

TRANSFORMING NUCLEAR SAFEGUARDS CULTURE

The IAEA, Iraq, and the Future of Non-Proliferation



TREVOR FINDLAY

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NUCLEAR SAFEGUARDS
CULTURE

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The IAEA, Iraq, and the
Future of Non-Proliferation

Trevor Findlay

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Contents

List of Illustrations	vii
List of Abbreviationsix
Prefacexiii

Introduction.	1
1. IAEA Nuclear Safeguards and Iraq's Nuclear Program	9
2. Missing Iraq: Political and Organizational Explanations	35
3. The Explanatory Power of Culture	71
4. Culture Shock: The Impact of Iraq on Safeguards Culture	127
5. Contemporary Safeguards Culture.	171
6. Conclusions and Recommendations.	231

Notes.	237
Bibliography	313
About the Author	343
Index.	345
About the Belfer Center Studies in International Security	361
About the Belfer Center for Science and International Affairs	366

List of Illustrations

Chapter 1

Figure 1.1. Tuwaitha: Activities Declared Prior to 1991.

Figure 1.2. Tuwaitha: Clandestine Nuclear Weapons Activities.

Chapter 2

Table 2.1. Heads of IAEA Safeguards, 1958–2021.

Chapter 3

Figure 3.1. The Institutional Context of Safeguards Culture.

Figure 3.2. The IAEA Safeguards Community.

Table 3.1. IAEA Directors General, 1957–2021.

Table 3.2. Traditional Safeguards: Artefacts and Espoused Values.

Chapter 4

Table 4.1. Enhanced IAEA Powers and Responsibilities under Strengthened Safeguards.

Chapter 5

Table 5.1. Safeguards Artefacts, Pre- and Post-1991.

Table 5.2. Cultural Change in Espoused Values.

List of Abbreviations

ABACC	Argentine-Brazilian Agency for Accounting and Control
ACDA	U.S. Arms Control and Disarmament Agency
C&S	Containment and Surveillance
CSA	Comprehensive Safeguards Agreement
CTBT	Comprehensive Nuclear Test Ban Treaty
CTBTO	Comprehensive Nuclear Test Ban Treaty Organization
CWC	Chemical Weapons Convention
DDG	IAEA Deputy Director General
DPRK	Democratic People's Republic of Korea (North Korea)
EAEC	European Atomic Energy Community (also EURATOM)
ECOSOC	UN Economic and Social Council
EMIS	Electro-Magnetic Isotope Separation
ESARDA	European Safeguards Research and Development Association
EURATOM	European Atomic Energy Community (also EAEC)
ExPo	IAEA Office of External Relations and Policy Coordination
FAO	UN Food and Agriculture Organization
GAO	U.S. General Accountability (formerly Accounting) Office
HEU	Highly-enriched uranium
IAEC	Iraq Atomic Energy Commission
IAEA	International Atomic Energy Agency
ICAO	International Civil Aviation Organization
ICNND	International Commission on Nuclear Non-Proliferation and Disarmament
IMO	International Maritime Organization
INFCE	International Fuel Cycle Evaluation
INFCIRC	IAEA Information Circular
INMM	Institute of Nuclear Materials Management
INPO	Institute of Nuclear Power Operations
INVO	Iraq Nuclear Verification Office
ISO	International Organization for Standardization
ITU	International Telecommunication Union
JCPOA	Joint Comprehensive Plan of Action
JIU	UN Joint Inspection Unit
kW	Kilowatt/s

kW(th)	Kilowatt/s (thermal)
LEU	Low-enriched uranium
MW	Megawatt/s
MW(th)	Megawatt/s (thermal)
NAM	Non-Aligned Movement
NASA	U.S. National Aeronautics and Space Administration
NEA	OECD Nuclear Energy Agency
NGO	Non-Governmental Organization
NNWS	Non-Nuclear Weapon State/s
NPT	Nuclear Non-Proliferation Treaty
NRC	U.S. Nuclear Regulatory Commission
NTM	National Technical Means
OECD	Organization for Economic Cooperation and Development
OMV	Ongoing Monitoring and Verification (Iraq)
OPCW	Organization for the Prohibition of Chemical Weapons
OTA	U.S. Office of Technical Assessment
QMS	Quality Management System
RSAC	Regional System/s of Accounting and Control
SAC	IAEA Scientific Advisory Committee
SAGSI	IAEA Standing Advisory Group on Safeguards Implementation
SAL	IAEA Safeguards Analytical Laboratory
SEERT	State-Level Effectiveness Evaluation Review Team
SEG	State Evaluation Group
SIPRI	Stockholm International Peace Research Institute
SIR	Safeguards Implementation Report
SLA	State-Level Approach
SLC	State-Level Concept
SQP	Small Quantities Protocol
SSAC	State System/s of Accounting for and Control of Nuclear Material
TC	Technical Cooperation (IAEA)
UNAEC	UN Atomic Energy Commission
UNESCO	UN Educational, Scientific and Cultural Organization
UNMOVIC	UN Monitoring, Verification and Inspection Commission
UNSC	UN Security Council
UNSCOM	UN Special Commission
UNSCR	UN Security Council Resolution
VCDNP	Vienna Center for Disarmament and Non-Proliferation
VERTIC	Verification Research, Training and Information Center

VIC	Vienna International Center
WiN	Women in Nuclear
WINS	World Institute for Nuclear Security
WMD	Weapon/s of Mass Destruction

Preface

THIS STUDY IS a product of the Project on Managing the Atom (MTA) at the Belfer Center for Science and International Affairs at Harvard University. The research was funded by the Carnegie Corporation of New York. The project was stimulated by the growing international interest in nuclear safety and security cultures and the likelihood that similar cultural concepts could also be applied to nuclear safeguards. It was also prompted by reports that the International Atomic Energy Agency (IAEA) had sought to change its safeguards culture after the Iraqi non-compliance case of the early 1990s revealed the shortcomings of its safeguards system.

I began research for this project by reviewing the general literature on organizational culture and consulting management theory experts. Professor John Carroll, Morris A. Adelman Professor of Management at the Massachusetts Institute of Technology's Sloan School of Management, was of great assistance in helping me understand the finer points of organizational culture theory. I then conducted archival and current documentary research on the origins of IAEA safeguards culture and its evolution since the Iraq case. One challenge in pursuing such research is that the IAEA Secretariat does not publicly report to its member states the details of its organizational, management, or personnel changes.¹ This secrecy extends even to its archives. Unlike other organizations in the UN system, the IAEA will only release documents after thirty years, rather than the standard twenty years elsewhere at the United Nations, and even then the Agency insists that certain documents remain classified indefinitely.² The analysis in this book is necessarily hampered by such constraints.

I have addressed the lack of official documentation on organizational change within the IAEA through interviews and email correspondence with current and former IAEA staff, including inspectors and safeguards experts; officials of IAEA member states; and academic and government researchers. Official interviews with current staff were difficult to arrange at IAEA headquarters. Instead, it was necessary to conduct them off-site, at conferences or in informal meetings. In addition, I drew on the invaluable oral history interviews of IAEA safeguards staff conducted by the Pacific Northwest Nuclear Laboratory (PNNL) from 2005 to 2009 and by Elisabeth Roehrlich for the IAEA History Project at the University of Vienna from 2015 to 2016. I also

scoured published materials—personal reminiscences and memoirs—of former Directors General and other IAEA officials for cultural stories and references. My research was further supplemented by a workshop on safeguards culture convened by MTA at Harvard in May 2014, which involved former IAEA officials and academics.

I presented a preliminary version of the study at the IAEA's International Safeguards Symposium in Vienna in October 2014. I received comments both during the formal session and afterward. Furthermore, I attended and interviewed participants at workshops and conferences held by the IAEA and the Institute of Nuclear Materials Management (INMM). Such events, in addition to being devoted to policy and technical issues, are also jamborees for the nuclear community and are thus culturally revealing. I also had access to papers presented at workshops on safeguards culture convened by the INMM and the European Safeguards Research and Development Association (ESARDA) in 2005 in Santa Fe, New Mexico and by the INMM at Texas A&M University in April 2016.

One of the ways in which organizational culture can be investigated—often used by management consultants—is to conduct a formal survey and systematic interviews of an organization's personnel. This method was not possible at the IAEA due to the then-management's constraints on transparency and openness, an unfortunate hallmark of the organization's culture. In any case, formal surveys do not necessarily reveal the deepest aspects of culture, as respondents are not always willing to be frank about their true beliefs.

Due to such constraints, much of the evidence for this study is therefore unavoidably anecdotal rather than based on systematic collection of data. Moreover, given the sensitivities associated with revealing information about organizational culture, most of those who were interviewed or provided comments for this book prefer anonymity. The 2014 Harvard workshop was run according to Chatham House rules, according to which comments may not be attributed to individuals without permission. I am grateful to all my interlocutors for their frank insights and willingness to humor me with my probing and sometimes uncomfortable questions.

I am thankful for the enthusiastic assistance of the staff of the IAEA Archives, especially director Leopold Kammerhofer and Marta Riess, despite the constraints under which they operate. In addition, I am grateful to those who read the manuscript, in whole or in part, for their insightful comments and suggestions; among them were Matthew Bunn, John Carlson, Jim Casterton, Vilmos Cserveny, Olli Heinonen, Shirley Johnson, Robert Kelley, Martin

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MTA Research Assistant Brett Cox conducted a valuable literature search on safeguards culture, while Katie Miller, Josh Anderson, and Casey Campbell provided critical production support. My partner Christopher Reberger assisted at crucial moments with IT and graphics. Beth Clevenger and Anthony Zannino at the MIT Press were model collaborators in ushering the book into print. Above all, I am thankful to my editors at the Belfer Center, Morgan Kaplan and Karen Motley, for their moral and editorial support in getting a book to publication during a global pandemic. I am eternally grateful to Karen for her superb editorial skills and Herculean efforts in the final sprint to publication.

Naturally, notwithstanding the assistance I have received, I am completely responsible for the content of this book.

This study is dedicated to my friend, the late Dimitri Perricos (1936–2016), a legendary IAEA inspector who, as a cultural skeptic, introduced me to the term “candy concept.”

Trevor Findlay
Melbourne, January 2022

Introduction

IN MAY 1991, following Iraq's defeat in the Gulf War, inspectors from the International Atomic Energy Agency (IAEA) entered Iraq to conduct inspections of the country's nuclear facilities. They were astonished to discover that for years, Iraq had been violating its international commitment not to acquire nuclear weapons. The Iraqis had assembled a substantial nuclear weapons infrastructure "over the berm" from the peaceful nuclear facilities and materials that had been declared to the Agency and which had been subject to IAEA nuclear safeguards. Not only did Iraq have a substantial secret nuclear weapons program hidden beyond the view of IAEA inspectors, but it had also successfully misled inspectors about the purposes of its declared nuclear activities.¹ Saddam Hussein's regime had come closer to acquiring nuclear weapons than anyone, including the IAEA itself, had imagined.

