South Africa and Nuclear Order: Between 'Local' Technopolitics and 'Global' Hegemony

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Thesis submitted in fulfilment of the requirements for the degree of Ph.D.

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Aberystwyth University

July 2021

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Abstract

This thesis is an investigation into South Africa's interactions with the global nuclear order, from apartheid to the present day. Since the advent of the apartheid nuclear programme, South Africa has found itself in constant interaction with nuclear order, with the order helping to shape its domestic technical and political landscapes, and with Pretoria itself contributing significantly to the present-day constitution of the nuclear order. The significant contribution to knowledge here comes from bringing South Africa's 'local' nuclear technopolitics into conversation with a critical reading of the 'global' nuclear order, and interrogating the multiple theoretical and political functions of the assumed categories of 'local' and 'global' in world nuclear politics. The small amount of existing work on this topic has been hamstrung by a very limited engagement with important concepts, including even conventional readings of global nuclear order. I apply an original conceptual framework which draws on mainstream International Relations theory, critical nuclear politics, and the extra-disciplinary concepts of 'technopolitics' and 'nuclearity'. Drawing on archival and interview fieldwork as well as secondary sources, I offer a radically new understanding of South Africa's important role in world nuclear history—as well as a contribution to the growing critical literature on global nuclear order.

Acknowledgements

I would first like to thank my excellent supervisors, Dr Jan Ruzicka and Prof Mustapha Kamal Pasha. Jan has been an exemplary primary supervisor and I have benefited immensely from his sharply critical instincts. His ideas have heavily influenced my approach to nuclear politics, and I could not have hoped for a more supportive, responsive, or attentive supervisor. Mustapha's insights on world politics and theory have expanded my mind and helped to reignite a previously lost sense of radicalism in both my work and personal politics. I also thank Prof Jutta Weldes for sparking my curiosity around critical approaches to nuclear politics, encouraging my postgraduate education, and in a very real sense starting me off on my academic journey.

I would also like to thank all of my colleagues and friends around the Department of International Politics for a total of five years of companionship, conversation, and fun, and for making the Interpol office a great place to be. Thanks here go to Paul Blamire, Kat Kusic, Rob Cullum, Aimee Strang, John Wood, Nick Morgan, Suzanne Klein Schaarsberg, Tim Van Veen, Louise Ridden, Charlotte Botfield, Emma Kast, Duncan Fuller, Kaela Bamberger, Karijn van den Berg, Jana Wattenberg, Talwyn Baudu, Toni Cerkez, Lance Giessinger and Roberto Roldan, and everyone else who has contributed so much to our small research community. On this count, thanks also go to the members of ACORN Aberystwyth and ACORN staff who supported our fledgling group, for helping to provide a constructive outlet for my frustrated political urges, and for building community power in a time of darkness and crisis. Given the events of 2020, I would be remiss not to thank the boys in the group chat for making successive lockdowns more bearable while writing up. I'd also like thank my family, especially my parents, for their belief in me and encouraging my academic career. Most importantly, I thank my partner Dr Andrea Warnecke for her boundless support and reassurance throughout my PhD, without which things would have felt far more difficult.

I would also like to thank the rest of the staff, past and present, at the Department of International Politics, Aberystwyth University, for supporting my PhD proposal, encouraging the development of my research, and providing a welcoming, collegiate environment in which to work. In particular, my thanks go to Prof Inanna Hamati-Ataya, Dr Alistair Shepherd, Prof Milja Kurki, Dr Warren Dockter, Dr Carl Death, and Dr Charalampos Efstathopoulos. For advice on the PhD process from older hands, I thank in particular Dr Lydia Cole and Dr Danielle House. I also thank members of the British International Studies Assocation (BISA), the BISA Postgraduate Network, and the BISA Global Nuclear Order Working Group for helpful comments on my research and for welcoming me into a vibrant academic community. Particular thanks here go to Dr Laura Considine, Dr Hassan Elbahtimy, and Dr

Patricia Shamai. I thank those at the Economic and Social Research Council and the Wales Doctoral Training Partnership for supporting this research and attendant fieldwork.

I also extend my sincere thanks to all those who assisted my research during my fieldwork visits. I would like to thank the archives teams at the Bodleian Library, Oxford, at the International Atomic Energy Agency in Vienna, Mandy Noble and the University of Cape Town Special Collections Staff, and Gabriele Mohale at Wits University Library, and the Research Support Team at the International Development Research Centre, Canada. Thanks go to Dr Elisabeth Roehrlich for advice on navigating the IAEA archives. I would particularly like to thank Geraldine Frieslaar, Zandile Nkumane, and Nonhlanhla Ngwenya at the South African History Archive in Johannesburg for their hard work and providing me with such a welcoming environment in which to work. For their interviews, insights, and stories I thank Renfrew Christie, Keith Gottschalk, Mike Kantey, Peter Becker, Kate Davies, Kevin Mileham, Andre Buys, Johan Slabber, Kelvin Kemm, Chris Yelland, Verne Harris, Rene Geyer, and Right2Know Cape Town. I also extend my sincere thanks to all of those who spoke to me under condition of anonymity. Special thanks must also go to Prof Anna-Mart van Wyk for a very warm welcome to Pretoria.

Too many others have indirectly supported this work to be listed here; my heartfelt thanks go to each of you. Finally, I would like to extend my solidarity to those in South Africa, within and without the African National Congress, who are still struggling for economic, social, and racial justice and for genuine democracy: *a luta continua.*

This thesis is dedicated to my grandfathers Colin Vaughan and Roy Pout, who would have been proud.

Common abbreviations and acronyms

AAM – Anti-Apartheid Movement (Britain)

ANC – African National Congress

AP – Additional Protocol

CTBT – Comprehensive Test Ban Treaty

ENDC – Eighteen-Nation Disarmament Committee

GNU – Government of National Unity

HEU – Highly enriched uranium

HI – Humanitarian Initiative

IAEA – International Atomic Energy Agency

ICAN – International Campaign to Abolish Nuclear Weapons

IR – International Relations

LEU – Low enriched uranium

NAC – New Agenda Coalition

NAM – Non-Aligned Movement

(A)NFWZ – (African) Nuclear Weapon-Free Zone

NPT – Treaty on the Non-Proliferation of Nuclear Weapons, or Non-Proliferation Treaty

NSG – Nuclear Suppliers' Group

NWS – Nuclear-weapons state(s), as designated by the NPT

NNWS – Non-nuclear weapons state(s)

PBMR – Pebble-bed modular reactor

PNE – Peaceful Nuclear Explosion

PTBT – Partial Test Ban Treaty

SAFCEI – South African Faith Communities Environmental Institute

TPNW – Treaty on the Prohibition of Nuclear Weapons

TRC – Truth and Reconciliation Commission (South Africa)

UDF – United Democratic Front

UNSC – UN Security Council

Introduction

> Indeed, the legacies of the bomb—in terms of our global order, our political and scientific institutions, our democratic process, our notions of ecological and biological integrity—amount to a fundamental mutation in American life.
>
> — Joseph Masco, *The Nuclear Borderlands*[1]

The kernel of provocation that would eventually develop into this thesis was planted during my MA studies in 2017. Though I had nurtured a general interest in nuclear weapons since childhood (the classic BBC documentary film Threads having played no small part in this), not until my postgraduate training in the Department of International Politics at Aberystwyth University did I begin to seriously specialize in the topic, primarily through the lens of critical International Relations (IR) theory. Indulging in the kind of undirected reading that most career academics will recognize as a luxury, I came across the rich extra-disciplinary literature on nuclear technology: cultural histories, anthropological studies, critical geographies, and ethnographies. Alongside the work of Gabrielle Hecht, which serves as a conceptual cornerstone to this thesis, the book by which I found myself the most gripped was Joseph Masco's ground-breaking ethnography of Los Alamos National Laboratory and its New Mexico surrounds: *The Nuclear Borderlands*. It is a wide-ranging work, rich in theoretical experimentation, woven through with metaphors of mutant ants and the spectre of the 'nuclear uncanny'. However, my attention was drawn to another aspect of Masco's narrative. Despite *The Nuclear Borderlands*' major focus being on a specific and delineated geographic area, and largely concerned with the 'local' effects of the 'global' Cold War and nuclear standoff coming home to roost in the desert of New Mexico, elements of Masco's work are a study in (decapitalized) international relations. It discusses how the Cold War and its attendant nuclear order continue to participate in the making and unmaking of nationhood in the United States. It is a study on how the relations *between nations*—Pueblos, Nuevomexicanos, and the US government itself—are structured by local and global nuclear traditions. Perhaps most fundamentally, it is a study of *world* politics, including of how some worlds have already been ended by the bomb.

Working as I was within the confines of disciplinary IR—if somewhat more towards the margins than many colleagues in the sub-field of nuclear politics—Masco's work above others stood out to me as one that surely must be of 'international' significance. Why, I wondered, had IR scholars not attempted to synthesize a framework within the discipline that was capable of incorporating the

[1] Joseph Masco, *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton University Press, 2006), 27.

kind of 'multidimensional, nonlinear, complex' analysis undertaken in *The Nuclear Borderlands*? Although I failed to grasp it at the time, Masco himself gestures towards an answer at the very beginning of his book. Like the Los Alamos scientist who expects the author to 'model' New Mexico's nuclear complex, the social-scientific metatheories of disciplinary IR encourage scholars to find an 'equation-of state that could transform the intensity of local political processes into something predictable and manageable for the laboratory'.[2] This imperative bears down on even those working in more critical strands of IR, and I quickly shelved my initial plan (practically unworkable in hindsight) to bridge the gaps in nuclear scholarship between IR, STS, and anthropology. Understanding the likely nature of the trade-off between fine-grained, textured local analysis and 'macro-level' theorizing, I nevertheless was determined to demonstrate that extra- and interdisciplinary insights on the nuclear 'local' should be of interest to IR scholars. I was convinced that the stories told by Masco, Gusterson,[3] Hecht,[4] and others had something to tell us about world nuclear politics—about 'global nuclear order'. Although I have in this instance chosen to throw my lot in with IR—recognizing value and untapped potential in the under-investigated concept of global nuclear order—these fascinating studies have helped to guide this research in spirit if not always in content. Therefore, while the project I pursue here is very different in both content and scope to Masco's analysis, the central aim of recovering the 'local' in 'global' nuclear politics is true to the spirit of such critical ethnographic and historical studies. This impulse is the conceptual driver of thesis, and it leads to some challenging ontological questions regarding the status of 'levels of analysis' in IR and in world nuclear politics specifically.

A deeper engagement with the literature on global nuclear order, including with its theoretical origins in English School theory (see the subsequent chapter for a full conceptual discussion) revealed that my instinct regarding the missing 'local' in global nuclear order was correct. Although William Walker and Hedley Bull respectively both pay lip service to the importance of 'local' (or variously 'sub-state', 'regional', 'intra-national', and so on) histories and processes in projects of international ordering, neither is particularly inclined to expand on them—or even precisely how they fit into their broader macro-level theories.[5] However, even a cursory glance at the minutes of International Atomic Energy Agency (IAEA) Board meetings for instance will reveal to the casual reader the sheer complexity of national and 'local' interests at play. The institutional density of the

[2] Masco, *The Nuclear Borderlands*, 37.
[3] Hugh Gusterson, *Nuclear Rites: A Weapons Laboratory at the End of the Cold War* (University of California Press, 1996).
[4] Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (MIT Press, 2012).
[5] William Walker, *A Perpetual Menace: Nuclear Weapons and International Order* (London: Routledge, 2011); Hedley Bull, *The Anarchical Society: A Study of Order in World Politics* (Basingstoke: Palgrave Macmillan, 2012).

global nuclear order itself, with regional and sub-regional agreements, bilateral and trilateral and multilateral instruments, and transnational advocacy and activism networks which attempt to address and regulate myriad 'local' processes, also points to a complex and messy assemblage wherein 'local' and 'global' imperatives collide and interact. If global nuclear ordering were purely an *inter-national* endeavour, with its institutions and common norms arising only from structural dynamics prevailing between a collection of state-units, we might not expect to see such a complicated picture: Waltz's vision of a structurally-balanced world of many nuclear-armed states is perhaps a more straightforward one, if a great deal more dangerous.[6] As things stand, however, it is readily apparent that historic, social, and political specificities within states can comingle with nuclear technology in a multitude of ways. It would be simple enough to stop here: either recognizing this as a vague truism of world politics that is nonetheless too empirically cluttered to make sense of and moving on to a suitably 'zoomed-out' IR analysis, or conversely to 'zoom in' and embark on a granular ethnographic analysis of a particular locale—abandoning ambitions to make a substantive intervention into the question of global nuclear order itself. In this thesis, I try to eschew both of these opposed alternatives. I adopt South Africa as a case study which demonstrates fascinating patterns of interaction between its own local dynamics and the nuclear, while continuing to make an outsized contribution (for a relatively small, Southern state) to the project of a multilateral global nuclear order.

South Africa, it is routinely asserted, is 'unique' within the global nuclear order. This putative uniqueness is usually attributed to Pretoria's voluntary dismantling of the modest nuclear weapons capacity that it acquired during the latter years of apartheid,[7] which in turn has permitted South Africa to carve out a special diplomatic 'niche'[8] as a 'poster child'[9] of multilateral non-proliferation and disarmament practice, as well as being unique on the southern African subcontinent in terms of its level of nuclear technological advancement. Some historians and veterans of the nuclear weapons programme have additionally been keen to highlight the apparently unique achievement of the weapons programme, which was conducted in a context of progressively increasing international

[6] Kenneth N. Waltz, 'The Spread of Nuclear Weapons: More May Be Better', *The Adelphi Papers* 21, no. 171 (1 September 1981).
[7] Waldo Stumpf, 'Birth and Death of the South African Nuclear Weapons Program' (50 Years After Hiroshima, Castiglioncello, Italy, 28 October 1995).
[8] Jo-Ansie van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency', *South African Journal of International Affairs* 19, no. 2 (1 August 2012): 179–200.
[9] SAIIA, 'Nuclear Energy in South Africa', South African Institute of International Affairs, 23 March 2021, https://saiia.org.za/research/nuclear-energy-in-south-africa/.

isolation and a slew of sanctions on important technologies.[10] As will quickly become apparent, many of these claims to 'uniqueness' are the product of myth-making on the part of various South African political elites, often in concert with the global nuclear order itself. It is nonetheless undeniable that South Africa has played a pivotal role in the development of the global nuclear order, from the inception of the IAEA, via the crucial event horizon of the 1995 NPT Review Conference, to the present-day efforts surrounding the Humanitarian Initiative and the 2017 TPNW or 'Ban Treaty'. It might appear self-evident that South Africa's ability and inclination to make such an impression on the institutions of global nuclear order have been conditioned by specific 'local' histories: of opposing nationalisms, settlement and colonization, oppression, struggle, and liberation. However, few analysts have attempted to trace these interactions.[11] Fewer still—if any—have addressed or even explicitly acknowledged the converse possibility that the global nuclear order might act on South Africa itself, feeding back into these local specificities. There is also an almost complete lack of studies which draw links between South Africa's post-apartheid civil nuclear complex and the apartheid-era weapons programme. As I will show, the two cannot be meaningfully separated, but the continuities and similarities between the two are obscured by the technopolitics of the global nuclear order.

These interactions between local nuclear (techno)politics and global nuclear order are not in fact 'unique' to South Africa; as Itty Abraham has shown, for instance, the politics of global nuclear order can be found in otherwise unlikely nuclear locales, and an analysis of this kind could be applied to any country which has had even the most tangential relationship with the global nuclear order.[12] The factors that make South Africa an attractive case study include the sheer density and shifting nature of this relationship during the past five decades, alongside the highly visible imbrication of nuclear politics with questions of colonization, liberation, and democratic transition. Indeed, the triumphalist narratives of South African 'uniqueness' and progressive exceptionalism within the global nuclear order are of great interest in and of themselves. There is, ironically, something unique about such stories: the legitimizing power and triumphant narrative of liberal progress offered by the South African nuclear experience is valuable to the ongoing project of global nuclear order to an unparalleled extent.

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[10] Richardt van der Walt, Hannes Steyn, and Jan Van Loggerenberg, *Armament and Disarmament: South Africa's Nuclear Experience* (New York: iUniverse, 2005); Nic von Wielligh and Lydia von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program* (Pretoria: Litera, 2015).

[11] With welcome exceptions, such as Gabrielle Hecht, 'Negotiating Global Nuclearities: Apartheid, Decolonization, and the Cold War in the Making of the IAEA', *Osiris* 21, no. 1 (1 January 2006): 25–48.

[12] Itty Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1', *Critical Studies on Security* 4, no. 1 (2016): 24–41.

Research questions

In the interests of organizing a potentially sprawling project, I have formulated two central research questions. They are as follows:

- How have distinctly 'local' social and political factors within South Africa contributed to processes of global nuclear ordering?
- Conversely, how has the global nuclear order informed 'local' social and political dynamics within South Africa?

These questions structure the empirical enquiry of the thesis, and are addressed in tandem throughout each chapter. Assuming that it is possible to identify such interactions, two sub-questions regarding their significance arise.

- What are the implications of such interactions for our understandings of the concept of 'global nuclear order', how it is constituted, and how it operates?
- What are the implications of such interactions for our understanding of South Africa's own nuclear history?

With these questions guiding the research, I turn now to a literature review. Detailed excavations of the core concepts at the heart of this work—global nuclear order, technopolitics, and nuclearity—are provided in the subsequent chapter. In addition, the thesis is empirically driven with any conceptual insights deriving in an inductive manner from the empirical work, and so the literature review is organized primarily around existing empirical research. More conceptual works are of course touched upon, particularly those concerned with the interaction of 'local' and 'global' in nuclear order, but I locate this thesis firmly within the literature concerned with South Africa, nuclear politics, and nuclear technology, of which there is a wealth. There are, however, sizeable gaps to be found—particularly in regard to wide-ranging studies on South Africa's broader relationship with the global nuclear order, as well as critical interventions on South African nuclear politics. This thesis aims to fill both niches.

Structure of the thesis

I now begin the thesis with two introductory chapters: a literature review, followed by a detailed exposition of my theoretical and conceptual framework. I then progress to four empirical chapters, which are arranged—in the absence of a more appropriate ordering device—in chronological order. Each one taken in isolation serves as a response or corrective to conventional academic understandings of a given episode in South Africa's nuclear history and interaction with the global

nuclear order; together, the four of them constitute a coherent counter-history of South Africa in the global nuclear order.

Chapter 1 examines the history of the apartheid nuclear programme, and how the technopolitics of Afrikaner nationalism dovetailed with the imperatives of global nuclear order to generate the enduring myth of an 'indigenous' bomb. The idea that the apartheid South African nuclear weapons programme was purely a feat of Afrikaner ingenuity, conducted in isolation from the rest of the world and the global nuclear order, was an important technopolitical myth for the regime—and in hindsight, an obvious fiction. However, nuclear ordering imperatives for the US and Western Allies—who were deeply implicated in assisting the apartheid bomb—motivated much wider acceptance of this myth, ultimately helping to embed this peculiar element of Afrikaner-nationalist technopolitics into the narratives of nuclear order. Though it is demonstrably false, the 'isolation narrative' and the spectre of the indigenous bomb have functioned to ensure that the South African episode is not understood as a case of 'proliferation' abetted by the US and its allies. Chapter 2 revisits the African National Congress (ANC)'s transnational campaign against the apartheid bomb, interpreting it as a process through which the ANC forged a commitment to the developing hegemony of nuclear order and the non-proliferation agenda. While others have written about this campaign, they typically miss its significance as an episode of nuclear ordering on the part of the ANC. I argue that this campaign served as the crucible in which the ANC forged its commitment to the non-proliferation agenda, despite the South African case offering many avenues of fundamental criticism against the prevailing make-up of the global nuclear order. While some have understood the ANC as having been long-standing critics of the NPT, in this chapter I draw on archival material and conceptual work to show that they have long been staunch non-proliferation advocates. Chapter 3 deals with South Africa's disarmament, transition from apartheid, and the ANC's crucially redemptive intervention at the 1995 NPT Review Conference. Complex processes were at play during the period between 1989 and 1995 in South Africa, and in this chapter I focus on the ways in which accession to the global nuclear order served to (partially) reconcile the competing technopolitical regimes of the ANC and the outgoing apartheid government. On accession, the ANC imported a universalist yet parochial 'anti-technopolitics' from the global nuclear order, and outsourced difficult questions of 'local' nuclear ambivalence to the 'global' level. However, this process remained incomplete. Finally, Chapter 4 examines the technopolitical debris of apartheid that persists through South Africa's remaining nuclear infrastructure, the punctured boundary between 'civil' and 'military' nuclear technology, and how this interacts with the ANC's activist diplomacy around non-proliferation and disarmament. I conclude that despite the ANC's continued 'activist' line in nuclear diplomacy, South Africa retains a significant stake in global nuclear business-as-usual—in no small part because of apartheid

diplomats' technopolitical manoeuvrings during the formative years of the IAEA and nuclear order. The elevated status afforded by South Africa's 'enhanced' civil nuclearity is a product of the prevailing configuration of nuclear order, giving Pretoria a vested interest in the present ordering principles of non-proliferation, reformist multilateralism, and 'Atoms for Peace'.

Literature review

This literature review proceeds in the following stages. The first and most important section is comprised of the literature on South Africa in world nuclear politics: spanning histories and studies of the apartheid bomb, the ANC's historic opposition to nuclear weapons, the decision to disarm, and post-1994 multilateral non-proliferation and disarmament practice. Other empirically important interventions under this category come from anti-nuclear activists, which are also surveyed, and some of whom were also interviewed for this project. The second important literature to be consulted is that concerned with 'local/global' interactions in nuclear politics—a relatively small literature, and one where the specific nature of interaction is often implicit rather than the central object of study. This extends to the critical, extra-disciplinary works mentioned in the introduction, wherein questions of international relations and global order are touched upon in studies primarily located within anthropology, STS, critical geography, and history. Finally, there is an important body of empirical work concerning the operation of technopolitics in South Africa.

South Africa in world nuclear politics: histories, testimonies, and analysis

As one might expect, given the many headline moments in South Africa's nuclear history, this is probably the richest literature surveyed here—at least in terms of sheer density. The thesis is partly a contribution to this literature, though as noted above, also aims to go beyond it. One of the most abundant subsets of work on the apartheid weapons programme is that of historical accounts, gleaned from the limited available primary sources, which began to proliferate shortly after the programme's existence and dismantling was publicly announced by de Klerk in 1993. The first overarching chronology of the programme is provided by Masiza.[13] This concise piece offers a useful overview of South Africa's nuclear experience from 1944 (which saw the discovery of extensive uranium ore deposits) to 1993, marking key dates including the formation of the Atomic Energy Board, the construction of the Pelindaba laboratories and Koeberg power station, the commencement of domestic uranium enrichment, and the decision to initiate a military nuclear programme, which Masiza dates at 1975. While short, the chronology displays an impressive level of technical detail and documents a number of instances of technical co-operation, 'civil' and 'military' alike, between South Africa and Israel, France, and the United States, and remains an important touchstone for any investigation into nuclear South Africa.

[13] Zondi Masiza, 'A Chronology of South Africa's Nuclear Program', *The Nonproliferation Review* 1, no. 1 (September 1993): 34–53.

Other non-proliferation experts, usually US-based, soon began to fill in the narrative gaps. The questions usually asked in the immediate post-disarmament years tended to regard the prospects for future South African nuclearization, the dangers of proliferation that might stem from the shuttered weapons programme and its erstwhile employees, and its underlying proliferation drivers. Such questions were of immediate concern to the US policy establishment and broader non-proliferation community. Albright and Hibbs explore the possibilities of political transition and the options available to the ANC in dealing with their inherited nuclear legacy, in a piece also reliant on publicly available sources.[14] They warn that while on the strength of its political pronouncements, the ANC is unlikely to continue the pursuit of any clandestine nuclear activities, a full accounting of the apartheid regime's activities is necessary for 'the development of a stable political democracy in South Africa'.[15] Although the new government pointedly rejected nuclear weapons, this ominous warning was perhaps not entirely unjustified given the programme's highly ambivalent legacies, which this project explores. In a longer article benefiting from more empirical information, Albright consults a combination of on- and off-the-record sources to elucidate South Africa's nuclear strategy.[16] All of them claim that the apartheid government never seriously planned to use nuclear weapons in anger, but that the bomb—as well as the carefully-curated stance of nuclear ambiguity—was a response to South Africa's international isolation, 'a political bluff intended to blackmail the United States or other Western powers into coming to South Africa's assistance' should it come under serious territorial threat from Soviet-backed or otherwise hostile forces to the north.[17] Albright provides further technical details of the programme, writing in more depth about the enrichment processes pursued at Pelindaba's Y-Plant, and even the physical layout of the Kentron Circle facility where nuclear weapons were manufactured after the Armaments Corporation of South Africa (Armscor), the procurement wing of the South African Defence Forces, took over the project. The sheer level of technical detail Albright offers makes this piece one of the more valuable early expositions of the inner workings of the project, short of the memoirs and accounts of those directly involved.

However, there is an additional intriguing dimension to Albright's piece, of particular relevance to this research. Perhaps because at the time of publication the transfer of power to the ANC was not yet complete, and the orthodox narrative which linked South African disarmament, the liberation

[14] David Albright and Mark Hibbs, 'South Africa: The ANC and the Atom Bomb', *Bulletin of the Atomic Scientists* 49, no. 3 (1 April 1993): 32–37.
[15] Albright and Hibbs, 'South Africa', 37.
[16] David Albright, 'South Africa and the Affordable Bomb', *Bulletin of the Atomic Scientists* 50, no. 4 (1994): 37–47.
[17] Albright, 'South Africa and the Affordable Bomb', 38.

struggle, and the 'Rainbow Nation' had yet to congeal, Albright notes that 'a few isolated individuals within the ANC have voiced support for nuclear weapons', and '[o]thers have complained about giving them up'.[18] Furthermore, he points to concerns on the part of apartheid-era officials that 'the ANC [would] learn too much about operating a nuclear weapon program' in the event of an official investigation, and also that 'several of these officials [would] continue to play important roles in implementing non-proliferation policies'.[19] While these are simple asides, unreferenced and presumably the product of off-the-record conversations, they offer important glimpses into the technopolitical contestations surrounding political transition and nuclear power that most later studies do not. While I encountered similar anecdotes during the course of documentary and interview research, few if any of these 'isolated officials' appear, frustratingly, to have codified their concerns. Over time, many similar pieces to Albright's emerged in a collective effort to chart the scope of South Africa's nuclear weapons programme and any associated proliferation risks; much of this information is condensed into Albright and Stricker's comprehensive book summarising the programme, its history, and its demise, with the general aim of marshalling as much information on the project as possible to inform non-proliferation policy, particularly from a US perspective.[20] Thus, as the principal details were confirmed and catalogued, scholars of IR and its attendant sub-disciplines rushed to make sense of the international significance of this apparently unprecedented story. Significant with regard to the question of the 'local' in world nuclear politics are those attempting to 'model' the factors involved in (non-) proliferation decisions based on the South African case.

Most famously Scott D. Sagan questioned the explanation, which had begun to approach the status of received wisdom, that disarmament had simply been a response to the radical change in the sub-Saharan security environment following the collapse of communism.[21] This structural-realist explanation was especially popular among the outgoing South African establishment, attributing as it did nuclearization decisions almost exclusively to external pressures and thus somewhat lightening the burden of responsibility. Unsurprisingly, this rationale appears often in the memoirs of former

[18] Albright, 'South Africa and the Affordable Bomb', 47.
[19] Albright, 'South Africa and the Affordable Bomb', 47.
[20] David Albright and Andrea Stricker, *Revisiting South Africa's Nuclear Weapons Programme: Its History, Dismantlement, and Lessons for Today* (Washington, DC: Institute for Science and International Security, 2016).
[21] Scott D. Sagan, 'Why Do States Build Nuclear Weapons?: Three Models in Search of a Bomb', *International Security* 21, no. 3 (1996): 54–86; cf. Darryl Howlett and John Simpson, 'Nuclearisation and Denuclearisation in South Africa', *Survival* 35, no. 3 (1 September 1993): 154–73; J.W. de Villiers, Roger Jardine, and Mitchell Reiss, 'Why South Africa Gave Up the Bomb', *Foreign Affairs* 72, no. 5 (1993): 98–109; Frank V. Pabian, 'South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy', *The Nonproliferation Review* 3, no. 1 (1 December 1995): 1–19.

programme staff.[22] Sagan complicates this account by noting that South Africa's initial research into so-called Peaceful Nuclear Explosions (PNEs) began as early as 1971, three years before the collapse of the Portuguese Empire left a power vacuum in Angola which invited the intervention of Soviet-backed Cuban troops. This, combined with the SADF's scepticism regarding the utility of nuclear weapons in the resultant border wars, suggests to Sagan that the programme was not entirely about 'deterrence' in the first place. Instead, he suggests that domestic politics had a decisive role, with the original PNE programme designed to bolster South African techno-scientific standing on the international stage and with weapons as a secondary, post-hoc development.[23] F.W. de Klerk also initiated investigations into disarmament 'before the Cold War was unambiguously over' in 1989.[24] Under this model, Sagan suggests that the perennial 'fear of a black bomb' may have been the primary motivator for disarmament. He concludes by advocating for an openness towards multi-causal analyses, and for considering a combination of security, domestic, and normative factors when analysing proliferation.

Sagan's argument was credible and introduced a welcome counterpoint to what threatened to become a rather one-dimensional discussion. Liberman further develops this line of argument by emphasizing the role of organizational politics in pushing Pretoria to nuclearize, but also argues that the decision to denuclearize runs counter to a conventional organizational politics explanation—especially given the large amounts of money and personnel invested in the programme by the late 1980s.[25] For Liberman, the most satisfactory account is that de Klerk and the liberalizing coalitions surrounding him aimed to ease South Africa's international isolation by demonstrating a willingness to comply with the non-proliferation agenda.[26] Additionally, and with interesting implications for this project, de Klerk himself has testified that he saw NPT co-operation as a way to further his domestic agenda; specifically, the securing of continued white minority property rights once the ANC took power: 'The ANC must somehow or another be moved to the position where they were really negotiating in the true sense of the word […] For that I needed to have credibility outside South Africa that I mean what I say, I have a good cause, and I wanted support for my way of doing things'.[27] It becomes ever more apparent that the forces at work around the apartheid bomb were at once domestic and international—or perhaps 'local' and 'global'—and every closer examination

[22] Stumpf, 'Birth and Death of the South African Nuclear Weapons Program'; van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*; von Wielligh and von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program*.
[23] Sagan, 'Why Do States Build Nuclear Weapons?', 69–70.
[24] Sagan, 'Why Do States Build Nuclear Weapons?', 71.
[25] Peter Liberman, 'The Rise and Fall of the South African Bomb', *International Security* 26, no. 2 (1 October 2001): 45–86.
[26] See also the work of Etel Solingen, discussed in more detail below.
[27] Quoted in Liberman, 'The Rise and Fall of the South African Bomb', 80.

makes their interactions more difficult to disentangle. Purkitt and Burgess, authors of a comprehensively-researched book on South Africa's nuclear, biological, and chemical weapons, further complexify matters by pointing out that omissions in Liberman's analysis lead 'to a portrait of South Africa as a seemingly ordinary state, rather than the minority-ruled, security-obsessed regime that darkened the international stage for four decades'.[28] They argue that Liberman neglects to adequately account for the 'political psychology' of the minority regime:

> Apartheid leaders made little distinction between the domestic threat posed by the ANC and its sympathizers, the presence of socialist regimes in the region, and the influence of the Soviet Union; in addition, they viewed them all as part of a threatened Soviet-orchestrated takeover. Thus South African leaders resembled their counterparts in the Middle East and Asia in terms of their level of fear, reliance on nationalism, and desire for secrecy.[29]

This is a crucial point and a necessary prelude to the following section. Pretoria's fear of 'total onslaught' and, subsequently, South Africa's nuclear programme must be understood through the prism of its complex history and highly contested articulations of nationhood, *as well as* continuing interactions with the global nuclear order. As the 1990s progressed and more information about the nuclear programme was uncovered, historical accounts grew in their scope and detail. As one might expect, the availability of new, reliable information remains inconsistent; many of the unofficial journalistic accounts whose blurbs hint at tantalizing details are out of print and elusive. Cervenka and Rogers' exposé of alleged technology transfer between West Germany and South Africa, *The Nuclear Axis*, is a landmark here.[30] Based on documents obtained by ANC personnel from South Africa's West German embassy, apparently misplaced during a premises move, this activist tome added weight to existing beliefs that the two states had co-operated on nuclear matters, the most obvious suggestion being the similarities between South Africa's ostensibly indigenous 'Helikon' uranium enrichment process and the 'jet nozzle' process pioneered by E.W. Becker's team at Karlsruhe. Their outlandish claim that West Germany might be seeking to physically obtain nuclear warheads from South Africa, however, proved to be misguided. While their book is not of primary significance to this project (in which I am not interested in re-treading the well-worn path of charting South Africa's nuclear history from the limited available documentation), it was an important milestone for activists seeking to highlight international complicity with South African state power

[28] Helen E Purkitt and Stephen F Burgess, 'Correspondence: South Africa's Nuclear Decisions', *International Security* 27, no. 1 (2002): 186.
[29] Purkitt and Burgess, 'Correspondence: South Africa's Nuclear Decisions', 189.
[30] Zdenek Červenka and Barbara Rogers, *Nuclear Axis: Secret Collaboration between West Germany and South Africa* (London: Julian Friedmann, 1978).

and, by extension, apartheid.[31] Similarly, Walters' book on South Africa's nuclear weapons is an important contemporary analysis which points the finger of responsibility for the apartheid bomb squarely at the United States and its collaboration with Pretoria, in favour of perceived strategic interests.[32]

There additionally exist a number of primary, yet still unofficial, accounts of all aspects of the weapons programme, authored by former scientists and officials who enjoyed varying degrees of closeness and access to its internal workings, which are perhaps of greater empirical interest. These accounts are somewhat inconsistent in quality and levels of detail, which is likely attributable (at least in part) to the aforementioned secrecy laws and self-censorship to which the authors have been subject. Likewise, their reliability should be critically evaluated. While I do not claim to divine the authors' intentions in writing their memoirs in the way that they did, secrecy oaths and the subjective nature of recollections must be borne in mind. In addition, incentives do exist for former nuclear programme staff to downplay or omit certain unflattering details, arising from reputational imperatives, self-censorship, Nonetheless, the value of these accounts is twofold: they add context and provide reasonably authoritative counter-narratives to some of the accepted wisdom about the apartheid bomb, and—most importantly—they betray traces of the technopolitical ideologies and discourses which supported, and were engendered by, the weapons programme. The two most comprehensive accounts produced by those closest to the programme are van der Walt et al.'s *Armament and Disarmament* and von Wielligh's *The Bomb.* Despite the range of material presumably at their disposal, van der Walt et al.'s book comes in at a concise 160 pages. The preface explains that the authors (all three of whom participated in the programme within one of its three protagonist organizations: the Atomic Energy Corporation, the South African Air Force, and Armscor) do not intend to catalogue the weapons programme in 'minute historical detail', as useful as this would be for researchers. Instead, it is intended as a rebuke to 'those who want to present the history of this Program [*sic*] in a more unfavourable light than it deserves', drawing particular attention to the Southern African security environment and broader global context which they argue were the primary drivers behind Pretoria's nuclearization efforts.[33] *Armament and Disarmament* is not a technical manual of Afrikaner nuclear science, and as such does not offer the source material required for the kind of micro-analysis of individual technological choices on which Hecht, for

[31] Paul N. Edwards and Gabrielle Hecht, 'History and the Technopolitics of Identity: The Case of Apartheid South Africa', *Journal of Southern African Studies* 36, no. 3 (1 September 2010): 619–39. See below for a deeper discussion of this piece.
[32] Ronald W. Walters, *South Africa and the Bomb: Responsibility and Deterrence* (Lexington: Lexington Books, 1987); this argument is well-supported by Or Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals* (Oxford: Oxford University Press, 2014).
[33] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, xiii.

example, bases *The Radiance of France*.[34] However, despite repeated claims to neutrality and appeals to 'the facts', it is difficult to read this book as anything short of an effort to rehabilitate the apartheid bomb, explicitly intended to dispel the atmosphere of suspicion created by the South African government's reticence to declassify relevant documents.

Accordingly, the technical and narrative information offered here is sparser than might be expected of three officials who occupied the highest echelons of South Africa's military-industrial complex. They provide overviews of the structure and daily operations of the programme's pillars: namely the SADF, the civil nuclear industry, and the arms industry, supplemented by the authors' subjective musings on deterrence theory and interesting but often throwaway personal anecdotes. The self-censorship posited by Harris et al. is clearly at work, always bubbling just below the surface.[35] Much, although not all, of the historical information presented is a matter of public record. However, the book does contain some important insights; more context is provided surrounding Pretoria's nuclear doctrine and strategy, and the authors explain the decision to develop medium-range ballistic missiles (an odd choice, some might argue, for a purely 'political' bomb) as a necessary component of a credible 'deterrent'.[36] They are also, like von Wielligh, at pains to deny that the 1979 'Vela Incident' had anything to do with South Africa and that any collaboration with Israel had been strictly 'non-nuclear'; although we know the boundaries of nuclearity are flexible and negotiable, the latter claim is at the very least highly contestable given the evidence presented in Polakow-Suransky's *The Unspoken Alliance.*[37]

Van der Walt et al.'s continued adherence to the narrative that South Africa's bomb was completely indigenous in every meaningful sense may simply reflect their genuine beliefs; however, combined with the defensive tenor of their book it suggests the existence of a powerful technopolitical ideology at play, one by which former technicians and officials remain honour-bound to the present day. Periodic references to the 'Defence Family' (as opposed to Defence Force) are just one of the many unsubtle indicators of this. The final two chapters, 'Post Mortem' and 'Spirit and Awareness' give the most vibrant impressions of this ideology at work. On one hand, the Afrikaner nationalist project of technological excellence is reaffirmed by repeated assurances that the weapons programme was a shining beacon of safety, professionalism, and restraint, with technicians often

[34] Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge: MIT Press, 2009).
[35] Verne Harris, Sello Hatang, and Peter Liberman, 'Unveiling South Africa's Nuclear Past', *Journal of Southern African Studies* 30, no. 3 (2004): 457–75.
[36] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, 13–15.
[37] Sasha Polakow-Suransky, *The Unspoken Alliance: Israel's Secret Relationship with Apartheid South Africa* (New York: Pantheon, 2009).

warning political leaders of the grave consequences of nuclear use, in a manner reminiscent of their Manhattan Project forerunners. The authors (along with fellow scientist Gideon de Wet, who provides a foreword), while acknowledging that disarmament was the correct course of action, lament the loss of South Africa's nascent space rocketry programme, its leading-edge advantages in ballistics and arms exports, and its overall reversion to the status of a 'technological colony'.[38] Their prediction that the new South Africa 'will take a global demonstrative lead in nuclear weapons',[39] despite no longer holding them, gestures to the contemporary nuclear paradox facing the ANC. On the other hand, while expressing considerable pride in the ingenuity of South Africans, the authors are also simultaneously determined to downplay the central role of Afrikaners in the programme. They persistently direct attention away from domestic concerns and decision-making processes, placing the blame squarely on the fragile geopolitics of Southern Africa and the sanctions regime enforced by Western powers and the UN. Apartheid is an ever-present elephant in the room. They reject as 'offensive' the claim that the project was an Afrikaner endeavour, claiming that 90% of the documentation generated was in English and that such an accusation 'would be an unfair diminution of the role played by people of non-Afrikaner descent'.[40] 'Post Mortem' closes with the following declaration, which encapsulates the authors' aim to elide the history of apartheid and integrate South Africa's nuclear history into the project of the 'Rainbow Nation':

> South African leaders should take courage: Most of these white South Africans […] who led the intrepid adventures against the British, the Soviets and the Cubans are still around. They are still committed, they are real Africans with no racial axe to grind and they are ready to help. South African leaders do not have to take their eyes off the target in front of them; they do not have to turn around to check on the ones behind them.[41]

Armament and Disarmament, through the conceptual lens of this project, is an extraordinary read and an artefact of great analytical value, regarding both apartheid South Africa's technopolitics and its nuclear relations with the wider world. I will return to this book as a useful primary source in the first chapter. It is not, however, a reliable historical account of the weapons programme, nor a comprehensive study of its inner bureaucratic workings.

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[38] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, 111; see also G. de Wet, 'Emerging from the Technology Colony: A View from the South' (PICMET '99: Portland International Conference on Management of Engineering and Technology. Proceedings Vol-1: Book of Summaries (IEEE Cat. No.99CH36310), Portland, Oregon, 1999).
[39] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, 113.
[40] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, 117.
[41] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, 112.

Von Wielligh's *The Bomb* is, in some respects, a different animal. It strives for a greater level of detail than *Armament and Disarmament* and nuclear physicist von Wielligh seems keen to pitch his work more squarely toward an academic audience. Like its forerunner, *The Bomb* fills many pages by recounting well-known elements of global nuclear history which may always repeating, but ultimately contribute little to the promised new knowledge of South Africa's nuclear journey. Chapters 3-5, however, deliver on this count, perhaps most significantly including original, previously unseen documents obtained by von Wielligh himself, and new information regarding the regime's desire to produce plutonium, lithium, and tritium for fusion weapons. The levels of technical precision and the clarity with which specific meetings and encounters are remembered are remarkable, with the usual caveat that they are subjective recollections. *Arms Control Wonk* notes that *The Bomb* contains several revelatory details 'between the lines' about the dimensions and characteristics of South Africa's nuclear weapons and their delivery systems.[42] Von Wielligh is clearly an authoritative commentator on South African nuclear matters who has maintained his access to South African nuclear affairs into the post-apartheid era, having been involved in the disarmament process and liaising with the IAEA over its verification efforts. For instance, his explanation of the complex, proliferation-related factors which motivated South Africa to destroy most of the documentation related to its nuclear weapons (apparently in full accord with Hans Blix and the IAEA), is a credible caution to researchers to resist the impulse to always impute nefarious intentions to South Africa's disarmament decisions.[43] Overall, the book is of considerable value towards a better understanding of the technical and organizational factors directing the apartheid bomb programme, supplementing the existing archival material and providing a source for a deeper technopolitical analysis than do van der Walt et al.

Once again, the most interesting aspect of *The Bomb* is its apparent nostalgia and traces of a rump Afrikaner technonationalism. It shares with *Armament and Disarmament* the exultations of the professionalism, proficiency, and camaraderie that characterized the nuclear programme in the eyes of those most intimately involved. It is readily apparent that von Wielligh harbours no regrets. He is equally quick to dismiss allegations of South African-Israeli co-operation and, as Rabinowitz points out, ties himself in something of a narrative knot in his eagerness to explain away the Vela Incident.[44] However, he often comes across as a more credible narrator than other contemporary observers. His extended account of the procedural and legal wrangling with the IAEA over accession

[42] See Jeffrey Lewis, 'Revisiting South Africa's Bomb', Arms Control Wonk, 12 March 2015, https://www.armscontrolwonk.com/archive/1200544/revisiting-south-africas-bomb/.
[43] von Wielligh and von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program*, 224–25.
[44] Or Rabinowitz, 'Review Essay 29 on The Bomb: South Africa's Nuclear Program', ISSF, 10 May 2016, https://issforum.org/essays/29-the-bomb.

to the NPT and safeguards regimes, coupled with not only Afrikaner but American fears over an ANC government in possession of the bomb, greatly complexifies the celebratory boilerplate which too often characterizes accounts of South Africa's disarmament.[45] He also directly accuses several prominent US non-proliferation analysts—including David Albright, Frank Pabian, and Mark Hibbs—of being in the pay of the CIA, publishing articles containing highly restricted and otherwise inaccessible information (see Albright's piece discussed above) in order to 'fly kites' and gauge South African responses to intelligence leaks.[46] *The Bomb* thus merits close attention: while a technopolitical agenda is clearly detectable and of great interest here, dovetailing as it does with the attitudes betrayed by van der Walt et al., the comprehensive nature of von Wielligh's account does also, at times, produce challenges to the accepted wisdoms surrounding South Africa's bomb.

These two books form the backbone of the first-hand literature on the weapons programme thanks to both their technical detail and insights into the technopolitical attitudes and discourses prevalent within that expert community. There are other primary accounts available, although they are mostly of more limited or specialist use. Waldo Stumpf's account is an oft-cited official chronology of the programme, tacking closely to the conventional narrative of progress and reconciliation preferred by the new ANC-led administration.[47] Stumpf, now a professor of metallurgy at the University of Pretoria, retained his post as head of the AEC into the post-apartheid era, and unsurprisingly declines to make any explosive revelations. Of greater interest for my purposes are the various writings and reports produced by former officials which do not directly pertain to their experiences in the programme; for instance Andre Buys, in a report supported by the Ploughshares Fund, meticulously tracks and catalogues the destinations of former weapons scientists after the close of the nuclear programme, for the purposes of assessing remaining proliferation risks.[48] His close statistical analysis leads to several nuanced conclusions about the nature of skills and innovation in post-apartheid South Africa and finds little cause for concern regarding proliferation, but interestingly confirms Harris et al.'s suggestion that, despite debriefing efforts, there existed 'a lot of uncertainty and contradictory views about what guidelines on secrecy should be adhered to' by former employees.[49] It also offers insights into the career destinations of and attitudes of these personnel. In particular, a shared concern with South Africa's technological innovation capacity

[45] von Wielligh and von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program*, 207–83.
[46] von Wielligh and von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program*, 244.
[47] Stumpf, 'Birth and Death of the South African Nuclear Weapons Program'.
[48] Andre Buys, 'Proliferation Risk Assessment of Former Nuclear Explosives/Weapons Program Personnel: The South African Case Study' (Pretoria: University of Pretoria, 2007).
[49] Buys, 'Proliferation Risk Assessment of Former Nuclear Explosives/Weapons Program Personnel: The South African Case Study', 47.

appears to have permeated the work of several former employees who have pursued academic and industry careers.

Most of the works discussed above roughly share a common objective, which is to explain, or indeed explain away, the factors that drove apartheid South Africa to obtain a nuclear weapons capability and then dismantle it. Most of them focus heavily on what might crudely be termed 'local' factors—be they domestic security objectives of the regime in Pretoria, techno-nationalist pride on the part of the South African nuclear establishment, or fear of a future ANC government holding the whip hand over their former oppressors using their inherited nuclear bombs. However, it is one thing to ask what the domestic factors influencing the South African nuclear weapons decision were; it is another, altogether bigger question to ask how the South African 'local' has contributed to wider processes of global nuclear ordering, and vice versa. While armament and disarmament are the most obvious means through which South Africa has stamped its influence on the global nuclear order, they represent only a small part of the story.

After the initial post-disarmament flurry of excitement from mainstream non-proliferation analysts died down, global scholarly interest in South Africa as a significant player in the global nuclear order appeared to wane. A small group of researchers primarily based in South Africa has carried the torch in using the country's experiences to interrogate received understandings of world nuclear politics, and it is to their work I now turn. Given the circumstances under which the apartheid bomb was born and the labyrinthine history of South African (de)colonization, it would seem that South Africa is an ideal candidate to have its 'ambivalent nuclear history'[50] more closely examined. The apparent reluctance of most Western academics to take on this task may stem in part from the well-documented difficulties in accessing empirical materials on the subject outside of South Africa.[51] South Africa-based scholars generally offer some of the best available studies which consider the broader global significance of the apartheid bomb, backed up with historical rigour and often painstaking documentary research. Many of these studies have also endeavoured to consider the ongoing significance of both the apartheid bomb and of Pretoria's post-apartheid practice in the various institutions and multilateral fora of the global nuclear order—although there is little direct conceptual engagement with the latter. These analyses, though useful, tend to focus on individual elements of South African civil and military nuclear practice in isolation from each other, and none

[50] Cf. Itty Abraham, 'The Ambivalence of Nuclear Histories', *Osiris* 21, no. 1 (1 January 2006): 49–65.
[51] See for instance Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past'; these difficulties are discussed at greater length in the next chapter.

as yet have constituted an overarching assessment of South Africa's relationship with the global nuclear order such as this thesis aims to provide.

By far the most significant of this work is the impressive cumulative survey of South Africa's nuclear history, largely assembled by Anna-Mart van Wyk and Jo-Ansie van Wyk. This literature is heavily referenced throughout the thesis, and is hugely valuable as both a collection of secondary empirical sources and as analysis in its own right. The former's work has centred primarily on South Africa's nuclear conduct during the 1970s and 1980s, connecting it with the broader 'global Cold War', and it is Anna-Mart van Wyk's work that I review first.[52] For instance, van Wyk explores through archival analysis the ways in which the South African nuclear programme was articulated as an expression of defiance against the NPT— and by extension, thus intimately entangled within the processes of an evolving global nuclear order.[53] Aside from the extremely welcome level of detail on display, one fascinating takeaway from these works is the extent to which Pretoria publicly expressed its objections to the nascent NPT order in terms which were usually the preserve of post-colonial or non-aligned states: 'The apartheid regime in South Africa regarded the NPT as inherently discriminatory and hypocritical; similarly, other post-NPT non-proliferation efforts such as the international safeguards system were regarded as 'a clear infringement of the sovereignty of the non-nuclear states'.[54] It is remarkable that the dissenting narratives, alternative visions of international coexistence, and specifically the postcolonial arguments in favour of nuclear justice generated by the Non-Aligned Movement in the wake of Bandung were available for use by apartheid South Africa. Pretoria which was able to use these ideational resources to object to the non-proliferation agenda in moralistic, even solidarist terms. There are interesting connections here to, for example, Miller's wider study of the apartheid regime's use of postcolonial positioning and rhetoric in its search for survival, which while an excellent work does not address the nuclear question in any great detail.[55] Similarly detailed is van Wyk's study of the role played by the apartheid bomb in the stymying of the Southern African regional liberation struggle.[56] Via a thorough review of diplomatic and other sources, van Wyk details how Pretoria exploited its state of 'nuclear

[52] Odd Arne Westad, *The Global Cold War: Third World Interventions and the Making of Our Times* (Cambridge: Cambridge University Press, 2006).
[53] Martha S. van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980', *Cold War History* 7, no. 2 (1 May 2007): 195–225; van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980'; Anna-Mart van Wyk, 'South African Nuclear Development in the 1970s: A Non-Proliferation Conundrum?', *The International History Review* 40, no. 5 (20 October 2018): 1152–73.
[54] van Wyk, 'South African Nuclear Development in the 1970s', 1168.
[55] Jamie Miller, *An African Volk: The Apartheid Regime and Its Search for Survival* (Oxford: Oxford University Press, 2016).
[56] Anna-Mart van Wyk, 'Apartheid's Bomb and Regional Liberation: Cold War Perspectives', *Journal of Cold War Studies* 21, no. 1 (2019): 151–65.

ambiguity' alongside the US interest in waging the Cold War. She concludes that Washington was happy to turn a blind eye to Pretoria's nuclear activities so long as South Africa remained a bulwark against communism in the region. While this account adds some welcome empirical texture, particularly from the South African perspective, it serves largely to confirm the argument made by Rabinowitz in her study of US Cold War nuclear deals—perhaps an indication, more than anything else, of the relative lack of dialogue between scholars within and outside of the US and Europe.[57]

All of these pieces are revisited in the first empirical chapter, but van Wyk's most valuable contribution to knowledge from the perspective of this project is her study with Michal Onderco—based largely around oral history interviews—of South African behaviour at the 1995 NPT RevCon.[58] This was a pivotal moment in the early development of the unipolar post-Cold War nuclear order, and one in which South Africa—can at least be argued—played a highly significant role in saving the NPT. Though contemporary reports have discussed South Africa's diplomatic role in the conference, Onderco and van Wyk provide the only dedicated, in-depth study, making it an invaluable resource. The piece forms an important part of the foundations of the third chapter of this thesis. The argument that the authors make is somewhat conventional, as the authors simply find that a long-standing ANC opposition to nuclear weapons led, in a linear fashion, to South Africa taking up a unique role as a champion of human-rights based non-proliferation policy after apartheid. On this account, while Pretoria has pivoted towards support for the NPT, its efforts at moderating the worst excesses of inequality 'from the inside' have reaffirmed South Africa's non-aligned credentials and are true to the ANC's heritage of anti-nuclear opposition. As I demonstrate throughout the thesis, a critical reappraisal of ANC/Anti-Apartheid Movement documents in conjunction with conceptual literature significantly complicates this account. In this sense, Onderco and van Wyk's piece suffers from a similar condition to much of this 'second wave' of South African non-proliferation analysis, which tends to hew rather closely to an uncritical and somewhat Panglossian attitude to non-proliferation. This is also true of van Wyk and van Wyk's recent working paper on the ANC's historic relationship to global non-proliferation policy.[59] While a very valuable empirical study indeed, the conventional narrative is adhered to, despite there being scope for a more critical reading. The standard story, repeated here as above, is that the ANC's campaign against the apartheid bomb and its present-day multilateral disarmament activism are connected by a universalist commitment to

[57] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*.
[58] Michal Onderco and Anna-Mart van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', *The Nonproliferation Review* 26, no. 1–2 (2019): 23–41.
[59] Jo-Ansie van Wyk and Anna-Mart van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program', Working Paper, Nuclear Proliferation International History Project (Washington, DC: Woodrow Wilson International Center for Scholars, 2020).

human rights—and that the ANC continues to crusade against inequality in nuclear order. While there are elements of truth to this, it is without doubt a partial narrative at best.

These observations do not devalue Anna-Mart van Wyk's contributions to global nuclear history in the slightest; her interventions are excellent empirical historical studies, and by their own standards do not need to engage with concepts from IR theory to be valuable. Jo-Ansie van Wyk, a frequent collaborator with Anna-Mart, adds some welcome conceptual development to this literature. Her work retains a strong empirical focus, but in many places engages indirectly with the various institutions of global nuclear order and, indeed, South African nuclear technopolitics—though the specific concepts themselves may not be directly addressed. Van Wyk adds to the relatively slim body of South African nuclear history with narrative chronologies covering such specifics as South Africa's relations with the IAEA during the middle Cold War,[60] the ANC's bombing of the Koeberg power plant in 1982,[61] the regional legacies of the apartheid bomb,[62] the evolving role of the SAFARI-1 research reactor,[63] and the genesis of the African nuclear-weapons free zone.[64] These are all relatively niche topics and therefore of considerable academic value in their own right, given that in many cases van Wyk provides the only thorough scholarly treatment of the issue. Van Wyk also considers South Africa's 'civil' nuclear industry—to the extent that separation is possible, given that South African nuclear technology was imbued with martial intent from the start—in conjunction with the more familiar issue of weapons. This is welcome, given that much nuclear weapons scholarship reproduces the 'Atoms for Peace' logic of assuming a clear separation between 'civil' and 'military' applications of nuclear power.[65]

However, van Wyk's work is more useful when considering these apparently disparate elements of the South Africa nuclear complex in a more holistic manner and illuminating the connections between them. The biggest contribution to knowledge here is van Wyk's account of Pretoria's establishment of its own brand of 'niche diplomacy' with regard to nuclear issues in global

[60] Jo-Ansie van Wyk, 'Atoms, Apartheid, and the Agency: South Africa's Relations with the IAEA, 1957–1995', *Cold War History* 15, no. 3 (3 July 2015): 395–416.
[61] Jo-Ansie van Wyk, 'Nuclear Terrorism in Africa: The ANC's Operation Mac and the Attack on the Koeberg Nuclear Power Station in South Africa', *Historia* 60, no. 2 (November 2015): 51–67.
[62] van Wyk, 'Apartheid's Bomb and Regional Liberation: Cold War Perspectives'.
[63] Jo-Ansie van Wyk, 'South Africa's SAFARI: From Nuclear Weapons to Nuclear Medicine', *Africa Insight* 43, no. 2 (2013): 1–13.
[64] Jo-Ansie van Wyk, 'No Nukes in Africa: South Africa, the Denuclearisation of Africa and the Pelindaba Treaty', *Historia* 57, no. 2 (2012): 263–97.
[65] For instance, see Benoît Pelopidas, 'Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies', *Journal of Global Security Studies* 1, no. 4 (1 November 2016): 326–36; Columba Peoples, 'Redemption and Nutopia: The Scope of Nuclear Critique in International Studies', *Millennium* 44, no. 2 (2016): 216–35.

multilateral settings.[66] Adopting a conventionally constructivist IR lens,[67] van Wyk examines South Africa's post-apartheid 'norm entrepreneurship' in its nuclear diplomacy, finding that Pretoria has been able to exploit its ostensibly 'unique' identity and technical expertise gained from its nuclear past. These factors have allowed South Africa to ascend to a number of prominent positions throughout the institutions of the global nuclear order, and as van Wyk notes, this status has served South Africa well both in terms of material gains and national prestige. Overall, this analysis is highly pertinent to the research undertaken here and maps well onto an English School-inflected analysis, as van Wyk charts a balanced line between the structural constraints acting upon South Africa and the opportunities for agency within the order that it is located. Again, however, the piece focuses on only a short chapter in South Africa's nuclear history, and the analysis does not explicitly consider events in the context of global nuclear order—a device which would doubtless have been revealing in this context, as chapter 3 of this thesis demonstrates. Van Wyk does importantly recognize the constructed nature of the narrative of South African 'uniqueness', but the analysis ultimately succumbs to the same congratulatory, even triumphalist tone that appears to haunt much of the literature on nuclear South Africa. While many of the ANC's achievements in multilateral non-proliferation and disarmament are laudable, and Pretoria has doubtless been a savvy actor, the overall story is considerably more ambivalent than van Wyk implies here. South Africa's apparently technocratic approach to nuclear politics masks—as is often the case with technocracy—a rather deeper technopolitical commitment to the precepts of the global nuclear order, including the hierarchical assumptions which underlie it.

Besides van Wyk and van Wyk, a small group of other scholars have engaged substantively with questions surrounding domestic South African dynamics. Robin Möser, associated with the Wilson Center in Washington D.C. (which has been key in the broader South African nuclear history project) has produced an excellent study of how domestic political dynamics—beyond the ubiquitous 'fear of a Black bomb'—influenced the outgoing National Party's accession to the NPT during the late 1980s.[68] Characteristically detailed and rigorous, he shows how the South African government played a 'two-level game'[69] by attempting to demonstrate to relevant domestic constituencies that it was not simply caving to external pressure, aiming to extract commitments from the so-called Front

[66] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'.
[67] see also Jo-Ansie van Wyk et al., 'The International Politics of Nuclear Weapons: A Constructivist Analysis', *Scientia Militaria: South African Journal of Military Studies* 35, no. 1 (2007): 23–45.
[68] Robin Möser, '"The Major Prize": Apartheid South Africa's Accession to the Treaty on the Non-Proliferation of Nuclear Weapons, 1988–91', *The Nonproliferation Review* 26, no. 5–6 (2020): 599–573.
[69] Robert D. Putnam, 'Diplomacy and Domestic Politics: The Logic of Two-Level Games', *International Organization* 42, no. 3 (1988): 427–60.

Line States of Angola, Namibia, Zambia, and Zimbabwe to accede concurrently to the Treaty. Leith and Pretorius argue, against van Wyk's somewhat rose-tinted view of Pretoria's 'niche diplomacy', that South Africa's technocratic 'middle-power' role in foreign policy (and nuclear politics specifically) has in fact drifted away from the interests of non-aligned and developing states. Instead, South Africa's carefully-crafted image of middle-powership and 'bridge building' conceals an agenda that is much closer to that of developed countries and the Western allies[70]—a point made forcefully elsewhere by Ian Taylor.[71] Joelien Pretorius individually provides a number of pieces on South African nuclear diplomacy post-apartheid. She has also written on South Africa's nuclear relationships with fellow non-aligned countries,[72] but most interestingly examines its espousal of a 'politics of denial' with regard to non-proliferation measures—specifically the Additional Protocol to the NPT. The argument here deserves attention, and accordingly I return to it in chapter 4.[73] In brief, Pretorius argues that South Africa has accepted Additional Protocol restrictions itself but opposes them as preconditions for nuclear trade agreements to be imposed on other non-aligned countries as part of a principled stance against unfairness in non-proliferation arrangements. By advocating for the Additional Protocol elsewhere and becoming one of the first states to conclude an AP agreement with the IAEA in 2002, South Africa has demonstrated a commitment to the principle of non-proliferation; by opposing the mandatory acceptance of AP agreements by non-aligned states, it demonstrates solidarity with them and opposition to the hierarchies embedded in the global nuclear order. Pretorius concludes, in a somewhat woolly fashion, that this approach to nuclear diplomacy 'can be placed at that turning point in the dialectic between realism and idealism, where actors design an outcome that they "can live with"'.[74] In other words, Pretorius seems to imply that South Africa does, in fact, occupy a 'middle ground'. This conclusion is overall a little unsatisfying, since the author appears content to accept that South African nuclear diplomacy occupies a permanently liminal space between 'pragmatism' and 'principle'—essentially advancing the 'middle ground'

[70] Rian Leith and Joelien Pretorius, 'Eroding the Middle Ground: The Shift in Foreign Policy Underpinning South African Nuclear Diplomacy', *Politikon: South African Journal of Political Studies* 36, no. 3 (2009): 345–61.
[71] See Ian Taylor, *Stuck in Middle GEAR: South Africa's Post-Apartheid Foreign Relations* (Westport: Praeger, 2001); Ian Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty', in *The New Multilateralism in South African Diplomacy*, ed. Donna Lee, Ian Taylor, and Paul D. Williams (Basingstoke: Palgrave Pivot, London, 2006), 159–81.
[72] Joelien Pretorius, 'Africa–India Nuclear Cooperation: Pragmatism, Principle, Post-Colonialism and the Pelindaba Treaty', *South African Journal of International Affairs* 18, no. 3 (2011): 319–39.
[73] Similarly, Sizwe Mpofu-Walsh, 'Obedient Rebellion: Nuclear-Weapon-Free Zones and Global Nuclear Order, 1967–2017' (Oxford, University of Oxford, 2020) is a very interesting piece, though of more limited relevance here. It is also returned to in chapter 4.
[74] Joelien Pretorius, 'Nuclear Politics of Denial: South Africa and the Additional Protocol', *International Negotiation* 18 (2013): 396.

argument that she rebuts alongside Leith.[75] The relative importance of Pretoria's interventions on this issue—advocacy for the Additional Protocol as a universally applicable instrument, vs. opposition to its application in certain cases—is underplayed, and as a result the author equivocates where more strident criticism is warranted.

A pattern emerges from this subset of literature. Although the more recent literature on South African nuclear history and nuclear diplomacy is usually very rigorous and always highly valuable, researchers in this field often seem reluctant to make substantive critiques of South Africa's post-apartheid nuclear policy. There are two probable reasons for this, both of which this thesis aims to at least partially remedy. The first is that each of the interventions described above are concerned with one specific element or another of South African nuclear history or politics. While this results in numerous very detailed yet digestible pieces, the lack of an overarching study on the South African nuclear experience—one which draws together apparently disparate 'local' and 'global' elements into a single analysis—means that each intervention is essentially decontextualized from important historical and structural factors. No effort has so far been made to connect, for instance, South Africa's intervention at the 1995 NPT RevCon with both the ANC's liberation struggle *and* the technopolitics of the global nuclear order at large, and so the task of drawing these links remains to be done. Isolating these analyses from the technopolitical and geopolitical backdrops against which they take place has allowed scholars to virtually exclude critical works on global nuclear politics and order from their purview. Additionally, it is possible that a degree of academic self-censorship is in operation when it comes to the non-proliferation and disarmament policies of the ANC. Pelopidas has observed that the twin ideas of non-proliferation and deterrence have, through continuous discursive reinforcement in both policy and academia, become 'accepted as valid descriptions of the world and desirable outcomes'.[76] Indeed, this has happened to such an extent that

> statements expressing concerns with non-proliferation and deterrence can be stigmatized as dangerous. A scholar would be suspected of jeopardizing deterrence and compromising non-proliferation efforts by questioning their efficacy or the reality of the diagnoses of proliferation and deterrence.[77]

The ANC and its liberation struggle have become intertwined in the global liberal imaginary with South Africa's disarmament and non-proliferation, and it is tempting for scholars to plot liberation struggle, disarmament, and accession to the NPT as points on a linear trajectory towards justice and

[75] A very similar argument can be found in Michal Onderco, 'A Battle of Principles: South Africa's Relations with Iran', *Commonwealth & Comparative Politics* 54, no. 2 (2 April 2016): 252–67.
[76] Pelopidas, 'Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies', 329.
[77] Pelopidas, 'Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies', 329.

peace.[78] Of course, within South Africa, nuclear weapons are naturally associated with apartheid, and anti-apartheid activists are keen to point out the ways in which nuclear weapons were used as tools of state oppression.[79] Furthermore, the more recent Humanitarian Initiative discourse which frames nuclear weapons as a human rights problem is highly resonant in South Africa, and the ANC has been a global pioneer in explicitly connecting anti-nuclear arguments with the fight for universal rights.[80] Non-proliferation and disarmament is therefore synonymous with South Africa's liberation. It is therefore possible that, for the scholars in question, critiquing the efficacy of the ANC's nuclear diplomacy or its approach to non-proliferation and disarmament comes uncomfortably close to questioning the value or completeness of the victory over apartheid. However, proving that such a condition affects scholarly output in this area deserves a separate research project in itself, and I do not believe that any of these talented researchers are consciously limiting themselves or their output. Rather, it is far likelier that they genuinely believe in the sincerity of the ANC's efforts towards nuclear peace. There is in any case much to applaud. Regardless, an appropriately critical appraisal of South Africa's nuclear politics does not aim to impute cynicism to the ANC's post-apartheid nuclear diplomacy, but rather understand how South Africa's possible nuclear futures have developed against specific structural and historic backdrops—both of a developing global nuclear order *and* turbulent local processes. To do this requires connecting the empirics of the South African nuclear experience with wider critical literatures and concepts. There is a lack of engagements along these lines—in fact, none presently exists—and it is from this condition that the absence of criticality towards South African nuclear politics stems. It is the aim of this thesis to remedy this condition.

The 'local' and 'global' in nuclear politics

The major conceptual devices of global nuclear order and technopolitics—and the precise manner in which I use them to connect the 'local' and 'global' in nuclear politics—are discussed at length in the next chapter, and there is no need to excavate them here. However, there are a select few

[78] See Vincent Intondi, 'Nelson Mandela and the Bomb', *Huffington Post* (blog), 9 December 2013, https://www.huffingtonpost.com/vincent-intondi/nelson-mandela-and-the-bo_b_4407788.html; Vincent J. Intondi, *African Americans Against the Bomb: Nuclear Weapons, Colonialism, and the Black Freedom Movement* (Stanford: Stanford University Press, 2015).
[79] See Renfrew Christie, 'The Military Dimensions of Nuclear Development in South Africa', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 157–62.
[80] For details on the ANC's approach see Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension'; see Beatrice Fihn, ed., *Unspeakable Suffering: The Humanitarian Impact of Nuclear Weapons* (Geneva: Reaching Critical Will, 2013) for an exposition of the humanitarian approach to nuclear weapons.

interventions, both inside and outside of the broad IR discipline, which have approached questions of locality/globality in nuclear politics, albeit usually in an indirect manner and without specific reference to South Africa. They are nevertheless worthy of review. By far the most prevalent type of analysis within this subset of literature is that which seeks to use 'domestic' or 'local' lenses to explain states' nuclear decisions—in particular whether or not they choose to 'go nuclear'.[81] As I have already discussed, several analyses in this vein were published in the early-to-mid 1990s after the full story of the apartheid bomb became public; some authors have subsequently attempted to generalize this episode and others into a widely applicable account of proliferation decisions. For instance, Sagan identifies a 'domestic' model of nuclearization as one of his 'three models', which is potentially useful when states' behaviour does not conform to structural imperatives in the way that, say, realist accounts would expect.[82] He finds 'nuclear pork and parochial interests' to provide a compelling explanation for both South Africa's armament and disarmament,[83] but concludes that as a universal explanatory model it is insufficient—eventually concluding that 'causal complexity' and an accounting for the roles of norms, structural imperatives, and domestic dynamics is necessary for an overarching explanation of proliferation decisions. Sagan's point is well-taken and there is some crossover with his analysis here. By incorporating local technopolitics with questions of global nuclear order, I blur the boundaries between normative, security, and domestic 'models'. However, I do not share Sagan's narrowly defined explanatory approach—which is responsible for his inconclusive argument—and am not particularly interested in tracing the 'causes' of proliferation, opting instead for a more processual model which is outlined in the following chapter.

Several attempts to build on specifically on Sagan's domestic model have followed, all of them attempting to explain given nuclear behaviours based on internal dynamics. Heuser's *Nuclear Mentalities* is one of the more interesting, examining internal British, French, and West German nuclear debates during the Cold War, and specifically attentive to 'beliefs' about national characteristics and power structures, each state's 'place in the world', and strategic cultures more broadly.[84] Like Sagan's account, it strongly problematizes still-prevalent realist assumptions about the primacy of external/structural factors in nuclear decisions. Similarly, Hymans highlights the importance of particular domestic factors in proliferation decisions, with a focus on psychology,

[81] An already problematic category, as Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1' points out.
[82] Sagan, 'Why Do States Build Nuclear Weapons?'
[83] Sagan, 'Why Do States Build Nuclear Weapons?', 63.
[84] Beatrice Heuser, *Nuclear Mentalities? Strategies and Beliefs in Britain, France and the FRG* (Macmillan, 1998).

emotion, and scientific ambition.[85] Again, both Heuser and Hymans touch on important factors which are shown in the first empirical chapter of this thesis to have played an important part in the decision-making around the apartheid bomb.

However, there are some key differences between those works and this project, the most obvious among them being their shared project of using domestic lenses to construct better explanatory frameworks for the nuclear weapons decisions of given individual states: these are not interventions into the much larger question of global nuclear ordering, beyond the extent to which states impact the makeup of the global nuclear order by choosing (or not) to acquire nuclear weapons. A second and related difference is, naturally, the choice to privilege the domestic as a 'level of analysis' at the expense of a more interactive account which is attentive to 'local' and 'global' together. While global dynamics are nominally considered, they tend to collapse into an explanation which places undue weight on the domestic side of the putative divide. As discussed in the subsequent chapter, considerable conceptual innovation is necessary to avoid such outcomes, and given these authors' more delineated objectives this does not detract from their analyses on their own terms. As an example, where Heuser considers global questions of nuclear order, it is done with reference to the beliefs and imaginaries of such which exist in officials' minds. As such, the 'global' serves as a mirror onto which official beliefs are projected, and subsequently reflected back onto a 'local' context to inform decisions.[86]

This dynamic is perhaps better explained in detail with reference to the work of Etel Solingen, which at the initial stages of this research was central to the thesis. Solingen's work on 'nuclear logics' shares much in common with the projects of Heuser and Hymans, and her central thesis is that a given state's susceptibility to nuclear weapons proliferation can be assessed with reference to the relative prominence of particular domestic coalitions within the state. Solingen makes a claim towards disaggregation and elevating different domestic factors to the level of analytical importance, but her theory falls victim to the converse of the condition described above, which is overdetermination by the 'global' level at the expense of the 'local'—despite a stated intention to bring more localized dynamics into her analysis. The 'domestic' factors that Solingen considers most important are generally reducible to, proxies for, or driven by political economy.[87] Her thesis overall is reliant on the relative receptiveness of states to the global economy; this openness may vary

[85] e.g. Jacques E.C. Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy* (Cambridge: Cambridge University Press, 2006); Jacques E.C. Hymans, *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation* (Cambridge: Cambridge University Press, 2012).
[86] Heuser, *Nuclear Mentalities? Strategies and Beliefs in Britain, France and the FRG*.
[87] For an illustration of this, see the discussion of Asian cases in Etel Solingen, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East* (Princeton University Press, 2009), 57–117.

according to already-existing internal political dynamics—affected by a range of issues including perceptions of national identity and culture, histories of decolonization, religious doctrine, political institutions, and so on—but the ultimate arbiter of (de)nuclearization decisions is global economics. By Solingen's own estimation, 'these coalitions rely extensively on the global economy and on the political support of major powers within regimes and institutions involved in managing international economic relations'.[88] Domestic coalitions may move in and out of power, but they are ultimately subordinate to global finance and thus the structure of 'international anarchy' is merely substituted with another - the structure of the world economy. Subsequently, her prescriptions to prevent regimes from going nuclear – 'aid, trade benefits, investments, debt relief, food, and selective removal from export-control lists' – are economic in substance.[89] It is difficult to see how this account provides the disaggregated analysis of domestic politics that Solingen aims for. In fact, myriad domestic political and social processes are subsumed by an economic rationale which, despite Solingen's admirable attention to detail, does not achieve its desired level of disaggregation. My response to this, and the specific ways in which I aim to go beyond these accounts of domestic determinants of proliferation and nuclear behaviour, is discussed in the following chapter.

This is not, however, to deny the importance of political-economy considerations in nuclearization decisions and wider nuclear politics. These must be a consideration in any serious analysis, and here are of considerable importance given networks of nuclear trade and, more widely, the imbrication of the developing global nuclear order with the Cold War and, later, the dominance of liberal capitalism. Shampa Biswas demonstrates the viability of an historical materialist-influenced account of global nuclear order in *Nuclear Desire*, which while centred around commodity fetishism and the global 'value' of nuclear weapons also succeeds in offering a more disaggregated and contextualized analysis than do those discussed above. This book stands out as the most comprehensive and important critical study of global nuclear order, and was important alongside Masco's *Nuclear Borderlands* in the genesis of this thesis. Though it is not the central theme of her work by any means, Biswas approaches the issue of locality/globality in nuclear order from a different perspective, in her response to Sagan, Solingen, and other who are concerned with the question of how nuclear weapons acquire value. Biswas's analysis of how nuclear weapons acquire 'fetish commodity' status is necessarily contingent on the global conditions of capitalism, but it is also a process which takes place at a 'local' level.

[88] Etel Solingen, 'The Political Economy of Nuclear Restraint', *International Security* 19, no. 2 (1994): 139.
[89] Solingen, *Nuclear Logics*, 293.

> What makes the link between value and exchange political […] are the shared understandings of what is desirable and reasonable and how and who determines what—always a contested process that sets up social relations of order and privilege between parties with different interests.[90]

These processes of fetishization look very different at different locations within the global nuclear order; shared understandings of what is desirable about nuclear weapons might be very different in India, for example, than they are in France, given the specific local technopolitical regimes which operate respectively in each.[91] Examining the fetishization of nuclear weapons, argues Biswas, is key to restoring the 'nuclear referent': rediscovering the materiality and rootedness in social relations of nuclear weapons, rather than continuing to understand them as 'mute', decontextualized, depoliticized, almost spectral tools of 'deterrence'. Biswas advocates for a renewed awareness of 'the social, cultural, political relations that help produce, sustain, consume and live with nuclear weapons on a daily basis, *and that are themselves shaped in profound ways through the existence of those weapons*'.[92] In other words, the local relations that condition local nuclear complexes are themselves conditioned to a very considerable extent by the global nuclear order. Biswas goes on to further examine these fetishization practices and how they contribute to the wider project of nuclear order, although she stays away from excavating any specifically, empirically 'local' dynamics. Nevertheless, *Nuclear Desire* is sharply relevant to this thesis and Biswas's motivations also, to a large extent, drive my work here. Although this research is presented in a rather different register to Biswas's more explicitly Marxist account, my project takes up where Biswas leaves off, aiming to contextualize and provincialize the 'anti-technopolitics' of global nuclear order by revealing their roots in highly local and deeply political processes like apartheid and liberation in South Africa—and simultaneously to locate South Africa's nuclear weapons and their civilian legacies within the shifting global nuclear order. Within the disciplinary confines of IR and security studies, Biswas has gone further to this end than anybody else. Some welcome exceptions here include Dalaqua's short piece on Brazilian nuclear technopolitics and nuclear order, and Itty Abraham's efforts at uncovering nuclearity and 'nuclear things' in supposedly 'non-nuclear' locales. Dalaqua identifies a dialogue between the 'indigenous' Brazilian nuclear programme and the norms of global nuclear order,

[90] Shampa Biswas, *Nuclear Desire: Power and the Postcolonial Nuclear Order* (Minneapolis: University of Minnesota Press, 2014), 128–29.
[91] See for a comparison Itty Abraham, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State* (London: Zed Books, 1998); Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009.
[92] Biswas, *Nuclear Desire*, 133, emphasis added.

although in this case the former appears to be much more heavily conditioned by the latter.[93] Abraham follows Hecht in choosing to understand the condition of 'being nuclear' as a position on a socially-constructed spectrum, rather than an objective, binary condition, and is therefore able to locate 'nuclear' activity on the part of protest movements in Thailand and the Philippines.[94] This is a useful insight for my own work, and it enables me to locate the genesis of early ANC nuclear policy and orientation to the global nuclear order in their anti-nuclear liberation struggle while in opposition and exile. These are welcome interventions, but for the most part it is necessary to move outside of the discipline in order to find empirical studies on particular nuclear locales—South Africa in particular—and their interactions with nuclear politics.[95] Even then, as I show in the final section of this literature review, the pickings are rather slim for researchers interested even tangentially in questions of global nuclear order.

