Bureaucratic objectivity promises the apolitical production

NPT is international law. I want to point out that the IAEA's production of technolegal categories buttress the entrenched political power positions that underlie these "legal" distinctions. Both the "techno" and the "legal" part of *technolegal* should be read as indexing the purportedly apolitical forms of knowledge that underlie technology and law. See also the field of critical legal studies for a critique of the supposed neutrality of law.

of technical knowledge by constraining bureaucrats into a rule-governed system. Moving towards this new holistic safeguards methodology has contributed to destabilizing the technopolitical boundary, and exposing the seeming naturalness of the nuclear order. It also opens the potential for a new epistemics and a new politics to emerge, but this, of course, depends on the actors and their commitments.

Iraq's clandestine nuclear weapons program

The discovery in the wake of the Gulf War that Iraq had clandestinely pursued a nuclear weapons program significantly upset the IAEA's standing as an authoritative technical organization trusted with verifying the Non-Proliferation Treaty. Iraq, as a signatory of the NPT, had forsworn the pursuit of the military use of nuclear material. The country had been a recipient of IAEA technical assistance and inspectors regularly visited declared facilities according to the safeguards agreement between Iraq and the Agency. Today, when IAEA staff present a history of the inspections in the early 1990s, they like to show two versions of an aerial photograph of the Tuwaitha site that depicts a satellite image of a number of buildings of varying shapes and sizes arranged within a rectangle. The first image shown by the staff identifies the three sites regularly visited by the inspectors, and the second identifies an additional eleven sites across the complex at which Iraqi scientists and engineers had been pursuing undeclared and primarily illegal nuclear activities. The "illicit" sites outnumber the safeguarded sites by a factor of 4:1 and the slide is supposed to elicit audience indignation about the ignorance of well-intentioned yet naive inspectors who dutifully visited declared facilities while Iraq was pursuing a nuclear weapons program right under their noses.

In addition to the discovery of Iraq's clandestine nuclear weapons program, the IAEA

learned in 1992 that North Korea had failed to declare to the IAEA all of its nuclear activities. Furthermore, after acceding to the NPT in 1991 South Africa revealed that it had formerly possessed a nuclear weapons program, now dismantled, and invited the IAEA to verify its dismantlement. This trifecta of events called into question much of the received wisdom about safeguards and led to a thorough revision of the safeguards system. The inspectors' failure to detect the clandestine sites was not a result of limited resources or insufficient technologies. Rather, it was the result of the IAEA's own safeguards system that was designed to detect diversion. Agency safeguards were not designed to detect clandestine activity. The safeguards focus on non-diversion of material has its origins in the very early negotiations about the technological and technical possibilities of safeguarding nuclear material in the 1940s. Negotiators' assumptions about what kinds of safeguards are possible and about how the system would work, continued to hold sway and became the bedrock of the safeguards agreements following the Non-Proliferation Treaty.

The political limits of nonproliferation

In the late 1940s, the UN Atomic Energy Commission studied the problem of the international control of nuclear energy and identified three types of situations against which safeguards should protect: 1) diversion of nuclear material, 2) clandestine development of nuclear weapons, and 3) unauthorized seizure of nuclear material.[16] The problem of seizure was seen to be in the state's realm of responsibility and was not further pursued. The possibility of

[16] Atomic Energy Commission, First Report on Safeguards, Draft submitted to Committee 2, 18 December 1946; 15H. 4c, First Report of the AEC to the SC – Safeguards; Box 71, General Records Relating to Atomic Energy Matters, 1948-1962; Office of the Secretary, Office of the Special Assistant to the Secretary of State for Atomic Energy and Outer Space; General Records of the Department of State, Record Group 59. National Archives at College Park, College Park, MD.

clandestine nuclear activity was described as such:

> As to clandestine operations, the Commission assumed that all national Governments would be required to submit frequent reports on all relevant matters, and that the international authority would co-ordinate all relevant information for the purpose of determining what areas were suspect of harbouring clandestine activities. The Commission assumed that the authority's privileges of movement and inspection would include rights to conduct surveys by ground and air. It thought most plants in the nuclear cycle possessed features which would facilitate detection of clandestine activities, although conversion plants would be much more difficult to detect than others, and detection of secret bomb manufacture would be almost impossible. Consequently, the vital need was to prevent the unauthorized accumulation of essential nuclear materials. (McKnight 1971, 15)

The Commissioners thus thought that clandestine activities would most likely be detectable by the types of inspection activities and information monitoring which they envisioned for the international authority.[17] They saw the main problem in the "unauthorized accumulation of essential nuclear material" (McKnight 1971, 15) and thus focused on safeguarding against the unauthorized diversion of nuclear material from declared facilities. These assumptions were maintained throughout the negotiation of the IAEA's statute and were also embedded in the first two safeguards documents (INFCIRC/26 and INFCIRC/66) produced by the Agency. The main concern was that nuclear material gotten through the Agency or through bilateral channels would not be used for military purposes, so the Agency focused on keeping track of this material.

This focus can be traced back to a direction taken by the US and the USSR during informal "technical talks" that were held in Geneva in the summer of 1955 alongside the first International Conference on Peaceful Uses of Atomic Energy (which was a result of Atoms for

[17] Capabilities for air and ground surveys were not part of NPT safeguards. In fact, the inclusion of spy satellite imagery (also known by the euphemism "national technical means") in safeguards evaluations of a state is contested.

Peace). The USSR called US attention to the possibilities of using a civil nuclear program for military purposes (the "diversion" problem) which apparently had not been entirely clear in the State Department.[18] But neither side had a good idea of how that could be prevented. As Roehrlich writes, "While the notion of safeguards had been part of nuclear control proposals since 1945, the meetings in Geneva revealed that no one really knew how these safeguards would work" (n.d., under review). At the same time the "political" feasibility of a freeze on nuclear weapons states (which was the purpose of the NPT fifteen years later) was not considered great.[19] Thus, the possibility of states to independently and clandestinely develop nuclear weapons (without Agency assistance) was seen as a risk that could nevertheless not be controlled at the time.

The two super powers focused their efforts on the control of the "diversion" problem when they realized that they had one common interest which was to prevent the spread of nuclear weapons to countries receiving technical assistance (either from them through bilateral agreements or from an Agency). The success of IAEA statute negotiations and the safeguards system (despite the USSR presenting itself publicly as critical of safeguards on account of its neo-imperialist implications) are attributed to this shared interest. Until the NPT, the ability to prevent the independent nuclear weapons efforts of countries were seen as not possible to control politically. States who were also exporters of nuclear technology could limit some of these risks by imposing bilateral controls on the importing states. This, however, was also seen as carrying

[18] Specifically, Molotov pointed out to Dulles that the burn-up of uranium in a nuclear reactor actually produced plutonium (for nuclear weapons use) as a byproduct. Cf. (Holloway 2016)

[19] See page 35 of Roehrlich (under review) for a discussion of State Department correspondence on the feasibility of supporting a policy to deny other states the right to manufacture nuclear weapons. Smith's marginalia states: "We can't deny them, but we can refuse to help them if they want to build weapons." J. B. Hamilton to Smith, "Your paper on international control and the IAEA," 22 September 1955, RG 59: General Records Relating to Atomic Energy Matters, 1948–1962, File: IAEA Control and Inspection, 1955–1957, Box 137, NARA.

an economic risk in an as yet unrestricted marketplace of nuclear exporters.[20]

The Non-Proliferation Treaty introduced the idea that some states would voluntarily denounce nuclear weapons, and thus focused solely on a control system that would detect diversion from peaceful nuclear facilities. McKnight notes, "The Non-Proliferation Treaty does not deal expressly with the problem of clandestine activities, and it foresees no role for IAEA safeguards in connection with allegations that they are taking place" (McKnight 1971, 34).

The basic concept for safeguards against diversion rests on the idea that the central component of nuclear weapons production is the fissionable material in itself, Uranium or Plutonium. If this material is tightly controlled then the state cannot make a nuclear weapon.[21] The safeguards system against diversion is based on the technical and physical possibility of measuring and calculating the transformation of nuclear material as it passes through the so-called nuclear fuel cycle. Thus, fundamentally, NPT safeguards are composed of accounting for nuclear material through inspections and operator and state declarations, as well as containment and surveillance of the nuclear material to discourage and prevent tampering with it. These two components maintain what is called the continuity of knowledge about the nuclear material in a state.

The safeguards document developed for the IAEA's role in verifying the NPT, INFCIRC/153, states that the Agency is tasked with verifying the "correctness and completeness" of the state's declarations. This assumed that states would *declare all nuclear*

[20] The Nuclear Suppliers Group, composed of representatives from states that export nuclear technologies (initially, Canada, West Germany, France, Japan, the Soviet Union, the United Kingdom, and the United States) was founded in response to the Indian test in 1974.

[21] *Unmaking the Bomb* pushes fissile material control to its logical limit for the purpose of total global nuclear disarmament (Feiveson et al. 2014).

material[22] (since all nuclear material and activities were, according to the treaty, to be under safeguards). The document assumes that states would not, in effect, cheat by pursuing parallel nuclear activities. It also does not provide for the possibility that a state pursues all necessary nuclear weapons related activities without introducing nuclear material until it was ready to test, and then withdraw from the treaty, and use the nuclear material they did have in order to detonate their weapon. Thus, in response to the revelations of clandestine nuclear activity, in order to be able to verify all of a state's nuclear material, the Agency would now have to begin assuming that states *may* not declare all their material and looking elsewhere in the state for clues about undeclared, potentially nuclear weapons-related activities and material. Nuclear material accountancy is good for verifying declared nuclear material but the Agency would need different tools to learn about the possibility of undeclared development towards the military use of nuclear material.

The limitations of this focus on diversion can be shown to go back to the early negotiations for the IAEA statute. The US attempt to keep disarmament out of the conversation and to quickly implement an international control organization (no matter how ineffective), invariably led to the consolidation of a focus on safeguards against diversion. The possibility of independent or clandestine nuclear weapons development, while awareness of it existed, was eliminated with the NPT's exclusive focus on diversion from the IAEA roster of responsibilities until the early 1990s. The technolegal enrollment of the nuclear order of NWS and NNWS into

[22] The definition of nuclear material (in the IAEA statute) has received historical and theoretical treatment from Gabrielle Hecht (Hecht 2010) who shows that what determined the inclusion of which types of nuclear material under IAEA control—although described as a technical matter in most histories of the negotiations—was greatly influenced by South African concerns about both the non-surveillance of their Uranium mines (which assisted their long-running secret nuclear bomb program) and their claim to the status of African representative on the Board of Governors.

the IAEA's bureaucratic functioning enabled a certain complacence in the way that the Agency conducted its inspections. Once the inspection plan for a state was drawn up, it was not greatly revised until the state acquired additional facilities or material. It is possible that the repetitive monotony of safeguards inspections produced bureaucrat-inspectors that weren't attentive to their surroundings when they went on inspections to the point that they could miss the many other nuclear activities at a site like Tuwaitha in Iraq.[23]

The IAEA responds: patching up cracks

The failure of the IAEA to deter and detect Iraq's nuclear weapons program led to a lot of soul-searching within the Agency. The problem with the non-detection of the clandestine program was seen as resulting from the fact that the IAEA had been focused exclusively on safeguarding the declared material in a state in order to discourage and detect the potential *diversion* of nuclear material. As we know from the paragraphs above, the focus of safeguards on detecting or deterring the diversion of nuclear material is programmatic. The mandate and legal instruments were designed to allow the IAEA inspection system to function for the case of diversion. However, it was clear to the parties involved that, in the interest of international security, the "non-proliferation regime" would have to be able to address a variety of challenges such as those of clandestine nuclear weapons development (Iraq), exit from the NPT (DPRK), and the verification of abolished nuclear weapons programs (South Africa). These events must also be seen as playing an important role at the 1995 NPT Review Conference. The serious threats this context posed to the nonproliferation regime contributed to an atmosphere of

[23] I do not want to discount that throughout the 1970s and 1980s, efforts were made to identify weak spots in the technical elements of inspections. A plethora of IAEA publications from that period show that safeguards staff were working on improving safeguards. However, these efforts were focused more on improving the technical and scientific methods of safeguards inspections, than considering efficacy of the system itself.

cooperation in which the treaty was extended indefinitely.

The Board of Governors tasked the Secretariat to study the problem and provide recommendations for a strengthened safeguards system. The effort to "strengthen safeguards" was a collective one. From 1991 to 1993, largely in response to what Agency inspectors were learning about the Iraqi clandestine program and from the verification of the dismantled South African program, the Secretariat began proposing a number of strengthening measures that relied on existing legal tools and mechanisms to expand the "effectiveness" of safeguards. Over the years, certain aspects of the mandate and the NPT safeguards agreements had fallen in disuse, and the Secretariat took advantage of this opportunity to dust them off and apply them. Technical and administrative weaknesses in existing safeguards mechanisms were identified and repaired through changed procedures. Implementing the Agency's existing (but disused) legal and technical capacity for safeguards went a long way in closing some of the gaps that were created by the exclusive safeguards focus on the possibility of diversion. But many realized that being able to detect clandestine activity would require additional means beyond the strengthening measures that had already been introduced. In September 1992, the Director General (DG) called on the Standing Advisory Group on Safeguards Implementation (SAGSI) to "re-examine how safeguards are implemented and advise on ways to reduce costs while meeting new requirements and maintaining 'effectiveness'" (Rosenthal et al. 2010, 33).

The recommendations of SAGSI presented to the DG a few months later provided fodder for discussion in the Board of Governors that the proposed strengthening measures would make the Agency too much like a "police force" (Rosenthal et al. 2010, 34). Nevertheless, the DG set up a program to study SAGSI's recommendations and produce implementation proposals by

early 1995, the year of the next NPT Review Conference. It became known as “Programme 93+2” and the group tasked with carrying it out divided its work into two separate parts. Part I measures were concerned with strengthening existing safeguards verification methods and capabilities. These measures included reemphasizing the right to non-routine inspection measures which had fallen into disuse, expanded state reporting and the reorganization of the information available to the IAEA, expanded use of advanced technologies such as environmental sampling and remote monitoring and measurements, as well as increased cooperation with the State System for Accounting and Control (SSAC). Part II measures sought to expand the IAEA’s ability to discover clandestine nuclear activity and it required new additional authorities and consent from individual states. Part II resulted in the introduction of a new voluntary legal agreement called the Model Additional Protocol (INFCIRC/540) which would provide the IAEA with additional information and more intrusive inspection powers in the member states that signed it.

To summarize, IAEA safeguards were historically restricted to the detection of the diversion of nuclear material in nuclear facilities. This limitation, while previously seen as a necessary condition for the political success of the NPT, was now recognized as seriously endangering the IAEA’s ability to effectively and legitimately continue its verification work under the NPT. Throughout the 1990s, the IAEA worked to expand the scope of its safeguards objective to include the detection of clandestine nuclear activities. This shift and expansion in scope required a substantial conceptual reorientation—from accounting for nuclear material to considering the state's entire capacity—of safeguards methods and practices. If previously the IAEA had only focused on the nuclear material in a state’s declared facilities—its entrance, flow,

transformation, and exit—it now needed to consider if and how a given state might be building a clandestine nuclear program. This is a critical and significant shift in epistemic mode. The original epistemic mode of accounting for the type and quantity of nuclear material in a state,[24] previously the bedrock of the IAEA safeguards system, becomes in this new epistemic mode only a component (if an important one) of the entire approach[25] to nuclear verification. The detection of clandestine nuclear activity requires a larger view of the state's activities and relies on the accumulation and synthesis of information critically related to a state's industrial, technological, and scientific infrastructure. In this way, IAEA safeguards inspectors no longer exclusively focus on how a state might pinch off nuclear material from its safeguarded facilities when an inspector isn't looking, but first attempt to identify the "technically plausible" paths to a nuclear weapon a state might pursue.[26] This methodology requires the involvement of "analysts" whose expertise is constituted as language skills, subject matter familiarity, and technical knowledge, and whose work involves gathering a variety of data on industrial and scientific activities in the state that are relevant or potentially related to the development and production of a nuclear weapon. The work of analysts and the contribution they make to the evaluation of the "state as a whole" has been viewed with deep suspicion both by member states as well as by

[24] "Traditional" safeguards are comprised of nuclear material accounting (in which the state's declarations about the nuclear material are checked by the inspector through a variety of identification and counting methods) and containment and surveillance (the installation of security cameras and seals to ensure "continuity of knowledge" about the safeguarded material). Taking "environmental samples" (to determine the presence or absence of radionuclides) was also added to traditional safeguards in the early 1990s.

[25] "Integrated" safeguards are comprised of traditional nuclear material accounting and identification methods but add the analysis of information from "open" sources, the process called "acquisition path analysis", and regular meetings of the state's "evaluation group" to discuss and evaluate all of the collected information with view to the state's compliance with the agreement.

[26] While this is adamantly rejected by the Secretariat, the identification of "acquisition paths" also requires projecting the intention of nuclear weapons development onto the state, if only for the purposes of carrying out the analysis. Member states, unsurprisingly, do not look favorably upon this projection of intentionality.

some of the secretariat's staff (notably, the inspectors).

The politics of politicization: subjective knowledge

The uneasiness with the methodological change in safeguards practices was publicly voiced in an animated clip released in early 2012, called "iaea super inspectors." This clip was published anonymously on the video-hosting platform vimeo and eventually uploaded to YouTube by an account named SuperIAEA (*Iaea Super inspectors.mp4* 2012).[27] My informants suspect it was the work of someone inside or very close to the work of the Agency. The clip takes place in a space that conjures the command center of a spaceship. There are two characters, one blond woman who presents the critical perspective and a male figure in a superhero-type outfit who plays the role of a somewhat delusional pawn. The superhero-figure repeatedly claims that he is a "super inspector" (and repeats the slogan "Atoms for Peace) while the woman presents a point by point rebuttal of "super hero" powers. She points out the importance of nuclear material accounting and argues that the incorporation of "third party information" in safeguards investigations is a way for powerful countries to trap the Agency for their own political purposes. She notes the political consequences of IAEA reports (some states have been using the report to argue for war) and suggests that the IAEA does not have the means nor the competence to adequately vet intelligence information or compete with the intelligence services of the US and other "super" powers. The clip ends with the woman asking the superhero about his pay and benefits (which are generous) and suggests that "it must be hard to risk a package like that by exercising technical independence" to which the superhero repeats only his tired reply, "I am a super inspector."

[27] The YouTube account has three more clips listed that lampoon aspects of the Iran inspections as well as inspector incompetence with information insecurity.

The clip thus articulates the concerns of politicization—primarily voiced by member states but also articulated by safeguards staff—that have accompanied the transformation of safeguards methodology. It particularly locates these concerns in the additional "information analysis" capacities of the secretariat, pointing out how they may be and may have been abused by member states for political and military goals. In other words, the concern here is that the division of labor between the "technical independence" attributed to the Secretariat and the political work of the policy-making organs has broken down in part due to the admission of non-technical and third party information into the safeguards evaluations of states. This clip encapsulates the controversies that have arisen from the Secretariat's effort to expand the safeguards role to include the detection of clandestine nuclear activities. After a short acknowledgment of prevalent political science interpretations of these conflicts, I will analyze the critiques of the IAEA's new safeguards approach to reveal underlying anxieties about the epistemic legitimacy of IAEA safeguards.

As mentioned, member states were largely in agreement about measures to "strengthen the effectiveness and improve the efficiency" of IAEA safeguards in the context of shoring up a seemingly crumbling nuclear non-proliferation regime. However, since the early 2000s this consensus has begun to unravel. This unraveling has been assisted by a number of events. Mark Hibbs, a longtime, well-respected, and original commentator on nuclear affairs notes that

> The abuse of intelligence information by the United States in the run-up to the second Gulf War in 2003 touched off concern by a number of states that proliferation judgments may be based on subjective conclusions and insufficiently vetted third-party information. (Hibbs 2012)

The Bush administration's attempt to use intelligence information in order to make a case for an invasion, and its attempt to enroll the IAEA into this charade contributed to an

international political atmosphere increased in suspicion and distrust. The fact that the IAEA won a Nobel prize for its efforts to provide a "technically objective" assessment of Iraq's nuclear capabilities (the results of which ran counter to US intelligence claims) with thorough and unbiased inspections and reporting has faded away since former Director General, Egyptian lawyer (and thus politically closer to the non-aligned movement) Mohammad El-Baradei was replaced by the US-friendly (as revealed by leaked US diplomatic cables) Japanese career diplomat Yukiya Amano in July 2009.

When the IAEA safeguards system was being revised in the 1990s, there was also a desire voiced to reduce the cost of safeguards inspections by focusing the effort of inspectors on the most "safeguards-sensitive" cases. The criticism went like this: the IAEA spent large portions of its safeguards budget inspecting the vast civil nuclear programs of states such as Canada, Germany, and Japan. States which, according to received "expert" judgment, posed little to no "proliferation threat." Given the lesson of Iraq, it would be more effective for the IAEA to focus its safeguards efforts on states for which there was a greater risk of proliferation. While this proposal makes logical and intuitive sense if the objective is to prevent the proliferation of nuclear weapons, member states were concerned that the case-by-case application of safeguards could result in more intensive and intrusive inspections of some states (than in others). The unequal application of safeguards (among states with identical safeguards agreements) was seen as discriminatory. Throughout most of the 1990s, the member states generally accepted and agreed with the new safeguards measures proposed by the secretariat. However, in the early 2000s, the differential treatment by the Secretariat and the Board of Governors of a number of cases of possible "non-compliance" became fodder for new charges of discrimination in IAEA

safeguards.

Since 2003, a number of additional countries have come under IAEA scrutiny for various degrees of failing to comply by their safeguards agreements. These countries are Iran (from 2003), Libya (2003-2004), South Korea (2004), Egypt (2004-2005), and Syria (from 2008). The ways in which these cases have been handled has also been criticized by member states on the basis of discrimination. The former French Governor Pierre Goldschmidt (2009) and policy scholar Trevor Findlay (2015) have written about the differences by the Secretariat and the Board of Governors in reporting and in handling the cases. Some states and authors see the influence of "political considerations" in the non-reporting to the UN Security Council of South Korea and Egypt's failures to comply with their safeguards agreement. Thus, the concern about the IAEA's politicization was highlighted in the first decade of the twenty first century and found its target at the beginning of the second decade in the state level concept. From a historical perspective, the charge of discrimination is not surprising. As was described earlier, the political legitimacy of an international safeguards system relied on the idea that states would be subject to bureaucratically defined safeguards inspections in their nuclear facilities. The uneven application of safeguards efforts depending on the opaque weighting of "proliferation risk" is far from the assurance of the bureaucratically objective administration of inspections.

In an article describing the evolution of and obstacles to the state level approach at the IAEA, Hibbs describes the critiques that have grown against the Secretariat's new methods. The main, and initial, critique, likely stemming from the recent memories of uneven treatment of non-compliance cases in the Board of Governors, is that a custom-built safeguards approach that is based on evaluating the risks of that state developing a nuclear weapon, is inherently

discriminatory. Russia, in closed meeting of Board of Governors in June 2012, "objected that the state-specific approach favored by the IAEA is discriminatory" (Hibbs 2012). These concerns were echoed by other states during the drafting of a resolution of safeguards at the General Conference (GC) in September 2012. At the GC, member states demanded more information on the implementation of the state level approach. In particular, about which "state specific factors" would be used to make up a state's safeguards program. Hibbs writes, that IAEA state specific factors "include a country's legal framework, its nuclear fuel cycle, and the "history of safeguards implementation for the state, and the nature of cooperation with the state" (Hibbs 2012). There are concerns about some factors that Australia says are "difficult to fully quantify" (Hibbs 2012). These demands have a background and history:

> During an April 2012 meeting of state parties to the Nuclear Non-Proliferation Treaty, in preparation for a treaty review conference in 2015, a discussion of possible state-specific factors included ones that were clearly subjective. One European country proposed whether a country is a democracy as a factor. That proposal was dropped, but Russia requested that the IAEA provide a list of state-specific factors it intends to use. (Hibbs 2012)

Since then, concerns about the use of "subjective" and non-quantitative state-specific factors in the evaluation of states began to grow. The Secretariat responded by preparing a document intended to explain and describe the changes in safeguards implementation that they felt were necessary in order to fully be able to carry out their mandate. This document initially went to the Board of Governors for review. The Board requested changes which the Secretariat carried out and presented to the General Conference in 2013. Throughout the spring of 2014, the Department of Safeguards carried out a series of "technical meetings" with the Board of Governors at which the state level concept, its main ideas, methodology, technologies, procedures, and reporting mechanisms were explained in detail to the members of the Board.

Some member states in the Board of Governors are particularly dogged about hounding the Secretariat on the way that the state level concept is implemented. Their representatives insist that this work must rely on a solid "technical basis" and remain "technically objective" or "technically credible." Their primary concern is that "individual assessments" would lead to "subjective" or, even worse "political" evaluation. The state level concept threatens to pit technical measurement against political judgment, in particular, because of the involvement of Junior Professional Officers and Cost Free Experts in the information collection process. The loyalty and professionalism of these irregular staff members (who are paid by their home governments and usually return there to work after their contract at the IAEA ends) is questioned. Thus, member states insist that the evaluation of the state must be free of "political subjectivity" which may be due to individual judgments but there is also a general concern about a "collective political bias" which could unduly influence a state's evaluation.

The member states also question the validity of certain sources (such as a trade database based on voluntary reporting used by the Secretariat) as well as the Department of Safeguards ability to properly interpret the information they gather (especially if such information comes from "third party sources," that is, from intelligence information given to the Agency by a member state). Finally, states are anxious about the flexibility of the state evaluation concept and would prefer to see the process set "in stone" while constantly reminding the Secretariat that they are not allowed to act or change their procedures without the Board's approval (which is only partly correct). The member states want more detailed information about the state evaluation process because they are not confident in the Secretariat's assurances that its internal processes are sufficiently rigid or structured to produce unbiased evaluations.

Technopolitical instability

Another way one might interpret these apparently new concerns with the "politicization" of the Agency's safeguards work is that the methodological changes destabilized what the bureaucratic objectivity of the Agency's functioning was supposed to stabilize: a fictional separation between the technical aspects of inspections and the political influence of the member states. As described earlier, this separation was concretized in the Nonproliferation Treaty that also produced the nuclear ordering of states. The IAEA played the crucial role of producing this political nuclear order as a technolegal one in the bureaucratic administration of safeguards. Traditional safeguards methods were based on the type of legal agreement a state had with the Agency (the state's facilities would be subject to a specific inspections regime according to bureaucratic safeguards "criteria.") The naturalization of different orders of nuclear states created the appearance that all states with a specific safeguards agreement were treated equally. At the same time it concealed that the different safeguards agreements corresponded to the different statuses in the nuclear order (NWS, NNWS, outside) and were thus inherently discriminatory. This new approach threatened to create the uneven (and perceived as discriminatory) application of safeguards within states with ostensibly the same safeguards agreements. It ruptured a perception of equality of contract among NNWS that was upheld by the objectivity produced through a technolegal bureaucratic inspections regime. In other words, it was now possible to locate politics in people and methods where previously politics had been hidden beneath an ideology of bureaucratic objectivity.

The critiques from the member states have been countered in a few ways by the Secretariat. The former Deputy Director General of Safeguards Hermann Nackaerts, in his

opening plenary address at the annual conference of the Institute for Nuclear Materials Management[28] on July 18, 2011, defended the state level concept as a positive change from the rigid, mechanistic application of bureaucratic criteria to a new flexible, responsive mode fit to adapt to a changing environment. If bureaucratic objectivity is what makes international nuclear safeguards politically acceptable with its assurances of the rigid apolitical application of rules and procedures, then the championing of a new, flexible approach is a cause for great concern among those member states who bought into the idea of safeguards based on a system of bureaucratic, non-discriminatory procedure. It can be seen as deteriorating the bureaucratic objectivity which everyone had relied on and trusted for so long (and which was exploited by Iraq). In other words, the state level concept threatens to undo and undermine the bureaucratic structure and assurance of administrative objectivity while also upsetting the conventional way of doing safeguards to which member states had grown accustomed and trusted. The talk of flexibility and responsiveness undermines the trust in a rigid bureaucratic structure and its promises of knowledge production as technical nuclear material accounting.

However, it may have become clear to the Secretariat that pushing the "state as a whole" methodology as a great new dynamic thing was not working as planned. Another approach, which I discuss in greater detail in chapter 3, has been to literally bureaucratize the implementation of this holistic safeguards concept by developing procedures and guides for the relatively new parts of the process that require collective evaluation and decision-making. In other words, the qualitative, "analytical" knowledge production processes are being proceduralized in order to embed them in the bureaucratically predictable structure which lends

[28] The INMM is the most important extra-IAEA conference for safeguards matters.

legitimacy to the organization's work.

It is clear that the technopolitical separation has been destabilized. While it creates the possibility for delegitimating the IAEA's work in safeguards verification, it also opens the potential for the reordering of nuclear politics and epistemologies. In the following chapters, I look at how the controversies around "state level" safeguards play out in the day to day work of safeguards staff. I consider how the technopolitical is bureaucratically mediated, paying particular attention to how actors negotiate competing epistemic paradigms and possibly make radical claims about nuclear knowledge and knowing. I take a closer look at the practices in this organization whose claims to technical independence through bureaucratic objectivity have become fragile.

Chapter 3: Practices: Negotiating the Technopolitical

3.1. Introduction

Member states criticize the new "state level" safeguards approach for not being objective. This is based on adherence to an epistemic ideology that I've identified as bureaucratic objectivity. I've argued that this epistemic ideology has provided the condition of possibility for an international safeguards inspection to become acceptable to a wide variety of states because it helped to stabilize a boundary that is thought to exist between technical and political domains. Specifically, bureaucratic objectivity is perceived to keep out "politics" from the "technical" activity of the safeguards inspector's job by ostensibly forcing the inspector to adhere to a rule-based system of procedure. The new safeguards methodology jeopardizes the constitution of this supposedly apolitical knowledge making practice. Because the methodology treats each state as its own individual entity and allows for resources to be redistributed to focus on states of concern, some stakeholders have pointed out that this contains the potential for discriminatory treatment of states.

In the previous chapter, I argued that the safeguards system was discriminatory from the start, and was institutionalized as an apparently neutral technolegal practice through the IAEA's safeguards agreements that followed the entry-into-force of the NPT. Bureaucratic objectivity has thus, objectively, never been actually non-discriminatory, yet its ideological effects have made it appear as if it was. Proponents of the state level safeguards methodology, by contrast, explicitly argue for the differential distribution of safeguards resources, and also advocate to train inspectors in "analytical skills" in the name of an improved safeguards system. Clearly, the

new safeguards methodology is based on a new epistemic ideology for governing the conduct of safeguards evaluation. But, this epistemic ideology conflicts with the bureaucratic objectivity that used to lend legitimacy to the IAEA's safeguards functions. These epistemic ideologies also carry with them different sets of politics (Shapin and Schaffer 1985). This is the backdrop against which I studied safeguards training at the IAEA.

The history of science and science and technology studies have taken the production of knowledge as their central object. Foucault's accounts of vast societal shifts in authoritative ways of knowing (Foucault and Foucault 1971; Foucault and Foucault 1972) and the associated practices of social regimentation (Foucault 1965; Foucault 1977) provide an important foundation for considering the transformation of epistemes on a smaller scale. Laboratory studies such a Latour's (Latour 1979; Latour 1987) and Knorr-Cetina's (Knorr-Cetina 1999) have examined in detail the quotidian practices of scientists in their place of work, observing the ways in which scientists interact with their instruments and each other in a collaborative process towards new knowledge. The results of these studies describe the dominant paradigms and organizing logics of different scientific "cultures."

While I was not able to observe genuine inspections in the field, I took the opportunity to look at the process by which inspectors are first trained at the IAEA. Explicit pedagogical moments have also been subject of study by sociologists (Bosk 1979) and linguistic anthropologists (Mertz 2007). They are useful because they present moments in which participants tend to be more reflexive about the frameworks and paradigms that govern the knowledge and practice that is being imparted. The introductory course to Agency safeguards that I observed, while primarily a classroom and lecture-based course, emphasized practical

experience and hands-on experimentation for the participants. The course culminated in a mock inspection exercise that attempted to recreate the conditions of an actual inspection at an operational nuclear power plant. In addition to observing the introductory course, I also attended training sessions on specialized topics.