Iraq was among the first countries to join the IAEA, and one of the first to sign and ratify the 1968 Nuclear Non-Proliferation Treaty (NPT) and a comprehensive safeguards agreement (CSA). Iraq also became the first country to confront the Agency with a major safeguards violation.² The apparent ease with which it fooled the Agency meant that the credibility of the entire safeguards system was at stake. The then-Director General of the IAEA, Hans Blix, said that the revelations "shook the world."³ Critics accused the IAEA Secretariat of being "complacent and unobservant."⁴ Veteran IAEA official David Fischer lamented at the time that "the IAEA was seen by many as having failed its (presumably) first diversion detection test; it has patently been unable to detect a large and longstanding undeclared programme. Without the Gulf War, the IAEA may not have discovered the programme until the Iraqi Government openly demonstrated that it had acquired the bomb."⁵ He records in his official history of the Agency that the Iraq case "demonstrated serious defects in the system."⁶

How did this happen? How did the international organization charged with detecting non-compliance with the NPT fail to discover Iraq's clandestine weapons program, which had been planned since 1972, pursued in research and development mode until 1988, and then visibly ramped up into large-scale facility construction for three years prior to 1991? With almost half a century of experience with safeguards, how was it that the IAEA failed to detect a nuclear weapons program located in plain sight of its inspectors? Why had they chosen not to look and inquire? Wasn't the whole point of nuclear safeguards that violations be detected early enough for the

international community to act? Long before the Iraq case, safeguards expert Paul Szasz explained that:

It hardly seems conceivable that even a large State could maintain entirely separate two massive nuclear cycles, one open and controlled and the other secret—keeping in mind that the frequent presence of inspectors in the country and their contacts with many persons dealing with nuclear matters would mean that even in the most repressed society rumors and news of the construction of large “secret” facilities would reach the Agency long before these became operational.⁷

Mohamed ElBaradei, IAEA Director General from 1997 to 2009, himself asked: “Why had the IAEA not challenged the Iraqis on the incompleteness of their declarations? Why had there been no calls for special inspections? How could the IAEA have ‘missed’ Iraq’s broader nuclear ambitions?”⁸

This book seeks to answer such questions by considering the possible role of the IAEA’s organizational culture, especially its safeguards culture. While there is no agreed definition of an ideal IAEA nuclear safeguards culture, as there is for both nuclear safety and nuclear security, I draw on those models to propose such a definition as: “That assembly of characteristics, attitudes, and behavior, exhibited by the Agency’s personnel, which supports and enhances effective and efficient nuclear safeguards as a vital contribution to the non-proliferation of nuclear weapons and international peace and security.”⁹

In the decades after the inception of safeguards in the late 1950s, safeguards culture had become cautious, process-driven rather than goal-oriented, and complacent about potential non-compliance. It had drifted away from the original goal of deterring states’ clandestine acquisition of nuclear weapons by detecting any illicit acquisition of nuclear materials. Rather, it became entirely focused on nuclear material and facilities declared by states, while ignoring the possibility that they might fail to declare everything that they possessed.

Organizational theorists, especially those concerned with investigating major accidents, have increasingly come to use three broad “lenses” or perspectives to analyze organizational success and failure: the institutional, the political, and the cultural.¹⁰ Each lens magnifies a stereotype that is never found in pure form in real life, but which nonetheless provides useful analytical insights into what drives organizations. As John Carroll argues, “By using all the lenses to analyze an organization or problem, we gain new insights and a richer understanding of organizational dynamics and human behavior within organizations.”¹¹

First, there is the institutional perspective, which Carroll calls the strategic design lens; it portrays organizations as “a kind of machine” that can be rationally designed for optimal performance. As Carroll notes, “People, money, equipment, and information are assigned using logical principles of efficiency and effectiveness to achieve organizational goals.”¹² In this case, Carroll says, “action comes about through planning.”¹³

This model, applied to the IAEA, would assume that the original negotiators of the IAEA’s safeguards system strove for maximum effectiveness and efficiency and that the organizational design reflects these aspirations. As implementation of the system proceeded, the Board of Governors and the Secretariat would make decisions designed to maximize the operation of the system and ensure that it evolved optimally. Problems with safeguards can, this perspective holds, be fixed with better planning, management, administration, and resources.

One hears this view, naturally, from IAEA managers, who explain that if only they are given the right tools, they could do the job more effectively. Management consultants and some critics contend that the IAEA is unable to meet the challenge of implementing safeguards principally because of its management and administrative flaws. Both characteristics, in this view, derive from the Agency being a United Nations–type institution, rather than from any inherent deficit in safeguards as negotiated. This perspective, while clearly of some merit, is nonetheless inadequate in entirely explaining organizational behavior. Organizational theorists such as John Child bemoan the fact that “most of the literature on organizational design treats it as a purely technical matter, a question of adjusting structure to suit prevailing contingencies.”¹⁴

Second, there is the political lens. In contrast to the institutional or strategic design lens, the political lens assumes that “everything is political,” or at least that most important decisions are driven by politics. It is the quest for power, rather than rational analysis, that has the greatest effect on organizational performance. As Carroll, citing Jeffrey Pfeffer, puts it, “The political lens views the organization as a contested struggle for power (the ability to get things done) among stakeholders with different goals and underlying interests.”¹⁵ Action in this case comes through jockeying for power and negotiations between various interest groups. One hears this perspective on the IAEA most vividly, often expressed cynically, from diplomats accredited to the Agency. But it also dominates the views of some Agency employees and some external observers, especially the media.

The governance of international organizations such as the IAEA is arguably particularly prone to political machinations. Unlike entities such as

corporations, which are driven principally by profit-maximization goals that management, boards of directors, and shareholders have in common, international organizations have as their principal stakeholders their member states, which often have widely differing opinions on their goals for and expectations of the organization. Unlike the shareholders of corporations, the stakeholders of international organizations themselves provide the management, funding, and staffing, creating multiple opportunities for political maneuvering and intrusion. Member state involvement can range from strong support for an organization's declared goals and mission at one end of the spectrum (such as Western support for safeguards) to efforts to hobble the organization's ambitions at the other (as India, Iran, Iraq, Pakistan, and Russia have all attempted to do in the case of IAEA safeguards).

Explanations by political scientists and international relations scholars of the behavior of international organizations thus emphasize the pivotal role of international politics.¹⁶ Oran Young writes of the United Nations that "it does not operate above the hurley-burley of power politics. . . . The states which engage in power politics are its constituent units, and the problems generated by power politics constitute its reason for being."¹⁷ Global affairs theorists highlight an eternal struggle between states' desire for international organizations to assist them in meeting collective challenges that they cannot meet individually, on the one hand, and their desire to preserve their national sovereignty, power, and prerogatives on the other. As Ian Hurd notes, "The tension between state obligations and state sovereignty provides the fuel that drives world politics in and around international organizations."¹⁸ This struggle affects the IAEA's ability to detect and deal with violations of safeguards by limiting the capabilities of its verification system and constraining its continuing operation and enhancement. Problems faced by the safeguards system, the political perspective assumes, can only be solved by negotiations between states.

Third, there is culture theory, which, in contrast to the other two approaches, contends that the key to organizational dysfunction is often found in the values, norms, perceptions, attitudes, and resulting behavior of those who work in the organization, rather than in flaws in the formal structures and processes or in political machinations. Organizational behavior, viewed through this lens, often reflects implicit or even unconscious understandings of "the way we do things around here," rather than formal job descriptions or the official line about how things are done. The cultural approach focuses on how organizations find solutions to the challenges they face by institutionalizing "rules, rituals and values of the group."¹⁹ From a cultural perspective, action

comes through habit and routine.²⁰ In the formation of culture, political and institutional arrangements develop routine and unmindful behavior going beyond the original intent. In investigating culture, the most revealing comments often come from rank-and-file employees when explaining how they do their jobs day-to-day—in contrast to their job description and how management envisages those jobs being done pursuant to political or strategic planning decisions. A key insight of the cultural perspective is that decisions made for political and institutional reasons may be absorbed, shaped, distorted, ignored, or resisted by an organization's culture. Despite the best efforts of political and institutional forces, culture may prevail. A cultural perspective presumes that there is something ineffable in organizational behavior that is not reducible to factors such as material interests or power. As renowned organizational theorist Peter Drucker reportedly famously said, "culture eats strategy for breakfast."²¹

This study does not assume that culture explains all or even most organizational behavior. Rather, it accepts that culture is a useful lens through which organizations may be viewed to gain greater insights into why they operate the way they do. Exploration of the IAEA's organizational culture, especially its safeguards culture, will be used to supplement the standard explanations of the Iraqi non-compliance case—the political and the institutional—and to address nagging suspicions that they do not tell the whole story.

How could it be, for instance, that no one at the IAEA, whose main business is to worry about nuclear weapons proliferation, was sufficiently concerned to blow the whistle on Iraq? Why were disquieting media reports and the concerns of some member states not taken more seriously, prompting a review of the Agency's information? After all, Iraq was not a standard case; its nuclear research reactor, which it had claimed was for peaceful purposes, had been bombed by Israel in 1981 on the suspicion that it was part of a nuclear weapons program. There were clearly some aspects of Iraq's declared nuclear activities that did not make sense in terms of a standard peaceful research agenda, an issue that bothered both French and Italian technology suppliers. Was the organizational culture of the IAEA Secretariat, which had had almost half a century to gestate, blind to the type of non-compliance pathway taken by Iraq? Did IAEA member states, which are responsible for the Agency's governance, imbibe the same safeguards culture as the Agency's Secretariat, or did they help to create it? Even after the IAEA gained unprecedented access to Iraq in 1991 and began to uncover evidence of Iraq's non-compliance, why was the Agency reluctant to accept what it was finding? And why did the Agency, after Iraq's transgressions were revealed, initially begin reapplying its

standard safeguards approach when it was clear that something more ambitious was required?

Was this case like the 1986 *Challenger* space shuttle disaster, which was allegedly spawned by the National Aeronautical and Space Administration's cultural "normalization of deviance"?²² Or was it more like a "normal accident," such as the 2011 Fukushima nuclear power plant disaster, involving systems so complex that they are bound to fail sooner or later because human beings cannot conceptualize all the potential pathways to failure?²³ In the Iraq case, the IAEA safeguards system had some of the qualities of "an accident waiting to happen," because it dealt with the proliferation of complex technologies and failed to take account of all potential pathways to non-compliance. The question for this study is how much of this may be attributed to culture.

The principal motivation for this book is to help ensure that the cultural perspective is taken into account as continued efforts are made to strengthen IAEA nuclear safeguards. Understanding of and attention to organizational cultures in the fields of nuclear safety (prevention of nuclear accidents) and nuclear security (prevention of nuclear terrorism) are well advanced compared to that of nuclear safeguards culture, partly because the chain of events that produces the greatest threats are more imaginable.²⁴ This study addresses this lacuna; I consider these differences in more detail in Chapter 3. This book does not consider the national safeguards cultures of IAEA member states, except where they have contributed significantly to the Agency's safeguards culture (which is true of the United States and some other Western states). National safeguards culture has been analyzed extensively by others.²⁵ In fact, when most safeguards experts discuss safeguards culture, they are invariably referring to national safeguards cultures, not that of the IAEA. Furthermore, this volume does not examine in detail the safeguards culture of the two regional safeguards organizations, the European Atomic Energy Community (EAEC), also known as EURATOM, and the Argentine-Brazilian Agency for Accounting and Control (ABACC), except where they may have contributed to IAEA safeguards culture. This does not imply that these are unimportant regimes, but they pale in comparison to the size and complexity of the IAEA system and its foundational and transformative role in safeguards culture globally.

Unlike nuclear safety and nuclear security, where the state is held to be principally responsible, it is the IAEA that is primarily accountable for applying nuclear safeguards to states. It is the Agency alone that negotiates safeguards agreements with each state, establishes the appropriate safeguards regimes, conducts inspections, assesses a state's compliance with its

obligations, and reports serious non-compliance to the UN Security Council. If safeguards fail, it is the Agency, rightly or wrongly, that is blamed. In fact, one of the assumptions of the IAEA's safeguards culture is that the credibility, professionalism, and technical competence of the IAEA's safeguards performance should be the gold standard for states and regional organizations to emulate in fulfilling their respective safeguards obligations.