Technopolitics in South Africa

This closing section is not a systematic review of the literature outside of IR concerning nuclear weapons and technology, or South Africa's relationship to it; the former literature is vast, spanning the disciplines of history, Science and Technology studies, anthropology, and human geography, among others. The intention here is to briefly account for those interventions from across these diverse fields and sub-fields which share—at least in part—this project's orientations, and which have often been influential in developing my own approach to thinking about South Africa's nuclear technopolitics and the global dynamics therein. The pieces noted here are important, and most of them are returned to in the empirical chapters of the thesis, which could be considered a secondary contribution to this body of work. The most prominent analyst working in this area is of course Gabrielle Hecht; Hecht's work has been enormously influential on critical nuclear politics, and it is conceptually important for this thesis. However, Hecht has also made some important empirical interventions on African nuclearity, and indeed South Africa, as an under-studied nuclear locale of underappreciated global significance. The most obvious starting point here is the 2012 monograph *Being Nuclear*, in which Hecht reveals the operation of global nuclear politics and economics in sub-

[93] Renata H. Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program', *Nonproliferation Review* 26, no. 3–4 (2019): 231–49.
[94] Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1'.
[95] There are isolated accounts of individual states' interactions with the global nuclear order, though these have tended to focus on diplomacy and the 'international' without seriously engaging with the kind of local processes that Biswas talks about and which I am interested in here. See Togzhan Kassenova, 'Kazakhstan and the Global Nuclear Order', *Central Asian Affairs* 1, no. 2 (2014): 273–86; Nicola Horsburgh, *China and Global Nuclear Order: From Estrangement to Active Engagement* (Oxford: Oxford University Press, 2015).

Saharan Africa.[96] The book is structured in two parts: the first is concerned with the technopolitical construction of a market value for African uranium, and the interactions between postcolonial elites and Western nations to manipulate this value, while the second deals with the effects of this market—in particular, its constituent differentiated stages of 'nuclearity'—on the various African miners charged with its extraction.[97] South Africa's occupation of Namibia (then South West Africa) takes centre stage, as Hecht chronicles the technopolitical struggles surrounding the Rössing uranium mine. Similar to how South Africa's nuclear weapons were seized upon by opponents hoping to highlight Western complicity in apartheid, '[t]argeting Rössing helped SWAPO [the South West African People's Organization] consolidate its authority among international activists, not the least because uranium helped forge political alliances within the anti-nuclear movement'.[98] It is a complex but compelling story, and Hecht comprehensively details how South Africa's uranium converged with other subcontinental dynamics to make sub-Saharan Africa a key location on the Cold War's nuclear map. Focused as it is on the raw material of uranium itself, *Being Nuclear* does not deal with the apartheid bomb in any detail. This is something of a missed opportunity, given its imbrication in the very subcontinental and global dynamics that Hecht is investigating. Hecht is to be applauded for what constituted at the time a ground-breaking study, and making visible the nuclear locales like uranium mines and processing facilities that heretofore had been considered 'banal' in ways detrimental to labour rights and human dignity more broadly. *Being Nuclear* is also a superb conceptual resource for those hoping to detail the oft-neglected integration of Africa into the world nuclear complex. It does, however, feel somewhat incomplete without a more detailed accounting of how South Africa's own nuclear complex fit into this picture of nuclear Africa, even if the overall intent were to focus more heavily on oft forgotten, 'non-nuclear' corners of the continent.

Elsewhere, however, Hecht has directly addressed the issue of the apartheid bomb. The 2006 article 'Negotiating Global Nuclearities' is of particular interest, demonstrating as it does how the domestic technopolitics of apartheid interacted with the institutions of international nuclear governance, specifically the IAEA.[99] Consistent with the theoretical framework adopted here, these negotiations took place between a variety of mutually-conditioned local and global factors. South Africa's bid for leadership and African representative status within the ranks of the IAEA depended on imbuing its uranium reserves and products with particular definitions ('source materials', 'fissionable materials',

[96] Hecht, *Being Nuclear*.
[97] See also Gabrielle Hecht, 'The Work of Invisibility: Radiation Hazards and Occupational Health in South African Uranium Production', *International Labour and Working-Class History* 81 (2012): 94–113.
[98] Hecht, *Being Nuclear*, 82.
[99] Hecht, 'Negotiating Global Nuclearities'; see also Gabrielle Hecht, 'On the Fallacies of Cold War Nostalgia: Capitalism, Colonialism, and South African Nuclear Geographies', in *Entangled Geographies: Empire and Technopolitics in the Global Cold War*, ed. Gabrielle Hecht (Cambridge: MIT Press, 2011), 75–100.

'special fissionable materials'). This political manipulation of apparently static material qualities affected South Africa's 'nuclear' status *vis-à-vis* rival powers like Egypt, and also determined which safeguards would need to be adhered to.[100] At the same time, apartheid politics played a key part in determining the remit of the IAEA, as ambassador Donald Bell Sole pushed for a 'maximal separation between technology and politics'[101] to prevent anti-apartheid sentiments from jeopardizing South Africa's seat at the table. Hecht also shows how Sole attempted to mobilize the Afrikaner national project to technopolitical ends, emphasizing the duality of being simultaneously Western and African to claim a unique positionality within this key institution of nuclear order. This article goes some way to showing how the multifaceted means by which apartheid South Africa's parochial nuclear concerns helped to mould aspects of the IAEA regime which persist today, feeding into the broader makeup of the global nuclear order. It is nonetheless only a partial treatment of the issue, and does not constitute an investigation into apartheid and nuclear order on its own: a broader purview of how the IAEA and the nuclear order around it was evolving contemporarily, from a 'local-developmental' remit to a 'global control' order, is necessary. I incorporate Hecht's piece into a bigger analysis of this issue in the first chapter of the thesis.

Alongside Paul Edwards, Hecht has also examined apartheid technopolitics from the other side of the fence, authors demonstrating both how the South African nuclear programme was used to advance a specific articulation of a muscular Afrikaner nationalism, but also crucially how the anti-apartheid movement 'appropriated those same strategies to its own ends, increasingly addressing apartheid as a technopolitical system'.[102] In the nuclear arena, this entailed highlighting the technological collaboration with South Africa in which several Western states, including the US, France, West Germany, and Britain, were implicated, and arguing 'that transnational networks underwrote South African [nuclear] technology and expertise—and therefore underwrote apartheid'.[103] This campaigning strategy piled domestic pressure onto Western governments who were loath to be seen, in contrast to their rhetorical condemnations, as propping up apartheid state power. During the 1980s, international sanctions increasingly limited South Africa's access to nuclear-related imports, and it became more difficult for the US in particular to deny its role, intentional or not, in bolstering the Pretoria regime. Edwards and Hecht are circumspect as to whether these attempts by grassroots activists to appeal to the global nuclear order produced substantive change on their own. While they detail a strikingly relevant case in which locally-situated constituencies attempted to exploit the institutions of global nuclear order to their own ends, the

[100] Hecht, 'Negotiating Global Nuclearities'.
[101] Hecht, 'Negotiating Global Nuclearities', 30.
[102] Edwards and Hecht, 'History and the Technopolitics of Identity', 629.
[103] Edwards and Hecht, 'History and the Technopolitics of Identity', 637.

overall image given is one of a dynamic domestic constituency in the form of the anti-apartheid movement reflecting its technopolitical project off of a static image of nuclear order. The authors consider little as to how the global nuclear order itself informed the terms and conditions of anti-apartheid struggle, nor the extent to which this relatively brief episode of campaigning might have reverberated through the evolving global nuclear order after its conclusion. This is easily forgivable, since a set of somewhat more specialized IR tools are necessary in the construction of such an analysis, and chapter 2 of this thesis picks up Edwards and Hecht's work where they leave off—again, weaving it into a more holistic picture of global nuclear order and local/global interaction.

Through this impressive body of work, Hecht has made a singular contribution to expanding the study of the nuclear condition in sub-Saharan Africa as a whole, and South Africa in particular. Though she is not concerned specifically with the concept of nuclear order, her interventions offer probably the most productive and valuable tools for researchers of global nuclear politics to make robust empirical connections to 'local' dynamics. Similarly oriented works include Masco's aforementioned *The Nuclear Borderlands*, which sits alongside Gusterson's ethnographic contributions in mapping the complexities of the United States' nuclear weapons establishment and its cultural significance in the years following the Cold War.[104] While Gusterson in particular does go to the effort to make interventions into the global dimensions of nuclear order in an edited volume of essays, his treatments of—for example—inequality and hierarchy in global nuclear order are somewhat cursory when compared to either his highly textured anthropological work, or dedicated studies in IR such as Biswas's.[105] Hecht's influential *The Radiance of France* is ground-breaking in its deep-level analysis of French nuclear technopolitics—indeed, it is where Hecht coins the term[106]—and Schmid's investigation of the development and operation of Soviet nuclear technopolitics is invaluable to students of the USSR, Eastern European area studies, and STS more broadly.[107] Unfortunately, though I maintain a keen interest in this literature, I do not contribute directly to it, and asides from Hecht's conceptual innovations it is of limited analytical use to my study. At a very early point in the research, there was a vague intention to carry out an ethographically-informed survey of the South African nuclear complex in the vein of Hecht, Gusterson, or Masco's studies, but even a passing familiarity with the subject matter reveals the naivety of such an approach: the

[104] Masco, *The Nuclear Borderlands*; Gusterson, *Nuclear Rites*.
[105] Hugh Gusterson, *People of the Bomb: Portraits of America's Nuclear Complex* (University of Minnesota Press, 2004); cf. Biswas, *Nuclear Desire*.
[106] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009.
[107] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009; Sonja D Schmid, 'Nuclear Colonization? Soviet Technopolitics in the Second World', in *Entangled Geographies Empire and Technopolitics in the Global Cold War*, ed. Gabrielle Hecht (Cambridge: MIT Press, 2011), 126–54; Sonja D Schmid, *Producing Power: The Pre-Chernobyl History of the Soviet Nuclear Industry* (Cambridge: MIT Press, 2015).

nuclear weapons programme is long-dead, and access to information in South Africa regarding nuclear activities both past and present is extremely limited.[108] The existing memoirs and available first-hand accounts of the weapons programme offer only a very partial picture, and the secrecy surrounding it means that surviving documentation is almost non-existent, as I discuss more fully in the subsequent section. As a result, an analysis focused so heavily on the 'local' as are these pieces was not a realistic proposition but, happily, choosing to operate between the 'local' and the 'global'—drawing on available sources regarding the South African nuclear encounter while maintaining a firm orientation toward the global nuclear order—yields more wide-ranging insights and a more interesting analysis.

With this in mind, however, there do exist a small number of very locally informed studies on South Africa and the intersection of history, technology and democracy. Many of these are not specifically concerned with nuclear politics. However, when put into conversation with a wider conceptual nuclear literature, they provide extremely valuable starting points for conversations on how apartheid and democratization have interacted with technology and infrastructures descended from nuclear weapons. These are important points of discussion in the final two chapters and mark a significant original contribution to the literature. The historian Saul Dubow has contributed greatly to the development of understandings of apartheid, and his book *A Commonwealth of Knowledge* is important contextual reading here, as it details how science and technology has been applied to the ends of the state in South Africa since the advent of British rule.[109] Nuclear technology features only briefly, which is a shame, but his broader discussion of the ways in which scientific and technical proficiency became markers of Afrikaner ingenuity—and thus helped to construct a distinct Afrikaner nation—is exemplary. Dubow's work is significant, though mostly peripheral to the research carried out in this thesis, although I return to it in the first empirical chapter on the apartheid bomb. Somewhat more directly relevant in empirical terms is von Schnitzler's recent work *Democracy's Infrastructure*, which examines the imbrication with public utility infrastructure—specifically water and electricity—with the country's shift from apartheid to democracy.[110] Based on close ethnographic work in the townships of Johannesburg, von Schnitzler is interested in how points of public service provision mediate residents' interactions with the South African state and

[108] See David Fig, 'In the Dark: Seeking Information about South Africa's Nuclear Energy Programme', in *Paper Wars: Access to Information in South Africa*, ed. Kate Allan (Johannesburg: Wits University Press, 2009), 56–87; Chandré Gould, 'The Nuclear Weapons History Project', in *Paper Wars: Access to Information in South Africa*, ed. Kate Allan (Johannesburg: Wits University Press, 2009), 88–101.
[109] Saul Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa* (Oxford: Oxford University Press, 2006).
[110] Antina von Schnitzler, *Democracy's Infrastructure: Techno-Politics and Protest After Apartheid* (Princeton: Princeton University Press, 2016).

how, despite a new constitution, water pumps and electricity meters continue to be flashpoints of protest and civil disobedience against what many South Africans perceive as the stalled transition to full democracy. She finds that 'the late apartheid moment lives on in the often micro-political ways in which people relate to the state' and that '[l]ocal experiences of the state often appear eerily reminiscent of the late-apartheid period, rekindling embodied memories of its administrative modalities of power and associated bureaucratic practices'.[111] Relatively few South Africans have experienced an 'embodied' relationship to nuclear technology directly, and anti-nuclear activism is even something of a boutique pursuit in today's South Africa. Nevertheless, a general public scepticism and distrust of nuclear technology in general does prevail, and von Schnitzler's study is helpful towards interrogating this. It may be possible in some ways to understand, following Stoler, South Africa's civil nuclear infrastructure as 'debris' of apartheid:[112] physical remnants which are still imbued with the technopolitical projects of the former regime, and continuing to act as such even in the context of a liberal-democratic political settlement in the country. Combined with the fundamental 'ambivalence' of nuclear technology and the difficulties in controlling its potential meanings and uses, I show towards the end of the thesis the ways in which nuclear infrastructure continues to be understood by many as an apartheid relic that hinders 'transition'. Thus, von Schnitzler's study has been influential here, even if the empirical approach and frames of reference applied are slightly different.

A related study which deals with the technopolitics of South African infrastructure in the wake of apartheid is Jaglin and Dubresson's investigation of Eskom (South Africa's state-owned energy utility) and its evolving technopolitical regime.[113] While a very valuable study which is unique in the field, it is also a highly technical account which delves deep into the political economy of electricity supply in South Africa, and devotes remarkably little to the issue of nuclear power. This is perhaps to be expected, since the sole Koeberg nuclear plant generates only a small fraction of the country's electricity, and the nuclear controversy is rather dwarfed by Eskom's spiralling debt and periodic rolling blackouts as a result of supply shortages—as the authors explore in detail.[114] However, Jaglin and Dubresson's account is surprisingly depoliticized, and their overly technical approach drowns out the wider political dynamics of transition from apartheid—ultimately failing to capture the centrality of Eskom to South Africa's economic model and the state's capacity for oppression. The

[111] von Schnitzler, *Democracy's Infrastructure: Techno-Politics and Protest After Apartheid*, 200.
[112] Ann Laura Stoler, 'Imperial Debris: Reflections on Ruins and Ruination', *Cultural Anthropology* 23, no. 2 (May 2008): 191–219.
[113] Sylvy Jaglin and Alain Dubresson, *Eskom: Electricity and Technopolitics in South Africa* (Cape Town: University of Cape Town Press, 2016).
[114] Jaglin and Dubresson, *Eskom: Electricity and Technopolitics in South Africa*.

relationship of Eskom to contemporary liberal democracy, in the stark political terms presented by von Schnitzler, is also largely ignored. Given that Jaglin and Dubresson claim to place 'technopolitics' front and centre in their analysis, the end result is a surprisingly anaemic political analysis. Fortunately, others have noted the importance of Eskom to apartheid's model of 'racial Keynesianism' and its post-apartheid transformation.[115] In particular, the anti-apartheid activist Renfrew Christie's blistering and contemporary Marxist analysis of South Africa's energy landscape lays bare the ways in which cheap Black labour and, subsequently, cheap South African coal and uranium were an invaluable resource to the West during the Cold War.[116] Christie has since gone as far as to claim that apartheid itself was a 'Cold War construct', cooked up and maintained by the Western powers for the sole reason of safeguarding access to these resources.[117] While there is undoubtedly a little more nuance to the explanation than this, his political-economic account is rather convincing, and draws concrete linkages between 'local' South African labour conditions and the 'global' Cold War. Christie's work also contributes to another decidedly 'local' literature, which is that of domestic anti-nuclear and anti-apartheid activism—the two, for obvious reasons, often being intertwined. Stalwarts of the Cape Town anti-apartheid movement such as David Fig, Keith Gottschalk, Mike Kantey, and others continue to publish excoriations of the post-apartheid nuclear industry, often highlighting the ways in which its associated secrecy and lack of public accountability mirror apartheid-era conditions, as well as making more conventional ecological arguments against nuclear power.[118] This is an important body of activist literature, and it is not one in which I locate myself. It is, however, absolutely invaluable as a primary empirical resource in filling many of the gaps in official documentation regarding the nuclear industry in South Africa, and in teasing out how Pretoria's interactions with the global nuclear order have manifested locally after apartheid. I therefore opt to forgo a full review of this literature here, instead returning to it in later empirical chapters.

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[115] Leonard Gentle, 'Escom to Eskom: From Racial Keynesianism Capitalism to Neo-Liberalism (1910-1994)', in *Electric Capitalism: Recolonising Africa on the Power Grid*, ed. David A. MacDonald (Cape Town: HSRC Press, 2009), 50–72.

[116] Renfrew Christie, *Electricity, Industry and Class in South Africa* (Albany: State University of New York Press, 1984).

[117] Renfrew Christie, Personal interview in Cape Town, interview by Tom Vaughan, (22 July 2019) (22 July 2019); Renfrew Christie, 'Speech to Winelands Mensa' (Somerset West, 18 July 2019).

[118] For examples, see David Fig, *Uranium Road: Questioning South Africa's Nuclear Direction* (Johannesburg: Jacana, 2005); David Fig, 'A Price Too High: Nuclear Energy in South Africa', in *Electric Capitalism: Recolonising Africa on the Power Grid*, ed. David A. MacDonald (Cape Town: HSRC Press, 2009), 180–201; Keith Gottschalk, 'The Politics of Electricity Generation in South Africa', in *New South African Review 4: A Fragile Democracy – Twenty Years On*, ed. Gilbert M. Khadiagala et al. (Johannesburg: Wits University Press, 2014), 91–108; Mike Kantey, *Nukes? No Thanks! Five Arguments against Nuclear Power in South Africa* (Plettenberg Bay: Watermark Press, 2017).

This has been by no means a comprehensive review of all of the literature which touches upon various aspects of this project: the wider bodies of work on domestic South African politics, histories of apartheid, science and technology in colonialism, and world nuclear politics are positively sprawling, and far wider than anything I could hope to sufficiently cover here. That said, the twin concepts of 'global nuclear order' and 'technopolitics' have appeared at numerous points throughout this literature review, and in the next chapter I embark on a much deeper reading of both the IR literature on nuclear order and Gabrielle Hecht's development of technopolitics as an analytical concept. While this review has explored the parameters of the empirical literature on South Africa's nuclear experience to which I contribute, the theoretical and conceptual chapter sets up in detail my contribution to the study of global nuclear order writ large.

Conceptual framework

The central aim of this thesis is to interrogate and move towards resolving the sometimes implicit, often explicit divide between 'local' and 'global' in IR-derived accounts of global nuclear order, via an in-depth case study of South Africa. As detailed in the literature review, there are a small number of scholarly interventions into both nuclear politics and South Africa specifically which have made limited inroads towards such an account. One subset of these works are accounts of limited scope, which focus on a specific aspect of the South African nuclear experience and yield tangential insights into the local/global conundrum.[119] The other, less populous grouping is that of more ambitious efforts at systematization or re-appraisal of global nuclear order, which have either deliberately stopped short of tackling or been unable to tackle directly the artificial local/global boundary in nuclear politics.[120] This is therefore an important study, because it aims to firstly examine how the local/global binary functioned in South Africa's relationship with the global nuclear order, and secondly to critically address the very idea of a local/global binary in nuclear politics at all. These are tasks yet to be taken up in full by other researchers. Moreover, at an even more basic level, there exists no book-length treatment on the subject of 'South Africa and the global nuclear order'—a striking gap in the literature, given Pretoria's highly eventful nuclear history. The conceptual approach employed here therefore aims to provide an overarching account of South Africa's relations with the global nuclear order from apartheid to the present day, while simultaneously offering a critical reading of the topic which significantly advances the boundaries of discussion in the field. To paraphrase the late Ian Taylor, South Africa—like the rest of the continent—is 'globally dialectically connected, [determining and] determined by myriad developments, actors, and structures, both internal and external, if such an artificial separation is to be cited.[121] The conceptual framework for this project draws from both sides of this separation, with a view to bridging the gap.

Theoretical foundations

William Walker's concept of 'global nuclear order' provides the first and most important organizing principle for this study—as explained below, however, it is not adopted uncritically.[122] Walker's interventions are firmly rooted in English School theory, and the idea of global nuclear order can be

[119] e.g. Edwards and Hecht, 'History and the Technopolitics of Identity'.
[120] Solingen, *Nuclear Logics* being perhaps the primary example of this tendency.
[121] Ian Taylor, *The International Relations of Sub-Saharan Africa* (London: Bloomsbury, 2010), 2.
[122] William Walker, 'Nuclear Order and Disorder', *International Affairs* 76, no. 4 (2000): 703–24; William Walker, 'Nuclear Enlightenment and Counter-Enlightenment', *International Affairs* 83, no. 3 (1 May 2007): 431–53; Walker, *A Perpetual Menace: Nuclear Weapons and International Order*.

usefully read as a development of Bull's thinking on 'international society'.[123] Bull's perspective evolved over many years in response to the course of world events, resulting in an intellectually complex and normatively varied body of work which contained significant internal tensions. The classical expression of an 'international society' of states, which upholds a set of relatively minimal institutions and values in the interest of order, was expressed by Bull in *The Anarchical Society* and is of primary relevance here. Bull's vision of a loose society of states with shared norms and standards of behaviour emerging from a context of structural anarchy and conflict attempted to thread the needle between the dominant (then and still) schools of IR theory, liberalism, and structural realism; Walker's subsequent conception of related 'systems' of deterrence and abstinence correspond respectively with the structural and normative aspects of Bull's theory. More fundamentally, Walker's concept of nuclear order shares the general metaphysical roots of English School thought. Bull conceives of a society of states that has expanded throughout history, eventually resulting in the convergence of numerous 'regional international systems' into a single European international society. The European iteration of international society is distinct from the various systems preceding it because its basis in 'a law common to all nations, that could be used to regulate relations among nations and applied beyond the bounds of Christendom or Europe just as it was within them' and 'moral and legal equality' in inter-state relations provided the basis for a universalist project.[124] Bull explicitly recognized the Eurocentricity of this account (though he argued it simply reflected a Eurocentric historical reality), and the fact that global accession to European international society was by no means a fully consensual or even universally accepted process.[125] Walker shares this general faith in the utility of liberal universalism in the pursuit of nuclear order, explicitly identifying it as a universalist Enlightenment project whose benefits to global strategic stability outweigh any injustices served during the process of its creation.[126] Neither Bull nor Walker view international society or global nuclear order as inevitable developments, but do see them as necessarily ongoing projects. Stable order also offers the prospect of thicker, more 'solidarist' forms of international justice; in his later writings, Bull's solidarist commitments became more pronounced

[123] Bull, *The Anarchical Society*.
[124] Hedley Bull and Adam Watson, 'Introduction', in *The Expansion of International Society*, ed. Hedley Bull and Adam Watson (Oxford: Clarendon Press, 1984), 5.
[125] For important works on this process and its rootedness in patterns of coloniality, see Siba N'Zatioula Grovogui, *Sovereigns, Quasi Sovereigns, and Africans: Race and Self-Determination in International Law* (U of Minnesota Press, 1996); Antony Anghie, *Imperialism, Sovereignty, and the Foundation of International Law* (Cambridge: Cambridge University Press, 2005). While this thesis does not seek to excavate the foundations of English School theory, postcolonial critiques of 'international society' are implicit in many critical treatments of global nuclear order. This extremely rich literature therefore maintains a background presence throughout the thesis.
[126] Walker, 'Nuclear Enlightenment and Counter-Enlightenment'.

in comparison to his earlier work, which envisaged sparser ordering arrangements.[127] At the most basic level, just as English School theorists are primarily concerned with questions of 'order' and 'justice'—two elusive goals to be pursued in balance, but which are often found in opposition to one another—so too are scholars and critics of global nuclear order.[128]

However, it is important to note that, quite apart from Walker, Bull himself wrote prolifically on problems of non-proliferation and disarmament. As such, English School engagement with the problem of nuclear order predates Walker's work, which largely glosses over Bull's previous treatments of the subject matter. Bull and Walker share many concerns, again focusing on the nexus between order and justice, so this is a curious omission. Indeed, Walker's lament regarding the United States' perceived abdication as a responsible steward of nuclear order echoes Bull's diatribe on the behaviour of the 'great irresponsibles' of the US and USSR, 25 years prior.[129] As Ruzicka notes, Bull also recognized the uneasy but crucial balance between deterrence and restraint, but was perhaps more concerned than Walker that the burden of restraint should fall principally on the nuclear-armed states.[130] Bull is also more 'agnostic' than Walker on the question of non-proliferation and the utility of robust and comprehensive non-proliferation arrangements, being slightly more willing to recognize the benefits to stability engendered by deterrence in a world where nuclear weapons already exist. On the flip side, Bull was perhaps more sceptical than Walker regarding the question of whether 'restraint' on the part of the US and USSR would be significant enough, or enduring enough, to engender reciprocal restraint on the part of emerging nuclear states.

> It is all to easy to envisage the breakdown of Soviet and American restraints; the non-participation of China and other nuclear powers in the system of restraints; the emergence of new nuclear powers, less interested in constraint and co-operation than the older ones; the acquisition of nuclear weapons by groups other than the state; or the failure of the nuclear powers to consolidate and extend the present system.[131]

Indeed, Ruzicka detects, given Bull's doubt that such a system is sustainable under the weight of these various challenges, a 'whiff of desperation […] in his plea for restraint'.[132] Bull is also rather

[127] For a useful intellectual history of Bull's writings, see Nicholas J. Wheeler and Timothy Dunne, 'Hedley Bull's Pluralism of the Intellect and Solidarism of the Will', *International Affairs* 72, no. 1 (1 January 1996): 91–107.
[128] For a demonstration of different camps in this particular debate, contrast Walker, 'Nuclear Enlightenment and Counter-Enlightenment'; with Biswas, *Nuclear Desire*.
[129] Hedley Bull, 'The Great Irresponsibles? The United States, the Soviet Union, and World Order', *International Journal* 35, no. 3 (1 September 1980): 437–47; Walker, 'Nuclear Enlightenment and Counter-Enlightenment'.
[130] Jan Ruzicka, 'A Plea for Restraint: The Anarchical Society and Nuclear Proliferation', in *The Anarchical Society at 40: Contemporary Challenges and Prospects*, ed. Hidemi Suganami, Madeline Carr, and Adam Humphreys (Oxford: Oxford University Press, 2017), 141.
[131] Bull, *The Anarchical Society*, 277.
[132] Ruzicka, 'A Plea for Restraint: The Anarchical Society and Nuclear Proliferation', 141.

pessimistic about the prospects for disarmament, predicting that calls for such will 'fall on deaf ears', but also that 'demands that the nuclear weapon states take some of these tangible measures of restraint will be heeded by some'.[133] In the same breath, he suggests that proliferant states, 'by refusing to co-operate in the control of proliferation if these steps are not taken, will be making a constructive contribution'.[134]

By contrast, Walker is slightly more optimistic regarding the NPT's potential utility to facilitate restraint. He is not pollyannaish about the prospects for disarmament, but neither does he come across quite as gloomy as Bull regarding the possibility of a lasting, if unjust, nuclear peace. 'Unless some profound shock alters sentiments or the great powers co-operate in unexpected ways to promote disarmament, my expectation is that the basic model of international nuclear order […] will not be departed from'.[135] Walker sees incremental progress towards disarmament, though it is still a remote prospect, in the 2005 and 2010 NPT RevCons, and more broadly locates restraining value in any multilateral efforts towards the ultimate end of disarmament—even if it is infinitely deferred. Walker's desire for restraint is also centred more on nuclear 'rogues' and those outside of the NWS elite. Much of Walker's critique of the Bush administration's undermining of the nuclear Enlightenment centres on its permissive attitude towards India,[136] and 'embed[ding] restraint in the Asian hub' is identified as one of the key challenges for today's non-proliferation framework. Walker is certainly not blind to the transgressions and failures over disarmament of the NWS, but through positing nuclear order as a morally universalist political project, he seems to place more responsibility on non-nuclear states to practice restraint—in contrast to Bull's view that non-compliance might itself constitute a valuable contribution to the ordering project. Even in his earlier work, Bull sees justice, or at least the spectacle of working towards some kind of more just settlement, as a necessary component of order. Walker is more circumspect on the importance of justice in nuclear order, and questions what 'justice' might mean in this context:

> Complete nuclear disarmament will not bring justice if it undermines the security of states and peoples, and justice has to be sought through actions to increase that security without necessary reference to, and in possible contradiction with, the ideal of complete nuclear disarmament.[137]

[133] Hedley Bull, 'Rethinking Non-Proliferation', *International Affairs* 51, no. 2 (1975): 189.
[134] Bull, 'Rethinking Non-Proliferation', 189.
[135] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 159.
[136] Walker, 'Nuclear Enlightenment and Counter-Enlightenment'.
[137] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 189.

Walker is right to point out that nuclear disarmament in and of itself will not bring about global justice in a broader structural vacuum—a statement which many of his critics would agree with.[138] However, he somewhat downplays the importance of justice—and particularly more equitable arrangements for non-nuclear weapons states—in maintaining even the present arrangements of restraint in nuclear order, and places a good degree more faith than did Bull in the order's ideological underpinnings as a unifying force. In part, this could be interpreted as simply a reflection of the times in which both scholars wrote: Bull's Cold War anxiety was evidently acute. However, questions over the legitimacy, fairness, and stability of nuclear order have never fully receded, and in 2021 remain pressing.

In sum, while this is not primarily an 'English school thesis'—and certainly does not share Walker's ideologically-informed optimism towards nuclear order—it takes the tradition seriously. The concept of global nuclear order has been immensely impactful on the field of study, and provides scholars with extremely useful analytical tools with which to interrogate the global nuclear condition. In some ways, the critical outlook of this project reintroduces some of Bull's scepticism and wariness about the durability of nuclear order into the concept of global nuclear order. Walker's formulation of the concept is useful but, as discussed below, borders on complacency when it comes to questions of inequity, power, and the ways in which injustice might threaten order. Following Suganami, one might argue on this basis that the project is in fact a substantive contribution to English School thinking.[139] This thesis accordingly adopts in large part the English School starting points of global nuclear order, but attempts to build on them through constructive criticism, an engagement with postcolonial and other critical literatures, and most importantly, in-depth empirical work.

On the other side of the putative divide between the global and local, I adopt the two interrelated concepts of 'technopolitics' and 'nuclearity', developed by Gabrielle Hecht through a series of richly detailed empirical studies. Again, before delving into the fine conceptual detail a note about theoretical underpinnings is necessary here, since Hecht's use of empirics to generate her concepts is in turn reliant on an interdisciplinary blend of theory—drawing primarily on social and cultural history and science and technology studies (STS). Though often occupying similar terrain to IR at least in terms of subject matter, reconciling IR theory with that of STS in a systematic manner is a significant project. Though this has not deterred scholars from attempting to do so, it is not my aim here.[140] For her own part, Hecht arrives at her formulation of technopolitics (not to be confused with

[138] Biswas, *Nuclear Desire*.
[139] Hidemi Suganami, 'The English School in a Nutshell', *Ritsumeikan Review of International Studies* 9 (2010): 27.
[140] See for instance Maximilian Mayer, Mariana Carpes, and Ruth Knoblich, eds., *The Global Politics of Science and Technology - Vol. 2: Perspectives, Cases and Methods* (Berlin Heidelberg: Springer-Verlag, 2014);

Mitchell's 'techno-politics'[141]) via a self-described conceptual 'toolbox'.[142] It incorporates diverse insights from, *inter alia*, cultural historians concerned with national identity,[143] constructivist STS theorists,[144] and a necessary engagement with the philosophy of Bruno Latour. Hecht hews close to the empirics throughout her two most important works in terms of conceptual innovation, *The Radiance of France* and *Being Nuclear*, and accordingly is relatively unconcerned with grand theorizing. Technopolitics and nuclearity have nevertheless been seized upon by a number of researchers, including within the broad realm of international studies, as versatile heuristic devices which are particularly useful for excavating the lesser-seen elements of nuclear and other infrastructure complexes.[145] The products of Hecht's somewhat eclectic toolbox have thus come to serve as components in many other toolboxes.[146] Care is therefore taken that the concepts do not come to serve as malleable and decontextualized black boxes, divorced from their original theoretical underpinnings, which allow the researcher to perform otherwise impossible intellectual gymnastics.

The issue of the 'global/local' divide is helpful here as a device to bring together the concepts of global nuclear order and technopolitics/nuclearity, even as they come from disparate theoretical and disciplinary traditions. As previously noted, this thesis aims to go beyond simply borrowing Hecht's concepts and applying them narrowly to the South African nuclear experience, in such a way that the thesis tells us *only* about South Africa in its relations with nuclear order—yielding few insights into the interaction of the categories of 'local' and 'global' in nuclear order more widely. Granted, I remain here firmly within the bounds of 'eclectic' and 'mid-level' theorizing,[147] both by

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Maximilian Mayer and Michele Acuto, 'The Global Governance of Large Technical Systems', *Millennium* 43, no. 2 (2015): 660–83.

[141] Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002).

[142] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009, 10.

[143] Benedict Anderson, *Imagined Communities* (London: Verso, 1983).

[144] Wiebe E. Bijker, Thomas P Hughes, and Trevor Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, MA: MIT Press, 1993).

[145] For diverse recent applications of these concepts, see Ulrike Felt, 'Keeping Technologies out: Sociotechnical Imaginaries and the Formation of Austria's Technopolitical Identity', in *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, ed. Sheila Jasanoff and Sang-Hyun Kim (Chicago: University of Chicago Press, 2015), 103–25; Jaglin and Dubresson, *Eskom: Electricity and Technopolitics in South Africa*; von Schnitzler, *Democracy's Infrastructure: Techno-Politics and Protest After Apartheid*; Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program'.

[146] See variously Schmid, 'Nuclear Colonization? Soviet Technopolitics in the Second World'; Felt, 'Keeping Technologies out: Sociotechnical Imaginaries and the Formation of Austria's Technopolitical Identity'; Jaglin and Dubresson, *Eskom: Electricity and Technopolitics in South Africa*; von Schnitzler, *Democracy's Infrastructure: Techno-Politics and Protest After Apartheid*.

[147] Rudra Sil and Peter Katzenstein, eds., *Beyond Paradigms: Analytic Eclecticism in the Study of World Politics* (Basingstoke: Palgrave Macmillan, 2010).

virtue of utilizing cherry-picked extra-disciplinary concepts and of 'violat[ing] levels of analysis'—[148]a violation which is the entire animus of this work. However, by using the related concepts of technopolitics and nuclearity to forge links (or, rather, illuminate those existing) between the 'global' and 'local' of nuclear politics, I aim to posit and make explicit my theoretical 'micro-foundations'.[149] Although Walker and his direct theoretical descendants inevitably tend to focus on great-power balances and statecraft at the global 'level', he recognizes—as did Bull before him—that

> the pursuit of order in this context is inherently problematic, will always be contentious and entail political struggle, *has to operate simultaneously at several levels (global, regional, and local, inter-state and intra-state)* and can probably never end.[150]

Walker, at the very start of his book on nuclear order, allows and even demands that the pursuit of *global* nuclear order incorporates *local* struggles and agency. His analysis duly proceeds to focus heavily on the inter-state rather than intra-state dimensions. He also recognizes that nuclear order is a processual project and one that, at least under current global conditions, is perpetually unfinished, implying that there is an ongoing interaction between the local and the global. Despite this, the local is never discussed in any great deal throughout Walker's work. Given his grand theorizing project, this is an understandable omission: as this thesis shows, individual states and even smaller groupings within them can contribute an enormous amount to the wider process of nuclear ordering, and the amount of empirical detail they produce in doing so is huge. However, to do so is an important effort towards scholarly understandings of nuclear order. South Africa is widely assumed to have had an outsized impact on world nuclear politics, from the 1960s up until the present day, but few if any researchers have made serious efforts towards understanding the distinctively South African, or Afrikaner, or anti-apartheid contributions to nuclear ordering. A sizeable body of work dealing with South Africa and nuclear politics exists, as surveyed in the literature review, but overwhelmingly approaches the issue by attaching South Africa to one of many categories constructed with exclusive reference to the 'global': South Africa as a 'middle power', or a 'rogue state', or a 'non-proliferation champion'.[151] These analytical labels are crafted using the conceptual tools of IR and a focus on the global 'level' of analysis, and finer detail is obscured. While this may pose immediate challenges to

[148] David Lake, 'Theory Is Dead, Long Live Theory: The End of the Great Debates and the Rise Eclecticism in International Relations', *European Journal of International Relations* 19, no. 3 (2013): 567–87.
[149] Lake, 'Theory Is Dead, Long Live Theory: The End of the Great Debates and the Rise Eclecticism in International Relations', 573.
[150] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 2, emphasis added.
[151] See variously Leith and Pretorius, 'Eroding the Middle Ground: The Shift in Foreign Policy Underpinning South African Nuclear Diplomacy'; Robert E. Harkavy, 'Pariah States and Nuclear Proliferation', *International Organization* 35, no. 1 (1981): 135–63; Jo-Ansie van Wyk and Anna-Mart van Wyk, 'From the Nuclear Laager to the Non-Proliferation Club: South Africa and the NPT', *South African Historical Journal* 67, no. 1 (2015): 32–46.

macro-level theorizing, this is not an adequate justification to turn away from much more locally-specific questions. Asking how particular cultural configurations of Afrikaner nationalism drove Pretoria's nuclear weapons conduct during the 1980s, or how local interpretations of and reactions to global nuclear norms have fuelled conflicts over the South African enriched uranium stockpile, can contribute immensely to the understanding of global nuclear order. It does, however, require some methodological and conceptual innovation to consciously broaden analytical lenses beyond the tools of IR, and a willingness to incorporate those extradisciplinary concepts that can better achieve this end.

Elsewhere, Hecht recognizes the unavoidably global dimension of her highly localized analysis of the nuclear in sub-Saharan Africa. She employs the anthropologist Anna Tsing's concept of 'friction', which

> calls attention to the unevenness with which knowledge travels, the always-local circumstances that change its content along the way, and the material consequences of its motion. Regimes of perceptibility in African uranium mines, I argue, emerged from the friction between *universalizing claims to, or denial of, nuclearity* and particular imperial histories, with consequences for occupational exposures, their legibility, and workers' changing political options.[152]

These 'universalizing claims to nuclearity' are a product of global nuclear order. Though the IR concept of global nuclear order is absent from Hecht's work,[153] she equally recognizes that 'local' nuclear terrains are unavoidably conditioned by global dynamics, institutions, and power. Together, these are two concepts which, despite having distinct theoretical origins and explicitly focusing on different 'levels' of analysis (see below), are already open to dialogical engagement with one another. Walker's 'global nuclear order' and Bull's 'international society' are theoretically attuned to the nominally 'local', despite focusing on 'global' processes of inter-state relations and evolution of norms and institutions. Hecht's 'technopolitics' and 'nuclearity', although she uses them mainly to excavate local cultural specificities, are also explicitly partially constituted by 'global' dynamics. I explore below in detail the specifics of each concept, the precise ways in which they dovetail together, and the choice to tack closer to disciplinary IR and 'conventional' studies in nuclear order rather than engaging in, say, an ethnography of the South African nuclear programme. First, a brief

[152] Gabrielle Hecht, 'Africa and the Nuclear World: Labor, Occupational Health, and the Transnational Production of Uranium', *Comparative Studies in Society and History* 51, no. 4 (2009): 899–900, emphasis added.
[153] The term 'world nuclear complex', referring largely to global uranium markets, is nonetheless present throughout Hecht, *Being Nuclear*.

note on 'levels' of analysis is necessary. Given my aforementioned eclectic approach to theory and the project's central focus on interaction between 'local' and 'global' in nuclear order, it is inevitable that the traditional 'levels' of global and local are violated—yet they are also retained as useful analytical categories, on account of their 'real-world' material effects and appearance as part of objective social reality. This aspect of the global/local question also requires us to touch—albeit briefly—upon the eternal problem of structure and agency.

'Levels of analysis' (and their conscious violation)

The issue of levels of analysis has been a durable concern in international relations, as well as in related disciplines such as political science and human geography. Although I do not primarily intend this thesis as a theoretical intervention into that long-running debate, the proposition that 'global' and 'local' in nuclear politics are not stable categories is one of the main organizing principles of this work. It is therefore necessary to briefly recall some of the important IR discussions on the topic, before sketching out my own orientation to the issue and how it differs from some of the more conventional approaches. From an international relations perspective, the work of the most immediate relevance is Waltz's 1959 work *Man, the State, and War*.[154] Waltz's account will be familiar to most scholars situating themselves within disciplinary international relations for his important and influential development of what would become known as structural realism. In the course of developing his theoretical argument, for which the book is best known and on which it makes its most important contribution, Waltz identifies three 'images' of world politics. In very brief summary, an understanding of 'man' and 'the state' (the actions and thoughts of individuals, and the domestic politics of individual countries) is required to explain why particular wars occur in the way that they do, but the underlying condition that enables the recurrence of war is found within the third image: the international system, and in particular the structural condition of anarchy. There has been a tendency to equate these images directly to levels of analysis, but as Suganami points out in a characteristically insightful article, this is a mistake: 'Weighing of causes is a very different exercise from finding them'.[155] Waltz does not even use the term 'level' anywhere in the text. His interest lies not in presenting a metatheoretical framework for levels of analyses in international relations, but rather in making a theoretical argument for the prime importance of the third 'image' of the states system as a cause of war. Although I therefore do not adopt a 'Waltzian' approach to the levels of analysis question (to the extent that one exists), Waltz's thinking around the matter has been influential in IR and probably is to some extent responsible for the assumed divide between

[154] Kenneth N. Waltz, *Man, the State, and War* (New York: Columbia University Press, 2001).
[155] Hidemi Suganami, 'Understanding Man, the State, and War', *International Relations* 23, no. 3 (2009): 375.

'global' and 'local' dynamics. This is especially true with regard to the study of nuclear politics, a field which has long been intellectually dominated by structural realism. Furthermore, the extent to which English School theory in turn is influenced by structural realism helps us to understand why Walker's theory of global nuclear order tends rather to privilege so-called 'third image' explanations.

Perhaps the classical treatment on the levels of analysis problem itself is provided by Singer, who argues that scholars of international relations must make choice between two main levels when calibrating their inquiries: that of the 'international system' and the 'national state'.[156] Neither of these framings is perfect, he acknowledges: selecting to ask questions at the international or systemic level sacrifices detail and precision in favour of drawing much wider theoretical conclusions, while working at the national or sub-systemic level allows us to make finer-grained analyses at the expense of coherence and more generalizable insights. Scholars may choose to switch between these levels of analysis depending on which is most appropriate for their chosen question, 'temporarily' resolving this fundamentally irresolvable question for the purposes of a given research project—a laudably pragmatic approach.[157] Singer darkly warns us, in a conclusion which bodes ill for the remainder of this thesis, that failing to nail one's level-of-analysis colours to the mast will yield 'little more than an ever-growing potpourri of discrete, disparate, non-comparable, and isolated bits of information or extremely low-level generalizations'.[158] Unfortunately, any researcher taking Singer's advice will quickly run into problems if her primary interest lies, as with this thesis, in teasing out the nature of relationships and interactions *between* levels.

A degree of interaction between levels is always a given, whether or not the researcher chooses to work at a particular level or privilege one over another. What's more, as Putnam points out, it is not simply enough to point out that such interaction exists. It is necessary 'to seek theories that integrate both spheres, accounting for the areas of entanglement between them'.[159] Otherwise, researchers risk being hamstrung by undue attachment to a set of inappropriate theories, or by an approach which tethers them to a given level of analysis at the expense of another—even when trying to synthesize the two. An illustrative example of this in the specific field of nuclear politics is Solingen's project on the logics of nuclear restraint, and how domestic constituencies can affect proliferation decisions.[160] While an extremely valuable study in many ways, Solingen's work does not quite manage to 'bridge the gap' or work in the space between Singer's principal levels of analysis.

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[156] J. David Singer, 'The Level-of-Analysis Problem in International Relations', *World Politics* 14, no. 1 (1961): 77–92.
[157] Singer, 'The Level-of-Analysis Problem in International Relations', 90.
[158] Singer, 'The Level-of-Analysis Problem in International Relations', 92.
[159] Putnam, 'Diplomacy and Domestic Politics: The Logic of Two-Level Games', 433.
[160] Solingen, 'The Political Economy of Nuclear Restraint'; Solingen, *Nuclear Logics*.

Her thesis that the relative prominence of 'globalizing' or economically liberal constituencies within a given state will determine levels of proliferation restraint is in many ways a convincing one—but 'local' specificities are obscured from the picture as domestic constituencies simply serve as a mirror which reflects the global back onto itself.[161] Similarly, in a piece extremely relevant to this thesis, van Wyk and van Wyk refer to Putnam's idea of the 'two-level game'—in which actors attempt to reconcile domestic and international goals—in an analysis of the ANC's transnational anti-apartheid anti-nuclear campaign (see chapter 2). They acknowledge, importantly and entirely correctly, that 'South Africa's domestic policies reverberated with consequences internationally, and vice versa'.[162] However, converse to Solingen's argument, this argument also falls short since the 'global' level in their analysis is represented rather instrumentally, a resource used by the ANC (a domestic constituency) to achieve its domestic goal of ending apartheid. In other words, the global simply reflects the local back on itself.[163] This is only half of the story, since it fails to account for the processes of nuclear ordering that this campaign entailed, and how *those* ordering products of the campaign came to reverberate through South Africa's future nuclear politics and 'atomic publics'.[164] It is apparent, therefore, that closer attention needs to be paid to the analytical work that levels do, and the ways in which they can limit the analysis of world nuclear politics.

With this in mind, it is more helpful to take a more constructivist approach to the question of levels. As Onuf reminds us, their construction is a matter 'of choice and convention', arising often from methodological requirements as Singer's work suggests: although artificial, levels are necessities for the pursuit of social science.[165] Walker's choice, for example, to focus on *global* nuclear order has enabled him and countless other researchers who have adopted his typologies to make important interventions into macro-level problems. Were the boundaries of Walker's global 'level' to be dissolved, the wide-ranging implications and (intended) universal applicability of his work would be diminished; for these reasons, I do not harbour pretensions to (re)theorizing global nuclear order in this thesis. However, Onuf also points two considerations regarding levels that are centrally important to this work. First, levels 'are not just a taxonomic convenience for scholars, or a methodological expedient. They are a potent metaphor, an ancient convention, for marking, and

[161] I thank Jan Ruzicka for helping me to tease this point out of my earlier writing.
[162] van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program', 7.
[163] For another example of this broad argument, see Edwards and Hecht, 'History and the Technopolitics of Identity'.
[164] See Itty Abraham, *South Asian Cultures of the Bomb: Atomic Publics and the State in India and Pakistan* (Indiana University Press, 2009).
[165] Nicholas Onuf, 'Levels', *European Journal of International Relations* 1, no. 1 (1 March 1995): 53.

thus making, wholes'.[166] Second, when working at high 'levels' of abstraction, boundaries between levels

> exist only to the extent that we fashion rules defining them […] Rules work to make some relations more consistently causal in pattern than might otherwise be the case […] They do this notably by empowering various people to act in various ways on behalf of themselves and others.[167]

Taken together, these insights regarding the structuring consequences of 'level-thinking' inform my study of global nuclear order. The concept of global nuclear order and, more widely, its underlying assumption that nuclear politics takes place on a distinctly 'global' level is such a powerful organizing metaphor that it has 'real-world' consequences. Readers will see throughout the thesis that ontological assumptions about what constitutes respective 'global' and 'local' domains of nuclear activity are upheld by the institutions and rules of nuclear order. These rules do indeed empower and disempower certain actors and authorities in certain areas, hiving off some areas of nuclear activity to 'global' multilateral oversight and removing them from the purview of national policymaking, while designating other—usually 'less nuclear'—activities as safely permissible at a more 'local' level.[168] Therefore, while I am partly interested in examining the ways in which 'global' and 'local' are insufficient categories which often obscure more than they reveal in studies of nuclear order, it is critically important to recognize both their utility as methodological constructs *as well as* the political work done by them as categories. Scholars of post-development, decoloniality, and globalization have argued in a slightly different context that knowledges or constructs designated as 'global' are simply 'local' ones which have been elevated to a globally hegemonic status.[169] An analogue can be identified with regard to global nuclear order and the non-proliferation agenda, which elevates parochial superpower (and later, specifically US) concerns to the level of global public goods.[170] As such, throughout the thesis, the 'global' and 'local' fade in and out of view simultaneously, with the 'levels' remaining an important component of a reflexive critique of IR.

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[166] Onuf, 'Levels', 53.
[167] Onuf, 'Levels', 52.
[168] Hecht, *Being Nuclear*.
[169] Boaventura de Sousa Santos, João Arriscado Nunes, and Maria Paula Meneses, 'Opening Up the Canon of Knowledge and Recognition of Difference', in *Another Knowledge Is Possible: Beyond Northern Epistemologies*, ed. Boaventura de Sousa Santos (London: Verso, 2008), xix–lxii.
[170] Campbell Craig and Jan Ruzicka, 'The Nonproliferation Complex', *Ethics & International Affairs* 27, no. 3 (ed 2013): 329–48.

Critically-minded readers may detect something of actor-network theory (ANT) in this orientation—specifically in my wariness of unduly reifying constructions like 'global' and 'local'. Though explored during the earlier stages of this work, this and various other critical methodological interventions on scale, 'flat ontology', and 'assemblage thinking' were deemed to be unsuitable for the task at hand.[171] Nexon and Pouliot provide a brief but useful summary of some of the problems that arise from attempting to incorporate ANT into an IR project. While it is doubtless a fruitful approach in many situations, it was not the case for this project, for reasons that Nexon and Pouliot neatly explain. They note that 'ANT's emphasis on uncertainty and fluidity may sometimes be unproductive in the conduct of social inquiry' in the context of IR studies, because although it is necessary to be ontologically cautious about constructed categories like levels, they often 'tend to be locally stable because they inhabit things […] and institutions'.[172] This is an important observation that is borne out throughout the thesis: the categories of 'global' and 'local', as well as more specific constructions like 'global nuclear order', are inscribed in the way actors behave, in the institutions that regulate nuclear technology, and—as Hecht's concepts enable us to recognize—even in the physical makeup of South Africa's nuclear infrastructures and resources. As discussed in the section below, constructions like this can take on a 'social ontology' which imbues them with 'real-world' power. For a thesis which aims to address in part the hierarchcical nature and power-effects of global nuclear order, and how they condition global-local interactions, it becomes quickly apparent that ANT and other approaches which attempt to flatten ontologies are an analytical dead end. Accordingly, the decision was taken to remain within IR and the concept of global nuclear order precisely for the 'double work' it can do for the thesis: serving at once as a tool for understanding world nuclear politics on its own terms *and* as an object of interest itself for the political and power effects it produces. These dynamics are fleshed out in much greater detail, with concrete examples abound, in the forthcoming empirical chapters.

Structure, agency, and power in nuclear order

[171] Some texts consulted at this stage of the research include Saskia Sassen, 'The Global City: Introducing a Concept', *Brown Journal of World Affairs* 11, no. 2 (2004): 27–44; Sallie A. Marston, John Paul Jones, and Keith Woodward, 'Human Geography without Scale', *Transactions of the Institute of British Geographers* 30, no. 4 (1 December 2005): 416–32; Helga Leitner and Byron Miller, 'Scale and the Limitations of Ontological Debate: A Commentary on Marston, Jones and Woodward', *Transactions of the Institute of British Geographers* 32, no. 1 (2007): 116–25; Michele Acuto and Simon Curtis, 'Assemblage Thinking and International Relations', in *Reassembling International Theory* (Palgrave Pivot, London, 2014), 1–15; Saskia Sassen and Aihwa Ong, 'The Carpenter and the Bricoleur: A Conversation with Saskia Sassen and Aihwa Ong', in *Reassembling International Theory: Assemblage Thinking and International Relations*, ed. Michele Acuto and Simon Curtis (Basingstoke: Palgrave Macmillan, 2014), 17–24.

[172] Daniel H. Nexon and Vincent Pouliot, '"Things of Networks": Situating ANT InInternational Relations', *International Political Sociology* 7, no. 3 (2013): 344.

Regarding the question of structure and agency, this thesis does not aim to reinvent the wheel nor to make substantial theoretical inroads into that particular matter. However, the preceding points about 'rules' and how assumptions about levels of analysis can generate structuring effects does demand a basic awareness of the issues at play. In many ways, the thesis perhaps comes down more heavily on the side of 'understanding' rather than 'explaining' local/global interactions in global nuclear order—to the extent that they are even separable—[173] and I attempt to offer a more processual, narrative account of the interactions under examination. An awareness of the function of power, however, is vital in discussions of nuclear order, and as Ritchie rightly points out, too many treatments of the subject have failed to incorporate power into their analysis.[174] My critically oriented stance towards the concept of nuclear order is elaborated below, but the understanding of power/structure/agency which animates Ritchie's critique—developed most importantly by Robert Cox—also informs the direction of my inquiries here.[175] Bieler and Morton refer to this in their useful survey of the 'second wave' of the structure/agency debate as a 'historicist neo-Gramscian' perspective. This perspective is mostly implicit in the empirical work, rather than explicitly followed as 'method', but as an orientation to questions of power and agency it proves extremely fruitful.

On this account, Coxian or neo-Gramscian scholars are able to locate 'agency *in* structure' by understanding structure as 'resulting at least partly from actions in the past while acknowledging the possibility that social forces can choose among several available strategies' within the simultaneously enabling and constraining context of structure.[176] Alongside actions, structure is also of course a result of historical processes and a product of particular historical epochs—recalling Marx's famous dictum regarding the circumstances under which actors make history. The global nuclear order emerged out of the structural economic and geopolitical conditions of the Cold War, but also from the agency of myriad actors at both 'global' and 'local' spheres of activity. Having firmed up and coalesced around the non-proliferation norm, it has also taken on structuring capabilities itself. This thesis demonstrates how South Africa's interactions and entanglements with global nuclear order, throughout its development, bears out this account. I will examine the ways in which the apartheid government worked hard to shape the global nuclear order which was rapidly

[173] Martin Hollis and Steve Smith, *Explaining and Understanding International Relations* (Oxford: Clarendon Press, 1990); Hidemi Suganami, 'Agents, Structures, Narratives', *European Journal of International Relations* 5, no. 3 (1999): 365–86.
[174] Nick Ritchie, 'A Hegemonic Nuclear Order: Understanding the Ban Treaty and the Power Politics of Nuclear Weapons', *Contemporary Security Policy*, 31 January 2019, 1–26.
[175] Robert W. Cox, 'Gramsci, Hegemony and International Relations: An Essay in Method', *Millennium* 12, no. 2 (1 June 1983): 162–75, https://doi.org/10.1177/03058298830120020701; Robert W. Cox, *Production, Power, and World Order: Social Forces in the Making of History* (New York: Columbia University Press, 1987).
[176] Andreas Bieler and Adam David Morton, 'The Gordian Knot of Agency-Structure in International Relations', *European Journal of International Relations* 7, no. 1 (2001): 27.

forming around it as a product of the Cold War. I will also show how the ANC endeavoured to stamp its own influence on nuclear order in the 1990s, in the face of overwhelming US preponderance as liberal capitalism prevailed—and working within constraints of nuclear order that were partially the results of actions by the previous regime.

This historicist view is of further use when considering the aforementioned questions around levels of analysis. Against both (an admittedly crude characterization of) the positivist tendency to accept the categories of 'global' and 'local' as objective realities, but also the poststructuralist conclusion that these terms can only be understood as purely subjective, the neo-Gramscian orientation towards structure and agency posits a 'social ontology' of these terms. Similar to the geographical constructions of North and South, these 'levels' are at once intersubjective shared understandings arising from human interaction, while crucially 'retaining a 'humanly objective' sense because of the direct physical impact they would have on people's lives'.[177] In other words, they are made powerful in a very 'real' sense, regardless of their socially constructed and historically contingent nature.

This orientation to structure and agency therefore allows us to examine the very real political impacts and power-effects of the categories of 'local' and 'global', taking seriously the notions of 'global nuclear order' and 'local nuclear politics' while simultaneously positing that their separation is not so clean-cut as such categories imply. It is however crucially important not to conflate the constructed categories of 'global' and 'local' with 'structure' and 'agency'. To fall victim to the assumption that the global realm is one of solid, immutable structures, while the agency of different actors can only prevail locally, is nonsensical. It implies a hard boundary between 'global' and 'local', and denies the possibility that 'global' and 'local' dynamics can be meaningfully connected. On the contrary, agency on the part of various actors within the nuclear order can be found at both the so-called local and global 'levels' of activity. Meanwhile, the structural effects of nuclear order can also be found to permeate those 'local' processes which one might otherwise assume are under the control of local actors. This recognition is central to the thesis. It enables us to locate 'local' agency in studies of global nuclear order, which have too often over-emphasized prevailing structural dynamics despite paying lip service to the fact that 'ordering' activities necessarily take place at all 'levels' of analysis—indeed, it could be argued that they violate them. [178] Conversely, it should also be recognized that what may appear to be the relatively unconstrained exercise of authority over nuclear policy, research, and so on at the 'local' level is also conditioned by ideas of nuclear order. The designation of what activity is permissible at 'global' or 'local' levels in nuclear politics is a part

[177] Bieler and Morton, 'The Gordian Knot of Agency-Structure in International Relations', 20.
[178] Referring again to Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 2.

of a technopolitical project, and a function of the global nuclear order's hegemonic power. Siloing off particular kinds of activity appropriate to take place at one 'level' or the other is an important way in which the institutions and norms of nuclear order work to limit opportunities for meaningful agency. Throughout the proceeding chapters, then, the categories of 'local' and 'global' fade in and out of view, continuously and simultaneously. They are retained on the one hand in recognition of their undeniable 'social ontology', the ways in which their assumed immutability shapes the processes of global nuclear ordering and academic analysis and enquiry. At the same time, they are intentionally transgressed, so that the processes of interaction between South Africa and global nuclear order can be seen as continuous chains of activity.

The above discussion is not an attempt to resolve the quandaries of structure/agency or 'levels of analysis' in IR. These theoretical debates will rumble on irrespective of the findings outlined in this thesis. It should however prove useful as a primer on my orientation towards these infinitely sticky issues, and offer the requisite degree of coherence to the conceptual work done throughout the forthcoming chapters. Most importantly, it outlines my recognition of the importance of *power* throughout the study—a dimension that merits further discussion in the context of global nuclear order.

Concepts: Global nuclear order

I turn now to the primary organizing device of the thesis: the concept of global nuclear order. As Horsburgh details in her useful study of China and global nuclear order, before the term was expounded upon by Walker it was oft-used but rather vague. Indeed, this condition persists in many quarters partly because the very idea of a global nuclear order is not universally accepted. Realists in particular claim that 'a global nuclear order doesn't exist, or if it does, it is best defined in narrow power politics terms, where nuclear order is simply a set of relations between major powers'.[179] These views, Horsburgh notes, made up the bulk of responses to Walker's formulation in a 2007 special issue of *International Affairs*—with analysts who fancied themselves harder-nosed objecting to his ideological commitment that nuclear order represented an apogee of Enlightenment liberal institutionalism.[180] This alone was not an unreasonable objection, and it is one shared to an extent by the author. Realists' insistence on the importance of power, structure, and deterrence relationships between the principal nuclear weapons states is well-taken. However, Walker's formulation of global nuclear order offers plenty of room for these important factors. In addition, it

[179] Horsburgh, *China and Global Nuclear Order: From Estrangement to Active Engagement*, 6.
[180] e.g. David S. Yost, 'Analysing International Nuclear Order', *International Affairs* 83, no. 3 (2007): 549–74; Joachim Krause, 'Enlightenment and Nuclear Order', *International Affairs* 83, no. 3 (2007): 483–99.

allows me to incorporate into my analysis the complex and hegemonic institutional, normative, and ideological frameworks that have sprung up around nuclear technology since the beginning of the Cold War. These are of course, in part, products of structure and power relationships, but take on an additional significance which is beyond the scope of structural realist analysis. Incorporating a power analysis as outlined above—which is sensitive to history and hegemony—enables us to treat the institutions and norms of nuclear order as part of the exercise of power. Finally, given that the global nuclear order encompasses the vast majority of states which do not possess nuclear weapons, it is necessary to expand one's analysis beyond raw deterrence (and even extended deterrence) relationships. Clearly, the concept of global nuclear order offers the possibility of a more nuanced and wider-ranging analysis of the nuclear world than do accounts solely concerned with great-power balancing and nuclear strategy.

Walker's basic argument is that during the 1960s, an arrangement based on 'two mutually supportive cooperative orders: the systems of deterrence and abstinence' began to solidify into something resembling an order.[181] These systems existed in perpetual tension, yet for global nuclear order they were both vitally important and dependent on one another. This nexus called for stable nuclear deterrence relationships between nuclear-weapons states and specifically the Cold War superpowers, which essentially precluded any form of nuclear 'abstinence' on their part. Abstinence was, however, required from the non-nuclear weapons states which made up the great majority of the international community; for many states which did not benefit from security guarantees with nuclear powers, this was not an attractive bargain. Squaring the circle required the 1968 Treaty on the Non-proliferation of Nuclear Weapons (NPT) to offer negative security assurances to the nuclear 'have-nots' by the 'haves' and a commitment to eventual nuclear disarmament on the part of the NWS. Finally, Article IV of the Treaty enshrined 'the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination'.[182] This bargain at the heart of the NPT is crucial to its legitimacy, and the widely accepted non-proliferation norm, alongside the theoretical promise of eventual disarmament, functions to make acceptable the NPT's 'logic of inequality' to the nuclear have-nots.[183] For Walker, deterrence has always been the most important element of this settlement: 'the formation of a nuclear order was animated by a desire to prevent enmity among the major powers from spilling

[181] Walker, 'Nuclear Order and Disorder', 707.
[182] United Nations, 'Treaty on the Non-Proliferation of Nuclear Weapons', 2005, https://www.un.org/en/conf/npt/2005/npttreaty.html.
[183] Joseph S. Nye, 'NPT: The Logic of Inequality', *Foreign Policy*, no. 59 (1985): 123–31.

over into catastrophic war'.[184] Nevertheless, the required strategic balance to prevent nuclear war was delicate, and depended on the system of restraint to ensure that nuclear weapons did not spread so far as to upset it.

Walker has periodically reiterated, updated, and slightly modified his framework. In the 2007 *International Affairs* special issue, he delivered a grave warning that the Enlightenment project of global nuclear order was under threat. A 'counter-enlightenment' was gathering steam, supporters of which

> drew the United States into placing trust in its enormous hegemonic capacities, using the constitutionalism of the NPT and other multilateral treaties as disciplinary instruments but abandoning them as vehicles for cooperative engagement and innovation, and ignoring the cautionary advice of realists.[185]

The targets of Walker's ire in this article were the George W. Bush administration and its advisors who by his estimation threatened global strategic stability by progressively delegitimizing the norms upholding nuclear order. Trust in US stewardship of nuclear order was seriously undermined, he argues, by the weaponization of counter-proliferation against countries like Iraq and Iran, while America rewarded India's repeated NPT transgressions with a unique special status within the order.[186] Walker's last major contribution to the concept came in 2011 with the book *A Perpetual Menace*, which provided a sweeping overview of nuclear history and the development of global nuclear order. Refinements were made to the typology of 'systems': non-proliferation and deterrence became non-proliferation 'plus' and deterrence 'plus' respectively, reflecting a more expansive conception of the elements at play. Deterrence-plus covered the entire 'managed system' of military engagement with nuclear technology, not only deterrence relationships, and non-proliferation plus encompassed the managed system of 'military abstinence from, and civil engagement with, nuclear technology'—not only non-proliferation measures and institutions.[187] Walker consciously eschews the term 'governed' in favour of 'managed', so as not to imply 'more cohesion and overlordship than seems appropriate'.[188] Within these systems operate the three 'logics' of armament, disarmament, and restraint. Given Walker's unease with recent geopolitical developments and the logic of armament which, he argues, continues to prevail in Asia and the Middle East, he identifies the 'main political objective' of the nuclear age as 'to achieve restraint in

[184] William Walker, 'Weapons of Mass Destruction and International Order To 1990', *The Adelphi Papers* 44, no. 370 (2004): 24, https://doi.org/10.1080/05679320412331340417.
[185] Walker, 'Nuclear Enlightenment and Counter-Enlightenment', 433.
[186] Walker, 'Nuclear Enlightenment and Counter-Enlightenment', 448.
[187] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 24.
[188] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 24.

states' resort to war and in the usage and spread of nuclear weapons'.[189] Recalling Bull's pivot towards solidarism in his later work, Walker advocates a thickening of non-proliferation (plus) measures and identifies a bolstered logic of restraint as humanity's best hope in avoiding nuclear war.

Walker having provided the still-definitive account of nuclear order, there have been few scholarly attempts to revise the concept and even fewer, if any, to posit alternative frameworks. In this thesis, therefore, when the term 'global nuclear order' is used, it refers to a reading of the concept which is quite close to Walker's original formulation. Kutchesfahani identifies Horsburgh's study of China and nuclear order alongside Walker's body of work as one of the key efforts in advancing the concept,[190] but in fact it only amounts to a very minor reshuffling of some of Walker's categorizations and terminologies—rather than substantively reworking the concept itself. Alongside a useful potted history of the development of nuclear order through the decades,[191] Horsburgh condenses Walker's 'two systems/three logics' into 'four elements' of deterrence, arms control, non-proliferation, and disarmament. She argues that this revised model is an improvement on Walker's, since it 'enhances the ability to uncover the inner workings of nuclear order, in particular the ways in which the elements complement and contradict each other'.[192] This slight variation on a tried and tested formula is useful for Horsburgh's study of China, which has been actively involved in each of the four identified elements to varying extents since the early 1960s and the advent of Beijing's first nuclear test. However, it is not clear for the purposes of this project that this represents a significant departure from Walker's original framework. South Africa, in addition, has been overwhelmingly active in the realms of non-proliferation and disarmament; for obvious reasons, Pretoria has had little say in arms control agreements, and it is highly debateable as to whether South Africa, even when nuclear-armed, existed in any form of deterrence relationship with another state—though of course, it has contributed to these elements through its bolstering of the institutions of nuclear restraint. From the perspective of this project, there is little need to further disaggregate or modify Walker's framework as Horsburgh does, although her study into Chinese 'engagement' with nuclear order is illustrative of the valuable insights than can arise from studies of this nature.

[189] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 175.
[190] Sara Z. Kutchesfahani, *Global Nuclear Order* (Oxon: Routledge, 2018).
[191] An endeavour that I have chosen not to pursue here given the abundance of global nuclear histories already written. For a book-length history of the development of nuclear order, see Walker, *A Perpetual Menace: Nuclear Weapons and International Order*; See also Kutchesfahani, *Global Nuclear Order* for a global overview of nuclear order in historical context.
[192] Horsburgh, *China and Global Nuclear Order: From Estrangement to Active Engagement*, 22.

More value is to be found, I argue, in developments of the concept of global nuclear order which have come from critically inclined scholars, especially those returning to the sticky issue of power. Perhaps the most persistent critique of Walker's theory is that he pays insufficient attention to the operation of power within global nuclear order. It is not that Walker's work cannot accommodate a power analysis—power is implicit in his focus on deterrence as the 'king' element of nuclear order, and in the strong realist influences on his work—but rather that he provides an inadequate account of the ways in which power shapes the norms and institutions of restraint, non-proliferation, and so on. In a damning but necessary criticism, Ritchie rebukes current nuclear scholarship for failing to account for power and hierarchy, even when talking about issues such as the TPNW and Humanitarian Initiative which are unavoidably bound up in power imbalances. Further illustrating the suitability of an approach to nuclear order that is informed by Gramscian analysis, Ritchie applies Cox's framework for understanding power and hegemony. He posits three 'pillars' which come together to constitute a 'hegemonic nuclear control order': material capabilities, institutions, and ordering ideas.[193] He then subsequently identifies six key 'social institutions' of nuclear order, which are aimed at perpetuating the hierarchies of nuclear order—not eliminating them. These institutions are an 'oligarchy' of nuclear weapons and trade, the assumption that the modern state should be capable of strategic violence, bilateral arms control between the US and Russia, alliance structures that map onto the distribution of global wealth and power, 'a system of intrusive and institutionalized nuclear policing', and a set of formal institutions tasked with regulating civilian nuclear technology.[194] It is these institutions that initiatives like the TPNW must challenge with their own 'counter-hegemonic' project if nuclear order is to be reformed and disarmament achieved.

Through this analysis, Ritchie paints a highly textured and sharply critical portrait of nuclear order which succeeds in stripping back the ideological trappings of Walker's envisioning. It also provides a much more precise overview of the exact obstacles faced by states or other groupings who aim to challenge the power of global nuclear order; it is in this sense more useful than the idea of Walker's three 'logics' or Horsburgh's four 'elements', which are essentially the same. South Africa, as I will show throughout the thesis, has experienced concrete confrontations with most of the social institutions that Ritchie identifies; furthermore, Ritchie's approach encourages a greater awareness of the structural and material conditions of both the global economy and of nuclear hierarchy, which have also undoubtedly coloured South Africa's interactions with nuclear order. Ritchie is not completely alone in making this kind of analysis, although fellow travellers are admittedly scarce. In

[193] Ritchie, 'A Hegemonic Nuclear Order: Understanding the Ban Treaty and the Power Politics of Nuclear Weapons', 415.
[194] Ritchie, 'A Hegemonic Nuclear Order: Understanding the Ban Treaty and the Power Politics of Nuclear Weapons', 424–25.

an article that precedes Ritchie's power analysis but is animated by a very similar understanding and typology of power, Ruzicka focuses on 'the non-proliferation norm' (as a constitutive element of nuclear order), examining in finer detail than does Ritchie how nuclear weapon states have created 'the belief that non-proliferation is the unquestionable good. It is the right thing to do'.[195] I will return to this analysis, particularly in the final two chapters of the thesis, since South Africa's relationship to the non-proliferation norm undergirding nuclear order has been of central importance at to both 'global' and 'local' observers since the ANC took power in 1994. In general terms though, Ruzicka's intervention further cements the case that a robust analysis of power, hierarchy, and the manipulation of norms by the nuclear elite is required for this project. Extremely important also is Egeland's analysis, which follows Ritchie's taxonomy of hegemonic power, of the deeply ideological technopolitical content of nuclear order.[196] Finally, another contribution which proved influential to the conception of nuclear order adopted here is Shampa Biswas's *Nuclear Desire*.[197] As discussed in the literature review, this is a landmark treatment on the intersection of coloniality and nuclear hierarchy. Biswas's critique is regularly cited throughout the thesis, as is to be expected from a project which deals with a post-colonial state's encounter with the global nuclear order. However, while a useful work overall, Biswas's central motif of 'commodity fetishism', desire, and nuclear weapons does not assist us greatly in crafting a conceptual approach to nuclear order specifically. Her focus on coloniality nonetheless adds further and welcome depth to critical understandings of nuclear order, as does her deconstruction of the Eurocentric philosophy underpinning Walker's formulation of the concept.

Overall, the approach to global nuclear order adopted in this thesis is heavily informed by these critical interventions. While Walker conceives of global nuclear order as a public good which is ultimately governed by reason and a multilateral reformist drive towards disarmament, I am far more convinced by the charge that it entrenches hierarchy and power disparities through a set of coercive and constraining institutions which are ultimately discriminatory in their logic. However, none of this renders Walker's formulation of global nuclear order obsolete or useless. On the contrary, it is still an incredibly helpful device for understanding world nuclear politics, especially in conjunction with accounts of order that are more explicitly attentive to power. The metatheory of the concept permits an accounting for power structures and material capabilities in conjunction with

[195] Jan Ruzicka, 'Behind the Veil of Good Intentions: Power Analysis of the Nuclear Non-Proliferation Regime', *International Politics* 55, no. 3–4 (May 2018): 383.
[196] Kjølv Egeland, 'The Ideology of Nuclear Order', *New Political Science*, 2021, 208–30; See also Columba Peoples, 'Life in the Nuclear Age: Classical Realism, Critical Theory and the Technopolitics of the Nuclear Condition', *Journal of International Political Theory* 15, no. 3 (2019): 279–96.
[197] Biswas, *Nuclear Desire*.

institutions and norms, while a Coxian/Gramscian critical eye allows us to understand much more deeply how power operates between these two aspects of order. Moreover, the 'social ontology' of global nuclear order, as discussed with regard to 'levels of analysis' in world politics, is a powerful one. As Horsburgh points out, the term 'global nuclear order' has over the past two decades entered into the Western foreign policy lexicon, its purported erosion unnerving non-proliferation analysts in Washington and Vienna alike.[198] An entire sub-field of study has also coalesced around the concept.[199] In short, global nuclear order is increasingly treated as if it externally exists and, furthermore, is organized according to Walker's idealistic precepts (which themselves are in harmony with the acceptance of multilateral liberal institutionalism that prevailed in the immediate post-Cold War moment). Global nuclear order is therefore an indispensable conceptual lens through which to critically appraise South Africa's encounter with the nuclear world, since the ANC both during and after apartheid has been an extremely important actor in upholding and continually reifying its norms and institutions.

Concepts: Technopolitics and nuclearity

As suggested previously, Gabrielle Hecht's twin, related concepts of technopolitics and nuclearity can help us to effectively bridge the gap between 'global' and 'local' in nuclear politics and enable us to work between these putative levels of analysis. Technopolitics enables us to see how 'global' configurations of nuclear power and order can be embedded in technologies at the 'local' level, and vice versa. Nuclearity is similarly useful, since it can be instructive in demonstrating how the categories of 'global' and 'local' can be politically deployed by mapping them onto designations of what is 'more' and 'less' nuclear. Using the concepts in this way is fully compatible with the stances outlined above on levels of analysis, structure and agency, and power. It completes an approach which is attentive to both processes and practices of social construction *and* materiality, retaining what is useful in the concept of global nuclear order while critically appraising how it is constituted and maintained. The author readily acknowledges that this reads as somewhat vague and all-encompassing, so some precision is now necessary in outlining these concepts and how they can work in an IR context. Helpfully, good company is also provided by other critical scholars of IR who have successfully incorporated elements of these concepts into their own analyses.