I observed these courses with attention to how the current safeguards methodology would be taught and to see if the tensions and fears about the politicization of the inspector's work that were described in the last section of the previous chapter[1] would arise throughout the course. Ultimately, the aim was to attempt to define if the safeguards inspector was inculcated with a specific epistemic ideology and if this ideology differed from that of bureaucratic objectivity described in chapter 2. Through an analysis of pedagogical moments in which ideal-typical and undesirable inspector practices and behavior would be made explicit, this chapter contributes to defining the "epistemic virtues" (Daston and Galison 2007) required of IAEA safeguards inspectors. The chapter will show that while the inspector training course and its instructors emphasize the importance of being an inspector who "thinks for himself," this is frequently contradicted by the pedagogical instruction that new inspectors simply "follow the procedure." This contradiction, which echoes Perin's notions of "real-time logics" versus "calculated logics" among nuclear power plant operators (Perin 2006) articulates the tension of the competing epistemic paradigms in the everyday practices such as preparing for inspections, taking measurements, filling out forms, and writing reports. Furthermore, I show that the demands of bureaucratic objectivity remain influential in an analysis of the "bureaucratization" of one of the key methodologies in the new safeguards paradigm. Finally, I describe how new inspectors

[1] Specifically, the tensions described in the online video clip that was analyzed.

themselves identify the division between technical and political labor at the IAEA.

3.2. Becoming an inspector in the 21st century

Let us begin in the introductory course classroom in order to situate the new inspectors and the learning situation in their context. The classroom in which the Introductory Course for Agency Safeguards—always referred to by its acronym, ICAS—was located on the floor of the training section. It was a long, somewhat narrow room with one row of desks facing the front on each long side of the room with an aisle in the middle. There were windows on one long side of the room that overlooked the IAEA headquarters' circular entrance plaza with its fountain and line of national flags. Just outside of the security checkpoint (which also housed a florist, a hairdresser, a cafe, and a UNICEF souvenir shop) the nearest subway stop on Vienna's U1 line stood ready to whisk Vienna International Center employees back to their homes at the end of the day. Parallel to the subway, on the far side of the tracks ran an eight-lane thoroughfare that connected the further districts across the Danube with the city's center. Just beyond this thoroughfare was a small body of water, the "Kaiserwasser" (emperor's "water"), where ducks and swans swam and residents cooled off in the summer heatwave. On this day in January there were no ducks, swans or residents. The gray Vienna winter sky brooded as if to commiserate with the students on the beginning of their grueling course which would keep them in this classroom for nearly forty hours a week over the course of the following six months.

Despite the efforts of human resources to improve the dismal gender imbalance among the IAEA's professional staff, there were only five women in a class of 18. While the women all had partners none of them had children in contrast to the men of whom all but two were married

with children in schooling age. My joke that it appeared from this group of new inspectors that being “married with two children” was one of the requirements of male candidates for the position was not as widely appreciated as I would have liked. The inspectors ranged in age from their late twenties to their mid-fifties with more than three quarters of them under 43. The class nationalities were distributed across the following parts of the world: Europe, Eurasia, North America, Southeast Asia, South Asia, East Asia, Africa, and Latin America. One third of the class hailed from western countries. A third of them had PhDs in either engineering or physics. Most of the rest had master’s degrees in engineering or nuclear science. Only one had a “non-technical” educational background in a social science. Fewer than a quarter had held positions elsewhere in the Department of Safeguards before applying to the inspector position, and thus most of the new inspectors were also new to the IAEA. Most of the students with doctorate degrees had been in research positions previously. The rest of the students had been employed in the nuclear industry of their country or worked for the state nuclear regulator in some capacity. English proficiencies among the new inspectors ranged from fluency to the level B1 (”threshold or intermediate”) in the Common European Framework of Reference for Languages.

This was the third day of the course but the first day with formal introductions and words of welcome from the Deputy Director General of Safeguards (DDG), a Finn whose position kept him quite occupied, especially as negotiations between the Islamic Republic of Iran and the P5 states were under way. The DDG impressed upon the new inspectors that they joined the Agency at an auspicious time in which the number of nuclear power plants and thus the number of inspections necessary was increasing. He stressed the significance of their work (“could make 184,000 nuclear explosions from the totality of the safeguarded material”) and presented a

picture of the safeguards department's work through some numbers ("over 2000 inspections/year, 700,000 reports, 2,500 items of open source information, 500 satellite images analyzed"). By recharacterizing safeguarded nuclear material as potential nuclear explosions, the DDG concretizes the abstract and provides a way to connect the banal everyday of inspection to the stakes of the task. In contrast to the escalating nuclear fears which Masco (Masco 2006; Masco 2014) argues are constitutive of the US Cold War and post-9/11 security state, the IAEA's bureaucratizing measures (as mentioned in chapter 2) robustly establish nuclear boredom and banality in everyday practices. The purpose of these activities was not only to work with countries to safeguards their nuclear material but to "provide assurance that countries are meeting their commitments" and that everything is fine. The DDG thus highlighted the role of the Agency in providing confidence for an international system of nonproliferation law that seeks to counter the fears about nuclear weapons.

In his lecture, the DDG contrasted these developments against some of the challenges of recent years including the financial crisis of 2008, the economic impact of which also prompted the IAEA to "improve efficiency." He briefly noted the controversial cases of the last decade (Iran, DPRK, and Syria) and expressed hope that these would soon be "moving in a better direction" and that no additional troubling developments would surface. He added that while it may seem that "your work is not that important" (especially for those who would not be working on the high profile cases reserved for more experienced inspectors), that was not true because each and every individual's contribution to the work was important.[2] He gave an example (that he would repeat at the Departmental meetings) that if every individual in the Department

[2] See (Mattingly 1998) for insight into how banal exercises are enrolled into a narrative of transformative healing and future potential.

achieved one positive result each week that would entail 40,000 “improvements” per year. And that this would be the same if everyone makes a mistake each week. In this way, the DDG tried to quantify and make measurable the impact of the individual’s efforts on the collective. He noted that the “world increasingly depends on cooperation” and that their success depended on their colleagues, that they were “all in the same boat.” He stressed that the work was not “high performance everyday” but rather more a test of endurance, “like running a marathon.” He wished them all the best on their course and encouraged them to enjoy their stay in Vienna which was “a great city with culture.” The DDG was pressed to leave—the Iran file was calling! The new inspectors would meet the DDG again face to face on the day of their “graduation” of the course roughly five months later where they were handed a certificate by him and had their picture taken with the DDG and the head of the training section.

Following the DDG, the head of the training section, a Frenchman, welcomed the new inspectors and delivered a speech in which he tried to highlight the significance of their work by putting it in a historical context (the destructive power of nuclear weapons), while also specifying the requirements for success in the course (enthusiasm, participation, respect, patience, sharing, and punctuality), and the stakes of their tasks in the context of upholding the Agency’s legitimacy (drawing independent conclusions based on factual information in order to remain credible). In this presentation, he stressed the importance of each individual’s background in contributing to a common work goal, and urged them to share information with each other while also appreciating other people’s points of view. Given the diversity of nationalities and cultures, he encouraged the new inspectors to be patient with each other and “give people time to speak” as they were not all native English speakers. He also articulated a view that would be

reiterated throughout the course: the inspectors should not be afraid of speaking their mind and should “use their brain” while doing their work. He hinted that the IAEA as an institution was not necessarily welcoming of honest opinions, but that this needed to be overcome because the stakes of safeguards were so high.

He continued his presentation with an excerpt from the Nonproliferation Treaty’s preamble: "considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every...safeguard the security of peoples". Here he takes the mention of safeguarding the security of peoples to tie directly to the task of safeguards which can often seem technically abstract and removed from its original purpose to protect human life. The director of the training section situated the inspector at the center of three interconnected aspects of nuclear nonproliferation and safeguards: a legal framework, a historical background, and a technical challenge. I don’t know how much of this individual inspectors retained but I was mightily impressed with this thoughtful articulation of the complex factors at play in governing the inspector’s work.[3]

The training section head went on to describe three distinct but interrelated pillars on which the safeguards system’s political efficacy rested. He described these pillars under the rubrics of independence, legitimacy, and credibility, and stressed that the inspectors contributed to maintaining them in their everyday work, in each and every measurement they took. Under the independence rubric, the section head urged the inspectors to question the data they encountered

[3] In a later presentation on the effects of nuclear weapons, the section head treats the historical development of atomic weapons and includes rather graphic slides of the devastation at Hiroshima and Nagasaki (sites he had visited) as well as images of the effects of radiation sickness on the human body. These images were not only grim reminders of the effects of nuclear weapons on the environment, they were also meant to draw an arc from those distant moments in the past to the present and heighten the relevance and importance of the inspector’s work.

and not to take any collected data or information for granted. Their data collection tasks were part of a "bigger cake" in the state evaluation process, and thus were consequential for the eventual results of that evaluation. The independence of the IAEA's conclusions needed to begin with the inspector's data. The IAEA's legitimacy, he stressed, was lost through mistakes.

Currently, their work was considered "valid" because inspector rights and responsibilities were "clear" and the system was "established." Inspectors needed to stick with the factual because it was straying into "political" territory and outside of the IAEA's (perceived to be) technical mandate that resulted in the loss of legitimacy for the organization. This, too, began with the inspector at a facility. The section head warned that operators of nuclear facilities recognized a good inspector and "the worst that can happen to you is not to be recognized as a good inspector by a country or an operator." Here he was gesturing at the fact that the inspector was in effect performing the IAEA's technical expertise for the member state whenever he/she performed an inspection. And it was for the member state that the IAEA (in particular the Secretariat) needed to maintain legitimacy. The section headed elaborated on what he meant by the "political" in his discussion of the final pillar: credibility.

He argued that safeguards conclusions needed not only to be independent ("can be independent but stupid") but credible. This could be achieved by basing conclusions on facts (drawn from inspections) and on an understanding of the information necessary to be able to draw a conclusion for a particular facility (bigger picture). Cognitive biases ("wishful thinking"), personal biases ("blurry assumptions"), and reliance on non-expert and non-technical information or opinions pieces ("reading the newspaper") could destroy the credibility of the inspector's conclusion which should be based on "fact." He admitted that it was easier to achieve

"technically credible" evaluations with clarity and certainty for certain types of inspections, and that the tasks were more difficult with other types of inspections.[4] Nevertheless, the state evaluation framework required the inspector to think about how he or she could achieve the goal of technically credible and independent verification with view to maintaining legitimacy before the Board of Governors.

To summarize, in his opening speech, the training section head introduces the new inspectors to the notion that the IAEA's efficacy in providing credible conclusions about a state's nonproliferation commitments rests on the inspector's ability to capably perform technical inspection tasks, and the world's ability to trust those actions within a paradigm of bureaucratic objectivity. In this way, the performance of IAEA legitimacy is directly tied to the inspector's technical practice which must be free of errors and enrolled into a bureaucratic proceduralism in order to be considered valid. This is the challenge of the training section's introductory program: to train a group of inexperienced new hires to being competent inspectors that can capably conduct verification activities in member states so that member states maintain their confidence in the IAEA's legitimacy. The new inspectors must be trained to use and apply the great variety of inspection tools and techniques in the many different kinds of nuclear facilities. This requires knowledge of and adherence to the technical procedures for carrying out inspections.[5] But it is

[4] Trainers and inspectors distinguish between "item-type" facilities and "bulk" facilities. Item-type facilites are commercial nuclear power plants with nuclear material that is already packaged into items (in this instance, fuel rods) and thus easy to count and account for. Bulk facilities are characterized by the fact that the nuclear material there exists in "bulk" and undergoes transformation. Enrichment, fuel fabrication and reprocessing plants are examples of these types of facilities. In these facilities, accounting for nuclear material is more difficult because there are more opportunities for the bulk material to be stuck in pipes, etc. One trainer liked to characterize the difference by describing nuclear material in item form as "chocolate" and nuclear material in bulk form as the ingredients for making chocolate in a chocolate factory.

[5] Some of these include non-destructive and destructive analysis of nuclear material through gamma ray spectrometry, neutron counting, elemental and isotopic analysis; servicing and installing cameras and seals, and taking environmental samples.

not sufficient for effective safeguards.

In a closing moment of final points to the inspectors, the section head reiterated his directive, “use your brain.” He elaborated that they should not rely on procedure as “a procedure will never replace your value.” And they should also not rely on their memory because it could be faulty. Instead they should always be actively thinking, doubting, questioning, and focusing on the larger picture of their work in order to keep the purpose of their task (which seems small in a larger context of the nonproliferation regime) in mind. This directive would be reiterated throughout the course but also sometimes contradicted by a directive to simply “follow the procedure.” How to explain these competing logics? Does this tension between proceduralism and independent thinking derive from the change in safeguards methodology that appears to be challenging imaginaries of bureaucratic objectivity? It certainly appears this way from the present vantage point but a glance in the archives can show us that the earliest discussions on inspector training also emphasized the importance of not falling prey to rote proceduralism, and remaining alert to possible signs of proliferation.

3.3. Becoming an inspector in the 1960s

The training section head’s speech and the virtues that are required, or which the inspectors are encouraged to cultivate in their training and practice of inspection have much in common with the virtues and qualities of the inspection system (and its inspectors) as they were imagined in the 1960s when the IAEA began formalizing inspection practices and procedures, and also started developing a training program. The reader will remember the discussion from Chapter 2 that detailed the virtues and qualities of an effective international control system as it

was described by early proponents of atomic control. These reports stressed the importance of inspectors to remain at the forefront of technological innovation, creativity, and flexibility (Lilienthal, Acheson, and U.S. State Department 1946).

The reader will also remember that the negotiators of the IAEA statute wanted to ensure that safeguards would not be trapped by rigid bureaucratic procedures, but could remain flexible to adapt to a problem that was likely to grow and transform in the decades to come. At the IAEA, the safeguards system was developed incrementally and iteratively due to a number of constraints. First, bureaucrats were well aware that the system might change and needed to anticipate future developments of the nuclear sector. Second, there was also resistance by some members of the Board of Governors to allow the Secretariat to move forward with developing a safeguards system which they thought a "minor function of the Agency" (McKnight 1971, 45).

The first system described in INFCIRC/26 and simply called "The Agency's Safeguards" which only applied to reactors of small sizes (research reactors, no power reactors, under 100MW), was revised and extended to include power reactors in 1965. As the policy-making bodies were negotiating this first more widely applicable safeguards system, the Department of Safeguards (was it called that at the time?) began conceptualizing the type of pedagogical materials that would be required to train newly hired inspectors in this novel task.

The archival material shows not necessarily a linear progression of training but rather repeated attempts to develop and grow a comprehensive training program according to the safeguards problem as it was conceptualized at the time. In the period from 1964-1969, we can see the development of what seem to be four distinct training programs under different names. Indeed, in 1969, a recently joined staff member writes that he had conceptualized and

implemented a two-month (?) training program in the fall, “the first of its kind” in the Department. This gives an indication of the lack of coherence and institutional memory (the archives contain records from 1966/67 that show that longer trainings (several months) had taken place), likely linked to what might be a high turnover of staff, and the organizational expansion of the Department of Safeguards.[6] Indeed, in each of the attempts at formulating a training program the staff seemed to be developing materials from scratch.

Another element that can be observed from the archives is that up until the late 1960s, the safeguards staff developed training materials in relative isolation from outside institutions. It is only in 1968, that the first IAEA safeguards employee attends (and delivers a lecture) at a safeguards training at the Argonne National Laboratory outside of Chicago where the US Atomic Energy Commission had set up a safeguards training section (likely in order to deal with their own safeguards responsibilities and requirements that were growing in that decade).

From the late 1960s and into the 1970s, the archives show increased and intensive cooperation with the US, the UK, and in isolated moments, the USSR for training purposes. Most of these “external” trainings are designed to provide inspectors with hands-on experience with safeguards techniques in actual nuclear facilities (which are in short supply in Austria). For example, the UK Atomic Energy Agency organized a bulk sampling course at the Windscale facility. These training visits allow the inspectors to visit and experience a variety of nuclear facilities, especially less common ones such as enrichment and reprocessing facilities. The types of nuclear reactors are different depending on which country and company developed them.[7] The

[6] In the early 1960s, there was only a Division of Inspections. A few years later, this division grew into a Department of Safeguards with a Division of Development and a Division of Inspections. (I have not been able to find records of when exactly this occurred.)

[7] See Hecht (1998) and Schmid (2015) for technopolitical histories of the French and Soviet civilian

biggest differences for IAEA safeguards are between reactors that use natural uranium as fuel of which the primary example is the Canadian "CANDU" (short for CANada Deuterium Uranium) reactor and reactors that use low-enriched uranium for fuel. Among these reactors, the most common is the pressurized water reactor (PWR) designed in different ways in the US and the USSR.

Nevertheless, there is significant overlap between the trainings devised internally by the safeguards staff and by the training recommendations issued by external organizations. A few themes on the virtues of the safeguards system and its inspectors are highlighted throughout the decades and find their newest expression in the speeches of the Deputy Director General and the training section head at the introductory course I attended. Looking at the archival material, one may note that the qualities of bureaucratic objectivity adhere mostly in the safeguards system itself. The inspector is, of course, an important component of this system, but he must walk a thin line between upholding the virtues of a system based on bureaucratic objectivity and embodying the astute competence that can overcome the shortcomings of a necessarily rigid system.

Let's look first at what the system is supposed to be like. A training manual from March 1964 articulates that safeguards at this stage are a work in progress and that many changes are anticipated in the future[8]. At this point in time, the original safeguards system had just been expanded but the first overhaul of the system that would result in INFCIRC/66 would not be

nuclear energy programs, respectively.

[8] "The functions of inspection may or may not end here, those of the [control] system clearly do not. Whether or not inspectors should count among their duties that of determining (or judging) if certain detected anomalies evidence the existence of a military programme, it is clear that the control organization does have that responsibility. The extent to which individual inspectors or teams will be expected to discharge this responsibility is a policy matter which probably will not be settled until a substantial number of significant facilities are under safeguards." (SAF-131, Programme March 1964, page 3).

agreed until the following year. The manual stresses that the inspector must exercise judgment. "A very important task to be performed by the inspectors, and one which calls for the exercise of sober judgment is the investigation of findings.[9]" It also articulates that the lack of technical instruments requires a focus on material accountancy.

> The present situation with regard to availability of instruments etc. favors a certain over-estimation of the importance of records and reports. Surely at present it is one of the most important tools in safeguards activities - but only one of them.[10]

The general message of the manual is that while things are changing, it is important to recognize the limitations of the present system and work within them.

A few years later, in a report on his attendance at an Argonne safeguards training course in the fall of 1968, Safeguards department staff member Alexander Stefanescu writes,

> The participants in this training programme also had the useful opportunity of listening to the opinions of most of the important people involved with international and national safeguards who defined almost unanimously the future development and qualities of a modern international safeguards system as being:
>
> (1) Credible
> (2) Technically effective
> (3) Inexpensive relative to the value of the materials safeguarded
> (4) Depersonalized to the maximum extent possible
> (5) Minimum interference with plant operation
> (6) Changes should be implemented in a progressive manner for minimum disturbance of the economy.[11]
>
> These six qualities can be seen as the evolved consensus after a near decade of

[9] No box number given, SAF-131, March 1964 programme, page 9.
[10] No box number given, SAF-131, March 1964 programme, page 12.
[11] Box 9847 SAF-131 1966 to 1970 Discussions of more formalized training program with Argonne USAEC, (page 9 in PDF).

developing a working safeguards system and two decades of considering the problem of the international control of atomic energy. Points 3, 5, and 6 speak to the constraints of international governance and echo the concerns with discrimination and sovereignty that were articulated during the negotiations of the IAEA's statute. While inspections were by definition invasive, the system needed to attempt to be as minimally invasive as possible in order to not interfere with the economic operations of the member state. And of course, it would have to be as cheap as possible. Point 1 arguably relies on points 2 and 4 for achievement. The safeguards system must be designed in a way to be able to ensure that it can detect diversion of nuclear material. And it must be carried out in a way to be effective through a rule-based organization of tasks and to limit accusations of politicization and discrimination through the thorough depersonalization of the inspection process. In this point we can see that this aspect of bureaucratic objectivity is thought to be central to the achievement of a successful safeguards system. While points 3, 5, and 6 are desirable for the most widespread acceptability of the safeguards system, points 2 and 4—technical effectiveness and depersonalization—are the pillars upon which the system's *credibility* rests.

While the safeguards system's theoretical technical effectiveness relies primarily on the adherence to a conceptually sound rule-bound set of procedures through which diversion would ideally be detected, its practical effectiveness has to counter the rigidity and thus also the flaws of the rule-bound system. This position can be found in a letter from a chemist and safeguards training officer at Argonne National Laboratory to the staff member (Alexander Stefanescu) mentioned above. In this letter, Hymans comments on the proposed training program devised by Stefanescu and offers suggestions for improvement. This letter is worth quoting at length:

> I think your proposed course is a detailed and excellent summary of the material you will have to teach your inspectors. I would not want to comment on such details as the specific analytical procedures and the time taken to learn these. I'm sure your guesses are as good as anybodys [sic] and you might modify them with experience as you need to. I would like to make a few general comments about the course and safeguards philosophy which I'm sure will come as no surprise to you, but which, perhaps, I ought to put in writing.
> The first, I suppose, is the recognition of the substantial variety of experience and the flexibility that an inspector must have if he is going to deal sensibly with the many and various patterns of performance he will encounter. There was an obvious tendency in our course for the students to look for definite answers, very much in line with the usual requirements of students learning a particular set of subject matter. I have a feeling this tendency will be even stronger for the inspectors you will be training and there will be a strong tendancy [sic] to want an official procedure, a book of rules which one can follow and feel secure. I think it is vital to get across to your inspectors that if they indeed confine their observations to any specific and well prescribed set of procedures this very fact itself will reduce their effectiveness. Any attempt to enforce an international safeguards procedure will require men who are flexible enough to look for the loopholes that will inevitably be found by someone dealing with any preconceived set of rules. I would resist strongly any attempt to develop inspection into an agreed upon repetitious pattern, no matter how well designed the particular pattern is for detecting deviations in any particular system.
> It is obvious that there are built-in weaknesses in an international system established after the fact. I think the inspectors at least should be trained to distinguish between reality and window dressing…I guess to sum up, I am emphasizing flexability [sic] and broad knowledge and alertness on the part of the inspectors rather than a rigid ritual and I would hope the training reflected this bias just a little.[12]

This letter reveals that by 1968, professionals dealing with the issue of nuclear safeguards inspections had become well aware of the limitations of the rigid "preconceived set of rules." It was widely anticipated that no set of safeguards rules could be completely free from potential manipulation by parties who wanted to cheat the system, and build (or even experiment with developing) nuclear weapons. Hymans acknowledges that students new to a topic understandably clung to a set of rules and guidelines to follow in order to "feel secure" in their new area of work.

[12] Box 9847 SAF-131 1966 to 1970 Discussions of more formalized training program with Argonne USAEC, Dec 20, 1968.

But he highlights the importance of flexibility in order to counteract the limitations that were understood to be necessarily part of any safeguards system. The inspector has to complement the "technically effective" sets of procedures that are invariably put in place (bureaucratic objectivity) with flexibility and individual alertness if the flaws of the system should be shored up. It is interesting to note that Hyman's advice not to "attempt to develop inspection into an agreed upon repetitious pattern, no matter how well designed the particular pattern is for detecting deviations in any particular system" was eventually substantively ignored in the development of NPT-based safeguards. These, now dubbed "traditional safeguards" rely on a predictable system whereby "quantity" of nuclear material and "timeliness" of detecting diversion determine the number and types of inspections to be carried out by the inspector in any given facility.

The NPT-type inspection system was supported by a rubric called "safeguards criteria." The section head of the training section repeatedly argued that these criteria were intended to be an evaluation tool (for evaluating the effectiveness of a given inspections plan for a facility) and had been mistakenly—and widely—adopted by the operations division as a tool to plan inspections. With the introduction of the state level concept there was an attempt to move away from the safeguards criteria and towards the dynamic production of an "annual implementation plan" for a given state which would take into account factors beyond the quantity of nuclear material and the timeliness of detection. Indeed, it seems that this is a way to finally address the rigidity and ineffectiveness of a calcified system that did not address the "loopholes" that Hymans argues "will inevitably be found by someone dealing with any preconceived set of rules."

The reader will remember that Iraq successfully exploited the loopholes of the IAEA's safeguards system focused on diversion that allowed the country to clandestinely pursue a nuclear weapons program. The transformation of the safeguards system seems to have finally attempted to address the shortcomings of a rigid system by emphasizing flexibility and highlighting the importance of the inspector's alertness and broad knowledge to the success of the inspections. It becomes clear then that there is a trade-off here between the perceived legitimacy offered by bureaucratic objectivity institutionalized in a system of rule-based knowledge and the perceived improved effectiveness provided by a flexible and dynamic approach to safeguards that emphasizes the inspector's embodied contribution. The credibility of an international safeguards system that had been built to rest upon the procedural promises of bureaucratic objectivity is now threatened with the introduction of a safeguards methodology that builds flexibility and anticipation of loopholes into its assumptions and activities.

In her ethnography of nuclear facility operators, Perin (2006) identifies three competing "logics of control culture" (Perin 2006, 198), "calculated, real-time, and policy" logics that enable and constrain different ways of enacting nuclear safety. Policy logics are associated with the economic interests of running a commercial nuclear power plant. Calculated and real-time logics relate more directly to the everyday operation of the nuclear station. Perin shows how achieving safety is a difficult balancing act between following the "routines and scripts [that] are plentiful for predicted situations and imagined emergencies" (Perin 2006, 199) and mobilizing "evidence, knowledge, and methods that are largely experiential and substantive" (Perin 2006, 202) whose main drawback is their general resistance to quantifiability. She argues that the fetishization of quantifiable knowledge, which Porter (1996) has also described in the context of

state bureaucrats, combined with the policy logics of management can lead to the systematic devaluing and neglect of real-time logics embodied by seasoned plant operators. This tension between intuitive and systematic knowledge has also been described by Ginzburg, who tries to recover the value of "clues" across art history, detective fiction, and psychoanalysis (Ginzburg and Davin 1980).

In the context of nuclear safeguards, too, the dominance of rigid quantifiability at the expense of the intuited, experiential knowledge has run throughout the IAEA's history, and seems to continue to determine much of its functioning, at least formally. Even the training section head seems of two minds about how he'd like the new inspectors to carry out their tasks. But perhaps the new state level safeguards methodology has only brought to light what has always been an in-built tension between rote proceduralist "calculated logics" and the embodied "real-time logics" that accompany the running of complex engineered systems. Is this the moment at which flexible and experiential knowledge can finally claim ascendancy against its long-time rival in quantified and bureaucratic knowledge?

Next, I discuss how the new safeguards methodology was returned to the fold of bureaucratic objectivity. In response to accusations of politicization but also as a way to systematize new processes, the new safeguards system has been enrolled into bureaucratic practices and procedures. I will turn to consider the bureaucratization of an analytical process that the Department of Safeguards implemented as a key indicator of how actors within the organization are trying to manage the stresses of defending against accusations of politicization.

3.4. Bureaucratizing analysis

One of the major critiques from both within and externally to the Secretariat about the state level safeguards methodology centered on an accusation that the methodology unduly projected the role of a state's possible intent[13] to build nuclear weapons into estimates of the state's nuclear weapons development capabilities. In his speech to the new inspectors, the training section head makes clear that while this new methodology does more explicitly (than the old system) consider the possibility of a state's paths to a nuclear weapon (and uses these paths as the basis on which to build a custom safeguards approach for this state) this does not imply that the inspectors should be gauging the state's intent to build a nuclear weapon. Indeed, inspectors should assume no intent at all in their projection of a state's likely paths to a nuclear weapon. Rather, they should focus on the technical "plausibility" of a given identified path. In a cultural context in which states do not develop nuclear weapons accidentally, there is an attempt to remove from consideration the state's political intent and merely focus on technical agency ("plausibility").[14]

The attentive reader will remember the discussion about the development of nuclear safeguards in chapter 2 which details that the international control of nuclear energy is based on the founding assumption that states intend to develop nuclear weapons with their civilian nuclear program, and that in order to prevent the spread of nuclear weapons, states must be monitored. Such an international control system loses its rationale if it is assumed that states are absolutely

[13] The discussion centers on the notion of a state's intent because the safeguards state level methodology is a projective exercise. If evidence for non-compliance has been found in a state, then culpability could be assigned to that state for its non-fulfillment of its legal obligations. However, discussions about the state level methodology tend to focus on what is perceived as an inappropriate focus on state intent.

[14] In this way, the inspector as anthropologist must consider possible actions without deliberating their meaning (Duranti 2015).

not interested in building nuclear weapons. This raises the question why assuming a state's intent to build nuclear weapons is suddenly a problem for critics? I argue that this is another peripheral effect of the ideology of bureaucratic objectivity. This effect makes nuclear material accounting seem like an end in itself. It obscures that the whole premise of safeguards must assume intent in order for there to be a need for nuclear safeguards.

Through the change in the methodology, the assumption of intent is moved from the bureaucratically objective practice of nuclear material accountancy and made visible in the practice of "acquisition path analysis,"[15] which are carried out by state evaluation groups that comprise inspectors as well as analysts. Intent has become the target of breathless outrage because its determination is thought to rest in the hands (or minds) of analysts who are imagined to possess a threatening subjectivity that could "politically" influence the outcome of the state evaluation group's work. The attentive reader will also remember that the inspector's subjectivity was also of great concern in the early development of an international control system; and was satisfactorily corralled through bureaucratic proceduralism.

In this section, I first take a look at the role of and stereotypes about analysts within Department, and then show how the internal response has been to attempt to regiment parts of the analytical process in order to highlight its technical facticity and bureaucratic objectivity, and once again re-obscure intent as the foundational assumption of nuclear safeguards.

The Department of Safeguards structurally divides the labor of inspectors and analysts into separate Divisions. The three operations divisions (A, B, C) are distinct from the division of Information Management (SGIM). They are also located on different floors of the Vienna

[15] Acquisition path analysis is used as a way to custom build the safeguards approach for a state. Do it once and build on it. Develop it as you learn more etc.

International Center's "A-tower." During the previous DDG's tenure, a collaborative structure was implemented through which the expertise of analysts and inspectors were to be pooled in "state evaluation groups" (SEGs). The expertise of inspectors and analysts are differentially valued. This is expressed in the priorities of assignment to training courses offered by the training section. Certain popular courses are thought to be the prerogative of inspectors and only a few slots per course may be opened for analysts or even "general-staff." Despite the fact that analysts and G-staff (in certain higher grades) work on projects for which they would benefit from certain courses, they are excluded from the inspectors' realm of technical expertise and are deemed not to need courses with "technical content."

There is a baseline assumption among many staff that individuals without a "technical background" (which sometimes includes inspectors) must prove themselves to be as capable and useful as their counterparts who do possess a "technical background" (despite the fact that a technical background does not immediately and necessarily translate into greater ability in the inspector or analyst job). The analysts' expertise is not primarily tied to the competent execution of technical tasks, rather it rests in the ability to "analyze" a diversity of information and draw out its interconnections and relevance. (This is of course also what an inspector does on inspections but this practice is not described in terms of analysis.) In order to support the analytical tasks of the Department, the training section had developed (sometimes with the assistance of Member State Support Programs) training courses for a variety of "analytical skills" that both inspectors and analysts were encouraged to take in another example of the bureaucratization of judgment.

In critiques of analysis, the practice is often linked to the introduction of "subjective

opinions" or "bias." There is a concern (echoing back to the early days of the international nuclear control) that the analyst would let his or her own "political opinions" influence the state evaluation process. Indeed, as was mentioned in chapter 2, member states must approve the inspectors that are "designated" to conduct inspections in their country. States have used this rule to exclude inspectors who are nationals of unfriendly or unallied countries.[16] But this concern about political bias can in part be explained by pointing out that much of the "analysis" that is done externally on the IAEA and nuclear subjects is undertaken by political scientists and policy scholars at think tanks who do represent particular positions on the political spectrum. In addition, the Department of Safeguards often draws on this pool of experts to staff analyst positions in SGIM. Nevertheless, this position ignores that analysts who work for the IAEA are international civil servants just as much as other staff members and that therefore their commitment to the organization's objectives should not become the subject of scrutiny.