In light of these considerations, the purpose of this study is to:

- discern what the IAEA's organizational culture, particularly its safeguards culture, can tell us about the failure of safeguards in the Iraq case, in a way that usefully supplements the traditional explanations;
- explore the challenges that the Iraq case posed to the then-prevailing IAEA's safeguards culture;
- examine whether a new safeguards culture has embedded itself at the Agency since the Iraq case along with the considerable strengthening of the safeguards system overall; and
- suggest how the Agency might deal with safeguards culture in the future.

In the first chapter of this volume, I analyze the IAEA nuclear safeguards system, the Iraqi nuclear program, and the way in which safeguards were applied to that program before 1991. In Chapter 2, I discuss the standard political and organizational explanations for why the IAEA missed evidence of illicit Iraqi nuclear weapons activity. In Chapter 3, I investigate the explanatory power of the cultural approach to the Iraq safeguards puzzle and explain how it complements the standard approaches. In the fourth chapter, I probe the culture shock experienced by the IAEA and its safeguards system as a result of its failure in the Iraqi case. In Chapter 5, I consider the state of IAEA safeguards today and measures that should be taken to cultivate an optimal safeguards culture. In my conclusion in Chapter 6, I argue that, alongside the standard political and organizational factors, culture played a discernible role in the IAEA's failure to detect Iraqi non-compliance in the several years prior to 1991. I conclude that as a result of the culture shock experienced by the Agency, a new safeguards culture has arisen since the Iraq case, though this was not due to a deliberate, systematic strategy of cultural change. Safeguards culture remains largely unexamined and, among some IAEA officials, dismissed as irrelevant. I recommend that the IAEA regularly assess the state of its safeguards culture using widely accepted techniques, and incorporate its findings into its strategic planning and organizational change strategies.

Bibliography

Books

Ancona, Deborah G., Thomas A. Kochan, Maureen Scully, John Van Maanen, and Eleanor Westney, *Managing for the Future: Organizational Behavior and Processes*, 3rd ed. (Boston: South-Western College Publishing, 2004).

Andemicael, Berhanykun, and John Mathiason, *Eliminating Weapons of Mass Destruction: Prospects for Effective International Verification* (London: Palgrave, 2005).

Ayres, Ian, and Braithwaite, John, *Responsive Regulation: Transcending the Deregulation Debate* (Oxford: Oxford University Press, 1992).

Barnaby, Frank, *The Invisible Bomb: The Nuclear Arms Race in the Middle East* (London: I.B. Tauris, 1989).

Barnett, Michael, and Martha Finnemore, *Rules for the World: International Organizations in Global Politics* (Ithaca, N.Y.: Cornell University Press, 2004).

Bate, Paul, *Strategies for Cultural Change* (Oxford: Butterworth Heinemann, 1994).

Blix, Hans, *Disarming Iraq: The Search for Weapons of Mass Destruction* (London: Bloomsbury, 2005).

Bolton, John, *Surrender is Not an Option: Defending America at the United Nations and Abroad* (New York: Simon and Schuster, 2007).

Braut-Hegghammer, Målfrid, *Unclear Physics: Why Iraq and Libya Failed to Build Nuclear Weapons* (Ithaca, N.Y.: Cornell University Press, 2016).

Brown, Robert L., *Nuclear Authority: The IAEA and the Absolute Weapon* (Washington, D.C.: Georgetown University Press, 2015).

Burrows, William, and Robert Windrem, *Critical Mass: The Dangerous Race for Superpowers in a Fragmenting World* (New York: Simon and Schuster, 1994).

Butler, Richard, *Saddam Defiant: The Threat of Weapons of Mass Destruction, and the Crisis of Global Security* (London: Weidenfeld and Nicholson, 2000).

Chabris, Christopher, and Daniel Simons, *The Invisible Gorilla: How Our Intuitions Deceive Us* (New York: Broadway Paperbacks, 2009).

Cirincione, Joseph, Jon B. Wolfsthal, and Miriam Rajkumar, *Deadly Arsenal: Nuclear, Biological, and Chemical Threats* (Washington, D.C.: Carnegie Endowment for International Peace, 2005).

Conner, Daryl R., *Managing at the Speed of Change: How Resilient Managers Succeed and Prosper Where Others Fail* (New York: Villart, 1993).

Doyle, James, ed., *Nuclear Safeguards, Security, and Nonproliferation: Achieving Security with Technology and Policy* (Amsterdam: Elsevier for Los Alamos National Laboratory, 2008).

Duelfer, Charles, *Hide and Seek: The Search for Truth in Iraq* (New York: PublicAffairs, 2009).

ElBaradei, Mohamed, *The Age of Deception: Nuclear Diplomacy in Treacherous Times* (New York: Metropolitan Books, 2011).

Fischer, David, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997).

Fischer, David, and Paul Szasz, *Safeguarding the Atom: A Critical Appraisal* (London: Taylor and Francis for the Stockholm International Peace Research Institute [SIPRI], 1985).

Fuhrmann, Matthew, *Atomic Assistance: How “Atoms for Peace” Programs Cause Nuclear Insecurity* (Ithaca, N.Y.: Cornell University Press, 2012).

Garmonsway, G.N., *The Penguin English Dictionary* (Harmondsworth, UK: Penguin, 1965).

Geertz, Clifford, *The Interpretation of Cultures* (New York: Basic Books, 1973).

Gilovich, Thomas, Dale W. Griffin, and Daniel Kahneman, *Heuristics and Biases: The Psychology of Intuitive Judgment* (Cambridge: Cambridge University Press, 2002).

Goldblat, Jozef, ed., *Nonproliferation: The Why and the Wherefore* (London: Taylor and Francis for SIPRI, 1985).

Hagen, J.U., ed., *How Could This Happen? Managing Errors in Organizations* (Cham, Switzerland: Springer Nature Switzerland AG, 2018).

Hamza, Khidhir, with Jeff Stein, *Saddam’s Bombmaker: The Terrifying Inside Story of the Iraqi Nuclear and Biological Weapons Agenda* (New York: Scribner, 2000).

Harrer, Gudrun, *Dismantling the Iraqi Nuclear Program: The Inspections of the International Atomic Energy Agency, 1991–1998* (Abingdon, Oxon: Routledge, 2014).

Hawkins, Darren G., David A. Lake, Daniel L. Nielson, and Michael J. Tierney, eds., *Delegation and Agency in International Organizations* (Cambridge: Cambridge University Press, 2006).

Hazzard, Shirley, *Defeat of an Ideal: The Self-Destruction of the United Nations* (London: Macmillan, 1973).

- Hewlett, Richard G., and Jack M. Holl, *Atoms for Peace and War, 1953–1961: Eisenhower and the Atomic Energy Commission* (Berkeley: University of California Press, 1989).
- Hurd, Ian, *International Organizations: Politics, Law, and Practice*, 2nd ed. (Cambridge: Cambridge University Press, 2014).
- Hymans, Jacques C., *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation* (Cambridge: Cambridge University Press, 2012).
- IAEA, *Atoms for Peace: A Pictorial History of the International Atomic Energy Agency* (Vienna: IAEA, 2007).
- IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).
- Jacob, Philip E., and Alexine L. Atherton, *The Dynamics of International Organization: The Making of World Order* (Homewood, Ill.: Dorsey Press, 1965).
- Kahneman, Daniel, *Thinking, Fast and Slow* (New York: Farrar, Strauss, and Giroux, 2011).
- Kahneman, Daniel, and Amos Tversky, eds., *Choices, Values, and Frames* (Cambridge: Cambridge University Press, 2000).
- Kahneman, Daniel, Paul Slovic, and Amos Tversky, eds., *Judgment Under Uncertainty: Heuristics and Bias* (Cambridge: Cambridge University Press, 1982).
- Karns, Margaret P., and Karen A. Mingst, *International Organizations: The Politics and Processes of Global Governance*, 2nd ed. (Boulder, Colo.: Lynne Rienner, 2010).
- Koremenos, Barbara, Charles Lipson, and Duncan Snidal, eds., *The Rational Design of International Institutions* (Cambridge: Cambridge University Press, 2004).
- Krasno, Jean E., and James S. Sutterlin, *The United Nations and Iraq: Defanging the Viper* (New York: Praeger, 2003).
- Krass, Allan S., *Verification: How Much Is Enough?* (London: Taylor and Francis for SIPRI, 1985).
- Luck, Edward C., and Michael W. Doyle, eds., *International Law and Organization: Closing the Compliance Gap* (Lanham, Md.: Rowman and Littlefield, 2002).
- Mathiason, John, *Invisible Governance: International Secretariats in Global Politics* (Bloomfield, Conn.: Kumarian Press, 2007).
- McKnight, Allan, *Atomic Safeguards: A Study in International Verification* (New York: United Nations Institute for Training and Research [UNITAR], 1971).
- Morgenthau, Hans J., *Politics Among Nations: The Struggle for Power and Peace* (New York: Alfred A. Knopf, 1962).
- Nye, Joseph S., Jr., *The Future of Power* (New York: PublicAffairs, 2011).

Transforming Nuclear Safeguards Culture

Perrow, Charles, *Normal Accidents: Living with High-Risk Technologies* (Princeton, N.J.: Princeton University Press, 1999).

Pfeffer, Jeffrey, *Power: Why Some People Have It—And Others Don't* (New York: HarperCollins, 2010).

Pheysey, Diana C., *Organizational Cultures: Types and Transformations* (London: Routledge, 1993).

Pringle, Peter, and James Spigelman, *The Nuclear Barons* (New York: Avon Books, 1981).

Rittenberger, Volker, Bernhard Zangl, and Andreas Kruck, *International Organization*, 2nd ed. (Houndsmills, UK: Palgrave Macmillan, 2012).

Ritter, Scott, *Iraq Confidential: The Untold Story of the Intelligence Conspiracy to Undermine the UN and Overthrow Saddam Hussein* (New York: Nation Books, 2005).

Rosenthal, Michael D., et al., *Deterring Nuclear Proliferation: The Importance of IAEA Safeguards* (Upton, N.Y.: Brookhaven National Laboratory, 2019).

Schein, Edgar H., *The Corporate Culture Survival Guide* (San Francisco: Jossey-Bass, 1999).

Schein, Edgar H., *Organizational Culture and Leadership*, 3rd ed. (San Francisco: Jossey-Bass, 2004).

Schein, Edgar H., with Peter Schein, *Organizational Culture and Leadership*, 5th ed. (Hoboken, N.J.: John Wiley and Sons, 2017).

Scheinman, Lawrence, *The International Atomic Energy Agency and World Nuclear Order* (Washington, D.C.: Resources for the Future, 1987).

Schiff, Benjamin N., *International Nuclear Technology Transfer: Dilemmas of Dissemination and Control* (Lanham, Md.: Rowman and Littlefield, 1983).

Seaborg, Glenn T., with Benjamin T. Loeb, *Stemming the Tide: Arms Control in the Johnson Years* (Lexington, Mass: Lexington Books, 1971).

Snow, C.P., *The Two Cultures: A Second Look* (New York: New American Library, 1959).

Sokolski, Henry, ed., *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, Penn.: Nonproliferation Policy Education Center, Strategic Studies Institute, U.S. Army War College, 2008).