The concept of technopolitics, now familiar to most scholars of nuclear technology, is first developed in Hecht's landmark study *The Radiance of France*, which deals with the evolution of the French civil

[198] Horsburgh, *China and Global Nuclear Order: From Estrangement to Active Engagement*, 3–4.
[199] BISA, BISA Global Nuclear Order Working Group, 2020, https://www.bisa.ac.uk/members/working-groups/gno/about.

nuclear complex in the context of the immediate post-WWII moment. Rival coalitions attempted to stamp their own political projects and national visions of France into the physical make-up of the country's burgeoning nuclear infrastructure. This was the pursuit of technopolitics. As noted prior, Hecht draws her conceptual influences from STS and the study of the social construction of large technical systems, as well as cultural history. At the most basic level, Hecht defines technopolitics as 'the strategic practice of designing or using technology to constitute, embody, or enact political goals'; technology, in addition, can 'include artifacts as well as non-physical, systematic methods of doing things'.[200] As Hecht explains, the reason that this process cannot simply be reduced to 'politics' is in the materiality of the technologies at hand. The material reality of technology means that potentially infinite political choices are much more constrained, and those pursuing technopolitics must choose the option that best suits their agenda. More broadly, technology gives political projects material expression and 'real-world', tangible manifestations. Because of the nature of technical and scientific work, in addition, technopolitics can take place where one might not otherwise expect to see conventional politics, but rather in 'the design of material artifacts'.[201] Closely related, and also used extensively throughout much of this thesis, is the subsidiary concept of 'technopolitical regimes'. These are

> grounded in instititutions [and] consist of linked sets of people, engineering and industrial practices, technological artifacts, political programes, and institutional ideologies, which act together to govern technological development and pursue technopolitics.[202]

In Hecht's example, France's Atomic Energy Commission, the CEA, and its state-owned power utility, EDF, pursued opposing technopolitics through different regimes. To provide a very cursory summary of a complex book which merits reading in its entirety, Hecht argues that the CEA operated under a 'nationalist', Gaullist technopolitical regime, the physical manifestation of which were reactors at the Marcoule site which were capable of producing plutonium—with the intent that France should pursue its own nuclear 'deterrent'. EDF's Cold War technopolitical regime, by contrast, was a 'nationalized' one, animated by socialist politics and aimed squarely at the public provision of affordable nuclear power, and pursued in large part through reactor design which eschewed the possibility of building nuclear weapons. The CEA's regime eventually triumphed over EDF's, paving the way for the *force de frappe* and France's independent 'deterrent'. Edwards and Hecht have in fact expanded these definitions to South Africa, specifically addressing the ANC's anti-nuclear campaigning during the 1970s and 1980s, in a study which provides a useful jumping-off point for

[200] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009, 15.
[201] Hecht, *Being Nuclear*, 15–16.
[202] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009, 16.

chapter 3 of this thesis. Their piece is addressed in much greater detail in that section of the thesis. In brief, their argument is that the ANC challenged the technopolitics embedded in the apartheid nuclear programme—which posited an account of muscular Afrikaner independence and apartheid state power—by 'contesting claims about the distinctively South African character of technologies and expertise, and revealing the repressive politics hidden in apartheid technological systems'.[203] This is a convincing account although, as I will show, only a partial one.

Hecht's concepts are defined in relatively straightforward terms, though they are rooted in complex theoretical and conceptual foundations. In order to understand how technopolitics and technopolitical regimes are conceptually valuable to a study on global nuclear order, it is useful to briefly survey some of the literature which has developed them in an IR context. Reflecting Hecht's overriding concern with the so-called domestic level, there exist some recent studies on the technopolitics of South African energy and utility provision—although none specifically addressing nuclear technology in South Africa.[204] These are dealt with in greater detail in the literature review. However, despite an interest in global history,[205] Hecht does not discuss in any significant detail the relationship between French Cold War nuclear technopolitics and the global nuclear order—or even world nuclear politics in general. This seems like a glaring omission. Most obviously, questions can be raised over how far it is possible to understand the nationalist nuclear technopolitics of the CEA in isolation from France's sense of place in the global nuclear order and Gaullist scepticism towards multilateral non-proliferation instruments.[206] Edwards and Hecht's study of the ANC's technopolitical campaign, though globally-oriented on the surface, falls victim to the 'levels of analysis' problem identified above: it posits a relationship in which a domestic constituency (the ANC) simply uses the global or international as a mirror to reflect its campaign back at domestic targets. Clearly then, more work is needed towards integrating questions of nuclear order into accounts of nuclear technopolitics. Such efforts are very few and far between. One account comes from Peoples, who embarks on a primarily theoretical study of the idea of 'Atoms for Peace'—arguing that it constitutes a technopolitical regime which posits a split between the 'civil' and 'military' applications of nuclear technology and regulates the global 'nuclear condition'.[207] This insight is duly noted, and I return to

[203] Edwards and Hecht, 'History and the Technopolitics of Identity', 620.
[204] von Schnitzler, *Democracy's Infrastructure: Techno-Politics and Protest After Apartheid*; Jaglin and Dubresson, *Eskom: Electricity and Technopolitics in South Africa*.
[205] see Hecht, 'On the Fallacies of Cold War Nostalgia: Capitalism, Colonialism, and South African Nuclear Geographies'.
[206] See for instance Heuser, *Nuclear Mentalities? Strategies and Beliefs in Britain, France and the FRG*.
[207] Peoples, 'Life in the Nuclear Age: Classical Realism, Critical Theory and the Technopolitics of the Nuclear Condition'.

Peoples' ideas on the boundary between the 'civil' and 'military' atom—as well as the 'anti-technopolitics' of nuclear order—in the latter part of the thesis.

The second discussion of technopolitics in the context of global nuclear order comes from Dalaqua, who examines the technopolitical regime governing the Brazilian nuclear programme and interprets it, in part, as a repudation of the hierarchical, discriminatory technopolitics pushed by the institutions of nuclear order.[208] Dalaqua's piece is the closest in conceptual and methodological terms to this thesis and, while it is more limited in scope, usefully demonstrates how the concept of technopolitics can be applied to the interactions between states and the global nuclear order. Dalaqua weaves disctinctively 'local' elements into Brazil's 'autonomous technopolitical regime',[209] but crucially also integrates 'local' reactions to and interpretations of the 'global' nuclear order, such as reactions to perceived technological colonization. The objectives of regime are conditioned explicitly by the technopolitics of nuclear order, as Brazil attempts to demonstrate that mastery of nuclear technology by a state in the global South need not always result in weapons proliferation:

> Operating within the limits of the nonproliferation order, Brazil has pursued nuclear activities as a means to develop scientific, techno-logical, and industrial competencies that distinguish the"truly independent"nations from the ones that are"technologically enslaved."[210]

Here is Hecht's reading of 'friction' at work. The global nuclear order prescribes standards of behaviour and places states into hierarchical categories, which come into contact with 'local' histories and experiences and are rearticulated into a distinct technopolitical regime. Dalaqua's piece is an excellent demonstration of how the concepts of technopolitics and nuclear order fit together. However, it is a short piece and does not explore how Brazilian technopolitics have, in turn, contributed to practices of nuclear ordering. Since Brazil is an active participant in the global nuclear order, with a robust civil nuclear sector and occupying—especially historically—an important role in its development, one would equally expect to observe interactions in the 'other direction', so to speak. Alternatively, one might conclude that the 'local' of Brazil and the 'global' of the nuclear order—while the categories perform important analytical *and* technopolitical work—are in constant interaction, with the lines between them blurred. The global is to be found in the local, and the local

[208] Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program'.
[209] Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program', 240.
[210] Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program', 249.

in the global. While Dalaqua's analysis of Brazilian nuclear technopolitics misses this part of the equaition, it does suggest a relatively straightforward methodological path to incorporating it.

Before moving on to the related concept of nuclearity, it is necessary to differentiate Hecht's understanding of technopolitics from an alternative one advanced by Timothy Mitchell in his study of Cold War-era Egypt—'techno-politics'. In Mitchell's formulation,

> [t]echno-politics is always a technical body, an alloy that must emerge from a process of manufacture whose ingredients are both human and nonhuman, both intentional and not, and in which the intentional or the human is always somewhat overrun by the unintended. But it is a particular form of manufacturing, a certain way of organizing the amalgam of human and nonhuman, things and ideas, so that the human, the intellectual, the realm of intentions and ideas seems to come first and to control and organize the nonhuman.[211]

As such, Mitchell's poststructural orientation to the concept adds another layer to Hecht's formulation. While it accounts for intentionality and human agency over the non-human world, it turns a critical eye on the processes of rationalization and organization that, for Mitchell, result in an illusory sense of mastery over nature. It is fundamentally a critique of modernism in state policy.[212] I have chosen not to work with Mitchell's formulation here for methodological reasons: though conceptually attractive, Mitchell's greater willingness to negate intentionality and agency would make it difficult to study how groups like, for example, the ANC have wielded nuclear technopolitics in service of concrete political goals. Hecht's ideas have also been more commonly applied in the context of IR, being that much more straightforward to work with, offering some welcome precedent. However, I take care to give Mitchell's skeptical orientation towards techno-politics and human mastery over the physical world its due. The phenomenion which Itty Abraham has called 'nuclear ambivalence' makes many appearances throughout this thesis, particularly in reference to South Africa's accession to the NPT and the subsequent troubles the ANC has had with disciplining the nuclear legacies of apartheid.[213] Controlling the simultaneous meanings of nuclear technology and policing the boundary between 'civil' and 'military' applications is an ongoing process of illusion-crafting, and ultimately an irresolvable problem.[214] Institutions like the IAEA are accordingly constantly engaged in the activity of 'organizing the amalgam of the human and non-human' to

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[211] Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity*, 42–43.
[212] See also J.C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998). Mitchell himself cites Scott, but notes differences from his work on several key points.
[213] Abraham, 'The Ambivalence of Nuclear Histories'; Itty Abraham, '"Who's Next?" Nuclear Ambivalence and the Contradictions of Non-Proliferation Policy', *Economic and Political Weekly* 45, no. 43 (2010): 48–56.
[214] See also Peoples, 'Redemption and Nutopia'.

generate a sense of mastery over a dangerous technology with multiple possible meanings and uses. I will discuss the question of ambivalence in detail, with specific empirical reference to South Africa; suffice to say, it has the potential to greatly complicate the pursuit of technopolitics. In this sense, Mitchell's skepticism of the possibility of modernist, political control over technology is incorporated throughout this project.

Related to the concept of technopolitics is that of nuclearity. In some ways, it is a subordinate concept, since nuclearity is itself in Hecht's formulation a technopolitical designation. Developed in the most detail in her 2012 monograph *Being Nuclear,* Hecht proposes that nuclearity is 'a contested technopolitical category. It shifts in time and space. Its parameters depend on history and geography, science and technology, bodies and politics, radiation and race, states and capitalism'.[215] Hecht's study here focuses on the uneven distribution of nuclearity, specifically among sub-Saharan mines and mineworkers, along lines structured by patterns of colonial hierarchy and domination, capital, and geopolitics. The material quality of radioactivity, while important, is not the sole or even most significant factor in the distribution of nuclearity:

> Nuclearity is a technopolitical phenomenon that emerges from political and cultural configurations of technical and scientific things, from the social relations where knowledge is produced […] To understand nuclearity, we must explore its spatial and temporal variations. Nuclearity took different shapes and had differtent heft in Gabon, Madagascar, Namibia, Niger, and South Africa.[216]

Hecht is careful to point out that the purpose of this intervention is not to deny the devastatingly harmful material potential inherent in much nuclear technology. It is rather 'to show the consequences of rendering such things exceptional or dismissing them as banal'.[217]

Hecht's study touches on South Africa, although mainly in the context of labour and conditions at the Rössing uranium mine in occupied Namibia. Nuclearity is discussed with reference to the 'global nuclear complex', though this tends to refer to trade networks and global nuclear capitalism specifically, rather than the global nuclear order as conceived of here. As with technopolitics more broadly in *The Radiance of France*, Hecht thus hints at a global dimension of nuclearity but never fully explores it. Nonetheless, the concept of nuclearity has been developed further than that of technopolitics in the context of IR, political science, and critical nuclear studies. Aside from Hecht, the most important contributor to this effort is Itty Abraham, who uses the concept to assess how

[215] Hecht, *Being Nuclear*, 14.
[216] Hecht, *Being Nuclear*, 15.
[217] Hecht, *Being Nuclear*, 15.

states are deemed to have 'become nuclear', and how the criteria for nuclear recognition—as prescribed by the institutions of global nuclear order—are deceptively narrow. For Abraham,

> [b]y highlighting the power of 'disguised'and 'naïve' knowledges in these accounts, a hidden history of nuclearity begins to emerge, as the place of antinuclear sentiments and actions within the accepted historical record of political resistance and social movements begins to become clearer.[218]

This is a useful move. Expanding the view of what counts as 'nuclear' beyond the technopolitical diktats of the global nuclear order allows researchers to locate nuclear activity in perhaps unexpected places. Abraham does this via an examination of anti-nuclear social movements in 'non-nuclear' Southeast Asia, and recovers 'subaltern agency' against more powerful pro-nuclear forces.[219] Abraham explicitly makes the argument, around which this project is largely organized, that 'Nuclear studies rarely, if ever, consider domestic political conditions […] At best, bureaucratic actors and the role of elite interest groups such as scientists may be called on to explain the timing or causes of 'becoming nuclear.'[220] An understanding of differential levels of nuclearity, how it is distributed among certain coalitions, and importantly how it can be *claimed* by 'non-nuclear' or 'less nuclear' groupings and actors.

This is a crucial device which allows us to bring the 'local' into nuclear studies. I have already discussed how the categories of 'local' and 'global' are frequently deployed as claims to power, and in the context of global nuclear order, they often map onto claims of nuclearity. As Hecht's book demonstrates, some things which might otherwise be considered nuclear are 'banalized' through their designation as 'local' issues.[221] On the flipside, states and their leaders attempting to claim or retain the most enhanced level of 'nuclearity' possible by the dominant terms of global nuclear order—nuclear weapons—tend to do so with an eye on the correspondingly enhanced 'globality' they can confer. For instance, apartheid South Africa successfully established a high level of nuclearity—although not yet a nuclear-armed power—through its involvement in the foundation of the IAEA, the Board of which was seen by the apartheid leadership as a venue in which Pretoria could stake a claim to global relevance even as it was progressively isolated in other for a (see chapter 1). South Africa would soon go further and 'stipulate its birthright at the negotiating table of

[218] Abraham, 'What (Really) Makes a Country Nuclear?' 28.
[219] Ibid.
[220] Abraham, 'What (Really) Makes a Country Nuclear?', 37; See Solingen, ***Nuclear*** *Logics* for examples of the studies that Abraham is critiquing here. Hymans, *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation*.
[221] Hecht, *Being Nuclear*.

the Greats' by proving its weapons capability.[222] 'Civil' nuclear policies are understood to be sufficiently less nuclear in that they can be pursued with appropriate oversight and compliance at a 'local', national, or even regional level; 'military' or military-adjacent initiatives are considered to be sufficiently dangerous as to be a 'global' problem, perhaps requiring international responses. If nuclearity is a sliding scale, so, it could be argued, is globality. The two often, although not always, correspond. Being sensitive to shifts on these scales allows us to locate different degrees of nuclearity at different times during the South African nuclear experience. I discuss the formation of the ANC's nuclear technopolitics while it was still in opposition and exile during the 1980s, and I remain sensitive to the somewhat diminished but still significant nuclearity of South Africa's remaining civil nuclear infrastructure without positing some kind of hard boundary between it and the historic weapons programme. Finally and most importantly, I apply these conceptual insights in order to illuminate the linkages between ostensibly 'local' and 'less nuclear' South African things and the broader processes of global nuclear ordering.

Methodological considerations

The methodology employed throughout this thesis is qualitative and inductive. The conceptual and theoretical work performed herein is driven by empirical findings. My approach to excavating processes of technopolitics and the discursive formations of nuclearity is similar to that of Hecht, in that I am strongly informed by a critical historical reading of the available material. Accordingly, the project has been structured around fieldwork, utilizing both paper and digital archival sources alongside interviews with participants involved to various degrees in the South African nuclear complex. Interviewees included anti-apartheid and anti-nuclear activists, engineers and scientists who had worked on the apartheid nuclear weapons programme, present-day officials, and those involved in various parts of the energy industry. Fieldwork was carried out between 2018 and 2019 in the UK, Austria, and South Africa. The primary archives consulted respectively were the archive of the Anti-Apartheid Movement, held in the Bodleian Library at the University of Oxford; the archive of the International Atomic Energy Agency in Vienna; and the South African History Archive (SAHA) in Johannesburg. A number of university library holdings in South Africa were also consulted. Given the challenges of physical archival research in South Africa (see below), online archives also proved to be tremendously valuable. Notably useful sources included the archive of the Wilson Center's Nuclear Proliferation International History Project, and the US-based National Security Archive. Interviews were primarily carried out in person in Cape Town, Johannesburg, and Pretoria, although

[222] P.W. Botha in a 1981 speech at a South African weapons facility, quoted in Albright and Stricker, *Revisiting South Africa's Nuclear Weapons Programme: Its History, Dismantlement, and Lessons for Today*, 92.

some—in a portent of what was to come—were conducted as online video calls. I make no apologies for adopting a relatively loose methodology that will doubtless be anathema to those who prefer a more systematic approach—I believe that the empirics, and the alternative narrative of South Africa's imbrication with global nuclear order which emerges from them, speak for themselves.

For obvious reasons, conducting archival research around nuclear weapons is challenging at the best of times. South Africa's archival terrain is in addition 'notoriously difficult' to navigate,[223] and particular historical dynamics mean that trying to research the history of nuclear technology in South Africa poses a uniquely difficult challenge. Accordingly, archives that would ordinarily have been consulted as part of this study were inaccessible—including those of the Department of Defence (DoD) and Department of International Relations and Co-operation (DIRCO), as well as the National Archives of South Africa (NASA). I therefore readily acknowledge that the research undertaken for this project has been necessarily imperfect and with access to limited resources. The difficulties of researching this and related topics in South African archives have been the subject of academic inquiry in their own right, with many scholars detailing the web of bureaucracy and secrecy facing researchers.[224] One issue facing nuclear researchers is that much of the information about the South African nuclear weapons programme was destroyed by the outgoing apartheid government. This was ostensibly in the service of meeting non-proliferation obligations, but more likely was part of an attempt to ensure that sensitive information on how to develop a nuclear capability fell into what are often euphemistically referred to as 'the wrong hands'. Despite promises from the ANC to facilitate transparency and access to information about the past, apartheid-era secrecy laws have combined with newer legislation to make researching South Africa's nuclear past extremely difficult. The problem of access to information in present-day South Africa is indeed so severe that it has generated an entire edited volume, focusing primarily on the history of the military, nuclear power and weapons programmes, and the Truth and Reconciliation Commission (TRC).[225] It is no coincidence that the excellent SAHA was the most useful and comprehensive archive in South Africa; the organization's mission is to improve access to information and contribute to a fuller understanding of the past. SAHA is staffed by dedicated activists, who have worked alongside academics in a painstaking process of declassification and Promotion of Access to Information Act (PAIA) requests.[226] Alongside these deep-rooted issues, there seems to be a general attitude of

[223] van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program', 38.
[224] Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past'; Matthew Graham, 'Finding Foreign Policy: Researching in Five South African Archives', *History in Africa* 37 (2010): 379–87.
[225] Kate Allan, ed., *Paper Wars: Access to Information in South Africa* (Johannesburg: Wits University Press, 2009).
[226] See Polakow-Suransky, *The Unspoken Alliance: Israel's Secret Relationship with Apartheid South Africa*.

neglectfulness from the South African government towards the preservation and systematic cataloguing of documents—perhaps understandable given the upheaval and challenges the country has faced since 1994. Though inconvenient and frustrating, these dynamics themselves are of great empirical interest with regard to global nuclear order, and are discussed in chapter 4.

I ran up against these issues during my fieldwork trips to South Africa. Even prior to the Covid-19 pandemic, the DIRCO archive could not be physically accessed by researchers. PAIA requests were necessary to access documents via e-mail, and applications had to made in the name of a person resident in South Africa. Although the archivists contacted were willing to help, the byzantine process, long waiting times, and demands that would have to be placed on my South African contacts to access these materials meant that DIRCO documents were simply out of reach to a PhD student from overseas, short on both time and financial resources for research. The DoD archive was a similar story. Although the archive had moved from its central Pretoria location to a new location in Centurion (about 10 miles outside of the city) without fanfare and without publishing its new address online, I was able to access the building. I was however informed on my arrival—whether erroneously or not—that document requests would need to go through the standard PAIA channels, even if the documents in question had been previously declassified. This process could take several months, and I would be required to physically be in South Africa to access the materials when they were eventually made available. Thus, although researchers in my network had already done much work towards declassifying nuclear history material at the DoD archive and pointed me towards materials that should have been accessible, this resource was also closed off to me. The final archive, NASA, was rendered inaccessible by more mundane infrastructural issues—inoperable phone lines and a water leak. Although a member of staff at SAHA was able to supply me with the mobile number of a helpful archivist, I was informed that the site was presently closed for repairs, with no indication of when it might reopen.

Conclusion

If any aspect of the approach outlined above sounds at all imprecise, it is because the empirical detail is what brings this project to life. In lieu of a precise (meta)theoretical exegesis here on the exact nature of interaction between the concepts of global nuclear order and technopolitics/nuclearity, I therefore turn now to the empirics. Each of the four succeeding empirical chapters demonstrates clearly the technopolitical content of global nuclear order, and how global nuclear finds its way into technopolitical regimes, 'global' and 'local' alike. While I have shown that these concepts can be usefully applied to IR, and that a few valuable studies have made real headway in this endeavour, there are bound to follow imperfections, blind spots, and an

unavoidable degree of messiness—especially given the difficulties of conducting this kind of research in South Africa. However, with the project's colours firmly pinned to the mast in terms of its situation vis-à-vis the structure/agency debate, orientation towards the question of power, and attitude towards disciplinary IR and the English School, it is possible to navigate and retell the complex story of South Africa, nuclearity, technopolitics, and the global nuclear order—from the apartheid weapons programme to the anti-nuclear power protests of the present day. The insights generated through the forthcoming empirical work do not amount to a conceptual reformulation of global nuclear order at large, though it is my firm hope that they pave the way for such a larger project, and illuminate some avenues of inquiry which have so far gone untouched by most critical nuclear scholarship.

Chapter 1: Apartheid South Africa in the global nuclear order and an 'international bomb'

Introduction

This first empirical chapter is an investigation of apartheid South Africa's engagement with the global nuclear order via its nuclear weapons programme. It is not intended as an exercise in nuclear history, nor cataloguing chronologically the regime's interventions into world nuclear politics; such ground is ably covered elsewhere.[227] Though drawing on these historical resources, the aim here is to examine the interaction between 'local' South African and 'global' nuclear ordering processes using the conceptual framework outlined in the previous chapter. I explore South Africa's apartheid-era nuclear weapons programme and, more specifically, the crucial role of the global nuclear order in bringing it into being. The history of the apartheid bomb is clearly of formative importance to the rest of the project and to South Africa's post-apartheid nuclear diplomacy. A critical reckoning with the contradictions and obfuscations embedded in the orthodox history of the apartheid bomb is therefore a necessary jumping-off point for the rest of the thesis. Just as 'the idea that most problems would vanish once democracies had replaced old police states is a 'simple minded delusion',[228] it is equally naïve to assume that nuclear technology and politics in the new South Africa has thrown the shackles of its apartheid legacy. To understand South Africa's nuclear present, and more to the point its possible nuclear futures, it is necessary to understand the past. However, as the literature review discusses, there are ample resources for students of nuclear history to familiarize themselves with the events surrounding the apartheid nuclear weapons programme. My aim here is therefore not to retread this path, but to contribute an original, revised reading of the bilateral interactions between Pretoria and the global nuclear order during the apartheid years. This chapter posits a new, critical account which highlights the important role of the global nuclear order and its Cold War guardians, which has tended to be absent from conventional nuclear histories. The crux of this account is that the twin myths of South Africa's international 'isolation' (with regard to nuclear trade) and the 'indigeneity' of its nuclear weapons programme were extremely convenient for both the Afrikaner governing elite in Pretoria *and* the institutions of the global nuclear order

[227] See van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980'; Anna-Mart van Wyk, 'South Africa's Nuclear Programme and the Cold War', *History Compass* 8, no. 7 (2010): 562–72; van Wyk, 'Atoms, Apartheid, and the Agency'.

[228] Cockburn in Peter Vale, 'The New South Africa at Twenty: Some Brechtian Whispers', in *The New South Africa at Twenty: Critical Perspectives*, ed. Peter Vale and Estelle H. Prinsloo (Pietermaritzburg: University of KwaZulu-Natal Press, 2014), 14.

during the middle to late Cold War, and particularly the United States in its role as the 'responsible' guardian charged with keeping South Africa's nuclear ambitions at bay.[229]

South Africa, apartheid, and the paradox of an 'indigenous' bomb

The spectre of international 'isolation' haunts accounts of South Africa's nuclear weapons programme, both contemporary and present-day. Conventional narratives which attempt to explain the regime's decision to pursue nuclear weapons continue to accept the interpretation that posits structural isolation as the primary driver of the apartheid nuclear programme, at least as part of a fuller explanation.[230] The broad contours of such an argument are that the bomb was a response to a highly adverse security environment, and Pretoria's nuclear doctrine demanded a stance of calculated nuclear ambiguity and secrecy, with the aim of extracting assistance from the United States via a demonstration of nuclear capability should South Africa's borders ever come under existential threat. The idea of 'isolation' was central to this argument, and it is not in doubt that Pretoria was diplomatically marginalized, or that this condition coloured its approach to international relations.[231] The ANC in exile also banked in large part on policies of diplomatic 'isolation', specifically sanctions, to choke off vital supplies of the resources required by the state to maintain its stranglehold over the country; the nuclear industry included.[232] However, while international revulsion at apartheid was widespread and on the rise throughout the 1970s and 1980s, South Africa could scarcely be characterized as 'isolated' in its nuclear endeavours, receiving at various points direct, indirect, and tacit aid from the US and several other Western states. In addition to complicating the 'isolation' narrative, this caveat also gestures towards the fragile secrecy surrounding South Africa's nuclear weapons. Both the US and USSR had significant intelligence which all but confirmed the existence of a South African nuclear weapons programme (and a presumed capacity to deliver a warhead)[233], and some contemporary observers were even able to discern and deduce specific details regarding both technology and strategy.[234] By the late

[229] See Bull, 'The Great Irresponsibles?'; William C. Potter, 'Nuclear Proliferation: US-Soviet Cooperation', *Washington Quarterly* 8, no. 1 (1985): 141–54.
[230] Howlett and Simpson, 'Nuclearisation and Denuclearisation in South Africa'; de Villiers, Jardine, and Reiss, 'Why South Africa Gave Up the Bomb'; Albright, 'South Africa and the Affordable Bomb'; van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*.
[231] See Deon Geldenhuys, *Isolated States: A Comparative Analysis* (New York: Cambridge University Press, 1990).
[232] Philip I. Levy, 'Sanctions on South Africa: What Did They Do?', *American Economic Review* 89, no. 2 (1999): 415–20; David Fig, 'Sanctions and the Nuclear Industry', in *How Sanctions Work: Lessons from South Africa*, ed. Audie Klotz and Neta C. Crawford (Basingstoke: Macmillan, 1999), 75–102.
[233] US intelligence documents confirming Washington's knowledge of South Africa's nuclear endeavours have been painstakingly collected by Richelson. Jeffrey T. Richelson, 'U.S. Intelligence and the South African Bomb', The National Security Archive, 13 June 2006, https://nsarchive2.gwu.edu/NSAEBB/NSAEBB181/index.htm.
[234] Richard K. Betts, 'A Diplomatic Bomb for South Africa?', *International Security* 4, no. 2 (1979): 91–115.

1970s, South African officials had communicated with successive US presidents on nuclear matters, making little secret of their ambitions.[235] It is therefore doubtful that Pretoria's declared doctrine of 'nuclear ambiguity'—which was theoretically predicated on secrecy—could ever be seriously implemented, raising questions about the exact purposes which South Africa envisaged its nuclear weapons might serve. In short, a paradox exists here which is thus: the apartheid nuclear weapons programme has conventionally been explained as an 'indigenous' technological programme in response to a condition of international isolation, but subsequent research and revelations have shown that South Africa received significant assistance towards constructing nuclear bombs. Clearly, a condition of true structural isolation did not exist, but as a strategic justification, the idea of some form of 'isolation' does appear to have been significant in driving the programme.

To date, few if any scholars have questioned this apparent paradox lurking beneath conventional accounts of South Africa's nuclear experience, nor attempted to explain its origins or significance.[236] Many accounts, especially those of non-proliferation experts and policy specialists on the South African bomb like David Albright, have tended to tack towards the untenable narrative that neither the US nor anybody else had significant intelligence regarding Pretoria's nuclear ambitions: 'Because its strategy of uncertainty required secrecy to work, South Africa kept its weapons production infrastructure extremely secret. As a consequence, the program could not depend on outside assistance as much as expected'.[237] I argue here that this narrative, which ignores the historical detail of the apartheid weapons programme and its imbrication with the geopolitical imperatives of the Cold War, functions to obfuscate the role key players and institutions within the global nuclear order from any complicity with the apartheid bomb. To be clear, I do not necessarily impute an intention of deliberately concealing Western assistance to South Africa to those who reproduce this narrative. The explanation is somewhat more subtle: as I will demonstrate through the course of this chapter, the 'isolation' narrative is easily compatible with the prevailing ideology of global nuclear order and its assumptions regarding the function of structures, power, and state behaviour.[238] The 'isolation' narrative has therefore found favour among 'common-sensical' accounts of proliferation and nuclear order, despite being riddled with internal contradictions—some of which, as I show, are products of a very specific configuration of Afrikaner nationalism and apartheid thinking.

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[235] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*; Or Rabinowitz and Nicholas L. Miller, 'Keeping the Bombs in the Basement: U.S. Nonproliferation Policy toward Israel, South Africa, and Pakistan', *International Security* 40, no. 1 (July 2015): 47–86.

[236] One exception is Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*. Her account, while extremely useful, is nonetheless written from a perspective focusing on US geostrategic objectives.

[237] Albright, 'South Africa and the Affordable Bomb', 38; see also Michael Schmidt, 'CIA Baffled for Years over SA Nukes', IOL, 19 March 2006, https://www.iol.co.za/news/politics/cia-baffled-for-years-over-sa-nukes-269908.

[238] See also Egeland, 'The Ideology of Nuclear Order', 213.

Nevertheless, a reappraisal of the available evidence and contemporary accounts reveals that the nascent global nuclear order, which in the 1970s was coalescing apace around the NPT which predicated norms of 'restraint'[239]—is implicated in the establishment of an apartheid nuclear weapons capability. The expectation to uphold the bargain at the heart of the NPT, combined with the deterrence and strategic imperatives which ran counter to the logic of restraint, provided a strong motivation to the United States to turn a blind eye to the apartheid bomb. It was in the interests of the United States, as one of the two superpower guardians of nuclear order, to keep secret the apartheid bomb in order to protect the fragile legitimacy of the global nuclear order. The order, as I will show, faced severe challenges during these precarious years and did not yet benefit from a high enough degree of consensus and consent to reliably weather the storm that would result from South African nuclear disclosure.

This argument invites us to reassess contemporary narratives of South Africa's nuclear 'indigeneity' and, more broadly, the story of the apartheid bomb. As I will show, South Africa's nuclear weapons were not 'indigenous', nor does South Africa's geopolitical 'isolation' appear to have been sufficient in itself to motivate a nuclear programme. Sagan has noted this point in his 'three models' for explaining nuclear decisions, where he finds 'security' explanations alone insufficient in accounting for the South African case, instead arguing that some combination of his three explanations—security, domestic politics, and norms—are more likely to yield accurate, if messy, explanations.[240] What Sagan does not discuss is the extent to which these three 'models' interact, and the South African case demonstrates this in a nutshell. The supposedly 'indigenous' apartheid bomb had decidedly 'global' roots, having been enabled and encouraged by an emergent global nuclear order: kickstarted under the Atoms for Peace rubric, when the SAFARI-1 reactor was commissioned in 1965 alongside the US Department of Energy, but later minimized and obscured through clandestine supply arrangements and no-test deals in order to protect the order's authority and fragile legitimacy. However, the story does not end with South Africa's disarmament. Retroactive accounts which attempt to explain the genesis of the apartheid bomb have internalized Afrikaner-nationalist technopolitical narratives, and ultimately functioned to defuse criticism of the United States, the institutions of global nuclear order, and the integrity of its non-proliferation efforts. This has produced a highly particular rationalization of the entire episode, one which contributes to the myth of South Africa as 'unique' in global nuclear history: by virtue of its superhuman achievement of constructing a nuclear weapons capacity using only locally-available knowledge and resources. Once this is recognized, the myth of an 'indigenous' South African nuclear weapons programme is

[239] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*.
[240] Sagan, 'Why Do States Build Nuclear Weapons?'

dissolved.[241] An alternative account of the South African nuclear weapons programme—one based on a continuous interaction between 'local' and 'global' processes previously thought separate—appears in its place.

'Isolation' as a rationale for the apartheid bomb

That South Africa was, at least to some significant extent, isolated from the rest of the world during the 1970s and 1980s, is not in doubt. Anti-apartheid campaigns sprung up worldwide, including the British organization the Anti-Apartheid Movement which spearheaded international boycott and divestment efforts, and in which South Africa's future IAEA ambassador Abdul Minty was heavily involved. While the regime's opponents were keen to highlight Pretoria's progressive departure from internationally-accepted standards of decency, other South Africans (who were not necessarily all apologists for apartheid) complained of unfair treatment and double standards at the hands of the international community. The latter attitude is demonstrated by Deon Geldenhuys, one of the few contemporary scholars to systematically analyse the dynamics of South Africa's isolation, albeit from within the Afrikaner-dominated South African academy of the 1980s. In a sprawling empirical work entitled *Isolated States*, Geldenhuys compares South Africa's treatment in several spheres—military, diplomatic, economic, socio-cultural, and so forth—to that of Taiwan, Israel, and Chile; all of which were subject to varying degrees of international isolation at the time for a wide variety of reasons. Geldenhuys, however, marshals tremendous amounts of evidence to claim that South Africa 'stands apart [in its isolation]: its ostracism embraces the political and democratic, economic, military and cultural spheres', and that this isolation 'finds considerable and highly visible and vocal support inside the country and from exiled organisations', generating 'mutually reinforcing […] internal and external campaigns of ostracism'.[242] Briefly touching on the nuclear question under the umbrella of arms transfers, Geldenhuys adheres to the standard narrative of the time that Pretoria was almost totally cut off from nuclear assistance with the rest of the world, as well as 'keeping the world guessing about its true nuclear intentions and real capabilities'.[243] Not unexpectedly, Geldenhuys' account also contains some deafening silences.[244] Apartheid is dealt with in a passing fashion, with little investigation into the specific content of white minority rule that the international community found so objectionable. More importantly, however, Geldenhuys overstates in many

[241] As Itty Abraham points out, the idea that a 'purely indigenous' nuclear programme is even possible, anywhere in the world, is itself a myth. Abraham, 'The Ambivalence of Nuclear Histories', 56.
[242] Geldenhuys, *Isolated States: A Comparative Analysis*, 667.
[243] Geldenhuys, *Isolated States: A Comparative Analysis*, 515.
[244] Lisa Thompson, 'Diplomacy in Isolation', *Journal of Contemporary African Studies* 11, no. 1 (1 January 1992): 104–13.

areas the true extent of isolation. In the economic arena in particular, 'it appears that South Africa was "isolated" when it in fact remained integrated on all economic levels, albeit with much underhand and clandestine trade and agreements'.[245] Since the nuclear programme and its dismantlement became public in 1993, it has become similarly clear that while South Africa may have been *formally* constrained in its nuclear dealings with the citizens-in-good-standing of the global nuclear order, 'underhand and clandestine' relationships with Western states continued (see below).

South Africa's generalized isolation was widely understood, both domestically and internationally, as a credible rationale for military nuclearization at the time, and idea of a 'total onslaught' against Pretoria has coloured South African historiography of the period.[246] It should be noted that actual South African nuclear capabilities during the late 1970s and 1980s were a matter of speculation, although generally assumed to be reasonably advanced, perhaps to the extent that South Africa could be considered a de facto nuclear-armed state. Harkavy largely brushes aside questions about the strategic applicability of nuclear weapons to Southern African theatres of guerrilla warfare by citing Pretoria's political-psychological response to its security environment and formal isolation from the rest of the world, especially with regard to arms procurement: '[the South African government] must presumably have thought such things through and come (rightly or wrongly) to some "optimistic" conclusions [about the usefulness of nuclear weapons]'.[247] Pretoria also appears to have believed that its isolation, and apparently inevitable overrun, could be compensated for by a nuclear 'deterrent'. Betts, who correctly divined the purpose of the apartheid bomb not as a 'deterrent' but rather a diplomatic instrument designed to leverage support from the US in the event of a crisis, argued that while South Africa 'still has a fair amount to lose' in terms of support from the US and Europe, its increasing perception of isolation meant that 'if [the South African government] see the issue differently, they may build a bomb no matter how irrational or counterproductive such a move seems to others'.[248]

Statements from South African officials have since backed up Betts's observation—that a South African *perception* of isolation motivated the nuclear programme—many times over. Former Defence Minister Magnus Malan, speaking on the Soviet presence in Southern Africa as early as 1976-1977 remembered: 'If your enemy is sitting with a nuclear bomb and you don't take precautions about it, there's something wrong […] the Russians had one and we had the Russians in

[245] Thompson, 'Diplomacy in Isolation', 110; see also Levy, 'Sanctions on South Africa: What Did They Do?'
[246] Wessel Visser, 'The Production of Literature on the "Red Peril" and "Total Onslaught" in Twentieth-Century South Africa', *Historia* 49, no. 2 (2004): 105–28.
[247] Harkavy, 'Pariah States and Nuclear Proliferation', 153.
[248] 'A Diplomatic Bomb for South Africa?', 91.

Angola. There was nothing preventing their using it, other than the international community'.[249] This international community could no longer be relied upon, under Pretoria's assessment, to check Soviet aggression. Former nuclear programme officials later argued that 'South Africa's 1978 formal decision to change the focus of its nuclear program to military applications is best understood in light of its international standing at the time', specifically fears of encirclement by hostile regimes and an inability to count on outside assistance if attacked.[250] Isolation from outside support was also cited as a motivation for the nuclear programme by F.W. de Klerk in his famous speech to the South African parliament announcing unilateral disarmament.[251] This narrative also looms large in many, if not all, *post facto* analyses of South Africa's nuclear weapons; it is especially prominent in accounts aligned with the positions of the United States and the objectives of the non-proliferation agenda.[252] Perhaps this is unsurprising. After all, there is a broad consensus between the contemporary academic literature and official accounts that international isolation—specifically, being formally cut off from arms imports, diplomatic organs, and security guarantees from erstwhile allies—was a key motivation to pursue the bomb.[253] The post-1993 accounts which adopt these assumptions are examined below. However, it is first important to note that South Africa's isolation, with regard to arms and nuclear arms in particular, may not have been quite so complete as is routinely claimed.

The limits of isolation: Tacit American consent and the Vela Incident

Van Wyk argues that Jimmy Carter's election in 1976 'presaged disaster' for South Africa's nuclear links with the US.[254] Carter was both a former human rights lawyer and a zealous non-proliferation advocate. In previous years, the United States had enthusiastically (if covertly) supported South Africa in both its nuclear endeavours and in its escalating border wars. The Kennedy administration provided the SAFARI-1 research reactor and enriched fuel in 1961, continuing nuclear co-operation with Pretoria despite its 1963 arms embargo. The Johnson administration continued this policy, and Nixon's government stepped up support even further, and the CIA opted to look the other way when

[249] quoted in van Wyk, 'South Africa's Nuclear Programme and the Cold War', 565.
[250] de Villiers, Jardine, and Reiss, 'Why South Africa Gave Up the Bomb', 101.
[251] 'Speech by South African President F.W. De Klerk to a Joint Session of Parliament on Accession to the Non-Proliferation Treaty', 24 March 1993, History and Public Policy Program Digital Archive.
[252] e.g. David Albright, 'South Africa's Secret Nuclear Weapons', Text, Institute for Science and International Security, 1994, http://isis-online.org/isis-reports/detail/south-africas-secret-nuclear-weapons/13; Albright and Stricker, *Revisiting South Africa's Nuclear Weapons Programme: Its History, Dismantlement, and Lessons for Today*.
[253] See for instance Stumpf, 'Birth and Death of the South African Nuclear Weapons Program'.
[254] van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980', 207.

4,600 tons of uranium oxide, likely stockpiled for enrichment purposes, went unaccounted for.[255] In 1974, when intelligence services knew that South Africa was working on a 'secret enrichment process'—because Pretoria had directly approached Washington requesting further co-operation in its development—the US opted not to take action to prevent a likely apartheid bomb.[256] In the Nixon administration's view, this decision allowed the US to retain reasonable influence over South Africa's nuclear direction and enabled it to quietly check on proliferation risks. The US did not respond to the South African Atomic Energy Board (AEB)'s 1974 announcement that it was able to construct a functioning nuclear warhead, and van Wyk believes that 'it is fair to regard this lack of response as an encouragement to Pretoria to continue plans to develop a nuclear arsenal'.[257] Formal civil nuclear co-operation and covert CIA support for SADF operations in the Angolan theatre also continued, although the latter only until the US-backed South African forces were defeated by the Cuban contingent in 1976.[258]

Despite the maintenance of these various forms of support, the late 1970s through to the turn of the 1980s was the period during which isolation was most keenly perceived, coinciding as it did with the most significant developments in Pretoria's nuclear programme. However, it was not until the second half of 1977 that Carter began to seriously pressure South Africa over its nuclear intentions, in the wake of the Kalahari test site debacle during which a USSR satellite had detected preparations for a test detonation at a remote desert location, the sighting subsequently confirmed by US intelligence sources. This was quickly followed, in November 1977, by a unanimous Security Council vote to impose a mandatory arms embargo on South Africa, which included co-operation on nuclear weapons technology, and the US's 1978 Non-Proliferation Act which ended the supply of HEU to South Africa unless it was willing to submit to safeguards and move towards NPT accession.[259] However, with regard to South Africa, the non-proliferation ship had sailed. Soviet intelligence had picked up preparations for a nuclear test at the Vastrap test site in the Kalahari Desert in August 1977, and promptly informed the United States. While Richelson notes that the US intelligence community was unsure of precisely how advanced the weapons programme was,[260] a 1977 CIA document regarding the test preparations assumed 'that the South Africans, without specific

[255] van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980', 201.
[256] van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980', 202.
[257] van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980', 202.
[258] van Wyk, 'Ally or Critic? The United States' Response to South African Nuclear Development, 1949–1980', 210.
[259] Pabian, 'South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy'.
[260] Richelson, 'U.S. Intelligence and the South African Bomb'.

additional foreign assistance or consent, could conduct a nuclear test within a matter of weeks, and that they could continue their nuclear weapons development thereafter without foreign assistance'.[261] By the end of 1978 Pretoria had completed two prototype 'gun-type' warheads, similar to the 'Little Boy' weapon dropped on Hiroshima, and had almost enriched enough uranium to arm them with warheads. South Africa could now 'be considered a de facto nuclear state' [262].

Despite being cut off from formal military co-operation by the US, which was undoubtedly a significant blow to South Africa in the context of a mounting global boycott and divestment campaign, nuclear assistance in indirect and tacit forms was still forthcoming. Despite Carter's harsher line on both nuclear proliferation and apartheid than his predecessors, the US pushed for the UN to soften its embargo so as not to cut off all nuclear ties with South Africa—only those that were weapons-related—fearing that this would push Pretoria to go it alone. Of course, South Africa had already done this.[263] However, an even more remarkable gesture of tacit support came in response to the 1979 'Vela Incident', in which a US Vela monitoring satellite picked up a characteristic 'double-flash' signal in the South Atlantic, leading to immediate accusations of a South African, Israeli, or joint nuclear test. The Carter administration immediately moved to downplay the incident, blaming a meteoroid strike or a malfunctioning, ageing satellite for an apparently erroneous signal. The US military and intelligence establishments scrambled for answers. While a Presidential panel examining the evidence concluded that the signal was the result of a meteoroid colliding with the satellite, the Defense Intelligence Agency, national laboratories, and independent contractors all posited the occurrence of a nuclear test.[264]

Carter was extremely keen to promote the meteoroid or malfunction narrative. According to National Security Archive documents

> [t]he aversion to even identifying the test as a nuclear event was so intense that Leonard Weiss, a scientist and nonproliferation expert on the staff of Senator John Glenn (D-OH), recalls that at a briefing a senior State Department official told him "that if I continued to say that the Vela event was a nuclear test, my reputation would be destroyed".[265]

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[261] Director of Central Intelligence, 'South Africa: Policy Considerations Regarding a Nuclear Test', Interagency Assessment (Washington, DC: Central Intelligence Agency, 18 August 1977), MORI DocID: 1034614, National Security Archive.
[262] van Wyk, 'South Africa's Nuclear Programme and the Cold War', 1167.
[263] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*, 115.
[264] Jeffrey T. Richelson, 'The Vela Incident: Nuclear Test or Meteorite?', National Security Archive, 5 May 2006, https://nsarchive2.gwu.edu/NSAEBB/NSAEBB190/.
[265] William Burr and Avner Cohen, 'The Vela Incident: South Atlantic Mystery Flash in September 1979 Raised Questions about Nuclear Test', National Security Archive, 12 June 2016, https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2016-12-06/vela-incident-south-atlantic-mystery-flash-september-1979#_edn2.

Recent radiological and ballistic evidence makes it increasingly clear that a nuclear detonation is by far the likeliest explanation for the Vela flash.[266] Because the signal was relatively weak and South Africa did not possess a viable nuclear device in 1979, the most credible version of events is likely that Israel tested a small device, such as a nuclear anti-tank round or artillery shell, perhaps with South African logistical support or observation.[267] This suggested ongoing collaboration between Israel and South Africa on nuclear development, with South Africa benefiting from advanced Israeli expertise and eventually 'leapfrogging' the technical requirement to test its own weapons.[268] This much was likely very clear to Carter and the US, but the political consequences of acknowledging that a test had probably occurred were vast. This was true not only for narrower US objectives in Southern Africa, such as heading up the international oversight of occupied Namibia, but particularly with regard to the establishment of a credible NPT regime. One declassified October 1979 intelligence memorandum states the following:

> The likelihood that an atmospheric nuclear explosion did occur and the possibility that South Africa has tested a nuclear device, impinge on our global nonproliferation policy interests. Our nonproliferation policy is to prevent any non-nuclear weapons state from acquiring nuclear explosives or the means to produce them […] In the event a non-nuclear weapons state succeeded with a nuclear weapons program, we would seek an international reaction that discouraged others from following the same path […] The nonproliferation stakes could be high if the September 22 event caused a rupture in our nuclear negotiations with South Africa. But, failure to take action in response to the September 22 event could make more difficult efforts to deter proliferation elsewhere, e.g. Pakistan and India [269].

The above document neatly demonstrates an awareness within the US state machinery of the implications of failing to respond to a public revelation of a likely South African-involved nuclear test. It recognizes the tension between responding robustly to South Africa, as US non-proliferation credibility demanded, and retaining a degree of authority in the eyes of Pretoria's diplomats and therefore some minimal sway over the ultimate direction of its nuclear programme. Under White House direction, the need to address this contradiction was resolved by the steadfast and systematic

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[266] Christopher M. Wright and Lars-Erik De Geer, 'The 22 September 1979 Vela Incident: The Detected Double-Flash', *Science & Global Security* 25, no. 3 (2 September 2017): 95–124; Lars-Erik De Geer and Christopher M. Wright, 'The 22 September 1979 Vela Incident: Radionuclide and Hydroacoustic Evidence for a Nuclear Explosion', *Science & Global Security* 26, no. 1 (2 January 2018): 20–54.
[267] Leonard Weiss, 'Israel's 1979 Nuclear Test and the U.S. Cover-Up', *Middle East Policy* 18, no. 4 (2011): 83–95.
[268] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*, 122.
[269] National Security Council, 'Memorandum for: Secretary of State and Others, Subject: South Atlantic Nuclear Event, October 22, 1979, w/Att: Discussion Paper' (Washington, DC: National Security Council, 22 October 1979), 1–2.

denial of any nuclear explosion in the South Atlantic, obviating the requirement for any overt response. The credibility of the NPT-centred nuclear order could thus be safeguarded by way of quiet, behind-the-scenes co-operation with Pretoria.

Ronald Reagan would come to power in 1981, quickly instituting the much-maligned policy of 'constructive engagement' with Pretoria. Supposedly aiming to ease South African feelings of isolation and bring the country back into the fold of Western allies, Reagan hoped that South Africa could be persuaded to act as a responsible regional power and quell conflicts on the Southern African subcontinent. As Ungar and Vale detail, the policy instead encouraged Pretoria to double down on its domestic policies with a newfound sense of security coming from its US backing.[270] By 1985, the policy had effectively disintegrated, and a new US stance was required.[271] The immediate effects of constructive engagement included an easing of US pressure on Pretoria and a spike in US-South Africa trade; this rather more 'hands-off' approach also extended to the spheres of nuclear trade and diplomacy. Washington quickly struck a bargain with South Africa effectively reinstituting US nuclear support, albeit in an indirect fashion. Reagan 'was able […] to turn a blind eye to South Africa's de facto status while simultaneously supplying it with nuclear fuel through a third country [NPT non-signatory France] and maintaining his declared non-proliferation agenda in the international arena', providing that Pretoria refrained from conducting any nuclear tests.[272] The US could be a non-proliferation leader while simultaneously facilitating free trade among friendly states and, by proxy, keeping the Soviet threat in Southern Africa at bay. Justifying this approach at a 1986 press conference in Singapore, the US Ambassador to the United Nations, Vernon A. Walters, argued that the US was still on the side of the Non-Aligned Movement in pushing for the end of apartheid and nuclear disarmament in South Africa, 'except [for] how we are trying to do it'.[273] If the US cut off support and engagement, he argued, Pretoria 'in accord with their traditions, would form their wagons in a circle and probably try to develop nuclear weapons and say, 'to hell with the world'.'[274]

The US thus kept Koeberg power station supplied with enriched uranium, since South Africa could not produce the required quantities domestically, and informally stopped treating South Africa as a

[270] Sanford J. Ungar and Peter Vale, 'South Africa: Why Constructive Engagement Failed', *Foreign Affairs* 64, no. 2 (1985): 234–58.
[271] Others have argued, however, that the policy was successful in laying the groundwork for a new round of more robust sanctions towards South Africa. Michael Clough, 'Beyond Constructive Engagement', *Foreign Policy*, no. 61 (1985): 3–24.
[272] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*, 106.
[273] Vernon A. Walters, 'Press Conference at Le Méridien Hotel, Singapore', 14 June 1986, AL2878, A03.1.2, South African History Archive, Johannesburg.
[274] Walters, 'Press Conference at Le Méridien Hotel, Singapore'.

'proliferation risk' since it was now a 'friendly' state. Rabinowitz explores in detail the deal struck between Reagan and Botha in 1981, which relieved the pressure on South Africa to accede to the NPT and guaranteed its fuel shipments in exchange for remaining 'untested'.[275] Of course, as Rabinowitz and others have noted, the bargain effectively destroyed the claimed strategic rationale of South Africa's 'deterrent'. Testing a nuclear weapon would be to renege on the clandestine bargain and to force the US into responding harshly in order to save its blushes—in all likelihood this would entail withdrawing assistance and instituting harsh sanctions, not doubling down in support of a widely reviled and increasingly erratic regional ally.

In defiance of Reagan, the United States Congress eventually passed the Comprehensive Anti-Apartheid Act in 1986, which instituted a raft of measures intended to pressure Pretoria into renouncing apartheid, including banning outright nuclear co-operation until South Africa acceded to the NPT. Aside from a brief window during the Carter administration, even during which the prospect of an apartheid bomb was grudgingly tolerated if not overtly supported, this was arguably the first time that the US had seriously and comprehensively isolated Pretoria. By the time the Act came into force in 1987, it was of course far too late; South Africa's six functional nuclear devices were likely all completed by then, and delivery options were being explored in partnership with Israel. During the brief window in which Carter put half-hearted pressure on South Africa over its nuclear programme, assistance was forthcoming from elsewhere to plug any gaps. Israel was not as important an enabler as the US, which was able to single-handedly bend the rules of nuclear order around South Africa's requirements and shield its endeavours from global scrutiny, but it was probably the most important technological collaborator in terms of weapons science and expertise.

Additional nuclear assistance to South Africa: isolation debunked?

Israeli co-operation on the apartheid bomb, despite being strenuously denied by both states up to the present day and the technical details being closely guarded, is relatively well-documented.[276] Most if not all analysts of South Africa's nuclear programme agree that Israel was involved quite intimately throughout its life. Co-operation between the two countries began in earnest in 1962 when South Africa supplied ten tons of uranium yellowcake to Israel, reported to the IAEA and

[275] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*, 120–22.
[276] Helen E Purkitt and Stephen F Burgess, 'Correspondence: South Africa's Nuclear Decisions', *International Security* 27, no. 1 (2002): 186–94, https://doi.org/10.1162/016228802320231271; Peter Liberman, 'Israel and the South African Bomb', *The Nonproliferation Review* 11, no. 2 (June 2004): 46–80, https://doi.org/10.1080/10736700408436966; Sasha Polakow-Suransky, *The Unspoken Alliance: Israel's Secret Relationship with Apartheid South Africa* (New York: Pantheon, 2009).

monitored under a bilateral safeguarding agreement and likely used to manufacture depleted uranium anti-tank shells.[277] Clandestine, unsafeguarded collaboration on nuclear weapons-related research began some years later. Masiza cites a 1976 report which claimed South Africa and Israel signed a technical co-operation agreement, which Polakow-Suranksy dates at 1975, providing for a scientific exchange programme between the two increasingly vilified states; under the terms of this agreement, South African technicians would travel to Israel to assist in nuclear development, and Israel would send scientists to Valindaba to assist in plans for a new research reactor.[278] It is worth noting that the co-operative relationship between Israel and South Africa stepped up around 1976, when the two states were increasingly short of friends and Carter's election in the US appeared to threaten South Africa's main nuclear partnership.

While memoirs of officials involved in the programme are at pains to stress the non-military nature of any nuclear weapons collaboration with Israel,[279] it is widely accepted that South Africa's RSA-3 space launch vehicle and intended medium-range ballistic missile was developed from the Israeli Jericho 2 system.[280] Israel also supplied South Africa with 30g of tritium in return for a large amount of uranium yellowcake, which was apparently intended for 12 'boosted' fission weapons but eventually only used in 'weapons-related experiments' at Pelindaba.[281] Liberman also notes that both South African and Israeli informants have independently claimed that Israel offered South Africa warheads for these missiles, forming a complete system. However, 'it remains much less clear whether Israeli nuclear technology [as opposed to raw materials or conventional weapons technology] was ever transferred to South Africa',[282]and these statements remain unsubstantiated. A more credible claim is the possibility that the Vela incident of 1979 was a South African-backed Israeli test. As discussed above, assuming that a test did take place, it is almost certain that it was an Israeli one since South Africa was not at a sufficiently advanced stage to detonate a nuclear warhead in 1979. Furthermore, despite the Carter administration's public position, Polakow-Suransky documents the CIA's view that 'Israel had a strong incentive to conduct a secret nuclear test and South Africa would have likely "had enough confidence in Israeli security to consider conducting a joint test"—a highly unusual practice that only the United States and Britain had undertaken

[277] Polakow-Suransky, *The Unspoken Alliance: Israel's Secret Relationship with Apartheid South Africa*, 43.
[278] Masiza, 'A Chronology of South Africa's Nuclear Program', 37.
[279] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*; von Wielligh and von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program*.
[280] Lewis, 'Revisiting South Africa's Bomb'.
[281] Mounzer Sleiman, 'Shutting down Dimona: Israel's Nuclear Programme, Arsenal and Environmental Threat', *Contemporary Arab Affairs* 3, no. 4 (November 2010): 437–79.
[282] Liberman, 'Israel and the South African Bomb', 52.

together in the past'.[283]

While the extent of technology transfer between Israel and South Africa is unclear, and still denied by both governments to this day, it is still clear that between 1975 and 1979—the period during which South Africa's nuclear weapons capability evolved most significantly, and Carter's presidency placed modest limits on US nuclear assistance—South Africa benefited at the very least from Israeli knowledge transfer, technical assistance from expert personnel, and at least a limited amount of technology and material exchange. It is highly likely that the two also co-operated on a South Atlantic nuclear test in 1979. South Africa also consciously adapted Israel's doctrine of nuclear ambiguity, applied to great effect during the Yom Kippur war of 1973.[284] The intellectual and ideological content of South Africa's nuclear programme appears to have owed much to Israeli strategizing. The political psychology of 'Total Onslaught' closely aligned with Israel's own bunker mentality, the two states sharing a perception of being surrounded by hostile forces and abandoned by the West. In sum, while South Africa endured a brief window of isolation from nuclear trade with the United States during the late 1970s and very early 1980s, limited but more direct nuclear assistance from Israel helped to soften the blow.

In sum, the US and Israel were arguably the two most important partners of the South African nuclear weapons programme. Israel provided the most direct weapons assistance to South Africa, as a fellow 'pariah' state with little to lose from the partnership. The United States, however, was by far and away the most significant enabler of the programme: while its assistance was indirect, it was sustained. More important, however, was Washington's position at the head of the global nuclear order. As the section above details, the US's tacit consent for South Africa to continue pursuing its nuclear ambitions largely shielded it from consequences and global scrutiny, ensuring that technical and materials assistance could continue flowing in from America and from all over the world. However, as Konieczna notes in her study of French nuclear co-operation with South Africa, nuclear weapons assistance should 'must focus on the process of acquiring nuclear weapons and not exclusively on the endpoints of proliferation'.[285] This widening of the analytical leads us to conclude that a host of states assisted in South Africa's nuclear weapons ambitions, and while the US was the most significant enabler of the programme, it was far from alone. France, in particular, was a very important collaborator in the South African bomb. Paris provided several nuclear services, including

[283] Polakow-Suransky, *The Unspoken Alliance: Israel's Secret Relationship with Apartheid South Africa*, 141.
[284] Andre Buys, quoted in Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*, 125.
[285] Anna Konieczna, 'Nuclear Twins: French-South African Strategic Cooperation (1964–79)', *Cold War History* 21, no. 3 (2021): 284.

constructing and supplying fuel for Koeberg and assisting with the construction of the Valindaba military enrichment plant under the guise of civil assistance. Konieczna finds that French leaders were well aware of the risk of proliferation by South Africa, even tacitly supporting it, and that France also benefited from South African nuclear co-operation in a mutual strategic relationship.[286] In addition, according to ANC activists, West Germany was implicated in the supply of technical details to Pretoria regarding uranium enrichment processes.[287] The South African 'Helikon' process was indeed eerily similar to the West German 'jet-nozzle' technique developed at the Karlsruhe facility, and it is broadly accepted that South African representatives worked with the German scientist E.W. Becker in developing their own process.[288] Brazil also used a variant of the 'jet nozzle' technology, but did not co-operate substantially with South Africa on nuclear development despite Pretoria's overtures.[289] Elsewhere, South African nuclear technicians were trained all over the world—notably in Britain, which like France provided a host of indirect technical assistance[290]—and continued South African participation in the IAEA and access to civil nuclear trade further furnished the regime with importance expertise and equipment that indirectly facilitated the apartheid bomb. Further research on direct and indirect nuclear assistance, particularly from European countries, to South Africa is needed, as apart from Konieczna's study of French-South African co-operation hard empirical evidence on the matter is difficult to come by—and exists mostly in the form of accusations by the ANC and Anti-Apartheid Movement (see chapter 2). Nonetheless, it is clear that the apartheid bomb was a distinctly multilateral endeavour.

Assistance outside of the nuclear realm also helped to bolster the apartheid bomb programme. Both France and Israel also provided a significant quantity of conventional arms; France supplied South Africa with a large number of Mirage fighter jets, while after the 1977 arms embargo Israel found that South Africa quickly became its biggest armaments customer. Among others, the UK also supplied computers to South Africa after the embargo, choosing not to construe them as 'related matériel' as the Carter government had, and Edwards and Hecht detail how computing power bolstered the apartheid state, particularly in the policing arena.[291] However, as one campaigner

[286] Konieczna, 'Nuclear Twins: French-South African Strategic Cooperation (1964–79)'.
[287] Červenka and Rogers, *Nuclear Axis: Secret Collaboration between West Germany and South Africa*.
[288] Rob Gillette, 'Uranium Enrichment: With Help, South Africa Is Progressing', *Science* 188, no. 4193 (1975): 1090–92.
[289] Carlo Patti, 'The Forbidden Cooperation: South Africa–Brazil Nuclear Relations at the Turn of the 1970s', *Revista Brasileira de Política Internacional* 61, no. 2 (2018).
[290] Anti-Apartheid Movement, 'Nuclear Collaboration with South Africa: Britain's Profile', Working Paper (London: United Nations Seminar on Nuclear Collaboration with South Africa, 24 February 1979), MSS AAM 1499, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford.
[291] Edwards and Hecht, 'History and the Technopolitics of Identity', 632.

noted in a 1984 UN address, it is highly likely that Western computing technology found its way to Armscor, quite plausibly for use in nuclear weapons applications.[292] Rabinowitz notes the significance of computing technology for the progress of the weapons programme, quoting a 1983 CIA report that 'South African scientists believed that nuclear testing was not required because of the favourable nuclear weapon modelling results they had obtained'.[293] Add into the equation the huge amounts of technical and nuclear assistance provided to South Africa pre-embargo under the auspices of the Atoms for Peace programme—including, but certainly not limited to, the SAFARI-1 research reactor at Pelindaba—and it becomes clear that South Africa's purported isolation certainly did not meaningfully extend to its nuclear endeavours. By the time the screws were genuinely tightened by the US, South Africa was a *de facto* nuclear state, armed with a bomb that was claimed to be 'indigenous' but was, in fact, decidedly global. Quite simply put, if Pretoria had been as isolated as claimed, the apartheid bomb would have been impossible.

This is not to argue that the concept of isolation is unimportant in accounting for the apartheid bomb. Rather, it is necessary to distinguish between the ways in which the concept of South African 'isolation' is deployed, and interactions between local South African technopolitics and global nuclear order which generated this *particular political articulation* of isolation. Doing this reveals that the apparent paradox of 'isolated' South Africa's 'international' bomb is, in fact, a mirage: there is no analytical contradiction between the oft-repeated claims to isolation and the various forms of nuclear assistance rendered to South Africa. Accounts which rely on an apparently objective, external, structural condition of isolation provoking a nuclear response are easily challenged in hindsight. Nonetheless, their initial acceptance and durability is attributable to their power as political tools. For South Africa, the isolation narrative was a valuable political resource, providing a justification for the nuclear programme which could be expressed in relation to one of the pillars of global nuclear order—the system of deterrence—and in a structural-realist vernacular prevalent in US strategic culture. Indeed, Vale argues that the then-dominant positivist brand of Anglo-American social science, specifically 'Strategic Studies' (which would soon morph into Security Studies) was complicit in apartheid; there was a considerable symbiosis between 'this body of knowledge [and] the ideological purpose of the national security state […] the support it enjoyed from the Cold War's

[292] Richard Knight, 'Constructive Engagement and the Arms Embargo: Statement before the Special Committee Against Apartheid of the United Nations General Assembly', October 2003, http://richardknight.homestead.com/armsun84.html.
[293] *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*, 123.

bifurcated explanation of the global predicament cannot be underestimated'.[294] Pretoria's agenda could be made both legible and palatable to Western audiences when expressed in the preferred language of defence intellectuals. Reagan's 'constructive engagement' in particular demonstrated Pretoria's successful political mobilization of 'isolation', as it assumed an acceptance that South Africa a) was structurally isolated, b) that this isolation was pushing Pretoria towards further unacceptable behaviours, including the development of nuclear weapons and therefore c) increased US assistance would remedy rather than exacerbate the situation.

However, statements from political leaders and nuclear programme officials demonstrate that, in Pretoria, 'isolation' was not simply an instrumental political claim, but also an acutely and genuinely perceived condition. Here is where 'local', specifically situated processes become inextricably bound up with the formations of global nuclear order: it is impossible to fully comprehend the genesis of the apartheid bomb and its treatment within the global nuclear order without a detailed understanding of the fractured nationalism and conflicting histories at the heart of apartheid South Africa's national project.

Isolation in context: Afrikaner nationalism, technopolitics, and Total Onslaught

Structural accounts which accept as fact the condition of South African 'isolation' do not provide space to examine the role of locally specific histories and experiences in engendering distinctive political rationalities which might call them into question. In this case, there is often a tendency to treat South Africa as simply another Western state, or at least one which is aligned against communism, indistinct in its perception of interests and threats from the US or NATO powers. For Howlett and Simpson, for example, 'a core strand of [South African security] policy was that global communism was the principal external threat to South Africa and, thus, the country had common security interests with the West'.[295] In terms of general nuclear strategy, William Walker argues that the Cold War nuclear order was underpinned by the assumption of a fundamental 'sameness' to the rational calculus of all states, in that they would apply the same logics in service of the avoidance of nuclear war.[296] Of course, this assumption was mistaken: South African perceptions of threat and understandings of the regional security terrain were extremely idiosyncratic and had little in

[294] 'The Cold War and South Africa: Repetitions and Revisions on a Prolegomenon', in *Beyond the Border War: New Perspectives on Southern Africa's Late Cold War Conflicts*, ed. Gary Baines and Peter Vale (Pretoria: University of South Africa Press, 2008), 29.
[295] Howlett and Simpson, 'Nuclearisation and Denuclearisation in South Africa', 154.
[296] 'Nuclear Order and Disorder', 708–9.

common with those of observers in, for instance, the US.[297] Concerns about security and territorial integrity, while crucially important, were shaped through a unique interpretive schema cobbled together from the intriguing dualities of Afrikaner nationalism and its attendant technopolitical regimes, highly selective theoretical understandings of world politics, and the technological resources at South Africa's disposal. The confluence of these factors contributed to a highly-charged climate of Afrikaner fear and paranoia, produced the narrative of 'Total Onslaught', and consequently called for a 'Total Strategy' of which nuclear weapons were an integral component—regardless of whether they were kept secret and in spite of their severely limited strategic value to Pretoria.

'Total Onslaught/Total Strategy' was much more than simply a mechanistic security response to outside conditions. In a useful contemporary analysis, Grundy blames the undue influence of SADF personnel in the country's administration for engendering a state of ideological paranoia analogous to the 1920s Bolshevik concept of 'capitalist encirclement':[298] for the architects of Total Strategy like General Magnus Malan, the historical processes underway during the Cold War all militated towards the destabilization and ultimate collapse of South Africa, masterminded by a Soviet Union which aimed to bring down Pretoria, largely via the liberation movements in the surrounding Front Line States. Critically, the West and US in particular were seen as complicit in this onslaught because, in failing to recognize the gravity of the Communist threat and instead ostracizing South Africa over apartheid, they strengthened the Soviet hand. The general public, 'subject to continued rhetorical assault and reinforcement', internalized these beliefs to a considerable extent.[299] While Pretoria was undoubtedly preoccupied with a keenly-felt external threat and, in response, continually angled for Western support, it would be inaccurate to characterize the Total Strategy as a means to pursue 'common security interests' with the West, since the US, its allies, and the anti-apartheid international community were perceived as accessories to the aggressor.

[297] The links between identity and threat perception have been comprehensively explored, particularly from within critical and constructivist IR, and a comprehensive review of the different positions available is beyond the scope of this project. Interventions here include David Campbell, *Writing Security: United States Foreign Policy and the Politics of Identity* (Minneapolis: University of Minnesota Press, 1998) and Jutta Weldes, *Constructing National Interests: The United States and the Cuban Missile Crisis* (Minneapolis: University of Minnesota Press, 1999). A detailed overview of identity, fear, and perception of security environments, pertaining specifically to nuclear proliferation, is provided by Hymans (2006, pp. 17-46 especially). Both of these approaches are useful to a certain extent, though as discussed in the literature review, they are not adequately attentive to the structural and material dimensions of hegemony to be useful in an analysis of global nuclear order.

[298] *The Militarization of South African Politics* (Oxford: Oxford University Press, 1988), 13.

[299] Grundy, *The Militarization of South African Politics*, 12.

The most idiosyncratic element of Total Strategy which invested nuclear weapons with particular technopolitical value to South Africa was Afrikaner nationalism, a complex beast which deserves a much fuller treatment than can be given here. It has always been an evolving phenomenon and scholars have hotly contested its relationships with theology, social class, and state power; furthermore, it has generated pervasive historical myths which have often been adopted by even critical, non-Afrikaner scholars.[300] For the purposes of this chapter, the most important characteristic of Afrikaner nationalism is the duality at its heart: Afrikaners saw and sought to articulate South Africa as both an African and a European state. The Anglo-Boer war of 1899-1902 was particularly important here. As Dubow details, the war 'is generally regarded as having provided the vital stimulus for the development of Afrikaner nationalism as a mass movement. Confused and insecure in defeat, leading Afrikaner nationalist theoreticians sought above all to confront the power of British imperialism'.[301] Afrikaner identity came increasingly to be defined in opposition to Britain. Early Afrikaner race theorists strove to resolve the contradictions of their Dutch heritage and settler-colonist status by exploiting 'the essential plasticity of racist ideology' to claim that Afrikaners were racially distinct from their European forebears.[302] The institution of Afrikaans as a legally distinct language, as opposed to a 'kitchen' or 'mutilated' variant of Dutch (appropriated from various non-white groups, including slaves), aided in this project of a highly distinct 'ethnic nationalism' which entailed a strong 'attachment to the continent of Africa'.[303] Thus, while they may have been of European descent, the Afrikaner nationalists who would build apartheid envisioned South Africa as a post-colonial African nation, liberated from British oppression and pursuing a distinctly 'African' path of development.[304] On the other side of this duality, of course, was the fundamental belief that the white Afrikaners were racially and culturally superior to indigenous, black, and 'coloured' South Africans. *Vis-à-vis* the 'natives', Afrikaners were agents of European-style civilization. This manifested itself differently over time: while liberal Afrikaner 'patriots' like Jan Smuts believed in a white *mission civilisatrice* and responsibility of trusteeship over the other nations of Southern Africa,[305] the hard-line National Party elected in 1948 turned the paternalistic liberal logic of

[300] For political-economic and theological interrogations of such myths, see Dan O'Meara, 'The Afrikaner Broederbond 1927-1948: Class Vanguard of Afrikaner Nationalism', *Journal of Southern African Studies* 3, no. 2 (1977): 156–86; and André Du Toit, 'No Chosen People: The Myth of the Calvinist Origins of Afrikaner Nationalism and Racial Ideology', *The American Historical Review* 88, no. 4 (1983): 920–52 respectively.
[301] Saul Dubow, 'Afrikaner Nationalism, Apartheid and the Conceptualization of "Race"', *The Journal of African History* 33, no. 2 (1992): 210.
[302] Dubow, 'Afrikaner Nationalism, Apartheid and the Conceptualization of "Race"', 229.
[303] Vic Webb and Mariana Kriel, 'Afrikaans and Afrikaner Nationalism', *International Journal of the Sociology of Language* 144, no. 1 (2000): 29.
[304] See also Miller, *An African Volk: The Apartheid Regime and Its Search for Survival*.
[305] Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa*, 247.

'separate development'—apartheid—to the ends of oppressive minority rule and the protection of an increasingly embattled *laager* of civilization from hostile outside forces.

The development of a distinct Afrikaner nationalism is not incidental to apartheid South Africa's nuclear weapons policies or its Cold War-era relations with other states. As Dubow notes, the 'renationalization' of science and technical expertise into the service of the apartheid state (contra the more paternalist, internationalist agenda of Smutsian liberalism) altered the path of technological development in South Africa, laying the groundwork for a nuclear weapons programme. During the 1960s, the apartheid government 'realized in earnest […] a technocratic template for social engineering [and] a much more insular technicism', dedicated almost exclusively to the consolidation of state power.[306] English-speaking scientists were quietly removed from research councils and replaced by Afrikaners. Public infrastructure projects such as the Orange River Dam demonstrated Afrikaner ingenuity and mastery over the natural environment. In this context, B.J. Vorster in 1970 heralded the perfection of the Helikon enrichment process by scientists in Cape Town as 'unparalleled in the history of our country'.[307] Following Hecht, we can identify the post-1948 moment in South Africa as a point where overarching Afrikaner-Nationalist technopolitical regimes came to drive official policy in science, technology, and development.[308]

South Africa's encounter with the global nuclear order: enabling the isolation narrative

It is easy to see how these historical developments generated a significant domestic demand for large technological projects and dramatic developmental statements among South African elites. However, given the aforementioned strategic limitations and paradoxes that would entail the pursuit of an apartheid bomb, why did these impulses manifest themselves in a nuclear weapons programme specifically? The answer lies with the interaction between this 'local' technopolitical regime and the global nuclear order. The Southern African security environment and global nuclear order were perceived in a very particular way, only legible through the lens of Afrikaner nationalism and technopolitics, and their attendant visions of 'Total Onslaught/Total Strategy'. This encounter between the global nuclear order and a national technopolitics forged in the crucible of Afrikaner myth allowed apartheid South Africa to see itself as both isolated and short-changed by the West

[306] Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa*, 252.
[307] quoted in South African History Online, 'SA Prime Minister, B.J. Vorster Reveals That SA Scientists Have Succeeded in Developing a New Process for Uranium Enrichment', South African History Online, 2012, https://www.sahistory.org.za/dated-event/sa-prime-minister-bj-vorster-reveals-sa-scientists-have-succeeded-developing-new-process.
[308] *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge: MIT press, 1998), 56.

and the NPT nuclear weapons states, *as well as* a crypto-Western bulwark against Soviet expansionism. Usefully for Pretoria, it also connected nicely with dominant, US-centric strategic understandings of the nuclear world,[309] which connected nuclear behaviour to external conditions and the security environments in which states found themselves. It is important to note that the idea that South Africa faced a 'Total Onslaught' and should employ a 'laager' mentality towards the rest of the world was not a structuralist security analysis, but a way of understanding the world through the lens of Afrikaner identity.[310] There is therefore no necessary contradiction in arguing that South Africa was not meaningfully isolated from the with regard to nuclear assistance, but that many South African elites nonetheless sincerely believed that the minority-ruled Afrikaner nation was cut off from the hostile outside world.