However, it seems that there are two additional related reasons why analysis is suspicious. The first is that analysis requires a level of abstraction from information sources which was not part of traditional safeguards. Interpreting and extracting information from open sources (such as academic publications, trade databases, and the news) requires a kind of judgment that has not been formally understood as having been widely practiced by inspectors at the IAEA. This practice of analytic abstraction is not as rigorously and practically externalized in the same way that inspection practices have been externalized through bureaucratic proceduralism under traditional safeguards. Analysis in the way that it has been practiced at the IAEA is not as formalized as inspection and thus it is somewhat inscrutable and not as traceable

[16] For example, some non-nuclear weapons states do not let inspectors from nuclear weapons state be designated for inspection in the non-nuclear weapons state.

as nuclear material accounting. The role of analysis for national intelligence services also introduces unwelcome connotations for those concerned with maintaining the boundaries of the IAEA's mandate.

For some opponents, the new safeguards methodology entails an exercise of judgment by inspectors and analysts that exceeds the mandate of the IAEA. These opponents understand the inspection regime's authority to derive from procedural rationalism in which the role of judgment (although it must clearly be a component of any data-gathering and evaluation exercise) should be structurally minimized. The inspector under traditional safeguards had his judgment carefully circumscribed by a set of procedures that would provide traceable and reproducible results, and thus hold individuals accountable to an ideally apolitical paradigm. Analysts and inspectors working with the new safeguards methodology, the fear was, would be able to insert their own judgments without trace, and potentially turn political hunches into technical imperatives. What was worse than being perceived as politicized, the IAEA's authority could more seriously be undermined if politicization was able to pass unnoticed under the cover of the technical.

Discussions surrounding these issues occupied a series of "Technical Meetings" held by the Board of Governors in which key safeguards bureaucrats attempted to present the new safeguards methodology as accountable and transparent. Safeguards bureaucrats understood that they needed to present their strongest case for this method. One of the key pillars of the new safeguards methodology was the so-called "acquisition path analysis." It was to be used by state evaluation groups (SEGs) in determining the safeguards approach for a given country. This kind of analysis had been in use in the department for years in a less complex form, but it had recently

been elaborately overhauled, formalized, and published internally as a "guide" document. Fundamentally, the guide brings analysis back into the bounds of procedure and introduces accountability to the various parts of the process. By following the guide, state evaluation groups are externalizing the analysis by providing visual and written documentation of their analytic process. This, I argue, is a way that safeguards bureaucrats came to address the problems of judgment, abstraction, and accountability that had begun to undermine the IAEA's claim to technical authority from the perspective of some member states. The bureaucrats attempted to make analysis bureaucratically objective.

The guide is an internal restricted 30 page document that gives detailed instructions and guidance on how to conduct an "acquisition path analysis" or APA. Acquisition paths are the technical ways that a state, given its existing nuclear, scientific, and industrial infrastructure, could produce enough nuclear material for a nuclear weapon.

The APA guide divides the process into multiple steps, provides a visual representation of the analysis process, and encourages the state evaluation groups to use visual tools to represent and document hypothetical acquisition paths. In the case of states with large fuel cycles and many nuclear facilities, the number of hypothetical acquisition paths is large, and must be narrowed down in order to be usable. The question of how to identify the paths that the SEGs should focus on also become controversial. In order to eschew discussions of intent, the guide requires users to concentrate on the "technical plausibility" of acquisition paths. The metrics for technical plausibility include the state's industrial capabilities (in machine engineering, for example), access to relevant equipment and resources, and specialized training and expertise. By focusing these kinds of metrics, the APA (and by extension, the state evaluation process)

attempts to remove any consideration of political intent. “Technical plausibility” and “time to estimated completion” were chosen as the twin criteria for selecting high priority paths.

According to the developers of the guide, the chief difficulty lay in writing the guide in such a way as to make it applicable to the variety of states and fuel cycles that are subject to safeguards. The stated purpose of the guide was to increase the robustness of the state evaluation process and to provide a uniform process across the operations divisions in order to ensure the consistent high quality of its outcomes. In the training section and beyond, trainers and inspectors are somewhat concerned about the (lack of) consistency in bureaucratic processes across the different operations divisions. Despite the fact that a department-wide master list of bureaucratic documentation is supposed to homogeneously regulate inspection activities, the actual inspection practice has evolved in different ways in different divisions according to habit. Inspectors argue that the differences in practices can be challenging when they are rotated as they often must learn a new set of procedures for familiar tasks. The APA guide is thus an attempt to impose a common procedure across the divisions.

In the development process and pilot phase of the APA guide, staff articulated great resistance against the tool. The first more widespread critique was about the guide’s perceived in/appropriateness for a particular state. Users complained that the tool expected them to provide too much detail or not enough detail, depending on the complexity of their state. The developers recognize that the tool must have this limitation of being a perfect fit for no case, in order to be able to serve all of the cases. They avoided producing a template that users could fill with information because they saw that the tool needed to provide maximal flexibility for users to be able to use it to its maximal effect.

A less common, and accordingly "outlier" critique, decried APA for being mechanistic and forcing the users to conduct the work of a computer. While this seems to counter the fears of analysis as subjectivity that so concerned the critics, it reveals the purpose of the APA guide development: to bureaucratize analysis. This outlier critique indicates that inspectors see their expertise as embodied, organic, and spontaneous, and that this kind of expertise was being stifled by the enrollment of analysis into a formalized technocratic process. The virulence with which the outlier critics reacted to the analytic procedure hints at the success of this proceduralization of analysis. The guide developers managed to bring analysis into the disciplining arms of bureaucratic objectivity and cast "intent" back into the shadow of the epistemic ideology's ideological effects.

3.5. The division of technopolitical labor (again)

The Department of Safeguards is trying very hard to re-stabilize the boundary between technical and political things by subjecting their analytical methods to bureaucratizing procedures so that they may fit into the dominant expectation of the IAEA as an organization based on bureaucratic objectivity. After the introductory course, I asked the newly formed inspectors themselves where they saw the dividing line in the work of the Department. Their answers reflected a task-based and hierarchical division of labor that in a recursively fractal way (Irvine and Gal 2000) mirrored the division of technopolitical labor between the Secretariat and the policy-making bodies that is built into the mandate. In order to better understand how and where the inspectors located the boundary between technical and political domains, I will briefly describe the process of how the operations division's main product, the "state evaluation report"

is produced. (There is also the annual safeguards implementation report which combines data from individual reports in order to provide an overview of that year's inspection activity.)

Inspectors conduct verification activities at nuclear facilities in member states. The results of these activities (nuclear material identification, measurement, and accounting, containment and surveillance) are documented in an inspection documentation package" (IDP) also known as an inspection report. For each state, a state evaluation group (SEG) meets on a regular basis to discuss and analyze the inspection reports as well as the information collected by "analysts" that is supposed to provide a view of the "state as whole." The group also conducts the acquisition path analysis described in the previous section in order to identify the "technical objectives"[17] according to which the safeguards approach for the state is planned and the information needs for the analysts are identified. The SEG collectively produces a state evaluation report (SER) with its all-important "conclusion" which then undergoes a process of review and revision up a hierarchical chain of responsibility and professional grade until it is eventually approved by the DDG and presented to the DG. We will see that inspectors understand the technical and the political aspects of the Agency's work to be distributed along a hierarchy of tasks and positions.

To begin with, all inspectors understand that the work of the Agency is subject to great scrutiny by the member states and that their work is politically consequential beyond the policy-making bodies. One inspector argues that "clearly [safeguards] is political because it's dealing with the state." The involvement of nation-states makes safeguards a matter of international

[17] For example, "detect Plutonium separation at hot cells," "determine chemical separation of Uranium isotopes," "detect design modification of reprocessing facility." Technical objectives should be accomplishable through the application of technical expertise and equipment. They are supposed to answer a question or clear up doubt about a posited step of a state' plausible acquisition path.

politics in the sense that there are international laws and structures of governance that support the work of IAEA safeguards. Most (all) inspectors consider the actual inspection work itself not to be political but purely technical. “The work done at the level of the facility is not, clearly not.” Indeed, the inspector’s verification activities are not only technical in and of themselves, they are also considered the “technical level” of the safeguards system. “On [the] inspector level, on [the] technical level, technical work dominates.”

The technical aspects of the safeguards system are not only expressed as the inspection tasks but also inhere in the professional grade positions of the new and mid-career inspectors. “I think the inspector, or maybe P-3, P-4 levels they are technical and we are not asked to have politics in our job.” The newly minted inspectors draw a dividing line that aligns with tasks but also with a certain position in the hierarchy of job grades that seems to indicate an understanding that with increased responsibility, and an increasing application of judgment, comes an increase in taking politics into consideration.

> Starting with P-5, Director [positions] everything, they really have to take into account and manage to make the member states happy,[18] but that's a good thing that for the technicians going into the field, we don't have to think about all that and we just do our job and … then the other ones decide how they communicate (… and they politicize it.)[19] But I think that's [the division of technical and political labor] very well done in my opinion.

This inspector is satisfied with the division of responsibility into technical and political domains. As an inspector, they have the freedom to simply “do our job” and “don’t have to think about” the political consequences of the outcome of this inspection. In effect, the safeguards

[18] This should not be read as the Secretariat sycophantically pleasing the member states. Rather I think it indicates an understanding that the Secretariat is responsible to the Member States as mandated in the Statute.

[19] I think what the inspector meant is that communication necessarily entails a positioning that can be described as political. I don’t think it means that the management purposefully polemicizes a given state evaluation.

management functions as a buffer between the member states and the inspectors.

Nevertheless, the understanding of the "political" nature of the safeguards work plays a role in how the inspector approaches his own responsibilities.

> I want to make things right [carry out inspections correctly and properly] such that I'm able to put my name at the bottom of the page [of the inspection report] saying that I did what I claim I did and if I see something wrong or if I see that everything seems okay, I can stand with that.

The inspector takes responsibility for their role in the safeguards system. The accuracy of the measurements and the accounting rests on the inspector's shoulders, and the inspector understands that these results may be the beginning of an indication that a state is not complying with its safeguards agreement.

> As soon as I come here and I report and I present something yes or no it's in agreement, it's not in agreement this becomes political because the consequence of that [might be] an anomaly [or] a discrepancy[20] … and that starts the political aspect.

While the inspectors take responsibility for the accuracy of their reports, at their level they are not forced to be responsible for the "conclusion" that is eventually reached when the inspection reports are combined with the outcome of the non-inspection production of knowledge about the state to result in the drafting of the state evaluation report.

> The things that I'm doing now [as a P3 inspector], the yes or no [certainty of information] is relatively obvious it's more of a science side or practical side, doing a measurement and getting a result. But then it's taking all of those results together and making a decision about the country as a whole [is where the process becomes more ambiguous], but at the moment that's outside of my duties.

[20] Anomaly and discrepancy are terms of art. A discrepancy is an inconsistency found in the operator's records. When it cannot be resolved and involves nuclear material in quantities that become significant for nuclear weapons production, the discrepancy can be classed as an anomaly. An anomaly is defined as a "an unusual observable condition which might result from diversion of nuclear material or misuse of safeguarded items, or which frustrates or restricts the ability of the IAEA to draw the conclusion that diversion or misuse has not occurred." (IAEA 2002)

While there are state evaluation groups (SEGs) that the inspectors participate in, it is usually the head of this group, the country officer (CO) that signs the report and it is then reviewed and eventually signed off on by a committee that spans the three operations divisions. Finally, the DDG of the Department and the DG take responsibility for the conclusion of the report. There is thus clearly a hierarchy of responsibility that ranges from technical responsibility at the lowest (entry-level inspector) level to political responsibility at the highest (DDG and DG) level. One inspector mused on the subject,

> For an inspector just understanding the political background is important but it does not really affect you too much, when you're doing your technical work. But of course for the management it's a different issue because they have to have a balance of difficult considerations with the technical objectives. How you balance that and even though the IAEA is a technical organization—we're supposed to be impartial and so on—in reality, it would be difficult, I don't know how management does this but it would be difficult to keep a perfect balance, how the management does this, it's something I don't really know.

In acting as a buffer between the technically-focused inspectors and the member states, the management must strike a "balance" in weighing the technical objectives of when and how to conduct safeguards in a state with the "difficult considerations" that arise from being the bearer of potentially unhappy news (about non-adherence to safeguards agreements). That is to say, the management is stuck in an uncomfortable position of having to make explicit the uncomfortable assumption about "intent" when they ask for clarification from a state.

The problem seems to lie in bringing together categories of states that are deemed to be unlike each other. For example, in recent years it has come to light that Japan had failed to report over 600kg of plutonium to the IAEA.[21] A June 14, 2014 Bulletin of the Atomic Scientists article

[21] http://www.japantimes.co.jp/news/2014/06/07/national/japan-failed-to-report-640-kg-of-nuclear-fuel-to-iaea/?utm_source=rss&utm_medium=rss&utm_campaign=japan-failed-to-report-640-kg-of-nuclear-fuel-to-iaea#.VzNTUIQrIdV

characterizes the issue:

> Japanese officials claim that this under-reporting was an honest error of interpretation of the rules, because the material in question was part of the plutonium-uranium mixed oxide (MOX) fuel stored in a reactor that happened to be offline during this period.
> But some Chinese policymakers and strategists question whether such under-reporting was an honest mistake, and wonder if it was a deliberate effort at concealment, as it is relatively straightforward to separate out the plutonium in MOX fuel that is "fresh" (i.e., not needing further reprocessing) and use it in a nuclear weapon. And in any case, the IAEA requires a report on all fresh, unirradiated MOX fuel.[22]

As we can see from this example, some of the difficulty arises from the fact that the Secretariat's mere reporting to the Board of Governors about a state's failure to comply with its safeguards agreements is immediately interpreted (by member states and others) as an intent to pursue nuclear weapons. The pragmatic entailments of a report of an anomaly are the intent to build a nuclear weapon, even if there are technically conceivable ways that a state could produce an anomaly in its nuclear fuel cycle without actually intending to build nuclear weapons.[23]

As I discuss at greater length in chapter 6, the interpretation of anomaly as non-compliance has been stickily entextualized in the recent history of non-compliance cases, and complicates the management's ability to act without taking into account what a report will "look like" to audiences.[24] The management must attempt to balance the perceived entailments of any

[22] http://thebulletin.org/china-worries-about-japanese-plutonium-stocks7248

[23] For example, this article discusses how Japan ended up with such a large stockpile of plutonium to begin with through slow reprocessing of the fuel, and suggests ways of remedying this apparent breach of confidence and restoring "transparency" to the Japanese civilian nuclear program through an IAEA nuclear material custodial regime (echoing Eisenhower's call for a fuel bank!) http://legacy.armscontrol.org/act/2014_09/Features/IAEA-Custody-of-Japanese-Plutonium-Stocks_Strengthening-Confidence-and-Transparency

[24] This restriction has, in part, become self-imposed with the Secretariat's introduction of the notion of a "broader conclusion." This is an expression used in state evaluation reports which indicates that a state has been acting in strict accordance with its obligations. In other words, when the IAEA bestows the "broader conclusion" it is confident that such a state is nuclear weapons (intent) free. A vocal critic of the IAEA, Dan Joyner, has taken issue with the pragmatic entailments of this notion and has pointed out its limitations on his blog. https://armscontrollaw.com/2014/06/18/did-japan-violate-its-safeguards-obligations-through-failure-to-report-plutonium/

given reported outcome with expected uptake from member states. The inspector quoted above seems puzzled at the possibility of achieving this balance, even though he also acknowledges that the management "does this" even if he does not "really know" how. As inspectors move up the chain of professional grades and eventually assume P-5 positions themselves, they may become more aware of how the technopolitical balance is struck in the management buffer zone between technical inspectors and the always already political member states.

3.6. Conclusion

Through a consideration of the prevalent practices and discourses of safeguards training section it becomes clear that the epistemic ideology that is propagated for safeguards inspections is only partly committed to an ideal of bureaucratic objectivity (as it exists primarily in the minds of diplomats as a persuasive fiction). In the training section, the section head and the trainers acknowledge that bureaucratic procedure is important in order to do the work correctly (indeed, the trainers spend much of their time inculcating procedural-technical skills in the inspectors), but the inspectors' work and responsibility to the larger effort do not end with the correct execution of inspection tasks. Effective safeguards, the training section head reminds, must rely on alert and able individuals. Over-reliance on the bureaucratic epistemic norm constrains the inspectors to the degree of failure, as the inspectors are frequently reminded of with the Iraq case. Indeed, the challenges to safeguards in the early 1990s (Iraq, South Africa, DPRK) show that just following the procedure is not enough, and that the Agency needed to use its brain again. Indeed, the Iraq debacle basically shows what happens when those in charge of safeguards are no longer thinking about the loopholes that the US safeguards trainer Crowson warned about

in his letter to the IAEA trainers in 1964. From the development of IAEA safeguards it appears that this advice was not explicitly followed, and that the preparation for the comprehensive safeguards required by the NPT mostly focused on the development of sophisticated technical tools and methods to sharpen and optimize nuclear material accounting.

The transformation in safeguards methodology is sometimes described by practitioners and observers as a change from nuclear material accountants to nuclear detectives. The implications of this characterization are rather obvious: accountants are considered to be disinterested agents, detached from their context who look at numbers on pieces of paper. Detectives, however, "snoop" and air people's dirty laundry, their presence implies unsavory, if not criminal, activity. This makes many who are satisfied with bureaucratic objectivity as the governing epistemic norm deeply uncomfortable. "Using the brain" is scary to critics who are used to figuratively "brainless" inspectors-as-accountants that soothingly produced rule-bound safeguards knowledge. The training section head tries to strike a balance by encouraging the inspectors to think independently but reminding them that their work must always be based on "facts." Facts are produced by following the procedure and this insight has also been instrumentalized in the development of a guide for acquisition path analysis.

This guide addresses the tensions that have arisen from the greater emphasis of the inspector-as-detective. By laying out a detailed approach for production of facts based on a stable procedure, it harnesses the inspector and analyst gone wandering in analysis-land back into a bureaucratic structure of knowledge production. The guide requires the users to externalize their analytic processes and provides for specific ways to document how they arrived at a particular conclusion. In other words, the participants both use their brain and follow the

procedure. At the same time, the guide aspires to be applied universally across the operations divisions of the department with the aim of achieving consistent quality in the outcome of the analysis. I read the guide as a way of addressing the persistent fears of analysis among the Secretariat and the Board of Governors with a familiar response that attempts to restabilize the bureaucraticity of safeguards as a practice and, in effect restabilize the boundary between technical and political. The success of this endeavor can be evinced by the virulent response of some inspectors who see a methodical acquisition path analysis as taking away from their embodied and artisanally crafted experiential expertise.

After their induction into the nuclear safeguards world, new inspectors identify the division of technical and political labor as lying structurally and functionally in the department's management which thus serves as a kind of buffer or firewall between "technical" inspectors and "political" diplomats. At their level of the safeguards hierarchy, they are mostly required to "follow procedure" as brain use is reserved (sometimes) for the positions higher up the ladder. Responsibility for safeguards conclusions lies with the members of management that signs the annual report. Perhaps it is useful to think of the epistemic ideologies at the IAEA to shift depending on who articulates it and who it is demanded of. As an unsatisfactory closing, I also want to note that the different fault-lines between and alliances within and across epistemic ideologies at the IAEA seem to contradict each other and stand in irresolvable tension is due to the diversity of positions within the Secretariat and the multiple orientations towards different understandings of the epistemic ideologies that should underlie the safeguards project. The next two chapters will illuminate how some of these multiple orientations are expressed through epistemic expectations of and aspirations for some of the key objects that support the safeguards

inspector’s work.

Chapter 4: Objects I: The Seal

4.1. Introduction

My office phone rings, the caller ID tells me it's one of the IAEA's seal technicians that I'd spoken to earlier in the day. I pick up and greet the technician who responds with amusement: "you're really into seals, huh?" He goes on to recount an anecdote about a recent project.

The work of the Iran Task Force to verify Iranian compliance with its safeguards agreements with the IAEA required the increased and extended presence of IAEA safeguards inspectors in the country above and beyond a regular inspection schedule of a state with comparable nuclear facilities. While usually inspectors go on inspections for anywhere from a few days to a few weeks in a given time period, in the Iran case inspectors spent a great deal more time in the country. This extended and more intensive presence required additional tools for the inspectors' use. In order to ensure the integrity of the files and records that inspectors carried around with them, the IAEA seals team developed a custom seal for the briefcases carried by inspectors. This seal would provide tamper-detection for the briefcase. Previously, records stored in portable containers could be sealed for brief periods with paper seals. These rolls of highly fragile and highly adhesive paper could be applied to objects such as a filing cabinet or briefcase. Why, then, would the seals team be tasked with the development of a custom seal for inspector briefcases? The paper seal's drawback was that its highly adhesive backing was nearly impossible to remove from the surfaces it had been adhered to (if you've ever been shamed by parking enforcement with an adhesive no-parking sign, you will know the plight involved in removal). A conventional briefcase undergoing consistent and extended use in the field would

end up amassing the messy, sticky and papery remains of dozens, if not hundreds, of placed paper seals. It would simply not look good. This was a concern because the IAEA inspector's presentation vis-a-vis a member state in the field was an important aspect of communicating the organization's professionalism and thus maintaining the respect the member states had for the IAEA's work. Appearances mattered and a briefcase covered in the remains of paper seals did not "look professional," according to the seals technicians. The organization's bureaucratic objectivity is not only produced through the rule-bound system of nuclear administration as described in chapter 2 or the pragmatic orientations of inspectors described in chapter 3, but also by the material objects that support the work of IAEA inspectors, even luxury briefcases.

The briefcase sealing solution designed by the seals team consisted of a welded cover over the opening side of the case where the seal was placed and the addition of bolts in the hinges of the case to prevent the possibility of opening the case by its hinges. In a division of labor in which the inspectors assume the heroic role of field officers while seal technicians generally remain at headquarters tinkering with equipment in crowded workshops, the technicians were mildly pleased when it became apparent that inspectors were hot for these custom sealing briefcases. Their pleasure was mild because they knew to attribute the popularity of the object not exclusively to the custom modifications they made but rather to the fact that these briefcases were luxury brand luggage procured from the IAEA's commissary.

This incident reveals but one aspect of the transformative pressure that can inhere in material objects mobilized as signs. While almost all signs are material, in this chapter I define material object signs as physically manifest entities functioning within a semiotic system. In this chapter I address the semiotic processes of mediation by which signs, and material object signs

in particular, are naturalized as icons. Within the Peircean framework of semiotic mediation this process of "downshifting" (Parmentier 1994, 18) describes how higher orders of sign complexity are reduced to and apprehended as lower aspects of their semiotic function. The processes by which signs are naturalized to be apprehended to stand inherently for themselves are socially significant in multiple ways. Keane writes,

> The social power of naturalization comes from this: not simply the false reading of indexicals as if they were directly iconic of some prior essential character, but rather the misconstruing of the possible entailments of indexicals—their effects and possibilities—as if they were merely expressing something (such as character) that already exists. (Keane 2003, 417)

Naturalization can thus be seen as contributing to the construction of the social world through a series of pragmatic accretions of meaning that make the world appear as if it had always already existed in precisely that way. But this occurs not only through ideological presuppositions but also through the interpretation of the consequences of social interaction. "What iconicity and indexicality begin to do is open up signification to causality, to the possible effects of material qualities, and of their logistical impositions, on persons and their social worlds" (Keane 2003, 417). In this way, naturalization ensures that the performative-productive aspect of pragmatic interaction is crucially misread as instantiating that which already is while at the same time containing the potential for the material expression of signs to disturb this seemingly solidly naturalized social reality.

Close attention to the materiality of the object-sign can help to reveal how precisely these ideological regimented processes are disturbed when the object-sign's material potentiality is expressed. These processes are embedded in the larger ideological social formation of the bureaucracy which also functions by naturalizing processes of social mediation into a technical-administrative system (and making the system appear self-evidently objective). To clarify, the

bureaucracy is the objectifying framework within which objectifying practices are undertaken. This chapter peels back the naturalizing layers in the semiotic order of mediation by considering some of the object-signs that do the mediating work, and also by showing how they contribute to reflecting back on the bureaucracy its objectifying face.

Ethnographically, this chapter investigates how specific material objects are enrolled to perform and produce the logics of bureaucratic objectivity. It does so by paying attention to ideological processes of downshifting (such as iconization) that reveal how objects are apprehended to instantiate particular forms of knowledge and expertise. It also employs the notion of "bundling": the co-presence of multiple qualisigns in any object that "shift in their relative value, utility, and relevance across contexts" (Keane 2003, 414) to analyze the materiality and pragmatic consequentiality of material objects. Indeed, as pragmatic consequentiality is central to apprehending the materiality of objects in a process of materialization (Nakassis 2013), the chapter investigates how the pragmatic consequences of material objects, in this case seals, at the IAEA illuminate ideologies of bureaucratic objectivity. I explore the ways in which the seal materializes bureaucratic objectivity (and thus the Agency's legitimacy) in its form, how it is managed, and how it contributes to understanding safeguards as a semiotic system.

These examples help to shed light on how the material world in its complexity contributes to ideological processes of knowledge formation and social organization. The chapter seeks to answer how material objects come to be recognized as signs at the IAEA and how their materiality contributes to the efficacy of the safeguards system. What are the ideological effects of bureaucratic objectivity on material object-signs? How do inspectors and technicians

apprehend the material object-signs epistemic affordances materially?

4.2. Seals

In this section, I explore the ways in which the seal embodies bureaucratic objectivity (and thus the Agency's legitimacy) in its materiality and form through a semiotic process by which the seal as symbol is naturalized as an icon. The seal is an indexical icon that also functions as a performative (Derrida 1977). I analyze how it is managed in a witnessing chain in the bureaucratic organization (Lynch et al. 2010), and how it contributes to understanding safeguards as a semiotic system. As part of the IAEA's safeguards measures, seals play an important role in the "containment and surveillance" aspect of verification where one of their primary purposes is to ensure the "continuity of knowledge" about nuclear material in a facility. Before going into greater detail about the IAEA's particular use of different sealing technologies, this section will first present a brief history of the seal as authenticating technology.

The seal enjoys a long and well-documented history as a technology that signals power, authority, ownership, and authenticity (Nissen, Damerow, and Englund 1993; Collon and Betts 1997; Vismann 2008; Wengrow 2008). Contemporary usage distinguishes between the seal as an emblem of some entity (the seal of the state of Illinois, or the University of Chicago, for example) and seals used for security purposes. The security seal enjoys wide application in industry and transport. Billions of seals are used each year to secure the contents of the approximately 21 million shipping containers[1] around the world. Security seals are descendants of one of the oldest sealing technologies, the wax seal (Johnstone 2006). They are not to be

[1] https://web.archive.org/web/20150718151432/http://www.csiu.co/resources-and-links/world-container-fleet

confused with technologies for physical protection (a padlock, for example). Rather, they belong to the class of tamper-evident technology. That is, the security seal is applied in order to provide evidence of possible tampering with the sealed item. Its material design provides information about the integrity of the contained item and thus is assumed to discourage tampering in the first place. Security seals are supposed to be very difficult to duplicate or forge, and there are varying techniques from material to procedural, to decrease the likelihood that the seal could be forged, duplicated, or simply opened and closed without detection (Johnston 2001).

The security seals used by the IAEA carry out two functions: they provide tamper-indication, but they are also apprehended as indexical icons of the organization, its inspectors, and the inspection itself. First, I will look at its function as a tamper indicator and the process by which seals are part of witnessing chain of evidence in the bureaucratic organization. IAEA security seals comprise a vital part of a sealing system which is part of the "containment and surveillance" element of safeguards. "A sealing system always comprises a containment enclosing the nuclear material to be safeguarded, a means of applying the seal (e.g. a metal wire) and the seal itself" (IAEA 2011). The IAEA employs a number of different kinds of "active" and "passive" seals. Active seals are usually electronic, reusable, and can provide records of being opened and closed (see Figure 1). This can be useful for locations where it is cumbersome to reapply a seal each time the inspector visits. Passive seals (made of metal, glass, fiber optic cable, or paper) are disposable and can only indicate evidence of having been tampered with; they do not provide further information. As mentioned previously, security seals do not provide physical protection, but function only as a tamper indicator. The seal is thus supposed to

discourage tampering, and should be as difficult to surreptitiously replace or forge as possible.[2] Seals can show if the "continuity of knowledge" about a container can be guaranteed. The seal's status is communicated through a binary message. An intact seal ensures the intactness of the sealed element and thus, the "continuity of knowledge" of the last recorded count about the

Figure 1: Active seal, Electronic Optical Sealing System (EOSS). Photo: IAEA.

material contained within the sealed containment. A tampered seal does not. Of course, the tampering can take many different visual and material forms but they all index "tamper," and are thus a symbol for the loss of the continuity of knowledge.

The most widely used seals at the IAEA are metal seals (called CAPS, "double cup

[2] Johnston (2001) criticizes the IAEA for not having done everything it could, despite professional behavior, to ensure that its seals are the most effective they could be.

seals", see Figure 2). The IAEA uses about 22,000 metal seals per year. Double cup seals are comprised of two metal parts, one copper colored casing and another brass colored disc, the seal body. The item to be sealed is secured with a wire or string which is then threaded tightly through two holes in the seal body and secured by a special knot or with a metal crimp. The seal casing is then snapped onto the seal body and cannot be removed without evidence of tampering. Seals such as these belong in the category of passive seals. In addition to being the most widely used, they are also the cheapest. The manufactured seal itself costs about $2-3. The bulk of the

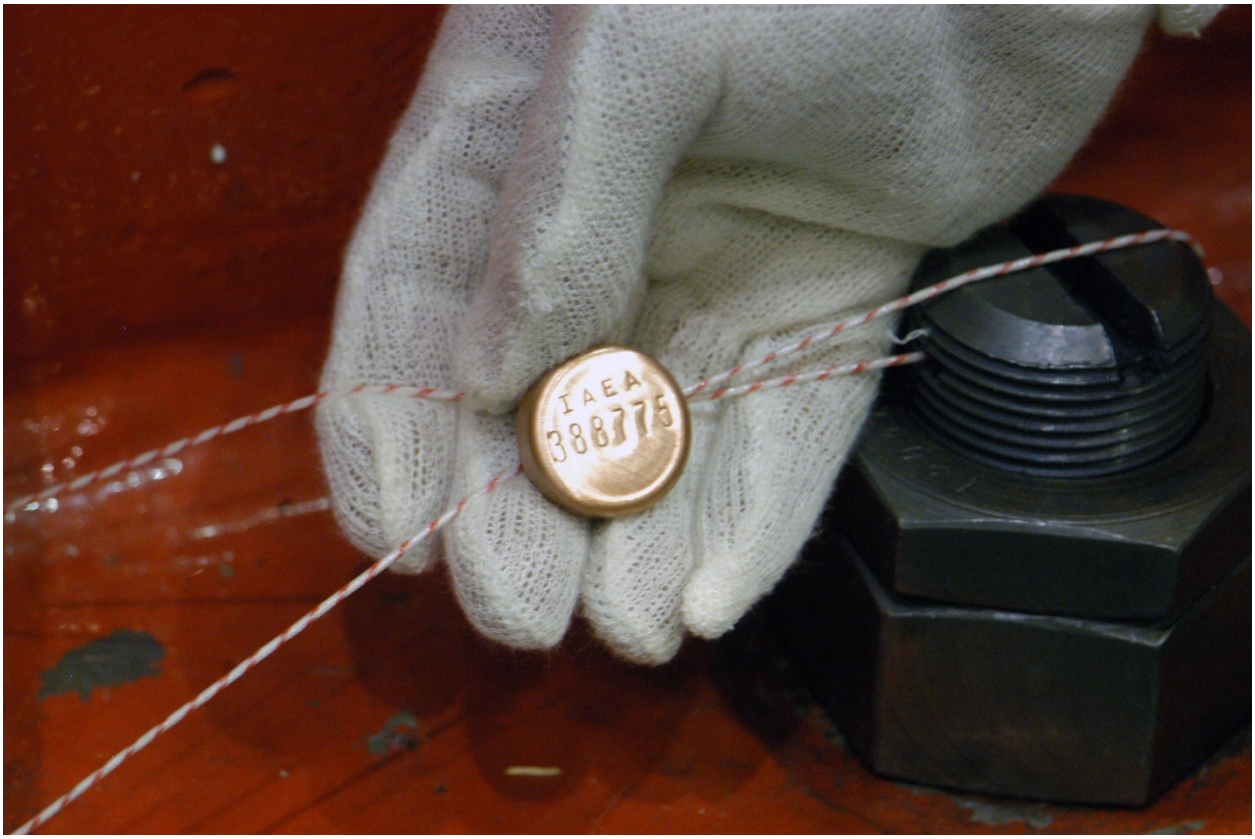

Figure 2: Passive seal, metal (CAPS). Photo: IAEA.

cost of the metal seal is the overhead associated with identifying (creating a unique identity for the seal), initializing (entering the seal into the seals database), and verifying (comparing the seal with its initial picture for tamper evidence) the seal. These labor and technology costs bring the

price of the metal seal up to $33-38/40 but are vital to the security of the sealing system.