Spector, Leonard S., *The Undeclared Bomb* (Cambridge, Mass.: Ballinger, 1988).

Stockholm International Peace Research Institute (SIPRI), *Safeguards Against Nuclear Proliferation* (Stockholm: Almqvist and Wiksell for SIPRI, 1975).

Szasz, Paul C., *The Law and Practices of the International Atomic Energy Agency*, Legal Series No. 7 (Vienna: IAEA, 1970).

- Trevan, Tim, *Saddam's Secrets: The Hunt for Iraq's Hidden Weapons* (London: Harper-Collins, 1999).
- Vaughan, Diane, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA* (Chicago: University of Chicago Press, 1991).
- von Wielligh, Nic, and Lydia von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Weapons Programme* (Pretoria: Litera for the Institute for Security Studies, 2015).
- Wing, Christine, and Fiona Simpson, *Detect, Dismantle, and Disarm: IAEA Verification, 1992–2005* (Washington, D.C.: U.S. Institute of Peace, 2013).
- Wood, Robert S., ed., *The Process of International Organization* (New York: Random House, 1971).

Book Chapters

- Barrett, John, “The Travails of Governance: A View from the Board Chair,” in Joseph F. Pilat, ed., *The International Atomic Energy Agency: Historical Reflections, Current Challenges, and Future Prospects* (London: Routledge, 2022).
- Boureston, Jack, and Yana Feldman, “Verifying Libya’s Nuclear Disarmament,” in Trevor Findlay, ed., *Verification Yearbook 2004* (London: Verification Research, Training and Information Center [VERTIC], 2004).
- Büchler, Carlos. L., “Safeguards: The Beginnings,” in IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).
- Boyer, Brian, and Mark Schanfein, “International Safeguards Inspection: An Inside Look at the Process,” in James Doyle, ed., *Nuclear Safeguards, Security, and Nonproliferation: Achieving Security with Technology and Policy* (Amsterdam: Elsevier for Los Alamos National Laboratory, 2008).
- Carroll, John S., “Understanding Safety Management Through Strategic Design, Political, and Cultural Approaches,” in J.U. Hagen, ed., *How Could This Happen? Managing Errors in Organizations* (Cham, Switzerland: Springer Nature Switzerland AG, 2018).
- Cochran, Thomas B., “Adequacy of IAEA’s Safeguards for Achieving Timely Detection,” in Henry Sokolski, ed., *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, Penn.: Nonproliferation Policy Education Center, Strategic Studies Institute, U.S. Army War College, 2008).
- Everton, Craig, “In Defence of the Evolution of IAEA Safeguards,” in *Verification and Implementation: A Biennial Collection of Analysis on International Agreements for Security and Development* (London: VERTIC, 2015).
- Findlay, Trevor, “The Lessons of UNSCOM and UNMOVIC,” in Trevor Findlay, ed., *Verification Yearbook 2004* (London: VERTIC, 2004).

Findlay, Trevor, "Lessons of UNSCOM and UNMOVIC for WMD Non-proliferation, Arms Control and Disarmament," in Waheguru Pal Singh Sidhu and Ramesh Thakur, eds., *Arms Control After Iraq: Normative and Operational Challenges* (Tokyo: United Nations University Press, 2006).

Heinonen, Olli, "International Atomic Energy Agency Inspections in Perspective," in Henry Sokolski, ed., *Moving Beyond Pretense: Nuclear Power and Nonproliferation* (Arlington, Va.: Strategic Studies Institute, U.S. Army War College, 2014).

Jolles, Paul, "From the East River to the Danube: Preparatory Commission and First Years in Vienna," in IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).

Keblušek, Emil, "The Spirit of Vienna," in IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).

Loosch, Reinhard, "The Emergence of the Group of 77 as a Major Player in the Board of Governors," in IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).

Mathiason, John, "Evolution of the International Public Service (1919–2006)," in John Mathiason, *Invisible Governance: International Secretariats in Global Politics* (Bloomfield, Conn.: Kumarian Press, 2007).

Quihillalt, Oscar A., and Carlos L. Büchler, "The Fifth General Conference of the IAEA (October 1961)," in IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).

Ramanna, Raja, "Positive Aspects of the Work of the International Atomic Energy Agency," in IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).

Rauf, Tariq, and Jan Lodding, "UNSCR 1540 and the IAEA," in Olivia Bosch and Peter van Ham, eds., *Global Non-Proliferation and Counter-Terrorism: The Impact of UNSCR 1540* (London: Royal Institute of International Affairs, 2007).

Sokolski, Henry, "Assessing the IAEA's Ability to Verify the NPT," in Henry Sokolski, ed., *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, Penn.: Nonproliferation Policy Education Center, Strategic Studies Institute, U.S. Army War College, 2008).

Tape, James, and Joseph Pilat, "Nuclear Safeguards and the Security of Nuclear Materials," in James Doyle, ed., *Nuclear Safeguards, Security, and Nonproliferation: Achieving Security with Technology and Policy* (Amsterdam: Elsevier for Los Alamos National Laboratory, 2008).

Wilson, Michael, "Safeguards and the IAEA Board of Governors: 1991–1993: Iraq, A Necessary Stimulus for Handling the DPRK," in IAEA, *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997).

Young, Oran R., "The United Nations and the International System," in Robert S. Wood, ed., *The Process of International Organization* (New York: Random House, 1971).

Journal Articles

Abbott, Kenneth W. and Snyder, Duncan, "Taking Responsive Regulation Transnational: Strategies for International Organizations," *Regulation & Governance*, No. 7 (2013), <https://onlinelibrary.wiley.com/doi.epdf>, accessed April 20, 2021.

Barnett, Michael, and Liv Coleman, "Designing Police: Interpol and the Study of Change in International Organizations," *International Studies Quarterly*, Vol. 49 (2005).

Barbeschi, Maurizio, "Organizational Culture of the OPCW Secretariat," *Disarmament Forum*, No. 4 (2002).

Boureston, Jack, and Charles D. Ferguson, "Strengthening Nuclear Safeguards: Special Committee to the Rescue?" *Arms Control Today*, December 2005, www.armscontrol.org/print/1951.

Brown, Robert L., and Jeffrey M. Kaplow, "Talking Peace, Making Weapons: IAEA Technical Cooperation and Nuclear Proliferation," *Journal of Conflict Resolution*, April 14, 2014.

Clarke, Alisa, "Organizational Culture, System Evolution, and the United Nations of the 21st Century," *Journal of Organizational Studies*, Vol. 4, No. 1 (2013).

Darrow, Mac, and Louise Arbour, "The Pillar of Glass: Human Rights in the Development Operations of the United Nations," *American Journal of International Law*, Vol. 103, No. 3.

Drucker, Peter F., "What We Can Learn from Japanese Management," *Harvard Business Review*, March 1971.

Fischer, David, "Safeguards Under the Non-Proliferation Treaty," *Disarmament*, Vol. 3, No. 2 (July 1980).

Frazar, S.L., and S.V. Mladineo, "The Importance of Safeguards Culture," *Nonproliferation Review*, December 2013.

Liechtenstein, Stephanie, "Rafael Grossi Isn't America's—or Iran's, or North Korea's—Man," *Foreign Policy*, December 2019, <https://foreignpolicy.com/2019/12/05rafael-grossi-iaea-america-iran-north-korea/>.

Transforming Nuclear Safeguards Culture

Meidinger, Errol, "Regulatory Culture: A Theoretical Outline," *Law and Policy*, October 1987.

Nackaerts, Herman, "The Future of Safeguards: Adapting to Change," *Journal of Nuclear Materials Management*, Fall 2011.

Nackaerts, Herman, "IAEA Safeguards: Cooperation as the Key to Change," *Journal of Nuclear Materials Management*, Fall 2011.

Pendley, Robert, Lawrence Scheinman, and Richard W. Butler, "International Safeguarding as Institutionalized Collective Behavior," *International Organization*, Vol. 29, No. 3 (June 1975).

Rao, Sriata, "Organization Culture and Leadership in the Department of Safeguards," *Journal of Nuclear Materials Management*, Volume 44, No. 2 (2016).

Rauf, Tariq, and Robert Kelley, "Nuclear Verification in Iraq," *Arms Control Today*, September 2014.

Rockwood, Laura, "The IAEA's State-Level Concept and the Law of Unintended Consequences," *Arms Control Today*, September 2014.

Schein, E.H., "The Three Cultures of Management: Implications for Organizational Learning," *Sloan Management Review*, No. 38 (Spring 1997).

Schwartz, Mark S., "Developing and Sustaining an Ethical Corporate Culture: The Core Elements," *Harvard Business Review*, January 2013.

Szasz, Paul C., "The Adequacy of International Nuclear Safeguards," *Journal of International Law and Economics*, Vol. 10 (1975).

Treviño, Linda Klebe, Gary R. Weaver, David G. Gibson, and Barbara Ley Toffler, "Managing Ethics and Legal Compliance: What Works and What Hurts," *Harvard Business Review*, January 1999.

Yang, Charles, "Demystifying Japanese Organizational Practices," *Harvard Business Review*, November 1984.

Zyl de Villiers, Van, Marguerite Leonardi, Carrie Mathews, Jenni Rissanen, and William Stanley, "Recent Developments in Performance Management in the IAEA Department of Safeguards," Topical Papers, *Journal of Nuclear Materials Management*, Volume 44, No. 2 (2016).

Newspaper, Newsletter, and Magazine Articles

"The 1970 Safeguards Committee," *IAEA Bulletin*, No. 1 (1990).

"An IAEA Inspection of the Iraqi Nuclear Complex 'Revealed No Non-Compliance,'" *Nucleonics Week*, November 26, 1981.

- Cannon, Sandy, "U.S. at Odds over Need for Osirak Strike," *Nuclear Fuel*, June 22, 1981.
- "Damage to Iraqi Reactor Still Unknown as Controversy Continues," *Nucleonics Week*, June 18, 1981.
- Eklund, Sigvard, "Peaceful Nuclear Development Must Continue," *IAEA Bulletin*, No. 3 (1981).
- "Factbox: Five Facts about Next U.N. Nuclear Chief Rafael Grossi," Reuters World News, October 29, 2019.
- "France Sees Obligation to Supply Iraq with New Reactor," *Nucleonics Week*, June 25, 1981.
- Frazar, S.L., and S.V. Mladineo, "Safeguards Culture: Lessons Learned," *ESARDA Bulletin*, No. 44 (June 2010).
- Gaspar, Miklos, "Security Culture: One for All, and All for One," *IAEA Bulletin*, December 2016.
- Grümm, Hans, "Safeguards and Tamuz: Setting the Record Straight," *IAEA Bulletin*, No. 4 (1992).
- Hall, John, "The International Atomic Energy Agency: Origins and Early Years," *IAEA Bulletin*, No. 2 (1987).
- "IAEA Secures 'Temporary Understanding' with Iran," *World Nuclear News*, February 22, 2021.
- Jennekens, Jon, "IAEA Safeguards: A Look at 1970–1990 and Future Prospects," *IAEA Bulletin*, No. 1 (1990).
- Karimi, Nasser, and Kiyoko Metzler, "Iran Officially Imposes Curbs on UN Nuclear Inspections," Associated Press, February 23, 2021.
- Khalef, Roula, and James Blitz, "IAEA Chief Embraces the Eye of the Storm," *Financial Times*, October 2, 2007.
- Kratzer, Myron B., "Prospective Trends in International Safeguards," *Nuclear News*, October 1980.
- McGraw, Marsha, "No More Safeguards," *Christian Science Monitor*, July 14, 1981.
- Miller, Judith, "Was Iraq Planning to Make the Bomb? Debate by Experts Seems Inconclusive," *New York Times*, June 19, 1981, <http://www.nytimes.com/1981/06/19/world/was-iraq-planning-to-make-the-bomb-debate-by-experts-seems-inconclusive.html?pagewanted=all>.
- Muntzing, L. Manning, "Safeguards and Nuclear Safety: A Personal Perspective," *IAEA Bulletin*, No. 4 (1982).