The global nuclear order, which was developing during the 1970s into an increasingly coherent and hegemonic set of arrangements, provided South Africa with many useful intellectual resources to justify its official stance of nuclear ambiguity and suspicion of non-proliferation frameworks, as well as fuelling its 'isolation' narrative. For instance, Pretoria was able to seize upon developing critiques of hierarchy and injustice in nuclear order. For non-nuclear weapons states, especially those located within the global South, outright opposition to the developing order—backed by the overwhelming material and structural power of the NWS and a developing hegemonic status—has almost always been a political dead end. Instead, as Itty Abraham explores with regard to the contested legality of nuclear testing during the Cold War, opponents developed

> [a] complementary discursive strategy [which] appealed to established principles, effectively mimicking and co-opting the dominant voice of the international system, whether in seeking to overcome ongoing colonialism and racial discrimination or to castigate global insecurities produced by arms races and nuclear weapons'.[311]

Adopting and adapting already powerful norms and mobilizing the dominant vernacular of international law, as Abraham demonstrates, proved to be a reasonably effective strategy towards delegitimizing nuclear weapons and staking out an alternative geopolitical position for the decolonizing and non-aligned states. During the Cold War, members of the Non-Aligned movement in particular turned to criticism of the NPT of 1968 on its own terms, arguing that it was 'unacceptably discriminatory and hypocritical for the superpowers to maintain weapons denied to

[309] For a deeper discussion of this issue, see Vale, 'The Cold War and South Africa: Repetitions and Revisions on a Prolegomenon'.
[310] van Wyk and van Wyk, 'From the Nuclear Laager to the Non-Proliferation Club: South Africa and the NPT'.
[311] 'Decolonizing Arms Control: The Asian African Legal Consultative Committee and the Legality of Nuclear Testing, 1960–64', *Asian Journal of Political Science* 26, no. 3 (2018): 2.

other states'.[312] Many argued that NPT controls on various nuclear materials and technologies violated their 'inalienable' right, as enshrined in the NPT itself, to nuclear power and hindered their prospects for economic development. Race and colonialism inevitably featured in these disputes: Pakistan's president Zulfikar Bhutto remarked in 1974 that 'the nuclear distribution indicated the continuing domination of the traditional White imperialists in an overwhelmingly non-White world',[313] while the prominent Kenyan essayist Ali A. Mazrui argued that a nuclear-armed, post-apartheid South Africa would be a crucial bulwark against imperialism in the future. [314] Critiquing the hypocrisy and disingenuousness of the West, using normative and discursive resources generated in conversation with the global nuclear order to legitimate these claims, was a powerful tactic for Southern and non-aligned states to assert themselves in a rapidly evolving world order.

Despite its racial policies, ongoing occupation of Namibia, and general ideological hostility towards the governments of most of the decolonizing world, Pretoria was able to adapt these arguments in defence of its ambiguous nuclear stance, glossing over most of the anti-imperial and anti-racist content which usually accompanied these arguments. This allowed Pretoria to politicize its self-diagnosed 'isolation' and fashion from it an ideological crusade. South Africa's isolation, went the argument, was no accident, but a calculated political condition perpetrated by larger and more powerful states. 'Principled' defiance of the NPT in response thus became a cornerstone of South Africa's nuclear diplomacy. A.J.A. 'Ampie' Roux, South Africa's top nuclear scientist, blasted the NPT and the NWS for 'accept[ing] no restrictions on themselves' and—with no hint of irony— 'infring[ing] the sovereignty of non-nuclear states' via intrusive and unfair safeguarding arrangements. In a similar tenor, Prime Minister Vorster remarked in 1977 upon the Western powers' treatment of South Africa as a 'backward', 'laughed at', and 'universally ignored' nation, which had defied the oppressive and hypocritical nuclear order by enriching uranium and developing the hypothetical ability to construct a nuclear weapon.[315] Similar attitudes are on display through the accounts of those directly involved with the programme. The collective memoir of van der Walt et al. articulates the nuclear weapons programme as a distinctly civic nationalist—rather than a minority or racial—project, emphasizing the roles of South Africans of all races in elevating their nation to nuclear prominence and challenging the condition of inequality at the heart of the global nuclear order. [316] The authors repeatedly stress the 'South African' rather than the Afrikaner qualities of the nuclear

[312] Nye, 'NPT', 126.
[313] Thomas in Shampa Biswas, '"Nuclear Apartheid" as Political Position: Race as a Postcolonial Resource?', *Alternatives: Global, Local, Political* 26, no. 4 (1 October 2001): 495.
[314] *The African Condition: A Political Diagnosis* (London: Heinemann, 1980).
[315] Roux and Vorster, quoted in van Wyk, 'South African Nuclear Development in the 1970s', 1161–63.
[316] *Armament and Disarmament*.

weapons project and close the book with a meditation on how its technological achievements and demonstrations of African ingenuity might be useful for post-apartheid South Africa and its standing within the global nuclear order.[317] The issues of apartheid and liberation are forgotten and elided into an optimistic narrative of a small, upstart African nation striking out on its own to challenge the excesses of an unjust nuclear order. This closely mirrors the post-colonial claims to nuclear rights and visions that were generated by non-aligned and Southern states, in response to the precepts of the NPT and the developing global nuclear order at large.

South Africa's appeals to sovereignty and great-power hypocrisy in rationalizing its nuclear programme clearly resonated with Afrikaner worldviews. They also helped Pretoria to craft a somewhat coherent narrative of denial and injustice in defence of its nuclear programme, in the absence of any obvious or credible strategic rationale. This approach relied upon *both* the historic components of Afrikaner nationalism which allowed Afrikaner elites to construct South Africa as a victim of imperialism and an African nation *and* the efforts of postcolonial and Non-Aligned states on the global nuclear stage to delegitimize the prevailing nuclear order through appeals to justice and international equity. Pretoria's encounter with the global nuclear order via its nuclear programme was filtered through highly particular, local conceptions of identity and nationhood. While the strategy of apprehending the global nuclear order from the position of a small, developing, Southern state much like any other was on one hand a deliberate political move,[318] its ubiquity in the statements and recollections of apartheid-era officials also suggests that this injustice was genuinely and keenly perceived.[319] The 'Total Onslaught' interpretation of South Africa's position in the world depended on a sense of isolation and dispossession at the hands of the Western powers and NWS. Afrikaner nationalism and a selective reading of the norms of the global nuclear order contributed to this interpretation. Combined, they formed a powerful argument in favour of a South African nuclear programme which did not rely on strategic value as conventionally understood. This argument also reinforced the overarching isolation narrative and *laager* mentality, encouraging Pretoria to view itself as disenfranchised despite the tacit nuclear assistance it received from the West.

Avoiding embarrassment: the global nuclear order, non-proliferation, and complicity in the apartheid bomb

The preceding section shows that South Africa's isolation was equal parts political fiction and

[317] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, 112.
[318] See Hecht, 'Negotiating Global Nuclearities' for a demonstration of this realpolitik at play.
[319] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*; von Wielligh and von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program*.

paranoid perception, contingent upon Afrikaner-nationalist ideology and political culture—and was not necessarily diminished by the clandestine assistance that Pretoria received towards is nuclear programme and in other areas. This, however, is still not the entire story. The apartheid bomb was not simply facilitated by individually complicit states in violation of their agreed-upon non-proliferation commitments, in spirit if not in practice. It was in fact facilitated, perhaps even made possible, by an evolving global nuclear order that was increasingly oriented around the NPT, whose normative prescriptions and 'grand bargain' demanded that the programme be kept secret. The price paid for this secrecy, as Rabinowitz demonstrates in the starkest terms, was a fully-fledged apartheid South African nuclear capability.[320] The question remains as to how South Africa, scrutinized and reviled, was able to embark on a military nuclear weapons programme against a backdrop of mounting superpower concern about the spread of nuclear weapons, how this endeavour was continually presented as 'secret' despite being common knowledge within Western intelligence communities, and why it did not damage beyond all repair the credibility and authority of the global nuclear order.

Although states' co-operation with South Africa in nuclear matters was likely motivated by a number of factors (Israel's shared sense of persecution and ideological sympathies; French unilateralism; German anxieties over the US nuclear umbrella; allied Cold War geopolitical hedging; US nervousness about race and the prospect of a black socialist regime coming to power; and commercial imperatives on the parts of all involved), the development of the apartheid bomb is not explainable simply with reference to relationships between South Africa and other individual states. The crucially important American support, in both its direct and tacit forms, was also motivated by the US desire to cement the hegemony of the nuclear order that was rapidly forming around the NPT. Furthermore, although France did not sign the treaty until 1992 and Israel has never signed, both of these states benefited from the attendant policy of US secrecy around the apartheid bomb, which spared them from unwanted scrutiny over their respective roles in abetting proliferation. It is important to note that South Africa's nuclear programme was diverted to military applications at some point between 1974 and 1976, depending on which account is accepted; Masiza pinpoints a decision in 1974, a credible estimate based on the available evidence.[321] This coincided with India's 1974 decision to detonate a device in a 'peaceful nuclear explosion', which despite New Delhi's benign characterization was nonetheless interpreted by most of the world as a nuclear test with clear military implications. The explosion prompted dismayed reactions from the USSR and China,

[320] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*.
[321] 'A Chronology of South Africa's Nuclear Program', 37.

while the US and Canada moved quickly to cut nuclear ties with India. Canada was particularly affronted by the apparent use of its exported civilian reactor technology in a nuclear warhead.[322] Carter's government soon instituted a raft of non-proliferation measures at home and internationally, including tying aid provision to IAEA safeguarding obligations under a restrictive Nuclear Nonproliferation Act and forming the Nuclear Suppliers' Group as a direct response. O'Mahoney has argued that the explosion was a defiant response to the emerging norms of global nuclear order enshrined by the NPT, but a significant strengthening of these norms followed their initial violation. [323] In short, just as South Africa was starting up its weapons programme, the US, the USSR, and their respective allies in favour of non-proliferation were eager to reassert the authority of a global nuclear order whose legitimacy had been severely dented, recognizing that a quick recovery from 1974's setback was vital to protect it.

Trust and shelter under a bipolar nuclear order

Before continuing, it is important to recognize the crucial role of the USSR in instituting and defending the developing global nuclear order during the period between 1968 and the mid-1980s. While US support to South Africa more directly enabled Pretoria's nuclear weapons programme to develop, the structure of the global nuclear order as a whole was largely defined at this time by US-Soviet co-operation. Indeed, this project serves in part as a corrective to orthodox narratives which overstate the United States' capacity to lead in shape the norms of the order,[324] or conflate the global nuclear order entirely with US policy objectives.[325] A presentist account of global nuclear order risks overlooking the bipolar nature of the order in the 1970s and 1980s. Weldes and Laffey have demonstrated with regard to the Cuban Missile Crisis—or Caribbean Crisis/October Crisis, depending on the viewpoint adopted—that Anglo-American academia has long written other participants in world nuclear politics out of the history books.[326] This has doubtless applied to small, 'less nuclear' states like Cuba and South Africa, but the end of Cold War bipolarity also threatens to obscure the foundational role of the USSR in building and maintaining today's NPT-centred nuclear

[322] Sumit Ganguly, 'India's Pathway to Pokhran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program', *International Security* 23, no. 4 (1999): 160.
[323] 'India's 1974 Nuclear Explosion and the Non-Proliferation Treaty', in *Global Nuclear Order: Past Present and Future* (British International Studies Association Global Nuclear Order Working Group Annual Conference, King's College London, 2018).
[324] e.g. Nina Tannenwald, 'The Nuclear Taboo: The United States and the Normative Basis of Nuclear Non-Use', *International Organization* 53, no. 3 (1999): 433–68.
[325] e.g. Graham Allison, 'Nuclear Disorder: Surveying Atomic Threats', *Foreign Affairs* 89, no. 1 (2010): 74–85.
[326] Jutta Weldes, 'Constructing National Interests', *European Journal of International Relations* 2, no. 3 (1 September 1996): 275–318; Mark Laffey and Jutta Weldes, 'Decolonizing the Cuban Missile Crisis', *International Studies Quarterly* 52, no. 3 (2008): 555–77.

order.

The USSR worked closely with the US towards instituting a raft of arms control, non-proliferation, and crisis avoidance agreements (the NPT, SALT, PTBT and ABM Treaty among them) during the late 1960s and early 1970s, installing itself alongside Washington—at least temporarily—as one of the two 'nuclear trustees for mankind'.[327] As Potter discusses in great detail in a contemporary analysis, the non-proliferation regime was dependent on a high degree of US-Soviet co-operation, and this entailed a division of labour between the US and USSR with regard to regulating the spread of nuclear weapons.[328] Ruzicka and Wheeler point out that the NPT regime has always depended on the maintenance of different trusting relationships, one of which is trust between the nuclear-weapons states: by agreeing to afford an 'inalienable' right to non-NWS to pursue nuclear energy for peaceful purposes, the two superpowers exposed themselves to the risk that the spread of civil nuclear technology might encourage some states to develop weapons of their own.[329] This generated a mutual interest in tightly controlling potential weapons programmes, and thus the basis for a trusting relationship over proliferation, alongside their existing mutual interest in maintaining superpower strategic stability. This explains what Potter calls 'the most unusual example of Soviet cooperation with the United States on non-proliferation measures':[330] the USSR's 1977 decision to inform the US that it had observed South Africa constructing a suspected nuclear test site in the Kalahari Desert. The USSR trusted that the US would act to restrain the nuclear weapons programme of South Africa—a country well within its sphere of influence which did not have even minimal trust in the USSR—in defence of their shared interest in maintaining a workable non-proliferation regime.

Thus, Cold War bipolarity and the USSR's investment in the non-proliferation agenda allowed the US a relatively free hand in South Africa—since US pressure was the only real hope of successfully reining in Pretoria's nuclear ambitions. By 1984, the USSR perceived a betrayal of this trust, with Reagan's decision to reinstitute formal limited nuclear co-operation with South Africa as well as Israel seen as a US dereliction of its Article VI duties.[331] Co-operation on non-proliferation between the two superpowers nonetheless continued. By this point, of course, South Africa was fully nuclear-capable, and US shelter from Soviet scrutiny had been beneficial in this endeavour. Additionally, the involvement of the USSR in Southern Africa also led the US to afford Pretoria further freedom to

[327] Bull, 'The Great Irresponsibles?', 447.
[328] Potter, 'Nuclear Proliferation: US-Soviet Cooperation'.
[329] Jan Ruzicka and Nicholas J. Wheeler, 'The Puzzle of Trusting Relationships in the Nuclear Non-Proliferation Treaty', *International Affairs* 86, no. 1 (2010): 76.
[330] 'Nuclear Proliferation: US-Soviet Cooperation', 143.
[331] Potter, 'Nuclear Proliferation: US-Soviet Cooperation', 156.

pursue its nuclear ambitions. The United States had a geostrategic interest in maintaining a friendly capitalist foothold in Southern Africa, and trade and investment ties between the two countries were deep and manifold. US defence officials nevertheless still thought it inconceivable that American troops would ever be deployed to Southern Africa in defence of the apartheid regime. Červenka and Rogers quote Andrew Young, the contemporary US ambassador to the UN:

> 'I see no situation in which we would have to come in on the side of the South Africans […] You'd have civil war at home […] An armed force that is 30% black isn't going to fight on the side of the South Africans' [332].

As the authors go on to note, this consideration was compatible with the policy of covert nuclear support to South Africa, which they argue was deliberately rendered with the express purpose of allowing Pretoria to develop a nuclear weapon of its own, minimizing the risk that the US would be drawn into the conflict on South Africa's behalf.[333] Caution is required here: despite the tacit assistance rendered once the programme was underway, it is unlikely that the US actively wanted South Africa to develop nuclear weapons—which were expressly intended by South Africa to draw America into the Border Wars. Nevertheless, it is clear that the presence of the USSR and its allies in the region did encourage the US to at least tolerate South Africa's nuclear ambitions.

American ordering imperatives and the apartheid bomb

However, while the USSR was undoubtedly important in both affording South Africa some leeway with regard to the US and, more broadly, providing a significant degree of bilateral stability to the agreements and institutions which structured the emerging order, it was less invested in the normative ordering imperative than the United States. As Walker argues:

> Throughout the nuclear age—this applies to later periods too—most of the *ordering ideas*, and most of the desire and power to realize those ideas, came from the United States. The American attitude towards the nuclear order has therefore always been monarchical, even in periods when its notion of order has been essentially liberal. The United States has unquestioningly conferred upon itself unique rights to decide when the game and its rules should be changed.[334]

[332] *Nuclear Axis: Secret Collaboration between West Germany and South Africa*, 259.
[333] Červenka and Rogers, *Nuclear Axis: Secret Collaboration between West Germany and South Africa*, 259.
[334] 'Nuclear Order and Disorder', 709, emphasis in original.

Examples of this behaviour include what Walker calls 'The Carter Policy', during which Jimmy Carter attempted to balance 'the complex trade-off between curbing nuclear proliferation […] without damaging [the] US image as a reliable supplier of nuclear fuel' by attempting to take control, effectively unilaterally, of other nations' nuclear reprocessing cycles via the International Nuclear Fuel Cycle Evaluation (INFCE).[335] Walker also cites Reagan's discarding of 'mutual vulnerability' in favour of a vision of US nuclear 'supremacy and coercion' during the 1980s, to be obtained partly through the 'Star Wars' initiative, as another example.[336] US nuclear policy towards South Africa during the 1970s and 1980s amounts to a further alteration of 'the game and its rules', albeit informally and covertly. The assistance rendered by the US to South Africa detailed in the first section—the provision of nuclear materials and trade, countless blind eyes turned by various intelligence organizations, and the scramble to cover up the Vela incident—all ultimately functioned to bolster a nuclear order which was developing and gaining consent, but still threatened by destabilizing events. Not only had the 1974 Indian test sent shockwaves through the institutions of nuclear governance, but the INFCE and Nuclear Suppliers' Group had amplified voices of discontent around nuclear trade restrictions. These were perceived in much of the world as attempts by the US and other industrial nuclear powers to solidify their advantageous positions in the world nuclear marketplace and bake yet another layer of stratification into the global nuclear order.[337]

In this context, a South African nuclear test would have been disastrously embarrassing. Although the extent of the US intelligence establishment's knowledge about the weapons programme remained hidden as Richelson's collection of documents and memoirs suggests,[338] the USSR, the nuclear 'have-nots', and Non-Aligned states would all have asked why the US had failed to keep Pretoria on a sufficiently tight leash to prevent an apartheid nuclear weapon. A South African detonation would have been met with near-unanimous worldwide condemnation and revulsion. In the late 1960s, Henry Kissinger fretted that '[w]orld wide knowledge that the Israelis had nuclear weapons would almost certainly wreck the Non-Proliferation Treaty',[339] and the same nightmare scenario presented itself once more. In addition, an actual nuclear detonation was not the only threat to non-proliferation policy. A contemporary observer noted that

[335] Antonio Tiseo, 'The Carter Administration and Its Non-Proliferation Policies: The Road to INFCE', *Humana.Mente*, no. 16 (2011): 54; see also NRC, 'Statement of President Jimmy Carter on Nuclear Policy', Nuclear Regulatory Commission, 21 August 2006, https://www.nrc.gov/docs/ML1209/ML120960615.pdf.
[336] 'Nuclear Order and Disorder', 709.
[337] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 95.
[338] 'The Vela Incident: Nuclear Test or Meteorite?'; 'U.S. Intelligence and the South African Bomb'.
[339] Quoted in Rabinowitz and Miller, 'Keeping the Bombs in the Basement', 59.

> although South African nuclear armaments may not be militarily credible, [its] capacity to undermine the Western non-proliferation regime by inadequately safeguarded nuclear exports is highly credible. It may be this unmentioned threat which […] ensures that the West continues to maintain nuclear and other contacts […] It is likely that there has been an unwritten understanding that a condition for South Africa remaining an ex-officio member of the Western world, at least so far as commercial and trading relations are concerned, is that [it] should continue to behave responsibly by requiring adequate safeguards on her nuclear exports [340].

South Africa thus embodied a serious threat to the global nuclear order during the 1970s and 1980s, for much of that period appearing to be only 'a screw's turn' away from a nuclear test and controlling large stockpiles of unsafeguarded nuclear materials and technologies. For numerous smaller, non-nuclear states who claimed an interest in pursuing domestic uranium enrichment and reprocessing for civil or research purposes, a flagrant South African violation of non-proliferation norms would serve as further ammunition with which to attack the hypocrisy and unfairness built into the developing nuclear order.

Rabinowitz argues that the US's subsequent deals with 'proliferant' states like South Africa—which aimed to prevent further nuclear tests—constituted subversions of the NPT. Statesmen like Nixon and Kissinger were certainly not non-proliferation idealists in the Carter mould, perceiving it as a threat to US interests and existing nuclear trade relationships with states like Israel and Japan.[341] Reagan shared a similar outlook. However, if the NPT is understood as 'constitut[ing] a simple demand for the nuclear have-nots to remain so', then it is reasonable to understand the US's selective but repeated bending of NPT rules as intended to protect the advantages to the US enshrined in the NPT, rather than to subvert it entirely.[342] As early as the 1970s, nuclear-aspirant states like India had seized upon the inequality and apparent hypocrisy of the NPT and its built-in advantages for the existing nuclear powers; [343] it is difficult to imagine that US leaders were not aware of this dynamic themselves. To characterize the US approach to South Africa during the development of its nuclear programme as a wholesale subversion of the NPT and its norms is to fail to tell the whole story. Carving out an unofficial niche parallel to the formal institutions of nuclear

[340] J.D.L. Moore, *South Africa and Nuclear Proliferation* (London: Palgrave Macmillan, 1987), 154.
[341] *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*, 198.
[342] Betts, quoted in Craig and Ruzicka, 'The Nonproliferation Complex', 334.
[343] e.g. Abraham, *The Making of the Indian Atomic Bomb*, 138.

order for South Africa to pursue an illicit nuclear weapons programme undetected was, ironically, crucially important to shore up the order's normative authority and legitimacy. Besides, as Rabinowitz and Miller note, 'non-proliferation policy does not end when a state acquires a capability to construct a nuclear device'.[344] Even after the Vela incident was unconvincingly brushed under the carpet and after 1980-82, between which years it is estimated that South Africa produced a prototype nuclear weapon,[345] the US could work to shore up the non-proliferation order by continuing an apparently consistent policy of trying to bring South Africa into the NPT, have Pretoria submit to safeguards, and control its ability to both access and export nuclear materials: a policy which, owing to cataclysmic domestic upheavals within South Africa rather than any special achievements on the part of the US or IAEA, found abrupt success upon the election of the reformer F.W. de Klerk in 1989. The success of the liberation struggle, dismantling of apartheid, and public announcement of nuclear disarmament spared Western blushes. Non-proliferation and extended safeguards suddenly became sharply relevant, as the new African National Congress leadership sought to forswear nuclear weapons and, perhaps more importantly, the outgoing National Party regime scrambled for assurances that unsafeguarded nuclear materiel would not fall into 'the wrong hands'—seeking global solutions to distinctly local problems. The reality, however, was that by 1987 South Africa had a nuclear arsenal of 6-7 functional weapons, which rather than being 'toss-dropped […] from a Mirage or a Buccaneer' as is often assumed,[346] may well have been mated to highly sophisticated television-guided cruise missiles.[347] The non-proliferation regime and wider nuclear order may have remained intact, its authority considerably bolstered as the moral victors of the apartheid struggled embraced it whole-heartedly while the villains retreated into its arms, but serious damage had to be averted by a hodgepodge of tacit acquiescence, technical circumvention of rules, and limited assistance to South Africa throughout the 1970s and 1980s.

In addition, the South African episode is rarely talked about as an instance of non-proliferation 'failure'. I argue that this reflects the complicity of the US and crucially its desire to protect the global order, in the apartheid bomb. Analyses tend to emphasize that South Africa had obtained most of its capabilities in nuclear technology during the late 1960s and early 1970s at the tail-end of the 'Atoms for Peace' heyday, before full-scope safeguards existed, and therefore any weapons-related development beyond that point was unfortunate but, ultimately, an independent endeavour rather

[344] 'Keeping the Bombs in the Basement', 48.
[345] Timothy McDonnell, 'Nuclear Pursuits: Non-P-5 Nuclear-Armed States, 2013', *Bulletin of the Atomic Scientists* 69, no. 1 (January 2013): 68.
[346] McDonnell, 'Nuclear Pursuits', 68.
[347] Lewis, 'Revisiting South Africa's Bomb'.

than a clear-cut case of non-proliferation failure. Albright is at pains to note that, although South Africa received US nuclear support from around 1965 onwards, 'when the international community began instituting international sanctions against the apartheid government in the 1970s, South Africa's nuclear program was one of its first targets.[348] He does mention that Pretoria had access to 'clandestine procurement networks in Europe and the United States' after this cut-off, but does not detail the make-up of these networks, and does not insinuate any degree of collaboration or facilitation on the part of the US toward South Africa. On this reading, South Africa was on its own after 1975, perhaps save for black-market activity. As Pabian puts it, '[t]he South Africa case demonstrates the difficulty of preventing proliferation in a state that, having once acquired the requisite fissile materials, is committed to producing nuclear weapons'.[349] Despite the incontrovertible facts—that a so-called 'pariah' state and NPT holdout managed to construct an entire nuclear weapons infrastructure and strategic nuclear weapons capability, thanks to the technical and political assistance of a network of Western and Western-allied states—'isolation' rather than 'proliferation' remains the favoured narrative of the US non-proliferation establishment.

According to this account, diplomatic pressure and sanctions packages were enough to prevent South Africa from reaching a 'tipping point' where it felt compelled to unveil, test, or use a nuclear weapon. Albright and Stricker are careful to note that sanctions in the short term exacerbated Pretoria's 'political isolation' and 'led South Africa's defense establishment to become more self-sufficient and more determined to defend itself'.[350] This concession is, of course, fully compatible with the 'isolation' narrative. They conclude that sanctions served to slow down the weapons programme sufficiently that the world could wait until the main security threat had passed, with the dissolution of the USSR and subsequent withdrawal of Cuban troops from Angola. Although there is no suggestion that Pretoria was swayed by the normative standards of the global nuclear order, non-proliferation advocates tend to agree that the degree of compliance necessary to maintain dialogue with the West, along with the restrictive effects of sanctions, were reasonably effective at delaying the programme. Pabian suggests that 'these controls may have had a role in keeping South Africa from achieving an implosion-design nuclear weapon before the program's termination in 1990'.[351] In sum, most post-mortems of the South African nuclear weapons programme which originate from today's US non-proliferation establishment tend to conform to the 'isolation' narratives and

[348] 'South Africa and the Affordable Bomb', 39.
[349] 'South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy', 16.
[350] *Revisiting South Africa's Nuclear Weapons Programme: Its History, Dismantlement, and Lessons for Today*, 289.
[351] 'South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy', 16.

diagnoses of the causes of the apartheid bomb which emerged—largely from within South Africa itself—during the 1970s. The events of disarmament and democratization appear to vindicate these arguments and let the 'non-proliferation complex' off the hook: now that Cold War bipolarity is a distant memory and the non-proliferation agenda has become ever more closely aligned with US policy objectives,[352] the South African 'success story' helps to ensure that US policy is 'elevate[d …] to the level of general principle'.[353] The notion that a global nuclear order centred around non-proliferation principles was successful in averting disaster in Southern Africa and even preparing the ground for disarmament (once more favourable security conditions emerged) also bolsters the idea 'that nuclear peace can be accomplished incrementally, over time, without requiring unorthodox forms of political action'.[354] It obscures the influence of ostensibly 'local' dynamics in bringing about both the bomb and the bomb's demise, locating effective nuclear politics in the arena of 'the international' and downplaying local complexities and, most importantly, the paths of interaction between 'local' and 'global' that are in fact vitally important for understanding nuclear trajectories. Most importantly, it distracts from the unsettling prospect that the apartheid bomb might not have come about—or at least not have reached such an advanced stage—were it not for a desire to protect US authority on non-proliferation and the legitimacy of its leading role within the global nuclear order. While it is not obvious that reduced Western assistance to Pretoria would have scuppered the apartheid bomb, the extent to which South Africa relied on this help is abundantly clear. Thanks to a combination of successful domestic struggle and sheer good fortune, the possibility of a nuclear detonation in Southern Africa was never realized, but through assisting the apartheid bomb the US and its allies were nonetheless complicit in propping up South African state power despite outwardly claiming to oppose apartheid.

Conclusion: South Africa in the nuclear order, the nuclear order in South Africa

The story of the apartheid bomb and its international content demonstrates the value of a conceptual approach which seeks to dissolve the assumed and often intuitive boundaries between local' and 'global' dimensions of nuclear politics. It clearly locates 'Africa in the nuclear world and the nuclear world in Africa'.[355] South Africa exerted its influence on 'the nuclear world' via a highly particular ideological interpretation of 'isolation', derived from an Afrikaner-nationalist ideology that began with the *Voortrekkers* and incubated over time, which was eventually adapted to fit

[352] The presidency of Donald Trump nonetheless cautions us against assuming that this condition will prevail indefinitely.
[353] 'The Nonproliferation Complex', 341.
[354] Craig and Ruzicka, 'The Nonproliferation Complex', 342.
[355] Hecht, *Being Nuclear*, 46.

perceptions of the modern-day Southern African security environment. By the mid-1970s, it had culminated in a distinct 'security ideology' [356] which provided an account of both South Africa's strategic situation and the appropriate military responses to it: 'Total Onslaught' and 'Total Strategy'. This account of 'isolation' resonated with the professed norms of the global nuclear order, partially founded as it was on deterrence, while providing the guardians of the order with a ready-made explanation as to why South Africa had felt so compelled to develop nuclear weapons, and why they—and the wider institutions of the order itself—were powerless to stop it. Disarmament and the end of apartheid, mostly borne of domestic processes, capped off a nonetheless triumphant account of the successful international containment of South Africa's nuclear programme—until such time as the security environment improved with the collapse of the Soviet Union—thus appearing to prove the capability of the nuclear order to restrain 'rogue' nuclear-armed states against even the most fragile geopolitical backdrops. Over the same period, 'the nuclear world' asserted itself in South Africa as the US, Western Europe, and Israel sowed the seeds for, proactively supported, and tacitly permitted military nuclearization until the early-mid 1980s, at which point it was too late to stop the weapons programme. On commencing this kind of clandestine support, the United States in particular placed the authority of an already-troubled nuclear order in jeopardy, generating a political imperative to conceal the extent of the programme and maintain the support until well after the non-proliferation ship had sailed—the result being a profoundly international bomb.

[356] see Daniel Deudney, 'Geopolitics as Theory: Historical Security Materialism', *European Journal of International Relations* 6, no. 1 (2000): 89.

Chapter 2: The nuclear counter-technopolitics of the African National Congress: between global nuclear order and liberation struggle

Introduction

South Africa's opposition African National Congress (ANC), even in exile, worked to develop a competing regime of South African nuclear technopolitics to counter that of the government in Pretoria. As chapter 1 details, the apartheid government had constructed an extremely potent nuclear technopolitical regime of its own, which drew strong links between nuclear advancements and Afrikaner technological progress. Most importantly, its techno-nationalistic focus on the fictional 'indigineity' of the South African nuclear programme dovetailed almost perfectly with the version of events that was required for the increasingly proliferation-centred and US-led global nuclear order to maintain its credibility: that Pretoria had obtained a nuclear weapons capability on its own, that no horizontal 'proliferation' had occurred, and therefore that South Africa's Western associates bore no responsibility for the disaster unfolding in the *bushveld*. It was thus imperative for the ANC and its allies in the global anti-apartheid movement to mount a technopolitical campaign capable of effectively countering that of the apartheid regime. This was not a simple task. Being an outlawed organization, there was little room for technopolitical manoeuvre for the ANC within South Africa, and its foray into (anti-) nuclear politics took place as part of the broader anti-apartheid struggle around the world via a network of campaign groups, non-governmental organizations, and international organizations, most notably those within the UN family. However, the opposition coalition also *needed* to mobilize within the global nuclear order, since South Africa had, for decades, worked at building international influence and credibility in the field—via developing an impressive national nuclear technological base and becoming a globally important supplier of nuclear fuel—that was increasingly unavailable to it in other international settings.[357] This imbrication with the institutions of nuclear order posed a challenge for any opposition technopolitics: on one hand, it was necessary, as Edwards and Hecht argue, to undermine the regime's techno-nationalist myths by highlighting the extent of external collaboration in its nuclear programme by several important Western states, including NPT signatories in the form of the US, the UK, and the Netherlands.[358] On the other, it was the authority of the global nuclear order, and the growing consensus around non-proliferation as a core organizing principle thereof, which offered the most promising line of attack against Pretoria's nuclear excesses—and, by extension, the

[357] Hecht, 'Negotiating Global Nuclearities'; van Wyk, 'Atoms, Apartheid, and the Agency'.
[358] 'History and the Technopolitics of Identity'.

regime itself. Accordingly, the ANC and other organizations carved out a strong and nationally distinct non-proliferation position in an effort to bring the institutions of nuclear order to bear against Pretoria.

One of the primary vehicles for this endeavour was the British Anti-Apartheid Movement (AAM), and the primary research informing this chapter is primarily drawn from the AAM archive at Oxford University. Although a nominally independent organization, the AAM maintained a close relationship with the ANC from its foundation in 1959. It drew criticism from other organizations and activists unaffiliated with political parties for a perceived ANC bias; AAM campaigns were conceived and organized in consultation with the ANC.[359] The AAM and its allied organizations strongly reflected ANC opinion. AAM documents therefore offer a glimpse into the embryonic nuclear stances of the ANC, and are important historical context for the positions it would eventually adapt in government. The AAM in turn co-operated closely with the United Nations Special Committee Against Apartheid (UNSCAA), which was established in 1962 and quickly became a stridently activist voice within the UN, boycotted by Western nations for its support of comprehensive sanctions against the South African regime. Alongside Tanzanian president Julius Nyerere, the Special Committee encouraged the AAM to establish the World Campaign Against Military and Nuclear Collaboration with South Africa, headquartered in Oslo and directed by Abdul Samad Minty, which 'was the UN's main source of information on violations of the arms embargo. Without it, the arms embargo would have been much less effective'.[360] Together, these organizations gave a platform for anti-apartheid activists to focus on South Africa's nuclear capability and link this to the maintenance of apartheid and South African state power.[361] Other UN-family organizations including the IAEA played a role; however, the Agency carefully cultivated a 'neut33ral' stance towards 'political' issues like apartheid, flimsily justified with reference to its 'purely technical remit'—an excuse which would wear increasingly thin over time.[362]

Edwards and Hecht have begun to investigate the anti-apartheid nuclear technopolitics advanced through these institutions. This chapter will briefly summarize their argument, then continue where their important article leaves off. I expand upon their conceptual framework to bring in the concept

[359] Genevieve Klein, 'The British Anti-Apartheid Movement and Political Prisoner Campaigns, 1973-1980', *Journal of Southern African Studies* 35, no. 2 (2009): 458.
[360] E.S. Reddy, 'AAM and UN: Partners in the International Campaign against Apartheid', South African History Online, 1 September 2019, https://www.sahistory.org.za/archive/aam-and-un-partners-international-campaign-against-apartheid.
[361] Edwards and Hecht, 'History and the Technopolitics of Identity'.
[362] Hecht, 'Negotiating Global Nuclearities'; see also Anna Weichselbraun, 'Not Talking about Disarmament at the IAEA: How Nonproliferation Rules Ensure That Nuclear Weapons Are Here to Stay', *Anthropology News* 59, no. 4 (2018): 42–43.

of global nuclear order, which is absent from the original analysis but is an indispensable heuristic through which to understand the processes at work. I then examine highlights of the ANC and its allies' anti-apartheid campaigning in the nuclear arena, the perhaps unlikely way in which it challenged the state-sanctioned technopolitical regime of the National Party, and the ways in which it interacted with, influenced, and was influenced by the evolving global nuclear order.

Accordingly, my argument departs significantly from that of Edwards and Hecht. Their focus on the technopolitics of 'identity' leads them to the somewhat thin conclusion that the ANC's counter-technopolitics 'broadened the [international] understanding of the basis of apartheid'.[363] By reassessing the anti-apartheid anti-nuclear campaign against the conceptual backdrop of a hegemonic nuclear order—as well as the story of the apartheid bomb as recounted in the preceding chapter—I make a more fundamental point. A much more important result of this period was that the ANC aligned with the principles of non-proliferation and the nuclear order more broadly, long before it became the governing party of South Africa. Itty Abraham has discussed how opposition and protest movements can claim different forms of nuclearity than that ascribed by the conventional technological markers of nuclear reactors and warheads,[364] and by extension are themselves integrated into the global nuclear order. This is what the ANC did through its campaign against nuclear co-operation with South Africa. In mounting what was essentially a muscular non-proliferation argument against the apartheid state, the ANC pinned its nuclear ordering colours to the mast. Although its motivations were 'local' rather than 'global'—the removal of the regime in Pretoria was of course the highest priority—there were consequences to the global nuclear order as a result. Despite the implication of the order, its institutions, and some of its most responsible guardians in arming South Africa, the anti-apartheid coalition did not seize upon these failings as indications that the prevailing ordering arrangements were dangerous, unfair, hypocritical, or even racist. In short, the ANC sought to portray the apartheid bomb as *exceptional* to broader issues of non-proliferation. This is a striking conclusion, given the efforts by the regime in Pretoria to mark out the South African bomb as exceptional by virtue of its isolation from the rest of the world and global nuclear order, and its putatively 'indigenous' birth. Though both sides put forward different narratives of exceptionality—always in conversation with the wider global nuclear order—the cumulative effect was to construct a history in which the apartheid bomb sat apart from other nuclear programmes and episodes of 'proliferation'. The analysis here is, in part, a corrective to this narrative.

[363] Edwards and Hecht, 'History and the Technopolitics of Identity', 638.
[364] Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1'.

As will become clear through the following chapters, this early alignment with the hegemony of global nuclear order prefigured South Africa's approach to post-apartheid nuclear diplomacy, and is important in understanding how Pretoria's reputation as a 'bridge-builder' or agent of compromise between the Non-Aligned Movement and NWS has developed.[365] It set the stage for a considerable legitimation of the global nuclear order in the early 1990s, forging an association between South African liberation, human rights, and non-proliferation. It also had fundamental implications for the possibilities of civil nuclear policy that could be pursued when the ANC took power. In sum, this episode is emblematic of the interactions between 'local' and 'global' in nuclear order, and specifically of local agency in the context of solidifying global hegemony: the anti-apartheid coalition carved out space for real, purposive action within the global nuclear order, choosing a course of action which ultimately served to bolster the order and—as Chapter 3 discusses—imprinted the mark of South Africa on future ordering initiatives.

'Anti-apartheid technopolitics' and global nuclear order

The starting point for this analysis is Paul Edwards and Gabrielle Hecht's investigation into the anti-apartheid movement's leveraging of global institutions against apartheid by focusing on particular technologies: computing and nuclear in particular. In both cases, anti-apartheid activists developed a technopolitical strategy which aimed to lay bare the dependence of the South African regime on technology and expertise from abroad, assistance which in most cases was rendered enthusiastically by the Western allies. This strategy, the authors argue, aimed at a twofold objective: to reveal 'the West's role in the maintenance of the South African state' and to counter 'the state's nationalist narratives'.[366] In the case of computers, the argument was quite straightforward. Equipment provided by American and British firms was used by the South African Defence Force (SADF) in its weapons systems, and by the South African Police (SAP) in its efforts to catalogue the fingerprints and data of millions of black South Africans, in support of the Kafkaesque system of 'homelands' and Pass Laws which formed the coercive backbone of the apartheid system until the beginnings of its unravelling in 1986.[367] Drawing attention to British and American collaboration with South Africa

[365] Leith and Pretorius, 'Eroding the Middle Ground: The Shift in Foreign Policy Underpinning South African Nuclear Diplomacy'; van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'.
[366] 'History and the Technopolitics of Identity', 636.
[367] Edwards and Hecht, 'History and the Technopolitics of Identity'; Keith Breckenridge, 'The Biometric State: The Promise and Peril of Digital Government in the New South Africa', *Journal of Southern African Studies* 31, no. 2 (1 June 2005): 267–82.

would associate their respective governments with the oppressive regime in Pretoria, as well as damaging the supplier companies.

The contemporary activist pamphlet *Automating Apartheid* makes clear that imported computer technology was used to support virtually every aspect of Pretoria's authoritarianism during the apartheid years (including the nuclear weapons programme), making it possible for the pass system to operate at a level of detail and sophistication which would have been practically impossible for a paper-based arrangement to match.[368] This was without doubt a vitally important battle for the anti-apartheid movement and lives hung in the balance. However, it was in the nuclear arena where the two-pronged technopolitics of the anti-apartheid movement were most significant, both globally and—crucially for this project—in terms of possible South African nuclear futures. For one thing, disrupting the state's narrative of ingenuity and indigeneity was much more important in the context of nuclear technology. While the practical value of imported computing equipment was immense, its *technopolitical* value with regard to the techno-nationalist aspirations of the apartheid state toward self-sufficiency was negligible, given that 'all computing equipment and some telecommunications equipment was beyond local production capacities' and the state's computing infrastructure was therefore entirely reliant on imports.[369] Nuclear technology, as explored in Chapter 1, was an entirely different story. As Edwards and Hecht argue, the mastery of nuclear technology was a key indicator of South Africa's 'Westernness', as opposed to the 'Africanness' of its physical geography; the pursuit of 'nuclear' status through an ostensibly 'indigenous' enrichment process articulated South Africa as a both a technologically advanced state in general terms and as a *nuclear* state.[370] As a sophisticated crypto-Western nuclear power, South Africa self-consciously protected the secrecy of its technological achievements and implemented its policy of nuclear ambiguity with all the responsibility and care of a legitimate member of the world's nuclear elite.[371] This strategy also supported the Afrikaner nationalist mythos of rugged self-reliance and ingenuity while obscuring the role of the global nuclear order itself in the development of the apartheid bomb. Of course, any technological imports at all give lie to the myth of a self-sufficient, indigenous technology base, but

[368] NARMIC, 'Automating Apartheid: U.S. Computer Exports to South Africa and the Arms Embargo' (Philadelphia: American Friends Service Committee, 1982).
[369] G.A. Wood, S.E. Goodman, and J. Roos, 'Information Technologies in South Africa: Problems and Prospects', *Computer* 27 (December 1994): 49.
[370] As Hecht discusses elsewhere, South African diplomats played a fundamental role in defining the limits of 'nuclearity' that would be recognized and rewarded within the IAEA. Donald Bell Sole and his colleagues worked to ensure that South African global influence as the most 'advanced' nuclear state in Africa would be guaranteed by the Agency's Statute. Hecht, 'Negotiating Global Nuclearities'.
[371] Edwards and Hecht, 'History and the Technopolitics of Identity', 620–24.

in the case of nuclear technology the regime in Pretoria was successful in constructing such an intoxicating narrative.

Activists were successful in highlighting the connection between countries including Britain, France, the US, West Germany, and South Africa's nuclear programme—one which had hitherto gone relatively unnoticed, despite the imbrication of South Africa with the Western nuclear complex since the discovery of uranium deposits in the Witwatersrand gold fields in the 1940s. Dramatic interventions were made, such as Červenka and Rogers' *The Nuclear Axis*, which was allegedly based on documents stolen from South Africa's embassy in Bonn and indicated nuclear collaboration between Pretoria and West Germany.[372] Encapsulating the transnational nature of the campaign and reflecting an increasingly widespread recognition that apartheid and its bomb were enabled by a US politics characterized by its own forms of systemic racism, many African-American organizations joined campaigns against 'nuclear colonialism' elsewhere in Africa and aligned themselves with the anti-apartheid movement's anti-nuclearism.[373] These developments, alongside the formal institutionalization of state-sanctioned boycotts and the aforementioned UN-affiliated campaigns, exposed '[t]he conjuncture between the prospect of a South African bomb and the increasing intensity of apartheid repression [and] captured international attention'.[374] The authors express the view that these counter-narratives to apartheid nuclear technopolitics contributed substantially to the sanctions regime which would take hold in the 1980s and, by the end of that decade, exert enormous pressure on South Africa to transition to democracy.

Overall, this is a compelling account which is commendable for illuminating a lesser-studied aspect of the nuclear world and convincingly arguing that the ANC and its allies were effective at leveraging international institutions and global public opinion against the apartheid weapons programme, even from a position of exile. In line with Hecht's broader research project, it also firmly locates the exiled ANC and anti-apartheid movement 'in the nuclear world' in defiance of traditional nuclear/non-nuclear binaries.[375] At the same time, however, the authors offer an incomplete treatment of the topic, declining to locate this episode in the broader global context. Edwards and Hecht dedicate only half an article to nuclear counter-technopolitics, which is understandable in light of the well-documented difficulties involved in accessing documentary information about both Pretoria's

[372] Červenka and Rogers, *Nuclear Axis: Secret Collaboration between West Germany and South Africa*.
[373] Intondi, 'Nelson Mandela and the Bomb'; Intondi, *African Americans Against the Bomb: Nuclear Weapons, Colonialism, and the Black Freedom Movement*.
[374] Edwards and Hecht, 'History and the Technopolitics of Identity', 637.
[375] see Hecht, *Being Nuclear*.

nuclear programme and the ANC's internal discussions on sensitive topics like nuclear technology.[376] There is however also another, more fundamental reason why nuclear counter-technopolitics were much more important in the international struggle against apartheid in South Africa than a counter-technopolitics constructed around computing which has far-reaching implications: the existence of a global nuclear order. Computing technology at the close of the 1970s was in a state of relative infancy. The advances in networking technology that would sow the seeds of the World Wide Web in the early to mid-1980s were still some years off, and while computing equipment would be later included in the scope of US and UN trade embargoes placed upon South Africa, no meaningful 'order' even approaching the global scope or institutional density of that around nuclear technology then existed—or indeed exists now—around regulating the use and spread of computers.[377] Although it could be credibly argued in a 21st-century context that information technology threatens the basic integrity of the 'real-state' in a fashion resembling that of nuclear weapons, [378] during the 1970s computing was in its infancy, and it was nuclear weapons around which a complex ordering apparatus had arisen. Apartheid South Africa confronted this developing order when it embarked on its nuclear programme and, as we saw in the preceding chapter, exploited elements of it in service of its technopolitical objectives. However, Pretoria did not by any means occupy a commanding position within the order, nor was it able to control or mitigate the order's inexorable drift towards non-proliferationism, safeguards, and the close control of domestic nuclear programmes.[379] The existence of a global nuclear order opened up another avenue for Pretoria's domestic opponents to criticize and pile pressure onto the regime, which Edwards and Hecht do not account for.

The defiance with which South Africa pursued its nuclear programme and its belief that a nuclear weapon would lend the country the legitimacy 'to stipulate its birth-right at the negotiating table of the Greats'[380] suggests that Pretoria's understanding of the trajectory along which the global nuclear order was developing was inaccurate. Its officials underestimated the difficulties involved in securing long-lasting influence within the order when positioned in opposition to its governing norms. Its side-lining within the IAEA's safeguards committee and the advent of the NPT should have served as

[376] Graham, 'Finding Foreign Policy'; Gould, 'The Nuclear Weapons History Project'; Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past'.
[377] IR scholars are still grappling with the challenges of conceptualizing contemporary global order in the face of the networking effects produced by large technological systems, the internet prime among them. See Mayer and Acuto, 'The Global Governance of Large Technical Systems'..
[378] Daniel Deudney, 'Nuclear Weapons and the Waning of the Real-State', *Daedalus* 124, no. 2 (1995): 209–31.
[379] For accounts of this progressive marginalization, see Astrid Forland, 'Negotiating Supranational Rules: The Genesis of the International Atomic Energy Agency Safeguards System' (University of Bergen, 1997); Elisabeth Roehrlich, 'Negotiating Verification: International Diplomacy and the Evolution of Nuclear Safeguards, 1945-1972', *Diplomacy & Statecraft* 29, no. 1 (2018): 29–50.
[380] P.W. Botha, quoted in Albright and Stricker, *Revisiting South Africa's Nuclear Weapons Programme: Its History, Dismantlement, and Lessons for Today*, 92.

a warning here.[381] Although South Africa's was intended as a 'diplomatic bomb' with political rather than immediate military-strategic justifications,[382] the extent to which the nuclear programme enabled the anti-apartheid to further marginalize Pretoria on the global stage suggests that it failed on its own terms.

The foundations of anti-apartheid counter-technopolitics in an unequal global nuclear order

As discussed in Chapter 1, South Africa's push for nuclear weapons coincided with a challenging period for the global nuclear order, which I have argued was a major factor in the decision of the US to turn a blind eye to the programme. William Walker locates a period of upheaval within the order between 1973 and 1986 which consisted of two successive yet discrete crises. The first was the attempted 'civil nuclear suzerainty' of the United States from 1973-1980, during which the US attempted to secure a monopoly on nuclear trade against the opposition of a number of Western states and nuclear suppliers elsewhere. The second was the 'overthrow of restraint' from 1980-1986, whereby a previous period of détente between the US and USSR gave way to more confrontational relations and ensuing threats to strategic stability, exemplified by the deployment of US Pershing missiles in Turkey and President Reagan's 'Star Wars' plan.[383] As with most well-known scholarship on the history of nuclear order, this is a somewhat superpower-centric analysis which neglects to consider the possible capabilities of smaller, 'non-nuclear', and/or non-Western states to instigate upheaval within the order. In the case of the first crisis, Walker mentions India's 'peaceful nuclear explosion' in 1974 as a catalyst which helped to sharpen questions that were already beginning to be asked around balancing nuclear trade with non-proliferation concerns, but quickly returns his focus to the disagreement between the US and dissenting Western allies like France and West Germany while occasionally gesturing to 'Third World' states, including South Africa, as a 'rejectionist' bloc principally represented by India.[384] South Africa's own nuclear ambitions and increasingly antagonistic attitude to the non-proliferation regime are not treated as a major challenge to the stability of the order; this oversight is somewhat mitigated by the fact that most of the diplomatic wrangling over South Africa's nuclear capabilities during the late 1970s took place largely behind closed doors.[385] However, it is clear that the spectre of an apartheid bomb, which

[381] See Forland, 'Negotiating Supranational Rules: The Genesis of the International Atomic Energy Agency Safeguards System'; Roehrlich, 'Negotiating Verification: International Diplomacy and the Evolution of Nuclear Safeguards, 1945-1972'.
[382] Betts, 'A Diplomatic Bomb for South Africa?'
[383] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 115–38.
[384] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*, 124.
[385] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*.

from 1977 onwards was a very public issue and loomed increasingly large, posed a significant threat to the legitimacy of the order. The anti-apartheid movement exploited this challenge by bringing to bear the institutions of nuclear order against the South African state, effectively temporarily co-opting nuclear order to their own ends. This confrontation and its ramifications have gone all but unexplored in studies of nuclear order, but they are of some significance to both the evolution of the non-proliferation centred order and to the nuclear choices of the ANC after taking power.

While the analytical concept of 'global nuclear order' is a more recent innovation, the ANC and its allies in the global anti-apartheid movement had a much better understanding of how to engage with nuclear ordering processes to their own benefit and to the detriment of the South African state. This what Edwards and Hecht miss: while the ANC and anti-apartheid coalition did not consciously engage in nuclear ordering, global nuclear order is the overarching conceptual frame which explains the political significance of their campaign—not only in terms of short- and medium-term victories like tightened sanctions and even the contribution toward hastening the end of apartheid, but also of long-term effects which would colour South Africa's post-apartheid nuclear diplomacy and civil nuclear choices. Furthermore, an important point which has gone unnoticed by analysts of world nuclear politics is that this technopolitical strategy also constituted a creative and perhaps counter-intuitive re-articulation of some of the global nuclear order's most controversial characteristics. The movement attempted to leverage the emergent normative consensus around non-proliferation against the repressive power of the apartheid state. The order, which was beginning to draw criticisms for entrenching colonial-era power imbalances,[386] and has since been characterized as relying on 'a set of preconceptions about the geography of Enlightenment rationality and the borders of its limits', was turned against the oppression of South Africa's non-white majority.[387] An unequal global order was used effectively to fight an unequal domestic political system. However, this strategy did not come free of costs or tensions and, importantly, was pursued within the restraints imposed by a powerful, increasingly hegemonic order. This meant that in instances where the ANC might have made more fundamental normative criticisms about the technopolitical foundations of the order, they were often compelled by the overarching power structures to align with its developing hegemony and restricted to tinkering with its technopolitical margins. This does not mean that the campaign was unsuccessful on its own domestic terms—but it did not constitute a radical rearticulation of global nuclear order towards justice.

[386] Jaswant Singh, 'Against Nuclear Apartheid', *Foreign Affairs* 77, no. 5 (1998): 41–52.
[387] Biswas, *Nuclear Desire*, 107.

The technopolitical strategies employed by the ANC, AAM, and allied organizations in campaigning against the apartheid bomb were in many respects heavily reliant on the emerging consensus around non-proliferation that had further cemented itself within the nuclear order from the mid-late 1970s onwards. The NPT helped to further entrench an increasingly dominant technopolitics of nuclear order which placed value on tightly restricting the horizontal spread of nuclear materials beyond established nuclear weapons states whilst protecting other states' right to civil nuclear development, a bargain which relied on the continuous policing of the boundary between 'military' and 'civil' nuclear technology through a beefed-up safeguards regime.[388] The charge that South Africa was engaged in 'proliferation', and that other states may have failed to meet their non-proliferation obligations by assisting, offered enormous political weight to the campaign as the non-proliferation norm became more entrenched and widely accepted. The opposition coalition were thus able to skilfully instrumentalize the IAEA and the NPT, implicitly accepting their authority as well as the broader norms surrounding the relative legitimacy of nuclear weapons possession in order to delegitimize the South African regime and its semi-clandestine bomb. Although, as Edwards and Hecht note,[389] the movement forged alliances with anti-nuclear campaigners and experts who routinely appeared at its seminars and contributed to its reports and publicity efforts, its prime political objective was not to 'ban the bomb'. The anti-apartheid campaign in this sense can be differentiated from the more radical anti-nuclear and peace movements of the Cold War, perhaps the best-known of which being the Campaign for Nuclear Disarmament (CND), which advocated a more comprehensive uprooting of nuclear order and were critical of NATO, arms control efforts, the NPT, and indeed nuclear weapons *per se*.[390] Instead, as some South African nuclear historians have noted, in the context of the anti-apartheid struggle the ANC 'took on a strong non-proliferation position and soon made South Africa's nuclear disarmament a major focus area of its liberation struggle and international strategy to change the constitutional dispensation in the country'.[391] Unfortunately, existing treatments have gone into little depth as to what this 'strong position' looked like, which has led to incomplete understandings of how the ANC historically relates to non-proliferation. Campaigning for apartheid South African disarmament is implicitly conflated with a pro-disarmament position, and a strong pro-NPT position in the 1980s somehow becomes a 'long-

[388] See Forland, 'Negotiating Supranational Rules: The Genesis of the International Atomic Energy Agency Safeguards System'.
[389] 'History and the Technopolitics of Identity', 635.
[390] E.g. Mark Phythian, "CND's Cold War," *Contemporary British History* 15, no. 3 (2001): 133–56.
[391] van Wyk and van Wyk, 'From the Nuclear Laager to the Non-Proliferation Club: South Africa and the NPT'; see also Pretorius, 'Africa–India Nuclear Cooperation: Pragmatism, Principle, Post-Colonialism and the Pelindaba Treaty', 330.

held skepticism' towards the NPT in the 1990s.[392] Elsewhere, it is taken for granted that a strong position in favour of non-proliferation is the same as an 'anti-nuclear' one.[393] As I note in the conceptual framework chapter, these inconsistencies are the result of a general lack of conceptual engagement and critique when writing about South Africa's nuclear history. Through my critical use of the 'global/local' divide as a heuristic for understanding world nuclear politics, I am able to posit a more coherent explanation. I consider the anti-apartheid campaign as the ANC's first foray into nuclear ordering, and as part of the continuous development of a consistent position on non-proliferation and disarmament.

In a nutshell, the liberation movement's position on non-proliferation was unusually strong, even compared to that of the United States, and represented a distinct, targeted technopolitical project designed to delegitimize the apartheid regime, sometimes using the global nuclear order's own embedded inequities. Understanding this, in turn, allows for a broader re-examination of South Africa, the battle against apartheid, and their often-understated importance to the configuration of contemporary nuclear order. Various documents produced by the AAM and its affiliated bodies and campaigns suggest a general stance that was critical towards the Western allies—in particular the United States, West Germany, Britain, and France—for abetting Pretoria's nuclear ambitions, but also broadly accepted the global nuclear order's focus on non-proliferation as the solution. Indeed, when the coalition attacked the institutions of global nuclear order tasked with keeping proliferation at bay, its criticisms were born not of an anti-colonial opposition to the unequal and racialized rules of the game—the government in Pretoria had ironically claimed this grievance as its own—[394] nor a charge that the existing institutions of nuclear order were complicit in South Africa's ambitions, but of the belief that only stronger non-proliferation measures could succeed in defusing the apartheid bomb. Where the efficacy of non-proliferation principles was questioned, it tended to be in terms of their applicability in light of the 'exceptional' nature of the apartheid regime. Accordingly, additional voluntary efforts to quell South Africa's proliferation efforts, in the form of embargoes and sanctions, were required alongside an expanded bill of IAEA safeguards. While the opposition coalition did mount limited criticisms of the non-proliferation regime—the bulwark of the global nuclear order's 'managed system of abstinence'—[395] the ANC and its allies did not diagnose systemic flaws. The principles of non-proliferation were powerful normative weapons against the apartheid

[392] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 34.
[393] van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program'.
[394] Singh, 'Against Nuclear Apartheid'; Biswas, '"Nuclear Apartheid" as Political Position'.
[395] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*.

state. It is furthermore probable that, as the balance of power in South Africa shifted and an ANC-led government became thinkable, opposition leaders understood that alignment with the fundamentals of global nuclear order would be crucial when it came to deciding South Africa's nuclear future.[396]

This brings us to an irony of anti-apartheid counter-technopolitics. The regime in Pretoria laid claim to a particular brand of postcoloniality by 'insisting on its own African-ness' and conspicuously performing the 'acquired indigeneity' of the Afrikaner *volk* when castigating the Western allies for their nuclear hypocrisy: [397]

> [w]hen I announced to the world in the name of the Government a few years ago that our scientists could enrich uranium, and that they had developed a process for doing so in the most ingenious way possible, the world laughed at us; and when we offered to work together with all the other nations peacefully and for peaceful ends, we were universally ignored […] Now this "backward" nation is being accused because she suddenly wants to explode a nuclear bomb'.[398]

Through statements like these, South Africa attempted to stake a moral position against a nuclear order which was evolving towards a general coalescence around the NPT, couching its stance of nuclear ambiguity in the language of technological maturity, independence, and ingenuity, as well as the defence of its sovereign right to pursue nuclear research and strike nuclear trade deals with other states (see the preceding chapter). In doing so, Pretoria trod a path that had been recently laid by India, whose national nuclear programme and 'peaceful nuclear explosion' of 1974 emerged from a very different national context and carried rather different meanings, but were defended in a similarly strident postcolonial vernacular.[399] India wrote an effective playbook for nuclear-aspirant, post-colonial states wishing to justify nuclear weapons programmes in moralistic, anti-imperialist, pro-sovereignty terms which dovetailed neatly with Pretoria's rhetoric and Afrikaner-nationalist ideological roots. South Africa's adoption of this approach struck a discordant tone for many reasons, not least because a recurrent feature of India's rhetoric was to identify a system of 'atomic apartheid' which hampered the 'economic and peaceful development' of the 'civil nuclear

[396] see ANC/Environmental Monitoring Group, ed., *The Nuclear Debate: Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (Cape Town: The Environmental Monitoring Group: Western Cape, 1994).
[397] Edwards and Hecht, 'History and the Technopolitics of Identity', 620; See also Miller, *An African Volk: The Apartheid Regime and Its Search for Survival*.
[398] B.J. Vorster quoted in van Wyk, 'South African Nuclear Development in the 1970s', 1163–64.
[399] Abraham, *The Making of the Indian Atomic Bomb*, 138–41; Rikhi Jhaipal, 'The Indian Nuclear Explosion', *International Security* 1, no. 4 (1977): 44–51.

powers'.[400] Nonetheless, the nature of the South African regime notwithstanding, its questioning of the global nuclear order touched on pertinent questions of inequity, rights, and responsibility, and was a potentially powerful strategy which dressed South Africa's ambitions for an apartheid bomb in a garb of insurgent normative legitimacy.

One consequence of this inversion was that Afrikaner nationalists' claims to 'African-ness' and distinction from Europe thus paradoxically made them vulnerable to the order's most discriminatory mechanisms and implicit hierarchies. Arguments that the global nuclear order is organized around a discriminatory logic which frames certain states as 'legitimate' or 'illegitimate' possessors of nuclear weapons—a demarcation which closely aligns to narratives about civilizational advancement—are well-rehearsed.[401] In brief, the Non-Proliferation Treaty retroactively grants certain actors, the five designated nuclear-weapons states (NWS), the right to hold nuclear arsenals—temporarily, at least—while the non-NWS majority forgo this privilege in the expectation that the NWS will work towards disarmament, the 'grand bargain' set out in Article VI of the Treaty —efforts which have to date fallen conspicuously short of anything close to resembling meaningful nuclear disarmament. Simultaneously, it reaffirms an 'inalienable' right for every state to pursue civil nuclear technology,[402] requiring strict safeguarding on the transfer of nuclear and related materials. Safeguards were in place prior to the NPT, but the NPT simultaneously strengthened them and redefined their core purpose.[403] The NPT thus institutionalizes and legitimizes inequality, on a theoretically temporary basis, within the nuclear order in apparent pragmatic pursuit of a much larger public good: a nuclear peace to be achieved not only through disarmament, but also through the control of horizontal proliferation and strategic stability.

Defenders of this 'logic of inequality' underpinning the NPT and the normative order which surrounds it are commonly heard arguing that it is a crucial component of nuclear stability, ostensibly from a technical rather than ideological perspective.[404] However, more critical treatments seek to uncover the ideological commitments underlying such claims. Chacko and Davis follow

[400] V.C. Trivedi, 'Statement by the Indian Representative to the Eighteen Nation Disarmament Committee: Nonproliferation of Nuclear Weapons, May 23', in *Documents on Disarmament* (Washington, DC: United States Arms Control and Disarmament Agency, 1967), 234.
[401] Biswas, *Nuclear Desire*.
[402] United Nations, 'Treaty on the Non-Proliferation of Nuclear Weapons'.
[403] Forland, 'Negotiating Supranational Rules: The Genesis of the International Atomic Energy Agency Safeguards System'; Roehrlich, 'Negotiating Verification: International Diplomacy and the Evolution of Nuclear Safeguards, 1945-1972'.
[404] e.g. Nye, 'NPT'; Walker, 'Nuclear Enlightenment and Counter-Enlightenment'.

theorists including Gong,[405] Bowden,[406] and Anghie[407] in identifying the operation of a 'standard of civilization' within world nuclear politics, arguing that 'civilizational discourse, particularly in the form taken following World War Two and decolonization, [is] a means of constructing and legitimating a hierarchical global nuclear order.[408] Gusterson similarly identifies this as an ideology of 'nuclear orientalism' which is endemic in US thinking about nuclear weapons, was institutionalized by the NPT in 1970, and is often propagated through a few common arguments against 'horizontal proliferation'.[409] These include, for instance, that nuclear weapons are too expensive for 'third-world' countries to responsibly pursue, that their governments lack the requisite levels of technological sophistication to reliably handle the weapons, and that they are more susceptible to 'the kinds of ancient hatred and religious fanaticism that could lead to the use of nuclear weapons in anger'.[410] The subtext of these arguments is that 'third-world', i.e. post-colonial and other Global South states are not civilizationally sophisticated enough, whether technologically, culturally, or cognitively, to be trusted with such advanced and destructive weapons.

Despite the deeply political nature of its founding logics and occasional attempts by nuclear-aspirant states to challenge their moral authority, the current iteration of the global nuclear order—centred around a governing ideology of non-proliferationism—enjoys a strongly hegemonic status.[411] Biswas has argued that the order and the NPT specifically have succeeded in 'effectively depoliticizing the problem of non-proliferation'.[412] Political questions of distribution and injustice are muted by the successful institutionalization of non-proliferation as an unproblematic and common-sensical good. Mathur points out that Walker's own defence of global nuclear order and its constituent inequality as an 'Enlightenment project' supports this narrative, justifying the 'coercive diplomacy' involved in institutionalizing the NPT by pointing out that it has now attained a 'magnetic authority and legitimacy' that is extremely widely accepted.[413] Jasper has expanded on the nature of this authority, investigating the nuclear order from a Bourdieusian perspective and characterizing it as a

[405] *The Standard of 'Civilization' in International Society* (Oxford: Clarendon Press, 1984).
[406] 'In the Name of Progress and Peace: The "Standard of Civilization" and the Universalizing Project', *Alternatives: Global, Local, Political* 29, no. 1 (2004): 43–68.
[407] *Imperialism, Sovereignty, and the Foundation of International Law*.
[408] Priya Chacko and Alexander E. Davis, 'Resignifying "Responsibility": India, Exceptionalism and Nuclear Non-Proliferation', *Asian Journal of Political Science* 26, no. 3 (2018): 355.
[409] Gusterson, *People of the Bomb*.
[410] Gusterson, *People of the Bomb*, 36.
[411] Ritchie, 'A Hegemonic Nuclear Order: Understanding the Ban Treaty and the Power Politics of Nuclear Weapons'; Egeland, 'The Ideology of Nuclear Order'.
[412] Biswas, *Nuclear Desire*, 12.
[413] Roberts 2007, quoted in Ritu Mathur, 'Sly Civility and the Paradox of Equality/Inequality in the Nuclear Order: A Post-Colonial Critique', *Critical Studies on Security* 4, no. 1 (2 January 2016): 63.

'quasi-religious field' which 'not only establishes and justifies a particular cosmological order or hierarchy but also leads to (and 'rationalizes') the (unequal) distribution of 'sacred goods''.[414]

It therefore makes sense, by the logic of adopting a position that could generate the maximum possible international support, that the anti-apartheid coalition should align with and endorse the basic tenets of a nuclear order which inspires near-religious international devotion and enjoys common-sense status—despite the movement's strongly anti-colonial thrust and position of non-alignment. Of course, the global nuclear order during the late 1970s did not quite enjoy the quasi-religious, hegemonic status that it would by the early 1990s. The order was unsettled, and both the ANC and Pretoria sensed opportunities to move the needle slightly towards their respective domestic goals. Nevertheless, the signing of the NPT had set the processes of solidifying hegemony in motion. The anti-apartheid coalition was concerned with toppling the regime in Pretoria, not overhauling the global nuclear order. Therefore, as Pretoria co-opted and inverted the emergent 'nuclear apartheid' narrative to fit its own ends, so did the ANC and AAM-led coalition draw upon the unequal logic of the order. They exploited its tropes of irresponsibility, backwardness, and illegitimacy—which have long provided legitimizing weight to global nuclear hierarchy, and which are necessarily entailed by the acceptance of the norms of nuclear order—to argue that South Africa should be further ostracized and excluded in world politics. The following section documents how this strategy played out and notes the considerable convergence between the campaign and the more discriminatory aspects of the global nuclear order.

Turning 'nuclear apartheid' against apartheid: activist interventions into global nuclear order

Highlighting individual transgressions

Contemporary documents point to some of the campaigning tactics of the anti-apartheid coalition in the arena of world nuclear politics. Some avenues of criticism did not specifically target South Africa, instead rehearsing arguments commonly heard among the Non-Aligned Movement. One common tactic, as Edwards and Hecht discuss, was simply to show that Western states were hypocritical in violating their non-proliferation obligations, or otherwise undermining the prospects of the broader non-proliferation project, by assisting South Africa.[415] Activists pointed out with reference to Bonn's

[414] 'Dysfunctional, but Stable – a Bourdieuian Reading of the Global Nuclear Order', *Critical Studies on Security* 4, no. 1 (2016): 46.
[415] Edwards and Hecht, 'History and the Technopolitics of Identity'.

alleged provision of enrichment technology to Pretoria that West Germany 'was bound by the [NPT] and it had a special responsibility to ensure that nothing would be done by West German firms to proliferate nuclear weapons to South Africa'.[416] The United States and United Kingdom were regularly singled out for criticism along these lines for being in violation of the spirit—and sometimes the letter—of the NPT, UN arms embargos, and domestic non-proliferation legislation. The UK took advantage of 'loopholes' in the UN arms embargo of 1985, which did not prohibit the training of South African personnel at British nuclear facilities, the importing of Namibian uranium, nor the involvement of British companies—principally Rio Tinto Zinc—in extracting uranium oxide from this uranium for use by South Africa.[417] While its policy was to abide by non-proliferation norms and its various international obligations around the export of nuclear materials, AAM investigations highlighted that the British government 'refused to publish any information on export licence applications or on the granting of licences', which meant it was 'impossible to verify whether this policy [was] strictly implemented'.[418] The US was similarly rebuked for failing to abide by both its international non-proliferation obligations as well as its own domestic arms embargoes and the 1978 Nuclear Non-Proliferation Act passed by the Carter administration. In general, Western states were criticized for their collective failure to live up to their Article VI NPT obligations, having 'not shown the good faith in negotiating nuclear disarmament to which they are committed'.[419] In its *Sechaba* publication in 1975, the ANC reminded readers of an earlier 1966 publication in which it identified a 'Great Power Conspiracy' to prop up white supremacist regimes in South Africa and Rhodesia as part of a 'broader imperialist strategy' on the part of the West.[420] However, this article focused specifically on the assistance rendered to the apartheid nuclear programme by West Germany—which had, incidentally, historically been a holdout in NPT and safeguards negotiations; a subsequent piece identified an 'international nuclear conspiracy' between South Africa, the US, Britain, France, and West Germany and focused in granular detail on specific types of assistance rendered by Western companies to Pretoria.[421] Interestingly, van Wyk and van Wyk choose to read these pieces as excoriations of 'the international community' and a broader multilateral, systemic failure—perhaps a deliberate one—on the part of multiple countries to prevent the suspected

[416] UN Centre Against Apartheid, 'Report: Nuclear Collaboration with South Africa' (London: World Campaign against Military and Nuclear Collaboration with South Africa, March 1979), 6.
[417] Anonymous, 'B.6: The UN Arms Embargo and UK Controls' (London: UN Special Committee Against Apartheid, 1986), MSS AAM 1503, folder 1, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford.
[418] Anonymous, 'B.6: The UN Arms Embargo and UK Controls', 10.
[419] e.g. Frank Barnaby, 'Nuclear South Africa' (United Nations International Seminar on the Implementation and Reinforcement of the Arms Embargo against South Africa, London: United Nations Special Committee Against Apartheid, 1981), 32.
[420] ANC, 'Fight the Nuclear Conspiracy between West Germany and South Africa', *Sechaba*, 1975, 3.
[421] ANC, 'International Nuclear Conspiracy with Racist South Africa', *Sechaba*, 1976.

nuclear armament of South Africa.[422] Once again, a lack of serious engagement with the (techno-) political bases of the ANC's position on non-proliferation and with the concept of global nuclear order leads them to identify a much wider and deeper critique on the part of the ANC than was actually made. The documents cited do not quite bear this interpretation out:

> The international community has watched with increasing disquiet the growth of South Africa's armory of conventional weapons and the development of a locally-based arms industry aided by the United States, the Federal Republic of Germany, Britain, France, and Italy.[423]

Despite the incendiary headlines of 'imperialist conspiracies' to arm apartheid, this is not an indictment of international inaction. Beyond their headlines, the *Sechaba* pieces amount to rather muted and targeted criticisms of specific countries—indeed, specific companies within those countries—for doing deals with Pretoria to feed its nuclear and arms programmes. The 'international community' is portrayed as a concerned observer, rather than a complicit or malevolent actor—and the ANC is explicit about its reliance on the UN as a venue for the exposure of these transgressions.[424] Although these criticisms echoed non-aligned or even, at times, Soviet rhetoric regarding the alliance between Western capital and the apartheid regime, in their substance they tended to single out a select few states and multinational firms. Moreover, although the NPT had been in force for nearly six years at this point, the institutions of global nuclear order, non-proliferation organs, and safeguards did not feature as part of the identified 'conspiracy'. Attacks on Western enablers of the apartheid bomb as such constituted only mild criticism and implicitly accepted the basic legitimacy of the global nuclear order, amounting to exhortations to respect the concerns of the 'international community' and the agreements to which they were party. Given the reality of the situation in South Africa, these were surprisingly restrained arguments. They aligned with those of the Non-Aligned Movement which, while remaining generally compliant with the principles of non-proliferation, had expressed concern since the early 1960s that any non-proliferation agreement would be compromised by loopholes which risked exacerbating the inequalities already embedded in the nuclear order.[425] Overall, critiques of this nature were useful in highlighting the need for additional voluntary embargoes and sanctions to plug the gaps in the non-proliferation regime, but they were not strident enough to highlight the severity of Pretoria's nuclear

[422] van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program', 8.
[423] ANC, 'Fight the Nuclear Conspiracy between West Germany and South Africa', 3.
[424] ANC, 'International Nuclear Conspiracy with Racist South Africa'.
[425] William Potter and Gaukhar Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement* (Oxon: Routledge, 2012), 40–41.

transgressions, let alone the extent of Western complicity in them. Accordingly, the ANC did mount stronger arguments: the danger of a nuclear South Africa needed to be averted through stronger non-proliferation measures.

Advocating for tougher non-proliferation and embargo measures

Activists' assessments of the failures that led to South Africa's nuclearization often concluded that the non-proliferation regime at the heart of the nuclear order was simply too weak. The ANC activists who alleged links between the West German jet nozzle enrichment process and South Africa's Helikon technology castigated the NPT for 'fail[ing] to achieve its primary objective: to freeze the number of States possessing nuclear weapons', arguing that to prevent further proliferation such as occurred in the South African case, full-scope safeguards should be required and 'exports of highly sensitive facilities' banned.[426] At a 1981 conference organized between the UN Special Committee Against Apartheid, the World Campaign, and the AAM, it was lamented that

> [t]he 1970 Non-Proliferation Treaty (NPT) lulled many into a false sense of security: politicians and non-politicians alike were convinced that the proliferation problem was more or less solved. The technical and economic barriers to the acquisition of nuclear weapons were, in 1970, still thought to be formidable. These barriers disappeared some time ago for the vast majority of countries, but it has taken time for this to be generally understood. The realization came to many as a result of the 1974 Indian nuclear explosion […] The NPT is a fragile instrument mainly because two nuclear weapon states (France and China) and a number of important non-nuclear weapon states with substantial nuclear knowhow […] have not joined the treaty.[427]

On this reading, the fragility of the NPT and coalescing consensus around non-proliferation were taken to have contributed to South Africa's ability to nuclearize, alongside an assumed lowering of the bar for entry to the 'nuclear club', exacerbated by the relatively easy availability of so-called 'dual use' nuclear equipment. South Africa is treated here as part of the bloc of 'proliferant' and near-nuclear states, whose aspirations are taken to pose a threat to nuclear stability, and the prescribed solution is a further strengthening of the non-proliferation component of nuclear order. In the same vein, campaigners sometimes highlighted the proliferation danger that South Africa posed to the rest of the world and the non-proliferation consensus. The Nigerian ambassador Leslie O. Harriman, Chair of the UN Committee Against Apartheid, warned that 'South Africa also wanted

[426] Červenka and Rogers, *Nuclear Axis: Secret Collaboration between West Germany and South Africa*, 399.
[427] Barnaby, 'Nuclear South Africa'.

to play a dominant role in supplying uranium and enriched uranium to the rest of the world […] it hoped that countries would become dependent on it for enriched uranium, for both civil and military purposes', thus 'becom[ing] an even greater menace to Africa' in the process.[428] The idea that South Africa might supply sensitive materials to its diminishing number of friends and become a proliferation 'contagion' seems tailored to appeal to the diplomats and policymakers of the nuclear weapons states, who since the 1960s had increasingly operated under a 'nonproliferation paradigm' which took as read 'the alleged general principle of an inevitable increase in the number of actors with nuclear weapons'.[429] Campaigners including the political scientist and anti-apartheid campaigner Ronald Walters and ANC activist Barbara Rogers expressed support for a stronger IAEA safeguards system on South Africa, and criticized the loophole that allowed South Africa to operate an enrichment plant without safeguards providing that it was not of a 'commercial' size.[430] Incidentally the IAEA, which was keen to perform its 'technical' and 'non-political' nature and did not always supply representatives to anti-apartheid events, agreed with Walters' assessment that an additional embargo was required should South Africa refuse to accept total safeguards.[431] The World Campaign repeatedly highlighted the need for additional embargoes and safeguarding measures to supplement existing multilateral measures, and aimed to supply the UN with the requisite information to institute such an embargo. On the establishment of an additional embargo—which was eventually achieved, although far too late to halt the nuclear weapons programme—'we should work for stricter enforcement of that embargo and […] its terms should also be made more comprehensive'.[432]

These discussions are representative of the approach taken to the shortfalls of the international non-proliferation regime embodied in the NPT—as well as its additional layers of safeguards and embargoes on 'civil' nuclear equipment—with regard to South Africa. The ANC and its allies in the anti-apartheid coalition refrained from critiquing any of the fundamental premises of non-proliferation as a set of policies. Instead, they favoured pushing for additional voluntary and unilateral measures that could strengthen and complement existing non-proliferation arrangements.