When seals are developed, they are tested by outside vendors who attempt to “defeat” the seal through vulnerability assessments. Defeating a seal means breaking it without leaving a trace. The metal seal has been in use for over forty years, it is a “very robust” seal. The previous version was a single cup seal (see Figure 3), and is still being used by EURATOM inspectors. The longer a seal is in use, the higher the chances of it being defeated, says one of the seal developers who is working on a replacement seal for the metal caps. Though to their knowledge the metal seal has not been defeated.

Figure 3: Historic seal, 1967. Photo: IAEA.

But the seal’s material design is not the only element that contributes to its robustness. It

must also be part of a controlled system of protocols that account for the trajectory of the seal, its career at the organization. This quote attributed to the Vulnerability Assessments Team at Argonne National Laboratory makes clear the stakes of enrolling the seal into an effective system of accountability within the organization:

> The effectiveness of seals is strongly dependent on the proper protocols for using them. These protocols are the official and unofficial procedures used for seal procurement, storage, record keeping, installation, inspection, removal, disposal, reporting, interpreting findings, and training. With a good protocol, a modest seal can provide excellent security. On the other hand, a sophisticated seal used poorly may be worse than useless if naively trusted.[3]

The IAEA's protocols attempt to ensure the effectiveness of the sealing system from origin to end of use. What follows is a thick description of the career of metal double cup seals at the IAEA.

The seals are manufactured in the US where the IAEA mark and a six digit serial number is stamped onto the outer casing. (I have been told that the IAEA is the only remaining customer for this kind of metal seal). At Seibersdorf (the IAEA's analytical laboratory around 40km south of the IAEA headquarters), two small holes are punched into the body of the seal and the important "signature" is made in the casing. (Seals used for training purposes are additionally marked with a conical indentation.) The signature is used in combination with the six-digit serial number in order to establish the seal's unique "identity" upon which the sealing system is based. In order to create a signature for the seal, technicians place a dollop of melted soldering metal inside the casing and scratch at it as it dries. Because they are made by hand, these scratches are assumed to be unique. Hull describes the graphic ideology of the signature as crucially hinging upon an "ostensibly inimitable biomechanical act, signing" (Hull 2012, 131). In contrast to the

[3] Quoted at https://en.wikipedia.org/wiki/Security_seal. Accessed July 12, 2016.

types of signatures that Hull describes, the signature produced inside the metal seal is not put in semiotic relation with a specific individual. The individual identity of the signature's producer is irrelevant for the metal seal's identity. What is important is that it is made by human hand (at the IAEA technical laboratory) in an "ostensibly inimitable" way. The seal's authorial identity is signaled by the mark of the IAEA's letters on the outer casing. However, those letters are assumed to be identical as they are produced mechanically.

At the analytical laboratory at Seibersdorf, the seals are packed into secure suitcases and sent to the seals lab at the headquarters in Vienna. There, the seals technician opens the suitcases, and begins by sorting the metal caps according to their serial numbers (seal caps with the same decade are grouped together). Once the seal caps are arranged in groups of ten, the seals technician starts putting them in serial numeric order on a large tray with custom made circular depressions for fifty seals. The depressions are arranged in ten lines of ten with cutouts for both the cup and the seal body. The technician uses a thin felt-tipped marker to number each seal body (brass disc) with the last two digits of the outer cup's serial number, thus creating pairs that belong together. The technician then photographs each side of the seal cup and body with a specially mounted camera. In order not to introduce error, the seal technician takes the seal part pair into one hand, photographs each part, and then returns the pair to its place. The images are saved in a database according to serial number along with metadata such as date initialized, batch number, and so on.

Once the seals have been "initialized", that is, their serials numbers and photographs submitted to the database, they are transferred from the trays to cardboard sheets with perforated ovals onto which the seals are placed in pairs. (This is done with a swift and studied gesture,

much like flipping a pancake). The cardboard with the seals on top is slid in a packaging machine. A sheet of plastic from a large roll is heated up by the machine and then the technician presses it down tautly onto the cardboard and the seals with the help of a hinge. Each seal pair is thus "sealed" together onto a piece of cardboard. Then the cardboard sheet is sent through a machine that perforates the cardboard around each seal pair. The technician tears the cardboard sheet at the perforations and gathers them into stacks of ten seals held together by rubber bands. These seal packages are then put into paper bags and distributed to the operations divisions for application in the field.

When inspectors prepare for inspection, they must anticipate whether they will have to apply or reapply seals at the facility and bring sufficient numbers of seals with them. At the facility, the inspector identifies the material or location needing a seal (according to the inspection plan). The inspector applies the seal by threading string or wire through the object to be sealed and the seal's brass disc. Then, the inspector must tighten the disc against the sealed object in order to ensure as little play as possible. If string is threaded through the brass colored disc, it must be secured with a special knot. If wire is used, the wire is threaded through a small, oval piece of metal that is then crimped with a crimping tool in order to squash and tighten the wires within the metal piece.[4] The excess wire must then be cut. The knot must be tied or the wire crimped properly and the excess string or wire must be cut off so that the copper seal cap/casing can be snapped onto the brass disc and be able to turn freely around the disc. (With the string, the ends must be kept long enough to prevent unraveling of the knot.) The casing

[4] One of the new inspectors recounted to me his dismay and resulting stress on one of his first inspections when he had to use the metal wire and crimping tool to apply a seal. He had "forgotten the trick" for easily and effectively crimping the metal piece to secure the metal wire, and struggled greatly to properly carry out this task. The trick enables the crimping with less physical force.

protects the knot or crimp from tampering, and cannot be removed without damaging the two metal parts.

Applying seals can be tricky because often inspectors will be wearing bulky work gloves (to protect against radiation, the cold or both) that impair fine motor skills. Tightening the string or wire can be difficult with gloves but even when the facility situation allows for bare hands, it remains challenging because one has to pull tight the string or wire which can be slippery and cut into the skin. Once the inspector has applied the seal, they have to record the number and location of the seal, as well as the date and time of the sealing activity on a specific "working paper" (form) for seals.

Seals can remain in use at a facility for several years as long as they are not subjected to extremely corrosive conditions. Once the seal needs to be replaced or removed, its wire is cut by the inspector and the seal is returned to headquarters for a tamper check and final processing. Before the seal processor receives the seals for "postmortem analysis" which a US sealing expert (Johnston 2001, 7) deems "first-class," they undergo a radiation contamination check, are cleaned of possibly harmful contaminants, and placed in large plastic bags. The seal technician then cuts these bags open with a special machine tool, and places the seals on trays in pairs. He again takes pictures of each seal, identifying them with their unique number. He then compares the original picture of the seal with the post-use picture to make sure that the seal signature has remained identical (in order to verify that the seal was not surreptitiously replaced by a nearly identical one). He also checks that the knot or crimp is intact.

As part of a process of quality control, a few people in an office in Safeguards are tasked with tampering with seals. These tampered seals are then included in the batches to be processed

by the seals processor. The seals technician proudly told me that he has “caught” each tampered seal, except for one “with a sloppy knot.” I gathered that he didn’t think that the sloppily knotted seal was a fair quality control test. He added that he is more forgiving with knots because not all inspectors tie them correctly and that it is hard to tie proper knots while wearing gloves (which is necessary in facilities with higher levels of contaminants or in cold climatic conditions).

Through this elaborate system of identification, initialization, and verification the seal is not only made as secure as possible but it is also produced as a bureaucratic artifact enrolled in a chain of custody much like evidence in a trial (Lynch et al. 2010). Its identity must remain stable and be accounted for through a time-consuming and labor intensive process. Through this process, the seal is apprehended as a “passive” tool. Its symbolic qualities have been “naturalized” and are apprehended as iconic. The seal seems to stand for itself. The indexical qualities that this seal shares with the wax seal for example are elided for most everyday users of the seal. However, some more reflexive users recognize in the seal further indexical qualities beyond its function as a tamper indicator.

The seal’s effective function and its ideal aesthetic requirements go hand in hand. A seal should be easy to apply, verify, and remove. One of the foremost concerns of those developing technologies for safeguards inspectors is minimizing the inspector’s exposure to dangerous radiation, a very localized concern. The faster an inspector can inspect a seal on, for example, a spent fuel cask (which are highly radioactive), the better. In addition to the seal being difficult to defeat yet easy to use, the seal should also “look professional.” A seal should be a neat, well-produced package not just sealing wire “wrapped around.” A good seal is “systematic.” It always looks the same when intact, making it is easy to verify. In addition, a Professional-looking seal

makes the inspector and the organization look serious. Thus, the seal also functions as a material representation of the IAEA in the member state facility, and thus expresses a more global concern. The inspectors come and go but the seal remains with the IAEA's letters stamped on top. As such, the seal is an indexical icon of the Agency's presence by proxy, which reflects a trace of the historical function of the traditional seal as a symbol of authority and authenticity in the security seal.

Technicians and inspectors' awareness of this indexical function of the seal was further elaborated in a concern with the proper presentation of the seal as was briefly described in the beginning of the chapter. Aside from the seals that are used widely in all facilities, the safeguards seals team also develops seals for particular facilities when the particularity of a facility and the location or arrangement of the nuclear material to be verified call for a custom solution. In these instances, the seals team takes great care to produce "professional" looking seals. When tasked with such a project, the seal designers need to take into account not only the ways to effectively seal the material or location, but they also make sure that the sealing design "looks professional." That is to say, it is possible to design seals that effectively carry out the sealing function but that do not meet the aesthetic qualities of a "professional" looking seal. For the seal developer, a "craft" seal (as opposed to the commercially produced seals with wide application) for specific facilities needs to look just as "professional" and uniform as the commercially produced seals in order to properly carry out its purpose and communicate professionalism. Through its attention to the aesthetic qualities of the seal, the seals team shows that they understand the seal to be a material representation of the IAEA in the member state.

The seal design is only one part of the objective to achieve a "professional aesthetic." The

way that the inspector carries out the application of the seal also reveals the inspector's moral and professional virtues. Most particularly, the construction of the knot is apprehended to be indexically iconic of the inspector's virtues and commitment; this was particularly highlighted during the training of how to apply seals. A tidy and neat knot point out the inspector's commitment to professionalism and the importance of the IAEA's work. A sloppy knot, however, is iconic of an unprofessional and unserious inspector. The inspector is deemed to be sloppy in their work as well. This semiotic ideology where details matter mirrors semiotic regimentations of class habitus, where poseurs cannot fool true connoisseurs who pay attention to just the little details that seem insignificant to those not in the know. (Think of the many examples in films where an imperfectly polished shoe is glanced at tellingly.) Throughout the training, the new inspectors are told that their work requires fastidiousness and attention to detail; that the small things matter. And indeed, inspectors who carry out their work fastidiously and accurately are well regarded amongst their peers (not only because their careful reports make it easier for others to complete an inspection after them).

From the above we have learned that the seal at the IAEA is a meticulously managed bureaucratic artifact that is ideologically understood to iconically reflect the organization's authority and expertise in the member state as well as the inspector's professional virtues. The IAEA's legitimacy rests, in part, on the felicitous accomplishment of the "professional" application of seals. The bureaucratic regimentation of seals also reveal two interrelated antagonisms. First, even though the seal is constantly handled and manipulated by people, its pragmatic efficacy is as a transparent objective indicator that speaks for itself (even if it must be read by a person). Second, while the seal is subject to rigorous protocols that discipline its use,

the seal can also become an indicator of the inspector's discipline. The seal is naturalized as an indexical icon of the IAEA's authority through ideological processes that conceal the human work that upholds the sealing protocol while constantly subjecting humans to its discipline.

But let us now consider to what purpose the seal is subjected to these disciplinary protocols. The seal's material and aesthetic regimentation is part of its enrollment in a semiotic system for nuclear safeguards. I propose that "safeguards" can be interpreted as a specialized multi-modal sign system. It combines linguistic, visual, aural, and spatial sign systems in the pursuit of its communicative task. It is comprised of a specialized, professionalized register of speech that has been built up historically on the basis of a number of legal agreements that sought to define the purposive function of safeguards as the chief mechanism for "providing assurance" that nuclear material in a nation state is in peaceful purposes. The legal measures have been implemented by the development of a set of "technical" measures derived from the disciplines of applied physics, statistics, and engineering. The central tenet of the safeguards system is maintaining "continuity of knowledge" through "nuclear material accountancy." Safeguards inspectors must establish and verify the types and quantities of nuclear material at the location to be inspected. For this purpose, the inspector combines a number of techniques to identify the type of nuclear material and measure its quantities. Through this process, the inspector produces records that register the results of the measurement and identification techniques. The interpretation of these records depends on a thorough understanding of the semiotic system safeguards which is comprised of legal agreements, conventional agreements, and "technical" measures. In this sense, one must be "fluent in safeguards" in order to accurately interpret the various communicative products, their presuppositions and entailments.

The seal's primary purpose within the safeguards system is to indicate the maintenance (or disruption of) "continuity of knowledge." In this situation, the seal functions as a performative, effectively stating "It is sealed." But the seal is not just communicating the continuity of knowledge about the contents of the containment, it is also consummating the action of sealing and performing the identity of the sealed seal.

The seal itself is a signature that fixes a moment and site to an indexical instant. It puts the indexical instant into a stasis whereby the seal-signature acts as a concealing mask that harkens—as a rigid temporal designator[5]—back to the baptismal moment of sealing, for all time continuously until the seal is broken. This calibration—nomic, reportive, and reflexive and lends the seal all the semiotic properties of a performative. This performativity by its particular temporality—its stasis and pointing back to the moment of sealing in a perpetual present—projects a rigid interdiscursivity (the "continuity of knowledge") that keeps the seal in play as a sign of the act of sealing: it says, "this is still sealed." This performative function also has as a result that the seal, in effect, entextualizes the safeguards system and makes it legible across domains. And at the same time, the seal becomes a sign of the loss of continuity of knowledge (but not a break in the rigid interdiscursivity) when it presents evidence of having been tampered with. An effective seal will reveal, to the learned reader of safeguards signs, tampering attempts in a change of its material integrity. The seal's (and some of the other verification technologies) safeguards signaling power is based on a binary. It can show either its integrity or its non-integrity. Once it has been tampered with, the seal—or more precisely its material non-integrity (which is collapsed to be the same as the seal)—suddenly becomes endowed with political

[5] Reflexively calibrated of course spatially to its very self-present location.

significance. The tampered seal is not only an indexical icon that the integrity of the contained nuclear material can no longer be assumed. It presents as a different kind of signature (Hull 2012): human biomechanical agency acts upon the seal to present evidence of authorship and intentionality. The tampered seal can be taken as a sign (or signature?) of a state's (bad) intentions, of its ill will, or impatience. The tampered seal stops pointing back at the IAEA and the inspector and begins to forcefully point outward to the member state, reaching out into other realms of action and significance. The interpretation of tampering only works through a translation of the sign from one realm of significance to another. Going back to chapter 2, these are the realms that the IAEA was established to diligently keep separate but the tampered seal becomes the object in which these two realms brush up against each other.

Let us consider this process of translation through an example. On August 1, 2005, during a period of intense work that began in March 2003 to monitor and return to compliance the Islamic Republic of Iran's safeguards agreement with the IAEA, Iran informed the IAEA that it would resume "uranium activities" at its Uranium Conversion Facility (UCF) that it had previously voluntarily suspended in light of the compliance investigations. A week later, Iran "started to feed UOC into the first part of the process line and on 10 August removed the Agency seals from the remaining parts of the process line" (Director General 2005, 13). The Board of Governors met only days later from August 9 to 11, 2005 to "discuss the implementation of the Agreement between the Islamic Republic of Iran…and the Agency for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT)" (Director General 2005, 1).

At the meeting, the Board of Governors adopted a resolution (Board of Governors 2005,

64) in which it “expressed serious concern at the notification” that Iran had decided to resume “uranium conversion activities” and “at the Director General’s report that on 10 August Iran had removed the seals on the process lines and the UF4 at that facility;” (Director General 2005, 1). Note here that the Board “expresses concern” not directly at Iran’s resumption of uranium conversion or the removal of the seal. Rather, the concern is directed at the report of these activities. In order to become objects of concern, these activities must become written into legible document genres. This act of translation is a semiotic process that brings the political realm of action (and political audiences) to bear on technical artifacts with sharp immediacy. In other words, in order to be able to read the bureaucratic artifact of the tampered seal as evidence of political intention, a process of translation must take place that relies on communication through documentary artifacts.

In her recent review article, Gal (2015) discusses the expansion of the term translation to include a wide variety of “conversions between what Jakobson called intralingual materials—expert registers, disciplinary languages, and Bakhtin’s ideological discourses…. These registers are not merely lexically different ways of saying some preexisting ‘same thing.’ They constitute knowledge as well as speech style; they are ways of doing tasks, taking positions, and inhabiting person-types in interactions, as the registers also reframe the objects of discourse” (Gal 2015, 232). The translation of the tampered seal into a politically efficacious event must undergo a hybrid process of transformation. First, the tampered seal must enter into the chain of witnessing events, like all other—intact—seals. In this case, the eventual removal of the seals was announced by the state’s notification. But in order to enter into the documentary chain, an inspector had to recognize and record the seal on a “working paper” as tampered or missing. This

working paper would then be added to the inspection report, in which the missing seal would be identified as an anomaly.[6] The report would then eventually be "cited"[7] in the Director General's report to the Board of Governors. Until it is tampered with, a lot of work goes into producing the seal as a mere bureaucratic artifact that is apprehended as a feature of the organization's technical tasks. The untampered seal remains thoroughly enclosed in the realm of action and responsibility of the safeguards staff, the inspectors and technicians (as I have described above). But once it is tampered with, the seal acquires new audiences: the member states, the media, and the public at large.

Within the intact seal's lurks the potential for its materiality becoming pragmatically consequential. The security seal's distinctly insecure materiality—it can be easily destroyed or removed with simple tools unlike a security lock—enables its pragmatic efficacy within the semiotic system safeguards. If the intact seal, as indexical icon of the IAEA's authority and the inspector's virtue, is the result of social semiotic processes of immediation eliding the work that goes into making the seal the self-evidently self-referential performative as if outside of human agency, then the tampered seal pulls back the curtain. The tampered seal expressed the potential for material consequentiality at the same time as it reveal the work that goes into making the seal appear as icon. The seal's iconic quality is disrupted at the same time as it is confirmed. Only this time the seal is indexing something else.

In the case of the missing seal in Iran, against a backdrop of the ongoing investigations

[6] Unlike a discrepancy which is an inconsistency in the operator's records and can possibly be explained by other means and thus remain at the level of "discrepancy," an "anomaly" is a discrepancy elevated to a level of serious concern and action. Tampered, broken or missing seals are immediately classified as anomalies.

[7] This citation is unnamed. The information is presented as evidence collected by Agency inspectors. The documentary process to produce this evidence is elided in the citation.

into the country's undeclared acquisition of equipment, construction, and activities, the removed seal, the act of removal, was apprehended to indicate the state's intention to frustrate the IAEA's efforts towards compliance with its legal commitments, but also, by extension, it was taken as a sign of the state's refusal to continue to participate in the international nuclear non-proliferation regime. The semiotic system safeguards is not isolated from other systems of meaning. Rather, it is connected (by presuppositions and entailments) to a geopolitical system in which tampered or absent seals become performatives of non-compliance. The seal's destroyed integrity is apprehended to index the simultaneous destruction of the integrity of the legal agreement and the larger system. The tampered seal is taken up by the various sides of a debate and is colored with additional shades of meaning about intentions, political participation, and justice. In this way, seals as bureaucratic artifacts come to exist in a technopolitical order in which technology and politics are mutually constituted even if they are persistently ideologically apprehended as (needing to be kept) separate.

Nevertheless, this process of translation while it brings them into contact does not destabilize the boundary between the technical and political. In fact, the tampered seal as sign reaffirms the efficacy of bureaucratic objectivity. The passivity of the tampered seal (that it is acted upon) shows that the system works and that tampering can be detected. In moments when the seal is center stage in the drama of nonproliferation compliance and geopolitics, it becomes clear that the staff's efforts to meticulously regiment the seal's role as icon of the IAEA's techno-bureaucratic legitimacy through its appearance and its enrollment into a chain of evidence are vital in order to ensure the seal's full performative and symbolic efficacy when it must point into the realm of the political and become a sign of noncompliance.

The conventionally apprehended semiotic affordances of the security seal as a potential indexical icon of state compliance within the international non-proliferation regime turn on its intentionally fragile material design that is characteristic of tamper-evident technologies. The security seal illustrates that bureaucratic objectivity rests in part on the conventional affordances of semiotic technologies. Epistemic ideologies mobilize, align, and regiment normative expectations about types of knowledge with normative expectations about the affordances of different modalities of representation. Aspects of the security seal's particular materiality are and are apprehended to be crucial for its signaling efficacy. This is all to say that there is a relationship between materiality and semiotic affordance that is conventionally constituted and ideologically overdetermines expectations for a technology's epistemic affordances. Security seals are one example of how material-object signs are enrolled into the epistemic ideology of bureaucratic objectivity.

4.3. Conclusion

Bureaucratic objectivity as an epistemic ideology is produced through the bureaucracy's objects: in this example, the seal. The seal is understood as one of the tools of the IAEA's knowledge making apparatus; it is one of the signs in the semiotic system safeguards. The elaborate process of making seals accountable (Joe's essay), lends it a scientism. All of the constituent components of this bureaucratic process: rigor, accountability, scrutiny, etc. are highly formalized. How the seal becomes a reliably objective bureaucratic artifacts becomes black boxed, so that the work that goes into it—all the people and all the steps—is concealed. The seal as apolitical, technical bureaucratic object is achieved (1) through regimentation by an

epistemic ideology in which certain types of routinized practices count as objective, and (2) through semiotic processes that naturalize the material object-sign as iconic of objective, thus inherently so. In other words, the quality and the thing are fused.

In this way, the seal, contributes to stabilizing the tenuous boundary between technical and political domains at the IAEA even when it becomes—itself, iconically, ironically—a sign of a political act: the act of non-compliance. The seal, I argue, has been robustly naturalized in the pragmatic effects of semiotic-ideological processes of bureaucratic objectivity as an impartial sign, so that when it must point out non-compliance it is merely the messenger and not tainted by the political. A bureaucratic objectivity by which material object-signs are naturalized as icons of an impartial knowledge making process contributes to how the IAEA can perform technical authority to international audiences.

Chapter 5: Objects II: The Manual

5.1. Introduction

Weber reminds us that “bureaucratic administration means fundamentally domination through knowledge. This is the feature of it which makes it specifically rational” (Weber 1978, 225). And the bureaucracy achieves this rationality because “the management of the modern office is based upon written documents ('the files')” (Weber 1958, 229). Bureaucratic objectivity as understood as an epistemic ideology expressed semiotically rests in part on the conventionally apprehended affordances of the semiotic technologies through which knowledge work is carried out. In a chapter on the printing of “blank books”—books that were meant to be filled in the modern office—media scholar Gitelman notes, “[filling] in and filing away are the ways that bureaucracies collect and connect…they are part of a repertoire of techniques through which bureaucracies come to know” (Gitelman 2014, 32). I have argued before that bureaucracies come to know through the rule-bound practices and activities of the bureaucrats that necessarily involve the production and circulation of documents. In this epistemic ideology, documents are understood and expected to present themselves as fixed, immutable, and self-evident modalities of representation. They are thought to give immediate access to the textual content. In this chapter I’d like to highlight how the document’s semiotic-epistemic affordances (which include the perception of immediate access and transparency) have historically been tied to its materiality when it appears in paper form. I consider how the digitization of documents entails changes in these affordances (at the same time as there is an active attempt to provide for continuities, for example through the use of the portable document format PDF). I interrogate the

semiotic and epistemic consequences for bureaucratic actors when the document goes digital. This media transformation, I will show, can tell us about the epistemic dimensions of semiotic ideologies, as it reveals cracks and fissures in the logics of representation. The affordances of semiotic technology are conventional and real. In his influential 1986 essay "Visualization and Cognition" Latour elaborates his analytic focus on the role of inscriptions in the production of scientific knowledge by developing the concept of "immutable mobiles." With this concept he describes the perceived affordances of printed media (in this case in particular, the charts, graphs, numbers, and text that represent and articulate the outcome of scientific experimentation) for the work of mobilizing alliances within the network. Immutable mobiles—as their name suggests—are mobile and immutable, but also flat, scalable, reproducible, recombinable, and superimposable; they can be incorporated into written text and can represent three dimensions (Latour 1986, 20–21). Latour leans heavily on Eisenstein's (1980) claims about the role of the printing press in ushering in the scientific revolution. Eisenstein's claims as well as Altor's interpretation of print have been strongly disputed by Johns (1998) who provides a social-processual view of how print acquired the authoritativeness with which it is imbued today.

The authority of print, Johns illustrates extensively, was only slowly and arduously acquired through the interaction of a constellation of "domains" which were, in turn, influenced by concerns about piracy and also by the knowledge-producing and legitimacy-seeking activities of the Royal Society. Johns shows the contingent historical construction of the apparent identity of print and authority and reveals Eisenstein and Latour's claims to be based on the misrecognition of normative conventions (or, the semiotic ideology) as the inherent or natural affordances of the medium. Eisenstein and Latour anachronistically deem print to have emerged

with the authority it enjoys today.

Johns work shows the process of how certain qualities became naturalized as inherent to the medium; it provides an account of the rise of a semiotic ideology of print. The development of the semiotic ideology of print shares resemblances with the development of certain language ideological formations such as Agha's description of the linguistic enregisterment of Received Pronunciation as a high-value register (Agha 2007). But what is crucial to recognize in these examples is the way they illustrate the normative force of the naturalization of convention (Parmentier 1994) through "a range of metasemiotic processes" (Agha 2007, 76).

Immutable mobiles are both immutable and mobile because individuals conventionally recognize them as such, and write essays claiming that they are. In her eclectic and interesting "media history of documents," Gitelman articulates the affordances of printed documents. She highlights the "know-show" quality of documents that "suggests that the document exists in order to document" (Gitelman 2014, 1) As such, documents are "epistemic objects" (Gitelman 2014, 1) that even when they exist only to be "filed away for the future, just in case" (Gitelman 2014, 2) (that is, their "no show" function), they "depend on an implied self-evidence that is intrinsically rhetorical" (Gitelman 2014, 2). Gitelman recognizes that the document's implied self-evidence derives from social processes that shape our habits and expectations as readers and users of documents. The document's self-evidence is thus not intrinsic to its material form, but rather, is a product of conventional uses and applications.

We will see that ideologies about printed documents as "immutable mobiles" blind users to the full range of a medium's potentially pragmatically consequential material affordances by limiting the users metapragmatic awareness only to the medium's conventionally salient

qualities. Keane's notion of bundling (Keane 2003), mobilized at the beginning of this chapter with respect to the sealable luxury briefcase, becomes useful here once again as it underlines the potential for unanticipated consequences that inhere in the mere fact that material object-signs always bundle more material qualities than are saliently recognized in conventional use. Semiotic ideologies overdetermine some of the medium's material qualities while underdetermining others. The semiotic ideology of "immutable mobiles" privileges as meaningful the stability of the text on the page, while it disregards the meaningfulness of the stability of the arrangement of pages. The pragmatic consequences of this misrecognition via naturalization become revealed when there is a changeover from the printed paper form to the digital. In a curious way, the transformation of the printed page to the portable document format (PDF)—which explicitly mimics the printed page in many of its perceived affordances—also reveals previously hidden affordances of paper that are lost in the move to digital. Semiotic ideologies of print as well as more general ideologies about the immediacy of representational forms lead to the misrecognition of the PDF as essentially "the same" as the printed document in its salient features. In other words, the transformation from manual to database (in the way that it occurred at the IAEA) reveals the ideological orientations of the users towards the semiotic technology of the document. Because semiotic ideologies about the authority and immutability of the printed page are also related to expectations about the epistemic qualities of printed texts, media change can have unanticipated consequences for users' orientations towards a medium's perceived epistemic affordances.

5.2. Safeguards Manual

The now-defunct "Safeguards Manual" was a two-binder reference collection of all relevant processes and procedures for safeguards inspectors. Several years ago, as part of a quality management-inspired attempt to move towards digitizing, the formerly paper based manual was integrated into an internal document management system. I analyze the semiotic qualities, organizational role and epistemic importance attributed to the manual by old guard inspectors who lament the manual's disappearance; I dub this position that of the "analog bureaucrat." I contrast this view with that of the defenders of the rationalization process (the "digital bureaucrats") as well as that of a newer generation (the "pragmatists"). I ponder how the intergenerational tension articulates the epistemic consequences entailed by this change in medium, from paper to a database of PDFs, and its affordances.

The analog bureaucrat

I was sitting at the back of an office space which had been converted into a cramped classroom. Laptop on my knees, I was taking notes about the lecture and struggled to stay focused through yet another PowerPoint marathon. There had been many of these marathons throughout the Introductory Course to Agency Safeguards (ICAS) that I was allowed to observe at the IAEA headquarters in Vienna. The lecturer, a man past middle-age with wire-rimmed glasses and short thinning hair, bashfully claimed the record for longest power point presentation with 116 slides. Enthusiastic about research reactors, he explained to the students—newly hired inspectors—the many uses of these reactors and their challenges for the inspector's verification activities. For the specifics, he referred them to the organization's online document portal, the Document Manager. But he did not miss this opportunity to editorialize: "Document mismanager

is more like it. You can never find anything on there! We used to have the safeguards manual. Now we can't find anything: the computer is a black hole." Throughout the course, I had heard lecturers refer to this elusive manual. They would say, "you used to be able to look this stuff up in the manual" always followed by an explanatory dismissal of "but they got rid of it" or "it doesn't exist anymore."

The replacement of the paper manual with the document manager occurred contemporaneously with the transformation of the safeguards system from a quantitative and punctual inspection and reporting process to a more qualitative and iterative inspection and *evaluation* process. These changes from pure accounting to qualitative information analysis have called into question the limits of the Agency's expertise, the claims it can make to expert knowledge, and its perceived efficacy as an actor in a geopolitical context. This must, in part, be seen through the lens of the relationship between competing epistemic and semiotic ideologies that inform actors' imaginaries of what counts as legitimate knowledge. The implementation of this change has not been thoroughly welcomed by the safeguards staff. One of the main critiques about the new system is the confusion it has wrought on a practice that used to be complex but structured. In many ways, critiques of the document manager echo critiques of the state level concept (as the new methodology has been called) and the concern about the loss of familiar material bureaucratic forms is also an exemplar of a larger anxiety about changes in the methods of safeguards inspections, from a mere technical accounting to the qualitative evaluation of the "state as a whole."