Murphy, François, “U.N. Nuclear Watchdog Picks Argentina’s Grossi as Next Chief,” *Reuters World News*, October 29, 2019.

“Paying Tribute to 25 Years of Safeguards Leadership,” *IAEA Bulletin*, No. 3 (1994).

“Secret Service Chief Says He’s Working on Culture,” *Washington Times*, March 17, 2015, <http://www.washingtontimes.com/news/2015/mar/17/secret-service-director-says-hes-working-on-agency/?page=all>.

Shane, Scott, “Agents Enjoy Status, But Intelligence Analysts Gain Attention,” *New York Times*, March 27, 2015.

“Uber Report: Eric Holder’s Recommendations for Change,” *New York Times*, June 14, 2017.

“US Embassy Cables: New UN Chief is ‘Director General of All States, But in Agreement with Us,’” *Guardian*, December 3, 2010, <https://www.theguardian.com/world/us-embassy-cables-documents/230076>.

Web-Only Articles

“Amano Wants Development Recognition,” *World Nuclear News*, January 23, 2015, <http://www.world-nuclear-news.org/NP-Amano-wants-development-recognition-2301152.html>.

Boureston, Jack, and Charles D. Ferguson, “Strengthening Nuclear Safeguards: Special Committee to the Rescue?” *Arms Control Association*, 2005, http://www.armscontrol.org/act/2005_12DEC-Safeguards.

“From Aflaq to Tammuz: Iraq’s Nuclear Weapons Program,” <http://nuclearweaponarchive.org/Iraq/IraqAtoZ.html>, accessed January 4, 2018.

Gärtner, Heinz, “Yukiya Amano: One Year In,” *Bulletin of the Atomic Scientists*, January 26, 2011, <http://thebulletin.org/yukiya-amano-one-year>.

Goldschmidt, Pierre, “Looking Beyond Iran and North Korea for Safeguarding the Foundations of Nuclear Nonproliferation,” *Nonproliferation Policy Education Center, Strategic Studies Institute, U.S. Army War College*, November 15, 2011, <http://www.npolicy.org/article.php?aid=1115&tid=4>.

Heinonen, Olli, “IAEA Safeguards—Evolving its 40-Year old Obligations to Meet Today’s Verification Undertakings,” *Belfer Center for Science and International Affairs, Harvard University, Cambridge, Mass.*, July 12, 2013, <https://www.belfercenter.org/publication/iaea-safeguards-evolving-meet-todays-verification-undertakings>.

Henriques, Sasha, “A Day in the Life of a Safeguards Inspector,” July 27, 2016, <https://www.iaea.org/newscenter/news/a-day-in-the-life-of-a-safeguards-inspector#:~:text=>

=The%20IAEA%20employs%20around%20385%20designated%20inspectors%20from%20around%2080%20countries.

Hibbs, Mark, and Andreas Persbo, "The ElBaradei Legacy," *Bulletin of the Atomic Scientists*, September–October 2009.

Hinderstein, Corey, "Inside Insights," *The Communicator*, INMM, June 2016.

"Leaked Document Describes IAEA Transparency Proposal," FreedomInfo.org, April 24, 2015, <http://www.freedominfo.org/2015/04/leaked-document-describes-iaea-transparency-proposal/>.

Lewis, Jeffrey, "Replacing Olli," Arms Control Wonk, July 3, 2010, <http://lewis.armscontrolwonk.com/archive/2792/replacing-olli>.

Lowther, Adam, "A Year Later: Responding to Problems in the ICBM Force," *Bulletin of the Atomic Scientists*, February 20, 2015, <http://thebulletin.org/year-later-responding-problems-icbm-force7984>.

McIntosh, Toby, and William Burr, "IAEA Lacks Transparency, Observers, Researchers Say," FreedomInfo.org, <http://www.freedominfo.org/2015/04/iaea-lacks-transparency-observers-researchers-say/>.

Mladineo, Stephen V., "International Workshop on Safeguards Culture," *The Communicator*, INMM, June 2016.

"Rafael Mariano Grossi," <https://www.iaea.org/about/rafael-grossi>, accessed March 29, 2021.

"Saddam Hussein," Wikipedia, https://en.wikipedia.org/wiki/Saddam_Hussein, accessed February 2, 2021.

"Report on 2005 INMM/ESARDA Santa Fe Workshop: Changing the Safeguards Culture: Broader Perspectives and Challenges," *INMM Communicator*, Vol. 3, No. 3 (January 2006).

Schwartz, J.P., "Uranium Dioxide Caramel Fuel for an Alternative Fuel Cycle for Research and Test Reactors," Commissariat à l'Énergie Atomique, Saclay, France, 1978, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/26/016/26016740.pdf.

Reports

Albright, David, Corey Gay, and Khidhir Hamza, "Development of the Al-Tuwaitha Site: What if the Public or the IAEA had Overhead Imagery?" Institute for Science and International Security (ISIS), April 26, 1999, <http://isis-online.org/isis-reports/detail/development-of-the-al-tuwaitha-site-what-if-the-public-or-the-iaea-had-over/9>.

Berdennikov, Grigory, John Carlson, Thomas Countryman, and Anton Khlopkov, "Principles and Recommendations for Implementation of the IAEA Safeguards System," in Nuclear Threat Initiative (NTI) and Center for Energy and Security Studies (CNES), "The Future of IAEA Safeguards: Rebuilding the Vienna Spirit through Russian-U.S. Expert Dialogue," Washington, D.C., November 2020.

Berriman, Annette, Russel Leslie, and John Carlson, "The Role of 'Safeguards Criteria' in an Evolving Safeguards Environment," Australian Safeguards and Non-Proliferation Office, Canberra, 2016, https://www.dfat.gov.au/sites/default/files/inmm2006_safeguards_criteria.pdf.

Campbell, M., et al., *At What Cost Success? Final Report of the External Review on the Management Processes of the International Atomic Energy Agency* (MANNET Report), Geneva, 2002.

Carlson, John, "Future Directions in IAEA Safeguards," Discussion Paper, Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard University, Cambridge, Mass., November 2018, <https://www.belfercenter.org/publication/future-directions-iaea-safeguards>.

Carlson, John, "SAGSI: Its Role and Contribution to Safeguards Development," Australian Safeguards and Non-Proliferation Office, Canberra, 2006.

Chauvistré, Eric, "The Implications of IAEA Inspections under Security Council Resolution 687," Research Paper No. 11, UN Institute for Disarmament Research (UNIDIR), Geneva, 1992.

Findlay, Trevor, "A Standing United Nations Verification Body: Necessary and Feasible," *Compliance Chronicles*, No. 1, Canadian Center for Treaty Compliance, Ottawa, December 2005.

Findlay, Trevor, "Proliferation Alert! The IAEA and Non-Compliance Reporting," Report No. 2015-04, Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard University, Cambridge, Mass., October 2015.

Findlay, Trevor, "Unleashing the Nuclear Watchdog: Strengthening and Reform of the International Atomic Energy Agency," Center for International Governance Innovation (CIGI), Waterloo, Ontario, 2013, <https://www.cigionline.org/publications/2012/6/unleashing-nuclear-watchdog-strengthening-and-reform-of-iaea>.

Haber, S.B., and M.T. Barriere, "Development of a Regulatory Organizational and Management Review Method," Research Report RSP-0060, Canadian Nuclear Safety Commission, Ottawa, 1998.

Institute of Nuclear Power Operations (INPO), "Principles for a Strong Nuclear Safety Culture," November 2004.

International Commission on Nuclear Non-Proliferation and Disarmament (ICNND), *Eliminating Nuclear Threats: A Practical Agenda for Global Policymakers* (Canberra and Tokyo: Paragon Press, 2009).

International Institute for Strategic Studies (IISS), "Iraq's Weapons of Mass Destruction: A Net Assessment," London, September 9, 2002.

Kelley, Robert, "Creating a 'One House' Culture at the IAEA through Matrix Management," *SIPRI Policy Brief*, SIPRI, Stockholm, January 2014.

Larrimore, Jim, Gothard Stein, and Grace Thompson, "Report on 2005 INMM/ESARDA Santa Fe Workshop: Changing the Safeguards Culture: Broader Perspectives and Challenges," *INMM Communicator*, Vol. 3, No. 3 (January 2006).

Mayhew, Noah, "A Lexical History of the State-Level Concept and Issues for Today," Vienna Center for Disarmament and Non-Proliferation (VCDNP), Vienna, December 2020, https://vcdnp.org/wp-content/uploads/2021/01/Lexical-History-of-the-State-level-Concept_Final.pdf.

Nuclear Threat Initiative (NTI) and Center for Energy and Security Studies (CNES), "The Future of IAEA Safeguards: Rebuilding the Vienna Spirit through Russian-U.S. Expert Dialogue," Washington, D.C., November 2020.

Potter, William, and Gauhkar Mukhatzhanova, "Nuclear Politics and the Non-Aligned Movement," Adelphi Paper, No. 427, 2012.

Rockwood, Laura, Noah Mayhew, Artem Lazarev, and Mara Pfneisi, "IAEA Safeguards: Staying Ahead of the Game," Swedish Radiation Safety Authority, Report No. 2019:14, Stockholm, 2019.

Shea, Thomas E., and Laura Rockwood, "Nuclear Disarmament: The Legacy of the Trilateral Initiative," Deep Cuts Working Paper No. 4, University of Hamburg, Germany, March 2015, https://deepcuts.org/images/PDF/DeepCuts_WP4_Shea_Rockwood_UK.pdf.

World Institute for Nuclear Security (WINS), "Nuclear Security Culture," WINS International Best Practice Guide, Vienna, September 2011.

Conference and Workshop Papers and Presentations

Amano, Yukiya, IAEA Director, "Challenges in Verification," Presentation to the Center for Strategic and International Studies (CSIS), Washington, D.C., April 5, 2019, <https://www.iaea.org/newscenter/statements/challenges-in-nuclear-verification>.

Blix, Hans, IAEA Director General Statement, IAEA Seminar on "The Current and Future Safeguards Role of the IAEA: Challenges and Opportunities," Vienna, Janu-

Transforming Nuclear Safeguards Culture

ary 27, 1994, <https://www.iaea.org/newscenter/statements/seminar-current-and-future-safeguards-role-iaea-challenges-and-opportunities>.

Carlson, John, "Changing the Safeguards Culture: Views on and Expectations from the Workshop," INMM/ESARDA Workshop on Changing the Safeguards Culture: Broader Perspectives and Challenges, Santa Fe, New Mexico, October 30–November 2, 2005.

Carlson, John, "Safeguards in a Broader Policy Perspective: Verifying Treaty Compliance," INMM/ESARDA Workshop on Changing the Safeguards Culture: Broader Perspectives and Challenges, Santa Fe, New Mexico, October 30–November 2, 2005.

Carlson, John, "Special Inspections Revisited," Paper Presented to Annual Meeting of the Institute of Nuclear Materials Management (INMM), Phoenix, Arizona, July 10–14, 2005.