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[428] UN, 'Seminar on Nuclear Collaboration with South Africa Urges Security Council to Demand End of Nuclear Links with Pretoria Regime', Press release (New York: United Nations Department of Public Information, 26 February 1979), 2, MSS AAM 1499, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford.

[429] Benoît Pelopidas, 'The Oracles of Proliferation: How Experts Maintain a Biased Historical Reading That Limits Policy Innovation', *The Nonproliferation Review* 18, no. 1 (2011): 288–99.

[430] UNSCAA, 'Implementation and Reinforcement of the Arms Embargo against South Africa' (London: United Nations, April 1981), 2, MSS AAM 1500, folder 1, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford; see also IAEA, 'Communication Received from South Africa' (Vienna: International Atomic Energy Agency, February 1984), 2.

[431] UNSCAA, 'Implementation and Reinforcement of the Arms Embargo against South Africa', 4.

[432] ANC, 'No Arms for Apartheid', *Sechaba*, June 1979, 20.

With the usual caveat that archival research on this subject is notoriously difficult, and in particular that a more detailed position on the specifics of non-proliferation was subsumed under the broader rubric of 'military and nuclear collaboration',[433] it is clear from interventions of this sort that the ANC did indeed maintain a strong non-proliferation position. Its campaigns in various multilateral arenas repeatedly stressed the need for additional controls on nuclear trade with Pretoria, and that such controls should be imposed through formal, multilateral frameworks. The ascension of Abdul Minty to a highly respected position within the IAEA after the fall of apartheid is testament to the credibility and perceived consistency over non-proliferation that the ANC demonstrated during these years. In 1994, Minty was keen to stress that the liberation movement had 'an extremely long tradition of opposing nuclear weapons' and their proliferation,[434] and from a perspective of global nuclear order it clearly posed little in the way of a proliferation threat itself. However, while the ANC in its opposition years espoused a commitment to non-proliferation that was often considerably stronger than that of the US when it came to South Africa, it also identified flaws in the non-proliferation approach to curbing the South African nuclear programme. The ANC did not necessarily accept every facet of the nuclear order's technopolitical prescriptions. This is a point that existing analyses have missed. Specifically, the anti-apartheid movement repeatedly questioned the 'assumed distinctions about the nature and applications of nuclear technologies'—the division between 'civil' and 'military' nuclear technology—a fundamental technopolitical boundary at the heart of the global nuclear order.[435] The logic at the heart of the NPT's Article VI 'grand bargain' depends on the separability of these two applications, and for the ANC to question this was potentially a radical critique. However, given the strong incentives to align with the hegemonic power of the order, it is perhaps not surprising that most of the subversive content was drained from this line of argument. The opposition argued that the civil/military divide was untenable *only in the exceptional case of South Africa*—a position which conveniently exonerated the NWS and institutions of the global nuclear order from their role in permitting Pretoria's 'proliferation'.

Identifying South Africa as an exceptional nuclear threat

One anti-apartheid movement analysis of British links to the South African bomb noted in striking terms that 'Britain seeks to reduce the issue of nuclear collaboration within South Africa to the *more*

[433] van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program', 41.
[434] Abdul S Minty, 'Keynote Address', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 8.
[435] Peoples, 'Life in the Nuclear Age: Classical Realism, Critical Theory and the Technopolitics of the Nuclear Condition', 281.

general issue of nuclear proliferation'.[436] The paper alleged that the UK government preferred to divert criticism of its policy towards South Africa by pointing to its joint efforts alongside the US to bring South Africa into the non-proliferation regime and thus into line with the standards of behaviour within the global nuclear order. The same criticism was made of US policy, which aimed to push South Africa towards the NPT; activists believed that the primary motivation for this was to maintain Washington's access to its nuclear fuel supply.[437] Throughout its campaigning, the movement preferred the term 'collaboration' to 'proliferation' in the case of South Africa. Recalling Europe's encounter with fascism four decades previously, the term suggested a much more serious violation of a specifically political nature, which countered the narrow, technical approach to proliferation which was enshrined in the rules of the IAEA and initially adhered to by the Western allies. It also gestured to the apparent exceptionality of the apartheid regime. Aside from the individual violations highlighted by the anti-apartheid movement, nuclear powers like the US and UK could point to their general compliance with the letter of the NPT and adherence to safeguards, defending themselves in legalistic terms against the charge of engaging in 'proliferation' activities with South Africa. However, the apartheid regime's especially deviant brand of fanaticism, authoritarianism, secrecy, and deceitfulness meant—in the eyes of the anti-apartheid coalition—that even strictly 'civil' nuclear co-operation effectively amounted to weapons collaboration. In response, the British Anti-Apartheid Movement petitioned officials to prevent South African 'civil' nuclear engineers being trained in the UK and even applied for nuclear engineering jobs within the South African nuclear industry (which placed advertisements in British newspapers) in order to expose the depth and breadth of nuclear 'collaboration' that fell outside of formal British 'non-proliferation' obligations.[438]

According to this line of argument, the uniquely repressive nature of the apartheid regime meant that the existing institutions of global nuclear order, specifically its ability to deal with proliferation, were insufficient in their scope to curb its nuclear ambitions. As set out in the conclusions and recommendations of the 1979 United Nations Seminar on Nuclear Collaboration with South Africa, co-organized by the ANC:

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[436] Anti-Apartheid Movement, "Nuclear Collaboration with South Africa: Britain's Profile," Working Paper (London: United Nations Seminar on Nuclear Collaboration with South Africa, February 24, 1979), 6, MSS AAM 1499, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford, my emphasis.

[437] UN Centre Against Apartheid, 'Report: Nuclear Collaboration with South Africa', 9; see also Christie, *Electricity, Industry and Class in South Africa*.

[438] Mike Terry, 'Letter from Mike Terry to Robert Hughes MP', 15 April 1976, MSS AAM 1494, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford; 'Letter from Mike Terry to Escom Management', 5 November 1979, MSS AAM 1494, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford.

> In view of the nature and record of the apartheid regime, no international or bilateral safeguards, including the [IAEA] safeguard system and the system of control of the [NPT] are adequate. The Seminar rejects and denounces the moves by certain Western powers to offer to the apartheid regime the benefits of international nuclear collaboration, and security and other guarantees, in return for adherence to the NPT. [439]

In addition:

> In the context of the nature of the Pretoria regime and its record, the Seminar rejects that any meaningful distinction can be made between 'peaceful' and 'military' nuclear collaboration with that regime. The major Western powers, which have always claimed that their 'peaceful' nuclear collaboration would not give South Africa any capability to develop nuclear explosive devices, were obliged in 1977 to warn the Pretoria regime not to proceed with its planned nuclear explosion.[440]

In short, the apartheid regime did not deserve the 'benefits of international nuclear co-operation' to which it would be entitled if it acceded to the NPT.

One of the most strongly worded critiques came from Abdul Minty himself, the British AAM Chair and a prominent ANC operator who would later serve with distinction as South Africa's ambassador to the IAEA. His report presented to the 1986 International Seminar on the UN Arms Embargo against South Africa was sharply critical of the Agency's willingness to retain South Africa as a member rather than expelling it completely, which he argued 'enhance[d] South Africa's all-round nuclear capability—including its capacity to develop and manufacture nuclear weapons'.[441] Continued membership allowed South Africa to cultivate useful links and participate in the exchange of expertise in a still-significant way, even if it was no longer invited to participate in Board or Working Group activities. This was despite the adoption of a 1983 UN resolution tabled by Nigeria which called on all members to end all forms of nuclear collaboration with Pretoria. Minty blamed the failure to fully eject Pretoria on its importance in world nuclear trade and the desire of Western governments to retain access to South African and Namibian uranium.[442] He reiterated the campaign's long-standing call for South Africa to be ejected from the IAEA.

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[439] UN Centre Against Apartheid, 'Report: Nuclear Collaboration with South Africa', 17.
[440] UN Centre Against Apartheid, 'Report: Nuclear Collaboration with South Africa', 17.
[441] Abdul S Minty, 'D.2: South Africa's Nuclear Capability: The Apartheid Bomb' (London: UN Special Committee Against Apartheid, 1986), 8, MSS AAM 1503, folder 1, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford.
[442] J.D.L. Moore investigates the extent of South Africa's uranium exports. Although it was illegal for anyone besides the South African government to publish 'material relating to the prospecting, production, and pricing of uranium', it is clear that during the 1970s and into the 1980s South Africa (along with occupied Namibia)

In addition, he rehearsed the now-familiar argument against pushing for South African membership to the NPT, stating that

> All moves to try and persuade South Africa to sign the NPT apparently involve continued co-operation with it in the nuclear field. In some cases where such co-operation is increased it is even suggested that it can serve as an inducement for Pretoria to sign the Treaty.[443]

For Minty, the principal concern was that bringing South Africa into the NPT would not guarantee co-operation on non-proliferation and/or disarmament, resulting in the legitimation and formal recognition of a nuclear-armed apartheid state. 'In any case, there is considerable doubt as to how far South Africa would abide by any international undertaking since it has a unique record of violating most of its international obligations'.[444]

These statements demonstrate the areas in which the ANC's nuclear counter-technopolitics found itself in tension with the technopolitical regime of the global nuclear order, and indeed, in contradiction with some of the arguments in favour of non-proliferation that they advanced elsewhere. At first glance, they appear to be damning criticisms which strike at the order's normative heart. The NPT and IAEA—at least in their dealings with South Africa—are weak, inadequate, and even counterproductive. The former merely serves as a tool by which the Western allies can continue nuclear trade with South Africa while bringing it into the fold of 'legitimate' nuclear states, while the latter offers South Africa too many benefits and opportunities to advance its nuclear programme and enhance its global standing—even as it is sidelined and sanctioned by most other multilateral institutions. Moreover, the distinction between 'civil' and 'military' nuclear technology, upon which the central bargain of the NPT rests,[445] is rendered meaningless the duplicitousness of a regime which cannot be trusted to adequately police that boundary. On the face of it, these arguments could have set the ANC at loggerheads with non-proliferation advocates and therefore hegemonic opinion within the global nuclear order.

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was indeed an important source of the West's nuclear fuel *South Africa and Nuclear Proliferation: South Africa's Nuclear Capabilities and Intentions in the Context of International Non-Proliferation Policies* (London: Palgrave Macmillan, 1987), 76.. Around 1972 amidst a depressed uranium market, the Nuclear Fuels Corporation of South Africa (NUFCOR) formed a price-fixing cartel alongside Canadian, French, and British companies; it was eventually sued by US corporation Westinghouse, but during the 1970s it is assumed that South Africa was an important source of US supply. By the mid-late 1980s the cartel had disbanded and the uranium market become more competitive, and Moore suggests that among South Africa's principal nuclear fuel customers were West Germany, Australia, and Canada (ibid).

[443] Minty, 'D.2: South Africa's Nuclear Capability: The Apartheid Bomb', 8.

[444] Minty, 'D.2: South Africa's Nuclear Capability: The Apartheid Bomb', 8.

[445] Peoples, 'Redemption and Nutopia'; Abraham, ''Who's Next?'

Crucially, however, these critiques were always made contingent upon the ostensible exceptional nature of the South African regime. As such, they did not amount to fundamental challenges to the norms or structures of the global nuclear order. The proliferation paradigm itself was rarely, if ever, seriously questioned. Instead, it was argued that in the case of South Africa standard non-proliferation policy and instruments needed to be supplemented with additional voluntary measures which essentially amounted to a parallel counter-proliferation framework—comprehensive embargoes, full-scale safeguards, and the total cessation of all forms of nuclear co-operation and trade. Those in the Western nuclear complex who had the power and leverage to starve South Africa's programme of necessary resources—mainly the US, the UK, and West Germany—had failed to do so. They were therefore guilty of 'nuclear collaboration' with South Africa, which was a more grievous violation than simply aiding a common-or-garden proliferant state and at the same time was not one that could be adequately countered by existing non-proliferation measures. Furthermore, the dissolution of the civil/military divide in nuclear technology is contingent on the specifically racist and authoritarian nature of the apartheid regime, which owing to its history of reneging on its international obligations and prosecuting large-scale oppression at home, cannot be trusted to contain its nuclear ambitions to the so-called 'peaceful' realm. Accordingly, any attempt to rein in South Africa by offering concessions in exchange for accession to the NPT and the acceptance of safeguards would be doomed to fail. By making their critique of the fragile civil/military divide specific to the purported exceptionality of the South African case, however, the ANC were able to express their discontent with the ways in which the prevailing nuclear order had permitted South Africa to nuclearize, without isolating themselves in the process. Once again, the idea of South Africa as a unique case which confounded orthodox approaches to non-proliferation and nuclear order reared its head, just as it had when the National Party regime stressed South Africans' unique brand of ingenuity and grit in overcoming their purported nuclear isolation. The episode of the apartheid bomb was beginning to take shape, in the narratives deployed by both sides, as an historical anomaly rather than a textbook case of proliferation.

Leveraging hierarchy and 'standards of civilization' in nuclear order against South Africa

As noted above, the critiques mounted by the ANC often aligned with the discriminatory logics of the global nuclear order and 'non-proliferationism'. This does not mean that they were unjustified (the ANC knew all too well the Pretoria government's capacity for repression and violence against its opponents), but over-emphasizing the exceptionality of the South African nuclear programme did help to bolster these arguments. By 1979 it was clear that South Africa was likely engaged in some

form of nuclear weapons programme. An ANC paper presented to the 1979 UN Seminar on Nuclear Collaboration with South Africa purported to show a disturbing section from a 1972 Atomic Energy Board report, which carried analysis of potential nuclear detonation sites within South Africa. This analysis was accompanied by several maps which showed urban areas and, specifically, the concentration of white populations within them, alongside the blast radiuses of 10-1000 kiloton nuclear devices. The clear intention of the map was 'to demarcate those areas that must be totally protected, and by corollary to establish those areas where it is feasible to set off nuclear explosions'.[446] Van Wyk and van Wyk note that this could be read as a 'potential strategy for ethnic cleansing'.[447] In hindsight, there is little evidence to support the interpretation that this map suggested that the government was planning to use nuclear weapons in anger inside South Africa, such as against invading forces or, to put down mass rebellions in black-majority areas. Given subsequent revelations about the timeline of the programme and Pretoria's apparent strategic intentions for its nuclear weapons, it is more plausible that the government was seeking to identify where its 'peaceful nuclear explosives' (PNEs) could be 'safely' tested. A PNE programme had been under investigation in South Africa since 1971.[448] Regardless, the maps starkly show that South Africa considered nuclear harm to its non-white inhabitants acceptable, and that the apartheid bomb was an endeavour shot through with racism. It was a powerful tool that the ANC could use to expose the regime in Pretoria to further scrutiny, once again demonstrating the barbarism and lack of regard for the boundaries between civil and military nuclear technology that disqualified Pretoria from legitimate participation in nuclear activities.

In spite of such arguments advanced by the ANC, however, a casual attitude towards nuclear danger permitted by racist and colonialist attitudes was not particularly exceptional. It did not independently mark South Africa out as an unusually irresponsible possessor of nuclear weapons. Several nuclear-armed states visited actual nuclear harm of varying degrees on colonized populations in places including New Mexico, Algeria, Kazakhstan, and the South Pacific during the course of the Cold War,[449] to say nothing of the indirect harms associated with the mining and

[446] ANC, 'The Nuclear Threat Posed by the Apartheid Regime', Working Paper (London: United Nations Seminar on Nuclear Collaboration with South Africa, 24 February 1979), 3, MSS AAM 1499, Archive of the Anti-Apartheid Movement, 1956-1998, Bodleian Library, University of Oxford.
[447] van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program', 24.
[448] Masiza, 'A Chronology of South Africa's Nuclear Program'.
[449] Masco, *The Nuclear Borderlands*; Jean Allman, 'Nuclear Imperialism and the Pan-African Struggle for Peace and Freedom: Ghana, 1959–1962', *Souls,* 10, no. 2 (2008): 83–102; Magdalena Stawkowski, '"I Am a Radioactive Mutant": Emergent Biological Subjectivities at Kazakhstan's Semipalatinsk Nuclear Test Site', *American Ethnologist* 43, no. 1 (2016): 144–57; Nic Maclellan, *Grappling with the Bomb: Britain's Pacific H-Bomb Tests* (Acton: ANU Press, 2017).

processing of uranium.[450] In order to exceptionalize the South African nuclear programme, the anti-apartheid coalition relied partly on the repugnance of the regime (though during the 1970s, South Africa still enjoyed a good deal of political support from the Western allies), but also needed to exploit some common normative tropes of the global nuclear order to more comprehensively delegitimize the apartheid bomb and, by extension, the regime itself.

Activists did not fundamentally reconfigure the discriminatory aspects of the global nuclear order, which functioned largely in their favour in allowing them to argue that Pretoria was not a legitimate or responsible possessor of advanced nuclear technology. They worked to accent the growing divergence between the standards of behaviour set out by the global nuclear order and Pretoria's actions. This was a powerful strategy, because of the way that the global nuclear order functions not only as a technology of power overseeing the distribution of nuclear rights and responsibilities, but also one of representation: as Biswas argues, it enables us to 'grasp and shape the world through its mechanisms of ordering', helping us 'to recognize our friends, rivals, and enemies through their location within its architecture'.[451] By highlighting the extent to which South Africa's behaviour diverged with the norms of non-proliferation, advocating for its ejection from the IAEA, and campaigning for its comprehensive marginalization across the global nuclear order, the anti-apartheid coalition both highlighted South Africa's position at the outer limits of the order as well as helping to push it even further into the periphery. This peripherality was more profound than a generalized status of 'isolation', as discussed in the first chapter.[452] The overall effect of the anti-apartheid campaign against the South African bomb, which hinged upon a characterization of Pretoria as an untrustworthy, unpredictable, and fanatical NPT abstentionist, was to locate it within the 'infantilized third world given to impulse, passion, and fanaticism […] within a Western geopolitical imaginary that positions the West as policing agent of any proliferation transgressions'.[453] The ANC's exhortations to members of the IAEA and its committees, the United Nations, and Western governments to variously isolate, eject, and embargo Pretoria indicated that the liberation movement was happy for the West to play such a policing role with respect to South Africa; indeed, one of their principal recurring criticisms was that the US and UK were falling short on this count. This was clearly a departure by the ANC and wider anti-apartheid movement from the postcolonial critiques made of the global nuclear order by India and other non-aligned states. This empirical case of an African-nationalist coalition appealing to the Western allies to step up their efforts as overseers of nuclear order, and otherwise deploying the hierarchical and discriminatory

[450] Hecht, *Being Nuclear*, 4.
[451] Biswas, *Nuclear Desire*, 96.
[452] *Isolated States: A Comparative Analysis*.
[453] Biswas, *Nuclear Desire*, 101.

tropes of non-proliferation thinking in service of national liberation, suggests a need for greater contextualization and theoretical nuance in present-day postcolonial accounts of international nuclear politics.

Postcoloniality, hegemony, and nuclear order: the ANC's campaign in context

The dynamic explored in the above section raises important questions for analyses of global nuclear order which focus primarily on its hierarchical and colonial characteristics. Shampa Biswas's work is the most important touchstone here. She takes issue with William Walker's liberal 'triumphalist narrative of historical progress' which she argues posits the global nuclear order as a teleological Enlightenment project tending towards universal acceptance which offers the best hope for a condition of justice, contrasting it unfavourably with realist accounts which—though flawed themselves—are better placed to understand the operation of power and materiality within the order.[454] However, Biswas points out that both liberal institutionalists like Walker and his realist critics share a preoccupation with 'rationality'. The former are convinced that it must prevail, while the latter are concerned that it is simply unrealistic to expect 'the most troublesome, risk-taking and zero-sum decision-makers [to] be persuaded into a simple direction deriving from benign eighteenth-century European rationality'.[455] Accordingly, they understand the proper function of the nuclear order, particularly the NPT, as to prevent nuclear weapons falling into these so-called 'wrong hands': 'In a world of widespread irrationality, this order is a mechanism to keep in check those barbaric, threatening others who mostly reside outside of the rational, enlightened West' [456]. This realist interpretation is, Biswas contends, a far sharper understanding of how nuclear order actually functions, and aligns more closely with the criticisms of those who have deployed postcolonial arguments against it.

This is a robust analysis, borne out by events: the NPT's Article VI 'bargain' which committed the nuclear-weapons states to 'good faith' efforts on disarmament has been all but ignored as the

[454] *Nuclear Desire*, 80; cf. Walker, 'Nuclear Enlightenment and Counter-Enlightenment'. It is possible that Biswas's reading of Walker here is overly harsh. Walker's work is after all a conscious order-preserving effort: a plea for rationality among what he perceives as a growing tide of irrationality and regression. Walker does not make an explicitly teleological argument, and he does not believe that the nuclear order for which he advocates will ultimately lead to a perfect condition of justice—it is simply the best available option, imperfect though it may be. However, Biswas's broader critique relating to Walker's reliance on liberal rationality still stands, since for Walker, the threat to the global nuclear order emanates from a cadre of individual counter-Enlightenment wreckers, rather than deeper-rooted problems of power.
[455] Schulte, 2007 quoted in Biswas, *Nuclear Desire*, 93.
[456] Biswas, *Nuclear Desire*, 94.

nuclear-armed states have continued to modernize their arsenals while controlling access to nuclear materials through the IAEA and other safeguarding arrangements. Charges of 'nuclear apartheid' have been deployed to justify further proliferation,[457] as in the case of India, which—by virtue of its material resources and geostrategic importance to the United States—has been the only state to muscle its way into full 'assimilation' within a nuclear elite which initially sought to exclude it entirely.[458] Biswas' prescription for confronting this inequality and making the global nuclear order more equitable and better able to incorporate disarmament is sweeping, revolutionary action on global justice: 'to tackle the profound challenges of global structural inequality that currently sustains the nuclear order', and consequently 'the larger structural imperatives that make nuclear weapons desirable'.[459] I find little to disagree with on this point, but to end the discussion of nuclear order and injustice here would militate against one of the key aims of this project: to locate possibilities for 'local' agency in global nuclear politics, particularly on the part of those who are oriented against the overarching hegemonic power configurations of global nuclear order. Is there space for counter-hegemonic action in the margins, or completely outside of the thinktanks, NGOs, and conferences that make up the 'nonproliferation complex'?[460] Is the global nuclear order available for those in pursuit of 'local' goals—for instance, exiled political dissidents seeking to bring down their government? The answer suggested by the preceding analysis of the ANC's campaign is complex. On one hand, it is clear that the ANC and broader anti-apartheid coalition had some success in aligning themselves with the global nuclear order and its hegemonic norms regarding responsibility, standards of civilization, and the overall suitability to handle nuclear technology. This was effective in the pursuit of the ANC's local political objectives. On the other, the campaign did not constitute much of a challenge to the fundamentals of the global nuclear order, and in many ways it bolstered the developing hegemonic status of the NPT and multilateral approaches to disarmament.

Ogunnubi urges scholars to recognize the importance of African and specifically South African contributions to the institutions of Western modernity, including the global nuclear order.[461] A study of the ANC's anti-apartheid anti-nuclearism bears out this importance. The local specificities of South Africa and its liberation struggle permitted the very discriminatory aspects of the global nuclear order that Biswas criticizes, at least in this incidence, to be turned against oppression. As the

[457] Singh, 'Against Nuclear Apartheid'.
[458] Biswas, *Nuclear Desire*, 104; Mario E. Carranza, 'From Non-Proliferation to Post-Proliferation: Explaining the US–India Nuclear Deal', *Contemporary Security Policy* 28, no. 3 (2007): 464–93.
[459] *Nuclear Desire*, 108.
[460] Craig and Ruzicka, 'The Nonproliferation Complex'.
[461] Olusola Ogunnubi, "South Africa's Soft Power and the Diplomacy of Nuclear Geopolitics," *GeoJournal*, Advance online publication 2020, 1–14; see also Michael Hanchard, "Afro-Modernity: Temporality, Politics, and the African Diaspora," *Public Culture* 11, no. 1 (1999): 245–68.

next chapter demonstrates in full, this eventually amounted to a significant contribution to global processes of nuclear ordering, since the ANC's strategy generated a clear, progressive association between the anti-apartheid struggle and multilateral non-proliferation efforts. This culminated in the events of the 1995 NPT Review Conference. In addition, Itty Abraham offers a revisionist investigation of a similar episode which took place during the earlier, pre-NPT years of the global nuclear order. He investigates how the Asian-African Legal Consultative Committee (AALCC), an instrument arising out of the Bandung Conference of 1955, used the negotiations of the Partial Test Ban Treaty (PTBT) to advance the worldviews the newly-decolonized states: specifically, their shared belief that the superpowers' nuclear standoff unjustly threatened nuclear annihilation for the rest of the world. Abraham's explanation of the process is worth quoting at length:

> Decolonization, in its international dimension, is here understood as a complex process of recognition and negotiation, where new states, notwithstanding their lack of the traditional instruments of global influence, namely, military power and economic depth, struggled to find ways of incorporating their views, beliefs, norms, and desires into a system that had been designed to exclude and constrain non-Western states and entities […] Contra the fears of Great Powers that newly decolonized countries would seek to upend the international system in their favour, new states typically reiterated their commitment to the existing order, seeking only to modify its rules and expand its norms to reflect their needs and aspirations more completely.[462]

The strategy here was to use the PTBT as a vehicle to argue that all nuclear testing—because its effects could not be contained—was a violation of the principle of sovereignty; further, nuclear weapons were 'were material and structural obstacles to the emergence of a pacific and post-imperial world order that privileged national economic development and global social progress'.[463] The representatives of the AALCC exploited the PTBT, an arms-control treaty designed to stabilize superpower competition and imbued it with postcolonial claims. Of course, this was a limited action, an innovative strategy not only carried out within an exclusionary nuclear order but turning one of the most exclusionary aspects of that very order—bipolar arms control—to the task of decolonization. Here, the parallels with the ANC's transnational campaign are apparent. While the AALCC achieved little material change and certainly did not upend an unequal unclear order, and the PTBT was only modestly successful as an arms control treaty, Abraham argues that it both served as 'the first global 'antipollution' environmental treaty due to its explicit aim of reducing environmental

[462] Abraham, 'Decolonizing Arms Control', 315.
[463] Abraham, 'Decolonizing Arms Control', 325.

contamination':[464] a consequence which benefited several postcolonial states located close to various nuclear testing ranges. It further helped to cement global public opinion against nuclear explosions. While the newly decolonized states had little power to overturn the structures and hierarchies of the nuclear order, they were able to 'suspend their consent and show their disagreement with prevailing ways of being, raising in no small measure the costs of 'business as usual' for the established nuclear powers'.[465]

Abraham uses this historical episode to claim that meaningful action within the global nuclear order by less powerful groupings is possible, even under the material and ideological constraints of hegemony. The ANC, however, achieved more than simply making 'business as usual' more difficult for the nuclear-weapons states (although this was perhaps its most immediate effect, as the Western allies were forced to tighten their sanctions regimes as the 1980s wore on). In terms of its primary political aim, namely using the tenets of the global nuclear order to further increase the international pressure on South Africa as well as undermining its claims to technological self-sufficiency, the work done by the global anti-apartheid movement was a success. Although it is functionally impossible to assess the true extent to which the campaign helped to bring about the end of apartheid, it did help to 'elicit transnational financial, ideological, and political support from sympathetic governments and civil society actors', with the effect of 'achiev[ing] the total global isolation of apartheid South Africa in the UN, OAU, the NAM, and the IAEA, and the UN's 1977 mandatory arms embargo against South Africa'.[466] David Fig notes that the escalating nuclear sanctions imposed on South Africa in the wake of this campaign came far too late to prevent South Africa's nuclearization but were not 'entirely futile', since they eventually helped to convince F.W. de Klerk that further 'proliferation was politically nonviable'.[467] While these glowing testimonies are not incorrect in their assessments, it is important to recall that the campaign against South Africa's nuclear weapons was not principally an 'anti-nuclear' campaign, but an anti-apartheid one. As such, from the preceding analysis it is not possible to conclude that the ANC mounted even a limited counter-hegemonic challenge to the global nuclear order of the kind that Abraham recounts. The apartheid bomb was squarely targeted; the NPT, the IAEA, and other multilateral institutions of nuclear order mostly escaped criticism and largely had their authority and legitimacy reaffirmed.

[464] Abraham, 'Decolonizing Arms Control', 324.
[465] Abraham, 'Decolonizing Arms Control', 327.
[466] van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program', 37.
[467] 'Sanctions and the Nuclear Industry', 98.

However, there was one important way in which the ANC's campaign shifted the needle of nuclear ordering: it dislodged, at least partially, the IAEA's stated commitment to retain an apolitical and technocratic stance towards matters of international relations. The campaign's regular seminars and addresses to the UN General Assembly (UNGA) and the presentation of expert testimony and evidence to UN Special Committees helped to bring about a series of increasingly harsh condemnations of South Africa's nuclear activities. In 1982 the UNGA explicitly asked the IAEA to terminate all forms of nuclear co-operation with South Africa.[468] South Africa was gradually sidelined within the Agency, beginning with suspension from the IAEA's Board in 1977 and eventually teetering on the brink of complete expulsion by 1988. Pretoria's Ambassador von Schirnding, its representative to the IAEA, was in a sense correct when he lamented that the Board's replacement of South Africa with Egypt as the representative of the African continent was an unprecedented divergence from the Agency's Statute and past practice, due to the politicized content of the decision.[469] South Africa's progressive marginalization within the Agency was informed by the powerful and decidedly political activist case that demonstrated an inextricable link between its nuclear programme—or more specifically, its proliferation—and the edifice of apartheid. Of course, the operation of (techno)politics in IAEA business was by no means unprecedented:[470] it was simply that, in this instance, apartheid South Africa found itself on the losing side. This convergence between the political interests of the ANC and the non-proliferation agenda would prepare the ground for a further consolidation of the global nuclear order's moral authority at the beginning of the 1990s. The forthcoming chapter on the disarmament-transition moment in South Africa, which coincided with the end of the rigid Cold War bipolarity underpinning the global nuclear order, will show that the legacy of anti-apartheid non-proliferationism enabled the institutions of order to be retroactively associated with the struggle for South African liberation.

The transnational anti-apartheid campaign also had a constitutive effect on the nuclear technopolitics of the ANC, which would be crucially important for South Africa's nuclear options at and after the moment of democratization. The coalition's appeal to the norms of the global nuclear order, in particular its enthusiastic adoption of non-proliferation as an organizing principle, effectively committed the ANC to uphold these norms when in power. The ANC's nuclear technopolitical regime—the 'linked [set] of individuals, engineering and industrial practices, technological and industrial artifacts, political programmes, and institutional ideologies' which would

[468] van Wyk, 'Atoms, Apartheid, and the Agency', 405.
[469] IAEA Board of Governors, 'Record of the Five Hundred and First Meeting' (Vienna: International Atomic Energy Agency, 16 June 1977), GOV/OR.501, IAEA Archives, Vienna.
[470] Hecht, 'Negotiating Global Nuclearities'.

guide its technological development and technopolitical objectives—[471] would not be fully-formed until it took power and assumed control of South Africa's physical nuclear infrastructure, research institutions, state-owned energy supplier, and its nuclear science and engineering base. However, while a strong commitment to non-proliferation was likely not universally held within the ANC,[472] the strength and global visibility of the opposition's non-proliferation stance since the 1970s meant that it was effectively committed to this strong non-proliferation stance upon taking power. As we shall see, the significance of anti-apartheid anti-nuclearism reverberated through South African nuclear policy into the 1990s and beyond, also posing distinct challenges for domestic civil nuclear policy.

[471] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009, 56.
[472] A credible ANC source told me that minority elements of the organization's military wing, umKhonto we Sizwe, had wanted to retain South Africa's nuclear weapons or at least the capability to construct them, given the uncertainties of the Southern African security environment Anonymous ANC source, online, interview by Tom Vaughan, 3 October 2019. Although this seems intuitively plausible—the Africanist scholar Ali A. Mazrui (1980) had long argued there was a strategic need for an African nuclear weapon and identified a liberated South Africa as a suitable custodian—there is virtually no documentary evidence of these debates. One tantalizing exception is an intervention by Nelson Mandela's son-in-law, Dr Isaac Amuah, at the landmark *Nuclear Debate* conference in Cape Town EMG/ANC, 'Section 4: Military and Legal Perspectives on Nuclear Power', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 139–40..

Chapter 3: The disarmament-transition moment: technopolitical reconciliation and nuclear redemption in South Africa

Introduction

This chapter will detail how South Africa's 'disarmament-transition' moment marked a point of at least partial reconciliation between the nuclear technopolitics of apartheid and the activist (anti-) nuclear technopolitics of the ANC, via the non-proliferation agenda of the newly unipolar global nuclear order. For the purposes of this chapter, this 'moment' is dated from the beginning of F.W. de Klerk's reformist presidency in August 1989 to the May 1995 Non-Proliferation Treaty Review Conference, which marked the conclusion of South Africa's accession to a position of leadership and authority within the global nuclear order. These were crucial years in which South Africa's relationship to the nuclear order, and the role of nuclear technology in South African public life, were transformed. However, the chapter aims to go much further than simply recounting the history of South Africa's nuclear disarmament and concurrent democratization—ground that is already well-covered.[473] The core contribution of this chapter is to establish an account of the interplay between the so-called 'local' or domestic dynamics of democratization and transition within South Africa and the global nuclear order: a mode of interaction that has been documented throughout the thesis so far, but which is most strikingly demonstrated by the tumult of the early 1990s. The chapter will show, via a combination of primary and secondary sources and conceptual work, that the global nuclear order's post-Cold War evolution and South Africa's democratic future have been inextricably linked. The turn of the 1990s demanded an urgent consolidation of the nuclear order's legitimacy ahead of the crunch 1995 conference. It also required South Africa's incoming democratic government to reckon with its nuclear past and chart an appropriate nuclear future. The continued interplay between South Africa and the global nuclear order helped to service both sets of needs. The processes described here are contingent on the outcomes of earlier technopolitical battles, discussed in preceding chapters. The chapter begins with a recap of the two most powerful

[473] For instance, see Darryl Howlett and John Simpson, "Nuclearisation and Denuclearisation in South Africa," *Survival* 35, no. 3 (September 1, 1993): 154–73, https://doi.org/10.1080/00396339308442704; Waldo Stumpf, "Birth and Death of the South African Nuclear Weapons Program" (50 Years After Hiroshima, Castiglioncello, Italy, October 28, 1995), https://fas.org/nuke/guide/rsa/nuke/stumpf.htm; Frank V. Pabian, "South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy," *The Nonproliferation Review* 3, no. 1 (December 1, 1995): 1–19, https://doi.org/10.1080/10736709508436602; Jo-Ansie van Wyk and Anna-Mart van Wyk, "From the Nuclear Laager to the Non-Proliferation Club: South Africa and the NPT," *South African Historical Journal* 67, no. 1 (2015): 32–46, https://doi.org/10.1080/02582473.2014.977337.

competing nuclear technopolitical regimes established in South Africa prior to 1994: Afrikaner-nationalist nuclearism, and anti-apartheid anti-nuclearism. It then proceeds in three sections.

The first is an analysis of a landmark 1994 conference in Cape Town which aimed to generate nuclear policy recommendations for the ANC. *The Nuclear Debate* addressed questions around dealing with South Africa's legacy civil and military nuclear infrastructure, in addition to its future approach to the global nuclear order, particularly international non-proliferation and disarmament efforts. The conference pitted the ANC's dominant (anti-) nuclear technopolitical regime against the imperative of technological and economic development, and the strictures of the global nuclear order. The incoming government had to reckon with an entire system of power and research reactors, enrichment vessels, institutions, organizational cultures, political ideologies, and technological expertise, all bequeathed by the apartheid nuclear programme and continuing to physically embody its authoritarian technopolitics. The ANC accordingly faced the challenge of simultaneously exorcising the nuclear demons of apartheid (and appeasing those who hoped for the total forswearing of all nuclear technology), preserving as many of the outgoing government's scientific and technological resources as possible, and capitalizing on its authority in the global nuclear order in the pursuit of a stronger non-proliferation regime. Despite the tensions between these opposing viewpoints, the ideal of non-proliferation—in spite of its failures to curtail the apartheid bomb project—served as a lodestar around which most of the progressive coalition could unite. That a rump coalition of political radicals who had spent the 1980s castigating the United States for its complicity in the apartheid bomb could so easily fall in behind it in service of non-proliferation was only possible because of seismic changes within the global nuclear order itself—to which the second part of the chapter turns.

The second section outlines the challenges facing the global nuclear order, and the new structural condition of unipolarity, at the turn of the 1990s. It then turns to South Africa's role in meeting these challenges. While it is true that the US found itself in a position of unprecedented power, alone at the head of the nuclear order, the eventual success of the 1995 RevCon was not a foregone conclusion and cannot be attributed to structural dynamics alone. South Africa, uniquely able to contribute to the consolidation of nuclear order thanks to the 'local' specificities of its history and liberation struggle, was important in ensuring the passage of an indefinite extension to the NPT and building the impression of compromise and consensus for which the conference is often remembered. Most scholarship on South Africa's role at the 1995 RevCon has approvingly treated South Africa as a bridge-builder or mediator, bringing together the divergent interests of the

nuclear-weapons states and NAM.[474] Here, a different interpretation is advanced: thanks to the 'local' imperatives to garner support for the domestic anti-apartheid struggle during the 1970s and 1980s, South Africa was already strongly aligned to the non-proliferation cause. Although NAM had historically been an ally in the liberation struggle, South Africa's intervention in 1995 was not to broker a compromise between the two camps. Rather, it leveraged its authority gained from experience to break NAM's resistance to an agreement which completely disregarded non-aligned positions on nuclear weapons and disarmament. While structural conditions were of course extremely favourable to the US and indefinite extension in 1995, they did not determine the outcome exclusively: South Africa's intervention and the way in which it was made were crucial factors.

The third and final section returns to South Africa and the 'local' consequences of accession to the global nuclear order. Recalling the competing technopolitical regimes of the apartheid era, this section demonstrates that South Africa's decision to participate fully and enthusiastically in all institutions of global nuclear order, and to accept its rules and standards of behaviour, resulted in an important new bilateral relationship of 'importing' and 'outsourcing'. South Africa *imported* a particular brand of non-proliferationist domestic technopolitics from the global nuclear order, and the NPT in particular—or perhaps more accurately, 'anti-technopolitics'. This technopolitical regime ultimately reconciled the competing domestic regimes by negating them both. Anti-nuclear environmentalists and left-wingers who wanted Pretoria to completely abandon all of its nuclear assets and activities were sidelined, because global anti-technopolitics positively encourages the use and development of 'peaceful' nuclear technology and rewards advancement in the field with privileged positions within the global nuclear complex. On the other side of the debate, the technopolitical regime behind the apartheid bomb had largely been dismantled, given the social and political revolution that the country had undergone. However, revanchist elements within the established nuclear bureaucracy and rump nuclear interests remained, as did a minority tendency within the ANC that advocated a more traditionally non-aligned approach to nuclear policy, independent of the restrictions imposed by global nuclear order. The possibility of an accordant local technopolitical regime incorporating independent, lightly safeguarded nuclear development, or even the maintenance of a residual nuclear weapons capacity, was also negated by South Africa's accession to the nuclear order. In this way, 'local' technopolitical conflict was resolved. However, I also argue that this left a technopolitical void in the absence of local technopolitical creativity, which

[474] e.g. Tom Zamora Collina, 'South Africa Bridges the Gap', *Bulletin of the Atomic Scientists* 51, no. 4 (1995): 30–32; van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'; Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension'.

resulted in a well-documented nuclear policy vacuum within the Government of National Unity (GNU).[475] In one sense this process of 'importing' and 'outsourcing' assisted in South Africa's broader process of reconciliation and democratization. Unfortunately, the technopolitical settlements brokered by the global nuclear order were incomplete, which sowed the seeds of further technopolitical discord into the 21st century and up to the present day. Chapter 4 examines this debris.

Technopolitical regimes at the end of apartheid

Previous chapters have detailed the construction and content of competing nuclear technopolitical regimes in South Africa. Once again, it is important to emphasize that these were many and varied, but for the purposes of this analysis it is possible to identify the two largest and most powerful regimes, with one gradually gaining ground over the other. As we saw in the first two chapters, the first of these was the Afrikaner-nationalist technopolitical regime which birthed the apartheid bomb and the South African nuclear complex at large. This was rooted in a broader ideological context, which drew on Afrikaner nationalist myths of self-sufficiency, rugged ingenuity, and the need to defend a divinely chosen Afrikaner *volk* from hostile outsiders—whether Black, British, or Soviet. Afrikaner nationalism thus became deeply embedded in the South African science and technology establishment.[476] Nuclear power generation was initially arrived at as a response to the need for an 'indigenous' technological base and to reduce dependence on outside energy sources as sanctions on Pretoria began to pile up during the 1970s; nuclear research at Pelindaba had been conducted since the mid-1960s. What was first conceived as a 'peaceful nuclear explosives' programme morphed into a collaborative effort between Armscor and the AEC towards developing a nuclear weapon. Interestingly, there was relatively little input on South Africa's nascent nuclear strategic doctrine from the military or political leadership, with Armscor engineers playing the leading role in developing it.[477] Research and energy activities served as a cover for the weapons programme, and Pretoria continued to receive assistance in the form of nuclear fuel from the US via France even once the programme became known.[478] The strategy eventually agreed upon was to use the threat of (or, in the worst case scenario, an actual) nuclear detonation to force the United States into intervening in South Africa's border wars, should the coalition of Soviet-backed forces and ANC guerrillas in the

[475] Andrew Marquard, 'The Origins and Development of South African Energy Policy' (Cape Town, University of Cape Town, 2006).
[476] Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa*.
[477] Andre Buys, Personal interview in Pretoria, interview by Tom Vaughan, (18 October 2019) (18 October 2019).
[478] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*.

North threaten to overwhelm the SADF. South Africa faced no credible external nuclear threat; the purpose of the programme was to protect the apartheid regime and safeguard the structures of domestic order. However, the fact that Pretoria investigated long-range delivery systems suggests that it expected its nuclear doctrine to evolve in the future beyond a 'minimum deterrent'.[479] Internationally, South Africa attempted to leverage its advancement in nuclear technology to secure positions of privilege in institutions such as the IAEA—a strategy that for a short time was successful—and appealed to postcolonial and non-aligned criticisms of the global nuclear order in justifying its activities.[480] Among the consequences of this technopolitical regime were more severe sanctions, stronger international condemnation, and a hulking, resource-intensive nuclear infrastructure which was rendered largely useless once its questionable strategic rationale had disappeared.

This was opposed by the anti-nuclear technopolitical regime of the anti-apartheid coalition, at the heart of which was the ANC, as recounted in the preceding chapter. Since fighting apartheid was the prime technopolitical goal of the ANC during this period, the extent to which it possessed a domestic nuclear technopolitical regime was limited. Its technopolitics were oriented primarily towards the 'global' level due to the ANC's inability to operate openly within South Africa's borders and as such, did not generate fixed domestic nuclear policy positions. The anti-nuclear and environmental movements were undoubtedly important allies in the liberation struggle,[481] which also contributed to a generally prevailing anti-nuclear position. However, none of this necessarily entailed a commitment to dismantling South Africa's nuclear infrastructure after the ANC took power. Indeed, the ANC's anti-apartheid anti-nuclear technopolitics would be confronted with a challenge upon the eve of democracy: dealing with the nuclear legacy of apartheid. Should South Africa completely divest itself of all nuclear assets, or should the sizeable nuclear inheritance be turned toward a project of national reconstruction and development—repurposed to serve the people? The ANC would move to publicly address this lacuna in early 1994, but would find its options constrained by its extant commitment to the global nuclear order and principles of non-proliferation.

[479] Polakow-Suransky, *The Unspoken Alliance: Israel's Secret Relationship with Apartheid South Africa*; Lewis, 'Revisiting South Africa's Bomb'.
[480] Edwards and Hecht, 'History and the Technopolitics of Identity'; see also Miller, *An African Volk: The Apartheid Regime and Its Search for Survival* for a wider discussion of the apartheid regime's appeals to postcoloniality.
[481] See Jacklyn Cock, 'Connecting the Red, Brown and Green: The Environmental Justice Movement in South Africa', Globalisation, Marginalisation & New Social Movements in Post-Apartheid South Africa (Durban: University of KwaZulu-Natal, 2004).

South African nuclear futures considered: *The Nuclear Debate*, Cape Town, February 1994

By the late 1980s, it was clear that the ANC was on a path to power in South Africa. Policy development was imperative as the magnitude of the task—rebuilding a nation entirely configured around serving its white minority—became apparent. Among myriad other problems, South Africa's industrial base and scientific research establishment had been disproportionately oriented towards the strategic heavy industries that aimed to make the country 'self-sufficient', in accordance with Afrikaner techno-nationalist ideology, and insulate it from the impact of sanctions against apartheid. Examples included the oil-from-coal technology developed by the state-owned corporation Sasol and the Helikon uranium enrichment process. Apartheid had left behind a blighted scientific landscape of ballooning costs and underdevelopment in crucial sectors. The benefits of cheap electricity, which was reliant on even cheaper black labour, accrued disproportionately to white-owned industry, while 68% of South African households (overwhelmingly non-white) were left unconnected to the grid.[482] In response, the ANC sought to assemble democratically a new Science and Technology (S&T) policy for South Africa through the architecture of its local organizations.

It was hoped that such a 'bottom-up' approach would help to destigmatize S&T among non-white South Africans, since 'educational discrimination along racial lines [had] ensured that intellectual inquiry itself, and particularly scientific inquiry, came to be seen by many people as racist and elitist'.[483] The major technological achievements of the apartheid era, from the Casspir armoured personnel carrier to South Africa's first operational nuclear explosive device, had been used to shore up the power of the apartheid state. It was therefore crucially important to reckon with the challenge of a post-apartheid nuclear policy in a way that was rooted in the struggles of the liberation movement, while catering to the everyday needs of a poor and long-disenfranchised populace. While the ANC had for a few years maintained a working group on S&T policy—unusual for a liberation movement, and accordingly a great source of pride[484]—it had yet to generate a detailed set of nuclear policy recommendations. Furthermore, with regard to international nuclear politics, the ANC and anti-apartheid movement had already forged a strong commitment to the principle of non-proliferation, such that the concept was now firmly associated with the South African liberation struggle (as discussed in Chapter 2). This appeared to limit the possibility of any

[482] Ania Grobicki, 'The Formulation of a Democratic Science and Technology Policy in South Africa: The ANC Policy Process 1990-1992', *Science and Public Policy* 21, no. 4 (August 1994): 216; Christie, *Electricity, Industry and Class in South Africa*.
[483] Grobicki, 'The Formulation of a Democratic Science and Technology Policy in South Africa: The ANC Policy Process 1990-1992', 216.
[484] Keith Gottschalk, personal interview in Cape Town, interview by Tom Vaughan (July 16, 2019).

future ANC-led government pursuing its own nuclear weapons and opened the door for a democratic administration to pursue peaceful nuclear technology as a tool in the reconstruction of the country. However, while the United Democratic Front (UDF) had since 1989 convened its own Working Group on International Relations which was later absorbed into the apparatus of the ANC, documents suggest that it spent little if any time on formulating an approach to nuclear policy on the global stage.[485] These issues were to be addressed at a landmark conference in Cape Town. *The Nuclear Debate: Policy for a Democratic South Africa* took place between 11-13th February 1994 and aimed 'to encourage informed public debate on issues long kept hidden, and to enable ANC delegates to formulate draft policy recommendations to be submitted to the organisation's National Executive'.[486] It was thus a significant step in deciding the ANC's official position on a range of nuclear issues. Rarely, however, have scholars examined the proceedings in detail. Select addresses are occasionally referenced by experts on South African nuclear history, energy analysts, or those involved with the conference itself.[487] This has been to the detriment of scholarly understanding of South Africa's post-disarmament nuclear politics, which have failed to grasp the weight of the ANC's commitment to the developing hegemony of the global nuclear order. The analysis of the proceedings below demonstrates that, despite the appearance of contestation and the consideration of alternative ways of 'being nuclear', there were few if any alternatives available. Even apparently radical critics of the global nuclear order soon found themselves endorsing non-proliferationism as the solution to South Africa's nuclear quandary.

The recommendations of the conference demonstrate a developing compromise between the ANC's long-standing 'anti-nuclear' technopolitical regime and the global technopolitics of non-proliferation. South Africa's joining the NPT and the imminence of an ANC-led government had necessarily brought these regimes into conversation with each other. The ANC's anti-nuclearism was rooted in anti-apartheid politics, and was not necessarily hostile to liberal non-proliferationism.[488] While many within the liberation movement were sceptical about nuclear power for historic, political, and

[485] WGIR, "World Campaign against Military and Nuclear Collaboration with SA; 1990" (Johannesburg: Working Group on International Relations, 1990), AL3109, B5.6, South African History Archive, Johannesburg. The WGIR liaised with many NGOs and interest groups, including the World Campaign, but does not appear to have engaged in a sustained way with questions future non-proliferation and disarmament policy. The vast majority of the WGIR's documented work, as might be expected, focuses on building aid, development, and investment relationships.

[486] ANC/Environmental Monitoring Group, *The Nuclear Debate: Proceedings of the Conference on Nuclear Policy for a Democratic South Africa*, 2.

[487] van Wyk, 'Nuclear Terrorism in Africa', 53; Marquard, 'The Origins and Development of South African Energy Policy', 234–35; Gottschalk, 'The Politics of Electricity Generation in South Africa', 95.

[488] For a discussion of the ideological content of non-proliferation, see Krause, 'Enlightenment and Nuclear Order'; Walker, 'Nuclear Enlightenment and Counter-Enlightenment'; also Egeland, 'The Ideology of Nuclear Order'.

ecological reasons—as the conference proceedings clearly demonstrate—I have also shown that the ANC's opposition to nuclear energy in South Africa was contingent on its opposition to apartheid. Few if any ANC policy elites were opposed to nuclear technology *per se*, and most saw the global non-proliferation regime as an effective way of regulating nuclear activities both in South Africa and globally. In addition, there was a further imperative to liberalize the South African economy in the name of development and break up large, state-run bureaucracies, in accordance with the emergent global economic consensus.[489] Briefly, the eventual recommendations were to oppose nuclear weapons worldwide and strengthen the NPT, to halt subsidies to the nuclear industry and run down those parts of it which were not profitable, but to allow those profitable and safe parts of the industry a potential role in South Africa's electricity provision alongside renewables—subject to a stringent cost-benefit accounting. As one of the conference organizers Keith Gottschalk notes, however, the latter of these recommendations soon 'vanished without a trace' from the ANC policy agenda: as I discuss below, it seems that the ANC was keen to retain a sophisticated domestic nuclear infrastructure. While the nuclear fuel cycle was indeed shut down and the AEC (later NECSA) was downsized and restructured into a more commercially-oriented organization under the '2000 Plus' plan,[490] the ANC drifted away from most of these recommendations during the mid- and late-1990s, 'as the scientists and technicians involved in the pro-nuclear coalition continued pushing for a continuation of nuclear energy'.[491] The main vehicle for this would be the pebble-bed modular reactor (PBMR) programme, pursued by a revanchist nuclear establishment within a general nuclear policy vacuum, which would later attract billions of rand in government investment.[492] While *The Nuclear Debate* struck a progressive chord and concluded that the GNU should reassess the future role of nuclear energy in South Africa, it certainly did not rule out the prospect of further civil nuclear development.

In addition, while the event saw 'a vigorous and, at times, hostile exchange of views' between representatives of the nuclear old guard, ANC officials, and activist groups,[493] a remarkable degree of consensus was evident on the subject of South Africa's approach to non-proliferation and

[489] In a broader national context, the 1994 Reconstruction and Development Programme (RDP) policy framework attempted to address the need for economic liberalization, retaining a strong redistributive element and a focus on public service delivery and welfare. It was superseded in 1996 by the more neoliberal Growth, Employment and Redistribution (GEAR) strategy, which increased the pace of privatization efforts and prioritized the reduction of the government's budget deficit.
[490] Gottschalk, 'The Politics of Electricity Generation in South Africa', 95.
[491] Britta Rennkamp and Rhadika Bhuyan, 'The Social Shaping of Nuclear Energy Technology in South Africa', in *The Political Economy of Clean Energy Transitions*, ed. Douglas Arent et al. (Oxford: Oxford University Press, 2017), 3.
[492] Marquard, 'The Origins and Development of South African Energy Policy'.
[493] ANC/Environmental Monitoring Group, *The Nuclear Debate: Proceedings of the Conference on Nuclear Policy for a Democratic South Africa*, 2.

international nuclear politics more widely. The value of non-proliferation as a concept was affirmed even by those who espoused the most radical critiques of previous non-proliferation failures and attributed to nuclear technology an inherent authoritarianism. The discussion below will outline how these debates broke down. Despite criticisms being voiced, the eventual reaffirmation of the value of a strengthened NPT regime and close South African involvement with the global nuclear order nonetheless appears to have been a foregone conclusion, as a result of ANC decisions taken in the preceding decades.

The Nuclear Debate: Prevailing winds

Before turning to the dissenting voices at the conference, it is necessary to outline the content of the mainstream views expressed and the broad scope of agreement on the main issues at hand. Trevor Manuel, head of the ANC's Department of Economic Planning, set the agenda. South Africa's nuclear policy was to be decided in line with the objectives already defined by the Science & Technology group, and should be compatible with 'governing in a manner that will put in place accelerated improvements in the quality of life of all South Africans, especially those who were maximally disadvantaged by apartheid.[494] In practical terms, this meant that any future civilian nuclear industry should foreground innovation, be economically competitive, help to meet the everyday needs of the poorest in South African society, and have a minimal effect on employment and working conditions. With regard to international nuclear policy and nuclear weapons, he assured attendees that

> the African National Congress does not want a nuclear weapons capability in South Africa. We have endorsed the OAU declaration calling for the African continent to be a nuclear weapon-free zone. The ANC has also endorsed the Nuclear Non-Proliferation Treaty. Whilst we do not want to sit on a nuclear arsenal, we want the truth out on apartheid's nuclear weapons programme. What is more, we shall not tolerate circumstances in which policy on issues as critical as a nuclear programme be confined to experts in dark, smoke-filled rooms. The debate must be public and the actions transparent.[495]

While the conference for an open discussion to decide on future policy directions, the parameters within which this discussion would take place were thus already quite narrow. Abdul Minty's authoritative keynote address further emphasized the importance of a commitment to non-proliferation, cementing the agenda. He advocated that South Africa act 'as an African country

[494] Trevor Manuel, 'Opening Address', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 3.
[495] Manuel, 'Opening Address', 5.

rooted in Southern Africa' towards a stronger non-proliferation regime: ameliorating the 'discriminatory' nature of the NPT, establishing the African continent as a nuclear-weapon free zone, being active in the IAEA and represent and act for 'the continent as a whole' on non-proliferation.[496] For Minty, the issues that needed to be resolved in order for South Africa to take on these roles were relatively minor: how should South Africa deal with the human legacy of its weapons programme, in the shape of the scientists and engineers who had worked on the bomb? Questions over retaining and redeploying this human capital, and how to ensure that sensitive expertise and information did not find its way into the hands of proliferant states, would feature heavily during the conference. How far should South Africa continue with nuclear energy generation, and how would it respond to the inevitable outside pressures from states in the global North to construct more nuclear power plants? How should the new government approach publicize the details of the apartheid nuclear programme in a transparent yet secure manner? Answering these questions, Minty believed, would allow South Africa to 'clean itself, but also play an international role, both to fight racism abroad, and to stop proliferation and help to produce peace.'[497] Minty's evocation of a potential 'international role' for South Africa through non-proliferation prefigures attempts by some in the ANC to draw a direct link between the historic anti-apartheid struggle and multilateral nuclear diplomacy: non-proliferation as the fight against (nuclear) apartheid writ global.

The boundaries of debate were thus set for the rest of the conference, and in turn for the substance of ANC nuclear policy in government. It was broadly agreed from the outset that South Africa should embrace non-proliferation wholeheartedly, though working within the international regime to make it more equitable, and wind down the strategic elements of its nuclear industry that were unhelpful in economic development or unsuitable for hiving off to the private sector. The debate that unfolded over civil nuclear policy accordingly focused on whether or not nuclear power generation was cost-effective relative to other sources of electricity. Representatives of Eskom and the AEC argued that nuclear power was cost effective, that the nuclear industry was already evolving to meet the demands of the market, and that most infrastructure and projects should be retained. [498] Energy analysts from the University of Cape Town challenged this claim.[499] Perennial concerns about the

[496] Minty, 'Keynote Address', 14.
[497] Minty, 'Keynote Address', 15.
[498] Tony Stott, 'The Role of Nuclear Power in Meeting South Africa's Electricity Demands', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 53–63; Waldo Stumpf, 'The Creation of National Wealth through Technology: The Atomic Energy Corporation's 2000 Plus Plan', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 25–37.
[499] Anton Eberhard, 'Options for Energy Policy and Planning in South Africa: Where Does the Nuclear Industry Fit In?', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate:

safety and ecology of nuclear power, with Chernobyl fresh in participants' memories, were also raised by a variety of international NGOs and local community groups.[500] The contours of the discussion thus mirrored those of general debates around nuclear energy which had long been taking place worldwide, apart from those more critical interventions which took into account the specificities of South Africa's recent experiences. In the end, the conference did not make concrete recommendations on whether the Koeberg plant should be closed or which parts of the nuclear industry should be closed down. Instead, it committed the anticipated Government of National Unity to reviewing the costs and benefits of nuclear power, pausing all development in the meantime. No concrete recommendations were made regarding the future uranium enrichment or fuel production. The GNU would investigate redeployment options for any nuclear workers who might lose their jobs in future, and continue any nuclear research 'on a level playing field with all other research funding' providing that it met 'the requirements for democracy and transparency'.[501] There was also no decision on the highly-enriched uranium (HEU) stockpile, other than that it would not be used in research—the Safari-1 reactor would later be converted to run on LEU. In sum, the recommendations encapsulated the general unease with nuclear power expressed at the conference. However, they left the door open to further development in all areas, albeit subject to theoretically much more stringent standards of cost-effectiveness, safety, and transparency.

The discussion and final recommendations also contained few surprises with regard to nuclear weapons, disarmament, and non-proliferation. As detailed below, there was little debate on South Africa's future relationship with the global nuclear order or position on nuclear weapons (with one exception); most contributions assumed as a matter of course that South Africa would assume a position of international nuclear leadership and significantly bolster the authority of the NPT as a result. Adding his voice to Manuel and Minty's support of non-proliferation was David Albright, one of the world's most prominent nuclear policy analysts and spokespeople for the US non-proliferation agenda. Albright argued that South Africa would have to go above and beyond the non-proliferation

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Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 38–51; Thomas Auf der Heyde, 'The South African Nuclear Fuel Industry: History and Prospects', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 97–98.

[500] John Large, 'The Environmental Implications of Nuclear Development: The International Experience', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 101–15; Rosalie Bertell, 'Health and Safety Implications of Nuclear Development: The International Experience', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 115–20.

[501] ANC/Environmental Monitoring Group, 'Recommendations to the ANC Science & Technology Policy Division Arising from the ANC & Alliance Delegates', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 237.

commitments of other states to convince the world that the new administration would not make South Africa 'the first black country to have a bomb'.[502] In addition to active participation in multilateral non-proliferation efforts, this would entail eliminating its HEU stockpile, or placing it under international control, ensuring that personnel formerly involved in the weapons program did not leave the country, and instituting strict export controls on potentially sensitive materials. Renfrew Christie, the famed anti-apartheid activist, fiercely attacked the racist logic of these 'black bomb' fears, but assured attendees that South Africa had no interest in rearming and would never do so. He reiterated Nelson Mandela's commitment 'make the country a responsible member of the international non-proliferation community'.[503]

As expected, the recommendations of the conference committed South Africa to the NPT and an African NWFZ. They advocated criminalizing the recruitment of South African experts to work on foreign nuclear weapons programme, and also establishing 'an independent commission of inquiry with international participation […] establish all facts of the apartheid nuclear weapons programme, including the weapons' dismantling, and publish them.'[504] This final recommendation would never come to pass, and is addressed in the next chapter. Nonetheless, the overall stance adopted on nuclear weapons and non-proliferation was unequivocal and in line with positions long officially held by the ANC and the rest of the liberation movement. To the contemporary observer, this overall outcome would have appeared to be a logical and linear development, preordained by the principles of the anti-apartheid struggle. However, a minority of more critical interventions on the topics of both civil and military nuclear technology offer a glimpse of another possible South African nuclear future—one which would ultimately not see the light of day.

The Nuclear Debate: Critical perspectives

Since the 1970s, the anti-apartheid cause had found allies in the environmental and anti-nuclear movements. Koeberg Alert was formed in 1983 by students at the University of Cape Town, primarily focused on opposing the nuclear power station to the north of the city but also South Africa's nuclear programme as a whole. Describing itself as 'the country's first activist green movement', it claims historical allyship with the broad anti-apartheid movement.[505] However, although many

[502] David Albright, 'The Legacy of the South African Nuclear Weapons Program', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 150.
[503] Christie, 'The Military Dimensions of Nuclear Development in South Africa', 157.
[504] ANC/Environmental Monitoring Group, 'Recommendations to the ANC Science & Technology Policy Division Arising from the ANC & Alliance Delegates', 233.
[505] Koeberg Alert Alliance, 'About KAA', 2011, https://koebergalert.org/about/.

environmentalists and anti-nuclear campaigners—who tended to be located on the 'soft left' of South Africa's progressive movement—had been involved in anti-apartheid protests on university campuses or within faith groups, few were seriously involved with the ANC.[506] Prominent exceptions included Renfrew Christie and David Fig, who both worked to expose the connections between nuclear energy, apartheid state power, and the nuclear weapons programme.[507] The former was imprisoned for the apartheid government for plotting to supply umKhonto we Sizwe with technical information about the Koeberg plant, which was bombed by the guerrilla organization in 1982. Christie and another veteran anti-nuclear and anti-apartheid campaigner, Mike Kantey, both mounted a similar political-economic attack on the apartheid nuclear complex: South Africa served the United States and NATO powers as a source of uranium and minerals, and the West thus had an interest in maintaining the system of apartheid and corollary Pass Laws and 'homelands' system of labour which enabled South Africa to supply these resources so cheaply.[508] Accordingly, those anti-nuclear campaigners who were involved with the ANC tended to see the South African nuclear complex not simply as an environmental threat, but as a component of the apartheid state's oppressive capacity. They also recognized the failure of the global nuclear order to halt South Africa's nuclear transgressions. The nuclear-weapons states and the IAEA, according to Christie, 'ignored and disbelieved evidence' and were 'absolutely complicit in the perpetuation of apartheid.'[509] While the ANC had cultivated strong ties to the institutions of global nuclear during the 1980s, many of its anti-nuclear allies at home had little faith in the efficacy of non-proliferation and safeguards in opposing apartheid.

This tendency was well-represented at the *Nuclear Debate* conference, which showed that a significant proportion of the anti-apartheid alliance was highly suspect of all nuclear technologies. The experience of the apartheid nuclear programme had severely damaged public faith in the idea of a civil/military nuclear boundary. The idea that the resources of South Africa's nuclear complex might be 'directed towards socially useful research and product development […] creat[ing] opportunities for successful technological conversion'[510] was regarded by these groups with deep suspicion. Columba Peoples has shown that the civil/military distinction in nuclear technology is both crucially important in global nuclear ordering and extremely fragile, since nuclear weapons

[506] Keith Gottschalk, personal interview in Cape Town, interview by Tom Vaughan (July 16, 2019).
[507] Christie, *Electricity, Industry and Class in South Africa*; Fig, *Uranium Road: Questioning South Africa's Nuclear Direction*.
[508] Mike Kantey, Video interview by Tom Vaughan (July 11, 2019); Renfrew Christie, "Speech to Winelands Mensa" (Somerset West, July 18, 2019).
[509] Renfrew Christie, personal interview in Cape Town by Tom Vaughan (July 22, 2019).
[510] David Fig, 'Apartheid's Nuclear Arsenal: Deviation from Development', in *From Defence to Development: Redirecting Military Resources in South Africa*, ed. Jacklyn Cock and Penny McKenzie (Cape Town: David Philip, 1998), 180.

capabilities are intimately linked to, and dependent upon, so-called 'civil' nuclear infrastructures.[511] The apartheid regime's use of a putatively civil nuclear energy and research complex to provide cover and deniability for its clandestine atom bomb shattered this artificial boundary, and many of the organizations represented at the 1994 conference consequently believed that any 'redemption' for South Africa's nuclear industry was impossible. Their pointed criticisms coalesced around one theme in particular: an unbreakable association between nuclear technology and apartheid.

David Fig was one of the more prominent figures to explicitly advance this line of argument. While he advocated that the Atomic Energy Corporation (AEC) should for now survive, focusing on developing 'socially useful' technologies such as air filtration with a view to becoming a 'hothouse for the research and development of clean technologies',[512] his assessment of the links between apartheid and nuclear energy—particularly South Africa's pursuit of an independent nuclear fuel cycle—was damning:

> In the name of security and the ideology the of total strategy, the industry maintained public silence. [This] concealed not only the costs of research and the extremely high costs of producing nuclear energy, it allowed the industry to disguise the origins of technologies like uranium enrichment. It allowed the nuclear bureaucracy to build scenarios in which thirty more nuclear power reactors would dot the coastlines of South Africa […] Worst of all, it shrouded the nightmare of nuclear weapons production.[513]

South Africa's nuclear industry, argued Fig, was borne of apartheid-era secrecy and served as a pretext to build nuclear weapons. This was an argument long advanced by the ANC. Moreover, though, it continued to pose a direct threat to nascent South African democracy:

> What it underlines is a that a body of ordinary men have enjoyed extraordinary power. They have for over thirty years been given extensive resources and allowed to operate outside public scrutiny […] The ANC has in its election manifesto offered a vision of a more open society in which government is answerable to the people. Pursuance of the nuclear fuel cycle *by its very nature* diminishes the openness of the society.[514]

The AEC and other institutions of South Africa's nuclear complex had for decades operated as a 'strategic' industry immune from any form of democratic oversight. Even if the government of the

[511] Peoples, 'Redemption and Nutopia'.
[512] David Fig, 'Does South Africa's Nuclear Industry Deserve to Survive?', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 23.
[513] Fig, 'Does South Africa's Nuclear Industry Deserve to Survive?', 21.
[514] Fig, 'Does South Africa's Nuclear Industry Deserve to Survive?', 22–24, emphasis added.

day were democratic and oriented towards social and economic development, however, nuclear fuel cycle research would continue to militate against the interests of democracy. For Fig, work on the nuclear fuel cycle was not simply an expensive folly, because nuclear power is 'ambivalent'. Per Abraham: 'It is ambivalent because the technology to produce nuclear power cannot fix outcomes in advance […] Nuclear power has been, and will be, both civilian and military at the same time'.[515] The dominant nuclear discourse, most prominently embodied in the NPT, assumed an 'irreducible binary'[516] between military and civilian applications of nuclear technology, but as the history of the apartheid bomb was pieced together this division was progressively shown to be untenable. Fig—and the other critical voices present at the conference—understood that retaining the fuel cycle would by definition always carry the possibility of secrecy, authoritarianism, and militarism. One (indeed perhaps the only) way to ameliorate this possibility while still retaining a sophisticated domestic nuclear capability was to 'outsource' the ambivalence into 'global' hands by accession to the NPT and broader nuclear order—as discussed in more detail in subsequent sections.

While Fig's criticisms were mainly levelled at the AEC's involvement in the fuel cycle and the amount of resources invested in unproven technologies such as molecular isotope separation (MLIS), other contributors turned their fire on all aspects of the South African nuclear industry, including Eskom and the nuclear power station at Koeberg. One notable contribution came from Damon Moglen, representing Greenpeace International. Underlying his comments was an opposition to nuclear energy on ecological grounds; this was the case for many of the conference papers that were critical of nuclear power, though it was not always made explicit. Moglen's presentation surveyed the history of both civil and military nuclear development across the world, and argued that secrecy, extralegality, and anti-democratic decision necessarily followed. Moreover, he warned that this history would repeat itself if a newly democratic South Africa attempted to continue a peaceful nuclear programme. Again prefiguring Abraham's observations on the unavoidable ambivalence of nuclear technology (though overestimating the desirability of nuclear weapons for most states), he quoted the French conservationist Jacques-Yves Cousteau: 'Human society is too diverse, national passion too strong, human aggressiveness too deep-seated for the peaceful and the warlike atom to stay divorced for long'.[517] Commitments to large nuclear power builds and fuel cycle research were also incompatible with democracy, he argued, since they entailed taking long-term decisions which

[515] Abraham, ''Who's Next?', 52.
[516] Abraham, ''Who's Next?', 52.
[517] in Damon Moglen, 'Nuclear Development Against Democracy: Why a Democratic South Africa Should Renounce Nuclear Development', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 134.

foreclosed the possibility for future governments and electorates to choose alternative energy sources. He concluded by explicitly connecting nuclear development with apartheid:

> As they emerge from the repressive circumstances of their past, the people of South Africa now have the opportunity to renounce the dangerous vestiges of the nuclear industry which remain as a feature and reminder of the old, undemocratic regime.[518]

Further, more strident interventions came from community and activist organizations, who offered shorter written and verbal contributions to the conference in addition to the individual presentations on the main programme. Some, like the Cape Town Ecology group, voiced purely ecological concerns about the impact of nuclear power within a given local area, or against the safety risks of nuclear technology. Many others however echoed Fig's points, identifying direct links between nuclear technology *per se* and South Africa's history of authoritarianism. Earthlife Africa (which would later become a key player in the opposition of 21st century ANC nuclear policy) argued that nuclear energy 'is characterised by danger and deceit, and is inextricably linked to militarism and unrepresentative government […] and that a cloak of secrecy exists around all aspects of the nuclear industry'.[519] The Environmental Monitoring Group, co-organizers of the conference, argued that

> the nuclear industry militates against the attainment of a fully democratic society. The rapid expansion of the industry in South Africa has its origins in the strategic concerns of the apartheid regime and the consequent development of nuclear weapons. This […] has bred a culture of secrecy and centralised control. Can South Africa, as an emerging democracy, afford to nurture selected remnants of apartheid and its military industrial bureaucracy? We say no.[520]

Representatives of the town of Komaggas, which had been identified as a potential site for a second nuclear power station, warned that this build would be

> an investment in everything that is undemocratic, even anti-democratic, where a few secretive groups control vast resource [sic], where power is concentrated to an

[518] Moglen, 'Nuclear Development Against Democracy: Why a Democratic South Africa Should Renounce Nuclear Development', 138.
[519] Greg Knill, 'Group Presentation: Earthlife Africa', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 195–96.
[520] EMG, 'Group Presentation: Environmental Monitoring Group', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 203.

> extraordinary extent. We cannot argue that a new government will not be prone to the temptation of misusing power.[521]

Finally, the campaign group Eco-Programme offered the starkest assessment, entitled simply 'Nuclear Power is Like Apartheid'. This brief but punchy intervention argued that both nuclear energy and the apartheid system were borne of Cold War economic imperatives and 'intimately woven into the military-industrial complex', had 'spawned large entrenched bureaucracies', and 'created jobs—but only for a qualified few, and at an unacceptable social, economic, and environmental cost'.[522] In a further refusal to recognize the existence of a boundary between civil and military nuclear technology, Eco-Programme argued that both nuclear power and apartheid were 'insane in their logic', eliding 'the insanity of Mutual Assured Destruction [sic]' with 'the insanity of endangering the lives and health of our citizens and our environment when renewable energy is so abundant in Southern Africa'.[523] Though most of these group presentations did not draw such straightforward connections between apartheid, nuclear weapons, and nuclear energy, each ended by calling for the total abandonment of all nuclear power generation, research, and development in South Africa. Even the venerable Denis Goldberg, ANC figurehead and veteran of the famous Rivonia trial, found agreement with their position in his closing address:

> We, in South Africa, have been denied information about every aspect of our lives for too long. We have been excluded from decision making for too long. Our new government and its officials must have an approach based upon openness; based upon the inclusion of our people, openly, through our elected representatives, in decision making; and based upon transparency in government.[524]

For this and other reasons, he argued, South Africa should eschew not only nuclear weapons but all nuclear development and power generation, save for the retention of the country's research reactor which could safely be run on low-enriched uranium for scientific purposes.

These positions did not represent the majority tendency at the *Nuclear Debate* conference. However, they did find an important commonality with those of the various energy analysts, non-

[521] Komaggas Community, Namaqualand, 'Group Presentation: Komaggas Community Namaqualand', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 210.
[522] Eco-Programme, 'Group Presentation: Nuclear Power Is Like Apartheid', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 197.
[523] Eco-Programme, 'Group Presentation: Nuclear Power Is Like Apartheid'.
[524] Denis Goldberg, 'A Nuclear Policy for a New, Democratic South Africa', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 219.

proliferation practitioners, and ANC officials who were far more sanguine about the potential democratic implications of nuclear energy: a commitment to the principles of non-proliferation in general, and to the NPT specifically. Opposition to further nuclear activity in South Africa and critiques of past non-proliferation failures were often couched in uncompromising and radical language. Ultimately, however, stronger non-proliferation measures were seen as the best solution. For instance, Eco-Programme—whose comments on the links between apartheid and nuclear technology were the among the most strident of the whole event—demanded that South Africa work in concert with the Organization of African Unity (OAU) in the establishment of an African Nuclear-Weapon Free Zone (NWFZ).[525] While the term implies a certain level of radicalism and a unilateral, abolitionist approach to nuclear disarmament, the idea of NWFZs 'was conceived with a view to preventing the emergence of new nuclear weapon states' a decade before the NPT was signed and has since been formally incorporated into the NPT and wider non-proliferation regime.[526] The minority who would point out that non-proliferation had not worked in the past nonetheless had precious few other avenues to pursue.