With view to this context, I, the dutiful ethnographic fieldworker with my overly complex analytic framework, began to ponder the ontology of the safeguards manual. What was

the nature and status of this thing? I went around to the safeguards instructors and pestered them about it. They responded “What do you want with the manual? It doesn’t exist anymore!” My interest grew the more they tried to discourage me. Another said “Nobody used it. We have the same thing on the computer now.” Particularly these attempts to easily commensurate apparently distinct things got me going. After I hovered outside their offices for long enough, one of them took pity on me and checked his cramped bookshelves to see whether he still had his copy around. He couldn’t find it and concluded that he must have thrown it out a while ago. But, he mentioned, the research reactor lecturer surely still has his copy, and that it would be “up to date.” This raised even more questions for my analytic framework! How can a thing that doesn’t exist anymore, remain up to date?

A few emails later, I was sitting in the office of Mr. Manual. He had taken advantage of the metal walls as giant surfaces onto which he had stuck various documents with magnets in a neat grid. I remarked upon his effort at visually organizing information and he mentioned that he once had an office with one concrete wall that wasn’t magnetized. He looked very disappointed when he told me this as if to say, what a disaster that was. Mr. Manual thus immediately revealed himself to be a master of recognizing (some of) the material affordances of the built environment. His initial suspicions about my interest in the manual quickly abated as he explained how it worked and how he used it. He pointed to two large binders that he’d placed on a table beside his desk. Both were 10cm thick and blue but one had a yellow sheet inserted in the front clear pocket and the other a white sheet (see Figure 5). Mr. Manual mentioned that there had also been a pocket sized version of the manual intended for use during inspections that was smaller and more compact and contained essential information for work in the field. But he

Figure 4: The Safeguards Manual. Photo: author.

didn't know where his was. He explained that he mostly used the manual to refer to procedures for the types of inspections he had been most likely to carry out. He no longer went on inspections because he had begun having problems with his back. The pages that he referred to the most were slightly curled, their edges grayed from use. He opened up the binder and turned to some pages that he frequently consulted. A few sheets fell out because their punched holes had broken through. He pointed to a package of punch hole reinforcement stickers on his desk saying, I'll have to fix this later. Mr. Manual was committed to paper.

Pivoting to his computer he explained that the contents of the manual had been transferred to the online database portal called “document manager.” There was a cross-reference table that lined up the manual’s documents with the new documents in the database, but he couldn’t find it anymore. He pawed at his keyboard, clicking around for a browser to open the document manager in an attempt to find this cross-reference table on the intra-net. It was painful to watch. We were not lucky in our search. Did I know, he asked, that a trainer had gotten into trouble for referring to the manual during a training course? Lecturers were not supposed to mention its existence anymore. He explained with quiet resignation that it seemed to him that inspectors were now less knowledgeable about inspection processes, that the manual had kept everyone on a common knowledge level. He let me borrow the two binders, told me I could keep them as long as I wanted, he didn’t need them urgently. I left his office to return to my floor, carrying the heavy binders.

The safeguards manual was a reference volume for staff in the Department of Safeguards in which are collected the entirety of bureaucratic documentation governing the inspection activities of the Department. As such it is a bureaucratic artifact. I have heard it jokingly referred to as the inspector’s “Bible” which gives an indication of the type of document-object-class it belongs to. It reveals the status of the bureaucratic documentation for safeguards inspections as a kind of sacred scripture guiding the inspector’s work. The manual makes up the core elements of the Department’s bureaucratic documentation which includes documents called policies (managerially determined structuring framework for action), process descriptions (collection of the organization’s business processes), procedures & instructions (describe the concrete particulars of inspection activities, how to use equipment, etc.), forms & working papers (filled

out by staff to capture information about inspection activities). These are conceptually-visually arranged in a pyramid in which policies make up the narrow tip and the other document types follow sequentially, each level increasing in width (mirroring the increasing quantity of documents). The pyramid stands on a base of "records" which are comprised of the documentary products that result from inspection activities (filled out forms and working papers, inspection reports, etc., see Figure 5).

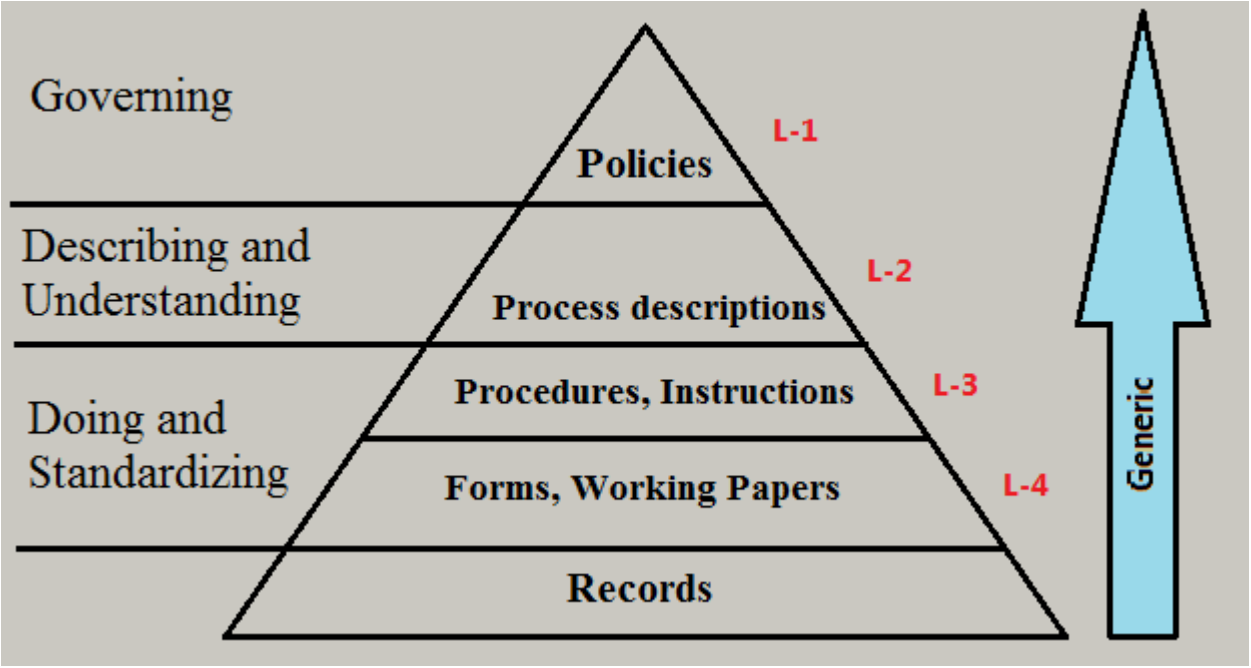

Figure 5: Pyramid of documents.

Later in my office perusing the manual, I noted that the table of contents provided a rubricized and structured overview of the manual's organization by integrating the different hierarchies of documents in a sequential but still hierarchical order. The flat linearity of the page is at once an affordance and limitation of print. The hierarchical order is indicated through a number of typographic features including bold face and italic face type, capitalization, and the sequential numbering of sections and subsections with increasing sub-levels. Key sections are

indicated by bold type face and indented one tab stop (they are the full number level 1/2/3). Each section contains subsections which are indented one additional tab stop and the headings of which are capitalized (1.1/1.2/1.3). Within the subsections (but not further indented) are further topics (at the levels of .1.1 and 1.1.1.1) written in regular type. Each subsection may also contain annexes the numbering of which starts anew in each new section and is indicated by italics. The annexes provide concrete examples of forms, guidelines for carrying out the described activities, or cheat sheets of abbreviations and codes. The hierarchical organization of the manual's documents groups them into related areas of activity, placing documents about similar practices in a serial order. Of course, the table of contents is also followed by the documents it refers to in the same order that it lays out.

This visual arrangement of information on the page has effects: it presents a logical structure for the achievement of the bureaucracy's work by laying out what is perceived to be the finite totality of the information required for carrying out the Department's mandate. It also presents itself as a map to the bureaucracy's knowledge and activities and allows for the user to identify relevant documents by their location in a larger structure. By extension, it allows the user to identify her location in the larger set of bureaucratic processes that exceed her own realm of responsibility. In other words, the table of contents provides for the "big picture." In semiotic terms, the manual's table of contents iconically diagrams the manual's actual structure at the same time as it iconically figures the structure of the Department of Safeguards' bureaucratic organization which is also apprehended to mirror the imagined structure of the inspector's expertise. The table of contents and, by extension, the manual provides meta-knowledge about the organization's bureaucratic structure, but also about the way that bureaucratic objectivity is

thought to work (in the structure) through a hierarchically serialized and sequential set of rules and procedures. The literal bundling of pages in a specific order constitutes the bureaucracy's practices and the inspector's expertise as a finite, coherent, and bounded object that neatly sits on your desk.

With this in mind, let us return to Mr. Manual's concern that new inspectors who never knew the manual seemed to be less knowledgeable about the inspection process. It becomes clear that for these analog bureaucrats, the elimination of the manual signaled an anticipated loss of knowledge and expertise because the new reference tool did not replace the meta-knowledge which the former manual provided through its material structure which enables the serial and hierarchical formal organization of information. One informant said that the new web interface of the document management database did not allow people to quickly get the specific resources they need (as the manual did). In contrast, he argued, the manual was precise: "you knew where to find the information and there was no uncertainty about which document was relevant." In this normative ideological position, the linear paper manual form, its specific material arrangement, is apprehended as providing the affordances of precision and certainty about the inspector's activities. Those who inhabit this position are concerned that the "death" of the manual also spells out the extinction of the knowledgeable inspector. In this imaginary the inspector's expertise is tightly bound up with the material knowledge structures that surround him.

I wondered whether Mr. Manual's lament was part of a predictable generational criticism of the elders about anything new. Should I be taking seriously the complaints of the relatively IT-illiterate older generation used to analog processes in an increasingly digital office? At the same time, this is a study of the real effects of transformations in form on content, and so I

wondered whether the elimination of the paper manual, and its replacement by a digital database objectively resulted in a loss of knowledge as the older generation claimed, even if it is a kind of meta-knowledge that exceeds the user's limits of metapragmatic awareness? In order to better understand the stakes of this transformation, the ideological commitments of the database, and the practical implications that follow from the adoption of a new media platform and interface, I decided to register for a "training" in using the document manager.

The digital bureaucrat

In the computer classroom, most of the participants were in their fifties. Because my intern account wasn't authorized to access the part of the intra-net that the document manager was on, I joined another participant at a computer desk. He was a past-middle aged man with graying hair and twinkly eyes. He said, I don't type very fast with an unapologetic grin. The trainer, a middle-aged man who was sternly committed to the document manager and the quality management system, began with an overview of how the document manager came about.

The trainer explained that the document manager was an element of the introduction of a quality management system which began in 2006. In-house software developers began working on this portal for controlling and managing the Department's many documents (including policies, processes, guides, procedures, and forms). The safeguards manual was split into 2200 documents that were transferred into quality controlled documents in the manager. The quality control of documents is intended to ensure that documents are up to date and undergo regular review. It installs a process for flagging review and assigns individuals responsible for reviewing documents in every section. From 2009 onward, the document manager was supposed to replace the manual. The most pressing problem that the management sought to solve with the adoption

of a “document control system” was the use of outdated procedures by staff. In the days of the paper manual, copies of updated documents were circulated with a memo. The staff was then expected to replace the outdated document in their own personal copy of the manual, but not all staff were equally diligent in the maintenance of their manual. As a result, some continued to use outdated procedures and policies. This was unacceptable to the digital bureaucrats who sought to preserve the bureaucracy’s efficient functioning through the uniform application of rules and regulations (Weber 1958, 215). The introduction of this document management system was wrapped into the larger “Quality Management” effort, the audit logics of which I shall leave for another time.

What is important to note at this point is that the documents that were introduced into the document manager were all in the PDF format. The PDF crucially retains many of the ideologically salient qualities of the printed page. Indeed, looking at the PDF helps us to fully grasp the apprehended affordances of the printed paper document. Gitelman argues that the PDF is considered to be an anachronistic, relatively anti-digital compromise of a format. But she explains its popularity in distinctly bureaucratic terms:

> Unloved or not, the portable document format has succeeded by dint of the ways in which it imagines and inhabits the genre of the document mobilized within the digital environment. The format prospers both because of its transmissiveness and because of the ways that it supports structured hierarchies of authors and readers (“workflow”) that depend on documents. (Gitelman 2014, 133)

In other words, the PDF is perfect for the bureaucracy with digital aspirations. Because it mimics the paper-printed document—the bureaucracy’s building block—it supports the bureaucratic organization’s structure, practices, and ways it thinks about itself. The “know-show” quality of documents appears in both the paper and the digital form, supporting the work of the bureaucracy as an organization that makes knowledge.

This analytic framing illuminates the ethnographic material by showing how the adoption of the database could occur relatively unproblematically and articulating why many users didn't see what the fuss was about, since they considered the database—filled with PDFs of the manual's contents—basically "the same" as the paper manual.

The document manager was, essentially, a database of PDFs tagged with metadata and the content of which was also machine readable (as the PDFs were digitally produced and thus included optical character recognition; they were not scanned from a paper print out). Gitelman dedicates a chapter to the PDF as genre and format. She writes,

> PDFs are already authored entities, understood as distinct from the written systems in and by which they are individually named and potentially manipulated and downloaded. The written system in question might be the web itself, a document management system created for a special purpose, a database, or any repository for storing digital files that has a query language and an interface for retrieving them. (Gitelman 2014, 133)

These immutable mobiles have been collected in the writing system of the document manager where they can be manipulated and downloaded by classes of authorized users.

The training was intended to provide a hands-on introduction to the manipulation and download of these "already authored entities" and enroll users into the logic of the quality management system and its aspirations. After clicking through a number of redundant log in pages, we arrived at the Document Manager interface. It contained several tabs across the top of the page that led to different ways of using the database's information. The default setting was on the master list. On this page were listed the first 50 or so documents in the database in a table with a number of columns with identifying information. At the top of each column in the table there were instant search boxes into which one could enter search terms relevant to the column and the table below would begin filtering results. Thus, if one knew a document's identifier, one

could enter it and it would ostensibly appear. In addition to these search boxes there was a dedicated search tab that allowed for "full text search." Without applying additional filters (such as "document title") the full text search returned mostly irrelevant results with the searched for document buried on the third page of results.

Gitelman has a passage on searching for PDFs that is worth quoting at length because it highlights the differences between the paper manual and the document manager.

> Using a file manager application to look on your own hard drive for a PDF is something like rooting through a filing cabinet, if you could ever root through files paying attention only to file names and locations, and not to things like thickness and signs of wear. And if you can let go of the idea that the document you call to the screen is actually entirely the same (rather than just looking the same) each time you call it up. Searching computationally for PDFs is different, though, both because searching can rely on data and metadata that go beyond file names…" (Gitelman 2014: 133)

Searching through the paper manual was like searching through a well-organized filing cabinet; the paper can provide additional information through material qualities like "thickness and signs of wear." To that one could add color, size, various marks and inscriptions, in short, a host of non-discursive graphic features[1] that contribute contextual information to the process of searching and finding. And indeed, searching the document manager was different because it required users to attend to literal metadata within the system; this required a new orientation towards the whole set of documents contained within the database.

For example, the browse tab allowed the user to look for a document by its place in the bureaucracy's processes. In this tab, the developers of the database included both a schematic overview of the management's new vision of the processes as well as a highly consolidated version of the former manual's table of contents (consisting only of some of the top level section

[1] See Hull's discussion of the importance of the "surface" of graphic artifacts in (Hull 2012, 17).

headings). From this page, the user could click through to reach subcategories within each category of documents. These subcategories would then lead to the same kind of list of documents in a table that existed in the Master List tab (but ostensibly filtered according to category and subcategory). The new visual arrangement of the Department of Safeguards processes had at its center four light green horizontal and parallel bars numbered C1 to C4 from top to bottom containing the "Core Processes" related to the inspector's tasks according to a legend to the right of the process image. This arrangement of processes reflects the changes in safeguards methodology that have been so controversial and are described in chapter 2. The main change in the core processes is that Evaluation is moved from a Support process (indicated by two orange boxes below the green bars) to a core process. Above the green bars are three blue boxes that contain "Management" processes named strategy, resource management, and development. The green boxes are contained in an arrow outline pointing right: on the left side of the arrow is a purple box containing the words "Member States Expectations" and on the right an identical box with the words "Member States Satisfaction." These functionally pointless additions (the boxes are not clickable) indicate that this new visual arrangement of processes is enrolled within the quality management system which integrates customer (member states) expectations and satisfactions into its organizational logic. Unlike the iconic figure of the table of contents in the old paper manual, the browse function in the document manager provided only a general schematic overview of its contents through a visual representation of "processes" as described.

The "Custom Classification" was an unlovingly created colorless box with a list of clickable headings and was purportedly included to appease the analog bureaucrats clinging to

their paper manuals. However, it does not take up the logic of the old manual's organization and the headings bear little resemblance to the old manual's table of contents. It is not clear, for example, under which heading the user might find the legal basis for safeguards implementation. Furthermore, Reference Material (likely the annexes in the paper manual) is structurally divorced from the inspection equipment and instrumentation section alongside which it would have been consultable in the paper manual.

Finally, the document manager included a "subscribe" function that allowed users quick access to the most recent versions of frequently used documents. This function was intended to eliminate the pesky problem of staff using outdated documents and threatening to undermine the rational logics of bureaucratic proceduralism. Users could identify documents that they frequently used and "subscribe" to them. Under the subscribe tab, these documents were then always readily available for the user's consultation. Unfortunately, its primary flaw was that the function of "subscribing" to a document was not accessible in the "Browse" modality. This was problematic because the "Browse" tab was the primary means through which analog bureaucrats could access the digital database through a version of the former manual's organizational logic. Once you found the document you needed, you'd have to enter its title or identifier again in the master list or the search tab in order to be able to "subscribe" to it in your list of frequently consulted documents.

Given the large number of documents included in the portal and the limitations of the browse function, the search function would be the primary way for users to find documents. The biggest semiotic change from the paper manual was that this portal presupposed the user's intimate knowledge with the contents and their interrelationships. For example, the poorly

calibrated search function returned a large number of similar documents with no indication as to their position in a hierarchy of documents. The user would thus have to know enough about the document's identity (expressed in meta-data) in order to pick it out of a lineup of similar ones. Compared to commercial databases and search engines such as Yelp and Google, even Jstor, this product was underwhelming. The training made clear that this was yet another in-house custom-developed software application that could not stand up to similar commercially developed programs. This was an experience that frustrated many of the staff across the organization. One inspector noted, "it contains information that would be useful to me, [but] it's so difficult to use…that I get most of my documents through people."

Despite attempts to ease user transitions across media, users fail to be completely enrolled into this change. Digital bureaucrats fear that a veteran generation of inspectors that relied heavily on the manual will give up on using the document manager and continue to rely on old procedures. (Some would mix the old and the new by printing current versions of documents and inserting them into their manuals.) Another failure that was due to a paper-orientation toward the document manager ironically reproduced the problem the document manager was introduced to solve: instead of using the "subscriptions" function to establish quick access to current versions of frequently used documents, users save static versions of the documents to their computers as references, and are not notified nor cognizant of updates to these documents. This replicated the "old" paper problem of staff ignoring the circulated memos to update the manual. This "paper" orientation to the electronic database expresses the wish for a "personal copy" of the document stored in a place of one's own choosing. Thus, the change in medium requires not only a certain fluency in computer use but also a reorientation of ideas about the

relationship between reference materials and ownership.

After the training, I felt sympathetic to the inspectors who clung to their paper manuals. I understood what they meant when they said that the paper manual was “clear” and provided “certainty” about which document to use. I, too, would be quite annoyed if the handy, portable reference I’d been using for decades was replaced by a database that looks like it was designed with little input from actual users. The digital bureaucrats, though, dismissed the nostalgia about the printed manual and argued that the document manager was essentially an electronic copy of the printed manual with additional valuable components that allowed for the more rigorous bureaucratic control and surveillance of the documents and its users. This is an example of how media tend to flatten the effects of their mediation (Eisenlohr 2011) which can be attributed to semiotic ideologies about media. Digital bureaucrats’ greatest fear was that the bureaucratic expertise would not be applied effectively because staff used outdated procedures. The document manager, for them, helped to close this dangerous gap between documentation and practice by ideally eliminating the inspector as a point of failure.

Both analog and digital bureaucrats share a strong commitment to the rule-following orderliness of the bureaucratic organization, but they are divided in their allegiances to its material expressions. Indeed, the great irony of this story is that the document manager’s semiotic and epistemic logics alienated some of the most loyal bureaucrats such as Mr. Manual.

The salient affordances of the manual for its loyal users provided for (1) a sense of ownership, and (2) a compelling structure. Each inspector had her own copy of the manual that took on the characteristics of her usage of it. That is to say, pages she consulted frequently would become worn and visually indicate their frequent consultation. The acquisition of this kind of

visual information through use provides the inspector with a sense of unique ownership. This copy of the manual is mine because it shows the traces of my specific use of it. Indeed, the manual is perhaps even an indexical icon of the inspector and the kinds of inspections she most frequently conducts. Secondly, the manual's structure comprised of the table of contents and the subsequent linear arrangement of the pages following the table of contents provided a bird's eye view of the department's safeguards activities. The multilayered complexity of the department's mandate was laid out in the hierarchical linear structure of the manual by which the inspector could grasp her place and the place of her activities within a larger whole.

In the database these affordances were transformed. The inspector could no longer "own" documents but only "subscribe" to them. Paper-oriented inspectors circumvented this function and the adherence to the database it required by downloading documents to their desktop. This, ironically, also undermined the in-built surveillance logic of the database that would allow for tracking user engagement with the documents. Users were unwittingly (as most of them were not aware that their account-based activity was being tracked) subverting the quality control mechanisms that inspired the document manager transformation in the first place. We might note this example as another instance of "bundling" producing unintended consequences.

Another important transformation of the paper manual's affordances in the digital database was that the linear-sequential hierarchy of the table of contents was replaced by the inscrutable relational connections of the database's organizing logics. Attempts to visually represent the structure of documents with a colorful table failed to capture the depth of the hierarchical complexity of the Department's bureaucratic documentation. Clicking on any of the headings on the table led to a list of search results of documents with metadata tagged with the

heading. There was no secondary level of organization. Filtering out classes of documents by selecting for relevant metadata also only returned results in a jumbled order. The database no longer afforded the rubricization provided in the manual's table of contents, and therefore eliminated its organizing logic. Inspectors who'd been loyal to the manual experienced this loss as a profound disorientation. The manual had provided a blueprint or map for the Department's activities by which the user could orient herself. It instantiated a material imaginary of the inspector's expertise.

If we return to the notion that the safeguards manual provided a diagrammatic figure of the organization's bureaucratic logics, we may ask the question whether the database (in its instantiation as the document manager) can suitably reproduce these regimenting logics or whether they are lost with the loss of a hierarchical serialized structure for organizing the bureaucracy's information. Can bureaucratic objectivity be diagrammatically figured through a keyword search database? Or is the "big picture" lost? Would losing an overview imply that the bureaucracy can no longer know objectively? Is this God's eye view necessary for the felicitous achievement of bureaucratic objectivity?

Reconsidering the questions raised at the beginning of this section, we can see that bureaucratic artifacts are apprehended to play different roles in authorizing bureaucratic objectivity and the production of expertise by their different users. Whereas the analog bureaucrats see the old manual as a store of important knowledge and lament the loss of new inspector expertise, the digital bureaucrats insist that the database is required in order to ensure the legitimate and effective functioning of the bureaucracy. Thus bureaucratic objectivity does not inhere in the artifacts themselves but is refracted through the epistemic stances of the

different users that project onto these artifacts distinct modalities for the achievement of the ideal bureaucracy.

The pragmatist

These positions must also be juxtaposed against the third position: that of the pragmatist. This position was held by those who trained the new inspectors, most of them former inspectors themselves, and many of the new inspectors. The new generation of inspectors is not nostalgic for the former manual. They are in their thirties and forties, and while not "digital natives" per se they are familiar and versed in both "old" paper media as well as "new" digital media technologies. They unblinkingly learned how to use multiple generations of inspection devices (from UNIX-based mini-computers to iPhones rigged to serve as a verification tool) as well as the various in-house software solutions such as the document manager. They were most worried about closing a gap they perceived between their classroom instruction and the hands-on component of field inspections. As they were aware that the classroom instruction and documents alone did not prepare them for the stressful experience of field inspections in far-flung places, they appreciated when trainers told anecdotes about difficult situations and how they mastered them.

The trainers, too, through their role as pedagogues and their experience as former inspectors were well aware of the task of developing expertise in the new inspector and the difficulties of imparting in the classroom through abstractions what is primarily an embodied and concrete practice. For the pragmatist, the inspector's expertise is comprised of a set of embodied practices of which the theoretical aspects are only a part. Indeed, the new inspectors' discourse about inspection procedures showed that studying the bureaucratic documentation in itself does

not yet endow the inspector with the skills to do his job. It is a tacking back and forth between the encoded procedures and the embodied performance of these procedures which thoroughly grounds the inspector's expertise in her person.

An abiding concern of the new inspectors was the perceived failure to grasp what is understood to be the "big picture" and their place in it. The "newbie's" confusion about how the organization works may be part of a larger phenomenon that is not particular to this organization. However, it is still interesting to note that the pragmatists contrasted the inspector as "robot" who did his job as he was instructed against a "thinking" inspector who went about his tasks in the full contextual knowledge of its purposes, able to respond to unusual situations that exceeded the limits of instruction. This characterization of the qualities of the good and bad inspector echo the concerns about training flexible bureaucrats who "use their brains" discussed in chapter 3. If we believe the analog bureaucrats who saw big picture utility in the former manual, this failure to grasp one's place in a system could partly be blamed on the affordances of the document manager that reproduce the "black hole" feeling of seemingly limitless and unstructured complexity of the safeguards work. The manual provided the user with the ability to locate her activities within a larger hierarchically serialized structure whereas the document manager provides only higher level abstractions of the Department's processes in colored boxes and a mess of unsorted PDFs.

To summarize, when I solicited opinions about the manual versus the document manager, I usually received responses that fell into three camps. The first group I've called the digital bureaucrats. They are not necessarily the younger generation, but they do tended to be a bit more technophile than the analog bureaucrats. The digital bureaucrats tended to dismiss the nostalgia

that circulated with respect to the manual and argued that the document manager was a mere copy of the information in the manual. “We have the same thing on the computer now” one of them said. The media transformation is not seen as significantly changing the user’s relationship to the documents. This, I have argued, is a misrecognition of the overdetermined features of the printed page as it is translated into portable document format. Indeed, these digital office-warriors imagine that the document manager improves upon the paper manual through its digital surveillance features even though, as mentioned above, actual use illustrates that inspectors are not engaging with the database in an ideally surveyable way.

The second position, that of the analog bureaucrat, presented a hyperbolically opposed point of view: according to those who represented this position, the elimination of the manual signaled a future loss of knowledge and expertise since the reference tool of the new generation was not as helpful as the former manual. One informant argued that the web interface does not allow people to quickly get the specific resources they need. In contrast, the manual was precise, “you knew where to find the information and there was no uncertainty about which document was relevant.” Here we can note a semiotic ideology that associates the paper manual form, its specific browseability, with precision and certainty. This position is concerned that the “death” of the manual also spells out the extinction of the knowledgeable inspector, and thus also the end of the effective and authoritative safeguards regime.

This presents a parallel to the generational changes in nuclear weapons testing and experimental regimes that Masco (2004) describes. On a smaller scale, the “technoaesthetics” of the paper manual as opposed to those of the digital database provide the inspectors with distinct experiences of embodied expertise. The paper manual more directly provides for the dynamic

figuration of the IAEA's bureaucratic-procedural structure, whereas the database does not mirror the organization's form. Just as the newest generation of nuclear weapons designers lack the embodied sensory experience of nuclear weapons explosions, so do the newest generation of nuclear safeguards inspectors lack the experience of consulting the manual as a mirror of their own presupposed expertise. In this imaginary the inspector's expertise is tightly bound up with the material knowledge structures that surround him.

The last group articulated the position of the pragmatist. They did not lament the loss of the manual or the introduction of the document manager. They said, "besides, nobody used the manual." While this statement is a bit big ambiguous (does it imply that the manual was obsolete because of its paper form? or was the content itself not frequently consulted? Does it mean that nobody's using the document manager either?) It crucially implies that the inspector's expertise does not depend exclusively on the manual whether in paper or digital form.

The changes in safeguards methodology parallel the epistemic changes entailed by the move from a paper manual to a digital database. The paper manual's perceived "precision" and "certainty" echoes the perceived certainty produced by traditional safeguards based purely on the literal accounting for nuclear material. This ideology of paper ties the inspector's knowledge and expertise to the specific material form of the policies and procedures contained in the old safeguards manual. By removing these bureaucratic forms from inspectors' desks and into the "black hole" of the computer, the close familiarity of the inspector with the procedures is no longer assured and begins to unravel. Likewise, the document manager's ability to organize knowledge in dynamic and relational ways, echoes the production of qualitative knowledge about the state as a whole. But it simultaneously echoes the epistemic uncertainties introduced by

the methodology.

Various attempts had been made by staff to visualize this new state level process graphically. The most famous iteration of this attempt is an illustration dubbed the “safeguards wheel” which was included in many power point presentations. It attempts to graphically represent the continuousness of the new methodology and indicate a number of feedback loops from one part of the wheel to the next. The former methodology might more aptly be illustrated by an arrow going from left to right with a beginning and an end and sequential steps in the middle. The new methodology could not easily be represented by such an arrow or in a hierarchically serialized list which does not allow for dynamism. Thus one might pose the question whether the new methodology fundamentally destabilizes the imaginary of a rule-bound system that enables bureaucratic objectivity. If the manual can be read as a diagrammatic icon of the complex but finite bureaucratic structure and technical expertise, can then the document manager be read as diagrammatically figuring a web of vague interconnections and loose ends? According to Weber’s model, the latter would no longer meet the criteria of an effectively bureaucratic organization. But can there be other forms of authoritative knowledge produced by a complex organization that need not rely on the model of bureaucratic objectivity as Weber described it? And how would the organization have to change in order to achieve this? How would assumptions about knowledge production have to change in order to recognize new forms of knowledge as legitimate?

In an organization that already must commensurate multiple purposes in nuclear governance, against the background of a destabilized nuclear safeguards regime and a highly volatile political context, the consequences of epistemic and political failure are significant. Both

the analog and the digital bureaucrats respond to the threat to the Agency's legitimacy by adhering ever more tightly to the rule-bound proceduralism (in their distinct forms) that is the hallmark of bureaucratic objectivity. The pragmatists, however, understand the organization's technical competence to derive from their embodied expert practice which can only be learned practically. These different strategies must, in part, be seen through the lens of the relationship between competing epistemic and semiotic ideologies among the staff and the constraints imposed on the IAEA's technical expertise.

5.3. Conclusion

The manual was literally taken apart into its constituent components (individual documents) and fed into a database. You can only turn the manual into a database if you think that the only thing that matters is the stability of each individual document (and the words it contains). What is ignored in this transformation is that the material arrangement of the individual documents in a particular order provided meta-knowledge and conceptual access to the documents seen as a whole. The database view privileges the apprehended stability of the individual document over the apprehended stability of the whole, and the perspective that provides. Following Vismann and Keane, I argue that the materiality of semiotic technologies provide conventionally recognized affordances regimented by epistemic-semiotic ideologies but also unanticipated and unrecognized affordances that emerge through use and transformation.

Adrian Johns has written about how printed matter came to be understood as fixed, immutable, and self-evident in the context of the "circulation of natural knowledge (what would become [modern] science) in the sixteenth and seventeenth centuries" (Gitelman 2014, 113).

While Gitelman is very attentive to the material characteristics that provide for the recognition of the document's (as semiotic technology) affordances but also limitations, the application of Peircean semiotics in linguistic anthropology can help us understand the processes by which certain material characteristics of a semiotic technology come to be apprehended as inherent.