Casterton, James, "Engendering Safeguards Culture," Presentation at Nuclear Safeguards Culture Workshop, Harvard University, Cambridge, Mass., May 9, 2014.

Casterton, James, Remarks at Seminar on IAEA Safeguards Culture, Carleton University, Ottawa, November 14, 2014.

Clark, R., "Setting the Culture from Day One," Session 21, "Enhancing the Organizational Culture to Prepare for Future Missions," IAEA Safeguards Symposium, November 1–5, 2010, Vienna, <http://www.iaea.org/safeguardssymposium2010>.

Cooley, Jill, "Addressing Verification Challenges," International Safeguards Symposium, IAEA, Vienna, October 16–20, 2006, http://www.pub.iaea.org/MTCD/publications/PDF/P1298/P1298_Book.pdf.

Cooley, Jill N., "Department of Safeguards Long-Term Strategic Plan, 2012–2023," IAEA Symposium on International Safeguards: Preparing for Future Verification Challenges, IAEA, Vienna, November 1, 2010.

Cooley, Jill N., "Views on and Expectations from the Workshop," INMM/ESARDA Joint Workshop on Changing the Safeguards Culture: Broader Perspectives and Challenges, Santa Fe, New Mexico, October 30–November 2, 2005.

Dahlgren, K., "Having the Right Organizational Culture," Session 21, "Enhancing the Organizational Culture to Prepare for Future Missions," IAEA Safeguards Symposium, November 1–5, 2010, Vienna, <http://www.iaea.org/safeguardssymposium2010>.

Dahunsi, Stephen, "External Factors that Shape Organizational Culture: A Nigerian Perspective," INMM/ESARDA Safeguards Culture Workshop, Texas A&M University, College Station, Texas, April 26–27, 2016.

Desson, K., "Organizational Culture—Why Does It Matter?" Session 21, "Enhancing the Organizational Culture to Prepare for Future Missions," IAEA Safeguards Symposium, Vienna, November 1–5, 2010, <http://www.iaea.org/safeguardssymposium2010>.

“Disarming Iraq: Preparing for the Long-Term Monitoring of Iraq’s Nuclear Weapons Capability,” Washington Council on Non-Proliferation, Washington, D.C., October 26, 1992.

Ellis, Doris, and Sara Scott, “Views on and Expectations from the Workshop,” INMM/ESARDA Workshop on Changing the Safeguards Culture: Broader Perspectives and Challenges, Santa Fe, New Mexico, October 30–November 2, 2005.

Findlay, Trevor, “The IAEA’s Nuclear Safeguards Culture: ‘Candy Concept’ or Powerful Prism?” Presentation at Symposium on International Safeguards: “Linking Strategy, Implementation and People,” IAEA, Vienna, October 21, 2014, published in IAEA, *Symposium on International Safeguards: Linking Strategy, Implementation and People*, Book of Abstracts, Presentations and Papers, IAEA-CN-220, https://www-legacy.iaea.org/safeguards/symposium/2014/home/eproceedings/sg2014_eproceedings_online.pdf.

Heinonen, Olli, “Five Decades of IAEA Safeguards,” Paper Presented to INMM Meeting, Atlanta, Georgia, July 2014, www.belfercenter.org/publication/five-challenging-decades-iaea-safeguards.

Heinonen, Olli, “IAEA Safeguards—Evolving its 40-Year old Obligations to Meet Today’s Verification Undertakings,” Presentation to Annual INMM Meeting, Palm Desert, California, July 14–18, 2013.

Hosoya, M., E. Franklin Saburido, H. Nackaerts, G. Bernasconi, V. Wong, and K. Warthan, “Implementing an Integrated Safeguards Approach at Multi-Unit CANDU Stations: Potential Savings,” IAEA-CN-148/60, “Addressing Verification Challenges,” Proceedings of an International Safeguards Symposium, IAEA, Vienna, October 16–20, 2009, STI/PUB/1289.

IAEA, “Human and Organizational Aspects of Assuring Nuclear Safety—Exploring 30 Years of Nuclear Safety,” Proceedings of an International Conference, Vienna, February 22–26, 2016.

Lockwood, D., M. Scholtz, L. Blair, and E. Wonder, “Next Generation Safeguards Initiative: Human Capital Development Programs,” IAEA, IAEA-CN-184/108, November 2010.

Mladineo, Stephen V., Karyn R. Durbin, and Andrew Van Duzer, “Changing the Safeguards Culture: Broader Perspectives and Challenges,” INMM/ESARDA Workshop on Changing the Safeguards Culture: Broader Perspectives and Challenges, Santa Fe, New Mexico, October 30–November 2, 2005.

Nackaerts, Herman, “Evolution of Safeguards Implementation,” Presentation to Nuclear Safeguards Culture Workshop, Harvard University, Cambridge, Mass., May 9, 2014.

Patten, John, “The Role of Quality Management in Changing Safeguards Culture,” INMM/ESARDA Workshop on Changing Safeguards Culture: Broader Perspectives and Challenges, Santa Fe, New Mexico, October 30–November 1, 2005.

Proceedings, INMM/ESARDA Workshop on Changing the Safeguards Culture: Broader Perspectives and Challenges, Santa Fe, New Mexico, October 30–November 2, 2005.

Pujol, Eric, “Methodology for Long-Range Strategic Planning in the IAEA Department of Safeguards,” IAEA Symposium on International Safeguards: Preparing for Future Verification Challenges, IAEA, Vienna, November 1, 2010.

Rockwood, Laura, “Safeguards 101,” Presentation at Belfer Center for Science and International Affairs, Harvard University, Cambridge, Mass., May 22, 2015.

“Safeguards Against Nuclear Proliferation,” Remarks by Myron B. Kratzer, Director, Division of International Affairs, U.S. Atomic Energy Commission, at George Washington University—American Assembly, Airlie House, Warrenton, Va., May 11, 1967, reproduced in U.S. Congressional Research Service, *Nuclear Safeguards: A Reader*, Report Prepared by the U.S. Congressional Research Service for the Subcommittee on Energy Research and Production transmitted to the Committee on Science and Technology, U.S. House of Representatives, 98th Cong., 1st sess., December 1983, U.S. Government Printing Office, Washington, D.C., December 1983.

“The Politics of Safeguards,” Transcript, Carnegie International Nuclear Policy Conference, Washington, D.C., March 24, 2015.

Unpublished presentations from Safeguards Culture Workshop, Texas A&M University, College Station, Texas, April 26–27, 2016, http://www.inmm.org/Content/NavigationMenu/Events/UpcomingEvents/SafeguardsCultureWorkshop_Agenda_as_of_04-14-16.pdf.

Varjoranta, Tero, Keynote Address, IAEA International Safeguards Symposium, Vienna, October 20, 2014.

Documents

IAEA General Documents, including Board of Governors information documents (INF), General Conference information documents (INF) and Information Circulars (INFCIRC) (in chronological order)

Statute of the International Atomic Energy Agency, 1957.

The Agency’s Safeguards System (1965, as provisionally extended in 1966 and 1968), INFCIRC/66/Rev. 2, September 16, 1968.

The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, INF-CIRC/153 (Corrected), June 1972, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf>.

Text of the Agreement between Iraq and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, INF-CIRC/172, February 22, 1973, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1973/infcirc172a1.pdf>.

Code 3.1, Subsidiary Arrangement to the Agreement between the Government of [. . .] and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, Fifth Revision, March 12, 1974, <https://www.iaea.org/sites/default/files/sg-fm-1170-subsidiary-arrangement-code-1-9.pdf>.

The Standard Text of Safeguards Agreements in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, Note by the Director General, GOV/INF/276, August 22, 1974.

Exchange of Letters Between the Government of the French Republic and the Government of the Republic of Iraq Supplementary to the Franco-Iraqi Co-operation Agreement for the Peaceful Utilization of Nuclear Energy Signed on 18 November 1975, INF-CIRC/172/Add 1, September 1979.

IAEA Safeguards: An Introduction, IAEA/SG/INF/3, October 1981.

IAEA Safeguards, Aims, Limitations, and Achievements, IAEA/SG/INF/4, 1983.

Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards, INF-CIRC/540 (Corrected), September 1997.

“The Evolution of IAEA Safeguards,” Vienna, 1998, www.pub.iaea.org/MTCD/publications/PDF/NVS2_web.pdf.

IAEA Safeguards Glossary, 2001 ed., International Nuclear Verification Series, No. 3, 2002.

Medium Term Strategy 2006–2011, 2005, http://www.iaea.org/sites/default/files/mts2006_2011.pdf.

IAEA Safety Glossary: Terminology Used in Nuclear Safety and Radiation Protection, 2007 Edition, http://www-pub.iaea.org/MTCD/publications/PDF/Pub1290_web.pdf.

“IAEA Safeguards: Staying Ahead of the Game,” 2007.

Report of the Commission of Eminent Persons on the Future of the Agency: Note by the Director General, GOV/2008/22-GC (52)/INF/4, May 23, 2008.

“20/20 Vision for the Future: Background Report by the Director General for the Commission of Eminent Persons,” Annex, “Report of the Commission of Eminent Persons on the Future of the Agency,” GOV/2008/22-GC(52)/INF/4, IAEA, Vienna, 2008.

Medium Term Strategy 2012–2017, 2011, https://www.iaea.org/sites/default/files/mts_2012_2017.pdf.

“Nuclear Security Culture: Implementing Guide,” IAEA Nuclear Security Series No. 7, IAEA, Vienna, 2008, https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1347_web.pdf.

Safeguards Department, Long-Term Strategic Plan (2012–2023) Summary, 2011, www.iaea.org/safeguards/documents/LongTerm_Strategic_Plan_%2820122023%29-Summary.pdf.

IAEA Department of Safeguards, Subsidiary Arrangement to the Agreement by the Government of [.] and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, Fifth Revision, SG-FM-1170, November 2, 2011.

“Inviting Commitment: Working for the IAEA,” IAEA Human Resources, Vienna, 2012.

“Managing Organizational Change in Nuclear Organizations,” IAEA Nuclear Energy Series, No. NG-T-1.1, 2014.

Sections N to S, Joint Comprehensive Plan of Action (JCPOA), Vienna, 14 July 2015, Communication dated 24 July 2015 received from China, France, Germany, the Russian Federation, the United Kingdom, the United States of America (the E3/EU+3) and the Islamic Republic of Iran concerning the text of the Joint Comprehensive Plan of Action (JCPOA), INFCIRC/887, July 31, 2015.

IAEA Fact Sheet on DPRK safeguards, <https://www.iaea.org/newscenter/focus/dprk/fact-sheet-on-dprk-nuclear-safeguards>, accessed November 1, 2016.

Medium Term Strategy 2018–2023, 2017, https://www.iaea.org/sites/default/files/16/11/mts2018_2013.pdf.

“Al Tuwaitha-Tamuz 2 Reactor,” <http://www-ns.iaea.org/projects/iraq/tuwaitha/tamuz-2.asp?s=8&l=66>, accessed August 22, 2017.

“The IRT-5000,” <http://www-ns.iaea.org/projects/iraq/tuwaitha/irt5000.asp?l=66>, accessed August 22, 2017.

Office of Legal Affairs, Country Fact Sheets, <https://ola.iaea.org/ola/FactSheets/CountryDetails.asp?country=IQ>, accessed August 22, 2017.

IAEA Mission Statement, <http://www.iaea.org/About/mission.html>, accessed November 2018.