The most sustained critique of non-proliferation at *The Nuclear Debate* was delivered by George N. Barrie, a professor of public law at Rand Afrikaans University who may have slightly misread the global room when he advised the conference that the NPT was 'crumbling' and 'an anachronism'.[527] Barrie perceived such a lack of consent among states—apart from the recognized nuclear powers—that he predicted the NPT would not be extended in 1995 without significant 'new agreements' in addition to the treaty that could bring holdouts like India, China, and Israel into the fold.[528] While recognizing that the global nuclear order was at a critical juncture, he underestimated (along with many other analysts) its capacity to absorb this dissent, as detailed in the next section. He did however identify, in forthright terms, the NPT's failure to prevent the apartheid bomb. The episode demonstrated that the non-proliferation apparatus 'works best where it is needed least', and tended to treat emergent nuclear powers—who are often regional leaders—as 'outlaws' while simultaneously lacking any effective enforcement mechanism to bring them into line. Such treatment simply encouraged further proliferation activity.[529] This was another instance in which contemporary South African observers, with the benefit of their own experiences, showed a sharp

[525] Eco-Programme, 'Group Presentation: Nuclear Power Is Like Apartheid', 197.
[526] Jozef Goldblat, 'Nuclear-weapon-free Zones: A History and Assessment', *The Nonproliferation Review* 14, no. 3 (1997): 18–19.
[527] George N. Barrie, 'Nuclear Law and Policy in South Africa after 1994', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 168.
[528] Barrie, 'Nuclear Law and Policy in South Africa after 1994', 169.
[529] Barrie, 'Nuclear Law and Policy in South Africa after 1994', 168.

awareness of the NPT's flaws: Barrie made these observations 16 years before Abraham identified the same self-fulfilling prophecy at the heart of the NPT.[530] Despite such a damning indictment, Barrie saw the best hope for nuclear stability and controlling nuclear weapons in a strengthened non-proliferation regime. South Africa should contribute to this by spearheading the negotiation of a supplementary instrument to the NPT in the form of an African NWFZ, modelled after the 1967 Treaty of Tlatelolco which established an NWFZ in Latin America and the Caribbean. This, he argued, was a 'golden opportunity' for South Africa to leverage its authority on disarmament and non-proliferation and unite 'Third World opinion' in favour of NPT extension.[531] As it turned out, these were remarkably prescient recommendations. Even Renfrew Christie, elsewhere so critical of the institutions of nuclear order and who, in his own contribution to the conference, skewered both the failure of the NPT to stop the apartheid bomb and the hypocrisy of the United States over the issue, was clear on the value of non-proliferation. South Africa had been 'on the receiving end of a proliferated bomb', used as 'a threat, to stop the creation of democracy, to stop the liberation of our country. This is why we feel so strongly about nuclear non-proliferation: we know what a nuclear threat feels like'.[532] Echoing the oft-repeated mantra of the anti-apartheid movement during the 1980s, Christie demanded 'a stronger Non-Proliferation Treaty Regime, without the Great Power Cheating [sic]'.[533]

Denis Goldberg also touched upon the issue of the upcoming NPT RevCon in 1995. While in agreement with the general consensus that a commitment to non-proliferation should form the bulwark of the ANC's international nuclear policy, Goldberg argued that the inequality and hypocrisy embedded in existing non-proliferation arrangements demanded a reconsideration of the nuclear-weapons states' disarmament obligations. Accordingly, South Africa

> should urge extension for a period long enough to assert our commitment to nuclear non-proliferation, say 10 years with a maximum of fifteen years, but not accepting permanent extension without serious modifications to the non-proliferation regime.[534]

These discussions show that even the most critical anti-nuclear voices in South Africa accepted the 'proliferation paradigm', and so alignment with the global nuclear order, as the medium through which to advance a democratic nuclear future for South Africa—even as they dealt with the legacy of a glaring non-proliferation failure in their own country. This is not without precedent: Pelopidas

[530] Abraham, ''Who's Next?'
[531] Barrie, 'Nuclear Law and Policy in South Africa after 1994', 171.
[532] Christie, 'The Military Dimensions of Nuclear Development in South Africa', 162.
[533] Christie, 'The Military Dimensions of Nuclear Development in South Africa', 162.
[534] Goldberg, 'A Nuclear Policy for a New, Democratic South Africa', 228.

points out that disarmament and abolition advocates have often tended to 'complain about the lack of progress' on their objectives through the lens of non-proliferation.[535] The almost unanimous support for non-proliferation within South Africa's progressive coalition speaks in part to the normative power of non-proliferation as a concept. Even as uncertainty swirled about NPT extension in 1995, collaborative efforts between the US and USSR had already cemented non-proliferation as something close to 'an indisputable public good'.[536] However, it was also rooted in the specific political imperatives of the South African liberation struggle. I have shown that an important front of the war against apartheid during the 1970s and 1980s was the anti-nuclear struggle, and that anti-apartheid activists were able to very effectively challenge Pretoria's overall legitimacy by appealing to the principles of non-proliferation and global nuclear order. In doing so, the ANC and its allies in the global anti-apartheid movement committed themselves to the Enlightenment progressivist project of nuclear order,[537] and would come to serve as one of its figureheads—even though the nuclearization of apartheid South Africa gave lie to these ideals. The enthusiasm for and depth of engagement with non-proliferation processes, and the prominence of representatives like Abdul Minty throughout this period, put the ANC in a position that was 'very difficult to step down from'.[538] These combined circumstances made it almost inconceivable that South Africa's government-in-waiting might be in any way sceptical of the non-proliferation project. The most critical anti-nuclear views tended to be held within a few smaller fringe grassroots organizations. For those within the policy mainstream of the ANC who expressed reservations about non-proliferation's poor track record in South Africa, the corrective was—could only be—*more* non-proliferation.

The sole exception was Isaac Amuah, representing the state-funded Foundation for Research and Development, who rejected the idea that South Africa should unconditionally accede to all possible non-proliferation agreements. Arguing from the belief that the de Klerk government had disarmed in order to keep nuclear weapons out of the hands of a future Black government,[539] Amuah said the decision 'does the nation a great disservice in deciding unilaterally to destroy a strategic asset in which a fortune has been invested'.[540] Instead, 'a policy that favours maintenance of an open

[535] Pelopidas, 'The Oracles of Proliferation: How Experts Maintain a Biased Historical Reading That Limits Policy Innovation', 301.
[536] Craig and Ruzicka, 'The Nonproliferation Complex', 340.
[537] Walker, 'Nuclear Enlightenment and Counter-Enlightenment'.
[538] Anonymous, video interview by Tom Vaughan, October 3, 2019.
[539] This is an oft-repeated and not altogether implausible theory, albeit one that de Klerk and other South African officials have always denied. Uri Friedman, 'Why One President Gave Up His Country's Nukes', The Atlantic, 9 September 2017, https://www.theatlantic.com/international/archive/2017/09/north-korea-south-africa/539265/.
[540] Isaac Amuah, 'Nuclear Policy in South Africa: Past, Present, and Future', in *Proceedings of the Conference on Nuclear Policy for a Democratic South Africa* (The Nuclear Debate: Policy for a Democratic South Africa, Cape Town: The Environmental Monitoring Group: Western Cape, 1994), 179.

nuclear weapons option must be pursued', while charting a 'Pan-Africanist' orientation to global politics and 'requiring the nuclear powers to abolish nuclear weapons within a limited period of time' as a condition of NPT extension in 1995.[541] This echoed Mazrui's exhortations for a future democratic South Africa to maintain a nuclear capability as a security guarantee, extending its nuclear umbrella over a liberated continent.[542] It also recalled classical Cold War-era NAM positions on the hypocrisy of the NPT and India's justifications for its own nuclear weapons programme. Amuah advocated universal disarmament, but clearly believed that this was impossible under the current non-proliferation regime. South Africa now had a unique opportunity, he argued, to chart a different course that would be more likely to achieve disarmament than simply committing itself indefinitely to the NPT and an African NWFZ.

Amuah's comments were, unsurprisingly, controversial. A summary of the session records that '[s]everal people opposed Amuah's position, arguing that a nuclear weapons-free zone in Africa was worth taking some risks for.'[543] While a commitment to the NPT and permanent disarmament was not universally shared within the ANC, it was unquestionably prevalent. To question the wisdom of disarmament, which had been one of the shibboleths of the liberation movement since the 1970s, bordered on the heretical. A consensus was rapidly forming around the value of non-proliferation and disarmament, and the ANC was extremely keen to bring South Africa back into line with the norms of good global citizenship after decades on the fringes of international society—this would also be key to attracting investment to the country's ravaged economy.[544] In fact, taken together, the anti-nuclear campaigns of the 1980s, the views expressed at *The Nuclear Debate*, and the ANC's post-1994 international nuclear policy all suggest a natural affinity between the anti-apartheid struggle and non-proliferation—and accordingly an inevitability to South Africa's eventual emergence as the poster child for progressive nuclear politics. In this context, the conclusions of the *Nuclear Debate*—and South Africa's subsequent part in extending the NPT in 1995—looks like a foregone conclusion. However, to understand why propositions like Amuah's were unrealistic, and how hardened critics of US nuclear policy became non-proliferation converts, it is necessary to examine more closely the state of the global nuclear order in the early 1990s. Recognizing the implications of unipolarity, and the South African response to them, is crucial to our analysis of how South Africa's domestic or 'local' nuclear politics evolved after 1994.

[541] Amuah, 'Nuclear Policy in South Africa: Past, Present, and Future', 184–86.
[542] Mazrui, *The African Condition: A Political Diagnosis*.
[543] EMG/ANC, 'Section 4: Military and Legal Perspectives on Nuclear Power', 140.
[544] For a discussion on the relationship between economic and political liberalization and nuclear decisions, see Solingen, 'The Political Economy of Nuclear Restraint'; Solingen, *Nuclear Logics*.

Unipolarity, non-proliferation, and global nuclear order: redemption at the 1995 RevCon

While South Africa's government-in-waiting discussed its nuclear future, so too did the world at large. The sudden collapse of the Soviet Union had removed one of the pillars which held up the global nuclear order, including the non-proliferation regime. In contrast to the current of liberal-democratic optimism for an 'unabashed victory for political and economic liberalism'[545] that was sweeping the Western world after the fall of the Soviet Union, many analysts of nuclear politics were less sanguine. Many worried that the end of the 'long peace', enabled by a fine strategic balance between the US and USSR, would usher in a new era of instability.[546] With the US now unconstrained by the imperative of deterrence and the requirement to respect a Soviet sphere of influence—and countries like South Africa having demonstrated the drastically lowered barriers to obtaining a nuclear weapons capability—realists in particular worried that small states may pursue nuclear programmes to safeguard their sovereignty. The lesson that the 1990-91 Gulf War had taught these states, as Indian Army General K. Sundarji remarked in 1993, was not to 'mess with the United States without nuclear weapons'.[547] Of even greater concern were the great-power aspirations of nuclear latent states like Germany and Japan. The retreat of the Soviet Union provided space for regional powers to cement their influence and project power further across the globe, attaining destabilizing nuclear capabilities in service of this end. Mearsheimer's influential and pessimistic analysis presented a number of scenarios in which, in the absence of the USSR, Europe might descend into nuclear war. He argued, paradoxically, that the United States and NATO thus had an incentive to maintain the USSR's superpower status; since this was likely to be impossible, Germany should be allowed to acquire nuclear weapons, but proliferation elsewhere should be robustly countered. Britain and America had a responsibility to facilitate balancing and maintain peace on the continent, 'since there is a sure risk that a European war might involve large-scale use of nuclear weapons'.[548] Because of this looming multipolarity, Frankel saw 'an inherent contradiction between welcoming the end of bipolarity and deploring the spread of nuclear weapons'.[549] Waltz may have been unusually optimistic in his theory that 'more [nuclear weapons] may be better' for strategic stability,

[545] Francis Fukuyama, 'The End of History?', *National Interest* 16 (1989): 3–18.
[546] John Lewis Gaddis, author of the 'long peace' theory, was decidedly less pessimistic, predicting that the end of the Cold War would allow the ultimate futility of nuclear weapons to be fully appreciated. John Lewis Gaddis, 'The Cold War, the Long Peace, and the Future', *Diplomatic History* 16, no. 2 (1992): 234–46.
[547] Quoted in Brad Roberts, 'On the Strategic Value of Ballistic Missile Defence', Proliferation Papers (Paris: IFRI, June 2014), 11.
[548] John J. Mearsheimer, 'Back to the Future: Instability in Europe after the Cold War', *International Security* 15, no. 1 (1990): 5–56.
[549] Benjamin Frankel, 'An Anxious Decade: Nuclear Proliferation in the 1990s', *Journal of Strategic Studies* 13, no. 3 (1990): 7.

eventually resulting in more bilateral and multilateral deterrence relationships, but in his long-running debate with Sagan he also foresaw a multipolar nuclear world in which proliferation had accelerated out of US control.[550] A common thread running through these worries was the concern that, while the world may be temporarily unipolar, this condition would not last. There was widespread agreement that further proliferation needed to be limited. While most realist observers were pessimistic about the prospects of such, there was a clear incentive here for the US to consolidate a non-proliferation regime that functioned in its favour while it still had the power to do so.

For institutionalist proponents of non-proliferation and multilateral efforts towards disarmament, the most pressing concerns were somewhat different. Many worried that the global nuclear order was 'in an advanced state of decay'.[551] The US's own past irresponsibility, favouritism, and failure to abide by its own non-proliferation diktats had led to serious problems of compliance and legitimacy. A commonly expressed fear was that, by 1996, 'there could be no NPT in existence'.[552] The 1995 Review and Extension Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (hereafter RevCon) was set to make or break the fortunes of the global nuclear order over the coming years and decades. This RevCon, unlike previous meetings, aimed to review and extend the NPT simultaneously. Amid divergent views among signatories and lingering complaints about the fairness of the non-proliferation regime, advocates of extension would need to tread carefully and prepare well. Indefinite extension of the NPT as favoured by the United States would require the acquiescence of the majority of non-nuclear weapons states, whose faith in the 'grand bargain' of the NPT had been severely shaken—both by the failure of states like the US to disarm, and the emergence of new nuclear powers like South Africa and Israel on America's watch. While the US found itself in a position of preponderance at the head of a unipolar nuclear order for the first time since the late 1940s, it appeared likely that securing the requisite wide co-operation—particularly from the Non-Aligned states—would not be easy. Jozef Goldblat identified two principle obstacles to an extension of the NPT 'for a substantial period of time': an agreement on the cessation of nuclear testing and the institution of a test ban, and the provision of positive and negative security assurances to NNWS.[553] Goldblat was relatively optimistic on the prospects for extension, and

[550] Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: An Enduring Debate* (New York: W.W. Norton, 2012).
[551] Jennifer Scarlott, 'Nuclear Proliferation after the Cold War', *World Policy Journal* 8, no. 4 (1991): 687–710.
[552] John Simpson, 'Nuclear Non-Proliferation in the Post-Cold War Era', *International Affairs* 70, no. 1 (1994): 30.
[553] Jozef Goldblat, 'Issues Facing the 1995 NPT Extension Conference', *Security Dialogue* 23, no. 4 (1992): 26–30.

referred to Graham's influential argument that, in the event no agreement was reached, the NPT would likely remain legally binding.[554]

Mohamed Shaker, the former Egyptian Ambassador to the IAEA, rebuked this perceived complacency. In addition to the questions identified by Goldblat, Shaker warned that the unfairness of some NPT provisions, in particular with regard to access to nuclear technology, was keenly felt: 'The lack of principles of cooperation still haunts the developing countries who are looking forward to better terms of trade in the nuclear field […] The developing world feels that it is at the mercy of the rules and regulations worked out by the majority of the suppliers.'[555] Even in the best-case scenario of all positions being met, Shaker believed that an indefinite extension was unlikely. Likewise, Simpson and Howlett predicted that 'the conflict between the rights of developing states under Article IV to have unconstrained access to the technologies they may feel are necessary for their economic development, and the desire of industrialized states never again to provide assistance for clandestine nuclear weapon programs' could be a stumbling block, especially if a North-South divide opened up in place of the previously existing Western, Socialist, and non-aligned voting blocs.[556] Perhaps most importantly, the question of disarmament was likely to be raised: since the Cold War confrontation was over, NNWS were likely to argue that now was the time for nuclear-armed states to begin making good on their disarmament commitments—and to adopt new ones. Given that from a US point of view the world was not necessarily made safer by the cessation of the Cold War, as detailed above, it seemed unlikely that the NWS would agree with this assessment. These demands would nevertheless carry great moral force, especially if Ukraine and Kazakhstan had by then fully acceded to the NPT and given up their own nuclear weapons inheritance: 'This could generate a totally new set of post-Cold War political alignments, with unpredictable consequences.'[557] Additionally, Simpson and Howlett argued, South Africa would likely be in a position to extract significant concessions from the NWS on behalf of Non-Aligned and developing states, given its own recent disarmament. US diplomat George Bunn wrote at length on all of these potential pitfalls and more, imploring that 'the obstacles to securing a lengthy extension are truly formidable, but they must be overcome'—even going so far as to moot an explicit American no-first-

[554] See Thomas Graham, Jr., 'The Duration of the Nuclear Non-Proliferation Treaty: Sudden Death or New Lease on Life?', *Virginia Journal of International Law* 29, no. 3 (1989): 661–80 for the legal basis of this argument.
[555] Mohamed I. Shaker, 'The 1995 NPT Extension Conference: A Rejoinder', *Security Dialogue* 23, no. 4 (1992): 36.
[556] John Simpson and Darryl Howlett, 'The NPT Renewal Conference: Stumbling toward 1995', *International Security* 19, no. 1 (1994): 65.
[557] Simpson and Howlett, 'The NPT Renewal Conference: Stumbling toward 1995', 68.

use nuclear stance to secure the support of the 'have-nots'.[558] In sum, the US defence and foreign policy establishment and liberal-institutionalist proponents of non-proliferation and multilateralism both saw NPT extension as critically important—but potentially difficult to achieve. At the turn of the 1990s, a post-NPT world to many seemed frighteningly plausible.

As Craig and Ruzicka discuss,[559] the neoconservative essayist Charles Krauthammer was perhaps the most perceptive analyst on questions of unipolarity and non-proliferation. Krauthammer shared many concerns with realists like Mearsheimer, decreeing that '[i]t is a certainty that in the near future there will be a dramatic increase in the number of states armed with biological, chemical and nuclear weapons'.[560] He predicted the rise of insurgent, authoritarian, unstable, and anti-Western 'Weapon States', pointing to Libya and North Korea as the likeliest contemporary candidates, and argued that a muscular, unipolar approach to counter- and non-proliferation efforts was necessary to prevent the world from sliding into chaos. He pointed out that a consensus was beginning to emerge around the spectre of proliferation as the defining issue in world politics for the 1990s, gesturing to the British Labour Party leader Neil Kinnock's wish to see Iraq forcibly disarmed and its nuclear programme placed under international supervision. At the time, as Krauthammer pointed out, the Labour party was 'hardly a home for hawks',[561] but an interventionist focus on proliferation would indeed become a defining feature of future Labour governments under Tony Blair. Krauthammer had accurately sensed a change in the prevailing winds, arguing that the emerging agreement between liberals and realists on the importance of non-proliferation was neither 'an imperial dream or a Wilsonian fantasy' but simple pragmatism.[562] He did not explicitly mention the importance of the NPT in defending this emergent unipolar stability, adopting a more kinetic stance under the rubric of 'denying, disarming, and defending'.[563] However, as long as the NPT could remain a viable institution, it only made sense that the United States should exploit it in order to peacefully further the agenda of unipolarity through non-proliferation.[564]

So it came to be that the 1995 RevCon represented such a pivotal moment in attempts to secure and stabilize the emerging world order. While the use of force, for the time being, would always be an available recourse should a 'proliferant' state decide to defy Western non-proliferation diktats, the

[558] George Bunn, 'Viewpoint: The NPT and Options for Its Extension in 1995', *The Nonproliferation Review* 1, no. 2 (1994): 57.
[559] Campbell Craig and Jan Ruzicka, 'Unipolarity and the 1995 NPT Extension' (International Studies Research Unit (ISRU) Work in Progress, Cardiff: Cardiff University, 2020).
[560] Charles Krauthammer, 'The Unipolar Moment', *Foreign Affairs* 70, no. 1 (January 1990): 30.
[561] Krauthammer, 'The Unipolar Moment', 32.
[562] Krauthammer, 'The Unipolar Moment', 32.
[563] Krauthammer, 'The Unipolar Moment', 32.
[564] Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension', 14.

overall objective would be greatly aided by a morally authoritative NPT which enjoyed a high level of consensus. Krauthammer recognized, along with others,[565] that unipolarity was fragile if it existed at all—he used the term 'unipolar moment' deliberately. If the NPT could be geographically broadened, technically strengthened, and temporally extended into the indefinite future, it had a much better chance of continuing to serve Washington's foreign policy goals long after overwhelming US preponderance had come to an end.[566] Craig and Ruzicka have convincingly argued the important point that structural conditions of a newly unipolar world ultimately meant that the NPT was indefinitely extended in 1995 by a much easier process than even the most optimistic observers had anticipated. First, the US was strongly incentivized as the unipole to try and 'lock-in' institutions that could perpetuate its dominance—and was therefore willing to marshal considerable resources towards this outcome. Second and more importantly, there was 'nowhere to hide and nowhere else to go' for smaller, historically Soviet- or non-aligned states who may otherwise have dissented, since they could no longer carve out room for action by 'play[ing] the divide between the two superpowers'.[567] Undoubtedly, this was a crucially important enabling factor for the 1995 NPT extension. We will also see later that, for the ANC, unipolarity was a significant factor in enabling a particular future nuclear policy path. However, while the structural conditions were certainly more favourable than most contemporary analysts recognized to an indefinite extension of the NPT, unipolarity could not do all the work. It was an 'enabling condition'—one structural element of the nuclear order's overarching hegemony—which redefined the scope of possible action for the US and like-minded states in ensuring a long or indefinite NPT extension. While the United States was now free to directly exert massive and direct pressure on some potentially recalcitrant states, it could also draw on the assistance of key allies whose own orientations to the global nuclear order had also been profoundly affected by the unipolar turn.[568] This is where South Africa, resplendent in its victory over the twin evils of apartheid and nuclear weapons, came in—playing a key role in fracturing the now-rudderless coalition of Non-Aligned states and helping to ensure that the final vote was in favour of Washington's preferred outcome. Moreover, this intervention helped to bolster the normative authority and legitimacy of the new-look global nuclear order in a broader sense, aligning non-proliferation with South Africa's liberation struggle. South Africa's diplomacy at

[565] e.g. Christopher Layne, 'The Unipolar Illusion: Why New Great Powers Will Rise', *International Security* 17, no. 4 (1993): 5–51.
[566] As argued by Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension' in the specific case of the NPT; following G. John Ikenberry, *Liberal Leviathan: The Origins, Crisis, and Transformation of American World Order* (Princeton: Princeton University Press, 2011), 155.
[567] Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension', 4.
[568] Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension', 20.

the 1995 RevCon is another striking instance of mutual interaction between so-called 'local' and 'global' nuclear politics.

The 1995 RevCon: South Africa's role in redeeming nuclear order

The South African intervention in the 1995 RevCon process has since been characterized as a shining example of Pretoria's post-apartheid nuclear diplomacy, setting the tone for a multilateral, collaborative, and activist policy agenda throughout the 1990s and beyond. In brief, South Africa's signature contribution was to successfully lobby among NNWS and members of the Non-Aligned Movement to generate support for an indefinite extension of the NPT. South Africa had originally favoured a limited extension, in line with some of those NNWS and NAM member states which had stood by the ANC during the years of struggle and supported its anti-nuclear stances.[569] A 1995 memo ahead of the conference suggested that South Africa was seeking a middle-way through a consensus-based approach, trying to develop a position 'which is in broad terms in line with that of the OAU and the NAM, but which could also get the broad support from the majority State Parties'.[570] On one hand, Pretoria was keenly aware of its emergent status as a non-proliferation poster child and wanted to preserve the NPT in which it had placed so much faith. On the other, delegates knew that the views of 'developing states', OAU and NAM members, and other NNWS on the shortcomings of the NPT were strongly held and that South Africa was expected to effectively represent them as a figurehead of the movement. Accordingly, the memo proposed to advocate a series of rolling extensions, while remaining committed to the overall cause of non-proliferation and working to make the operation of the NPT both fairer and more effective. Another document made explicit the thinking behind this position: diplomats hoped to engineer a brokering role for South Africa at the RevCon, 'to play a mediating role between the supporters of indefinite extension and the non-aligned countries', and to extract 'maximum political mileage from its "Third Option" position'.[571] This is consistent with retrospective suggestions that a conscious strategy of positive identity construction through 'niche diplomacy'[572] or 'bridge building'[573] was at play and characterized the delegation's approach to the RevCon. South Africa used its authority as a nation

[569] Jo-Ansie van Wyk, 'South Africa's Post-Apartheid Nuclear Diplomacy: Practice and Principles', *Africa Insight* 7, no. 2 (2015): 111.
[570] J. P. Du Preez, 'Nuclear Non-Proliferation Treaty (NPT): South African Position and Preparations for the NPT Review and Extension Conference' (History and Public Policy Program Digital Archive, 2 March 1995), 2.
[571] J. P. Du Preez, 'Nuclear Non-Proliferation Treaty (NPT): South African Position and Preparations for the NPT Review and Extension Conference' (History and Public Policy Program Digital Archive, 27 February 1995), 2.
[572] van Wyk, 'South Africa's Post-Apartheid Nuclear Diplomacy: Practice and Principles'; van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'.
[573] Zamora Collina, 'South Africa Bridges the Gap'.

which had experienced the consequences of proliferation to forge genuine compromise and consensus between opposing coalitions, securing for itself a reputation for both technical competence and political commitment to the ideals of non-proliferation and disarmament. In this way, Pretoria could elevate itself to a position of prominence within the global nuclear order and earn the respect of the NWS, while fulfilling expectations to effectively represent the interests of non-aligned and NNWS. However, South Africa did not pursue this strategy. Although the bridge-building still narrative persists, Pretoria ultimately chose to take a more uncompromising line in favour of indefinite NPT extension.

Just ahead of the RevCon, at an April 1995 meeting, the official position was rapidly changed. A discussion between the delegation team and the office Foreign Minister Alfred Nzo resulted in the abrupt adoption of a stance in favour of indefinite extension. By most accounts, this came as a surprise, and was certainly not favoured by the diplomats: their preference was for the aforementioned rolling extensions arrangement, while Abdul Minty himself even favoured the 'straight NAM line' of fixed-period extensions.[574] Nonetheless, according to Onderco and van Wyk, the preference of the ANC's political elites—specifically Deputy President Thabo Mbeki—was indefinite extension, and this overrode the previously developed position.[575] Accordingly, the South African delegation went into the RevCon with a goal that closely aligned with that of the United States, as well as Canada (a prominent proponent of indefinite extension) and a number of important Western European states. However, South Africa did not completely follow the US line on proceedings: as a compromise, or confidence-building measure, its team put forward a set of 'principles' aimed at

> push[ing] for compliance with the NPT without jeopardizing the Treaty itself […] Principles would have moral strength and could be seen as [politically, not legally] binding without threatening the existence of the NPT.[576]

The official position was that, regardless of objections by NAM or other sceptical delegations, it was not acceptable to put the future validity of the NPT in jeopardy. If indefinite extension was made formally conditional on, for example, the NWS adhering to certain standards of behaviour, then the NPT could theoretically unravel at some point in the future. Moreover, there may have been a domestic motivation at play here: continued adherence to a developing and strengthening NPT

[574] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 37.
[575] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension'.
[576] Goosen quoted in Susan B. Welsh, 'Delegate Perspectives on the 1995 NPT Review and Extension Conference', *The Nonproliferation Review* 2, no. 3 (1995): 3.

regime would also allow for the development of more advanced nuclear technological infrastructures at home without raising spectres of proliferation. The South African solution was therefore to suggest that all parties should agree to a set of principles with no legal weight, ensuring that the NPT could remain in force in perpetuity. These principles essentially amounted to a restatement of the spirit of the NPT—including stronger IAEA safeguards and expanded access to peaceful nuclear technologies—in addition to exhorting further progress on negotiating the Comprehensive Test Ban Treaty (CTBT) and Fissile Material Cutoff Treaty (FMCT).[577] As Onderco and van Wyk note, South Africa's support for indefinite extension was not made conditional even on the agreement to this very modest set of principles.[578] Neither did South Africa itself codify an exact statement of these principles; a document nonetheless emerged from the RevCon in New York which appeared to bear a close similarity to speech in which Nzo outlined the general issues for discussion.[579] A strengthening of the review process, also suggested by South Africa, was adopted.

Several analysts have speculated as to the reasoning behind the shift in position adopted at the April 1995 meeting, at which both Mbeki and Nzo were present. The political realities of unipolarity must factor into any explanation to a greater or lesser degree: the prime foreign policy concern of the liberation movement and government-in-waiting had long been securing development assistance and investment. Some argue that taking the NAM position as advocated by Minty, or even a more watered-down line as favoured by the rest of the delegation, risked Pretoria's all-important relationship with the sole global political and economic hegemon.[580] It is also clear that the United States applied significant diplomatic pressure on South Africa, as documented by Taylor.[581] Onderco and van Wyk, however, are the only researchers who have attempted to divine the thought process of Thabo Mbeki specifically in his decision to commit South Africa fully to indefinite extension, and arrive at an interesting answer. They argue that until the April 1995 meeting, the preferences of the 'old bureaucratic elite'—i.e. apartheid-era professional diplomats, including RevCon delegates like Peter Goosen and Jean du Preez—and their new political masters in the ANC were kept separate. In this environment, the bureaucrats were able to develop their 'third option'—which would have a

[577] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 39.
[578] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 37.
[579] UN, 'Principles and Objectives for Nuclear Non-Proliferation and Disarmament : Draft Decision / Proposed by the President.', United Nations Digital Library, 2017, https://digitallibrary.un.org/record/188026?ln=en; see also van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'; Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension'.
[580] Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension'; Leith and Pretorius, 'Eroding the Middle Ground: The Shift in Foreign Policy Underpinning South African Nuclear Diplomacy'.
[581] Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty'.

more genuine consensus-building approach, if not quite a radical proposition—free of direct political influence from the ANC. Onderco and van Wyk argue that this third option was nonetheless compatible with ANC policy, which was informed by a 'long-held skepticism of the NPT as a double-standard treaty': an orientation which was self-evidently at odds with the idea of indefinite extension.[582]

When the two camps finally met, however, it became clear that the preferences of ANC political elites diverged considerably from the position formulated by the diplomatic team. It turned out that Mbeki and Nzo were staunchly in favour of indefinite extension—a position which would appear to belie any supposed 'long-held scepticism' of the NPT. Informed by documentary and interview sources, Onderco and van Wyk 'guess' that Mbeki's advocacy of indefinite extension was motivated by a commitment to universal human rights. Mbeki himself made this position explicit in a letter to US Vice President Al Gore: 'South Africa sees its non-proliferation and arms control policy as being integral to its commitment to democracy, human rights, sustainable development, social justice and environmental protection'.[583] For their part, the authors do not rule out the possibility that this was simply a retroactive justification of a significant policy U-turn, which was ultimately motivated by the need to remain in the good graces of the US. However, in an oral history interview with Onderco, Peter Goosen strongly rejects the notion that the South African government could be so easily compelled into adopting a position that it was not already committed to:

> [A]t that particular point in time in our history […] we weren't really that easy to say that we must think the way other people tell us to think. […] This was not easy for people to do with us. But what was being followed, not just in that area, but was being followed in many areas of foreign policy was a very principled foreign policy. […] I know the way that [Mbeki] thinks, or at least I think I know the way that he thinks. And I don't think he would've [felt] under pressure to make a certain decision. And I don't think South Africa, particularly at that point in time of its history, would have felt under pressure to do anything.[584]

Goosen's belief is supported by the claim that US diplomatic efforts 'nearly backfired', and that Nelson Mandela himself apparently warned President Clinton that Pretoria might reverse its position if Washington continued to apply such intense lobbying pressure.[585] The importance of this point

[582] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 34.
[583] Mbeki, quoted in Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 38.
[584] Goosen, quoted in Michal Onderco, 'Oral History Interview with Peter Goosen' (Wilson Center, 28 June 2017), 11–12, History and Public Policy Program Digital Archive.
[585] Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty', 167–68.

should not be underestimated. While the newly unipolar environment and the imperatives of post-apartheid recovery certainly provided South Africa with incentives to align with the US, its authority around questions of nuclear non-proliferation and disarmament was also uniquely strong, almost to the point of unassailability. The diplomats' original 'third position' would have been a more credible compromise measure. Pursuing it would have been entirely consistent with a commitment to the ideals of non-proliferation and the survival of the NPT, without seriously damaging its standing in Washington. But while it may have appeared to some observers that South Africa simply 'caved in' to US pressure,[586] Onderco and van Wyk's work suggests that Pretoria's position was arrived at independently and was more deeply rooted in pre-existing political commitments than it might first appear. Despite this, the authors are cautious in assessing the reasons behind Mbeki's decision, claiming that they can 'only speculate' as to the depth of South Africa's rights-based commitment to non-proliferation and the NPT.[587]

Of course, the tenacity of American diplomatic efforts to bring South Africa on-side should not be ignored. The US piled pressure on key non-aligned and non-nuclear states to ensure that an indefinite extension was carried, in what the Washington Post described as a 'global full-court press'.[588] Some delegates openly complained about the use of 'pressure tactics' by the US and weapon states on smaller countries; when asked to elaborate, the Venezuelan ambassador Adolfo Taylhardat described the message telegraphed by the US as simply '[y]ou better think of what we do for you' .[589] The Iranian representative claimed that 'a lot of pressures […] promises and sometimes threats […] were put on non-aligned countries […] by certain nuclear weapon states, in particular, the United States, as well as certain Western countries',[590] while the Indonesian ambassador reported that other delegations had complained about 'conditionalities and other types of pressures'.[591] Much of the specific detail about what exact threats, incentives, and conditionalities this pressure entailed is not publicly available, but given the US's position as the sole global economic hegemon, we can deduce that future development and trade assistance were on the table, as well as peaceful nuclear co-operation. Miguel Marin-Bosch reported that 'U.S. officials suggested it would be difficult for the United States to provide assistance to Mexico and other developing countries for peaceful nuclear research and development if the NPT was not renewed

[586] Zamora Collina, 'South Africa Bridges the Gap'.
[587] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 40.
[588] Julia Preston and R. Jeffrey Smith, 'The Nuclear Treaty: Product of Global Full-Court Press by U.S.', Washington Post, 14 May 1995, https://www.washingtonpost.com/archive/politics/1995/05/14/the-nuclear-treaty-product-of-global-full-court-press-by-us/12c033a4-37ac-4b0d-aeb5-d7f941d6141b/.
[589] Quoted in Welsh, 'Delegate Perspectives on the 1995 NPT Review and Extension Conference', 9.
[590] Quoted in Welsh, 'Delegate Perspectives on the 1995 NPT Review and Extension Conference', 13.
[591] Quoted in Welsh, 'Delegate Perspectives on the 1995 NPT Review and Extension Conference', 6.

permanently'.[592] US ambassador Warren Christopher pointedly noted that 'the United States ha[d] "a very important stake" in Mexico's prosperity and stability. He also observed that "there are difficult days for Mexico ahead"'.[593] It is reasonable to assume that South Africa was subjected to similar pressures, crying out as it was for development and trade opportunities to reinvigorate its tattered economy.

However, the *Post* article also correctly identified the divide-and-conquer tactics pursued by the US, central to which was South Africa. The South African proposal for an indefinite extension, backed by a strengthened review process, was key here. In adopting the proposal at the expense of the many other options on the table which advocated greater compromise, the US was able to effectively counter NAM influence. This co-operation between Pretoria and Washington had been discussed ahead of the conference by Nzo and Gore.[594] It was not simply an instance of the US applying strong-arm tactics to South Africa, but made possible by Pretoria's already-favourable disposition towards the NPT. The analysis provided in Chapter 2 allows us to draw a much stronger conclusion and integrate Onderco and van Wyk's arguments into a much broader analysis of South Africa's relationship to the hegemony of nuclear order. During the anti-apartheid struggle, ANC and allied activists forged an extremely strong commitment to non-proliferation as an ideal. While they were consistently harshly critical of the specific failures of the non-proliferation regime to prevent the nuclearization of apartheid South Africa—and the hypocrisy of several Western allies in aiding and abetting the apartheid bomb—the liberation movement did not reject non-proliferation or even the NPT. They could have skewered non-proliferation and the global nuclear order more widely as a great-power conceit which sacrificed the oppressed of South Africa to US Cold War interests: a 'straight NAM line'. However, ANC contributions to various multilateral campaigns during the 1970s and 1980s appealed directly to the discriminatory logic of global nuclear order, in a strategic effort to further marginalize, exceptionalize, and delegitimize Pretoria internationally via its nuclear weapons programme. Criticisms tended to focus narrowly on the *procedure and practice* rather than the *politics* of non-proliferation. One of the most commonly heard demands was for the overall strengthening of non-proliferation measures, so that apartheid South Africa could no longer exploit legal and political loopholes to supply its weapons programme. In accordance with the imperatives of the domestic liberation struggle, and in line with a movement that was necessarily anti-apartheid first and anti-nuclear second, critiques of non-proliferation and nuclear order were usually mounted with specific reference to South Africa. The bomb programme was understood as part of a wider

[592] Preston and Smith, 'The Nuclear Treaty: Product of Global Full-Court Press by U.S.'
[593] Jacquelyn S. Porth, 'In Meetings, Christopher Urges Indefinite NPT Extension', Federation of the Atomic Scientists, 18 April 1995, https://fas.org/nuke/control/npt/news/950418-387721.htm.
[594] Preston and Smith, 'The Nuclear Treaty: Product of Global Full-Court Press by U.S.'

arsenal of state oppression: a technopolitical effort to safeguard white supremacy and keep the Black majority firmly under the jackboot of apartheid. It followed that the ANC forged, through years of international and multilateral campaigning, a strong commitment to non-proliferation, often framing it as a human rights issue.[595] Renfrew Christie, himself always critical of the NPT's failures, captured the essence of this position in his aforementioned contribution to the *Nuclear Debate*: the apartheid bomb was used to guard against democratization in South Africa,[596] and was first and foremost an affront to freedoms and rights at home. By the early 1990s, this position was widely shared among ANC elites and policymakers.

I therefore draw a less equivocal conclusion than do Onderco and van Wyk. It is this specific history of activism—resting on an interpretation of South Africa's nuclear weapons primarily as a corollary of apartheid, emergent from a highly specific socio-political-economic configuration, rather than as merely part of a wider global problem with nuclear weapons—which set South Africa on the path to indefinite extension. Onderco and van Wyk are unsure whether indefinite extension was really Mbeki, Nzo, and the ANC elite's genuine policy preference, but recalling how the liberation struggle partly was conducted through the global nuclear order this interpretation strengthens this conclusion. I do not agree with Onderco and van Wyk that the ANC's position on NPT renewal was borne purely of an idealistic commitment to liberal human rights; this is an ahistorical narrative which arises retroactively from the hegemonic status of non-proliferation, and its widespread acceptance of a universal global public good, associated with all things liberal and democratic. The ANC's position on the NPT was however a continuation of their anti-apartheid struggle, wherein a choice had been made to tolerate the hierarchical and discriminatory aspects of global nuclear order in service of a domestic fight for basic rights. Seen in this light, it does not appear that pressure to cave into US demands was the primary factor behind South Africa's position at the 1995 RevCon. There is very little available empirical evidence to support such a conclusion. The similarities between both countries' preferences—easily interpreted by an unsympathetic observer as a South African capitulation—would nonetheless have been welcomed by both capitals. Rather, the ANC-led government was already extremely favourably disposed to non-proliferation as a general concept, and apartheid no longer posed the obstacle to unequivocal support of the NPT that it previously had: the ANC's 'long-held skepticism' towards the NPT was not *a priori* but contingent on the existence of the apartheid bomb. In this way, NPT extension could be articulated as a logical continuation of the

[595] In this way, we might trace the roots of South Africa's important role in the Humanitarian Initiative and movement towards a Ban Treaty back to the anti-apartheid struggles of the 1980s. This is discussed in Chapter 5.
[596] Christie, 'The Military Dimensions of Nuclear Development in South Africa', 162.

ANC's historic activism, not a departure from it.[597] It is of course possible to speculate on the private deliberations of Mbeki, Nzo, and even Mandela: whether this human rights-based case for the NPT was rooted in deeply-held personal beliefs developed during these years of campaigning or a cruder path dependency: the commitments made to the cause during the 1970s and 1980s having simply made it politically infeasible to equivocate on the matter of NPT extension, or to consider alternative nuclear policy stances. There is likely some truth in both explanations. The main point, however, is that unipolarity and its demands did not force South Africa into changing its mind on NPT extension in 1995. For the ANC, the fundamentals of this position had been forged in the flames of struggle several years before. The diplomatic old guard may have had its mind changed, but on this matter, the ANC's commitment was already made.

'Playing in Yankeee stadium': unipolarity and the image of South Africa as a bridge-builder

When the conference drew to a close, a sense of triumph reigned. The United States had achieved its narrower foreign policy goal of locking its preponderance into the framework of the non-proliferation regime and global nuclear order, but more widely, supporters of multilateral non-proliferation and disarmament were jubilant. Where there had previously been discord, distrust, and disenchantment, observers now identified 'a remarkable display of vision and leadership by governments and personalities alike […] the resolve to make nuclear non-proliferation an enduring norm, and demonstrated the Parties' determination to take more effective steps towards the ultimate goal of a world without nuclear weapons'.[598] The consensus decision on indefinite extension was *made possible* by South Africa's proposal and its unique brand of authority and local experience in both anti-nuclear activism and the realities of proliferation and disarmament—created an illusion of compromise and of states pulling together towards a shared goal. This was despite the fact that the conference 'collapsed in disarray' on the final day, as the NAM and Western blocs clashed over the proposed language of the final declaration; having been roundly defeated, the NAM bloc wanted the declaration to at least include some stronger language on disarmament than was contained in the 'principles'.[599] A final declaration was never delivered, but this made no dent in the

[597] See Ruchita Beri, "South Africa's Nuclear Policy," *Strategic Analysis: A Monthly Journal of the IDSA* 22, no. 7 (1998), https://www.idsa-india.org/an-oct8-2.html. Beri briefly acknowledges the continuity between anti-apartheid anti-nuclearism and South Africa's position at the 1995 RevCon but does not expand on the issue. Most if not all other analysts miss this continuity.
[598] Tuiloma Neroni Slade, '1995 Review and Extension of the Treaty on the Non-Proliferation of Nuclear Weapons', *Review of European, Comparative & International Environmental Law* 5, no. 3 (1996): 252.
[599] Tariq Lauf and Rebecca Johnson, 'After the NPT's Indefinite Extension: The Future of the Global Non-Proliferation Regime', *Nonproliferation Review* 3, no. 1 (1995): 30.

historic significance of the agreement reached. The 'consensus' outcome masked the sense of pressure and acrimony felt by non-aligned delegates at the conference, thus helping the global nuclear order emerge into the 21st century vindicated and validated—its past failures redeemed. That South Africa as one of the prime victims of Cold War-era non-proliferation failure should so willingly provide the means to reach this consensus further signalled that a new chapter in international nuclear politics was beginning: the NPT was becoming the only game in town.

It is important to acknowledge that 'the role of South Africa in the NPT's extension should not be overstated, for it probably would have happened even if South Africa had opposed it.'[600] The combined political, economic, and diplomatic might of the US and the rest of the Western bloc was overwhelming. However, Onderco and van Wyk also correctly note that without South Africa's intervention, 'the extension would most likely have occurred after an acrimonious battle over the voting mechanism and would have left the NPT parties deeply divided and the treaty weakened', and that the regime would subsequently look 'dramatically different' after the fact.[601] The indefinite extension of the NPT was not secured solely due to South Africa's efforts; prevailing structural conditions made it a likely outcome. However, they were absolutely vital to generating an *impression of consent* for a multilateral, liberal nuclear order, which now appeared to operated with the support of almost every state in the world. South Africa thus played a significant role in the redemption of global nuclear order. As we will see in the final chapter, however, this redemption was a process that did not conclude with the 1995 RevCon. Into the late 1990s and 2000s, the global nuclear order deepened its association with South Africa, further benefiting from and aligning with the ANC's history of struggle. Finally, as ever, this was a bilateral interaction: the global nuclear order also helped to redeem South Africa and the thorny issues surrounding its nuclear legacies.

The above demonstrates that South Africa played an important role in shoring up the legitimacy of the global nuclear order through its actions at the 1995 RevCon, emphasizing that structural unipolarity did not mean that the overall outcome was a foregone conclusion. However, this is not to argue that unipolarity was unimportant in proceedings. To the contrary, as we have already noted, it was a crucially important enabling factor which provided the political space for South Africa to act in the way it did. The disappearance of the Soviet pole foreclosed other potential alternative outcomes of the conference, which allowed the South African position of 'indefinite extension plus principles' to appear as a much larger compromise on the part of Pretoria than it actually was. This

[600] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 41.
[601] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension', 41.

appearance of compromise in turn had two effects: it made the final proposal more acceptable to NAM states, and has been a crucially important component of the narrative of South Africa as a technically competent facilitator of consensus in nuclear diplomacy and emergent 'middle power'. The construction and fulfilment of this role would become one of the primary lenses through which to analyse South Africa's post-1995 international diplomacy.[602]

Ahead of the 1995 RevCon, NAM did not necessarily represent a single voting bloc with a shared view on nuclear non-proliferation policy, and this had held equally true during the Cold War as it did at the turn of the unipolar moment. As Potter and Mukhatzhanova note, in one of the most comprehensive and indeed only treatments of NAM's nuclear politics, NAM members are generally 'united in the conviction that the ultimate goal of the NPT is nuclear disarmament', which nonetheless leaves much room for disagreement on how best to affect this objective.[603] The fact that NAM advances apparently representative, formal positions on non-proliferation issues can obscure these differences, and divert attention from the reality that several member states maintain divergent views and policies. Accordingly, the authors choose to understand NAM in three 'related but distinct ways': as a normative concept, a loose association of states, and as a foreign policy tool that can be exploited by individual states to various ends 'that are not always coincident with those of the larger collective'.[604] While NAM as an association of states was undoubtedly influential on non-proliferation issues during the Cold War—deriving significant leverage from its strength in numbers, and accordingly being able to influence the drafting of the NPT[605]—it would thus be mistaken to assume that, prior to 1995, NAM had represented a solid united front on disarmament and non-proliferation. The chasm between the different nuclear policies of influential members, for example nuclear-armed India vs. the staunchly anti-nuclear Southeast Asian bloc, bluntly illustrates this dynamic.[606] That said, the Preparatory Committee (PrepCom) process ahead of the RevCon, taking place in early 1995, had still been 'dominated' by a 'north-south division', consisting of 'NWS and their NNWS allies, and the nonaligned NWS'—a dynamic that had 'traditionally' persisted

[602] For example, see Maxi Schoeman, "South Africa as an Emerging Middle Power," *African Security Review* 9, no. 3 (January 1, 2000): 47–58; Leith and Pretorius, "Eroding the Middle Ground: The Shift in Foreign Policy Underpinning South African Nuclear Diplomacy"; van Wyk, "Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency"; van Wyk, "South Africa's Post-Apartheid Nuclear Diplomacy: Practice and Principles"; Olusola Ogunnubi, "South Africa's Soft Power and the Diplomacy of Nuclear Geopolitics," *GeoJournal*, Advance online publication 2020, 1–14.
[603] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*, 38.
[604] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*, 34.
[605] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*, 37.
[606] See Jayita Sarkar, 'The Making of a Non-Aligned Nuclear Power: India's Proliferation Drift, 1964–8', *The International History Review* 37, no. 5 (2015): 933–50; Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1'.

throughout the Cold War.[607] However, even this loose coalition had largely disintegrated by the advent of the RevCon proper. Internal NAM discussions had failed to reach a consensus on a unified position on NPT extension, resulting in the emergence of a number of caucuses and subgroups, some of which were explicitly in favour of indefinite extension while others were more critical. In short, the usual veneer of NAM solidarity—imperfect as it had always been, yet a politically powerful rallying point nonetheless—was fully stripped away. Leigh-Phippard argues that the lack of agreement over a common position 'guaranteed the success of the Western lobby'.[608] This may be something of an overstatement, as the lobby for indefinite extension pushed hard to secure its preferred outcome,[609] but this upshot of unipolarity doubtless had a profound effect on the conference's diplomatic terrain.

However, with specific regard to South Africa and its machinations at the RevCon, there were other, less obvious benefits of unipolarity. The end of bipolarity removed one of the key reference points in international relations by which 'non-alignment' as a concept was defined: the Soviet pole. NAM has, as already noted, never been solely defined in purely structural terms—standing variously at different times and according on the institutional context for the 'Bandung spirit', economic development, national independence, and democracy— and its *raison d'être* accordingly transcends simply charting a path between two dominant poles.[610] The unpalatable truth was nonetheless that 'play[ing] the divide between the two superpowers' was what afforded the geopolitical space for NAM to carve out its identity and role in international relations, and particularly with regard to nuclear non-proliferation.[611] Small, non-aligned, non-nuclear states who chose to remain outside of the non-proliferation framework in the past were shielded from 'the full brunt of American power preponderance' by the presence of another superpower, always quick to draw attention to perceived American overreach and to rhetorically defend developing states' right to self-determination.[612] Those with nuclear ambitions could exploit this divide even further, as demonstrated by India's ability to find shelter in strategic co-operation with the Soviet Union while pursuing a nuclear weapons programme and alienating the US.[613] Alternatively, proliferant states

[607] Helen Leigh-Phippard, 'Multilateral Diplomacy at the 1995 NPT Review and Extension Conference', *Diplomacy & Statecraft* 8, no. 2 (1997): 176.
[608] Leigh-Phippard, 'Multilateral Diplomacy at the 1995 NPT Review and Extension Conference', 177.
[609] as detailed in Welsh, 'Delegate Perspectives on the 1995 NPT Review and Extension Conference'; Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension'.
[610] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*; Joelien Pretorius, 'Non-Alignment in the Current World Order: The Impact of the Rise of China', *Strategic Review for Southern Africa* 30, no. 1 (2008): 1–27.
[611] Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension', 4.
[612] Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension', 4.
[613] Ganguly, 'India's Pathway to Pokhran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program'.

could benefit from the superpowers' desire to carve out small advantages by making exceptions to their own rules.[614] While the non-proliferation regime relied on bipolar co-operation,[615] Washington in several instances gave tacit leeway to friendly nuclear aspirant states—on the condition that they kept their programmes quiet, so as not to undermine the credibility of US non-proliferation commitments. As we have noted, this dynamic greatly assisted apartheid South Africa's efforts to develop a nuclear weapon.[616]

All of these conditions meant that, during the Cold War, there were viable alternatives to engaging with the non-proliferation regime for states who wished to pursue them, including those in the non-aligned movement. This condition however was reliant on superpower tension, and as the USSR disintegrated, this tension was abruptly released. Non-aligned states were catapulted back into the orbit of the US and found themselves no longer 'playing in the stadium of the Cold War [but] playing in Yankee Stadium'.[617] To extend Miguel Marin-Bosch's sporting metaphor, the best outcome that NAM could now hope for was to simply to give the home team something of a workout. The range of possible outcomes of the RevCon was thus drastically narrowed. Without a second pole by which to calibrate positions, 'compromise' became a hollow concept. There was no divide to play: the preferred outcome of the US was unrivalled, save for a loose collection of groupings which made up an amorphous, fractured, and ultimately impotent opposition.

The flipside of this condition was that South Africa's advocacy of a 'package deal' looked like the closest possible thing to opposition, in the absence of any other serious challenges to the US's unrivalled power. By abandoning the 25-year rolling extensions proposal originally formulated by its diplomatic team, Pretoria appeared to be compromising. It is worth recalling the gloomy predictions, some of which were made just a few short months before the conference, of a post-NPT world. For those not appreciating the seismic importance of the unipolar shift, 25-year rolling extensions appeared to be the best possible outcome. George Bunn for example, fearful that a bare majority for indefinite extension would be counterproductive in sowing more problems than it solved, suggested in 1994 that rolling extensions were likely to be the best compromise alternative which also 'could provide an extension that is indefinite.[618] In contrast, Leigh-Phippard's 1997 academic analysis of diplomacy at the RevCon characterizes NAM states advocating for this outcome as 'hardline' holdouts with an 'unwillingness […] to consider forging new coalitions and alliances'.[619] Hardliners

[614] I thank Jan Ruzicka for raising this point.
[615] Potter, 'Nuclear Proliferation: US-Soviet Cooperation'.
[616] Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*.
[617] Marin-Bosch, quoted in Preston and Smith, 'The Nuclear Treaty: Product of Global Full-Court Press by U.S.'
[618] Bunn, 'Viewpoint: The NPT and Options for Its Extension in 1995', 54.
[619] Leigh-Phippard, 'Multilateral Diplomacy at the 1995 NPT Review and Extension Conference', 184.

they indeed appeared, given that indefinite extension eventually passed as a consensus position without a vote—despite the fact that the 'third position' advocated by Goosens et al. had been the original compromise option. In the absence of an exploitable superpower divide allowing the NAM states to formulate a coherent, widely supported, and substantively different alternative to the US proposal, indefinite extension quickly became the only thinkable outcome—alternatives that had seemed reasonable mere months and years before were now hopelessly idealistic and anachronistic artifacts of the Cold War. In the face of this new reality, Pretoria created a powerful illusion of 'appearing to minimize polarization between the haves and have-nots while actually strengthening the former'.[620] South Africa's milquetoast solution—which essentially amounted to an obligation for NPT signatories to pay more regular lip service to the principles of fairness and universal disarmament—was now as far as compromise went.

From this accrued significant benefits to South Africa in terms of prestige, within the global nuclear order and more broadly in other multilateral institutions. Van Wyk outlines how the RevCon was one of the first opportunities for the new government in Pretoria to establish itself as a credible 'middle power' in international relations, doing so through a crafted strategy of 'niche diplomacy': 'a specific diplomatic practice based on a state's diplomatic specialisation in a particular area […] focuse[d] on consensus and coalition building, cooperation on an issue-specific basis and adopting the role of bridge-builder, mediator, facilitator, or catalyst' through 'entrepreneurial flair' and 'technical competence'.[621] In van Wyk's constructivist analysis, the complex diplomatic manoeuvring recounted by Goosen and Minty[622] constituted a practice of 'consensus and coalition building' which eventually 'produced non-material rewards such as status and prestige' and 'signalled the country's compliance with the norms espoused in the NPT'.[623] This made a significant contribution to the normalization of South Africa's relations with the rest of the liberal-democratic world, along with a bevy of treaty accessions and multilateral agreements in other areas.[624] Similarly, Schoeman argues that South Africa's part in extending the NPT 'clearly reflects a leadership role for South Africa, and one that was accepted by both camps [sic] in the debate', contributing to South Africa's efforts to

[620] Philip Nel, Ian Taylor, and Janis van der Westhuizen, 'Multilateralism in South Africa's Foreign Policy: The Search for a Critical Rationale', *Global Governance* 6, no. 1 (2000): 51.
[621] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency', 110.
[622] see Welsh, 'Delegate Perspectives on the 1995 NPT Review and Extension Conference'; Onderco, 'Oral History Interview with Peter Goosen'; Michal Onderco, 'Oral History Interview with Abdul Minty' (Wilson Center, 12 June 2017), History and Public Policy Program Digital Archive.
[623] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency', 112–13.
[624] Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty'; see also Etel Solingen, 'The New Multilateralism and Nonproliferation: Bringing In Domestic Politics', *Global Governance* 1, no. 2 (1995): 205–27.

establish itself as a 'middle power'.[625] One contemporary analysis exuberantly concluded that the outcome of the RevCon would 'go far towards ensuring world peace and stability where weapons of mass destruction are concerned', and that 'South Africa shares the credit for the final agreement, and finds itself many steps removed from its recent status as a *pariah*!'[626] These sentiments were representative of the justified optimism following the RevCon, but even those more circumspect observers acknowledged the importance for the conference in allowing South Africa to position itself as an emergent middle power, facilitator of compromise, and champion of liberal-democratic norms on the international stage.[627] These analysts all agree that the RevCon set the stage for South Africa's multilateral diplomacy into the late 1990s and beyond.

Van Wyk's argument regarding 'niche diplomacy' is a strong one and is useful in understanding why the RevCon was such a watershed moment in South Africa's early democratic history. There is no doubt that the episode further elevated South Africa's international moral standing and spotless non-proliferation credentials. However, its singular focus on diplomatic practice means that it misses an important dimension of the story. Unipolarity was crucially important in allowing South Africa to reap the diplomatic rewards of the RevCon, and consequently served as one of the foundations on which its subsequent reputation as a competent mediator and 'bridge' between NAM and the West was built. Unipolarity did not, as has been shown, win the day for the side supporting indefinite extension; South Africa still played a vital role in helping indefinite extension pass, having made a strong and long-standing commitment to the principles of non-proliferation during the liberation struggle. It did, however, provide the structural conditions of possibility for South Africa to engage in the diplomatic practices van Wyk describes, and to imbue them the appearance of forging compromise and a path between two ostensibly opposing positions—even though no credible challenge to the US was mounted. This is not however a simple structural claim: it was a continuation of the constant elision and interaction between the imagined 'local' and 'global' spheres of nuclear politics. The goodwill and reputation built up by South Africa at the 1995 RevCon contributed to the broader project of domestic legitimation and reconciliation, and the fraught process of building a democratic nation. The shift to unipolarity within the global nuclear order in

[625] Schoeman, 'South Africa as an Emerging Middle Power', 51.
[626] Tsepe Motumi, "South Africa and the Nuclear Non-Proliferation Treaty - Diplomatic Coup or a Pyrrhic Victory?," *African Security Review* 4, no. 2 (1995): 51, original emphasis; see also Helen Yanacopoulos, "The Janus Faces of a Middle Power: South Africa's Emergence in International Development," *Journal of Southern African Studies* 40, no. 1 (2013) for a discussion of the role of South Africa's "heroic" interventions in global multilateral fora in constructing a "middle power" identity.
[627] Nel, Taylor, and van der Westhuizen, 'Multilateralism in South Africa's Foreign Policy: The Search for a Critical Rationale'; Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty'.

this way contributed to the redemption of post-apartheid South Africa as a responsible, conciliatory actor and champion of liberal multilateral norms.

After the RevCon: Importing global anti-technopolitics, outsourcing local ambivalence

The preceding section has been a detailed discussion of the RevCon, its aftermath, and the effects on South Africa's global standing. These processes would reverberate into its domestic politics through the rest of the 1990s and beyond to the present day, as the following chapter discusses. However, there were also more immediate implications of South Africa's full accession to the global nuclear order, which had to do with technopolitical importing and outsourcing. Elements of the apartheid and ANC technopolitical regimes remained in conflict with one another, and neither could adequately address the challenges of South Africa's nuclear future. The ANC did not have a settled policy or stance on civil nuclear power generation or research; only a commitment to keep the issue under review and to remain compliant with its NPT obligations. The material artefacts left over from apartheid, with its technopolitics encoded into their physical construction, did not easily lend themselves to a project of national reconstruction or a democratic energy economy. There were also unresolved questions around democracy, secrecy, and security relating to nuclear technology in South Africa, and a number of factors militated against greater transparency. In short, the question of how to deal with South Africa's nuclear legacy and its implications for the young democracy remained unanswered, even as Pretoria was taking decisive action with regard to 'global' nuclear politics.

Once again, however, we see a situation in which 'global' and 'local' are inseparably intertwined, and where multilateral action on the international stage filtered into South Africa's domestic politics. Returning to Hecht's seminal study of technopolitical regimes is instructive here. In examining the regimes competing to govern the French nuclear programme during the Cold War, Hecht identifies both a 'nationalist' and a 'nationalized' regime, emanating from the institutions of the CEA and EDF respectively.[628] One of the standout characteristics of the regimes that Hecht examines is their apparent independence from and freedom from interference by the global nuclear order; her study touches rarely on the wider global dynamics at play. Of course, France as one of the world's most advanced nuclear states during the early Cold War had a remarkable degree of freedom to pursue technopolitics, nationalist or nationalized, due to the lack of a constraining non-proliferation framework. Soviet Russia, as examined by Schmid, had a similarly free hand.[629] Dalaqua, who draws on Hecht's work, conducts a study of the Brazilian 'autonomous technopolitical regime' since the

[628] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009, 16.
[629] Schmid, 'Nuclear Colonization? Soviet Technopolitics in the Second World'.

1980s, and is more attentive to the global nuclear order. However, she finds the Brazilian regime to have been constructed in opposition to the global nuclear order, with an ideological focus on autonomy and the resistance of technological colonization.[630] Felt has examined the development of Austria's present-day anti-nuclear technopolitical regime, which is predicated on a strong rejection of both nuclear weapons and nuclear power: as a non-nuclear state, the stakes for Austria of opting out of the benefits of the global nuclear order are low.[631]

The commonality between each of these case studies is that each state has been able to pursue a strong national technopolitics, rooted in local specificities, histories, and socio-political dynamics. France and Russia were powerful, near-nuclear or nuclear-armed states as their technopolitics developed; the global nuclear order and non-proliferation regime would eventually grow around them to accommodate their national technopolitical projects. Austria had no nuclear ambitions whatsoever—aside from building the Zwentendorf nuclear plant, which a public referendum ensured would never be commissioned or fuelled—between 1972 and 1978. Brazil attempted to define its nuclear technopolitics in opposition to the demands of the global nuclear order for transparency and co-operation, but as Dalaqua notes, has still had to accommodate many of its requirements—including submission to international safeguards.[632] The South African situation in 1995 was very different. The ANC was fully committed to the global nuclear order and its attendant non-proliferation requirements, by virtue of both its history of non-proliferation activism and the decisions of the de Klerk government in 1989. South Africa's nuclear inheritance, entrenched establishment of nuclear industry officials and engineers, and high overall level of imbrication within the world nuclear trade complex also meant that the incoming government could not opt out of difficult questions around nuclear policy or easily pursue an Austrian-style abolitionist technopolitics. The nuclear legacy instead needed to be secured and disciplined in line with the obligations Pretoria had assumed by acceding to the NPT and various other instruments of nuclear order. South Africa thus was not afforded the same space as the aforementioned countries to pursue a creative 'local' technopolitics, because it was obliged to *import* the non-proliferationist 'anti-technopolitics' prescribed by the global nuclear order.

The term 'anti-technopolitics' should not be understood to signify that the global nuclear order is somehow free of technopolitical or ideological content. Egeland notes that 'appeals to a non-

[630] Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program', 240.
[631] Felt, 'Keeping Technologies out: Sociotechnical Imaginaries and the Formation of Austria's Technopolitical Identity'.
[632] Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program', 249.

ideological, 'practical' nuclear politics' organized around the 'pragmatic' principles of gradualism and non-proliferation 'are ideological statements *par excellence'*.[633] As Krause discusses, the post-Cold War nuclear order rests upon a number of shared liberal beliefs or 'myths', principally that managed nuclear deterrence and the pursuit of non-proliferation—that is, Walker's systems of deterrence and restraint—will beget stability, peace, and eventually disarmament. These are deeply ideological commitments, rooted an optimistic Enlightenment politics and the idea that all states are part of a global non-proliferation community, pulling together in the same progressive direction toward the ever-deferred goal of nuclear disarmament. Of course, as I have explored with regard to the 1995 RevCon and South Africa's crucial intervention in it, this image of consensus is a carefully maintained illusion. 'There [is] no consensus for any coordinated effort by the 'world community' to pursue an enlightenment project […] no other multilateral instrument is hedged about with so many reservations and unilateral declarations—made either at the signing or at the moment of deposition of instruments of ratification—as the NPT'.[634] Instead, in a unipolar post-Cold War nuclear order, 'the policy objectives of the world's most powerful state and its major allies' became accepted as 'universalistic principle that purports to seek a good anyone can perceive—the avoidance of nuclear apocalypse'.[635] This alignment is maintained and reinforced by the 'non-proliferation complex' identified by Craig and Ruzicka, consisting of the international institutions of nuclear order, governmental and non-governmental agencies, think tanks, universities, and research institutes dedicated to cementing the status of non-proliferation as a global public good. In other words, one function of this is to continuously negate any possibility for alternative nuclear technopolitics to challenge this hegemony—whether that be a radical globally-oriented technopolitics advocating world government as a necessary condition for disarmament as favoured by Craig,[636] or more local technopolitical programmes rooted in unique national experiences like that of South Africa. In this sense, the non-proliferation complex functions similarly to the 'anti-politics machine' which has formed the basis of a scholarly cottage industry in development studies: whereby the 'development' apparatus in a given country 'can effectively squash political challenges to the system not only though enhancing administrative power, but also by casting political questions […] as technical "problems" responsive to the technical "development intervention'.[637] The non-proliferation complex similarly substitutes deeply political technocracy for overt politics; safeguards, inspections,

[633] Egeland, 'The Ideology of Nuclear Order', 209.
[634] Krause, 'Enlightenment and Nuclear Order', 488.
[635] Craig and Ruzicka, 'The Nonproliferation Complex', 341.
[636] Campbell Craig, 'The Resurgent Idea of World Government', *Ethics & International Affairs* 22, no. 2 (2008): 133–42.
[637] James Ferguson and Larry Lohmann, 'The Anti-Politics Machine: "Development" and Bureaucratic Power in Lesotho', *The Ecologist* 24, no. 5 (1994): 180.

import and export controls, 'trigger lists' and painstaking definitional work towards separating 'civil' and 'military' technologies and components[638] define the permissible limits of nuclear activity, leaving no space for alternative national projects.

This is not to argue, of course, that myriad national nuclear technopolitical projects are necessarily more desirable than an imperfect non-proliferationism that preserves the status quo: the potential for heightened nuclear danger is readily apparent. Furthermore, in South Africa, importing this global anti-technopolitics to an extent facilitated the domestic transition to democracy and helped to partially exorcise the demons of the apartheid nuclear programme. When South Africa joined the NPT, it became part of a complex that sought to make local technopolitical creativity impossible. Nuclear anti-technopolitics narrowed the available political responses of the more progressive, radical, and anti-nuclear parts of the liberation movement in South Africa which, as we saw in our analysis of *The Nuclear Debate*, was not dominant but nevertheless capable of making itself heard. While ANC elites were largely committed to non-proliferation as a principle—as the majority of conference contributions make clear—some on South Africa's left remained sceptical of the new-look global nuclear order. Accession to the NPT and the acceptance of anti-technopolitics that entailed helped to further marginalize this lingering dissent, making it more or less impossible to imagine South African (anti-) nuclear futures that were not organized around non-proliferation as a first concept. Closely paralleling the prior discussion on the end of bipolarity and the hollowing-out of NAM at the 1995 RevCon, 'playing in Yankee Stadium' precluded the possibility of a radically divergent South African nuclear future. While retaining a residual nuclear capability—as advocated by Isaac Amuah at *The Nuclear Debate*—was already a far-fetched prospect given the strength of the ANC's ideological commitment to non-proliferation, joining the unipolar nuclear order made it impossible. More importantly though, activist concerns about the equity, efficacy, or stability of a non-proliferation centred global nuclear order could no longer find expression in credible policy proposals. As the RevCon illustrated, unipolarity had diminished the prospects for a 'non-aligned' approach to non-proliferation of the kind that was possible in the Cold War. In a national context, this might consist of nuclear ambiguity, a refusal to participate fully in the NPT, and/or the pursuit of a national nuclear energy programme outside of IAEA safeguards. All of these pathways were suggested at *The Nuclear Debate*; the RevCon showed definitively that none were plausible. As the following and final chapter discusses in more detail, progressive impulses around nuclear politics would be mostly subsumed either into South Africa's multilateralist and reformist advocacy of non-proliferation and disarmament, or into domestic opposition to nuclear power generation. These

[638] Gabrielle Hecht, 'A Cosmogram for Nuclear Things', *Isis* 98, no. 1 (1 March 2007): 100–108.

divergent tendencies are reflective of perhaps the most important redemptive effect of the global nuclear order on South African public life: the (incomplete) resolution of the conflict between apartheid nuclear technopolitics and the anti-apartheid campaign against the apartheid bomb. The importing of anti-technopolitics at the expense of local technopolitical creativity assisted in this but was further accompanied by a dynamic of *outsourcing*, which also had important redemptive and resolving effects.

As I have already explored, the apartheid roots of South Africa's nuclear infrastructure posed a problem for those within the ANC, broader GNU, and the rump nuclear establishment who wanted to retain or even expand the country's civil nuclear assets for purposes of economic development. Ostensibly 'peaceful' nuclear technology had been used as cover to build a nuclear weapons programme which helped to maintain the iron grip of apartheid on the country, and societal distrust of apartheid's physical and bureaucratic nuclear legacy was widespread. Simply retaining and repurposing the power reactors, research infrastructure, knowledge base, and personnel that had brought about the apartheid bomb would leave this legacy unchallenged. The Truth and Reconciliation Commission (TRC) process would leave the nuclear weapons programme untouched, since its mandate was to investigate individual cases of human rights abuses, based on victim statements and/or amnesty applications by perpetrators. Gould argues that '[t]his resulted in the TRC failing, on the whole, to reveal the systemic nature of apartheid'.[639] The 'sunset clauses' negotiated between the ANC and National Party, which safeguarded the positions of apartheid-era officials, also meant that many of those who had worked on the nuclear programme remained in the employ of the state, or at least bound by strict secrecy obligations. This has further hindered the pursuit of transparency and openness on the history of the nuclear programme. Since 1994, Pretoria has also been 'understandably preoccupied with more pressing priorities, may face foreign pressures to let sleeping dogs lie, and is probably anxious about a disclosure process that could ripple into areas of even greater domestic political and diplomatic sensitivity'.[640]

Von Schnitzler has explored what happened when communities in post-apartheid Soweto were confronted with ANC efforts to overhaul water and electricity provision infrastructure, repurposing these former apartheid assets to the needs of a developing nation.[641] She details several complex dynamics, but one effect was that formerly oppressed communities still related to these state utility assets as tools of oppression, regardless of the fact that they were now the property of a liberal-democratic, majority-ruled state. They remained physical manifestations of apartheid technopolitics.

[639] Gould, 'The Nuclear Weapons History Project', 89.
[640] Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past', 473.
[641] von Schnitzler, *Democracy's Infrastructure: Techno-Politics and Protest After Apartheid*.

Although South Africa's nuclear infrastructure does not directly mediate citizens' quotidian encounters with the state in the same way as water pipes or electricity meter boxes do, it is nonetheless a highly controversial, material artifact of apartheid excess which remains shrouded in secrecy. As participants at *The Nuclear Debate* highlighted, it is a reminder for South Africans of 'the era in which they faced an intransigent security state, one that had little regard for building democratic political culture or respecting the rights of all citizens'.[642] The boundary between 'civil' and 'military' nuclear development in 1994 was especially weak, having been thoroughly transgressed by the apartheid regime and rendered, for many South Africans, essentially meaningless. South Africa's full accession to the NPT, performance at the 1995 RevCon, resumption of its representative role for Africa at the IAEA, and membership of the Nuclear Suppliers' Group—in short, its full readmission to the global nuclear order—had a redemptive effect which helped to clear the way for further civil nuclear development.

Peoples has written convincingly on the redemptive technopolitics of the civil-military divide and non-proliferation, but his important analysis does not touch on the interaction between the presumed categories of 'local' and 'global' in nuclear politics.[643] Hecht has gestured towards this issue, hoping to 'disrupt facile distinctions between the "global" and the "local" in nuclear politics by 'placing Africa in the nuclear world, and the nuclear world in Africa'.[644] It is important to recognize that these 'facile distinctions' are in one sense untenable, but in other, absolutely foundational to the function of nuclear order. The South African case demonstrates this paradox neatly. Accession to the global nuclear order had the effect of at least partially repairing the boundary between civil and military technology in South Africa, untangling research and energy production from its associations with militarism and authoritarianism. This is an exemplary instance whereby 'local' and 'global' nuclear politics at once bleed into one another, to the point that they become almost indistinguishable, yet the categories or 'levels' of 'local' and 'global' also do a huge amount of work in 'marking, and thus making' global nuclear order.[645] The concept of non-proliferation assumes the existence of a boundary between civil and military nuclear technology, and these categories map in turn onto 'local' and 'global'. Civil or peaceful nuclear technology, as long as it is used within the boundaries of the international non-proliferation regime, is available for domestic or 'local' exploitation. The NPT specifies the 'inalienable right of all the Parties to the Treaty to develop

[642] Fig, 'In the Dark: Seeking Information about South Africa's Nuclear Energy Programme', 56.
[643] Peoples, 'Redemption and Nutopia'.
[644] In Maximilian Mayer, 'Nuclear Ontologies, Technopolitics in Postcolonial Spaces, and the Cold War as Transnational History: An Interview with Gabrielle Hecht', in *The Global Politics of Science and Technology - Vol. 1: Concepts from International Relations and Other Disciplines*, ed. Maximilian Mayer, Mariana Carpes, and Ruth Knoblich (Berlin Heidelberg: Springer-Verlag, 2014), 280–81.
[645] Onuf, 'Levels', 53.

research, production and use of nuclear energy for peaceful purposes without discrimination',[646] making civil nuclear technology the preserve of state governments. Power generation, isotope production, component manufacturing, and atomic research are all available for the pursuit of what might be assumed to be 'local' ends—the creation of jobs in a given area, for instance, or the advancement of a particular university's standing in the scientific community. After 1994, the ANC-led government would hope to use nuclear power in its endeavours to reorient South Africa's economy towards commercially driven economic development, and to ameliorate the gaping inequalities and areas of underdevelopment within the country's science and technology establishment. Nuclear power, in short, was to be used to address the national, regional, and local problems generated by apartheid. The standards of behaviour within the global nuclear order permit and actively encourage such pursuits.

'Military' nuclear technology, meanwhile, corresponds with the 'global' category. While it is true, as Hecht reminds us, that 'nuclear power in any one location ends up becoming a global issue',[647] given its rootedness in a worldwide nuclear complex of trade, safeguarding, and regulation, 'local' civil nuclear policy choices are permitted within the limits of non-proliferation rules. When a state crosses the threshold into 'military' nuclear technology, however—be it by hitting an IAEA safeguards trigger, or by a deliberate display of military nuclear prowess in the form of a nuclear test—it becomes a problem of 'global' significance, to be addressed at a 'global' level.[648] When 'proliferation' is judged to have occurred, it threatens the balance of global nuclear order. Regardless of the 'local' or national motivating factors behind a given national nuclear programme, it has 'global' implications which pay no heed to state borders.[649] For the same reason, the NWS who are legally permitted to maintain a nuclear arsenal under the NPT derive this authority from a globe-spanning, international agreement. The key point however is that the apparatus of the global nuclear order assumes responsibility for the detection, management, and countering of proliferation threats. In this sense, providing that states remain compliant with the rules and standards of behaviour set by the global nuclear order—which, in short, simply require the maintenance of a verifiable boundary between civil and military applications of nuclear technology—they absolve themselves of any responsibility for the potential military uses of their peaceful nuclear

[646] United Nations, 'Treaty on the Non-Proliferation of Nuclear Weapons'.
[647] Gabrielle Hecht, 'Gabrielle Hecht on Nuclear Ontologies, De-Provincializing the Cold War, and Postcolonial Technopolitics', Theory Talks, 14 July 2014, http://www.theory-talks.org/2014/07/theory-talk-64.html.
[648] See Abraham, ''Who's Next?'; Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1' for an empirical discussion on drawing the boundaries of nuclearity and according policy responses.
[649] Alan Robock and Owen Brian Toon, 'Local Nuclear War, Global Suffering', *Scientific American* 302, no. 1 (2010): 74–81.

infrastructure. The task of policing this boundary is *outsourced* to the 'global' level, allowing state governments to pursue domestic nuclear policy objectives free of the obligation to monitor and continually reassert the divide themselves.