Epistemic ideologies function much like language ideologies. How certain ways of speaking have come to be privileged or devalued has been shown in the case of Received Pronunciation by Agha (2003) and monoglot "standard" by Silverstein (1998). I want to suggest that the "affordances" of semiotic technologies (other than speech) develop in much the same way that ways of speaking offer the speaker social affordances (in-group signaling, elite status, authority, etc.), and by an analogous process. In language ideological processes certain qualia of speech are rendered saliently indexical of a particular social quality and type of person, and, crucially, the speech quality becomes iconic of a social type (and vice versa) through a process of naturalization/iconization. Similarly, through epistemic ideological processes aspects of a semiotic technology's material qualities are picked up as salient and indexical of the semiotic technology's affordance for its users. The semiotic technology's affordance is apprehended to be iconic of its material qualities. The material characteristics do not—in themselves—overdetermine the medium's apprehended affordances, but some of them are in an ex post facto fashion held up as the features that make a medium one way or another.

Keane has argued that what makes material object-signs unique for semiosis is that they always contain more material qualities than are pragmatically apprehended. The presence of these other qualities means that material object-signs are open for alternative pragmatic recognition. "Material representational forms composed of "bundled" material qualities…are

always in excess of the conventional meaning that has been assigned to it (in a particular indexical order) (Keane 2013, 201). For example, sometimes the adoption of new file technologies can have unintended tedious effects. In her magnificent history of file technologies, Vismann writes that around 1500, the Holy Roman Emperor Maximilian I's distrust of administrators spurred the proliferation of written texts; increased textual documentation was supposed to answer the demand for accountability. In the interest of conserving a "paper trail," Maximilian's imperial court chancery stopped the practice of canceling files and instead preserved them as copies. This eventually led to the problem that files could be changed retroactively, thus requiring close supervision of the staff and the files, and in effect canceling out the effect of accountability that was sought by the preservation of drafts and bringing about the rise of the technology of the registry (Vismann 2008, 91–94) .

Through this and other examples, Vismann shows that both the material qualities of the media technologies used to produce files as well as their arrangement and ordering had direct consequences on the expression of power and the making of law, and by extension, the production of knowledge. The use of and transition from papyrus to parchment to paper and finally digital files raises questions about how to ensure the validity and authenticity of a document and how to indicate this semiotically. Technologies' material qualities profoundly shape the affordances that technologies are apprehended to provide. A recurring concern for emperors as well as bureaucrats is how to index the authenticity of a document and a variety of semiotic devices have been employed: signatures, wax seals, digital encryption, etc. Administrators have been forced to adapt and transform their textual discursive practices in order to exploit the material constraints (and opportunities) of new media technologies. Each

innovation promised the improvement of the administrator's task, yet sometimes also brought with it unintended consequences because the material object-sign's bundled qualities.

In this section I considered the Department of Safeguards own bureaucratic documentation. I looked at the documents that define the realm of safeguards activities and dictate the specific ways of carrying out these activities. These documents used to be collected in a manual. In the last decade, at the same time as safeguards was being revised under a new holistic methodology, the documents from the manual were incorporated/transferred into a digital database. I considered the effects of this process of transformation and interrogated what users felt to be lost and gained in particular with respect to how bureaucratic documentation represents the organization's expert authority. The destabilization of the IAEA's expert authority over the last twenty years has also had residual effects in the ways that the staff engage with their objects of practice and documentation. Against this unsettled background I looked at the role of bureaucratic documents more specifically in producing imaginaries of safeguards expertise.

In the case of the safeguards manual, the literal bundling together of paper documents into a binder provided (hidden) affordances that were lost when the documents are de-bundled from the manual and put into a relational database. The portable document format PDF captures some of the conventional affordances of the paper document, but not all, and thus, the move to digital entailed unanticipated consequences. The move from one to another kind of semiotic technology required the transformation of user orientations to the media, which are more difficult to fully achieve than the mere infrastructural change in media.

Chapter 6: Writing and Translation: Producing the IAEA's Civil Voice

6.1. Introduction

English is the "working language" at the IAEA.[1] Job descriptions for positions at the IAEA require "excellent command" or "fluency" in "spoken and written English" and note that knowledge of the other official languages (Arabic, French, Mandarin, Russian, and Spanish) are considered an "asset." However, candidates with English competence levels far below the advertised levels are offered positions and do work at the organization. Language competence varies widely and the types of Englishes that are spoken are as numerous as the nationalities represented among the staff. This wide variety of competences and accents produces regular and irregular quirks in the "working language." When I arrived at the IAEA, I slowly became aware that the standard way that people greeted each other was with the expression "nice day!" Speakers were using this expression to communicate not that "It is a nice day today" but rather they used it as an equivalent to saying "Have a nice day!" From about 11am to 2pm this greeting was replaced with variously pronounced versions of "Mahlzeit!" (In German it literally denotes "mealtime" but is used to express "bon appetit") which is the stereotypically Austrian civil servant's salutation during lunchtime (the earlier in the morning a bureaucrat uses "Mahlzeit" the lazier he is thought to be). At the end of the work day when people leave the office, they say

[1] In contrast, at the United Nations, the working languages are both English and French. English as the exclusive working language at the IAEA may be a result of the preponderance and relative dominance of Anglophone countries in the early development of the nuclear field. For example, the initial participating governments in the Nuclear Suppliers Group (NSG) founded in 1974 in response to the Indian nuclear test with the purpose of defining export controls on nuclear technology, were Canada, West Germany, France, Japan, the Soviet Union, the United Kingdom, and the United States. Membership in the NSG generally indicates technological advancement in the nuclear field.

“nice evening” to their colleagues.

My intuition was that these non-idiomatic greetings might have been introduced through literal translations by French or German native speakers of the usual salutations in Standard Average European languages (Whorf 1956, 134–59) which take on the form “Good” + “Time of day.” But this does not explain why speakers did not simply use the grammatically and idiomatically correct English expressions for this purpose: “Good day,” “good afternoon,” good evening” but instead persisted in their use of “nice day.” Native English speakers generally showed themselves exceedingly annoyed with these “incorrect” greeting. Many persisted in greeting others with the full phrase “Have a nice day/evening” but others submitted to this IAEA idiosyncrasy. In fact, this idiosyncrasy was not even regular as people did greet each other with “good morning” upon arriving at the workplace. This example should serve to introduce the notion that at an international workplace at which employees command the “working language” at varying levels of competency, language use can get interesting. The language of nuclear safeguards has been developed into a functional register at the IAEA and can also be understood—just like the greetings of the IAEA’s multilingual staff—as a locally emergent and idiosyncratic practice, the internal logics of which may be probed by diligent researchers.

In this chapter, I explore how language is regimented at the IAEA with particular regard to the production and translation of written documents. Written language at the IAEA—it will become clear—is subject to a set of constraints, which derive from a concern with the real effects of language in the world, in particular, with the effects of words on politics and, conversely, with the effects of politics on words. I show that the production of written documents takes place under careful consideration of the eventual audiences of these documents and in view of their

anticipated uptake. First, I turn to the production of IAEA documents and uncover a contradiction between recommended writing guidelines and actual practice. I consider the collaborative writing process and the achievement of a particular "tone" (Silverstein 2003a, 89) of turgid dryness that I identify as conforming to a local notion of bureaucratic objectivity and that contributes to the production of boredom. Subsequently, I look at the work of translators at the IAEA in order to analyze their working constraints and its effects on the target texts that they produce. I conclude with a discussion of what the local language ideologies at the IAEA reveal about the role of language at an international organization in creating an idealized civil "public sphere" (Habermas 1991) of modern voices on paper (Bauman and Briggs 2003).

6.2. Finding the IAEA voice

Agency "language" & translatability

In a handout advertising an IAEA training course in "Effective Writing," the potential student is advised about the importance of writing "as a management tool." "Good communication" is required for the effective management of time and resources at the organization and thus "Agency documents should be concise and well structure" written in "clear, crisp, correct English." According to the handout, the fact that many of the Agency's readers and writers are not native speakers of English only increases the importance of "clear" writing in order to ensure understanding among diverse audiences. Potential students are implored to "minimize jargon" in order to ensure "transparency and translatability." Like the commands of "style mavens" such as Strunk and White (1959), the "effective writing" handout reveals a language ideology under which texts are understood to be able to transparently

communicate meaning. Specialized registers, through which experts index the contours of their authoritative knowledge and which are often apprehended by outsiders as opaque, are discouraged by the teachers of writing at the IAEA. According to the handout, specialized language is an impediment to achieving maximal transparency, especially with view to a text's eventual translation: "There is no need to disguise simple ideas in highbrow vocabulary; we should rather cut out all pompous verbosity, remembering, too, that our texts may have to be translated."

According to this handout, then, effective translatability is maximized when the source text is written "clearly and to the point." This was also the intuition of a former senior official at the IAEA who began working at the IAEA after a career in Foreign Service for a member state. The official recalled that during his time in the Foreign Service when he was dealing with IAEA affairs, he did not understand why IAEA documents were written in the way they were. He described the IAEA's style as boring, dry, turgid, obtuse, and verbose. Echoing Orwell's complaints of political language (Orwell 1946), the official noted, "If you could say something in thirty words which could be said in five they would say it in thirty words." Once he began working at the IAEA, he crafted documents in the way he thought best (clearly, lucidly) until he got a call from a translator who would ask about the meaning of a sentence. This, he said, made him realize that what he thought was unambiguous did indeed contain the potential for other readings. As we will see, the IAEA Secretariat is concerned with stabilizing meanings and foreclosing on the possibilities of misreadings. The sentence was amended to disambiguate the author's intended meaning by making it longer and more complex. The senior official used this example to illustrate that the IAEA's particularly obtuse and verbose style *in English* is the

necessary precondition for the successfully unambiguous translation of the text into the other official languages.

This argument directly contradicts the directives for "crisp, clear, and correct" English described on the handout for effective writing. How can one explain that the writing instructors argue that a simple and clear text will provide the best basis for translation when the writers of documents to be translated claim that the texts must be made more complex and awkward in order to enable an unambiguous translation? One possibility is that the handout is targeted at simply raising the writing level of the bulk of the Agency staff (whether or not their work is translated) and improving the general efficiency of communication among the many non-native English speakers at the organization. Another possible explanation is that there is a mismatch between the senior official's writing skill and his perception of his writing skill. But this does not explain that Agency texts in English are in fact not written according to the best practices of "style mavens."

This gap between supposed best practices and actual practice brings up an interesting disjuncture in the pragmatics that are tied to the intended function of the text. According to the senior official's description, texts that will be translated must be crafted to minimize semantic ambiguity in preparation for the text's translation into five languages (only two of which belong to the same language "family"). The intent is thus to maximally stabilize the text's meaning so that it can be robustly transmitted in other languages in a way that ensures the "same" uptake among the many different readers of the target texts. Translators thus are focused on the "denotational translation" of "Saussurean 'sense'" (Silverstein 2003a, 77). But in order to ensure maximal 'sense' identity across languages, notions and practices of "crisp, clear, correct"

English must be jettisoned. Perhaps sometimes a clunky text, one that native speakers would not applaud for its clear and lucid prose, is better for losslessly translating into other languages. In other words, the source text is created with view to its eventual transformation into other languages, which apparently creates a difference between the pragmatics of what a native English speaker would consider a clear, lucid text and the pragmatics of a semantically unambiguous and precise text.[2]

The answer to why this appears like a contradiction and a problem I think can be found in pervasive language ideologies of directness that equate grammatical and lexical simplicity with semantic clarity. It appears then that the translators have developed alternative frameworks for evaluating the pragmatic efficacy of source texts with view to their eventual translatability. In this language ideology of translation, a text cannot only be evaluated based on its appeal to native speaker's intuitions about proper style, but rather must be read for its potential to remain stable throughout the process of translation. The future translatability of a text is thus a major constraint and factor in its creation. This provides a partial explanation for why IAEA official reports are characterized by readers as boring, dry, and turgid. There are, however, additional elements in the collective report writing process at the IAEA that also constrain the language chosen and the final product.

Problems with language and semantic stability at IAEA

The Secretariat's reports that tend to garner the most international attention (because they have the potential to impact global conditions of war and peace) are those that indicate that a

[2] Further investigation into the systematic translation of official documents should be able to give insight on whether this stricture of "unambiguous translatability" affects only the source text (as has been argued) or also the target text. In other words, readers of IAEA documents in Russian, Mandarin, and Arabic might also be able to describe a pragmatic uniqueness of these texts.

state is in breach of compliance with its safeguards agreement with the IAEA. These reports are also most heavily scrutinized for their "language"[3] by practitioners and outside observers. In an article, former Deputy Director General of Safeguards, Pierre Goldschmidt points out lexical and expressive inconsistencies across reports on non-compliance. While Goldschmidt argues that the different expressions used are semantically equivalent, he nevertheless recognizes that inconsistent "language" opens up room for debate and politicization: for example when Iran in 2006 argued that the director general's report on their case had not explicitly found the state in non-compliance.

> Whether or not the word 'non-compliance' is used in the report transmitted to the board…is irrelevant, as demonstrated in the case of Libya, which admitted to working on an undeclared nuclear-weapons programme for many years. This was an indisputable case of non-compliance with Libya's Non-Proliferation Treaty and safeguards undertakings. However, in the director general's report to the board in February 2004, the word 'non-compliance' was not used; rather, it was stated that 'Libya was in breach of its obligation to comply with the provisions of the Safeguards Agreement', which is synonymous. Certainly to be 'in breach of one's obligations to comply' and to be in 'noncompliance' is a distinction without a difference. (Goldschmidt 2009, 145–46)

Goldschmidt's impatience with attempts by some parties to engage in semantic debates perhaps reveals the different orientations towards language and its effects between the policy-making bodies (and the diplomats that sit on them) and the Secretariat (with its technical bureaucrats). In any case, it highlights that those who draft and craft the reports must take into account their multiple possible kinds of uptake—in English as well as in translation.

In a report on non-compliance matters at the IAEA, political scientist Trevor Findlay

[3] Among practitioners, "language" refers to the specificities of phrasing in official documents that can become subject to divergent interpretations and debate. See Riles (1998) for a discussion of the aesthetic logics of "language" patterns during negotiations of an agreement during the United Nations Fourth World Conference on Women.

provides a table based on Goldschmid's article that illustrates the variety of terms employed in a number of different reports and resolutions (see Figure 7).

Findlay writes that in the early 2000s, then director general of the IAEA, Mohamed El Baradei was feeling squeezed by the Bush administration who wanted the Secretariat to use "non-compliance" in order to press a referral of the issue to the Security Council, while at the same time, other powerful Western nations wanted to hold off on using the expression. The IAEA's legal office determined that there was no difference between the expressions used so far and that it was up to the director general whether or not to use the term. But what the legal office

Table 1: IAEA Board Resolutions on Noncompliance

The table shows, for each of the cases of safeguards noncompliance to date, the term used by the International Atomic Energy Agency (IAEA) director-general to characterize the IAEA Secretariat's findings, the term used by the Board of Governors in its response, the form of the board's response, and whether a report was sent to the UN Security Council.

Case	Term used in director-general reports	Term used by Board of Governors	Response by board	Report by board to UN Security Council
Iraq (1992-2005)	"non-compliance"	"non-compliance"	resolution	n/a[1]
Romania (1992)	"non-compliance"	"non-compliance"	chair statement	yes (information only)
North Korea (1992-present)	"non-compliance"	"non-compliance"	resolution	yes
Iran (2002-present)	breach	"non-compliance"	resolution	yes
Libya (2003-2008)	breach	"non-compliance"	resolution	yes (information only)
South Korea (2004)	failures to report; serious concern	failures to report; serious concern	chair statement	no
Egypt (2004-2005)	repeated failures; matter of concern	repeated failures; matter of concern	chair statement	no
Syria (2008-present)	lack of cooperation	"non-compliance"	resolution	yes

1. Because the UN Security Council tasked the IAEA director-general rather than the IAEA itself with conducting verification in Iraq, he reported on compliance directly to the council.

Sources: IAEA; United Nations; Pierre Goldschmidt, "Exposing Nuclear Non-Compliance," *Survival*, Vol. 51, No. 1, February 2009.

Figure 6: Expressions used in Board of Governors resolutions. Source: Findlay (2016).

determines need not hold outside of the IAEA. Findlay notes,

> The compliance/non-compliance field is rife with linguistic ambiguities and sleights-of-hand. This is partly due to the absence of an agreed definition of non-compliance. But it is also due to the political baggage that the term "non-compliance" has acquired as a result of the Iran and other cases. Some observers reserve the term solely for those cases that the IAEA's Board of Governors and/or UN Security Council have officially declared to be so. Others use it only for "serious" cases, however defined. (Findlay 2015, 5)

Semantic precision is not simply a matter of defining non-compliance. Semantic effects also derive from the pragmatic and accruing meta-pragmatic entailments of texts in circulation. Previous cases of non-compliance (here, Iran) begin to shape how the participants feel about making similar judgments in subsequent cases. Goldschmidt writes, "In its decision not to report Egypt to the Security Council, it is likely that the board took into account…its wish not to put Egypt in the same category as Iran" (Goldschmidt 2009, 154). Thus, report writers must anticipate future audiences, uptake, and the circulation of their texts. However, even semantic consistency cannot ensure a consistency in the text's pragmatic entailments. Let us now consider the ways that IAEA bureaucrats collaborate in the production of such high profile reports.

Writing by committee

High profile reports (such as the one the first page of which is copied in Fig. 2) are written by committees composed of staff drawn from multiple sections and departments within the organization. While these reports are written by many staff members, recognized authorship belongs to only the director general of the IAEA to whom the report is attributed (see the first page of the report identified as GOV/2011/65 in Figure 7).[4]

[4] The first pages of IAEA documents contain graphic information by which the document is anchorable and anchored in a serialized web of documents that make up "what happens" at the organization. The document information number (GOV/2011/65) indicates that this is the 65th Board of Governors document in the year 2011. The text in the gray box circumscribes the purpose and audience of the document ("official use only"), but the added text at the top of the page indicates that this circumscription can be ignored as the Board has removed the restriction. Underneath the gray bar, there is information linking the present document, as an agenda item, back to a Board meeting. The footnotes in the introduction locate the document in serialized, chronological set of events (embodied

A former high ranking staff member explains,

> Every safeguards report like Iran, South Korea, North Korea is written by a committee; it's never written by any one person. You know different people will [informally] claim credit that they were the author, but they were not. They just held the pen. Different people will chip in and it's very frustrating, you know, it's usually in [Microsoft Word's editing and review feature] track changes and after, you know, two or three [rounds of edits, you've got] seventeen hundred colors and there you lose track. And so different people coming from different linguistic backgrounds are chipping in and trying to fix the language. And then particularly from the technical side of the safeguards side, they say well, you know, this is what the situation is. And then the rest of us have to find a way of expressing it in English because many times, inspectors are technical guys and engineers and sometimes their English is more of a technical or an engineering English rather than spoken English or written English.[5]

Safeguards reports include staff (inspectors and managers) from the Department of Safeguards, lawyers from the Office of Legal Affairs, and writers from the Director General's offices. The writing process presents multiple challenges. First of all, the committee members are native speakers of a variety of languages but the report must always be written in English. As mentioned earlier, English language skills are uneven across the staff and thus the committee writing process likely involves a fair amount of correcting incorrect Englishes. Secondly, the inspectors are thought to communicate most competently in "technical or engineering English" and thus their contributions must be re-articulated in a register that is appropriate for the report. Finally, the process of collaborative writing is supposed to be supported by the "track changes" function in Microsoft Word which allows for multiple writers and collaborators to share edits and make comments. However, in this instance of report writing at the IAEA this function is pushed beyond its practical utility to a point where after a few rounds of revisions the number

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as documentary precedents) that serve to authorize the present document both within the IAEA (by reference to IAEA-internal agreements, reports, decisions) as well as externally (by reference to Security Council resolutions that serve as the legitimating decisions for the current investigation).

[5] Interview, July 9, 2015.

and color of visual indicators have greatly multiplied and result in utter bafflement for the readers.

To summarize, the report writing process involves a variety of actors across the organization who must collaborate on writing the report as a committee. The varying linguistic and professional backgrounds of the committee members present challenges for the drafting process that can be overcome through the active involvement of all the members. The technological supports for the drafting process quickly reach their functional limits, and require additional patience, persistence, and concentration.

Tone and "language" of reports

In drafting the report, the committee pays great attention to the document's future potential uptake by its primary audience, the member states.[6] The general "tone" of the report should be "as neutral as possible" and the content should be "as precise (or accurate) as possible" while still remaining comprehensible to the "non-technical audience" of the member states. Outcomes must be communicated in a register that is recognizably impartial and reflects the organization's expertise in a manner legible to the diplomats. In recognition of these constraints on the genre of the report as a representation of the objective bureaucracy, the writers' challenge lies in "saying things in a way that is not directly accusatory," and in finding "language" that isn't "sharp" but "toned down." Reports should be written in a register that is descriptive and subdued.

This ideal of expressing findings in a register that signals neutrality and precision

[6] The international public is not seen as an important audience for these reports. Many of the reports remain restricted and are not made public in the first place. In addition, the international public is seen to have little influence on the IAEA's functioning, but they are also assumed not to possess the expertise to be able to understand these documents and their significance.

IAEA
Atoms for Peace

Derestricted 18 November 2011
(This document has been derestricted at the meeting of the Board on 18 November 2011)

Board of Governors

GOV/2011/65
Date: 8 November 2011

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Item 5(c) of the provisional agenda
(GOV/2011/63)

Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran

Report by the Director General

A. Introduction

1. This report of the Director General to the Board of Governors and, in parallel, to the Security Council, is on the implementation of the NPT Safeguards Agreement[1] and relevant provisions of Security Council resolutions in the Islamic Republic of Iran (Iran).

2. The Security Council has affirmed that the steps required by the Board of Governors in its resolutions[2] are binding on Iran.[3] The relevant provisions of the aforementioned Security Council resolutions were adopted under Chapter VII of the United Nations Charter, and are mandatory, in accordance with the terms of those resolutions.[4]

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[1] The Agreement between Iran and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/214), which entered into force on 15 May 1974.

[2] The Board of Governors has adopted ten resolutions in connection with the implementation of safeguards in Iran: GOV/2003/69 (12 September 2003); GOV/2003/81 (26 November 2003); GOV/2004/21 (13 March 2004); GOV/2004/49 (18 June 2004); GOV/2004/79 (18 September 2004); GOV/2004/90 (29 November 2004); GOV/2005/64 (11 August 2005); GOV/2005/77 (24 September 2005); GOV/2006/14 (4 February 2006); and GOV/2009/82 (27 November 2009).

[3] In resolution 1929 (2010), the Security Council: affirmed, inter alia, that Iran shall, without further delay, take the steps required by the Board in GOV/2006/14 and GOV/2009/82; reaffirmed Iran's obligation to cooperate fully with the IAEA on all outstanding issues, particularly those which give rise to concerns about the possible military dimensions of the Iranian nuclear programme; decided that Iran shall, without delay, comply fully and without qualification with its Safeguards Agreement, including through the application of modified Code 3.1 of the Subsidiary Arrangements; and called upon Iran to act strictly in accordance with the provisions of its Additional Protocol and to ratify it promptly (operative paras 1–6).

[4] The United Nations Security Council has adopted the following resolutions on Iran: 1696 (2006); 1737 (2006); 1747 (2007); 1803 (2008); 1835 (2008); and 1929 (2010).

Figure 7: First page of a Director General's Report to the Board of Governors.

illustrates that the language ideology of IAEA reports is informed by a larger epistemic ideology of bureaucratic objectivity in which the bureaucratic organization must communicate with the "political masters" (Weber 1958, 232) in a way that displays the organization's commitment to disinterested outcomes. Here, too, neutrality is ideologically posited as a realm distinct from the political; this ideological construction conceals that the achievement of neutrality, by positing the distinction between a supposedly neutral sphere of action and a political one, is in itself a political project. The IAEA's "neutral" voice in its reports should thus be understood as the ideological products of a political project in which bureaucratic objectivity is seen to permit the separation of the political from the (ostensibly neutral) technical.[7]

Operating within this epistemic paradigm, my informants' ideologies of language and associated metapragmatic awareness (Silverstein 2009) leads them to locate examples of how to write in the "right" way in the choice of specific lexical items. Discussions of the appropriateness-in-context of specific expressions illustrate that the writers seek to make lexical choices that reflect the ideology of subdued neutrality in the reports. Thus, "forgery" is replaced by "not authentic" and "failure to report" is preferable to "violating." Indeed, the selection of the "ju::::::st right" (Silverstein) register is a vital component for the achievement of a tone that can convincingly communicate bureaucratic objectivity.

Silverstein describes "tone" as the "indexical penumbra" that are apprehended to inhere in or attach to words or expressions in a text (Silverstein 2003a, 89). In the case described above we can understand these indexical penumbra to be the result of entailing social indexicalities due to the regimenting presence of an epistemic ideology of bureaucratic objectivity. The appropriate

[7] Indeed, in another instance, the same political project also achieves the "banality of evil" (Arendt 1963).

"tone" is achieved by the production of a text the various components of which (register as composed of lexical items, voicing, and tense) meet local expectations of "neutral" and "bureaucratic" language. While these texts all superficially "sound" the same to a novice reader, the expert reader can recognize subtle differences in the composition of the text that indicate that the text was produced under the influence of a particular manager. In this way, key individuals in the hierarchy also "put their stamp on the tone of the report" that can only be recognized by astute readers who have followed the production of these reports for some time.

Throughout the editing process, the writers make an effort to "smooth" out the marks made by individuals in the hierarchy and identify these attempts as the key moments of controversy in the drafting process (”and so that's where a lot of the fights would take place as to how the report would be done"). Significantly, though, the report should not reflect "the voice of any single person" but rather that of "a collective voice that is somehow made into an Agency voice." Reflecting with Haraway, the IAEA report writing process reveals that the institutionally situated voice of the director general, to whom the report is attributed, rests on orchestrating (like a choir) the multiply situated views of a heterogeneous set of IAEA staff members and their individual positions to the point where none of the individual voices/views are recognizable. Thus, many situated "partial perspectives" contribute to producing an institutional voice that is entextualized as an unindividuated albeit named view from nowhere (Haraway 1988).[8]

Even those intimately involved in the process of drafting reports are mystified by the

[8] Findlay provides a colorful emic account that details the different ways that director generals attempted to influence, or not, the reports that would carry their name. Footnote 301 states, "According to one account, there was considerable disagreement between [director general] ElBaradei and DDG Pierre Goldschmidt, whom ElBaradei saw as a "technical boffin" with no political nous. ElBaradei didn't try to work with him and there was essentially "war" between the department and the Director General" (Findlay 2015, 92).

inscrutability of how a smattering of people from a variety of backgrounds, speaking a variety of languages manage to work together to create a document that reflects not their individual voices and stances but that of an impersonal, institutional monolith: the Agency. To be specific though, this unified voice does not reflect the entire organization, rather it must reflect the Secretariat's position and its commitments to bureaucratic objectivity. The concern with tone and producing a report that neutrally, disinterestedly communicates "the facts" is also another way that the separation of technical and political domains through a division of labor between the Secretariat and the Board of Governors is upheld and maintained. The Secretariat is expected to be the producer and guardian of technical information that is communicated impartially to the policy-making bodies who are the guardians of political decision-making.

Continuity: no new language

After the committee has reached a consensus on their draft report, the text is sent to a "language specialist" who puts it in "Agency speak" in order to produce a "standardized text." The role of this editor is to ensure that this report's style is consistent with that of other reports and Agency documents according to the House style. It should not come as a surprise that the reports seen as a collection of texts share a lot of graphic features but are also remarkably similar in language and tone. In fact, after the editor's changes are made, the report is sent to an office called the Secretariat of the Policy-Making Organs (which is responsible for the logistics of the meetings of these organs) who then read the report again and flag it "so if new words have kept in crept in they also provide a sort of a check as to whether we really want those words in there or not." The remarkable lexical and expressive consistency from one report to another is not incidentally uncreative but deeply considered. It points out a thorough understanding of the way

that the audience reads the text and the way that language is considered and managed in the policy-making bodies. Among diplomats, the "meanings" of language can be highly contentious and negotiating these meanings, that is, "agreeing" on language is a central aspect of their work. "Agreed language" is language that has been agreed upon (often by consensus) by actors from a wide variety of positions. "Agreed language" is a professional (and often political) accomplishment[9]. As I will show later on, inconsistent language can create great confusion and consternation, especially when the language is in reports about controversial matters such as potential cases of non-compliance. The office that manages the policy-making bodies' meetings is thus well positioned to point out if a report has strayed from expressions that are conventionally accepted and legible to diplomats.

Another consideration in the striving for consistency and continuity in report language takes into account the turnover and expertise of representatives among the member states. Most diplomats do not have a technical understanding or background in nuclear things. They are rotated in and out of their posting like regular bureaucrats in a government. ("they could just as well be in customs or the post office"). Thus this means that they have to learn about the issues at the IAEA and a few years later they are replaced by someone equally ignorant. Reports that update the reader in a consistent way about an issue (some of the issues carry on for years and so the reports accumulate) help novice readers to recognize changes more easily. The reports thus follow a relatively predictable format that presents some background information (refers back to

[9] What diplomats do became clear to me on the last day of a General Conference I attended where the representatives managed to adopt a certain resolution by consensus (without a vote) in good time (it was not too late to have dinner on a Friday night!). The General Conference was closed and the diplomats filed out of the plenary hall, smiling, joking, shaking hands, and generally indicating happiness. I was surprised by their contentment with what to me seemed like a meagre accomplishment, the consensus adoption of a resolution. However, in light of the difficulty of coming to agreement on words, this accomplishment becomes a bit more significant. See Riles for a description of a similar moment (A. Riles 1998, 386).

previous reports) to bring the reader up to speed on what has happened in the long view, and then adds some new information about the most recent developments. These discontinuities among member state representatives thus demand maximal continuity among the reports, yet also require that each report can "stand alone."

Finally, it may also be pointed out that not introducing "new" language into a report and sticking with agreed language is probably also an attempt to avoid difficulties in future translation. Drawing on the language from texts that have already been translated in the past ensures that translators have already found ways to successfully translate these discourse chunks in ways that ensure their consistent uptake in the target texts. Indeed, the translators work with a translation software that builds a database of previous translations that it then draws on to suggest possible translations for new texts to be translated.

Conclusion

Reports written at the IAEA underlie a series of constraints that affect the aspects of the written language of the report that are variously described by their writers and readers as "style" or "language." These constraints include the future translatability of the reports, consistency and continuity for the ever-changing audience, and the convincing communication of the bureaucratic objectivity expected of the IAEA Secretariat. These constraints produce report language that is described by the writers themselves as boring, dry, obtuse, and verbose. The pragmatic features that produce this impression locally include complex syntax, Latinate lexical choices, repetition, and "authorlessness."

Considering the constraints under which IAEA reports are produced helps us to understand that the language ideology that govern these reports differ from the standard language

ideologies of “style mavens” that identify stylistic clarity with pragmatic simplicity. This gap was made eminently clear at the beginning of the section when the actual reports are contrasted against the best practices recommended by the effective writing trainers. Writers at the IAEA must thus negotiate competing language ideologies and constraints in their everyday writing practices. Not all written products at the IAEA undergo the same kind of scrutiny as the safeguards reports by the Director General to the policy-making bodies. Many of the other written products remain internal to the Secretariat and thus have the potential to be less turgid and obtuse. Nevertheless, the style of these prominent documents seems to influence many of the other documents as well.

6.3. Translation constraints

Controversial words

The importance of precision as a guiding frame for writers and translators become vivid in this story I was told about translation. During a time when the issue of the state level concept (the transformative safeguards methodology that is described in chapter 2 and 3) was being hotly debated in the Board of Governors meetings, the Secretariat invited comments on the concept from the member states. Most member states submitted comments in English but for the few that submitted in another official language, the translation section translated these comments into English and—as a courtesy—returned the translations to the authoring member states to give them an opportunity to check them. Most member states returned the translations with requested changes that were considered appropriate and acceptable by the translators. One state, however, took issue with the fact that one expression was translated as “technically sound.” They wanted

the translation to read “technically credible” or “technically legitimate.”

In the context of the controversies about the changed safeguards methodology, the epistemic status of the inspectors’ technical expertise is very much a fraught issue that is also bound up with the IAEA’s perceived legitimacy and effectiveness. Therefore, the member state’s insistence on pairing “technically” with “credible” or “legitimate” reveals an interest in semantically re-establishing the safeguards inspectors’ judgments as not merely “sound” in themselves, but rather as already expressing the credibility or legitimacy (however that is judged) of their technical expertise. This could be read as an effort to close down on the possibility of “subjectivity” and “politicization” encroaching upon the inspectors’ judgments. The status of the document as the member state’s opinion (“comments”) on the state level concept makes it an important record of the member state’s stance on the issue that would likely become a reference point in this growing debate. In that sense, the member state has an interest in maximally controlling the semantic outlines of this text.