“Development and Implementation Support Program for Nuclear Verification 2020–2021,” STR-393, Vienna, January 2020.

A Harmonized Safety Culture Model, IAEA Working Document (last revised 05 May 2020), https://www.iaea.org/sites/default/files/20/05/harmonization_05_05_2020-final_002.pdf, accessed March 31, 2021.

Joint Statement by the Director General of the IAEA and the Vice-President of the Islamic Republic of Iran and Head of the AEOI [Atomic Energy Organization of Iran], August 20, 2020, <https://www.iaea.org/newscenter/pressreleases/joint-statement-by-the-director-general-of-the-iaea-and-the-vice-president-of-the-islamic-republic-of-iran-and-head-of-the-aeoi>.

IAEA Director General Rafael Grossi, Statement to Sixty-Fourth Regular Session of IAEA General Conference, September 21, 2020, <https://www.iaea.org/newscenter/statements/statement-to-sixty-fourth-regular-session-of-iaea-general-conference>.

Joint Statement by the Vice-President of the Islamic Republic of Iran and Head of the AEOI and the Director General of the IAEA, February 2021, <https://www.iaea.org/newscenter/pressreleases/joint-statement-by-the-vice-president-of-the-islamic-republic-of-iran-and-head-of-the-aeoi-and-the-director-general-of-the-iaea>.

IAEA Core Ethical Values, <https://www.iaea.org/about/employment/iaea-values>, accessed April 1, 2021.

Additional Protocol, <https://www.iaea.org/topics/additional-protocol>, accessed August 1, 2021.

*IAEA Board of Governors Documents issued with
GOV number only (in chronological order)*

IAEA, Board of Governors, Official Records, GOV/OR.748, May 6, 1991.

Proposal for the Derestriction of Board Documents, GOV/2843, February 15, 1996.

Supplementary Document to the Report on The Conceptualization and Development of Safeguards Implementation at the State Level (GOV/2013/38): Report by the Director General, GOV/2014/41, August 13, 2014.

*IAEA Documents with a General Conference (GC) number or with
both a General Conference and Board of Governors (GOV) number
(in chronological order)*

The Agency’s Inspectorate: Memorandum by the Director General, and Annex, “The Agency’s Inspectors,” GC(V) INF/39, Vienna, August 28, 1961, https://www-legacy.iaea.org/About/Policy/GC/GC05/GC05InfDocuments/English/gc05inf-39_en.pdf (the Inspectors’ Document).

The Agency's Accounts for 1980, GC(XXV)/645, July 1981, http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/40/086/40086035.pdf.

The Annual Report for 1983, GC(XXVIII)/713, July 1984, https://www.iaea.org/About/Policy/GC/GC28/GC28Documents/English/gc28-713_en.pdf.

The Annual Report for 1989, GC(XXXIV)/915, July 1990, https://www.iaea.org/About/Policy/GC/GC34/GC34Documents/English/gc34-915_en.pdf.

The Agency's Accounts for 1990, GC(XXXV)/954, August 1991, https://www.iaea.org/About/Policy/GC/GC35/GC35Documents/English/gc35-954_en.pdf.

The Annual Report for 1990, GC(XXXV)/953, October 1991, https://www.iaea.org/About/Policy/GC/GC35/GC35Documents/English/gc35-953_en.pdf.

Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System: Report by the Director General, GC(39)/17, August 22, 1995, Annex 3.

Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System including Implementation of Additional Protocols: Report by the Director General, GC(51)/8, July 23, 2007.

Personnel: Women in the Secretariat: Report by the Director General, GOV/2007/47-GC(51)/17, August 17, 2007.

The Agency's Accounts for 2010, GC(55)/4, 2011, http://www.un.org/en/auditors/panel/docs/IAEA_2010.pdf.

The Agency's Financial Statements for 2010, GC(55)/5, 2011, http://www.iaea.org/sites/default/files/mts2006_2011.pdf.

The Agency's Financial Statements for 2011, GC(56)/5, 2012, https://www-legacy.iaea.org/About/Policy/GC/GC56/GC56Documents/English/gc56-10_en.pdf.

Federal Court of Auditors, Germany, Report of the External Auditor on the audit of the financial statements of the International Atomic Energy Agency for the year ended 31 December 2011, Part V, The Agency's Financial Statements for 2011, GC(56)/5, 2012.

Personnel: Staffing of the Agency's Secretariat: Report by the Director General, GOV/2013/34/GC(57)/14, July 23, 2013.

The Conceptualization and Development of Safeguards Implementation at the State Level: Report by the Director General, GOV/2013/38, August 12, 2013,

The Agency's Program and Budget 2014–2015, GC(57)/2, August 2013, https://www-legacy.iaea.org/About/Policy/GC/GC57/GC57Documents/English/gc57-2_en.pdf.

The Agency's Financial Statements for 2013, GC(58)/5, 2014, https://www.iaea.org/About/Policy/GC/GC58/GC58Documents/English/gc58-5_en.pdf.

Office of the Comptroller and Auditor General of India, Report of the External Auditor on the Audit of the Financial Statements of the International Atomic Energy Agency for the Year Ended 31 December 2013, Part V, The Agency's Financial Statements for 2013, GC(58)/5, 2014, https://www.iaea.org/About/Policy/GC/GC58/GC58Documents/English/gc58-5_en.pdf.

The Annual Report for 2014, GC/GC59/7, 2015, https://www.iaea.org/About/Policy/GC/GC59/GC59Documents/English/gc59-7_en.pdf.

The Agency's Program and Budget 2016–2017, July 2015, GC(59)/2, https://www-legacy.iaea.org/About/Policy/GC/GC59/GC59Documents/English/gc59-2_en.pdf.

Personnel: Staffing of the Agency's Secretariat: Report by the Director General, GOV/2015/46-GC(59)/16, August 3, 2015, https://www.iaea.org/About/Policy/GC/GC59/GC59Documents/English/gc59-16_en.pdf.

Personnel: Women in the Secretariat: Report by the Director General, GOV/2015/47-GC(59)/17, August 3, 2015.

Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards: Report by the Director General, GC(60)/13, August 12, 2016, https://www-legacy.iaea.org/About/Policy/GC/GC60/GC60Documents/English/gc60-13_en.pdf.

The Agency's Financial Statements for 2016, GC(61)/2, 2017, https://www.iaea.org/About/Policy/GC/GC61/GC61Documents/English/gc61-2_en.pdf.

Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards: Report by the Director General, GC(61)/16, July 26, 2017, https://www.iaea.org/About/Policy/GC/GC61/GC61Documents/English/gc61-16_en.pdf.

Personnel: Staffing of the Agency's Secretariat: Report by the Director General, GOV/2017/38-GC(61)/18, August 2, 2017.

Personnel: Women in the Secretariat: Report by the Director General, GOV/2017/39-GC(61)/19, August 2, 2017.

The Agency's Program and Budget 2020–2021, GC(63)/2, 2019, <https://www.iaea.org/sites/default/files/gc/gc63-2.pdf>.

Personnel: Women in the Secretariat: Report by the Director General, GOV/2019/37-GC(63)/16, July 19, 2019.

The Agency's Financial Statements for 2019, GC(64)/4, Vienna, July 2020.

Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards, Report by the Director General, GC(64)/13, August 11, 2020.

Transforming Nuclear Safeguards Culture

The Annual Report for 2019, GC(64)/3, September 2020, <https://www.iaea.org/sites/default/files/publications/reports/2019/gc64-3.pdf>.

The Agency's Financial Statements for 2019, GC(64)/4, 2020.

Audit Board of Indonesia, Audit Report on the International Atomic Energy Agency, 2019, Part V, The Agency's Financial Statements for 2019, GC(64)/4, 2020.

Safeguards Statement for 2020, B.1.1., <https://www.iaea.org/sites/default/files/21/06/statement-sir-2020.pdf>.

United Nations Documents (in chronological order)

Fourth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, Geneva, August 20–September 14, 1990, Report of Main Committee II, NPT/CONF.IV/MC.II/I, September 10, 1990.

Review and Extension Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, Final Document, May 1995, <https://www.un.org/disarmament/wmd/nuclear/npt1995/official-documents>.

United Nations, Report of the Secretary-General's High-Level Panel on Threats, Challenges and Change, New York, 2004.

United Nations, Joint Inspection Unit (JIU), Review of Management and Administration in the International Atomic Energy Agency (IAEA), JIU/REP/2012/Rev. 1, United Nations, Geneva, 2012.

United Nations, Sustainable Development Goals, 2015, <https://sustainabledevelopment.un.org/?menu=1300>.

United Nations Security Council Documents (in chronological order)

Note by the President of the Security Council, S/22746, June 28, 1991.

Consolidated Report on the First Two IAEA Inspections Under Security Council Resolution 687 (1991) of Iraqi Nuclear Capabilities, July 11, 1991, Security Council, Note by the Secretary-General, S/22788, July 15, 1991.

First Report on the Sixth IAEA On-Site Inspection in Iraq under Security Council Resolution 687 (1991), S/23122, October 8, 1991.

First semi-annual report (covering the period 17 June–17 December 1991) on the implementation by the IAEA of the plan for the destruction, removal or rendering harmless of items listed in paragraph 12 of UN Security Council Resolution 687 (1991), S/23295, December 17, 1991.

Eighth Report of the Director General of the International Atomic Energy Agency on the Implementation of the Agency's Plan for Future Ongoing Monitoring and Verification of Iraq's Compliance with Paragraph 12 of Resolution 687 (1991), Appendix, Note by Secretary-General, UN Security Council, S/995/844, October 6, 1995.

Report of the Twenty-Eighth IAEA On-Site Inspection in Iraq under Security Council Resolution 867 (1991), Attachment, Note by the Secretary-General, UN Security Council S/1995/1003, December 1, 1995.

Fourth Consolidated Report by the Director General of the International Atomic Energy Agency under Paragraph 16 of Security Council Resolution 1051 (1996), Appendix to Letter dated 6 October 1997 from the Director General of the International Atomic Energy Agency, Annex to UN Security Council, Note by Secretary General, S/1997/779, October 8, 1997, <https://nsarchive2.gwu.edu/NSAEBB/NSAEBB80/wmd07.pdf>.

Report of the First Panel Established pursuant to the Note by the President of the Security Council on 30 January 1999 (S/1999/100), concerning disarmament and current and future ongoing monitoring and verification issues, Annex 1, Letter dated 27 and 30 March 1999, respectively, from the Chairman of the Panels established Pursuant to the Note by the President of the Security Council of 30 January 1999 (S/1999/100) addressed to the President of the Security Council, S/1999/356, March 30, 1999 (the Amorim Report).

U.S. Government Documents (in chronological order)

Report on International Control of Atomic Energy, Prepared for the Secretary of State's Committee on Atomic Energy, Department of State Publication 2498, U.S. Government Printing Office, Washington, D.C., March 16, 1946 (the Acheson-Lilienthal Report).

Report of the Advisory Committee on U.S. Policy Toward the International Atomic Energy Agency, Hearing before the Joint Committee on Atomic Energy, Congress of the United States, Eighty-Seventh Congress, U.S. Government Printing Office, Washington, August 2, 1962 (the Smyth Report).

The International Atomic Energy Agency: An Appraisal with Recommendations for United States Policy: A Report to the Secretary of State of the Panel to Review the Activities of the International Atomic Energy Agency, U.S. State Department, Washington, D.C., 1972.