In the case of South Africa, this dynamic provided the new government with the technopolitical space required to retain and possibly expand the country's existing nuclear infrastructure. Pretoria required the assistance of the global nuclear order to reassert the civil-military boundary in South Africa, being unable or unwilling to do so itself by releasing all available information on the nuclear programme and/or thoroughly interrogating it using the TRC framework. South Africa's accession to the NPT, resumption of the Africa seat on the IAEA Board of Governors, admission to the Nuclear Suppliers' Group, and particularly its performance at the 1995 RevCon was constituted a performance—for both global and domestic audiences—of the acceptance of non-proliferation rules. Through these practices, South Africa was not only building a particular kind of identity for consumption in diplomatic settings but also signalling to a sceptical and wary country that any future peaceful nuclear endeavours would be conducted under global supervision, in line with global standards of behaviour. The ANC-led government had opted not to decide where the line between 'civil' and 'military' nuclear technology should be drawn, deferring this judgment in favour of alignment with the established rules of the rest of the liberal-democratic world. Pretoria would bear no responsibility for any possible ambiguities in its nuclear activity: this was now the preserve of the global nuclear order. In this way, the most problematically 'ambivalent'[650] elements of South Africa's remaining nuclear legacy—for instance, its HEU stockpile—were decoupled from any future civilian projects. Civil nuclear development could now be pursued locally, while the institutions of global nuclear order ensured that nothing came too close to 'proliferation' territory. This opened the door for the redemption of nuclear technology in South Africa. An illiberal, regressive, authoritarian regime and the nuclear weapons that helped to prop it up were overcome simultaneously; as South Africa entered a new era of liberal democracy and political progressivism, the reassertion of the civil-military boundary meant that those features of nuclear power that were 'crucial to human progress and economic prosperity' could play a part in the construction of a new Rainbow Nation.[651]

The final chapter will examine how this new chapter of South Africa's nuclear story played out from the mid-1990s into the 2000s, and eventually the present day. The reciprocal redemptive process between South Africa and the global nuclear order, we will see, has not been complete or unproblematic. Accession to and continued activist participation within the global nuclear order has

[650] Abraham, ''Who's Next?'
[651] Peoples, 'Redemption and Nutopia', 216.

not completely blunted anti-nuclear sentiment. While unipolarity and the hegemonic authority of non-proliferation have combined to restrict the options for the effective expression of anti-nuclear sentiments in South Africa, public suspicion about danger and secrecy around nuclear energy development is still widespread. The spectre of the apartheid bomb still looms large over the issue, and a continued lack of transparency has combined with illegal nuclear procurement deals and the misuse of public resources to invoke its spirit once again. To an extent, the global nuclear order has enabled this state of affairs. Meanwhile, the ANC has in part transferred its fight against apartheid to the global nuclear order itself, emerging as a leading diplomatic voice within multilateral non-proliferation, humanitarian, and nuclear disarmament fora. Despite a litany of impressive achievements and unparalleled authority in the field, however, South Africa's pursuit of a more stable and just global nuclear order may have had the effect of further entrenching the inequalities which it is committed to fighting. The apartheid bomb has left a complicated legacy indeed. However, none of this should take away from the important argument advanced in this chapter: South Africa and the global nuclear order worked in the mutual interests of one another during the early 1990s, culminating in the success of the 1995 RevCon. Structural unipolarity, while significantly important, did not deliver these outcomes on its own. Although still an emerging regional power, a small state reeling from decades of authoritarianism, South Africa left a mark on global nuclear order of the kind that no other country could. As we will now explore, the global nuclear order has also woven itself into South Africa's political fabric in a number of unexpected ways.

Chapter 4: How to be nuclear, and how nuclear to be? Democracy, diplomacy, and the atom in the 'Rainbow Nation'

Introduction

This final chapter brings the thesis to a close by examining the 'local-global' interactions between South Africa and the global nuclear order after apartheid and the 1995 Review Conference, bringing the analysis into the present day. In many ways South Africa's post-apartheid nuclear policy, especially in the domestic realm, has been no less controversial than the apartheid bomb. The conclusion of the disarmament process did not mark the end of South Africa's entanglement with highly 'ambivalent' nuclear technologies,[652] with the nuclear weapons programme leaving behind several tricky and messy legacies. The SAFARI-1 research reactor has continued to operate in a largely uncontroversial capacity, mostly producing medical isotopes. More contentious was the highly enriched uranium (HEU) stockpile left over from the bomb project which remained in storage at the Pelindaba facility, albeit under IAEA supervision, and ironically came to serve as a totem of independence and defiance for the newly democratic nation. Erstwhile employees of the weapons programme continued to work on the immensely controversial Pebble Bed Modular Reactor (PBMR) project which received substantial backing from the ANC government for several years, in the hope of positioning South Africa as a global technological leader in next-generation civil nuclear technologies. All the while, disputed plans to increase South Africa's nuclear power generating capacity have rumbled on, with perennial announcements that the ANC government intends to replace, update, or extend the life of the Koeberg power station on the Western Cape. A 2014 procurement agreement with Russia for 9.6GW of additional capacity was struck down in the courts following sustained challenges from activists, and the issue ultimately contributed significantly to the downfall of the Zuma administration as part of the 'state capture' scandal. As of summer 2021, new nuclear power remains on the agenda, with the 2019 Integrated Resource Plan (IRP) having identified the need for a further 2.5GW nuclear build and plans moving ahead to build at least one new plant. The proposal has already been met with stiff resistance. In the eyes of environmental and anti-nuclear activists, any continued role for nuclear energy in South Africa militates directly against accountability and democracy. To cap it all, the nuclear weapons programme was never investigated by the Truth and Reconciliation Commissions (TRC), and decades-old legal restrictions have

[652] Abraham, ''Who's Next?'

prevented a full historical accounting of it. In short, a complicated apartheid legacy lives on through South Africa's nuclear infrastructure, having been only partly domesticated by the ANC government.

South Africa's nuclear diplomacy in international fora, however, contrasts strikingly with the mistrust and opacity surrounding its nuclear dealings at home. At the 1995 Review Conference South Africa embarked on a new chapter of activism in foreign policy, beginning its process of integration into the global nuclear order as a progressive and reformist advocate of non-proliferation and multilateral disarmament. After playing an important role in ensuring the indefinite extension of the NPT with minimal conditions, Pretoria became one of the first governments to accept an IAEA 'Additional Protocol' agreement, opening up its nuclear facilities to a greater degree of inspection and safeguarding than legally required. It was also instrumental in the realization of the African Nuclear Weapon-Free Zone (NFWZ), a goal long envisioned by the OAU but one which required South African assent to be a workable instrument. The NFWZ was formally instituted by the Pelindaba Treaty, and South Africa hosts the Secretariat of the African Commission on Nuclear Energy established by the agreement. South Africa retains seats on the Zangger Committee and Nuclear Suppliers' Group and resumed its prestigious seat on the IAEA Board of Governors in 1995. Much more prominent in recent years, however, has been South Africa's support for nuclear disarmament. Despite having itself disarmed unilaterally, South Africa is firmly committed to multilateral disarmament efforts within the broad framework of the NPT. Since 2012, Pretoria has been a key representative of countries supporting the Humanitarian Initiative on nuclear weapons, advocating for the elimination of nuclear weapons as a necessary condition for the protection of fundamental human rights. This advocacy further coalesced into official support for the Treaty on the Prohibition of Nuclear Weapons (TPNW), which South Africa signed in 2017. Although the TPNW is designed to work within and alongside the NPT and does not supersede it, it nevertheless represents something of a radical departure from the orthodox view, promoted by the NWS, that the NPT alone is a sufficient disarmament treaty. In short, Pretoria has aimed to embody the ideals of transparency and trust on the global nuclear stage, in line with its strategy of 'niche diplomacy' on non-proliferation and disarmament.[653]

To the casual observer, there might seem to be a disconnect between these 'local' and 'global' aspects of South African nuclear policy. The ANC government is meticulously transparent and progressive in its international nuclear dealings, but its nuclear policy at home is marked by scandal, secrecy, and suspicion. Conventional wisdom might explain this by pointing out that 'local' nuclear

[653] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'.

decisions and 'global' nuclear diplomacy are simply separate areas of policy: there is no obvious connection between activist campaigns over Koeberg's safety record, for instance, and an international ban on nuclear weapons. However, as we have seen time and again throughout this thesis, nuclear matters are never so clear-cut. The 'local' and 'global' bleed into each other in the same way as the 'civil' and the 'military'. As discussed in the preceding chapter, South Africa's accession to the global nuclear order permitted the partial reconstruction of the boundary between these seemingly dichotomous poles, allowing the ANC to 'outsource' tricky questions of weapons and proliferation to the institutions of global nuclear order, clearing the way to pursue its domestic nuclear ambitions safe in the knowledge that these lines would never be crossed. Nonetheless, the nuclear technopolitics that inform domestic decisions on nuclear energy procurement are constituted equally by contact with the global nuclear order as well as local dynamics, while South Africa's interventions in multilateral non-proliferation fora are not merely questions of statecraft, but also responses to domestic imperatives. This divide between 'local' and 'global', while artificially constructed and policed through the NPT and similar instruments, has concrete political effects.

The central question addressed in this chapter is therefore as follows: how has the 'local/global' divide in nuclear politics shaped South Africa's post-apartheid nuclearity? The simple answer is that it has permitted the pursuit of distinctly different nuclearities, at home and abroad respectively. The complicating factor is that these nuclearities are largely contradictory, and coexist uneasily within South Africa. Conventional ontologies of nuclear politics have tended, implicitly at least, to silo 'global' nuclear (weapons) diplomacy and 'local' nuclear technopolitics away from each other at distinct 'levels' of activity.[654] For example, large swathes of Africa are assumed to be 'non-nuclear' whilst being deeply implicated in a range of nuclear activities, and states are generally assumed only to 'become nuclear' with the successful detonation of a nuclear weapon.[655] Under this ontology, which undergirds the function of global nuclear order, there is no reason to expect friction between South Africa's different spheres of nuclear activity. South Africa as an NPT-compliant state can develop its nuclear industry in line with non-proliferation obligations, while working towards gradual, multilateral disarmament in international fora. Of course, the reality is far messier, and despite its lauded non-proliferation activism South Africa does not escape these complications. South Africa's struggles with 'how to be nuclear' after apartheid can be understood through the prism of the 'local-global' divide that is assumed and reified through the structures of the global nuclear order. There is of course no such divide in concrete ontological terms: it is continually

[654] Onuf, 'Levels'.
[655] Hecht, *Being Nuclear*; Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1'.

reinforced and policed by non-proliferation policy and practice, and by the treatment of international nuclear diplomacy as separate from domestic nuclear technopolitics. However, this fiction manifests in and is perpetuated through real-world practices, and as such has material and political ramifications.

Straddling the divide: competing post-apartheid nuclearities

When South Africa acceded to the global nuclear order between 1989 and 1995, it did so with one foot in each of what would become, respectively, its 'conventional' and 'activist' nuclearities. The terms under which Pretoria became a participant in the global nuclear order and, more importantly, garnered a high level of importance within it, were not fully compatible or coherent. This left the ANC with a knot of complex challenges to untangle. On one hand, South Africa brought tremendous political and ideological heft into the very heart of the global nuclear order by virtue of having overcome both apartheid and its nuclear weapons. It resumed its previous position of status and privilege within the IAEA and the various multilateral organs of nuclear order, imbuing them with legitimacy and moral authority on the basis of its twin struggle for disarmament and liberal democracy. However, on the other hand, in order to meet the requirements of these very same offices and to remain relevant in an evolving nuclear order, Pretoria was encouraged to maintain the assets which put it there in the first place: the technologically advanced, national nuclear complex constructed by the apartheid regime. There are different potential modes of nuclearity—including complete renunciation[656]—by which a state can stake its claim in within the nuclear order, but South Africa's fundamental claim to authority has always been its advancement in nuclear technology relative to the rest of Africa.[657] For the incoming administration, this remained the path of least resistance to continued nuclear relevance and authority, and the ANC ultimately chose to follow it.

Pretoria adopted a conspicuously activist approach to nuclear diplomacy after apartheid, but this approach remained backed by a complex and advanced nuclear infrastructure. Successive ANC governments, reluctant to dismantle South Africa's nuclear industry and thus surrender this important source of authority, have therefore worked hard to reconcile their outwardly anti-nuclear, pro-disarmament progressive diplomacy with the incentive to retain a high level of domestic nuclear prowess. South Africa has continued to protect its official brand of nuclearity, but its reputation as a progressive force in world nuclear politics is equally contingent on the performance of an anti-nuclear radicalism which has largely been abandoned by the ANC and continues to live on mostly

[656] See for example Felt, 'Keeping Technologies out: Sociotechnical Imaginaries and the Formation of Austria's Technopolitical Identity'.
[657] Hecht, 'Negotiating Global Nuclearities'.

among domestic anti-nuclear and environmental activists. South Africa may now be a liberal-democratic 'rainbow nation', but it has not finished wrestling with the nuclear legacy of apartheid. This, I argue, is the fundamental source of the conflicts detailed in this chapter. To paraphrase Hecht, South Africa is struggling with how to be nuclear, and how nuclear to be.[658] No easy solution is forthcoming, and the conflicts between the competing forms of nuclearity continue to play out in different spheres. So far, the winning side in this struggle between nuclearities is that which demands further nuclear development at home and deep imbrication with the global nuclear order elsewhere.

In order to demonstrate the effects of this artificial division in empirical terms, it is helpful to return to Hecht's notion of 'nuclearity' and, indeed, plural 'nuclearities'. As discussed at length in Chapter 2, which addressed apartheid South Africa's role in defining the boundaries of a 'global' nuclearity through the foundation of the IAEA, nuclearity— 'the degree to which a nation, a program, a policy, a technology, or even a material count[s] as nuclear' is 'not an on-off condition'.[659] Rather, it is a spectrum, and since the 1960s the IAEA and associated institutions of nuclear order have worked at defining what makes a country 'more' or 'less' nuclear.[660] As I have discussed, the dominant standards of internationally-recognized nuclearity—that which is recognized by, for instance, a seat on the IAEA Board of Governors—are defined by a focus on technological 'advancement' in the nuclear field (which, thanks to the efforts of South African diplomats, also extends to the production of nuclear source materials). The very 'most' nuclear of all, the NWS recognized by the NPT, are afforded the special privilege of being permitted to maintain arsenals of nuclear weapons. As Hecht has explored elsewhere, the 'least' nuclear barely register on this 'cosmogram' of nuclearity, despite the fact that they are very often deeply imbricated within the global nuclear complex and vital to the enhanced nuclearities of the most 'advanced' states.[661] Abraham follows Hecht in deconstructing this 'nuclear exceptionalism', which marks out 'advanced' states as extraordinary and separate from the rest of the 'non-nuclear' world, and locates alternative nuclearities in the Philippines and Thailand. '[A]lthough neither country has a functioning nuclear power reactor nor shows any desire to build nuclear weapons', he argues, alternative nuclearities can be located 'in a context absent nuclear power reactors and nuclear bombs'; specifically, in governments' attempts to construct nuclear power programmes and the popular opposition to them.[662] Philippine 'disguised nuclearity'

[658] Hecht, *Being Nuclear*.
[659] Hecht, 'Negotiating Global Nuclearities', 26.
[660] See Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1'.
[661] Hecht, 'A Cosmogram for Nuclear Things'; Hecht, *Being Nuclear*.
[662] Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1', 25.

and Thai 'naïve nuclearity' are also profoundly 'local' in form; as Abraham explains, 'half a century of nuclear non-history in Thailand cannot be understood without understanding the country's deep political divisions'.[663]

The above understanding of nuclearity and the possibility of alternative modes of being nuclear can help to make sense of South Africa's own competing nuclearities. Pretoria's 'official' nuclearity, as I demonstrate below, is a conventional one which hews very closely to the standard criteria of technological 'advancement' as enshrined within the statute of the IAEA and which is constitutive of the hierarchies in the global nuclear order. While South Africa often takes an activist or even dissenting stance in certain diplomatic settings, and is a strong advocate of multilateral disarmament, the ANC chooses to 'be nuclear' on the global stage primarily by exploiting and building upon the legacy of the apartheid nuclear programme: a highly *conventional* official nuclearity. The leftover nuclear infrastructure, technology, and expertise has enabled Pretoria to continue claiming a high level of technological advancement *vis-à-vis* the rest of the continent, and thus to maintain its privileged position within the many institutions of global nuclear order. For instance, the Pebble Bed Modular Reactor (PBMR) project has served as a vessel for the continuation of the sublimated 'techno-nationalist' impulses fostered within the apartheid nuclear weapons programme, which the ANC was able (briefly) to turn to its advantage and rearticulate as a bid to be a nuclear technology 'pioneer'.

However, what helps to set Pretoria apart from other so-called middle power states in world nuclear politics is the way in which it further enhances its conventional nuclearity with a characteristically activist approach to non-proliferation, disarmament, and nuclear order in general. The scope for the pursuit of an independent technopolitics through the domestic nuclear programme is of course greatly diminished by South Africa's diligent adherence to the NPT and its Additional Protocol arrangement with the IAEA, but as we will discuss, demonstrations of non-aligned solidarity and dissent against the inequities of nuclear order are an important element of Pretoria's nuclear diplomacy.[664] These have taken the form of more technical interventions to assure fellow non-aligned states access to peaceful nuclear development, and grand symbolic moves such as advocacy for the Humanitarian Initiative and TPNW. Meanwhile, the HEU stockpile at Pelindaba has proven extremely useful for the ANC as a prop for the performance of non-aligned nuclear independence

[663] Abraham, 'What (Really) Makes a Country Nuclear? Insights from Nonnuclear Southeast Asia: Critical Studies on Security: Vol 4, No 1', 38.
[664] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*; Pretorius, 'Nuclear Politics of Denial: South Africa and the Additional Protocol'; Onderco, 'A Battle of Principles'.

and to assert its right to hold weapons-grade nuclear material, while its international commitments rule this kind of action out in essentially all other areas.

The potency of these performances is blunted, however, by Pretoria's crucial role in shoring up the status quo of the global nuclear order since 1995. South Africa's official nuclearity depends on maintaining a certain level of cachet within the global nuclear order, based on these conventionally accepted metrics of nuclear advancement. The disproportionate weight afforded to its activist interventions in non-proliferation and disarmament spheres is, ironically, derived from this inherited, enhanced nuclearity. On the other side of the divide to this South Africa's conventional nuclearity, permitted and encouraged by the global nuclear order, is a somewhat messier and weaker 'activist' nuclearity. Following both Hecht and Abraham, we can often locate this form of nuclearity in 'non-nuclear' or anti-nuclear settings.

The preceding chapter discussed how the NPT permits the outsourcing of thorny nuclear issues to the global level, in theory leaving governments to freely go about their internationally approved domestic nuclear policy—but in South Africa, the success of this outsourcing has been only partial, largely due to the country's specific history and prior nuclear experiences. The simple fact that South Africa's domestic nuclear activities do not constitute 'proliferation', and therefore have the blessing of the institutions of nuclear order, has not eliminated domestic controversy and struggle over how nuclear South Africa should be. Despite the superficially activist element to South Africa's conventional, official nuclearity, the ANC government has for more than two decades been locked in conflict with many anti-nuclear and environmentalist NGOs which formerly constituted a core element of its base, fighting alongside it in the liberation struggle. The former resistance fighters have had some success in transplanting the legacy of the anti-apartheid movement into the halls of the global nuclear order, but in doing so have left behind many of their former comrades who remain opposed to any rehabilitation of apartheid-era nuclearity.

South Africa's anti-nuclear movement, by contrast, offers up the proposition of an entirely different nuclearity: through the renunciation of nuclear technology altogether. This uniquely South African brand of anti-nuclearism is intertwined with a number of local dynamics, most obviously the experience of apartheid and the legacy of the liberation struggle. NGOs like Earthlife Africa have effectively mobilized arguments about democracy, human rights, and expunging the authoritarian legacy of apartheid through the movement for 'environmental justice'. In doing so, they reject wholesale Pretoria's conventional mode of nuclearity. Interestingly, the anti-nuclear movement recognizes, in a way that official nuclear discourse cannot, the porosity of the discursive boundary between 'local' and 'global' nuclear politics. This activist nuclearity at home, despite shared origins

with the ANC government, is in conflict with Pretoria's deliberate activism in its global nuclear diplomacy. There is little prospect of South Africa ever fully reckoning with its difficult nuclear legacies in the way that activists demand, since its deep level of imbrication with the global nuclear order—including even its involvement with outwardly radical disarmament initiatives—keeps Pretoria committed to nuclear technology at home. It also helps to ensure that the dominant power structures of the global nuclear order will be preserved into the future.

The rest of the chapter proceeds by examining South Africa's post-apartheid nuclear politics in terms of these oppositions: the divergent nuclearities pursued at home and abroad, which have been enabled by the assumed neat divide between 'local' and 'global' nuclear politics. Through this analysis, I demonstrate that South Africa's accession to the NPT and the wider global nuclear order during the 1990s has permitted the pursuit of different faces of nuclearity at home and abroad. The resulting contradictions have manifested in many of the controversies around nuclear technology that South Africa continues to experience, up to and including the ongoing 'state capture' scandal and the perennial wrangling over expanding its nuclear power generation capacity.

Rehabilitating apartheid technology and 'conventional' nuclearity in the global nuclear order

Both the PBMR project and the potential for nuclear power expansion—including the resumption of the fuel cycle—seemed to promise a potential shot in the arm for South Africa's official nuclearity after 1994. Although the ANC had promised its activist base (much of which was strongly anti-nuclear or environmentalist in orientation) a full review of the country's nuclear infrastructure, Pretoria's standing within the global nuclear order was still contingent on adhering to the mode of nuclearity established by the previous regime. Despite its disarmament and the ANC's heritage of radicalism, it is evident from the proceedings of *The Nuclear Debate* that the incoming government had no intention of casting off entirely the yoke of nuclear technology. Understandably, the government opted not to complete its dramatic nuclear *volte-face* by eschewing altogether nuclear technology, and perhaps instead claiming influence via a radical 'non-nuclearity'.[665] This would, after all, entail dismantling a strategic infrastructure into which billions of rand had been invested at the

[665] Though studies of Austria's claims to influential 'non-nuclearity' are lacking, the country provides an instructive example of how the rejection of nuclear technology can translate to a certain form of 'nuclearity'. This chimes well with Abraham's aforementioned analysis of Taiwain and the Philippines. Though Austria banned nuclear energy in 1978, it has continued to host the IAEA headquarters in Vienna and has been a driving force in the Humanitarian Initiative and Ban Treaty movements. Its 'non'-nuclearity appears to have been a key asset in cultivating this unique global status. Felt, 'Keeping Technologies out: Sociotechnical Imaginaries and the Formation of Austria's Technopolitical Identity'; Klaus Renoldner, 'Austria and Its Efforts towards the Prohibition of Nuclear Weapons', *Medicine, Conflict and Survival* 34, no. 4 (2018): 258–62.

expense of South Africa's oppressed majority, and the ANC urgently needed to divert all available resources to economic and social development. Instead, chose to pursue its advanced nuclearity through the same channels as the National Party had done—though, crucially, without the nuclear weapons. As Marquard notes, 'the nuclear establishment [was] very careful to position itself as an irreplaceable asset' from a science and technology, rather than an energy perspective, focusing on technological innovation and advancement as a goal rather than energy production.[666] This reorientation took place just as South Africa resumed its role in the world nuclear complex, 'a source of significant international prestige'.[667] A 1994 statement from IAEA Secretary General Hans Blix is illustrative of these shifts. On accepting the famous miniature stature of a ploughshare created out of materials from South Africa's dismantled nuclear weapons and presented to the IAEA as a gift, Blix noted that the piece was:

> symbolic, above all of the way in which weapons of war can be transformed into the tools of peace […] At the same time South Africa will have the capacity substantially to contribute to further uses of nuclear energy on the African continent.[668]

The IAEA's foundational image of 'swords into ploughshares' provided Pretoria with a means to sublate the official nuclearity of apartheid into one of its own—which conformed to the ideals of liberal multilateralism and progressive incrementalism enshrined within the global nuclear order[669]—while giving up the minimum of its technological capabilities. With the nuclear arsenal dismantled and all relevant facilities submitted, often voluntarily, to IAEA inspection, the military origins of projects like the PBMR were not a problem: indeed, this approach was entirely consistent with the 'conversion' agenda demanded by many activists, who wanted apartheid's strategic resources diverted to 'socially useful' ends.[670] In this regard, the path remained clear for Pretoria to pursue its official nuclearity according to the standards set by Donald Bell Sole and his colleagues in the early 1960s.

Indeed, through its intervention at the 1995 RevCon, Pretoria doubled down on this path of nuclear development as a means to maintain its prestige. By insisting on guaranteed access to nuclear technology for peaceful purposes as one of its key 'principles' to be upheld in return for NAM

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[666] Marquard, 'The Origins and Development of South African Energy Policy', 243.
[667] Marquard, 'The Origins and Development of South African Energy Policy', 243.
[668] Hans Blix, 'Director General's Statement on the Occasion of the Presentation by the Minister of Foreign Affairs of South Africa', IAEA, 7 April 1994, https://www.iaea.org/newscenter/statements/director-generals-statement-occasion-presentation-minister-foreign-affairs-south-africa.
[669] Walker, 'Nuclear Enlightenment and Counter-Enlightenment'.
[670] Though, of course, these activists opposed the PBMR on different grounds, addressed below. Fig, 'Apartheid's Nuclear Arsenal: Deviation from Development'.

support for the indefinite extension of the NPT,[671] the South African delegation upheld peaceful nuclear development as a core expression of non-aligned independence and solidarity in the context of a unipolar nuclear order. It has further continued to do so.[672] This has helped Pretoria to reconfigure significant components of the old apartheid technopolitical regime into assets for its own official nuclearity.

There is an ironic quality to this. Apartheid-era diplomats presciently codified a particular form of nuclear 'advancement' within the IAEA Statute in order to maintain South Africa's privileged nuclear status, foreseeing the eventuality that Pretoria would eventually be side-lined in most other international fora.[673] In other words, advanced nuclearity would ensure continued apartheid representation on the global stage. They perhaps did not anticipate the eventual fall of the regime. Three decades later, their ANC successors reaffirmed the fundamental value of technological advancement in nuclearity, but claimed its mantle for non-alignment and postcolonial liberation. In this way, the remnants of the apartheid weapons programme (both the physical inheritance and expertise but also the technopolitical commitment to 'indigenous' and 'pioneering' technology development) were reconfigured, via the global nuclear order, to fit the ANC's new official nuclearity. The new South Africa has also found itself conforming to standards that the apartheid regime helped to set. in this way, Pretoria's apartheid-era diplomats were perhaps more successful than they could have hoped in ensuring continued representation for the apartheid regime within the global nuclear order.

The PBMR and South Africa's official nuclearity

The PBMR project thrived during the period of uncertainty for the nuclear industry immediately after the 1994 elections. A policy and institutional vacuum surrounded the nuclear industry,[674] while the presence of the National Party in the GNU—including Pik Botha as the Minister for Minerals and Energy—prevented (or perhaps saved) the ANC from following up on the vague recommendations that emerged from the Cape Town conference. While the government shied away from examining the nuclear industry as stringently as it had promised, the PBMR project steadily developed. Eskom had obtained a design for the PBMR in 1993, and was able to continue with its work throughout the

[671] Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension'.
[672] Pretorius, 'Nuclear Politics of Denial: South Africa and the Additional Protocol'; Onderco, 'A Battle of Principles'.
[673] Donald B. Sole, 'Great Expectations: A Diplomat's Recollections of the Birth and 15 Early Years of the IAEA', in *International Atomic Energy Agency: Personal Reflections* (Vienna: IAEA, 1997), 15–26; Hecht, 'Negotiating Global Nuclearities'.
[674] See Marquard, 'The Origins and Development of South African Energy Policy'.

transition to democracy. PBMR (Pty) Ltd was set up by Eskom in 1999.[675] Led by a former engineer from the apartheid-era nuclear programme, Professor Johan Slabber, the PBMR company employed many personnel who had previously been involved in related AEC or Armscor work. Opponents of the project have also pointed out the PBMR's military links: Slabber, while employed during the late 1980s with Pretoria's Integrated Systems Technology Holdings (IST), persuaded Armscor to contract IST to investigate a nuclear propulsion system for proposed South African submarines.[676] The submarine programme was soon cancelled, but IST developed the technology to a sufficient extent that it was able to propose development of a PBMR to Eskom.[677] Eskom contracted IST to develop the PBMR before it formed PBMR (Pty) Ltd. Long-time anti-nuclear activist Mike Kantey is keen to highlight this 'unbroken thread' between apartheid-era military ambitions and the PBMR.[678] The PBMR is therefore significant as arguably the most direct descendent of the apartheid bomb programme and apartheid's militaristic technopolitics aside from the HEU stockpile, which is dealt with below and has not been further enlarged by the ANC. In contrast, the ANC supported the PBMR until 2009. Until it was mothballed, the project seemed to offer a promising means of protecting South Africa's global nuclear status for the foreseeable future.

The PBMR is based on a design of high-temperature gas-cooled reactor, first developed in West Germany from the 1950s to the 1980s. The 'pebbles' for which it is named are billiard ball-sized spheres of graphite, weighing approximately 200g each and containing uranium enriched to 8%. A typical PBMR reactor will contain 330,000 of these spheres, and another 110,000 which do not contain uranium and serve to moderate the reaction. In 2002, it was estimated by PBMR (Pty) that one such 'module' could produce 120MW at US $1000 per kilowatt - $100 per kilowatt cheaper than a new-build coal-fired power station.[679] Engineers who had formerly worked on the weapons programme and fuel cycle saw the future in a smaller modular design than the pressurised-water reactors (PWRs) of the type which fuelled Koeberg. The PBMR would be easily exportable, cheap to produce, and supposedly inherently safe, as it would be built in such a way as to preclude the possibility of a catastrophic failure or meltdown. They also wagered—correctly, at first—that the South African state, in a period of transition and upheaval, would be unwilling to spend significant sums on new PWRs given several more pressing developmental and economic priorities.[680] A test-

[675] Steve Thomas, 'The Demise of the Pebble Bed Modular Reactor', Bulletin of the Atomic Scientists, 22 June 2009, https://thebulletin.org/2009/06/the-demise-of-the-pebble-bed-modular-reactor/.
[676] PBMR Ltd, 'PBMR Chronology', No date, http://www.pbmr.co.za/contenthtml/files/File/Chronoloy.pdf.
[677] David Fig, 'Nuclear Energy Rethink? The Rise and Demise of South Africa's Pebble Bed Modular Reactor', ISS Papers (Pretoria: Institute for Security Studies, 2010), 14.
[678] Kantey, Video interview.
[679] D.R. Nicholls, 'Commentary: The Pebble Bed Modular Reactor', *South African Journal of Science*, no. 98 (February 2002): 31–35.
[680] Fig, 'Nuclear Energy Rethink? The Rise and Demise of South Africa's Pebble Bed Modular Reactor'.

scale reactor was slated for construction at the existing Koeberg site, alongside a fuel plant at Pelindaba which would manufacture the pebbles. The target date for the commissioning of the test reactor was 2018, and it was expected to produce 200MW of power.[681]

However, targets and deadlines were repeatedly pushed back as the PBMR company failed to secure export contracts. A flagship agreement to participate in new nuclear builds in the US as part of a consortium led by Westinghouse fell through, and in 2010 the project was mothballed by the state. PBMR entered a state of 'care and maintenance', retaining only a skeleton workforce to protect its intellectual property, having previously employed up to 700 staff and 600 contractors.[682] Over 80% of its funding had been awarded by Eskom; this amounted to as much as R9 billion, or US $1.23 billion (at 2010 rates) of public money.[683] The PBMR company estimated at the time that it required another R30 billion in funding. It also should be noted that the aforementioned domestic policy vacuum allowed the PBMR to emerge as a vehicle for both groups' technopolitical hopes: the PBMR had been in development since the de Klerk administration, and Eskom did not take full control of the project until 1999.[684] By this time, the institutional terrain had evolved in such a way as to be favourable to the PBMR, whose target of commercial spin-off was compatible with the aims of commercialization and diversification outlined in the AEC's (later Necsa) '2000 Plus' strategy.[685] However, although the policy environment was reasonably favourable to commercially viable nuclear development, the South African state no longer had the resources or political ability to continually to pour money into a risky, strategic infrastructure project that showed little sign of generating profit. Beset by 'fundamental' design problems and a gung-ho strategy that banked on building a commercial-sized reactor without first operating a prototype, the project ultimately proved to be unviable.[686] Such a gargantuan project was simply beyond the reach of the post-apartheid South African state, which no longer operated according to what Andre Buys called the 'unity of vision' (i.e., a willingness to spend unlimited amounts of money on developing strategic

[681] Jacqueline Holman, 'PBMR Modifies the Design for Koeberg Demo Power Plant', Engineering News, 7 August 2009, http://www.engineeringnews.co.za/article/the-pbmr-modifies-design-planned-for-koeberg-demo-plant-2009-08-07/rep_id:4136.
[682] NEI, 'Second Thoughts on South Africa's Pebble-Bed Reactor'', Nuclear Engineering International, 2 April 2017, https://www.neimagazine.com/news/newssecond-thoughts-on-south-africas-pebble-bed-reactor-5776340.
[683] WISE Amsterdam, 'The End Is near for the PBMR', World Information Service on Energy, 20 August 2010, https://www.wiseinternational.org/nuclear-monitor/714/end-near-pbmr.
[684] Fig, 'Nuclear Energy Rethink? The Rise and Demise of South Africa's Pebble Bed Modular Reactor', 15.
[685] see Stumpf, 'The Creation of National Wealth through Technology: The Atomic Energy Corporation's 2000 Plus Plan'.
[686] Thomas, 'The Demise of the Pebble Bed Modular Reactor'.

nuclear assets) possessed by the previous regime.[687] The PBMR ultimately proved to be an anachronistic relic, unsuited to post-apartheid South African priorities.

This extravagant use of state funds to pay for an untested and highly controversial technology naturally drew a great deal of criticism from the anti-nuclear and environmental lobbies, who had some success in delaying the project through legal challenges before it was halted indefinitely.[688] Earthlife Africa, South Africa's foremost environmental NGO, seized upon the lack of transparency surrounding both the financial cost and safety of the PBMR.[689] To activists, it was increasingly evident that the ANC was abandoning any pretensions to the openness and public accountability it had promised in 1994. David Fig, a seasoned anti-apartheid activist and nuclear analyst, has also pointed out the colonial dynamics of the PBMR saga. The technology was licensed from Germany—which was unable to achieve commercial viability and itself mothballed the project—by South Africa as well as China, and although South Africa paid for and conducted the research itself, it was still obliged to pay royalties to the German patent holders.[690]

Despite the apparently inequitable nature of this relationship, the PBMR has itself been characterized as a response to a condition of 'technological colonialism' and as a vehicle for South Africa to establish itself within the global nuclear complex as a serious commercial force. Gideon de Wet, a South African engineering professor who provides the foreword to one of the two first-hand memoirs recounting the nuclear weapons programme,[691] characterizes South Africa as a 'technology colony'. In his analysis, a technology colony is marked by low levels of research and development (R&D) activity, and activity is concentrated at the 'manufacture and "trade-in final products" end of the product life cycle'.[692] A technology colony may export significant amounts of raw resources, such as uranium, but it does not export advanced technology. Instead, it imports and manufactures such technology under licence from overseas sources. It is evident that de Wet, along with the authors of the memoir, considered it a necessary asset to elevate South Africa from its 'technology colony' status; disarmament and accession to the global nuclear order were 'a meek and tragic submission to the major powers' which needlessly wasted some of South Africa's most important strategic assets.[693] Successful development of the PBMR would, according to its proponents, establish South

[687] Buys, Personal interview in Pretoria.
[688] Carl Death, 'Resisting (Nuclear) Power? Environmental Regulation in South Africa', *Review of African Political Economy* 33, no. 109 (1 September 2006): 407–24.
[689] ENS Newswire, 'Earthlife Africa Sues for Public Power Giant's Nuclear Plans', Environmental News Service, 4 July 2005, https://www.ens-newswire.com/ens/jul2005/2005-07-04-03.asp.
[690] Fig, 'A Price Too High: Nuclear Energy in South Africa', 191.
[691] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*.
[692] de Wet, 'Emerging from the Technology Colony', 2.
[693] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, xx.

Africa as a pioneering force in the global small modular reactor (SMR) industry, going a considerable way towards alleviating this condition.[694] At the dawn of the 1990s—when Pretoria was beginning to wind down its strategic nuclear and fuel cycle activities—South Africa appeared to be well-placed to capitalize on the potential of the PBMR, and thus to channel its accumulated nuclear engineering expertise into becoming an important global player in civilian nuclear technology.[695]

The spectre of 'techno-nationalism' has often been invoked to explain both the motivations of the ANC government in pursuing the PBMR project so doggedly, and the ideological drive of the former apartheid-era engineers who hoped to continue their work. In the context of the South African nuclear terrain, few have attempted to develop the concept of techno-nationalism in detail, although Dubow has gone into great depth in his examination of the relationship between science, technology, and South Africanism more broadly—including with regard to the apartheid nuclear programme.[696] Analysts and activists alike have accordingly pointed out the continuities between the Afrikaner nationalism of the weapons programme and the 'techno-nationalism' of the PBMR programme.[697] An interview with Johan Slabber, Chief Technological Officer of PBMR (Pty) alongside van der Walt et al.'s memoir on the weapons programme, corroborates this argument—although neither appear to be motivated by Afrikaner-nationalist or pro-apartheid sentiments. Rather, although still very much in keeping with the attitude to science, technology and the nation detailed by Dubow, ex-weapons programme personnel express a more benign form of civic techno-nationalism: celebrating ingenuity against the odds, patriotism, and a 'job well done',[698] while mourning the demise of an indigenous South African technology base and the squandering of important national assets which, they argue, could have played a vital role in South Africa's economic and social development after apartheid.[699]

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[694] Johan Slabber, Personal interview in Pretoria, interview by Tom Vaughan (21 October 2019).
[695] Of course, it is also important to note that, alongside these more idealistic motivations, the career prospects of South Africa's many under-employed nuclear engineers and the continued relevance of its nuclear industry also rested largely on the success of the PBMR. An analysis by the former head of Armscor's planning department, Andre Buys, indicated that around 75% of former nuclear weapons programme employees would eventually go on to jobs that were only 'somewhat related' or unrelated to their prior experience. See Buys, 'Proliferation Risk Assessment of Former Nuclear Explosives/Weapons Program Personnel: The South African Case Study', 39.
[696] Dubow, *A Commonwealth of Knowledge: Science, Sensibility, and White South Africa*.
[697] Britta Rennkamp and Stefan Kuhlmann, 'Endogenous vs. Exogenous Models for Innovation Policy in Late Industrialising Countries', in *Proceedings* (World Conclave of Scientists on Regional Co-operation in Science and Technology: Opportunities and Challenges in the Context of Globalization, New Delhi: Zaheer Science Foundation, 2012), 419–46; M.V. Ramana and Z. Mian, 'One Size Doesn't Fit All: Social Priorities and Technical Conflicts for Small Modular Reactors', *Energy Research & Social Science* 2 (2014): 115–24.
[698] van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*, 119.
[699] Slabber, Personal interview in Pretoria.

Complicating this account is the fact that the ANC and its officials are also often accused of techno-nationalism in their support for the PBMR. During the initial challenge against the PBMR, the late veteran Earthlife activist Muna Lakhani lamented that 'we cannot understand why our government wants to support this, other than some sort of ego trip to show that Africa is capable of hi-tech stuff'.[700] Similarly, Fig points to former Necsa CEO Rob Adam's view that '[n]uclear technology and expertise are essential for any country that is serious about its position in the world' as an indicator of a techno-nationalist current within the ANC, and worries that it 'elides into demands for enrichment, and ultimately via the same logic for weapons proliferation'.[701] Fellow anti-apartheid and anti-nuclear activist Mike Kantey recounted that techno-nationalism was prevalent within the liberation movement during the 1990s, particularly within the South African Communist Party—which forms part of the governing Tripartite Alliance alongside the ANC—where a democratic South African nuclear industry was viewed as a national prestige project: 'like an airline'.[702]

While 'techno-nationalism' provides a tidy heuristic device for understanding why the ANC spent so much financial and political capital on the PBMR, it is too vague to be a useful analytical term. The following from David Fig demonstrates the problem: 'Satisfying the narrow technological nationalism of *a few scientists and politicians* is not the way to meet South Africa's energy planning needs'.[703] On this account, the techno-nationalism motivating the country's senior nuclear engineers—the vast majority of whom cut their teeth in the apartheid weapons programme—and that which animates the ANC's nuclear policy are assumed to be one and the same. As the preceding chapters demonstrate, this is not the case: rather than being united under the banner of a singular techno-nationalism, apartheid-era nuclear engineers and anti-apartheid liberation fighters were motivated by two distinct technopolitical regimes—both of which entailed equally distinct articulations of nuclearity and nationhood. In much the same way as EDF and the CEA in Hecht's landmark study advanced specific visions of French nationhood through their nuclear technopolitics ('nationalised' vs 'nationalist'),[704] the technopolitical regimes of the apartheid nuclear programme and the liberation movement were predicated on completely different visions of South African nationhood and nuclearity. Not only were they rooted in diametrically opposite visions for the future of the

[700] Muna Lakhani, 'Earthlife Africa Needs Our Help To Transform Leftover Apartheid Nuclear Energy Path', 15 April 2001.
[701] Fig, 'A Price Too High: Nuclear Energy in South Africa', 196.
[702] Kantey, Video interview.
[703] Fig, 'Nuclear Energy Rethink? The Rise and Demise of South Africa's Pebble Bed Modular Reactor', 29, emphasis added.
[704] Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II*, 2009.

country, but they posed dramatically different answers to the questions of how South Africa should be nuclear and how nuclear it should be.

However, thanks to the conditions of its accession to the global nuclear order and the incentives this created, the ANC was able to repurpose the PBMR project—and even the technopolitical impulses of those who worked on it—towards its own ends. Accession, in one sense, narrowed the technopolitical options open to both the legacy nuclear establishment and to the ANC. It channelled the many unacceptable elements of their technopolitical impulses into a mostly toothless form of civic techno-nationalism, necessarily restricted and drained of locally/nationally distinct content in order to fit within the rules and standards of behaviour that Pretoria had now agreed to: the anti-technopolitics of global nuclear order. Afrikaner-nationalist displays of technological prowess, mastery over a hostile African continent, and rugged self-sufficiency, expressed through a nuclear weapons programme and an indigenous fuel cycle capability, were not only incompatible with the new national government; they were self-evidently conflictual with the liberal, globalized politics of non-proliferation. Equally, while many aspects of ANC and anti-apartheid liberation technopolitics were compatible with the NPT and the broader standards of behaviour demanded by the global nuclear order, several other aspects were not. Non-aligned-style postures of ambivalence or reticence towards the NPT were mostly off the table: accession meant that those within the ANC who would have preferred to see a democratic South Africa maintain an enrichment or even latent weapons capacity in the name of preserving a new and fragile sovereignty were side-lined.[705] So too was the more mainstream proposition that the NPT was inequitable and unduly restrictive to the development paths of post-colonial and/or Global South countries: while Pretoria has continued to pay lip service to these critiques and make relatively small gestures of non-aligned solidarity, the value of non-proliferation as a concept has never been under serious question. In adopting such an enthusiastic stance towards the NPT and actively helping to consolidate its authority for the foreseeable future, the ANC also forfeited the opportunity to express a dissenting approach to the global nuclear order through an independent national nuclear programme—as pursued for example by Brazil[706]—or even to withhold support from further voluntary non-proliferation measures like the Additional Protocol in an attempt to leverage concessions from the NWS. While the NPT enshrined in theory 'the inalienable right to develop research, production and use of nuclear energy for peaceful purposes without discrimination',[707] the raft of restrictions to which South Africa was now

[705] According to one reliable insider, this viewpoint was not uncommon within the movement, but remains mostly undocumented. Anonymous ANC source, online interview, July 2019.
[706] Dalaqua, '"We Will Not Make the Bomb Because We Do Not Want to Make the Bomb": Understanding the Technopolitical Regime That Drives the Brazilian Nuclear Program'.
[707] United Nations, 'Treaty on the Non-Proliferation of Nuclear Weapons'.

subject provided very few avenues for the expression of a truly independent or non-aligned national nuclear technopolitics. The PBMR was one of the only remaining vehicles for such a project, and as such, found favour with the rump nuclear establishment and the ANC alike. In this sense, while accession to the NPT limited South Africa's technopolitical options in many ways, it broadened them in others: thanks to the outsourcing of nuclear ambivalence, the PBMR could channel these latent technopolitical impulses.

One immediate global imperative which impacted upon the continued development of the PBMR was the containment of South Africa's former nuclear weapons scientists and engineers. In 1994, observers were concerned that apartheid-era personnel should be prevented from seeking to continue their previous exploits elsewhere. David Albright warned at *The Nuclear Debate* that 'the next government has an interest in keeping Advena [the nuclear weapons manufacturing facility] scientists and technicians gainfully employed, or in giving them a "golden handshake" if their services are no longer required'.[708] At the time, the US Department of Energy was actively pursuing the Newly Independent States Industrial Partnering Program (IPP), which aimed at [r]educing incentives for nuclear scientists' from the former Soviet 'successor states' of Russia, Belarus, Kazakhstan, and Ukraine 'to emigrate to countries of proliferation concern'.[709] Through this programme, the DOE funded the development of non-military applications of weapons scientists' skills and expertise. It involved US companies, who shared research and development costs and helped with the commercialization of the technologies. According to the IPP project leader, the US spent $35 million on these activities in the 1994 financial year.[710] Large US firms like General Electric and Westinghouse were an important part of the IPP. No equivalent programme existed (or at least is known to have existed) for South Africa, which was assumed to pose a minor proliferation threat relative to that of the former Soviet states, which greatly worried the US non-proliferation establishment.[711]

Nonetheless, concerns existed and appeared to be borne out in 2004 when three men who had been indirectly involved in the nuclear programme—Gerhard Wisser, Daniel Geiges, and Johan Meyer—were arrested for their alleged involvement in the so-called AQ Khan network of nuclear smugglers. The three men were involved in private business concerns and charged with exporting banned

[708] Albright, 'The Legacy of the South African Nuclear Weapons Program', 152.
[709] US Department of Energy, 'Reducing the Nuclear Danger: Inventory of U.S. Department of Energy Nonproliferation and Nuclear Threat Reduction Initiatives', Federation of the Atomic Scientists, October 1995, https://fas.org/nuke/control/ctr/docs/doeredu.htm.
[710] Hugh Casey, 'The New Independent States Industrial Partnering Program', *Los Alamos Science* 24 (1996): 84–91.
[711] Graham T. Allison et al., 'Avoiding Nuclear Anarchy', *The Washington Quarterly* 20, no. 3 (1 September 1997): 185–98.

components for use in the Libyan nuclear programme.[712] Their company, Krisch Engineering, apparently imported parts for the South African programme during the 1980s.[713] Former Armscor official Andre Buys concluded in a 2007 study that 'the potential proliferation risk posed by South Africa's former NEWP [nuclear explosives/weapons programme] personnel after the termination of the program in 1991 was moderate to high', with a minority of personnel representing a threat mainly due to unemployment and financial hardship after the programme. [714] Nevertheless, the case of Wisser et al. proved to be an isolated incident. While Buys' analysis tells us little about the specific destinations of former nuclear programme employees, he does indicate that a significant majority (62.5%) of those who went on to new jobs found themselves employed in roles that were either 'directly' or 'somewhat related' to their previous experience. Buys indicates that his sample is self-selected and therefore not reliably representative, but his conclusions nonetheless seem to suggest that employment opportunities remained within South Africa; only a small proportion of those surveyed went abroad. At its height, PBMR (Pty) employed a core staff complement of 800 people. We know that a number of high-level engineers and scientists from the weapons programme went on to work on the PBNR, including Slabber, and though little reliable data exists it is reasonable to assume that a fair proportion of the others took the same path. An interview with Renfrew Christie also indicated that many higher-level nuclear bureaucrats and officials benefited from the so-called 'sunset clause', which guaranteed existing public servants a continuing stake in the administration of the new South Africa.[715]

In sum, one urgent condition of South Africa's accession to the global nuclear order was that the new government stem any proliferation risks resulting from the shuttering of the nuclear weapons programme. In addition to the domestic policy vacuum, non-proliferation obligations therefore created an incentive for the ANC to continue funding and permit the continued development of the PBMR—at least in the absence of an overriding policy agenda or strong commitments to an alternative South African nuclear future. The few billion rand invested by the government into the PBMR programme may in some ways have represented rather good value: it drew out the programme for the first 15 years of ANC government, more than likely bringing a significant

[712] Michael Wines, 'South African Is Charged with Making Nuclear Components', New York Times, 4 September 2004, https://www.nytimes.com/2004/09/04/world/africa/south-african-is-charged-with-making-nuclear-components.html; NTI, 'South Africa Asks Nations to Step Up Khan Network Investigation', Nuclear Threat Initiative, 11 September 2007, https://www.nti.org/gsn/article/south-africa-asks-nations-to-step-up-khan-network-investigation/.
[713] Buys, 'Proliferation Risk Assessment of Former Nuclear Explosives/Weapons Program Personnel: The South African Case Study', 12.
[714] Buys, 'Proliferation Risk Assessment of Former Nuclear Explosives/Weapons Program Personnel: The South African Case Study', 49.
[715] Christie, Personal interview in Cape Town.

complement of former weapons scientists to retirement age and at least nominally converting their expertise into civic gains. One important dimension of Pretoria's official nuclearity—as we will discuss with regard to the HEU stockpile—is the proven ability to prevent proliferation and responsibly steward sensitive nuclear assets. In the absence of widespread 'proliferation failures', it is difficult to identify proof, but there is a good chance the PBMR helped to retain otherwise flighty professionals inside South Africa. It likely assisted in bolstering South Africa's credentials as a modern nuclear-capable state, trustworthy and in control of its potentially dangerous nuclear assets.

The PBMR saga thus demonstrates how accession to the global nuclear order amounted to a partial resolution of the conflict between the apartheid and anti-apartheid nuclear technopolitical regimes of the 1970s and 1980s. The rump nuclear establishment and ANC alike were united in the pursuit of their own distinctive national nuclear technopolitics, expressed imperfectly and incompletely through the same flawed technology of the PBMR and together appearing as a deceptively simple 'techno-nationalism'. For the nuclear technicians of the 1980s, it represented a continuation of the most admirable aspects of the weapons programme: no longer an explicit statement in defence of Afrikaner nationalism or white supremacy, but rather a demonstration of indigenous technological prowess, of success against the odds, and of South Africa as a beacon of technological civilization on the African continent.[716] For the ANC, there was a continued incentive for Pretoria to maintain its mantle of an 'advanced' civil nuclear power and the successful development of the PBMR would have contributed significantly to this effort.

In an indication that some political interest in the PBMR remains, Eskom sought to attract investors in a bid to revive and fully commercialize the project in early 2020.[717] This came amid an uptick of global interest in modular reactor technologies, and South Africa's most prominent nuclear power evangelist Kelvin Kemm predicted the technology, once fully realized, would 'unleash a tidal wave of African development'.[718] As of summer 2021, no new investors have been found.

Nuclear energy, the fuel cycle, and South Africa's official nuclearity

Although the PBMR has been both highly controversial and instructive of South Africa's bid to sustain its official nuclearity via the global nuclear order, the primary target for anti-nuclear activists after apartheid has been nuclear energy. To paraphrase a famous pan-African liberation slogan, the

[716] See van der Walt, Steyn, and Loggerenberg, *Armament and Disarmament*; von Wielligh and von Wielligh-Steyn, *The Bomb: South Africa's Nuclear Program*.
[717] WNN, 'Eskom Seeks Interest in PBMR Commercialisation', World Nuclear News, 31 January 2020, https://world-nuclear-news.org/Articles/Eskom-seeks-interest-in-PBMR-commercialisation.
[718] Kelvin Kemm, 'SA's Nuclear Pebble Bed Reactor Could Get Second Chance', fin24, 3 March 2016, https://www.fin24.com/Opinion/sas-nuclear-pebble-bed-reactor-could-get-second-chance-20160303.

struggle is a continuation of one that began under apartheid. Organized opposition to the Koeberg nuclear power plant outside Cape Town has existed since 1983 in the form of Koeberg Alert, one of South Africa's first environmental groups. Koeberg Alert was allied to the broader anti-apartheid movement and groups like the United Democratic Front (UDF) and End Conscription Campaign.[719] Koeberg was also the target of ANC sabotage under apartheid, having been bombed while still under construction in 1982 by umKhonto we Sizwe.[720] The apartheid regime's adoption of nuclear power was a response to mounting international isolation, part of a wider bid for self-sufficiency in energy and industry and to harness South Africa's domestically produced natural resources. Activists, however, noted that it provided a pretext—albeit a thin one—for the domestic enrichment of uranium.[721] Marxian critiques like Renfrew Christie's have skewered the role of nuclear energy and the nuclear industry more widely in shoring up the apartheid regime's power, by making South Africa an important strategic partner and economic resource for the US and NATO during the Cold War.[722] It is clear that by 1994, the issue of nuclear power in South Africa was intertwined with the twin demons of nuclear weapons and apartheid. Keeping Koeberg open—let alone expanding nuclear generating capacity—would be a tough sell to the many radicals, progressives, and environmentalists who had helped to drive the liberation movement.

The Nuclear Debate conference in 1994 heard a variety of views on the appropriate fate for Koeberg, ultimately recommending that the plant should be mothballed and all other nuclear development put on ice pending the results of an inquiry into the costs and benefits of nuclear power.[723] Koeberg was not closed, and as critics have noted, the promised fine-toothed investigation into the future desirability of nuclear power failed to materialize.[724] The conference was followed by years of deafening silence on nuclear policy, during which the remnants of the country's nuclear bureaucracy worked to shore up their positions and advance their remaining modest projects with relatively little government interference. The 1998 White Paper on Energy Policy for the Republic of South Africa made more of the same promises, which also went unfulfilled.[725] As David Fig notes of government nuclear policy in the years since, '[m]uch of the decision-making has been top-down, without any stakeholder participation. What appears to be government policy has bypassed even the policy

[719] Gareth Evans, 'Apartheid's Wars', *IDAF News Notes*, August 1986, 28 edition.
[720] van Wyk, 'Nuclear Terrorism in Africa'.
[721] Fig, *Uranium Road: Questioning South Africa's Nuclear Direction*, 46.
[722] Christie, *Electricity, Industry and Class in South Africa*; Christie, 'Speech to Winelands Mensa'.
[723] ANC/Environmental Monitoring Group, 'Recommendations to the ANC Science & Technology Policy Division Arising from the ANC & Alliance Delegates', 234.
[724] Gottschalk, 'The Politics of Electricity Generation in South Africa'.
[725] DME, 'White Paper Energy Policy for the Republic of South Africa' (Pretoria: Department of Minerals and Energy, December 1998).

formation processes within the ruling ANC'.[726] In the context of the optimism and idealism around the ANC's Science & Technology policy unit during the late 1980s and early 1990s, which envisaged a radically democratic, bottom-up approach to energy policy, this is a striking retreat. The previous chapter discussed how a policy vacuum at the heart of government helped to keep the nuclear industry alive. This section discusses the extended (after)life of nuclear power in South Africa in relation to Pretoria's place in the global nuclear order.

Despite the absence of an explicit policy position, in February 2007 the government announced that Eskom would build a second 'conventional' nuclear power plant—as opposed to one powered by next-generation modular reactor technology like the PBMR—in the Cape Province.[727] At the same time, Necsa CEO Rob Adam expressed an interest in restarting domestic uranium enrichment, anticipating a boom in nuclear energy and a global shortage of nuclear fuel.[728] In October, the ANC government released a draft document for public comment on nuclear strategy. This was, as Greenpeace noted, the first time since it took power in 1994 that the ANC had made a statement of its position on nuclear power.[729] Although the document's tone was cautious, it contained unprecedented expressions of ambition to explore the resumption of nuclear fuel fabrication in South Africa, and opened the door for a future expansion of nuclear generation capacity:

> Government will review and assess the Atomic Energy Corporation's activities and future plans as a basis for decisions on the desirability of its restructuring and further fiscal support for its activities […] The complete nuclear fuel cycle, in particular the issues of spent nuclear fuel, nuclear fuel procurement and radioactive waste management will be investigated by the Department [of Minerals and Energy].[730]

Meanwhile, Eskom continued to fund the PBMR and still aimed to generate electricity in South Africa with PBMR plants. Earthlife Africa, an increasingly influential environmental NGO, joined a rebooted Koeberg Alert in campaigning against further nuclear development and eventually came to the forefront of South Africa's anti-nuclear movement, making successful interventions in the

[726] Fig, 'A Price Too High: Nuclear Energy in South Africa', 190.
[727] WNN, 'South Africa to Build Second Nuclear Plant', World Nuclear News, 12 February 2007, https://www.world-nuclear-news.org/newNuclear/120207-S_Africa_to_build_second_nuclear_plant.shtml.
[728] Mariaan Webb, 'Uranium Enrichment Could Prove Lucrative for SA - Adam', Engineering News, 14 February 2007, https://www.engineeringnews.co.za/print-version/uranium-enrichment-could-prove-lucrative-for-sa-adam-2007-02-14.
[729] Greenpeace, 'The True Cost of Nuclear Power in South Africa' (Johannesburg: Greenpeace Africa, August 2011), 8.
[730] DME, 'Nuclear Energy Policy for the Republic of South Africa' (Pretoria: Department of Minerals and Energy, June 2007), 12.

Environmental Impact Assessment (EIA) process for the PBMR and contributing to public hearings on the impact of the government's new nuclear build plans.[731]

Earthlife have since become the primary civil society actors in opposing the expansion of nuclear technology in South Africa, later winning several crucial legal victories against nuclear power. Their next significant challenge came in the form of the government's 2010 Integrated Resource Plan (IRP). This landmark document finally nailed the ANC's pro-nuclear power colours to the mast. As part of an effort to meet a tighter emissions target, the IRP called for a new nuclear build totalling 9.6GW of generating capacity. This was the equivalent of six new power stations in addition to Koeberg, all of which would be built to an existing pressurised-water reactor design—the type of reactor already in use at Koeberg, the PBMR having finally fallen out of favour. Under this plan, nuclear power would account for 13% of South Africa's energy mix by 2030. The IRP was attacked from several quarters, with environmental groups criticizing its continued reliance on coal as a core part of South Africa's energy mix and an insufficient commitment to increasing renewable generation.[732] The specifics of the nuclear build plan, however, would become the locus of anti-nuclear struggle over the following years. In 2013, an update report on the IRP suggested that the nuclear build plans should be scaled down or shelved in the event that economic growth did not reflect the initial IRP assumptions. Nevertheless, the 2010 IRP remained the basis for policy planning, and in 2013 President Jacob Zuma took over the leadership of the Nuclear Energy Committee (NNEECC). According to energy analysts Rennkamp and Bhuyan, this move 'reflect[ed] the president's growing interest in the nuclear programme'.[733] In 2014, Pretoria signed a memorandum of understanding with Moscow in Vienna that Rosatom, the Russian state nuclear utility, would build up to eight new nuclear reactors in South Africa by 2035, with the first units coming on stream in 2023.[734] The nuclear procurement, as outlined in the 2010 IRP, was eventually authorized in 2015.

In October 2015, Earthlife Africa alongside the South African Faith Communities Environment Institute (SAFCEI) launched a legal bid against several aspects of the government's procurement plan for the 9.6GW build. The case reached the Western Cape High Court in 2017, and the activists won a decisive legal victory. The procurement process, which according to activist Fig 'served special interests and displayed many elements of a democratic deficit', was found to be illegal on several

[731] Death, 'Resisting (Nuclear) Power?'; PMG, 'Nuclear Energy Impact in South Africa: Public Hearings', Parliamentary Monitoring Group, 20 June 2007, https://pmg.org.za/committee-meeting/9013/.
[732] Lucy Baker, 'Governing Electricity in South Africa: Wind, Coal and Power Struggles', The Governance of Clean Development Working Paper Series (University of East Anglia, July 2011).
[733] Rennkamp and Bhuyan, 'The Social Shaping of Nuclear Energy Technology in South Africa', 6.
[734] MG, 'SA, Russia Agree to $50-Billion Nuclear Deal', Mail and Guardian, 23 September 2014, https://mg.co.za/article/2014-09-23-sa-russia-agree-to-50-billion-nuclear-deal/.

counts.[735] The procurement did not follow due process and responsibility for it was transferred to Eskom in an illegal manner. It was 'rubber stamped' without the requisite public participation, and memoranda of understanding—with the US, South Korea, and most controversially Russia—were judged illegal having bypassed parliament.[736] This was not the end of controversy around the nuclear plan, however. A scandal over 'state capture' had been brewing since 2016, when inappropriate links were alleged between Zuma and the wealthy Gupta family of industrialists. Their relationship was apparently so close that the Guptas were able to offer cabinet positions and have unfriendly ministers removed.

The state capture scandal soon engulfed the nuclear sector, with questions being raised over the Gupta's purchase of a large uranium mine in 2010—along with Zuma's son—when uranium prices were still low, and the IRP had not yet been gazetted.[737] According to Winkler, however, 'the Guptas already considered themselves the exclusive uranium suppliers' for the as-yet unannounced nuclear build, and the purchase of the mine was secured with loans from the state development bank.[738] The agreement with Russia was also investigated. Allegations surfaced that the Russian government and even Vladimir Putin himself intervened in the hiring and firing of South African cabinet ministers, and Ries argues that, while the nuclear build was expected to be a 'loss leader' for Rosatom, it 'carried the potential for many new avenues for capture of South African and Russian state resources'.[739] In January 2018, the Judicial Commission of Inquiry into Allegations of State Capture, or Zondo Inquiry, was set up to investigate state capture in the South African public sector, and in February, Zuma resigned as President of South Africa after a parliamentary vote of no confidence. He was replaced by former Deputy President Cyril Ramaphosa. In short, the nuclear power issue directly contributed to the fall of the South African President.

In August 2018, Ramaphosa's government finally abandoned the plan for 9.6GW of new nuclear capacity in an update to the 2010 IRP. In October 2019, a brand-new IRP was published, which did not specify any amount of new nuclear generation but did call for the construction of two small

[735] David Fig, 'Capital, Climate and the Politics of Nuclear Procurement in South Africa', in *The Climate Crisis: South African and Global Democratic Eco-Socialist Alternatives*, ed. Vishwas Satgar (Johannesburg: Wits University Press, 2018), 252–71.
[736] Fig, 'Capital, Climate and the Politics of Nuclear Procurement in South Africa', 268.
[737] Lily Gosam, 'Zuma, the Guptas and the Russians — the inside Story', Rand Daily Mail, 18 January 2017, https://www.businesslive.co.za/rdm/politics/2017-01-18-zuma-the-guptas-and-the-russians--the-inside-story/.
[738] Hartmut Winkler, 'Key Questions the Zondo Inquiry Needs to Pose about the Nuclear Deal', The Conversation, 28 August 2018, http://theconversation.com/key-questions-the-zondo-inquiry-needs-to-pose-about-the-nuclear-deal-102139.
[739] Nancy Ries, 'Thugocracy: Bandit Regimes and State Capture', *Safundi: The Journal of South African and American Studies* 21, no. 4 (2020): 474; see also Gosam, 'Zuma, the Guptas and the Russians — the inside Story'.

modular reactors—be they PBMR or another design[740]—by 2030, and extended the operational life of the Koeberg plant until 2045.[741] To the great surprise of many and the horror of anti-nuclear activists, in May 2020 the government announced its intention to secure an extra 2.5GW of nuclear generating capacity.[742] Earthlife Africa and SAFCEI once again geared up to fight the government's nuclear plans in court.[743] Despite 25 years of legal and political turmoil over the future of nuclear energy in South Africa, the ANC for now appears undeterred from new nuclear power. As of July 2021, plans were moving forward to construct a second South African nuclear plant at Thyspunt in Eastern Cape, a site long earmarked for nuclear development.[744]

Like the ill-fated PBMR project, the prospect of an expanded nuclear energy sector in South Africa has served as a means for Pretoria to bolster its official claim to enhanced nuclearity within the global nuclear order. The few existing analyses of ANC nuclear policy have not examined this dynamic in any detail. Rennkamp and Bhuyan pose the eternal question: '[w]hy is the South African government pursuing a nuclear energy programme, despite abundant and accessible fossil and renewable energy resources'?[745] The answer they arrive at is that a powerful domestic pro-nuclear energy coalition has successfully shaped, through discursive processes, governmental choices and ultimately the trajectory of nuclear policy at large. Their analysis is a useful one, detailing as it does the contours of the domestic nuclear energy debate in a comprehensive manner and mapping the institutional terrain on which it has played out. Ultimately, a coalition of domestic actors with a high level of investment in nuclear expansion have mobilized to protect their privileges and benefits, aided by a favourable institutional context and sympathetic state-owned entities. However, as the authors readily note, the coalition of strongly pro-nuclear interests in South Africa is small, and its power is constrained compared to that of the various government departments involved.[746] Moreover, the ANC has renewed its push for nuclear energy even after the pro-nuclear coalition was dramatically weakened by the state capture scandal and fall of Zuma. Rennkamp and Bhuyan essentially discount the global dimension and what they refer to as 'international prestige'.

[740] Recall that as of 2020, Eskom was seeking to revive the PBMR project.
[741] ESI, 'Decision to Extend Koeberg's Plant Life Was a "No-Brainer"', ESI Africa, 4 December 2020, https://www.esi-africa.com/industry-sectors/asset-maintenance/decision-to-extend-koebergs-plant-life-was-a-no-brainer/.
[742] WNA, 'Nuclear Power in South Africa', World Nuclear Association, September 2020, https://www.world-nuclear.org/information-library/country-profiles/countries-o-s/south-africa.aspx.
[743] Reuters, 'South African Activists Warn Energy Minister over Nuclear Plan', Reuters, 11 June 2020, https://www.reuters.com/article/safrica-nuclear-idINL8N2DO516?edition-redirect=uk.
[744] Lameez Omarjee, 'Hearings to Be Held on Eskom's Nuclear Power Plant Plans for Eastern Cape', fin24, 8 July 2021, https://www.news24.com/fin24/economy/eskom/hearings-planned-on-eskoms-nuclear-power-plant-plans-for-eastern-cape-20210708.
[745] Rennkamp and Bhuyan, 'The Social Shaping of Nuclear Energy Technology in South Africa', 291.
[746] Rennkamp and Bhuyan, 'The Social Shaping of Nuclear Energy Technology in South Africa', 286.

However, our analysis here suggests that the imperative to maintain South Africa's official nuclearity has compensated to a considerable extent for the relative weakness of the domestic case for nuclear power.

Despite these obstacles, South Africa has still managed to keep itself sufficiently 'nuclear' to retain its relatively privileged global position. While Pretoria has worked closely with the US and other Western allies on non-proliferation, attempts to widen the horizons of South Africa's 'official' nuclearity can be detected among its erstwhile nuclear plans. Indeed, to their credit, Rennkamp and Bhuyan's piece does recognize the importance of South Africa's relationship with Russia to its domestic nuclear politics. Within the BRICS group, 'Russia has been the country that the South African government has least established relations with. The nuclear programme offered an opportunity to fill the gap'.[747] At least before the state capture scandal rocked the country, the ANC government appears to have identified an opportunity to work with Russia on nuclear technology. Geldenhuys argues that the slated nuclear co-operation between Pretoria and Moscow, though driven largely by the pursuit for mutual economic benefit, is also part of a shared agenda to work towards 'a more just and democratic multipolar world order'.[748] Although Russia does not constitute a counterweight to the US or a second pole of global nuclear order on its own, it does offer South Africa the opportunity to cultivate nuclearity outside of Washington's immediate orbit. Officials within the ANC and the nuclear establishment hoped to use South Africa's capabilities in this area to fill a 'niche' within the global nuclear order, as Stumpf notes above, and expand beyond the relatively narrow confines of US-sanctioned nuclear behaviour. While there was no serious prospect of rowing back on multilateral non-proliferation obligations or of South Africa ploughing its own, non-aligned furrow in global nuclear politics, there was a perceived opportunity for Pretoria to diversify its nuclear dealings. While the old condition of non-alignment and 'playing the divide' between the Cold War superpowers was over[749]—and for South Africa's purposes at least, non-proliferation was the only game in town—Pretoria enjoyed sufficient trust and cachet in nuclear matters to flirt with some of the nuclear world's less compliant states. A rebooted fuel cycle capability offered the potential to corner a niche market, acting as a 'safe and trusted guarantor of nuclear fuel' to 'countries the US would get nervous about'.[750] While suggestions that Pretoria might act as a nuclear broker to North Korea seem outlandish in hindsight, South Africa has nonetheless in

[747] Rennkamp and Bhuyan, 'The Social Shaping of Nuclear Energy Technology in South Africa', 285.
[748] Deon Geldenhuys, 'The Comprehensive Startegic Partnership between South Africa and Russia', *Strategic Review for Southern Africa* 2, no. 37 (2020): 118–45.
[749] Krauthammer, 'The Unipolar Moment'; Craig and Ruzicka, 'Unipolarity and the 1995 NPT Extension'.
[750] Michael Bleby, 'Integrated Resources: Nuclear Industry Set to Gain from Increase in Capacity', Financial Times, 1 December 2010, https://www.ft.com/content/d0f7b9d8-fc17-11df-b675-00144feab49a.

the recent past shown a willingness to defend the right of countries like Iran to maintain their own civil nuclear programmes—as we will discuss below.

All of this would be an extension of South Africa's 'niche diplomacy' first displayed at the 1995 RevCon:[751] Pretoria, as a trustworthy Western ally (but not a direct proxy) and non-proliferation advocate, aiding the civil nuclear development projects of states further outside of the US's sphere of influence. The nuclear energy sector, until very recently at least, offered South Africa a potential means of augmenting its official nuclearity gained through technological advancement with its characteristic 'bridge-building' approach to diplomacy—upholding an impeccable post-apartheid record on non-proliferation while brokering nuclear deals with regimes that exist in the margins of the global nuclear order. Ultimately, however, grand ambitions to resume a full spectrum fuel cycle and massively expand nuclear generating capacity met the same fate as the PBMR, accelerated by the state capture scandal. In spite of these failures, there is one other important area in which Pretoria has worked to defend its level of conventional nuclearity, sometimes displaying a pointedly activist tendency that even runs counter to its non-proliferation ideals: the national HEU stockpile.

The HEU stockpile at Pelindaba: where conventional and activist nuclearities meet

Conflict has been rumbling around the country's HEU stockpile since shortly after the nuclear programme was dismantled. For the purposes of this chapter, the ANC's decisions over HEU stockpile straddle the divide between adherence to mainstream global standards of nuclearity—via nuclear advancement and specifically the handling and storying of weapons-grade materials—and a more activist vision of nuclearity. South Africa's campaign to protect its HEU is at once rooted in this imperative to be conventionally 'nuclear', but is also arguably the strongest gesture of dissent that Pretoria has made in recent years against the inequities of global nuclear order. There are commonalities here with South Africa's outward-facing nuclear diplomacy towards non-aligned nations and its defence of the inalienable right to develop nuclear technology. However, while these diplomatic activities are usually safely siloed away within multilateral contexts and the structures of agreements like the NPT, Pretoria's dogged determination not to relinquish its HEU is a unilateral effort. Given that the HEU is a direct legacy of apartheid's nuclear weapons programme, the ANC's dedication to protecting it appears to run counter to its broad commitment to nuclear disarmament and transparency. Of course, spats over HEU have never seriously threatened the integrity of these commitments, though US-based elements of the 'non-proliferation complex' have expressed

[751] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'.

concern over the motives and implications of Pretoria's stance.[752] What the dispute does reveal however is the discord that results from a collision between 'conventional' and 'activist' nuclearities.

Stored at the Pelinaba facility under 24-hour IAEA surveillance, the HEU is the most heavily symbolic physical remnant of the bomb programme, much of it having been produced by the apartheid regime at the Valindaba facility. The remainder was supplied by the United States, during the apartheid years, to fuel the Safari-1 research reactor. Albright estimates that, at the end of 2014, South Africa's total HEU inventory was 395-525kg, of which 200-250kg was enriched to between 80% and 90% U-235.[753] Some of the HEU inherited by the new administration in 1994 has since been blended down into LEU (low-enriched uranium), while some was used to fuel Safari-1 before it was converted to run on LEU in 2009. The HEU stockpile has come to take on considerable—yet highly contested—symbolic value for the ANC, displaying in microcosm the tensions between its activist outlook on global nuclear order and the complexities of domestic nuclear politics it is faced with at home.

The early events of this technopolitical battle are recounted by de Villiers et al., writing in 1993. There were 'reports of the AEC trying to sell the HEU to foreign powers [specifically the United States] before the next election', with the implied motive being distrust of the ANC as a responsible nuclear custodian or, less euphemistically, to keep the HEU out of Black hands.[754] The authors cautioned that '[a]ny foreign government that signs an agreement with Pretoria regarding the HEU stockpile without the prior knowledge and approval of the ANC will jeopardize future peaceful nuclear activities of a democratic South Africa', in an appeal to the principles of transparency and accountability that had historically been absent from South Africa's nuclear dealings.[755] On the other hand, rumours swirled in the global press that the ANC planned to sell the HEU to Cuba or the Palestine Liberation Organization (PLO) 'to pay off old political debts'[756]—speculation which, in hindsight, was obviously fantastical. As the 1995 Review Conference demonstrated, the ANC had little interest in paying off such debts—such as those owed to the Non-Aligned Movement—by compromising over the fundamentals non-proliferation, though there was room to innovate in the margins. The issue was discussed at *The Nuclear Debate* conference in 1994, with a range of options mooted: sale to the US, transfer to international control outside of South Africa, and blending down

[752] Jack Boureston and Jennifer Lacey, 'Shoring Up a Crucial Bridge: South Africa's Pressing Nuclear Choices', Arms Control Association, 2 January 2007, https://www.armscontrol.org/act/2007_01-02/BourestonLacey.
[753] David Albright, 'Highly Enriched Uranium Inventories in South Africa: Status as of End of 2014', Plutonium and Highly Enriched Uranium 2015 (Washington, DC: Institute for Science and International Security, 16 November 2015), 8.
[754] de Villiers, Jardine, and Reiss, 'Why South Africa Gave Up the Bomb', 106.
[755] de Villiers, Jardine, and Reiss, 'Why South Africa Gave Up the Bomb', 106.
[756] de Villiers, Jardine, and Reiss, 'Why South Africa Gave Up the Bomb', 106.

into LEU were some of the suggested policy choices.[757] The minority opinion that South Africa should hold onto its HEU for the express purpose of retaining the ability to make a nuclear weapon was also expressed but found little support.[758] In the event, it was agreed between the ANC and the outgoing government that the stockpile would be retained for the immediate future, being used to fuel Safari-1, which still ran on HEU at the time. As part of the IAEA's disarmament verification activities, the stockpile was put into secure storage at Pelindaba and placed under round-the-clock surveillance. There it remains today, although the arguments around its ultimate fate are still far from resolved.

Controversies resurfaced in 2007, when a break-in at the Pelindaba facility raised concerns about the security of the HEU. In an alarming sequence of events, two groups of intruders managed to shut off the facility's power and storm the operations centre, shooting and wounding an employee. The intruders fled when confronted by additional security staff, and their identities were never revealed. The ANC brushed the incident aside as mere criminality falling within the jurisdiction of the police, but the *Washington Post* reported that both the US and Necsa chief Rob Adam reached different conclusions. A secret report apparently 'concluded that the raid was a carefully planned operation, that it relied on inside help, that those involved had special training, and that it probably targeted the nuclear explosives'.[759] Despite the 'military-style' nature of the raid,[760] the South African authorities were—and have remained—unable or unwilling to trace and name the perpetrators. The episode was of course particularly concerning to a United States then preoccupied with the global 'War on Terror' as its primary foreign policy objective, which expressed fears that insecure South African fissile materials might find their way into a terrorist nuclear warhead. It is also worth noting, however, that the US had aimed to secure South Africa's HEU for several years before this event.