The translators insisted that the expressions were semantically distinct and the argument with the member state representatives continued for almost an entire work day.[10] In order to find an acceptable expression for the member state, the translators pored over documents to which the member state had previously agreed, and found the source expression “technically based.” To the translators, this sounded like “something that people came up with at 2AM after a lot of arguing.” It was neither “idiomatic” nor a “good” expression in itself; rather, it was a “compromise.” The member state rejected this suggestion as well and, as a result, the member state’s translated comments were not distributed. Throughout this process, the translators

[10] In a commercial translation context, this would be inconceivable as regular output is measured in 2000 words per day.

realized that “this was not about the word but about policy.” Translation is, therefore, one of the battlegrounds on which struggles between member states about policy and its interpretation are carried out.

This example shows that the choice of lexical item from source to target text can become subject to great debate as the different options index larger conceptual and political differences among the stakeholders involved. In this context, the translator’s job is not merely interlingual glossing in a language ideology of directness. Rather, it’s a subtle negotiation of competing interests through a careful signaling of differentially indexically laden lexical items. To observers of the “political” use of language, this comes as no surprise. Whether you say “pro-choice” or “pro-life” indicates your position in the abortion debate. Member states as well as the Secretariat have an interest (or desire) in claiming semantic ground and thus also ownership over the subtle gradations of ideas and concepts intimately tied to political positions. All of these actors are clearly aware of the (meta-)pragmatic effects of steering the direction of the debate by exerting influence over its specific terms.

I wanted to highlight this episode as a way to show one end of the range of constraints under which the translators at the IAEA operate when producing translations. These types of conflicts and arguments about terms and expressions do not occur with great frequency but perhaps flare up only when the stakes have become magnified. The safeguards methodology that was the subject of comment by member states is an example of an issue in which the stakes of lexical items had become more salient than usual. The everyday of translation occurs in the context of lower stakes and less contentious issues.

The multiple calculi of meaning in translation

In this section, I show that translation as “interlingual gloss” (Silverstein 2003a) is subject to actors’ orientation to “multiple calculi of meaning” following Richland (2006). While translation at the IAEA is regimented in a larger sense by a language ideology of immediacy—that is to say, linguistic forms are understood to give direct access to that which they stand for—its practice results in a diversity of resulting texts that are modulated, I argue, according to understandings of the texts’ distinct role and pragmatic effectiveness. "The calculation of the meaningfulness of speech acts and events may not involve a uniform calculus across a given speech community or society, but rather social actors may orient to notions of intention, convention, and consequence in multiple and sometimes conflicting ways, depending on the social context within which such calculation occurs" (Richland 2006, 75).

This can be illustrated in the ways that language is adapted and transformed under an “ideology of denotational textuality” (Silverstein 2003a, 76) in order to fit conventional expectations of types of communication. Distinct outcomes are possible because language workers understand that language use varies in its pragmatic function and entailed effects across texts and contexts (Briggs and Bauman 1992): in these examples, I am calling the two calculi according to which my informants understand language to functions: (1) technology of participation and (2) technology of evidence. The first describes language understood as a means to engage in established processes of international governance. The second describes language understood as a tool for establishing fact and truth. Thinking about language as a technology allows us to think about its affordances, and to name them. Thinking about language as a technology derives from looking at how participants regiment language and with what aims. I will show in what follows that these distinct calculi modulate the semiotic ideology of

immediacy in practice.

At the IAEA, like at the UN, there are six official languages (Arabic, English, French, Mandarin, Russian, and Spanish) into which all important documents such as reports, resolutions, and meeting records must be translated. (The working language of the Secretariat is English and the working documents of the staff are generally not translated as the expectation is that all staff possess a "working" knowledge of English.) There are six translation sections, one for each language. While all the sections do translation work, the types of documents they translate differ between the English translation section and that of all the other languages.

Since most documents at the IAEA are originally drafted in English, they must be translated by the sections for the remaining official languages into those languages. The English translation section thus mostly deals with incoming correspondence from member states, contractors, and vendors (written in the Arabic, French, Mandarin, Russian, Spanish and sometimes German) and translates these documents into English. This implies that, collectively, the staff of the English translation section is competent in all of the official languages. Documents in German, usually from the Austrian government or local vendors, are also translated into English in this section. Aside from translating incoming correspondence, the English translation section also produces the summary records (at the IAEA they are called "official records") of all of the policy-making bodies' meetings. In order to set up the modulating distinction between language as technology of participation and as technology of evidence, I will begin with the example of translation.

Translating incoming correspondence

Incoming correspondence usually falls into two categories that align with the

technologies of language described above: (1) business and diplomatic correspondence and (2) safeguards related communications. The first kind of correspondence is translated under the calculus of language as technology of participation, whereas the second kind of communication is translated under the calculus of language as technology of evidence. In practice this means that while the former is frequently "massaged" to fit conventional genres and meet linguistic requirements of correctness, the latter are translated "literally" one to one from the source text. These different strictures derive from the documents' perceived uptake and what purpose they must serve as target document. Polite corrections of grammatical errors and some stylistic polish are thought to be appropriate for mere business correspondence when the goal is to communicate. No corrections can be permitted when the document's purpose is to serve as a form of evidence that must be scrutinized precisely for correctness. But let us examine these cases in greater detail.

Business correspondence usually comes from various government offices in the member state that deal with the IAEA in the planning and execution of projects or missions across the organization's different departments. This can also include correspondence to coordinate financial resources or personnel such as in the case of "cost-free experts" sent to the IAEA by the member state for a fixed period of time. According to the translators, the purpose of this type of correspondence is to "get something done." The authors of business correspondence are usually "government bureaucrats" in an office somewhere who are not concerned with the style of their writing, and therefore, these types of correspondence may not even be "well written" from a normative standpoint. When source texts such as this kind of business correspondence are less than ideally (from a normative perspective) composed—which apparently occurs with some

frequency—the translators will not carry out a “literal” translation but will translate these texts into grammatically correct and stylistically appropriate English. Indeed, the translators use a reference style sheet that provides instructions for Agency staff in how to compose outgoing correspondence. The translators use this style sheet in their translation of incoming business correspondence with the effect that all incoming correspondence is translated and formatted to look and sound like the organization’s own outgoing correspondence.

The translators characterized this type of correspondence as “utilitarian” in that its only purpose was a transactional communication and thus proper grammar and style were deemed irrelevant in the achievement of this purpose (for example, a letter requesting the bank account information for an impending payment). Its utilitarian purpose was further exemplified by the fact that such types of correspondence often only had one recipient reader and would subsequently be “filed away and never be read again by a soul anywhere at any time.” The translators did not think it was a “secret or an insult” to say that bureaucrats the world over, particularly in technical ministries, were “not necessarily good writers.” That is to say, they did not write in a way that would normatively be admired by people who are professional writers. Despite what the translators’ perceived as the relative insignificance of style and grammar to the communicative success of business correspondence they nevertheless produced translations of this correspondence that adhered to Agency style in grammatically correct linguistic form. “We don't try to make them look bad if they've written it very poorly. We're not going to produce a translation that reads just as poorly” as the source document.

Mistakes were thus corrected unless they obscured the meaning of the message. In that case, the translator would often call the recipient of the communication (or the recipient’s

assistant) and ask whether the recipient could identify the meaning despite the confusing error. Often times, the recipients knew what the correspondence was about and could assist the translator in producing a translation that corrected the mistake in a way that also allowed for the obscured meaning to become clear. In a minority of instances, however, the recipient was able to identify that the message was not written in the way that conformed to previous communication with the author in which case the translator would produce a translation that contained the non-conforming text. In the subsequent correspondence the author would be asked by the recipient to rewrite or restate the request in the terms that had been agreed upon.

Translators proceeded similarly with diplomatic correspondence, in particular, with "notes verbales." These notes make up a specific genre of diplomatic correspondence that is drafted in the third person and left unsigned (Berridge, James, and Barder 2003, 190). It usually has as its purpose the notification of a request or policy change. It is, in that sense, diplomatic business correspondence. It is described as "less formal" than a "note" (also called "letter of protest," by which governments can condemn each other's actions), but "more formal" than an "aide-mémoire.[11]" Diplomatic correspondence that appears to fit the parameters of a note verbale is translated and formally corrected to acquire the characteristics of this document genre. Sometimes these notes are (erroneously) signed, in which case the translators will not remove the signature.

It is regular practice for the translators, however, to replace the source text's closing salutations with a standard expression for diplomatic discourse in English (instead of literally translating the source text's specific salutation): "The Mission (or: embassy) avails itself of this

[11] A proposed text without attribution, identified source, or title that circulates informally among negotiating parties (Wikipedia 2016).

opportunity to express (or: renew) to the Director General (or: Secretariat) the assurance of its highest consideration." The IAEA is not alone in using this standard closing salutation. Its syntactic and lexical features indicate that it is a phrase that has been interlingually glossed from French, which was presumably the language in which this expression was originally formulated.[12] According to the translators, this practice of translating all diplomatic closing salutations with the standard expression was suspended temporarily by the express wishes of a former Director General, Mohamed El Baradei.

A native speaker of Arabic, El Baradei instructed the translation office to carry out close translations of all closing salutations found in diplomatic correspondence written in Arabic. In Arabic, closing salutations can be especially "flowery" and the former Director General's instructions indicate that he was interested in the original "floweriness" of these expressions. This case is of interest because it reveals the existence of an interstitial layer of metapragmatic awareness (and of the limits of translatability and expressive equivalence) among native speakers at an international organization whose functioning depends on a language and translation ideology that believes commensuration to be possible across translation. At the very least, it makes clear that at least one speaker understood there to be a pragmatic, semantic, and consequently metapragmatic loss in the time-saving practice of standardizing specific expressions in generic correspondence.

[12] Nicolson writes that Latin as language of diplomacy was replaced by French in the 18th century (Nicolson 1988, 124). He laments what he perceives as the declining prominence of French as diplomatic language with these extraordinary words of praise: "Nor can it be questioned that the French language possesses qualities which entitle it to claim precedence over others for all purposes of diplomatic intercourse. It is impossible to use French correctly without being obliged to place one's ideas in the proper order, to develop them in a logical sequence, and to use words of almost geometrical accuracy. If precision is one of the major virtues of diplomacy, it may be regretted that we are discarding as our medium of negotiation one of the most precise languages ever invented by the mind of man" (Nicolson 1988, 126).

The practice of standardizing incoming business and diplomatic correspondence to adhere to Agency style and grammatically correct English produces an effect of uniformity across the many different bureaucratic voices that speak to the IAEA from "the outside." While it potentially strips out layers of information from the message (as indicated by the former Director General El-Baradei's instructions), it also levels the playing field by producing documents of similar and comparable tone, style, and correctness. The translator's correction of grammatical mistakes seems to reveal an intuitive understanding that the message content's uptake can be influenced by message form through an ideological process of stereotyping that iconically associates poor (normatively disconforming) language form with low intelligence. The translators act according to a calculus under which they take into account what they apprehend as the purposive function of the text. By bringing all incoming correspondence to a similar "standard" of generic legibility they ensure that these pieces of mail can formally be treated as equal types of correspondence. In this way, the translators are contributing a small part to an aspirational utopia of international governance in which all member state participants are ostensibly equal in capacity and potential effect. Language is thus seen as a technology of participation in processes of international governance. We will see that this "standardization-through-translation" also takes place in the production of official summary records for the policy-making bodies' meetings. However, I first want to turn to the translation of safeguards documents, for which translators take great care not to standardize the target texts.

Translating safeguards documents: language as technology of evidence

The bulk of the translators' work in the English translation section is made up of translating documents that the states submit in accordance with their safeguards agreements. All

states must submit “design information questionnaire” with regular frequency in which a nuclear facility’s initial engineering design and any modifications to it are carefully detailed. Some states have signed a supplementary agreement (the “Additional Protocol”) with the IAEA which requires them to submit additional information about nuclear facilities, materials, and activities on their territory. The vast majority of states submit these documents in English but for those documents that are submitted (primarily) in Spanish and Russian, the translation section carries out precise translations of the source texts. In the case of these documents, the translators do not conduct any grammatical, syntactic or formal corrections of the source document in the target text. This is due to the status of these documents as elements towards the fulfillment of a legal requirement. The documents serve as evidence for the state’s adherence to the safeguards agreement and are thus scrutinized for their “correctness and completeness.” Any error in the document would need to be corrected by the member state itself, which is held accountable for the truthfulness of the declaration. Inconsistencies and incorrect information in a member state’s declarations can, in the context of these agreements, lead to scrutiny by the Board of Governors, with potentially serious consequences for the member state in the realm of international law. Thus, even innocuous typos such as the “wrong atomic number for hydrogen” would be reproduced in the target text.

Through these examples we can see two modes of translation forming. The first mode is modulated by an idea of language as a technology of participation in which the translator contextually interprets the source text in order to produce a “massaged” conventionally appropriate and linguistically correct target text. The second mode is modulated by an idea of language as a technology of evidence in which the translator reproduces the source text with

maximum fidelity and accuracy. In this mode the author's pragmatic intentions cannot be intuited and the text must be taken as directly representing itself. The following and final section moves away from the process of translation to show that the notion of language as a technology of participation also determines the production of summary records.

Summary records: producing the civil voice of the IAEA

I want to end with a final example that falls into the domain of the translators' work but is not strictly speaking only interlingual gloss: the production of summary records ("official records") for the seven weeks of meetings of the policy-making bodies. All meetings of the IAEA's policy-making bodies are documented through the production of "official records" that present a very complete, if not verbatim, record of "pretty much everything that was said" at the meeting. Unlike stenography which "faithfully turns physically-audible speech into a precise and permanent written record at the real-time moment in which the recorded speech is uttered" (Inoue 2011, 181), precis-writing is a technology that produces a civil and normalized record of all spoken contributions at a meeting. It is supposed to be semantically accurate but need not be denotationally precise. Precis-writing can be seen as contributing to the production of an international public sphere. Much like "Advocates of stenography dreamed of the voice of the modern rational Japanese citizen by excluding speech forms that would compromise the expression of pure rationality" (Inoue 2011, 184), we will see that precis-writers transduce (Silverstein 2003a) the varied voices of international representatives of nation-states into an essentially homogenized summary record that becomes an indexical icon of international governance.

The work of producing extensive summaries of all spoken interventions falls to "precis-

writers" who are usually outside workers hired to sit in on the meetings for this purpose. In most cases, the precis-writers will have been supplied with the previously formulated and circulated texts of the statements to be delivered and must, during the meeting, "check" these statements "against delivery." It is conventional in diplomatic practice that the record should reflect what was actually said in the room. The precis-writers will produce summaries of all that was said at the meeting in prose form. Speakers are identified by their nationality and last name; the summary records are full of metapragmatic verbs of speaking that specify the types of spoken interventions carried out by the speaker. Figure 3 shows a sample page from IAEA official records. The initial drafts of the summary records are presented to the Secretariat of the Policy-Making Organs (SEC-PMO) for review; this office usually approves the records with only minor suggested revisions (see for an example Figure 8).

A handbook for precis writers at the United Nations characterizes the precis writer's task as follows:

> Of all the functions of the precis writer, the exercise of judgement is perhaps the most important. Experienced precis-writers will sense what is important and what is not, what must be included and what omitted. They will be able to produce an intelligible, accurate and orderly record, which includes the essentials and excludes the superfluities.[13]

These instructions indicate that recognizing the difference between "important" and unimportant elements of a meeting is a matter of experience. According to the translators and precis-writers one of the "superfluities" that are excluded from the summary record include debates—sometimes long-winded—about procedure. Furthermore, the writers, like the

[13] Instructions for Precis-Writers, Translation Division, United Nations, New York. Cited in Instructions for Precis-Writers at Sessions of the Executive Board of UNESCO, Internal Document, UNESCO Archives, 30 January 1990.

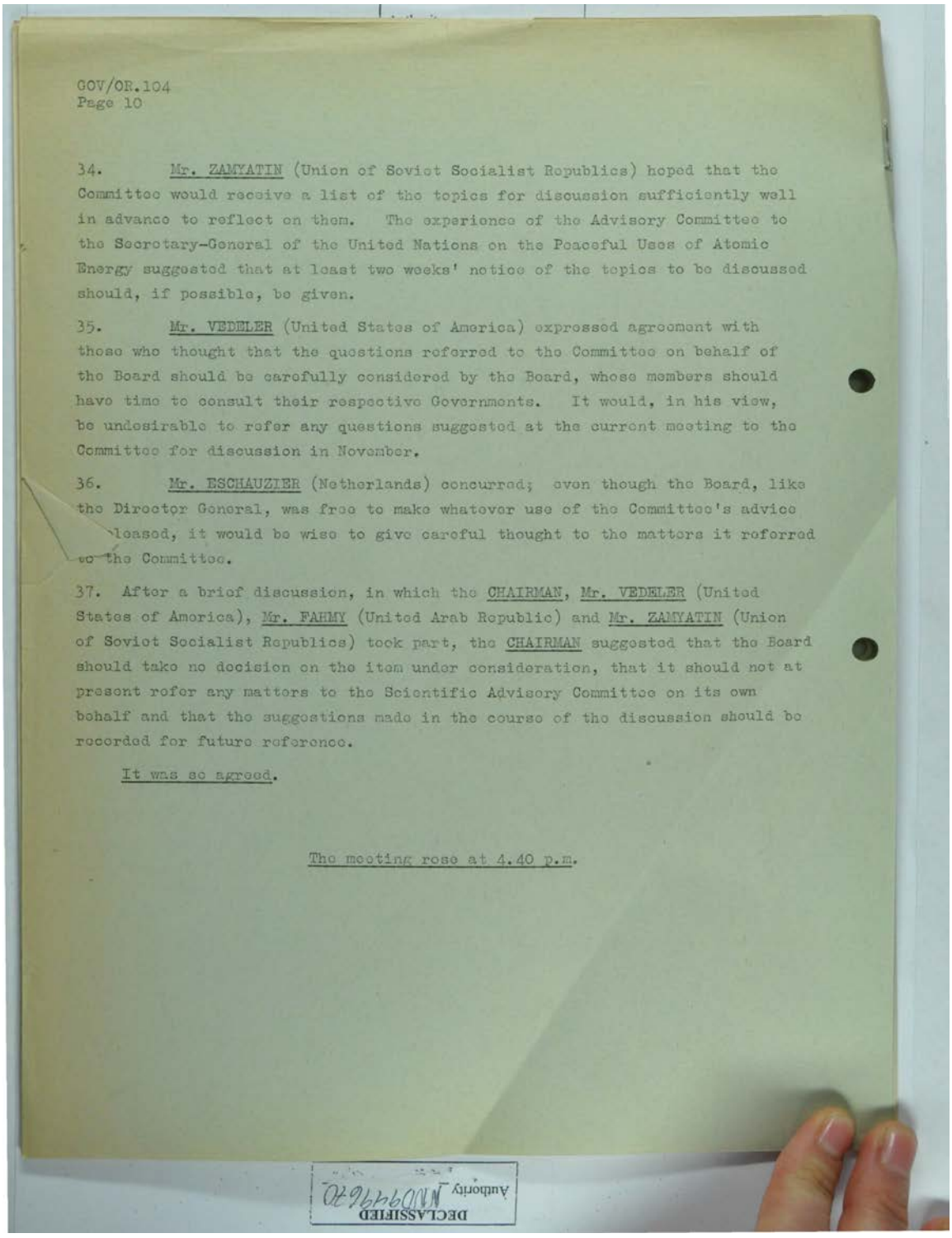
translators in their role as standardizers will correct errors of speech (such as thanking the wrong person, giving the wrong title, etc.) that are conceived to be minor or not substantive. This is seen as a way to smooth out the official record in a way that doesn't reflect the inevitable mistakes that occur in speech. This practice reveals an understanding of speech in which flubs are insignificant.

Different models of speech and communication, most famously that of Sigmund Freud but also more generally the disciplinary fields concerned with the social study of language, would argue that mistakes and misspeaks are interactionally meaningful. The model of speech that governs the production of summary records understands the interactional meeting to be more consequentially about the interactants' intentions and thus the illocutionary force of speech. Superficial mistakes are seen to make up the distracting noise that overlays the signal of real, consequential, purposive, and normatively ideal speech. In a way, the precis-writers restore the maximum illocutionary force to the speaker's words by smoothing the record. The writers will also correct grammatical and other linguistic mistakes, for example, for the rare (and often) non-native speakers of English who deliver their statements extemporaneously[14]. Some representatives deliver "fiery" speeches in English which is usually not their native language.

> And if he's trying to be fiery about it we're not going to make him look ridiculous and so of course we would have to then do the work after the fact that a good speech writer would have done for him to begin with.

There is an understanding that these speeches have as their intention to make a persuasive argument with the help of style and rhetorical devices but that the speaker is not as successful in delivering this speech in his non-native language as he would be if he was using his native

[14] Iran, Cuba, and Switzerland were named as the country's most likely to deliver extemporaneous statements.



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34. Mr. ZAMYATIN (Union of Soviet Socialist Republics) hoped that the Committee would receive a list of the topics for discussion sufficiently well in advance to reflect on them. The experience of the Advisory Committee to the Secretary-General of the United Nations on the Peaceful Uses of Atomic Energy suggested that at least two weeks' notice of the topics to be discussed should, if possible, be given.

35. Mr. VEDELER (United States of America) expressed agreement with those who thought that the questions referred to the Committee on behalf of the Board should be carefully considered by the Board, whose members should have time to consult their respective Governments. It would, in his view, be undesirable to refer any questions suggested at the current meeting to the Committee for discussion in November.

36. Mr. ESCHAUZIER (Netherlands) concurred; even though the Board, like the Director General, was free to make whatever use of the Committee's advice [illegible]leased, it would be wise to give careful thought to the matters it referred to the Committee.

37. After a brief discussion, in which the CHAIRMAN, Mr. VEDELER (United States of America), Mr. FAHMY (United Arab Republic) and Mr. ZAMYATIN (Union of Soviet Socialist Republics) took part, the CHAIRMAN suggested that the Board should take no decision on the item under consideration, that it should not at present refer any matters to the Scientific Advisory Committee on its own behalf and that the suggestions made in the course of the discussion should be recorded for future reference.

It was so agreed.

The meeting rose at 4.40 p.m.

Figure 8: Excerpt, official records from Board of Governors meeting, 7 November, 1958.[15]

[15] NARA, Record Group 59, Box 211, Folder 4, GOV/OR/100-104.

language. He is not capable of attaining the conventionally appropriate (higher) register for this kind of oratory. In this case, the intention is registered and the translators and precis writers will thus attempt to "massage" the source text to fit the appropriate genre in English. Here, then again, the transformation wants to stay true to the original illocutionary force (the effect of which is potentially "lost in delivery"). In the record, the speaker will thus be made to "sound" like a native speaker with competent delivery. This provides for the appearance of equal participation among speakers; it produces the Habermasian public sphere imagined to be inhabited by equally competent voices of modernity (Bauman and Briggs 2003).

While "controversial" or "political" statement are as a rule not altered or excluded, the precis-writers will render the summary records more civil and subdued when summarizing particularly "fiery" or "gruesome" statements. In these cases, the precis-writers will try to capture the rhetorical effect (intention) of a statement but without indulging in the repetition of gruesome detail. For example, the writers will include "the massacre of women and children" once but not repeat it (if repeat is actually what the representative did). The translators showed themselves to be sympathetic to the delivery of "gruesome" statements that dealt with war and devastation "usually in connection with the Middle East" but were nevertheless committed to a normative tone throughout the summary records.

It is not possible to show a recent example comparing a representative's delivery with the text of the official records (for either the annual General Conference or the more frequent Board of Governors meetings) because the audio recordings of both as well as the official records of the Board meetings are only made public after a thirty year period in the archives. However, the smoothing effect achieved in the production of the records can be illustrated with an example

from the very first meeting of the General Conference held in October 1957. This example, however, shows the opposite of what the translators described in the case above. In this instance, a capable orator's speech is stripped of its poetic structure in its enrollment into the mere register of the official records. Under Secretary General of the UN Ralph Bunche (representing UN Secretary General Dag Hammarskjöld who was unable to attend) delivered a speech, the poetic structure and deictic patterning of which illustrates the UN Secretary General's concern that the newly founded organization would become too independent from the UN (Roehrlich 2016, 14–15).

> This meeting here in Vienna of the first General Conference of the International Atomic Energy Agency is the culmination of a process of construction that began almost four years ago in the General Assembly Hall of the United Nations in New York. It was there that the president of the United States first suggested the creation of an international atomic energy agency in nineteen fifty three. It was there that the General Assembly one year later unanimously called for the establishment of the Agency. And it was in that hall on October twenty-third about one year ago that the representatives of eighty one nations unanimously adopted the statute of the Agency.

The above text is the beginning of the speech Bunche delivered (see the Appendix: Poetic Analysis of Speech for a full transcript). This was rendered as the following in the official records of the General Conference:

> The first General Conference of the International Atomic Energy Agency (IAEA) was the culmination of a process initiated almost four years previously at the General Assembly of the United Nations, when President Eisenhower had first suggested that the Agency be established. In 1954, that suggestion had been unanimously approved by Member States, and on 23 October 1956 the Statute had been adopted, again unanimously, by representatives of eighty-one States at the Conference on the Statute.[16]

The official records jettison the poetic structure of deictic anchoring (in the "here,"

[16] IAEA Archives, Records of the first General Conference, October 1957, GC.l/OR.l, Page 5-6. See the Appendix: Poetic Analysis of Speech for the full version.

"there," and "that hall") by which the speech is attempting to tie the IAEA's founding back to the United Nations. In these records, the opening lines are reduced to a mere recounting of facts and dates of "how we got here." The appendix includes a poetically parsed and chunked version of the beginning and end of Bunche's delivered speech, as well as a short discussion of its poetic effects. Suffice it to say here that the official records reveal an ideology of denotational textuality by which the "content" of speeches is summarized, and the poetic effects jettisoned.

The ideas of voicing normatively correct and standard speakers that we saw in translation of incoming business and diplomatic correspondence are also extended to the summary records of the board. In contrast to incoming business correspondence where the purpose of the communication is considered to be purely utilitarian and the audience of the communication is likely a lone IAEA staff member, the summary records enjoy a large audience comprised of member state representatives and IAEA staff. While the records are not immediately made public they are however deposited in the archives for internal reference as well as for possible future consideration by nosy researchers. Despite the difference in audience and reach, business correspondence and summary records are both produced with view to crafting a normatively correct and generically appropriate text. In the case of the summary records it becomes particularly apparent that the differences in language, English competence and—to a certain extent—style among the various representatives are smoothed over in favor of a normatively civil, generically diplomatic voice of modernity.

The translators regiment a cacophony of voices from capitals all over the world into a smooth, standard register in the target texts. The purpose of this is articulated, in the case of business correspondence, as contributing to the achievement of business goals in

communication, and in the case of the summary records, as achieving the author/speaker's rhetorical intentions. In both cases, the translators are concerned with allowing the speakers' purpose and intentions to be unaffected by their linguistic limitations. In a sense, they are translating texts towards greater efficacy. Through this practice, all participants are "raised" to a common level of expression on the written page that smooths the discursive differences of the international arena and produces the appearance of equal participation.

I argue that it is an understanding of language as a technology of participation—in this case, geopolitical participation—that provides the calculus for how to translate certain kinds of correspondence and write summary records. This practice of translation creates, in effect, a normative discourse that functions as the fulfillment of an aspirational register and performance of UN internationalism. At the IAEA, it also contributes to perpetuating the concealment of the geopolitical hierarchy established by the NPT and proceduralized through the IAEA's bureaucratic practices. The many concrete differences between member states: their contributions to the budget, the number of staff members from each state, the size of their delegations at important meetings, and so on, recede into the background of the official records. On those sets of paper, all states are ostensibly equal, and the precarious balance of nuclear governance is performed as if it was stable foundation.

In the case of the language workers at the IAEA, I have identified distinct conceptions of language as semiotic technologies with different purposes and pragmatic effects. These conceptions have been shown to modulate the ways in which an overarching semiotic ideology of immediacy—that the text is a direct representation of the authoring entity—regiments the language work at the IAEA. When language is seen to function as a technology of evidence,

texts must be literally copied in order to pragmatically maintain this function. When language is seen to function as a technology of participation, texts can be massaged and tuned for pragmatic appropriateness-in-context. This example shows that folk ideologies about truthfulness, fidelity and the indexically iconic potential of entextualization are highly dependent on the presupposed pragmatic entailments of texts. It also reveals to what extent the ideological fiction of equal participation of nation-states in an international system of governance is constituted by the linguistic practices of its language workers.

If we return to thinking about the anecdote that opened this section, we will be reminded that translation at the IAEA can become subject to great controversy and that translators generally feel that their time would be better spent doing their work rather than becoming pawns in a policy argument that spills over from the policy-making bodies into the translation section. In this way, the translators play a precarious role in maintaining a boundary against the political aspects from encroaching upon the translation of business correspondence and the production of summary records. The translators' strategy against politicization (or at the very least criticism of their work) is to produce target texts that meet the (meta-)pragmatic expectations of all participants and audiences—no easy task. They carry out the political project of the IAEA by claiming space for the imaginary of neutral discourse.

In the context of nuclear governance, the two understandings of language as semiotic technologies fulfill the distinct but always entangled purposes of the IAEA which can be traced back to its founding. Language as a technology of evidence fulfills the rational-legal promise of bureaucratic objectivity. The organization's safeguards program with its technical objective of ascertaining member-state compliance with nuclear safeguards agreements can be felicitously

achieved when translators faithfully produce interlingual copies of member state compliance documents. At the same time, language as technology of participation fulfills the calls for non-discrimination and the respect for national sovereignty. The presumed equality of member states is felicitously produced when their communications all appear to meet a normative standard corresponding to a civil, modern voice. We can see, thus, that in their daily work, the translators and precis-writers at the IAEA play an important role in carrying out the organization's foundational assumptions and mandated promises of bureaucratic objectivity in international nuclear governance.

6.4. Conclusion: Regimentation and its effects

We can see that language at the IAEA is thought to be quite efficacious and that it is variously regimented to produce certain outcomes. In the case of the Secretariat's safeguards reports, the committee of writers must pay attention to craft language that is precise but not "rough." The reports must achieve the right tone of bureaucratic objectivity that can be read as detailing a state of affairs without making assumptions about intentionality. In the case of the translations and summary records (with the exception of the translation of safeguards documents), the translators often attempt to clarify the communicative intentions of the authors and speakers by producing a translation or summary that more "appropriately" and normatively expresses the aim of the communication.

The safeguards reports appear like they are merely "directly copied" into English, but the attention brought to this act also requires the recognition of the text as enrolled into a legal structure and thus the regimentation of these texts takes place by reproducing the originals as

precisely as possible. These regimentations and articulated attentions to language by the various producers of written documents at the IAEA reveal a language ideology that understands language and the way something is expressed to have real effects in the world. In theoretical terms, the writers at the IAEA have combined Austin's felicity conditions (Austin 1962) with a Gricean understanding of conversational implicature (Grice 1989) in their understanding of the conventions that allow for the full social effect of text in the "right" register.

This understanding also reveals a universalist assumption about the validity of specific registers for social achievements and possibly rests on a vision of the international organization as composed of reasonable actors sharing a common commitment towards civility. While the universal effectiveness of the IAEA's particular register of discourse is not certain, the discourse must be recognized as possessing a centripetal effect that tends to enforce the legitimacy/naturalness of its own perceived universality. One assumption that the participants in the IAEA's "language games" clearly share is the idea that it is possible to influence politics by controlling language, or even more extreme, that politics is discourse, and discourse is politics. Given this assumption, the IAEA's tight regimentation of the language that is produced by staff authors, the language that comes into the IAEA from outside sources, as well as the language used to describe the debates in the policy-making bodies can be interpreted as a way to stabilize—or make predictable—the political effects/or entailments of words. Actors are acutely aware of the presuppositions and entailments of any "semiotic moment" (Richland 2007), especially in the realm of nuclear things in which all affect has been magnified (Masco 2006). The metapragmatic regimentation of communication is given a lot of precise scrutiny because the pragmatic consequences of communications about nuclear things are heightened.