Donnelly, Warren, "Nuclear Weapons Proliferation and the International Atomic Energy Agency: An Analytic Report," prepared for the U.S. Senate Committee on Governmental Operations, Washington, D.C.: U.S. Government Printing Office, 1976.

Comptroller General of the United States, *Assessment of U.S. and International Controls Over the Peaceful Uses of Nuclear Energy*, Report to the Congress by the Comptroller General of the United States, ID-76-60, Appendix II, September 14, 1976.

U.S. Congressional Research Service, *Nuclear Safeguards: A Reader*, Report Prepared by the U.S. Congressional Research Service for the Subcommittee on Energy Research and Production transmitted to the Committee on Science and Technology, U.S. House of Representatives, 98th Cong., 1st sess., December 1983, U.S. Government Printing Office, Washington, D.C., December 1983.

_____, Boright, John P., "Historical Development and Current Trends in Nuclear Safeguards," Lecture at the International Training Course on Implementation of State Systems of Accounting for and Control of Nuclear Materials, March 15-30, 1982.

_____, Report Prepared by Warren Donnelly, Foreign Affairs and National Defense Division, Congressional Research Service, Library of Congress, June 16, 1981, U.S. Congress, Senate Committee on Foreign Relations, Hearings, *The Israeli Airstrike*, 97th Cong., 1st sess., June 18, 19, and 25, 1981.

_____, "IAEA Comments on the Testimony of Roger Richter on June 19, 1981, before the Senate Foreign Relations Committee," Appendix, U.S. Congress, Senate Committee on Foreign Relations, Hearings, *The Israeli Airstrike*, 97th Cong., 1st sess., June 18, 19, and 25, 1981.

_____, Nakićenović, Slobodan, "Comments on IAEA Safeguards," U.S. Congressional Research Service, Washington, D.C., August 1981.

_____, Pilat, Joseph, "The International Atomic Energy Agency (IAEA) and its Safeguards: A Fact Sheet," May 6, 1982.

_____, "Prepared Statement of Emanuel R. Morgan," IAEA Programs of Safeguards, Hearings before the Committee on Foreign Relations, U.S. Senate, 97th Cong., 1st Sess., December 2, 1981.

_____, Report to the Atomic Energy Commission by the *Ad Hoc* Advisory Panel on Safeguarding Special Nuclear Material, March 10, 1967.

_____, "Statement by Senator Alan Cranston," U.S. Congress, Senate Committee on Foreign Relations, Hearings, *The Israeli Airstrike*, 97th Cong., 1st sess., June 18, 19, and 25, 1981.

_____, "Testimony of Roger Richter," U.S. Congress, Senate Committee on Foreign Relations, Hearings, *The Israeli Airstrike*, 97th Cong., 1st sess., June 18, 19, and 25, 1981.

_____, "Testimony of Dr. Thomas E. Shea," IAEA Programs of Safeguards, Hearing before the Committee on Foreign Relations, U.S. Senate, 97th Cong., 1st sess., December 2, 1981.

U.S. Arms Control and Disarmament Agency (ACDA), "Review of the Negotiating History of the IAEA Safeguards Document INFCIRC/153," AC2NC103, Washington, D.C., July 30, 1984.

ACDA, "Review of the Negotiating History of IAEA Document INFCIRC/66/REV.2, 'The Agency's Safeguards System,'" Washington, D.C., September 5, 1984.

Paternoster, Richard R., "Nuclear Weapons Proliferation Indicators and Observables," LA-12430-MS, UC-700, Los Alamos National Laboratory, New Mexico, December 1992.

Office of Technical Assessment, *Nuclear Safeguards and the International Atomic Energy Agency*, OTA-ISS-615, Washington, D.C., April 1995.

Director of Central Intelligence, Comprehensive Report of the Special Advisor to the Director of Central Intelligence (DCI) on Iraq's WMD, Vol. II, "Nuclear," Washington, D.C., September 30, 2004.

Director of Central Intelligence, Addendums to the Comprehensive Report of the Special Advisor to the Director of Central Intelligence (DCI) on Iraq's WMD, Vol. II, "Nuclear," Washington, D.C., March 2005.

Government Accounting Office (GAO), "Nuclear Nonproliferation: IAEA Has Strengthened its Safeguards and Nuclear Security Programs, but Weaknesses Need to be Addressed," GAO-06-93, Washington, D.C., October 2005.

"Contributions to the IAEA," Office of Management and Budget, The White House, Washington, D.C., 2006; <http://www.whitehouse.gov/omb/expectmore/summary/10004639.2006.html> (2006), cited in IAEA, "20/20 Vision for the Future: Background Report by the Director General for the Commission of Eminent Persons," Annex, "Report of the Commission of Eminent Persons on the Future of the Agency," GOV/2008/22-GC(52)/INF/4, IAEA, Vienna, 2008, p. 24.

Frazar, S.L., and S.V. Mladineo, "Safeguards Culture," PNNL-21555, Pacific Northwest National Laboratory, Seattle, Wash., July 2012.

Other Documents (in chronological order)

al-Mallah, Moyassar, Secretary-General of the IAEC, Letter to A.E. Cairo, IAEA, TA/IRQ/3, IAEA Archives, Vienna, September 12, 1973.

International Energy Associates Ltd., "Review of the Negotiating History of the IAEA Safeguards Document INFCIRC/153," July 30, 1984.

Nuclear Threat Initiative (NTI), Iraq Nuclear Chronology, http://www.nti.org/media/pdfs/iraq_nuclear.pdf?_=1316466791.

Organization for Economic Cooperation and Development, *OECD Best Practice Principles for Regulatory Policy: Regulatory Enforcement and Inspections* (Paris: OECD, 2014), <https://www.oecd.org/gov/regulatory-enforcement-and-inspections-9789264208117-en.htm>.

Statement by HE Mr Richard Sadleir, Resident Representative of Australia to the IAEA, Agenda Item 6(b): Safeguards Implementation Report for 2019, Australian Embassy and Permanent Mission, Vienna, June 16, 2020, https://austria.embassy.gov.au/vien/IAEABOG_Jun20_SIR.html.

Unpublished documents (in chronological order)

Shea, Thomas E., and David A. Thompson, "Human Factors Affecting IAEA Inspector Performance," Prepared for the U.S. Arms Control and Disarmament Agency (ACDA), AC2NC106 (unpublished), Washington, D.C., 1982/1983.

Carroll, John S., "Introduction to Organizational Analysis: The Three Lenses," unpublished class paper, Sloan School of Management, MIT, revised June 2006.

Rockwood, Laura, "What the Agency has Missed in Iraq," Memorandum from the IAEA Office of Legal Affairs, March 17, 2003, Archive of Hans Blix, cited in Gudrun Harrer, *Dismantling the Iraqi Nuclear Program: The Inspections of the International Atomic Energy Agency, 1991–1998* (Abingdon, Oxon: Routledge, 2014).

Press Releases (in chronological order)

Statement by Dr. Sigvard Eklund, Director General of the International Atomic Energy Agency to the IAEA Board of Governors, IAEA Press Release, PR 81/6, Vienna, July 6, 1981.

IAEA Press Release, PR/91–24, July 18, 1991.

2005 Nobel Peace Prize Press Release, Oslo, October 7, 2005.

"Training IAEA Inspectors: Newly Recruited Inspectors Take to the Field," <https://www.iaea.org/newscenter/news/training-iaea-inspectors>, accessed February 10, 2015.

"IAEA Director General Yukiya Amano Becomes a Gender Champion," June 17, 2017, <https://www.iaea.org/newscenter/news/iaea-director-general-yukiya-amano-becomes-a-gender-champion>.

Statement by IAEA Director General Yukiya Amano, October 2, 2018, <https://www.iaea.org/newscenter/statements/statement-by-iaea-director-general-yukiya-amano-2-october-2018>.

“New IAEA Laboratory Named after Late Director General Yukiya Amano,” September 16, 2021, <https://www.iaea.org/newscenter/news/new-iaea-laboratory-building-named-after-late-director-general-yukiya-amano>.

Web Sites

Glassdoor, <http://www.glassdoor.com/IAEA-Reviews-E474090.htm>.

“Culture Eats Strategy for Breakfast,” Quote Investigator, <https://quoteinvestigator.com/2017/05/23/culture-eats/>.

World Nuclear University, <http://www.world-nuclear-university.org/imis20/wnu/>.

Interviews

By the Author (in chronological order)

Laura Rockwood, Vienna, July 3, 2013.

Robert Kelley, Vienna, March 19, 2014.

U.S. safeguards officials, State Department, Washington, D.C., May 19, 2014.

Olli Heinonen, Cambridge, Mass., May 22, 2014.

John Carlson, Cambridge, Mass., June 5, 2014.

Dimitri Perricos, Baden, Austria, June 20, 2014.

Jean-Maurice Crete, Vienna, June 25, 2014.

Tom Shea, Vienna, June 26, 2014.

Shirley Johnson, Atlanta, July 22, 2014.

IAEA officials, IAEA Safeguards Symposium, Vienna, October 20–24, 2014.

Olli Heinonen, Cambridge, Mass., June 5, 2015.

*By Elisabeth Roehrlich, IAEA Oral History Series, University of Vienna,
<http://iaea-history.univie.ac.at/oral-history-videos/> (in chronological order)*

William Lichliter, Vienna, March 13, 2015.

Hans Blix, Stockholm, April 13, 2015.

Pier Roberto Danesi, Vienna, April 23, 2015.

Dimitri Perricos, Vienna, June 27, 2015.

Transforming Nuclear Safeguards Culture

Shirley Johnson, Vienna, August 20, 2015.

John Carlson, Vienna, November 13, 2015.

James Goodby, Washington, D.C., November 17, 2015.

David Waller, Washington, D.C., November 21, 2015.

Mohamed ElBaradei, Vienna, May 31, 2016.

Dieter Goethel, Vienna, August 18, 2016.

By Yale-UN Oral History Project, <https://archives.yale.edu/repositories/12/resources/3915> (in chronological order)

Rolf Ekéus, New Haven, Conn., February 3, 1998.

Scott Ritter, Larchmont, N.Y., October 27, 1998.

David Kay, McLean, Va., April 10, 2000.

Electronic Communication (in chronological order)

Jim Casterton, March 2, 2015.

Jim Casterton, March 3, 2015.

Robert Kelley, April 12, 2015.

Robert Kelley, April 24, 2015.

Former IAEA official, April 24, 2015.

Tariq Rauf, June 1, 2015.

Mark Schanfein, May 14, 2016.

John Tilemann, May 30, 2019.

Laura Rockwood, October 19, 2020.

Shirley Johnson, October 21, 2020.

Videos

Foundations of International Safeguards video series transcripts, Pacific Northwest Nuclear Laboratories (PNNL), <http://cgs.pnnl.gov/fois/videos/foundations/> (in chronological order)

Panel Discussion with Myron Kratzer, Rich Hooper, and Ambassador Norman Wolf, “Retrospective of INFCIRCs 153 and 540” 4.0, Santa Fe, New Mexico, October 2005.

Discussion with Laura Rockwood, "Legal Foundations of Safeguards," 3.0, Richland, Wash., June 2006.

Panel Discussion with Current and Former SAGSI Representatives, "International Perspectives on Safeguards," 5.2, Tucson, Arizona, July 2007.

Panel Discussion with Jacques Baute, Rich Hooper, and Dimitri Perricos, "The Path Toward Strengthened Safeguards: Verification Challenges of the 1990s," 7.0, Vienna, December 2009.

Interview with Rich Hooper, "Concluding Remarks," 7.26, Vienna, December 2009.