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Appendix: Poetic Analysis of Speech

1. Transcript of speech

Speech by Ralph Bunche at opening of first General Conference of the International Atomic Energy Agency (1957)

Mister President of the Federal Republic of Austria Mister President Honorable Delegates Excellencies Ladies and Gentlemen May I at the outset convey to the conference and to the host government the deep regret of the Secretary General of the United Nations Mister Hammerskjold that contrary to his plans and his desires he cannot be here today owing to unanticipated developments requiring his presence at the United Nations headquarters Until quite recently indeed he had hoped to participate in person in the history being made through this important step forward in the peaceful use of atomic energy an event undoubtedly of great if still untold significance for the world at large The message of the Secretary General is as follows. (2.2) This meeting here in Vienna? (0.5) of the first (0.4) General Conference of the International Atomic Energy Agency? (1.4) is the culmination of a process of construction (1.1) that began almost four years ago= in the General Assembly Hall (.9) of the United Nations in New York? (1.4) It was there that the president of the United States. (1.1) first suggested the creation (1) of an international atomic energy agency in nineteen fifty three (1.1) It was there? that the General Assembly (.8) one year later? (.9) unanimously called for the establishment of the Agency. (1.3) And it was in:: that hall:: (1.2) on October twenty-third= about one year ago. (1.3) that the representatives of eighty one (.) nations unanimously (.9) adopted the statute. of

the Agency. ¤<2038042>(0:33:58.0) When it was first proposed the creation of such an agency as this seemed to many an almost impossible task in the prevailing political climate The governments had sought in vain for years to reach agreements concerning atomic weapons and disarmament in general Indeed we know they have not yet succeeded in reaching even a first step agreement in this field though the effort still goes on as it must and will be taken up once more at the General Assembly in New York this month while you are meeting here The development of atomic weapons as well as other armaments has thus continued outside the control of any international authority It is all the more remarkable therefore that agreement was reached in less than four years to create an agency in which nations representative of all the different political groupings and regions of the world are pledged to work together in a common program for the development of atomic energy for peaceful purposes Without the existence of an organization as representative of the=as the United Nations it would have been impossible to compose the many differences and reconcile the interests that were involved The fact that it has been done constitutes I believe one of the most hopeful developments in international life since the United Nations was established twelve years ago This agreement upon an international program for the use of atomic energy for peaceful and constructive purposes is in itself a contribution to the lessening of tensions in international life It should also strengthen our faith that agreements may in time be reached through the same United Nations processes to banish the threat of nuclear war from the world And finally the establishment of the International Atomic Energy Agency opens up possibilities for cooperative development of new sources of power of immense potential significance for future economic and social progress throughout the world

And especially in the economically less developed regions To an even greater degree than other institutions in the United Nations family this is a pioneering and experimental venture Your preparatory commission has been prudent in its recommendations for the initial program of the agency But in a longer perspective it is clear that the program of this agency ought soon to become one of the most extensive and important of the programs undertaken through the United Nations family of agencies All the signs point to the likelihood that in the next few decades nuclear energy can become one of the principal sources of power in the world We know also that the addition of this new source of power will be essential both to sustain and expend=expanding economy In many of the most industrially advanced regions and to provide a sufficient power base for the economic development of the less industrially advanced regions where most of the people of the world still live in conditions of poverty The report of your preparatory commission declares that the agency's creation is the expression of common resolve that the development of atomic energy shall not accentuate but rather diminish the differences in the technological advancement and standards of living of the different peoples of the world. It might be added that the hope of closing the gap by raising standards of living in the less developed regions and thus avoiding some of the evils that accompanied the first industrial revolution of the past century depends to a large degree upon the ex-tent to which your agency is able to carry out in practice the purposes for which it was created Indeed the program of the International Atomic Energy Agency in the next few years might be regarded as one of the most necessary and valuable forms of technical assistance Understood in the full meaning of the term that can be provided through the United Nations family of agencies It will be a severe challenge

to provide this assistance on an adequate scale in the short time remaining before the general use of atomic energy as a source of power becomes economically as well as scientifically practical The United Nations and the International Atomic Energy Agency share several important continuing responsibilities in the international control and development of atomic energy Next year nineteen fifty eight the radiation committee of the General Assembly will report on the results of a series of fact finding surveys on the effect of radiation on human life and environment This report will be of special interest to your agency since one of your principal concerns will be measures for the protection of health and safety from the hazards accompanying the peaceful uses of atomic energy No technological development is entirely free of risk especially for those most immediately concerned Yet the hazards in the atomic field are so high that there is special need to pool all available knowledge in this field on a continuing basis The United Nations will also convene next year in Geneva the second scientific conference on the peaceful uses of atomic energy The agenda for this conference gives promise of resulting in an exchange of advances in knowledge as important as that which took place at the first conference in nineteen fifty five And finally the report of your preparatory commission recognizes the close relationship between continuing efforts toward disarmament by the United Nations and the increasing use of nuclear fuels for peaceful purposes through the agency when it stresses the importance of a reliable system of safeguards against the diversion of fissionable material to military use One of the items on your agenda...

CLOSING

I have said that this day, the first meeting of the general conference of the International Atomic Energy Agency, marks the culmination of a significant process of construction in the institutions created to serve the international life of our time. But the creation of this institution is also a beginning. The program which you will inaugurate now is a unique experiment in international cooperation that can result in greatly strengthening the prospects of peace as well as in great economic and social benefits to all nations. I would be the last to minimize the difficulties you face in bringing to fruition in the years ahead the hopes that the agency was created to serve. But I have faith that you will be sustained in your endeavors by the knowledge of how very much depends on your success.

2. Pages of official records containing summary of Mr. Bunche's speech

INTERNATIONAL
ATOMIC ENERGY AGENCY

Distr.
GENERAL
GC.1/OR.1*
27 January 1958

General Conference

First regular session

SUMMARY RECORD OF THE FIRST PLENARY MEETING

Held at the Konzerthaus, Vienna,
on Tuesday, 1 October 1957, at 3 p.m.

Temporary President: Mr. BERNARDES (Brazil)

CONTENTS

* This is the final version of the record previously issued under the same symbol and number, embodying the corrections requested by delegations.

the world; it might then be possible to tackle the other great problems still outstanding in that field with the same scientific earnestness. Deeply impressed by the appeal of that great humanist Albert Schweitzer, he had recently suggested that scientists of all nations should seek to solve the problem of atomic bomb tests, holding themselves aloof from all political influence and working with the calm objectivity of scientific knowledge.

13. Let there be no mistake: people all over the world expected their leaders to relieve them of their great anxiety for the health of future generations, and demanded that the last of the secrets wrested from nature should not be misused, that the way of life and progress, not that of death and destruction, should be chosen. He agreed with leading experts in the field of atomic energy that prevention of the total destruction of all life on the earth was no longer a technical or scientific problem but primarily a diplomatic and political one. Hence, all must bear a share of a great responsibility.

14. He wished the General Conference every success in the work for which it had met in Vienna, and hoped that such goodwill would prevail that, as President Eisenhower had said when the Conference had first been suggested, a way would be found "by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to his life". That was his own most heartfelt wish, and in that hope he welcomed the Conference, which might perhaps be the most important in modern history.

ADDRESS BY THE REPRESENTATIVE OF THE SECRETARY-GENERAL OF THE UNITED NATIONS

15. Mr. BUNCHE (Representative of the Secretary-General of the United Nations) said that Mr. Hammarskjöld very much regretted that, owing to unforeseen circumstances, he was unable to attend, as he had hoped to do, a historic meeting which would mark an important advance in the peaceful uses of atomic energy. He had sent the following message to the Conference.

Mr. Hammarskjold's message

16. The first General Conference of the International Atomic Energy Agency (IAEA) was the culmination of a process initiated almost four years previously at the General Assembly of the United Nations,

In this summary, we lose the poetic parallelism of the speech. Four sentences are transformed into one. We also lose the proximal deictics that locate Vienna with respect to New York.

when President Eisenhower had first suggested that the Agency be established. In 1954, that suggestion had been unanimously approved by Member States, and on 23 October 1956 the Statute had been adopted, again unanimously, by representatives of eighty-one States at the Conference on the Statute.

17. At the outset, the creation of such an Agency had seemed to many an almost impossible task in the prevailing political climate. Governments had long sought in vain to reach agreement on atomic weapons and disarmament, but had not yet succeeded in reaching even a first-step agreement; however, the matter would once more be taken up at the current session of the General Assembly. The development of atomic weapons as well as other armaments had thus continued outside the control of any international authority, so that it was all the more remarkable that agreement should have been reached in less than four years on the establishment of an agency in which nations representing all the different political groupings and regions of the world had pledged themselves to work together on a common programme. Without an organization as representative as the United Nations, it would have been impossible to compose the many differences or to reconcile the various interests involved; the fact that that had been achieved was, the Secretary-General believed, one of the most hopeful events in international life since the organization's inception.

18. Agreement upon such an international programme in itself helped to reduce international tension and should also strengthen the faith that agreements reached through similar United Nations processes might finally remove the threat of a nuclear war. The creation of the IAEA opened up possibilities for the co-operative development of new sources of power potentially very important for future economic and social progress throughout the world, particularly in the less-developed regions.

19. Even more than other United Nations institutions, the IAEA was an experimental venture, and the Preparatory Commission had been prudent in its recommendations concerning the initial programme; but from a longer-term view it was clear that the programme should soon become one of the most extensive and important undertaken by

any United Nations agency. There was every indication that in the coming few decades nuclear energy could become one of the main sources of power in the world and, indeed, would be an essential additional source for maintaining and expanding the economy of many of the industrially most advanced regions, as well as for providing an adequate source of power for the development of other less-advanced regions in which the great part of the world's population still lived in poverty. The Preparatory Commission had declared in its report that the creation of the IAEA was the expression of common resolve that the development of atomic energy should not accentuate but rather diminish differences in technological advancement and standards of living,[1] and it might be added that the hope for closing the gap between the more and the less advanced countries and of avoiding some of the evils of the first industrial revolution depended largely upon the extent to which the Agency could fulfil the purposes for which it had been founded. The programme for the next few years might be regarded as one of the most necessary and valuable forms of technical assistance, in the full meaning of the term, that could be provided through the United Nations, and it would be a severe test to provide such assistance on an adequate scale in the short time remaining before the general use of atomic energy as a source of power became economically as well as scientifically practical.

20. The United Nations and the IAEA shared several important responsibilities with regard to the international control and development of atomic energy. In 1958, the Scientific Committee on the Effects of Atomic Radiation of the General Assembly of the United Nations would report on the outcome of a series of fact-finding surveys about the effects of radiation on human life and its environment, a report which would be of special interest to the IAEA, since one of the Agency's principal pre-occupations would be measures for the protection of health and safety from the hazards accompanying the peaceful uses of atomic energy. No technological development was entirely free of risk,

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1/ GC.1/1, paragraph 2.

especially to those most immediately concerned, and the hazards in the atomic field were so great that it was especially necessary continually to pool all available knowledge.

21. The United Nations would also be convening at Geneva in 1958 the second Scientific Conference on the Peaceful Uses of Atomic Energy, the agenda for which promised to lead to an exchange of information on progress achieved as important as that which had taken place at the first Conference in 1955.

22. The Preparatory Commission had recognized the close relation between continued efforts towards disarmament by the United Nations and the increased use of nuclear fuels for peaceful purposes through the Agency, by emphasizing in its report the importance of a reliable system of safeguards against the diversion of fissionable material to military uses.

23. The General Conference would have to consider the draft relationship agreement negotiated by the Preparatory Commission with the Advisory Committee on the Peaceful Uses of Atomic Energy established by the General Assembly. The agreement reflected the Agency's special status under the aegis of the United Nations and the special need for close working relations between the two. It also reflected the desire to ensure effective co-ordination with the specialized agencies. Once the draft agreement had been ratified by the General Conference and the General Assembly, the IAEA would become the newest member of the United Nations family.

24. The Secretary-General assured the General Conference that the United Nations Secretariat wished to do everything it could to develop a fruitful programme of close and continuous collaboration in accordance with the agreement, just as it had sought to give all possible help during the preparatory stages. The programme to be inaugurated was a unique experiment in international co-operation which could greatly strengthen prospects for peace as well as bring vast economic and social benefits to all nations. He would be the last to minimize the difficulties, but was confident that members of the Conference would be encouraged in their task by the knowledge of how very much depended upon their success.

This ending also loses the poetic structure that mirrors the beginning. It also paraphrases the last few sentences in a way that strips them of the force of expectation in this inaugural ritual.

3. Analysis of speech

Characteristics of the data

From the whole speech which is about 1500 words long, I decided to focus on the initial and final paragraphs because of their poetic similarities. The "middle" section of the speech is the "business" part and doesn't boast the same kind of poetic organization as the beginning and the end. I have relied heavily on Prof. Nakassis' own metrical organization of the data. While the pauses during speech delivery at first seemed to be important especially because of their length (many over 1s), they were soon ignored because they seemed to be mostly a quality of speech making rather than of the speech itself. That is to say, there is obviously a cadence and rhythm to the speech as spoken but this rhythm is not as significant as the rhythm of parallel organization within the text.

The text has been arranged in vertical columns to highlight what seem to be the most important parallel structures. The first five sentences of the speech are arranged in Figure 1a. The last five sentences (how neatly parallel!) are arranged in Figure 1b, but only the first two sentences of the last part mirror the structure of the first part. The final three sentences display their own poetic arrangement.

The first line of speech in Figure 1a makes up the metapragmatic frame for the speech event that is to follow. The metapragmatic frame is represented as the outermost dotted rectangle within which is contained the speech. The two smaller rectangles contain the here and now and the there and then of the propositional frame which are calibrated against each other through the mirroring function provided by proximal deictics such as this/here and there/that hall. The first rectangle in Figure 1b also contains the proximal deictic this which serves to bring the audience

back to the here and now of the ritual speech event. The deictic markers as well as the repetition of the phrases in the grey boxes both serve to link the beginning and the end and to distinguish these sections from the rest of the speech. Through their almost identical form they become the sections that ritually anchor the text.

The second rectangle in Figure 1a shows syntactically parallel sentences which repeat simple forms in order to produce poetic parallelism. However, these parallel forms are only in some cases identical such as It was there that and of the Agency. In most other cases the parallel forms show some similarity of meaning through different lexical items. Thus, for example the column of Agent/Subject moves from a singular to more general agents, agents-at-large; the temporal moves from the more distant past to the present; and the verbs of speech and action move from weaker to stronger. This repetition with variation gives an effect of degrees to create a “framework of overall metaphor in which [the] ritual theme is established" (Silverstein 2003:52).

The second rectangle in Figure 1b also displays poetic parallelism in the columns of verbal complements where the process of inaugurat[ing] must be followed up with bringing to fruition and be sustained. The temporal development also goes from a beginning which is now, and continues in the years ahead. Finally, the objects of the sentences all possess definite articles and figure an arc from recognizing the difficulties, to having the hopes that all will be achieved, especially given the knowledge of how significant the process is. The addressee is tightly brought into this final segment as significant actor through the use of the modal verb of expectation/command will. In contrast, the speaker’s own verbs of action are in the conditional (as in would) or in the simple present (have). Finally, I see the speaker’s interjection, But I have

faith, as a break in the parallel construction that serves to highlight the final plea, how much depends on your success, where the how much serves to refer to all that has come before in the speech.

The ritual efficacy of the data

The ritual theme of this speech is self-consciously historical baptismal/inaugural speech. Before he begins with Hammarskjöld's speech, Bunche says that Hammarskjöld regretted not being a part of this "making of history". This ritual genre marks the beginning of something (a child's personhood, an elected politician's term in office) supposedly meaningful in socio-cultural life. This inauguration is authorized at once through the position of the speaker serving as a proxy for the conical top-and-center of the international political hierarchy. The Director General of the United Nations is the most authorized speaker in this arena. But the speaker nevertheless must through ritual speech authorize the inauguration. He does this by anchoring this baptismal moment in a series of events (the telling of history) which are figured as a self-evident progression leading up to the present moment. I will analyze the contextual time-space produced through the ritual text in order to show how it contributes to authorizing and centering the baptismal moment.

Unlike Lincoln's Gettysburg Address and many other ritual texts, this speech does not refer to a mythical past but rather remains firmly within a clearly circumscribed timeframe that does not go back further than 12 years (except with one mention in the body of the speech to the industrial age), which is the year in which the United Nations was founded. It is clear then that the speech must anchor its legitimacy in the creation and constitution of this international system of governance. It is within this framework that the speaker can authoritatively speak.

The text's time, while not extending back very far into the past, doesn't shy away from projecting into the future. It projects its own possibility into what may still yet be achievable at some point. Its own legitimacy depends on what it will achieve in the years ahead. Yet, the text's main anchoring time is the here and now, our time, the time of action, of inauguration, of consequence. Thus, this institution's framework of time, an institutional time, relies upon, not a mythical past of origin, but rather specific moments in recent history which authorize its present functioning. It is simultaneously projecting from a known present into an unknown future whose outcome depends on the ability to act in the present, which is again based on precisely defined historical actions.

The spatial context of the speech is clearly global but not in the sense of an abstract humanity and rather more concretely defined as the global under the aegis of the United Nations. Thus, the spatial context includes nation-states and regions within an international political order. This logic subsumes the entire world within it.

Within the space-time of this ritual, the present here and now is authorized by linking it to the origo of legitimacy within this political order: the headquarters of the United Nations in New York. It was there…in nineteen fifty three, along with the proximal deictics this/here create a link between the present moment and what has become a historical event. The General Assembly Hall of the UN, more so than the Konzerthaus in Vienna, is a hallowed space within the international political order. That which is being done here, today, was first suggested there and then, and is thus legitimate.

This ritual text is further efficacious insofar as it performatively creates the history it seems to merely recount. By selecting particular events as pivotal in the creation of the

organization, the text designates them as pivotal. It also highlights that the progression of events was achieved with remarkable speed for this particular political order and with remarkable consent, further indicating that this is no mere everyday baptism. Rather, it is a unique experiment, an achievement without precedent (except in its institutional orderliness). Riles (2001) has written about how the UN produces and refers to its own institutional history through text-based practices. This speech shows how this institutional history is also performatively created through ritual text. It may also be an example of how the extraordinary circumstances or speed of events are eventually normalized into "The history of the IAEA."

As was described in the previous section, the series of similar phrases that produce a parallel structure with variation creates an overall framework of metaphor in which the ritual theme of inauguration/baptism is established. Thus, this inauguration was made possible by a process of construction in which series of actors, the president of the United States, the General Assembly, the representatives of 81 nations, acting in various ways, first suggest[ing], unanimously call[ing] for, unanimously adopt[ing], in order to bring into being (creation, establishment, statute) the Agency. These parallel phrases show a variation in meaning which goes from a single individual's suggestion to an organized group of actors establishing a new organization.

The first sentence is reproduced with some variation in the last part of the speech (Fig. 1b), which indicates to the audience that the speech is about to close. Employing parallel forms at the beginning and ending of a ritual is a prominent feature of ritual text. It serves to mark the beginning and end of the ritual time-space in a recognizable way.

The last few sentences are something like a send-off message, or the take-home point of the ritual. By announcing that this is a beginning the text once again focuses the ritual on the here and now of the present. And projecting into the future, the speech addresses the audience with the modal constructions will inaugurate and will be sustained, which indicates the expectation or command of the Director General that these appointed delegates shall carry out the task which he has here authorized. It reminds one of the final words spoken by a Catholic priest at the end of mass, "[You will] go now in peace to love and serve the Lord". The ritual moment is supposed to have prepared you to follow through with the task now assigned to you.

The last clause, how very much depends on your success, is the thunderbolt that strikes the audience (as I have marked in Figure 1b) because how very much refers back to and contains all that has come before in the speech. In the most immediate sense, though, how very much refers back to the international cooperation that can result in greatly strengthening the prospects of peace as well as in great economic and social benefits to all nations which is the supposed aim of this international framework of governance. Indeed, the stakes are high at this inaugural conference as the nuclear arms race between the US and the Soviet Union had already begun, and it was the founding purpose of this Agency to prevent or even mitigate such international competition in atomic weapons development. That knowledge of how very much depends on [their] success is clearly expected of all of the delegates. It is a complex knowledge of possible futures based on the recently experienced past. The Director General is thus appealing to the embodied knowledge of the delegates to carry out what they all consider to be such an important project for the future welfare of the global community.

Thus, this inaugural speech achieves its ritual effectiveness through the dense, internal arrangement of the text within its relevant context. The repetition of parallel forms with a variation in meaning gives the effect of intensification. Repetition at the end of phrases used at the beginning serves to tie the ritual bundle. Proximal deictics function to provide a mirroring or inversion effect through which the here and now becomes reflected through the there and then. The ritual's authorizing effect is achieved through referral back to authorizing moments and places, which provide legitimacy to the current moment. The ritual's space-time is tightly limited in the past within the newly created context of international governance. But it also constantly projects from the present into the future, so that future possibility also authorizes the present opportunity to act. As has been widely acknowledged, here too, the telling of history is the making of history. Investigating the ritual qualities that adhere in international organizations may show to what extent legitimacy in this realm is not solely produced through international law but also resides in the verbal interactions of the actors.

4. Comparison with the précis of the speech

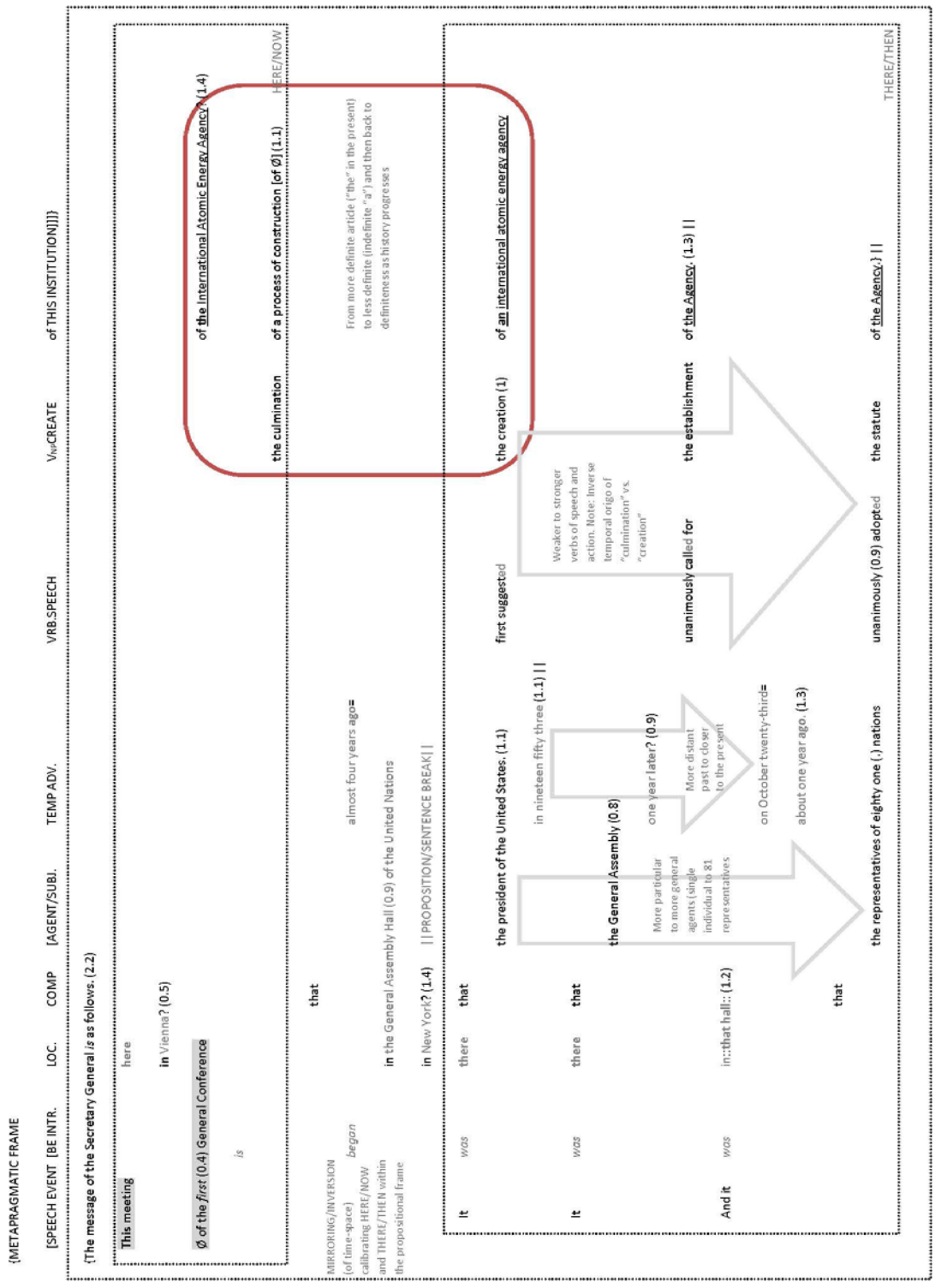
I've attached the pages of the "Summary Record of the First Plenary Meeting" that contain the summary of Dr. Bunche's intervention. The original speech came to just over 1500 words, and this summary makes up just over 1100. You can see from the included pages that the basic denotational content of the speech was summarized and carried over into this format. The précis genre in this context appears to be similar to journalistic reporting in terms of the kind of reported speech format that is used. The speaker is not cited in quotation marks but rather his speech is slightly adapted for a story-telling mode which sparingly employs reporting verbs. Dr.

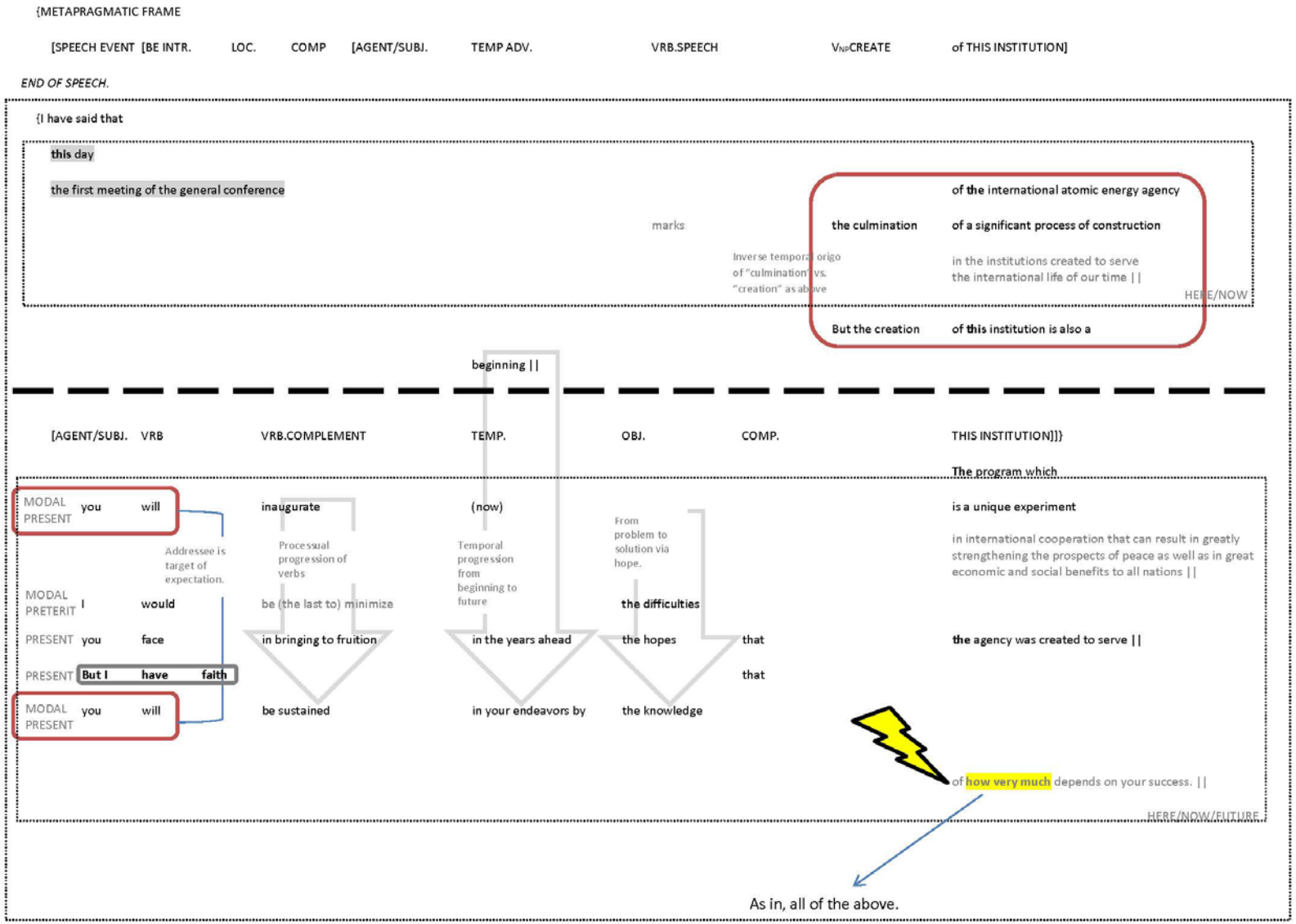
Bunche said that Mr. Hammarskjöld regretted and The Director General assured are the only examples of the use of such verbs. Most often, the précis represents his speech in the past tense but does maintain the tense of the original speech at some moments. This summary also sometimes includes entire phrases from the original speech. It is thus unlike the critical précis in academic writing, which attempts to avoid the direct copying of wording from the original piece.

In this summary, we lose the poetic parallelism of the original speech; the four parallel sentences at the beginning of the speech are transformed into one. We also lose the proximal deictics that locate Vienna with respect to New York and calibrate the here and now with the there and then authorizing origo of the ritual moment. The final sentence in the précis also does not contain the poetic structure of the last few sentences of the original speech. Thus, the effect of mirroring the beginning and creating a symmetrical ritual text is lost. The précis also paraphrases the last few sentences in a way that strips them of the force of expectation in this inaugural ritual. The breaking phrase But I have faith is recharacterized as was confident which charges the message with a rather less prophetic tone.

By comparing the transcribed speech with the précis, we can show that the latter is indeed governed by a familiar language ideology which privileges denotational content as the sole vehicle for the relevant meaning, and does not recognize the ritual efficacy in the poetic structure of the speech. What may still be contained in the précis is the ritually symbolic significance of the Director General of the United Nations addressing the General Assembly of the new International Atomic Energy Agency. Nevertheless, the effect of “making history” even if it is mentioned as historical at the beginning of the summary, is not transmitted through this summary.

5. Bunche speech, parsed




{METAPRAGMATIC FRAME
[SPEECH EVENT [BE INTR. LOC. COMP [AGENT/SUBJ. TEMP ADV. VRB.SPEECH VNPCREATE of THIS INSTITUTION]
END OF SPEECH.
{I have said that
this day
the first meeting of the general conference
marks
the culmination
of the international atomic energy agency
of a significant process of construction
in the institutions created to serve
the international life of our time | |
HERE/NOW
But the creation
of this institution is also a
beginning | |
[AGENT/SUBJ. VRB VRB.COMPLEMENT TEMP. OBJ. COMP. THIS INSTITUTION]]}
The program which
MODAL PRESENT you will inaugurate (now)
is a unique experiment
in international cooperation that can result in greatly strengthening the prospects of peace as well as in great economic and social benefits to all nations | |
Addressee is target of expectation.
Processual progression of verbs
Temporal progression from beginning to future
From problem to solution via hope.
MODAL PRETERIT I would be (the last to) minimize the difficulties
PRESENT you face in bringing to fruition in the years ahead the hopes that the agency was created to serve | |
PRESENT But I have faith that
MODAL PRESENT you will be sustained in your endeavors by the knowledge
of how very much depends on your success. | |
HERE/NOW/FUTURE
As in, all of the above.