Under the Obama administration, Washington continued to make overtures to Pretoria over the HEU stockpile, this time under the auspices of the President's vocal commitment to non-proliferation. According to Fabricius, in 2013, Obama visited South Africa and 'privately asked Zuma to exchange the HEU for a free shipment of about 350 kg of fresh, non-weapons-grade reactor fuel, valued at US$5 million',[761] repeating the request later that year at the funeral of Nelson Mandela. On each occasion Zuma declined. In the context of South Africa's strong positions on non-proliferation

[757] Albright, 'The Legacy of the South African Nuclear Weapons Program'.
[758] Amuah, 'Nuclear Policy in South Africa: Past, Present, and Future'.
[759] Douglas Birch and R. Jeffrey Smith, 'How Armed Intruders Stormed Their Way into a South African Nuclear Plant', Washington Post, 14 March 2015, https://www.washingtonpost.com/world/how-armed-intruders-stormed-their-way-into-a-south-african-nuclear-plant/2015/03/13/470fc8ba-579d-4dba-a0c0-f0a1ed332503_story.html.
[760] Noah Schachtman, 'Second Attack on South African Nuke Plant', Wired, 13 November 2007, https://www.wired.com/2007/11/second-attack-o/.
[761] Peter Fabricius, 'Why Is Pretoria so Jealously Guarding Its Fissile Material?', ISS Africa, 19 March 2015, https://issafrica.org/iss-today/why-is-pretoria-so-jealously-guarding-it-fissile-material.

and disarmament, Pretoria's desire to hold on to its HEU stockpile—which after all comprises sufficient material to construct more than one nuclear warhead—has worried and puzzled non-proliferation analysts. Some have attempted to divine Zuma's motivations, variously identifying factors such as 'national pride', 'domestic concerns', and 'historical precedent'.[762] Van Wyk similarly characterises these impulses as 'resource nationalism'.[763] These labels are at once specific without telling us much about the overall dynamics at play, particularly with regard to global imperatives. It is more useful to understand the ANC's motivations as a desire to express a nationally independent and perhaps even muscular brand of nuclear politics, informed by the historic politics of non-alignment: in other words, a somewhat conflicted bid for recognized global nuclearity. Quoting then-Minister of International Relations and Co-operation Maite Nkoana-Mashabane, Gottesman argues that relinquishing the HEU is incompatible with South Africa's sense of 'national pride', as it would amount to an admission that Pretoria is not responsible or competent enough to safeguard its own nuclear resources.[764] In 2005, Abdul Minty issued a tacit warning against attempts to pry South Africa's HEU away from it and into international hands by affirming 'the need to guard against the imposition of any arrangement that may infringe on the inalienable right of states to the peaceful application of nuclear energy'.[765] Jacob Zuma made a particularly strident intervention on the matter in Seoul in 2012. In a speech celebrating the successful conversion of SAFARI-1 to run on LEU, he went on to stress that '[South Africa's] international legally binding obligations on nuclear disarmament and nuclear non-proliferation allow for the enrichment of uranium for peaceful purposes only, irrespective of the enrichment level'.[766] According to the news site IOL, the last part of this sentence was the most important: 'What he was saying, officials explained, is that there is nothing in the Nuclear Non-Proliferation Treaty or any IAEA agreements which SA has signed that prevent it from producing HEU'.[767] Zuma's message was a remarkable one: South Africa not only reserved its right to maintain its existing HEU stockpile, but also to potentially produce HEU again in the future. Suggesting that South Africa might once again produce weapons-grade uranium, when neither its research reactor nor power reactors required it, was an altogether tougher challenge to

[762] Jessica Gottesman, 'What Is behind South African President Jacob Zuma's Refusal to Relinquish Nuclear Weapons Material?', Next Generation Nuclear Network, 11 February 2020, https://nuclearnetwork.csis.org/what-is-behind-south-african-president-jacob-zumas-refusal-to-relinquish-nuclear-weapons-material/.
[763] Jo-Ansie van Wyk, 'South Africa's Nuclear Future', Occasional Paper, Governance of Africa's Resources Programme (Pretoria: South African Institute of International Affairs, 2013), 15.
[764] Gottesman, 'What Is behind South African President Jacob Zuma's Refusal to Relinquish Nuclear Weapons Material?'
[765] Minty quoted in Boureston and Lacey, 'Shoring Up a Crucial Bridge: South Africa's Pressing Nuclear Choices'.
[766] Zuma quoted in Peter Fabricius, 'SA Playing Both Sides of the Nuclear Coin', IOL, 30 March 2012, https://www.iol.co.za/the-star/sa-playing-both-sides-of-the-nuclear-coin-1267182.
[767] Fabricius, 'SA Playing Both Sides of the Nuclear Coin'.

the normative bases of non-proliferation and nuclear order. There was no suggestion of weapons production; the production of HEU alone would be enough to rattle diplomats in Washington and Vienna.

These messages surrounding the production of HEU contradicted much of South Africa's other nuclear practice. Pretoria has always been at pains to stress its good nuclear behaviour and its compliance with non-proliferation and multilateralism. Its determination to hold onto HEU for which it had no immediate need seemed to fly in the face of several of the ANC's foundational commitments. This disconnect can be understood in the broader context of ANC's juggling of competing visions of South African nuclearity. On one hand, South Africa's brand of conventional/official nuclearity is maintained in large part by its status as a well-behaved advocate of non-proliferation and multilateral disarmament, Pretoria is expected to relinquish any legacy elements of the apartheid nuclear programme that might even hint at a future weapons capability. On the other, the status of nuclear 'advancement' is of course extremely well-served by the presence of HEU in South Africa. This is especially true since the HEU stockpile, while located at the Pelindaba facility, is held under 24-hour IAEA surveillance by agreement with the South African government in a demonstration of transparency and good intent towards non-proliferation obligations. The HEU stockpile nonetheless remains tremendously valuable to the ANC government *vis-à-vis* both domestic and global audiences. Noel Stott characterizes it as 'more precious to the African National Congress government than all the gold bullion in the Reserve Bank'.[768] Imbued with huge technopolitical value by the physical process of enrichment and the enhanced status of nuclearity that this confers, South Africa's uranium remains a signal of the 'sovereignty, power, and integrity' and 'technical ability to construct an atomic weapon' so coveted by its apartheid creators; however, it is has taken on a contradictory post-apartheid significance, indicating a 'firm moral determination never to [build another nuclear weapon]' and serving as a 'stick [with which to] beat up on the US for not dismantling its own nuclear weapons'.[769] The HEU's value lies partly how it continues to help South Africa maintain its high level of nuclearity as it is conventionally understood within the global nuclear order—and thus its outsized level of nuclear clout relative to other African states. As we have noted elsewhere, the ANC ironically remains beholden to apartheid-informed standards of nuclear civilization if it wishes to sustain South Africa's influence in international non-proliferation diplomacy—and chooses, pragmatically, to use apartheid-enriched uranium to fulfil these requirements. The possession of weapons-grade uranium, as well as the ability and institutional permission from the IAEA to safeguard it, is unique to South Africa on the African

[768] Quoted in Fabricius, 'Why Is Pretoria so Jealously Guarding Its Fissile Material?'
[769] Stott in Fabricius, 'Why Is Pretoria so Jealously Guarding Its Fissile Material?'

continent.[770] The HEU stockpile at puts South Africa in the exalted company of the NWS and the rest of the global elite in civil nuclear technologies—a position which is a necessary prerequisite for Pretoria's interventions over non-proliferation and disarmament to carry significant weight.

However, there is also a strong activist element to the nuclearity that South Africa claims via its HEU stockpile. Further tensions arise here, since this activist nuclearity is paradoxically rooted in the ANC's history of non-alignment and opposition to apartheid nuclear weapons. Considerable political hay can be made from the HEU's status as a historical monument to US hypocrisy, and how the global nuclear order itself abetted apartheid South Africa's nuclearization in the first instance. The HEU stockpile's continued presence in South Africa is a damning and intentional critique of the order itself. As noted by Stott, it serves as a physical rebuke to the liberal non-proliferationist edict that only certain states can be trusted to hold sensitive nuclear technology. When US officials point to South Africa's 'crime problem' as an indication that Africans 'cannot be trusted to keep nuclear materials',[771] they appeal to the racialized, civilizational logics of 'nuclear apartheid' that underpin the norms of global nuclear behaviour and which South Africa, post-1994, has routinely spoken against.[772] It is wielded as a demonstration that the US concern with 'non-proliferation' conceals its own unwillingness to fulfil its NPT obligation to drastically reduce and eventually eliminate its own nuclear weapons stockpile. In the context of growing support for a nuclear weapons ban, it is easy to see why the Obama administration was so opposed to the actions of a recalcitrant South Africa that could serve to sap further consent from the non-proliferation-based order. Perhaps most strikingly, it serves as a lurid reminder of US and wider international complicity in the apartheid nuclear programme. Much of the HEU came directly from the US as fuel for Safari-1, and Pretoria was able to enrich the rest domestically thanks to indirect support, tacit approval, and decisions to turn a blind eye on the part of the US and several European states.[773] 'For South Africa, maintaining a grip on its bomb fuel is tangled up with […] its anger over Washington's past half-measures in opposing apartheid', say Birch and Smith, before quoting US ambassador Donald Gips: 'It's a technical issue with an emotional overhang'.[774]

[770] IPFM, 'Materials: Highly Enriched Uranium', International Panel on Fissile Materials, 17 May 2020, http://fissilematerials.org/materials/heu.html.
[771] Douglas Birch and R. Jeffrey Smith, 'South Africa Rebuffs Repeated U.S. Demands That It Relinquish Its Nuclear Explosives', Center for Public Integrity, 14 March 2015, https://www.publicintegrity.org/2015/03/14/16873/south-africa-rebuffs-repeated-us-demands-it-relinquish-its-nuclear-explosives.
[772] Biswas, '"Nuclear Apartheid" as Political Position'; Biswas, *Nuclear Desire*; Intondi, 'Nelson Mandela and the Bomb'.
[773] See Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals*.
[774] Birch and Smith, 'South Africa Rebuffs Repeated U.S. Demands That It Relinquish Its Nuclear Explosives'.

In addition to proving South Africa's credentials in nuclear technology, then, the HEU is also a means by which Pretoria can continue to make a conspicuous show of dissent towards the global nuclear order. Importantly, however, this takes place within the context of Pretoria continuing to furnish the institutions of nuclear order with full-throated diplomatic support and legitimacy. The spat over the HEU thus echoes Pretoria's role at the 1995 RevCon. Through it, Pretoria appears to chart a policy of non-aligned independence and to rebel against the hierarchical organization of the global nuclear order. It also appears to defy the default and highly flawed non-proliferationist expectation that states which have the ability to make nuclear weapons will automatically do so: the presence of HEU in South Africa that is *not* used to construct nuclear weapons demonstrates clearly the country's peaceful intentions.[775] For the ANC government, the HEU serves as a vessel for the spirit of the liberation struggle and non-aligned solidarity, and a lens through which to refocus the fight against apartheid onto the global nuclear stage.

Taylor's assessment of Pretoria's actions in 1995 is directly applicable to the HEU issue, and worth quoting at length:

> [S]uch activism appears to demonstrate Pretoria's 'independent' stance with regard to Washington. Not only can this be usefully deployed domestically by the government against its critics who charge that its foreign policy is too close to the capitalist hegemon (and the NPT issue saw this charge being levelled with some vigour), but it can also be projected externally to demonstrate the proof of South Africa's apparent independence. After all, by pursuing the NWS over nuclear disarmament, South Africa appears to be delegitimising their position by striking out an autonomous policy position through asking the NWS to take the relevant articles of the NPT on disarmament seriously.[776]

Having effectively abandoned NAM in 1995 and proceeding to consolidate its alignment with the NPT and broader non-proliferation agenda—discussed in detail below—the HEU stockpile is an extremely valuable resource for South Africa with regard to trumpeting its non-aligned credentials. It is not the only means by which Pretoria vocalizes dissent towards the global nuclear order, of course: the same principles have been applied, as Onderco discusses, with regard to Iran's right to nuclear technology,[777] not to mention its Humanitarian Initiative and Ban Treaty advocacy. However, these apparently radical interventions are all made from a comfortable position within a non-proliferation framework which, as Taylor reminds us, South Africa has been instrumental in creating:

[775] Abraham, ''Who's Next?'
[776] Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty', 176.
[777] Onderco, 'A Battle of Principles'.

'Calls for disarmament by Pretoria, though they do fit within South Africa's overall foreign policy stance regarding disarmament, are compromised by the scenario where the current NPT has been indefinitely extended'.[778] South Africa is deeply enmeshed in the institutions of global nuclear order and subject to a raft of additional, voluntary agreements and measures which effectively guarantee, barring a complete and wholesale collapse of the international system, that it will never again turn to nuclear weapons.

The HEU, while an embarrassing thorn in the side of non-proliferation advocates and US policymakers, does not constitute a proliferation threat. South Africa itself is deeply committed to non-proliferation and multilateral disarmament efforts, and in any event no longer possesses the material infrastructure or knowledge base to restart a nuclear weapons programme. These commitments, combined with the IAEA surveillance of the stockpile, also mean that it is virtually inconceivable that South Africa would attempt to sell or otherwise supply the HEU to a 'proliferant' state. The work of Abraham and Rublee has cumulatively demonstrated that states have little demand for HEU for weapons purposes; around 60 states conduct civilian nuclear activities which according to flawed proliferationist logics pose risks, but nonetheless refrain from diverting their resources to weapons programmes.[779] In addition, despite the concerns of the Obama administration over the security of South Africa's HEU, the threat of 'nuclear terrorism' by non-state actors is greatly exaggerated, and it is not plausible that a terrorist organization would or could successfully steal the HEU and use it in a functioning nuclear weapon.[780]

Neither will the existence of the HEU shame the NWS into making concrete moves towards multilateral disarmament: as Abdul Minty was told by a frustrated US diplomat, nuclear disarmament is 'a fantasy. We need our weapons for our safety, and we're not going to give them up'.[781] The HEU permits South Africa to maintain a façade of an independent, national nuclear technopolitics when, in reality, the possibility of such was greatly diminished upon Pretoria's accession to the NPT. It also contributes to the continuing fiction that South Africa is opposed in principle to the NPT and the inequalities enshrined in it, when in reality, such rhetorical opposition is only possible in the first instance because of South Africa's privileged position within the global nuclear order. As in 1995, the institutions and guardians of the global nuclear order are threatened

[778] Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty', 176.
[779] Maria Rost Rublee, *Nonproliferation Norms: Why States Choose Nuclear Restraint* (Athens: University of Georgia Press, 2009); Abraham, ''Who's Next?'
[780] Robin M. Frost, *Nuclear Terrorism After 9/11* (London: Routledge, 2005); Keir A. Leiber and Daryl G. Press, 'Why States Won't Give Nuclear Weapons to Terrorists', *International Security* 38, no. 1 (2013): 80–104.
[781] Birch and Smith, 'South Africa Rebuffs Repeated U.S. Demands That It Relinquish Its Nuclear Explosives'.

little by the rhetorical objections of a state which remains as committed as ever to the ideals of multilateralism, liberal institutionalism, and non-proliferation.

I turn now to examine the 'activist' elements of South African nuclearity in more detail. The following section examines the governing ANC's activist diplomacy alongside the domestic anti-nuclear movement. It highlights the growing chasm between these respectively 'global' and 'local' articulations of (anti-) nuclear progressivism. I show how Pretoria's approach to multilateral disarmament initiatives ultimately ensures that the entrenched power structures of the global nuclear order remain unchallenged at a fundamental level, and that this further serves to bolster domestic nuclear policy—against which activists remain locked in battle.

'Obedient resistance'? Conspicuous compliance and South Africa's activist nuclearity

Much has been made of the ANC's approach to non-proliferation and multilateral co-operation in global nuclear fora after apartheid. While the credibility of South Africa's 'activist' interventions on non-proliferation and disarmament is significantly enhanced by this practice—along with its considerable technical expertise—these two aspects of Pretoria's nuclear diplomacy are not the same. Its 'activist' efforts are consciously presented as criticisms—however mild or superficial these may be—of the global nuclear status quo. Meanwhile, its 'conventional' non-proliferation practice revolves around full compliance, voluntary submission to stringent measures and protocols, and generally exemplary behaviour, helping to set the standards of what it means to be a 'good' non-nuclear weapons, but still highly nuclear, state. Unlike many aspects of South African nuclearity covered throughout this thesis, Pretoria's contribution to multilateral non-proliferation efforts is relatively well-trodden scholarly ground. Amidst the optimism of the 1990s, the issue provided an attractive case study for observers of the emergent 'middle power' states keen to participate in the newly hegemonic liberal world order.[782] Further, a small group of researchers—mostly based in South Africa—have explored in great depth this post-apartheid commitment to the NPT and global nuclear order more broadly, including through detailed archival and oral history research and the systematic declassification of documents.[783] It is thanks to them that our understanding of the

[782] See Schoeman, 'South Africa as an Emerging Middle Power'.
[783] For example Leith and Pretorius, 'Eroding the Middle Ground: The Shift in Foreign Policy Underpinning South African Nuclear Diplomacy'; van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'; van Wyk, 'South Africa's Post-Apartheid Nuclear Diplomacy: Practice and Principles'; van Wyk and van Wyk, 'From the Nuclear Laager to the Non-Proliferation Club: South Africa and the NPT'; Lucky Asuelime and Suzanne Francis, 'Drivers of Nuclear Proliferation: South Africa's Incentives and Constraints', *Journal for Contemporary History* 39, no. 1 (2014): 55–68; Onderco and van Wyk, 'Birth of a Norm Champion: How South Africa Came to Support the NPT's Indefinite Extension'.

subject matter is greatly improved. Nevertheless, a brief overview here is necessary both to contextualize Pretoria's activist nuclear diplomacy and to draw out the striking contrasts with present-day anti-nuclear campaigning within South Africa.

Pretoria's pivotal contribution to the 1995 NPT RevCon was comprehensively covered in the preceding chapter. That remarkable intervention has set the tone for South Africa's approach to non-proliferation up to the present day. Although its activist stance has developed since 1995, Pretoria's exemplary nuclear behaviour by the standards of nuclear order has strengthened in tandem, with South Africa accepting a full spectrum of voluntary measures and transparency initiatives with regard to its domestic nuclear activities. As van Wyk details, South Africa's relationship with the IAEA has deepened significantly since Pretoria resumed its prestigious Board of Governors position. The most significant aspect of this relationship has arguably been the conclusion of an Additional Protocol agreement with the Agency in September 2002.[784] The Additional Protocol 'transform[s] IAEA inspectors into detectives' by 'expand[ing] the declaration a state must make to the IAEA of activities that might contribute to the development of nuclear weapons' and 'broadening the agency's right of access […] to verify that declaration'.[785] On top of South Africa's existing safeguards agreement with the IAEA, the Additional Protocol represented a significant gesture of good faith and multilateralism. While the ANC could have conceivably made the argument that South Africa had nothing to hide and such intrusive and potentially restrictive measures were thus unnecessary (and has done with regard to other states: see below), it instead chose to conspicuously champion the global nuclear order's operating values of transparency and multilateralism. Indeed, in 2000 ahead of that year's RevCon, South Africa proposed in a working paper on safeguards that all signatories to the NPT should conclude Additional Protocol agreements with the IAEA—'a stance that in retrospect could be interpreted as an endorsement of the AP as a condition of supply'.[786] This position has since shifted, but it is emblematic of a commitment to exemplary non-proliferation practice and the upholding of high transparency standards on the part of Pretoria in the years following apartheid.

Other bilateral agreements followed, and South Africa has further co-operated with the IAEA on a number of regional initiatives in diverse areas including nuclear regulatory systems and technological development for Africa. In 2008, South Africa even nominated Ambassador Abdul Minty for the position of IAEA Director General, but ultimately suffered a damaging defeat when the

[784] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency', 185.
[785] Theodore Hirsch, 'The IAEA Additional Protocol: What It Is and Why Itmatters', *The Nonproliferation Review* 11, no. 3 (2004): 143.
[786] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*, 66.

Japanese candidate was elected instead. In spite of Pretoria's high level of compliance with the IAEA, factors including Minty's background in the liberation movement and past comments in support of Iran's right to a civil nuclear programme were apparently enough to spook Western states who wanted a more 'moderate' candidate[787]—not that Minty's own moderate credentials were to be sniffed at. This was a rare instance in which South Africa's 'activist' nuclear diplomacy materially damaged its standing within the global nuclear order, although the decision to stand a candidate for Director General demonstrates the extent to which South Africa perceives its own diplomatic aims to be in sync with those of the IAEA.

With regard to the NPT, South Africa in 2000 reprised its 'bridge-building' role of 1995, albeit as part of a grouping rather than as an individual 'norm entrepreneur'.[788] Ahead of the 2000 NPT RevCon (which South Africa was slated to host but abruptly pulled out late on during proceedings), the Non-Aligned Movement 'adopted quite a confrontational approach' in advocating for a time-bound disarmament commitment from the NWS.[789] Despite their defeat in 1995, a significant coalition within NAM was determined to resurrect these demands. The Preparatory Committees (PrepComs) held ahead of the conference had failed to produce any real progress on 'the raised expectations for substantive contributions the "strengthened review process" was supposed to bring about',[790] and despite the apparent achievements of 1995 conflict was once again in the air. Along with Brazil, Egypt, and Mexico, South Africa broke away from NAM to form a cross-cutting group with Ireland, New Zealand, and Sweden in the form of the New Agenda Coalition (NAC). Though NAC was nominally just as committed to nuclear disarmament as NAM, it quickly positioned itself as a 'moderate' body determined to reach a compromise agreement with the NWS. Much as South Africa had done in 1995, NAC took it upon itself to negotiate a deal with the NWS without the rest of NAM in the room to break the deadlock. A package was eventually agreed, the headline of which was the commitment to an 'unequivocal undertaking' towards nuclear disarmament.

Rauf contends that this moment represented 'a high watermark in the history of the NPT; for the first time, the nuclear-weapon states accepted a series of specific practical steps for nuclear disarmament leading to the elimination of nuclear weapons'.[791] However, this assessment reveals a

[787] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency', 189; Onderco, 'A Battle of Principles'.
[788] This is the term used by van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'.
[789] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*, 45.
[790] Paul Meyer, '"Permanence with Accountability": An Elusive Goal of the NPT', *Journal for Peace and Nuclear Disarmament* 3, no. 2 (2020): 215–23.
[791] Tariq Rauf, 'An Unequivocal Success? Implications of the NPT Review Conference', *Arms Control Today* 30, no. 6 (2000): 12.

devotion—characteristic within the non-proliferation complex—to process and procedure as an end in itself rather than as a means to disarmament; according to Rauf, the principal success of the deal was that it enabled the conference to end in agreement—'[d]espite its weaknesses and compromises, such as the lack of any time frame'.[792] The lack of any time frame was not simply a corollary matter, however: as in 1995, it was the cornerstone of NAM's demands. Without a time frame, the agreement at the 2000 RevCon once again amounted to little more than a recommitment to the disarmament obligations already written into the NPT under Article VI, and the NWS made it clear that this is exactly how they would interpret it. Once again, South Africa had effectively acted as a spoiler to the demands of NAM members calling for a more radical approach to disarmament, this time as part of NAC. As Potter and Mukhatzanova note, the deal was afforded a veneer of legitimacy by the involvement of respected and prominent NAM members.[793] While it may be unfair to single out South Africa for criticism over reaching a compromise deal with the NWS in the context of a still-unipolar nuclear order, this was certainly another instance of good, compliant behaviour rather than disarmament activism from Pretoria: once again corralling an unruly NAM minority and shoring up the authority of the NPT in the face of calls for a more urgent approach to disarmament.

After the 2000 RevCon, South Africa adopted a progressively more 'activist' approach to the NPT which entailed the limited elements of critique described below. Nonetheless, it has continued to demonstrate a conspicuous commitment to non-proliferation, and as we shall see, even its most activist interventions are heavily caveated with the recognition that the NPT—specifically Article VI—holds prime authority over any moves towards disarmament. Pretoria's commitment to non-aligned and NNWS solidarity is ultimately subordinate to its concomitant support for a 'rules-based international system',[794] and its so-called 'bridge-building' efforts have tended to consist of bringing hesitant NAM members closer to the positions of the NWS, rather than staking out 'neutral' or 'third' positions. Pretoria is deeply involved in the IAEA, working on global and regional efforts to develop verification regimes and promote best practice in the civil nuclear industry. In addition, it is part of a number of nuclear export control regimes—the Missile Technology Control Regime, the Nuclear Suppliers Group, the Waasenaar Arrangement, and the Zangger Committee—which van Wyk finds to have been highly beneficial 'in reinforcing its status as a responsible producer, possessor, and trader of advanced nuclear diplomacy'.[795] In sum, combined with the maintenance of a sophisticated domestic nuclear capability, Pretoria's strict adherence to non-proliferation rules and

[792] Rauf, 'An Unequivocal Success? Implications of the NPT Review Conference', 12.
[793] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*, 45.
[794] van Wyk, 'South Africa's Post-Apartheid Nuclear Diplomacy: Practice and Principles', 117.
[795] Jo-Ansie van Wyk, 'South Africa and the Global Nuclear Bazaar : Norms and State Identity in the Nuclear Export Control Regime', *Strategic Review for Southern Africa* 34, no. 1 (2012): 69.

imbrication in a dense web of global nuclear order institutions contributes to a robust official nuclearity. This has elevated South Africa to a highly 'nuclear' status—arguably second only to the NWS and alongside such 'top-tier' NNWS such as Japan and Canada.

South Africa's activist nuclearity: beyond non-proliferation?

In addition to the activities detailed above, however, there are areas in which South Africa has charted a more independent, traditionally 'non-aligned' course. These efforts began in earnest as soon as democracy dawned in South Africa, with Pretoria joining the decades-long effort to declare the continent a nuclear weapons-free zone (NFWZ). This campaign dated back to 1960, emerging as a response to the French *Gerboise Bleue* nuclear test in colonial Algeria. Parallel to the anti-apartheid campaign, the campaign to establish an NFWZ in Africa formed part of a broader transnational, anti-colonial struggle, and nuclear testing has remained an important pressure point in non-aligned politics.[796] The Organisation for African Unity (OAU) issued a 'Declaration of the Denuclearization of Africa' in 1964, which consequently gained overwhelming support at the UN, and until 1990 retained as a standing item on its agenda the principle obstacles to an African NFWZ—chief among which was the South African nuclear weapons programme.[797] Negotiations on a treaty restarted in 1991, though without South Africa which, though having disarmed and acceded to the NPT, remained under apartheid rule. However, it was recognized that South Africa's extensive expertise (i.e. conventional nuclearity) would be important in concluding any such agreement, and the newly democratic nation would play an important role in all subsequent discussions. In 1995, the final meeting before the conclusion of the agreement was held in Johannesburg, and in a highly symbolic gesture it was decided that the instrument would be known as the Pelindaba Treaty—named after apartheid South Africa's nuclear research facility.

In one sense, it is easy to see how the Pelindaba Treaty is complementary to existing global non-proliferation efforts, and how South Africa was simply fulfilling expectations after having 'practically held the African continent at [nuclear] ransom' until 1991.[798] After South Africa's disarmament, proliferation concerns remained regarding certain parts of the continent, and a further layer of verification and even stricter measures than set out under the NPT would be a welcome development among non-proliferation and arms control advocates. The fact that it originated from an African anti-colonial struggle and carried the blessing of the newly victorious ANC would further

[796] Intondi, *African Americans Against the Bomb: Nuclear Weapons, Colonialism, and the Black Freedom Movement*; Abraham, 'Decolonizing Arms Control'.
[797] Savita Pande, 'Treaty of Pelindaba: How Different?', *Strategic Analysis* 22, no. 4 (1998): 547–59.
[798] van Wyk, 'No Nukes in Africa: South Africa, the Denuclearisation of Africa and the Pelindaba Treaty', 278.

enhance its legitimacy. However, as Mpofu-Walsh argues in an important thesis, there is very good reason not to simply bracket NFWZs in general under the category of supplementary 'non-proliferation' instruments:

> They […] reveal the tensions inherent in global nuclear order itself through their location in the global South. This Southern perspective is sorely needed at a time when nuclear order is experiencing its most profound existential crisis in a generation […] NWFZs become key to international nuclear law by legitimising legally binding negative security assurances.[799]

In other words, NFWZs are distinctly Southern activist interventions into global nuclear order that demand much more from NWS than other multilateral instruments and articulate different demands. In the specific case of the Pelindaba Treaty, there appeared to be further disruptive potential in the NFWZ's ban on 'research into nuclear explosive devices by any means' within the territory covered and on the dumping of nuclear waste. As Hecht has explored, Africa has often occupied the multiple roles of proving ground, laboratory, resource mine, and dumping ground for various nuclear powers, especially during the Cold War, and such activities have tended to be rendered invisible by its putative 'non-nuclear' status.[800] These additional restrictions instituted by the Pelindaba Treaty therefore contained a kernel of radicalism by way of their potential to disrupt the usual functioning of a world nuclear-industrial complex which has historically relied on Africa as a passive host of various Western or Western-backed nuclear activities. In this regard, then, there is much to be said for the activist intent and content of the Pelindaba Treaty. That said, though Pretoria played an important role in concluding the agreement, the Pelindaba Treaty was decidedly not a South African initiative. There are other ways since 1994 in which South Africa has been more central to activist challenges to global nuclear order.

One particularly interesting way in which South Africa has displayed an activist approach to nuclear order is via conspicuous displays of non-aligned solidarity. This is an impulse which has, at times, threatened to come into conflict with its non-proliferation advocacy. Reprising many of the arguments over its own HEU stockpile, Pretoria has periodically defied the preferences of the NWS and their allies with regard to the global distribution of civil nuclear technology. Unlike the worthy if relatively uncontroversial Pelindaba Treaty, these interventions have brought South Africa into conflict with fellow IAEA Board members and occasionally even caused consternation around Pretoria's level of commitment to non-proliferation. South Africa has demonstrated solidarity with fellow NAM members who want to exploit civilian nuclear technology through opposition to the

[799] Mpofu-Walsh, 'Obedient Rebellion: Nuclear-Weapon-Free Zones and Global Nuclear Order, 1967–2017', 8.
[800] Hecht, *Being Nuclear*.

establishment of an IAEA nuclear fuel reserve, opposition to the extension of the Additional Protocol, bilateral agreements with states like India and Brazil, and support for Iran's right to develop peaceful nuclear technology, inter *alia*. Although South Africa itself has recently forsworn fuel cycle and fabrication activities and explicitly committed itself to high standards of compliance in non-proliferation, Pretoria has made a point of not expecting the same from other non-aligned or developing NNWS.

The IAEA push to multilateralize the global nuclear fuel cycle is one issue over which South Africa has taken an activist stance. In 2006 the US think tank Nuclear Threat Initiative (NTI) proposed the establishment of a global reserve of LEU, with the aim of discouraging states from pursuing their own domestic enrichment programmes. NTI pledged $50 million, and further pledges were received from the US, EU, UEA, and Norway, among others. Kazakhstan offered to physically host the fuel bank.[801] Opponents made familiar criticisms, centring around concerns that the reserve would restrict legitimate access to peaceful nuclear technology as guaranteed in the NPT, and that concerns about uranium enrichment *per se* posing a proliferation risk were overblown.[802] South Africa has consistently been this opposition camp. Although the debate over the fuel bank overlapped considerably with the years that Pretoria was toying with the idea of restarting its own domestic fuel cycle, as well as still pursuing the PBMR, it appears that there was more at stake for South Africa here than such a narrow conception of self-interest. As van Wyk details, while recognizing the ultimate authority of both the NPT and the IAEA as its enforcing body, South Africa 'has maintained that the NPT is discriminatory and that the IAEA Board should be democratised and expanded to include more NNWS', and Pretoria has made clear that it is opposed 'to not only the existing international nuclear hierarchy, but also to the IAEA and other norm entrepreneurs' making operational the norm of a multilateralised nuclear fuel cycle'.[803] South Africa's 2006 statement to the IAEA on the issue deftly threads this particular needle, arguing that the credibility of the NPT would be undermined by a multilateral fuel bank since it would call into question one side of the Article VI bargain: the 'inalienable right' to pursue peaceful nuclear technology for development. It also recalls the 'geopolitical conditions' of the 1970s when similar proposals were made, implying that such conditions of Cold War rivalry and colonial relationships between the West and the 'rest' have continued to exist and to militate against the establishment of a fuel bank.[804] These are not technical

[801] Daniel Horner and Oliver Meier, 'Talks on Fuel Bank Stalled at IAEA', Arms Control Association, October 2009, https://www.armscontrol.org/act/2009-10/talks-fuel-bank-stalled-iaea.
[802] A valid point; see Abraham, ''Who's Next?'
[803] Jo-Ansie van Wyk, 'Fuel for Thought? South Africa's Position on the Multilateralisation of the Nuclear Fuel Cycle', *South African Journal of International Affairs* 23, no. 3 (2016): 290.
[804] Bulaweya Sonjica, 'Statement by Ms Bulaweya Sonjica, Minister of Minerals and Energy of the Republic of South Africa, at the Special Session on "New Framework for the Utilization of Nuclear Energy in the 21st

or tangential criticisms: they strike at the heart of global nuclear order, explicitly identifying its hierarchies. Coming from a state with such cachet as South Africa, they carry considerable normative heft. Although the nuclear fuel bank plan was finalized in 2015, South Africa stood fast in its dissent while continuing to proclaim its commitment to genuine multilateralism in non-proliferation.[805]

Similarly, South Africa has altered its prior position in favour of extending the IAEA's Additional Protocol (AP) as a condition of nuclear supply to all states. Having concluded an AP agreement with the Agency in 2002 and sitting on the Nuclear Suppliers' Group (NSG), South Africa was widely expected to advocate for stringent controls on the global supply of sensitive nuclear materials and equipment and argue that the AP should be a precondition for transfer deals with the NSG. However, during the mid-2000s, Brazil and Argentina aimed to conclude agreements with the NSG without having an AP in place. South Africa joined them in opposing the AP as a condition of supply. After much wrangling, the NSG agreed that since Brazil and Argentina had forsworn nuclear weapons and already operated IAEA-backed regional agreements that could be interpreted as broadly equivalent to the AP, an exemption could be made in this case. Although the diplomatic was broken, South Africa continued to isolate itself by opposing mandatory APs for trade with the NSG. Joelien Pretorius gives this story an in-depth treatment and proposes that behind Pretoria's intransigence can be found a 'politics of denial' rooted in NAM solidarity. She argues that South Africa's opposition to the AP as a condition of supply reflects two forms of 'denial' on the part of the NWS: the physical denial of resources, and the political denial of the hierarchical nature of the global nuclear order. According to Pretorius, South Africa's position of promoting the utility of APs in general while resisting their use as a condition of supply 'can be placed at that turning point in the dialectic between realism and idealism –where actors design an outcome that they "can live with"'.[806] This activist intervention into nuclear order places South Africa in perpetual tension with more conventional non-proliferation advocates, while still displaying a trademark commitment to multilateralism and transparency in its own nuclear endeavours.

Under the same category falls South Africa's bilateral dealings with other non-aligned states who fall outside of the non-proliferation mainstream. South Africa has instituted nuclear trade and co-operation agreements with India, for instance: Pretorius argues that, in this case, a shared 'post-colonial consciousness' helps to mediate the tension between the economic incentives for nuclear

Century: Assurances of Supply and Non-Proliferation"', IAEA, 19 September 2006, https://www-pub.iaea.org/mtcd/meetings/PDFplus/2006/cn147_sonjica.pdf.

[805] van Wyk, 'Fuel for Thought? South Africa's Position on the Multilateralisation of the Nuclear Fuel Cycle'.

[806] Pretorius, 'Nuclear Politics of Denial: South Africa and the Additional Protocol', 396.

trade on one hand, and non-proliferation obligations on the other.[807] Perhaps the most important case here however is Iran, another state with a shared history of struggle alongside the ANC during the apartheid years. Iran's nuclear programme has caused particular headaches for South Africa. As Onderco details, given that Iran was a particular *bête noire* for Western non-proliferation advocates, Pretoria would be once again expected by virtue of its authority in the area to stand up in defence of rules-based international order and multilateralism; on the other, its turn towards non-aligned states and away from the West 'would nudge South Africa towards a conciliatory position vis-a`-vis Iran. The result was a policy in which South Africa scrambled to balance its interests'.[808] South Africa has continually opposed attempts to use coercive measures against Iran, to pass responsibility for the Iran issue from the IAEA to the UNSC, and more broadly to further isolate and choke off an already constricted Iranian economy. As Onderco notes, the diplomatic risks here for South Africa have not been inconsiderable; Pretoria, perhaps seeking a permanent seat on the UNSC in the future, would be expected not to undermine the institution's authority. He also attributes Abdul Minty's later failure to win the IAEA Director Generalship to his 'strong personal involvement' in the Iran matter.[809] Nevertheless, South Africa has repeatedly intervened on behalf of Iran. In 2005, reports suggested that Thabo Mbeki personally met with Iranian officials to offer South African co-operation in Iranian fuel cycle activities and assist Tehran in producing uranium hexaflouride, intended as an 'interim confidence-building measure' to allay Western fears about diversion to a weapons programme.[810] This was an arguably rare incidence where South African 'bridge-building' nuclear diplomacy aimed not to moderate the impulses of a fellow non-aligned state, but to assist them in carving out space for a national nuclear programme. Hindsight suggests that this apparently radical intervention on the part of South Africa was also the pragmatic course of action, with the global non-proliferation community eager to restart the Joint Comprehensive Plan of Action (JCPOA) with Iran after its temporary dismantling by US President Donald Trump.

Returning to the NPT, the 2005 RevCon was a failure even by unambitious procedural standards, failing to produce a consensual final document. It arguably marks a point of departure for South African 'activist' nuclearity and divergence from narrow adherence to the NPT and associated instruments. Acrimony and dissatisfaction around the NPT had been building for years and fault lines developed along familiar themes. This included a sense of discrimination and inequity among NAM

[807] Pretorius, 'Africa–India Nuclear Cooperation: Pragmatism, Principle, Post-Colonialism and the Pelindaba Treaty'.
[808] Onderco, 'A Battle of Principles', 257.
[809] Onderco, 'A Battle of Principles', 260.
[810] Najmeh Borzogmehr, 'SA Offers Solution to Nuclear Restart by Iran', The Irish Times, 11 August 2005, https://www.irishtimes.com/news/sa-offers-solution-to-nuclear-restart-by-iran-1.478773.

members and other NNWS. As Müller recalls: '[d]uring the 2005 Conference, all states not possessing nuclear arms were confronted with the near certainty of an indefinite future in which the discrimination between the "haves" and the "have nots" will persist. This was not the deal when the NPT was negotiated and signed'.[811] These divides proved too much for the internal coherence of NAC, whose non-aligned members including South Africa began to diverge from the European contingent.[812] Reviewing the conference, Potter presciently remarked that '[a]lmost certainly, NAC will cease to function, at least as it is presently constituted'.[813] At the 2010 conference, South Africa further receded into the background, eschewing the kind of prominent 'bridge-building' roles that it had assumed in 1995 and 2000.[814] However, Pretoria's nuclear diplomacy would hit the headlines again at the 2015 RevCon—which also ended in failure—with an apparent change in tack. Although not necessarily the main area of disagreement, the 2015 RevCon was beset by the same mounting dissatisfaction over a lack of progress on disarmament and the perceived failures by the NWS to fulfil their Article VI obligations. Activity around the HI had been increasing in the years since 2010, promoted by a number of INGOs and advocacy organisations, and South Africa itself led a statement signed by 80 parties in support of the HI at the 2013 PrepCom. A landmark conference in Vienna in 2014 resulted in the 'Austrian pledge', formally recognizing the humanitarian threats posed by nuclear weapons. In 2015, a paper submitted by Ireland on behalf of NAC (which built on the intervention of the Austrian delegation in 2010) helped to push the HI into the non-proliferation mainstream. During the years since, the movement has snowballed, proving to be arguably one of the most important developments in the history of global nuclear order.

In line with Potter's prediction, NAC thus evolved into its next incarnation. Its arguments are set out in comprehensive a 2013 edited volume, *Reaching Critical Will*, which mounts a compelling case for shifting international discourse on nuclear weapons away from strategy and deterrence (and the associated bevy of acronyms and 'technobabble') and towards a direct confrontation of the devastating humanitarian consequences of nuclear weapons use.[815] This strategy draws explicitly from 'critical constructivist' international relations theory,[816] positing that a shifting the discourse

[811] Harold Müller, 'A Treaty in Troubled Waters: Reflections on the Failed NPT Review Conference', *The International Spectator* 40, no. 3 (2005): 38.
[812] John Simpson and Jenny Nielsen, 'The 2005 NPT Review Conference: Mission Impossible?', *Nonproliferation Review* 12, no. 2 (2005): 271–301.
[813] William C. Potter, 'The NPT Review Conference: 188 States in Search of Consensus', *The International Spectator* 40, no. 3 (2005): 23.
[814] Potter and Mukhatzhanova, *Nuclear Politics and the Non-Aligned Movement*, 55.
[815] Fihn, *Unspeakable Suffering: The Humanitarian Impact of Nuclear Weapons*.
[816] Matthew Bolton and Elizabeth Minor, 'The Discursive Turn Arrives in Turtle Bay: The International Campaign to Abolish Nuclear Weapons' Operationalization of Critical IR Theories', *Global Policy* 7, no. 3 (2016): 385–95; see Carol Cohn, 'Sex and Death in the Rational World of Defense Intellectuals', *Signs: Journal of*

into humanitarian terms might sufficiently 'stigmatize' and 'delegitimize' nuclear weapons such that NWS governments may begin to reconsider their attachment to policies of nuclear deterrence.[817] The International Campaign to Abolish Nuclear Weapons (ICAN), founded in 2007, spearheaded the global movement to turn generalized support for the HI into a legally-binding treaty framework, which eventually took shape in the form of the 2017 Treaty on the Prohibition of Nuclear Weapons (TPNW). South Africa has been at the forefront of these efforts, positioning itself as a highly activist NNWS, often assuming a representational role *vis-à-vis* the rest of Africa in pushing for a nuclear weapons ban. A combination of historical struggle and victory over nuclear weapons, the aforementioned exemplary contribution to the global non-proliferation regime, and an impressive level of conventional nuclearity has placed Pretoria in a 'natural' leadership position, and there are high expectations among the rest of Africa and NAM more broadly that South Africa take advantage of this apparently unique opportunity to alter the complexion of global nuclear order.[818] Government statements have reflected Pretoria's apparent willingness to rise to this challenge, and draw an unbroken line between the liberation struggle—during which anti-nuclearism was a key battlefront in the fight for human rights—and contemporary efforts towards multilateral disarmament. For instance:

> It is significant to recall that South Africa's struggle for political freedom was closely linked to the campaign for nuclear disarmament, including the elimination of the apartheid nuclear bomb. The eventual abandonment of the nuclear weapons programme by South Africa is testimony to the principled stance of the overwhelming majority of South Africans against nuclear weapons and their elimination.[819]

And:

> South Africa's struggle for political freedom was closely linked to nuclear disarmament and as the first country to have eliminated our nuclear weapons, we are proud to have played a role in

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Women in Culture and Society 12, no. 4 (July 1987): 687–718 for a particularly influential text which prefigures much of the HI argument.

[817] e.g. Kjølv Egeland, 'Banning the Bomb: Inconsequential Posturing or Meaningful Stigmatization?', *Global Governance: A Review of Multilateralism and International Organizations* 24, no. 1 (1 January 2018): 11–20; Nick Ritchie and Kjølv Egeland, 'The Diplomacy of Resistance: Power, Hegemony and Nuclear Disarmament', *Global Change, Peace & Security* 30, no. 2 (4 May 2018): 121–41.

[818] Boureston and Lacey, 'Shoring Up a Crucial Bridge: South Africa's Pressing Nuclear Choices'; Sarah J. Swart, 'An African Contribution to the Nuclear Weapons Debate', *International Review of the Red Cross* 97, no. 899 (2015): 753–73.

[819] DIRCO, 'Opening Remarks by Deputy Minister Luwellyn Landers at the African Regional Conference on Nuclear Disarmament and Lethal Autonomous Weapons, 16 August 2018, Premier Hotel, Pretoria', Department of International Relations and Co-operation, 16 August 2018, http://www.dirco.gov.za/docs/speeches/2018/land0816.htm.

> the finalisation of the Treaty on the Prohibition of Nuclear Weapons, together with members of the Core Group [of Negotiators for the Treaty on the Prohibition of Nuclear Weapons].[820]

For Swart, this humanitarian orientation to the problem of nuclear weapons reflects Pretoria's commitment to its official diplomatic doctrine of *ubuntu*:

> *Ubuntu* reflects the concept of humanity, and refers to the idea that we affirm our humanity when we affirm the humanity of others. South Africa recognizes interconnectedness and interdependency as important aspects of its diplomacy, and aspires to act as a champion for collaboration, co-operation, and partnership rather than conflict.[821]

In keeping with these commitments, South Africa became the 22nd party to the TPNW in 2017, and is one of the most prominent of the 54 current parties to the agreement. Hailed as a 'disarmament hero' by ICAN,[822] this position has placed South Africa firmly in a global minority of states and at loggerheads with the NWS, states who benefit from nuclear protection 'umbrellas', and many in the mainstream non-proliferation complex who claim that the TPNW undermines the NPT and potentially threatens global nuclear stability. The NWS have tended to justify their refusal to sign the TPNW by pointing out that if the TPNW emerges as a parallel or alternative yardstick to the NPT by which to measure progress on disarmament, the NPT is at risk of losing crucial support. Parties may point to the TPNW as a justification to withdraw from the NPT, and proceed to embark on potentially destabilizing nuclear programmes. A 2017 statement by the British government responding to the TPNW's adoption is representative of these concerns:

> [The TPNW] will not improve the international security environment or increase trust and transparency […] This treaty also risks undermining and weakening the Nuclear Non-Proliferation Treaty, which has played an unparalleled role in curtailing the nuclear arms race. The NPT continues to make a significant contribution to the strategic stability that the international community requires. We must uphold and strengthen the NPT because of, not despite, the complex security challenges that we all face. It remains the right framework for progress across all three, mutually reinforcing, pillars, including disarmament.[823]

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[820] DIRCO, 'Statement by HE Deputy Minister Alvin Botes during the Virtual Commemoration of the Entry into Force, of the Treaty on Prohibition of Nuclear Weapons, 22 January 2021', Department of International Relations and Co-operation, 22 January 2021, http://www.dirco.gov.za/docs/speeches/2021/bote0122.htm.
[821] Swart, 'An African Contribution to the Nuclear Weapons Debate', 771.
[822] ICAN, 'South Africa: From Nuclear Armed State to Disarmament Hero', International Campaign to Abolish Nuclear Weapons, 25 February 2019, https://www.icanw.org/south_africa_from_nuclear_armed_state_to_disarmament_hero.
[823] FCO, 'UK Statement on Treaty Prohibiting Nuclear Weapons', Foreign and Commonwealth Office, 8 July 2017, https://www.gov.uk/government/news/uk-statement-on-treaty-prohibiting-nuclear-weapons.

In standing up to the recalcitrant NWS—many of whom assisted the apartheid regime in its nuclear programme—over the humanitarian consequences of nuclear weapons, the ANC government summons the spirits of its liberation struggle. However, Pretoria's TPNW and HI activism shares another characteristic with the anti-apartheid movements' anti-nuclear campaigning of the 1970s and 1980s: a veiled commitment to non-proliferation orthodoxy. I will now explore the ways in which this helps to bolster existing global structures of nuclear danger, as well as posing problems for democracy, transparency, and environmental justice at home.

The 'activist' interventions outlined above speak in favour of a South Africa which is willing to challenge non-proliferation orthodoxies, and back up its rhetorical criticisms of both nuclear hierarchy and danger with substantive action. There is little doubt that, whatever non-material benefits of authority and diplomatic clout South Africa might accrue through this approach, the ANC in government has preserved a genuinely principled element to its foreign policy practice[824]—even in the face of resistance from the NWS, its allies, and the IAEA. The purpose of this section is not to question the sincerity of the ANC's stated commitments nor to suggest that it is operating on a basis of cynically disguised *realpolitik*, but to make a more nuanced point. South Africa's 'activist' nuclearity may be aimed at reforming the global nuclear order and ameliorating its worst excesses and hierarchies, but it remains at heart just that: a form of nuclearity. Pretoria relies on its credentials as a highly nuclear actor for its critiques of unfairness in the NPT, of the lack of progress on disarmament, or of the humanitarian consequences of a hypothetical nuclear detonation to be taken seriously. In turn, these interventions further bolster Pretoria's official nuclearity, because all of these activities take place against a backdrop of South African affirmation of the NPT and—despite the problems which beset it—acceptance of its ultimate legitimacy. Pretoria does challenge some of the inequalities and hierarchies embedded in the global nuclear order, but has also devoted large amounts of political capital to entrenching the status quo.

South Africa, 'obedient rebellion', and nuclear exceptionalism

Despite a veneer of activism, few of the activities described above pose a challenge to the fundamental structure of the global nuclear order. In this sense, they can be considered to contribute to South Africa's 'conventional' nuclearity in much the same way as its exemplary non-proliferation behaviour and conspicuous compliance. In the case of its displays of non-aligned solidarity with regard to nuclear trade and supply, it is important to remember that Pretoria is asking for individual exceptions to be made to rules and structures which it has played a pivotal role in

[824] van Wyk, 'Nuclear Diplomacy as Niche Diplomacy: South Africa's Post-Apartheid Relations with the International Atomic Energy Agency'.

creating and sustaining. South African contributions to the 1995 and 2000 NPT RevCons were crucial in heading off non-aligned challenges to the NWS to make progress on disarmament. In 1995, South Africa helped to ensure indefinite NPT extension and in 2000, Pretoria was deeply involved in NAC talks which eventually resulted in the removal of set time frames for disarmament efforts. Taylor's characteristically uncharitable assessment is that its subsequent challenges to unfairness, hierarchy, and unequal access to peaceful nuclear technology are therefore little more than political *kabuki* theatre. 'Appearing to challenge and confront the dominant powers over nuclear weapons after the NPT has been indefinitely extended', he argues,

> throws up the imagery of autonomy in which a country such as South Africa can challenge the developed world. Of course, there is agency, but […] this has been largely confined to technical interventions, emasculated as it has been by the indefinite extension of the NPT and the reification of the nuclear powers' possession of their existing weaponry.[825]

This fits in with the approach that Taylor identifies within South Africa's broader trade and diplomatic relationships with fellow non-aligned states in the immediate post-apartheid years, which is to demonstrate to its former comrades-in-arms that it has not 'sold out', and that continued struggle is still possible within mainstream multilateral institutions.[826] This is perhaps a slightly cynical reading of the ANC's post-apartheid diplomacy. Nonetheless, there is little to disagree with in Taylor's overall assessment: South Africa is mounting these challenges—which have tended to be technical in nature (opposing the AP as a condition of NSG supply), or to address the grievances of individual states (offering assistance to the Iranian civil nuclear programme)—from a secure position, within a hegemonic institutional context that it has been instrumental in creating and securing. Rather than intentionally acting as a foil to NAM's objectives, however, it is more likely that the activist element of South Africa's diplomacy has evolved over time, within tight technopolitical boundaries that have long been settled. As discussed in the preceding chapter, the unipolar condition which prevailed in 1995 meant that South Africa had a number of strong incentives to fall in line with the NWS, including the fact that its authority on non-proliferation and disarmament was yet to be fully cemented. Co-operating at the 1995 and 2000 RevCons helped to put South Africa's non-proliferation credentials essentially beyond reproach, further aided by its advocacy of AP agreements and its conspicuous co-operation with the IAEA on inspection and verification at home. Since then, Pretoria appears to have used this accumulated goodwill to try and make amends with its non-aligned comrades. Put simply, from the viewpoint of radically overhauling the global nuclear

[825] Taylor, 'South Africa and the Nuclear Non-Proliferation Treaty', 176–77.
[826] Taylor, *Stuck in Middle GEAR: South Africa's Post-Apartheid Foreign Relations*, 2, 298.

order, South African activist diplomacy is more a case of 'too little, too late', rather than active duplicity.

A similar dynamic is at work surrounding the Pelindaba Treaty. While careful to stress that NFWZs are important interventions into nuclear order and manifestations of Global South Agency, Mpofu-Walsh has also characterized them as a form of 'obedient rebellion'. Contradictory impulses coalesce under the banner of NWFZs, which can represent both a measure of good non-proliferation behaviour complementary to the stability of global nuclear order or a principled objection to nuclear arsenals and the order that sustains them. The African NFWZ is no exception, borne of an 'ambivalence between competing norms'.[827] However, given the structural preponderance enjoyed by the NWS in any relations with the African continent, Mpofu-Walsh warns against viewing the Pelindaba Treaty through rose-tinted spectacles. Present-day South African 'antipathy to nuclear weapons has withstood several historical tests and remains robust' but, being expressed as little more than a desire for the NWS to live up to their disarmament obligations as enshrined in the NPT, 'is based on a fundamental acceptance of the institutions and norms of global nuclear order'.[828] After all, NFWZs have been widely understood as complements to the NPT in much the same way as tools like the IAEA's AP: additional, voluntary measures which enhance conventional efforts to guard against proliferation. As the UN's WMD Commission report notes, they 'complement and reinforce the basic non-proliferation commitments of the NPT' and 'contribute to the strengthening of comprehensive […] IAEA safeguards'.[829] Article VII of the NPT itself explicitly codifies the right of states to institute NFWZs, as did the reports of the 1995 and 2000 RevCons.[830] South Africa's own statements on the Pelindaba Treaty confirm that Pretoria sees the instrument as 'important step towards the strengthening of the non-proliferation regime [and] the promotion of co-operation in the peaceful uses of nuclear energy', contributing in an incremental fashion to the more distant goal of 'general and complete disarmament'.[831] To echo Mpofu-Walsh's conclusion, then, it is apparent that South Africa—having pursued a policy of 'extreme rebellion' via its nuclear weapons

[827] Mpofu-Walsh, 'Obedient Rebellion: Nuclear-Weapon-Free Zones and Global Nuclear Order, 1967–2017', 220.
[828] Mpofu-Walsh, 'Obedient Rebellion: Nuclear-Weapon-Free Zones and Global Nuclear Order, 1967–2017', 222.
[829] WMDC, 'Weapons of Terror: Freeing the World of Nuclear, Biological and Chemical Arms' (Stockholm: Weapons of Mass Destruction Commission, 1 June 2006), 79.
[830] Goldblat, 'Nuclear-weapon-free Zones: A History and Assessment', 19.
[831] DIRCO, 'African Nuclear Weapons Free Zone Treaty (ANWFZ) (Treaty of Pelindaba)', Department of International Relations and Co-operation, 13 February 2004, http://www.dirco.gov.za/foreign/Multilateral/africa/treaties/anwfz.htm; DIRCO, 'Statement by the Republic of South Africa on the Issues of Safeguards, Non-Proliferation and Nuclear-Weapon-Free Zones (Main Committee II), New York, 2-27 May 2005', Department of International Relations and Co-operation, 22 August 2005, http://www.dirco.gov.za/docs/speeches/2005/mint0822e.htm.

programme in the past—has now pivoted towards 'extreme obedience' in its nuclear diplomacy.[832] The African NFWZ, despite its activist trappings, sits firmly within the existing paradigm of non-proliferation, and poses little in the way of a disarmament challenge to the NWS.

Similar criticisms can be made of the movement around the TPNW. This coalition aspires to a radical revisioning of nuclear order: one in which states no longer feel compelled to maintain nuclear arsenals as the primary guarantor of security, in which widespread public revulsion further prevents them from pursuing nuclear weapons capabilities, and in which the NPT and its gradualist approach to disarmament are rendered obsolete by the 2017 Ban Treaty—which will become the primary global agreement governing nuclear weapons. This is indeed a vision of a very different world, which would require a root-and-branch restructuring of nuclear order. Admirable as the work of ICAN and those states allied to the cause is, however, the means by which the pro-disarmament coalition has opted to pursue its ends are insufficient for the task at hand. Several analysts have pointed out many ways in which the TPNW, contrary to the fears of the NWS outlined above, actually serves to reify and legitimize many of the elements of nuclear order to which it is outwardly opposed. The most prominent of these criticisms revolves around the manner in which the TPNW, like the AFNWZ, reaffirms the ultimate authority of the NPT. Article 18 of the TPNW states that '[t]he implementation of this Treaty shall not prejudice obligations undertaken by States Parties with regard to existing international agreements, to which they are party, where those obligations are consistent with the Treaty'.[833] The respective conditions of the TPNW and the NPT are fully compatible—since the NPT is in a technical sense a disarmament treaty itself—and so nothing in the TPNW prejudices the full implementation of the NPT. TPNW advocates are keen to point out the commonalities with the NPT, which help them to posit the agreement as a credible and 'sensible' measure. On this account, the TPNW does not attempt to create a parallel legal framework, but is simply another instrument in 'assisting' the NWS to fulfil their Article VI obligations. As Hajnoczi notes:

> the negotiations of the TPNW were marked by the utmost care to make the TPNW a new legal instrument in line with the existing disarmament and non-proliferation regime. The treaty explicitly and structurally fits into the framework created by the NPT and constitutes a necessary measure for the implementation of its Article VI.[834]

[832] Mpofu-Walsh, 'Obedient Rebellion: Nuclear-Weapon-Free Zones and Global Nuclear Order, 1967–2017', 160.
[833] ICAN, 'Full Text of the Treaty', International Campaign to Abolish Nuclear Weapons, 7 July 2017, https://www.icanw.org/full_text_of_the_treaty.
[834] Tomas Hajnoczi, 'The Relationship between the NPT and the TPNW', *Journal for Peace and Nuclear Disarmament* 3, no. 1 (2020): 6.

Egeland concurs, arguing that 'there is little reason to suspect that supporters of the TPNW will act as spoilers of any genuine strengthening of the NPT regime' at the upcoming (postponed) 2020 RevCon.[835] For supporters of the TPNW, its synergy with the NPT is a major point in its favour, since it allows for a reformist prohibition campaign within the bounds of current 'realistic' political possibilities. However, the extent to which advocacy of the TPNW can be understood as a fundamental challenge to the broader structures of nuclear order is doubtful. It is predicated on an acceptance of the order's legitimacy and current primacy in international law.

In itself, this is not necessarily grounds for criticism: the pursuit of limited goals within current non-proliferation frameworks is a pragmatic strategy, and supporters would argue that it has already had more of an impact on at least the discourse of global nuclear order than decades of radicalism on the part of the non-aligned movement.[836] It can be credibly argued that a discursive strategy predicated on delegitimizing nuclear weapons on humanitarian grounds is fully compatible with existing non-proliferation structures. Harrington de Santana suggests that 'nuclear zero [might be] best achieved through an aggressive education campaign emphasizing that creating and maintaining nuclear arsenals is expensive and has high human costs associated with it', and that such costs are not well-known to the public is an unfortunate legacy of Cold War 'national security' logic.[837] The TPNW advances this project effectively, in parallel with the NPT. However, Harrington de Santana also notes that highlighting humanitarian costs may not be entirely sufficient for a total devaluing of nuclear weapons. There are other components of nuclear exceptionalism to be dismantled as well, such as the assumption that nuclear weapons possess such a uniquely high 'threat value' they are the 'ultimate' guarantors of state security.[838] Although nuclear weapons are undeniably materially powerful, she argues, their perceived utility stems from the threat of their use—not their actual use. This threat value is constructed and historically contingent on particular understandings of the international system, not an immutable material characteristic of the weapon itself. It is in this sense that the TPNW hews closer to the prevailing nuclear orthodoxy than its proponents might like to admit. Specifically, the TPNW outlines a provision for states to withdraw at any time if 'extraordinary events' threaten their 'supreme interests'. This amounts to a recognition 'that under certain circumstances the prohibition on nuclear weapons would not apply', which 'undermines the core

[835] Kjølv Egeland, 'Dead Rubber Diplomacy: What to Expect from the Tenth NPT Review Conference?', *Medicine, Conflict and Survival* 36, no. 3 (2020): 206.
[836] e.g. Bolton and Minor, 'The Discursive Turn Arrives in Turtle Bay: The International Campaign to Abolish Nuclear Weapons' Operationalization of Critical IR Theories'; Egeland, 'Banning the Bomb: Inconsequential Posturing or Meaningful Stigmatization?'
[837] Anne Harrington de Santana, 'Nuclear Weapons as the Currency of Power: Deconstructing the Fetishism of Force', *Nonproliferation Review* 16, no. 3 (2009): 342.
[838] Harrington de Santana, 'Nuclear Weapons as the Currency of Power: Deconstructing the Fetishism of Force', 334.

normative thrust of the treaty: that nuclear weapons are unacceptable and illegitimate under any circumstances, and as such have no value'.[839] Under a future where the TPNW has superseded the NPT, nuclear weapons may be comprehensively delegitimized in moral/ethical terms on the grounds of the humanitarian consequences of their use, but simultaneously recognized as a regrettable necessity for the defence of a state's vital interests or territorial integrity.

It should be noted here that South Africa, along with a majority of non-aligned states, advocated for the deletion of these provisions from the TPNW altogether, opposing this reaffirmation of the ultimate value of nuclear weapons.[840] Article 20 of the Treaty of Pelindaba, however, also contains this provision in almost exactly the same wording.[841] Through both the TPNW and the AFNWZ, regardless of any objections raised during negotiations, South Africa therefore remains committed to a broader legal framework alongside that of the NPT which reaffirms the 'exceptional' military value of nuclear weapons. With this in mind, it is difficult to argue that South Africa's TPNW advocacy constitutes much of a departure from the existing non-proliferation paradigm thorough which nuclear weapons are understood. Indeed, returning to Taylor's evisceration of Pretoria's post-apartheid multilateral diplomacy, it can be argued that South Africa's keen participation in the TPNW might serve to strengthen and legitimize the mainstream global nuclear order itself. By continuing the struggle against global nuclear apartheid within mainstream multilateral frameworks, Pretoria signals to its former comrades-in-arms that change is possible through liberal reformism. The TPNW serves as a locus for the expression of radical critiques of nuclear order and global hierarchy, which appears to demonstrate that real, fundamental dissent is possible within the broader framework of the NPT. It potentially serves as a lightning rod for potentially dangerous and destabilizing challenges to nuclear order, channelling them into initiatives which end up bolstering the NPT—while also demonstrating to constituencies foreign and domestic that the ANC has not 'sold out' its anti-nuclear stance.[842] I show in preceding chapters that the ANC in opposition has never in fact been opposed to the NPT-centred nuclear order as a matter of principle, so this approach to 'activist' nuclear diplomacy is, in fact, largely in continuity with the history of liberation struggle. Nevertheless, it is apparent here that South Africa's more 'activist' nuclear diplomacy is much more closely aligned with its conspicuous compliance/'good behaviour' diplomacy than first glances might suggest.

[839] Laura Considine, 'Contests of Legitimacy and Value: The Treaty on the Prohibition of Nuclear Weapons and the Logic of Prohibition', *International Affairs* 95, no. 5 (2019): 1090.
[840] Considine, 'Contests of Legitimacy and Value: The Treaty on the Prohibition of Nuclear Weapons and the Logic of Prohibition', 1090.
[841] IAEA, 'African Nuclear Weapon-Free-Zone Treaty (Pelindaba Treaty)', International Atomic Energy Agency, 20 October 2014, https://www.iaea.org/publications/documents/treaties/african-nuclear-weapon-free-zone-treaty-pelindaba-treaty.
[842] Taylor, *Stuck in Middle GEAR: South Africa's Post-Apartheid Foreign Relations*, 298.

For clarity, I do not argue that South Africa's participation in the TPNW movement necessarily militates against disarmament. The point here is rather that South Africa's pro-disarmament activism exists in tension with the deep and conspicuous commitments that it has made to non-proliferationism, and by extension the status quo of the global nuclear order more broadly, since the ANC came to power in 1994. In other words, Pretoria's advocacy for the TPNW and other multilateral disarmament initiatives is an extension of its broader line of 'obedient rebellion' in global nuclear politics. South Africa has been instrumental in extending and preserving the legitimacy of the various institutional arrangements against which it now stands as a party to the TPNW. The TPNW and South Africa's NPT commitments are not entirely contradictory, as noted above. Furthermore, as Mpofu-Walsh notes, senior South African diplomats often justify their support for the TPNW and the ANWFZ not as protests against nuclear order, but as redeeming features which offer the possibility of reform.[843] In addition, South Africa remains committed to the Humanitarian Initiative coalition against nuclear weapons. It is important to note that, while the TPNW is a product of this campaign, there is considerable nuance among HI states and not all are proponents of the TPNW.[844] There is in other words room for some genuine rebellion within South Africa's obedience. However, the broader upshot of this activism is that South Africa's official nuclearity and reputation as a non-proliferation and disarmament norm entrepreneur are bolstered, and that South Africa continues to accrue benefits in terms of status and prestige from the status quo of nuclear order—even if it cannot quite be argued that Pretoria deliberately aims to perpetuate this status quo through its diplomacy. Another effect of South Africa's activist nuclear diplomacy, to which I now turn, is the appearance of a departure between its progressive face on the nuclear global stage, and controversial and secretive civil nuclear development at home.

The domestic anti-nuclear movement: contesting official nuclearity and the 'local/global' rupture

One dimension of nuclear exceptionalism is the assumption outlined in the above section: that nuclear weapons are 'exceptional' in their value in safeguarding the supreme interests of a state. Another, as Hecht and Considine both remind us, is that nuclear weapons are also assumed to be 'exceptional' in their fundamental separateness from other aspects of social, political life, and 'non-

[843] Mpofu-Walsh, 'Obedient Rebellion: Nuclear-Weapon-Free Zones and Global Nuclear Order, 1967–2017', 197.
[844] Jenny Nielsen, 'The Humanitarian Initiative and the Nuclear Weapons Ban Treaty', in *Nuclear Safeguards, Security and Nonproliferation: Achieving Security with Technology and Policy*, ed. James E. Doyle (Oxford: Butterworth-Heinemann, 2019), 37–58.

nuclear' life.[845] Treating nuclear weapons as exceptional therefore also 'obscures the complex material, political and social effects of the growth of a global nuclear weapons production infrastructure'.[846] The TPNW, in focusing on nuclear weapons as a 'bounded problem that can be solved through a singular solution',[847] further encourages them to be isolated from broader social and material contexts. While ICAN and other activist groups have sought to draw links between nuclear weapons and other dimensions of oppression[848]—drawing on the best traditions of critical international relations and geography[849]—the crystallization of their efforts, the TPNW, itself codifies this exceptionalism. Nuclear exceptionalism is also enshrined in the NPT which, as we have discussed, treats nuclear weapons as separate from civil nuclear technology—a distinction that is self-evidently untenable, given the huge 'peaceful' nuclear complex upon which nuclear weapon research and production relies. Pretoria's singular diplomatic focus on the elimination of nuclear *weapons* functions to obscure the difficult nuclear legacies with which it is faced at home. The government is able to make an impressive global performance of opposing nuclearism, yet its domestic nuclear infrastructure positions it as a key node in a world nuclear complex which perpetuates that condition.[850] Moreover, South Africa's imbrication with the global nuclear order has resulted in a number of morbid nuclear symptoms at home. The dominant lens of nuclear exceptionalism has enabled most analysts to ignore the post-apartheid ramifications of nuclear technology and global nuclear order for democracy, transparency, and civil life in South Africa, and the ways in which these things intersect with the country's extant inequalities.

The end of apartheid and South Africa's nuclear disarmament both marked significant victories for the domestic anti-nuclear movement, who alongside their environmental commitments shared the view of the ANC and its international allies that nuclear weapons were an important plank of apartheid state power. The election of the ANC in 1994 and South Africa's concomitant accession to the NPT, and additionally the full spectrum of trust-building and verification measures within the global nuclear order, produced a convincing appearance of 'rupture' from the past. It would be churlish to suggest that these were anything other than changes for the better. However, as one

[845] Gabrielle Hecht, 'Nuclear Ontologies', *Constellations* 13, no. 3 (September 2006): 320–31; Hecht, *Being Nuclear*.
[846] Considine, 'Contests of Legitimacy and Value: The Treaty on the Prohibition of Nuclear Weapons and the Logic of Prohibition', 1087.
[847] Bolton and Minor, 'The Discursive Turn Arrives in Turtle Bay: The International Campaign to Abolish Nuclear Weapons' Operationalization of Critical IR Theories', 389.
[848] Considine, 'Contests of Legitimacy and Value: The Treaty on the Prohibition of Nuclear Weapons and the Logic of Prohibition', 1080.
[849] e.g. Cohn, 'Sex and Death in the Rational World of Defense Intellectuals'; Masco, *The Nuclear Borderlands*; Biswas, *Nuclear Desire*.
[850] Gabrielle Hecht, without addressing South Africa in specific detail, shows us the manifold functions which Africa serves in the world nuclear complex. Hecht, *Being Nuclear*.

might expect, continuities and unresolved legacies remained. Hecht criticizes the 'ritual debunking' of 'rupture-talk' as a somewhat facile endeavour 'in which scholars demonstrate that the sharp breaks proclaimed by élites mas[k] profound continuities'.[851] This kind of account, she argues, usually fails to recognize that 'rupture-talk' is not 'mere rhetoric' but has very real, material consequences: it can be 'inscribed in sociotechnical practice, [stake] claims to power', and 'create[e] expectations among both élites and non-élites'.[852]

This has been the case with South Africa's rupture. As argued throughout this chapter, South Africa's accession to the global nuclear order has resulted in an apparent rupture between 'local' and 'global', one of the foundational binaries of nuclear order (alongside 'civil' and 'military' nuclear technology). According to the logic of nuclear exceptionalism, the problem of nuclear *weapons* has become divorced from the broader nuclear complex from which it arises. This artificial separation drawn between 'global' and 'local' has permitted the pursuit of two different nuclearities at home and abroad. Pretoria pursues an official, activist-inflected nuclearity using repurposed apartheid-era assets at home while staking a claim to a unique progressive, bridge-building role at the global level. However, this political use of nuclear exceptionalism has also resulted in the anti-nuclear and environmental movements to a large extent becoming unmoored from the progressive coalition which successfully battled apartheid. For the ANC, progressiveness in the global nuclear order is characterized by good non-proliferation practice, opposition to nuclear weapons on humanitarian grounds, and bounded displays of non-aligned solidarity. However, within South Africa, the progressiveness of the anti-nuclear movement has pitted it against the ANC and its determination to expand the country's nuclear technological base. Today's anti-nuclear movement is largely concerned with addressing the difficult legacies of the apartheid nuclear programme that the ANC, thanks to its commitment to non-proliferationism, has been able to mostly ignore. This is not simply a story of hidden continuities, then: South Africa's nuclear rupture-talk has reconfigured the terms of anti-nuclearism and spurred former comrades into action against ANC policies. In the course of their continuing struggle, present-day anti-nuclear campaigners have highlighted the ways in which South African civil nuclear policy, as well as adherence to the rules of nuclear order, have themselves posed obstacles to democratisation, transparency, and transition from apartheid.

As our review of the *Nuclear Debate* conference showed, at the moment of disarmament/transition a current of opinion existed, mostly outside of the ANC's elite circles, that South Africa's nuclear inheritance should be fully consigned to history. Some of the views expressed opposed nuclear

[851] Gabrielle Hecht, 'Rupture-Talk in the Nuclear Age: Conjugating Colonial Power in Africa', *Social Studies of Science* 32, no. 5–6 (2002): 692.
[852] Hecht, 'Rupture-Talk in the Nuclear Age: Conjugating Colonial Power in Africa', 692.

power mainly on environmental grounds.[853] However other interventions, particularly those made by South African groups with ties to the liberation movement, drew links between nuclear technology and the technopolitics of apartheid.[854] We have already examined how, within this tendency, many were sceptical of the possibility of maintaining a hard boundary between civil and military nuclear technology. When the ANC committed to non-proliferation and attempted to 'outsource' the inconvenient or ambivalent aspects of its nuclear inheritance by submitting itself to a slew of inspection and verification measures, this more radical tendency of the anti-nuclear movement was cut adrift. It became clear that the ANC had neither the political will nor the capacity to uproot the broader set of social relations and structural conditions that surrounded the apartheid nuclear programme and energy system,[855] despite the earlier promises of its Science & Technology Group to institute bottom-up policymaking that benefited the country's majority. As we have seen, these nuclear assets would be important in maintaining Pretoria's brand of official nuclearity on the global stage and in any case, the old guard of nuclear bureaucrats retained many key levers of power. Furthermore, both the government's Growth, Employment, and Redistribution (GEAR) doctrine and the AEC/Necsa's '2000-Plus' strategy emphasized the commercialization, privatization, and rationalization of state assets. There was therefore a policy incentive to retain and try to make profitable at least some of the nuclear legacy, and South Africa's increasing integration into global markets made the prospect of expensive national infrastructure overhauls an increasingly remote possibility.

Consequently, the old anti-nuclear movement became associated with a broader movement for 'environmental justice', linking the nuclear issue with larger legacies of apartheid: poverty and racial inequality. This nebulous grouping incorporates a diverse range of actors and NGOs working on multiple issue areas, among them Earthlife Africa. According to Jacklyn Cock, the movement 'is located at the confluence of three of our greatest challenges: the struggle against racism, the struggle against poverty and inequality and the struggle to protect the environment, as the natural resource base on which all economic activity depends'.[856] In other words, it is an umbrella movement incorporating 'red', 'brown', and 'green' constituencies. Respectively, these labels refer to anti-poverty organising and elements of the traditional left wing; urban environmental campaigns

[853] e.g. Moglen, 'Nuclear Development Against Democracy: Why a Democratic South Africa Should Renounce Nuclear Development'.
[854] e.g. Eco-Programme, 'Group Presentation: Nuclear Power Is Like Apartheid'; Knill, 'Group Presentation: Earthlife Africa'; Fig, 'Does South Africa's Nuclear Industry Deserve to Survive?'
[855] See Christie, *Electricity, Industry and Class in South Africa*; Baker, 'Governing Electricity in South Africa: Wind, Coal and Power Struggles'; Gottschalk, 'The Politics of Electricity Generation in South Africa'; Jaglin and Dubresson, *Eskom: Electricity and Technopolitics in South Africa*.
[856] Cock, 'Connecting the Red, Brown and Green: The Environmental Justice Movement in South Africa', 2.

around access to electricity, waste management, pollution, and so on; and traditional conservation-focused environmentalism, such as habitat protection. The rise of the movement has been driven by a 'contradiction between the discourse of rights and the experience of unmet needs' among both rural and urban poor communities, many of which are located within traditional ANC strongholds.[857] Simply put, the post-apartheid state has failed to deliver on most of its promises of socioeconomic uplift, and South Africa is still riven by inequality which very often conforms to the old racial hierarchies and divides. It is primarily within this context that the present-day anti-nuclear movement in South Africa is located. While Koeberg Alert focuses more on the technical merits and demerits of nuclear power and hopes to educate the public on the benefits of alternative technologies,[858] larger groups at the forefront of opposition to nuclear power including Earthlife, SAFCEI, and Right2Know have mounted broader and deeper criticisms, linking the struggle to issues of poverty, living standards, transparency, and democracy.

Anti-nuclearism within the environmental justice movement rejects South Africa's rearticulated official nuclearity on the grounds that it remains intertwined with both the historical excesses of apartheid (which continue to reverberate through South African society) and present-day structural injustices. While the narrow question of South Africa's nuclear weapons has been resolved, anti-nuclear groups see the abolition of South Africa's nuclear industry as a necessary component of social and environmental justice. There are numerous facets to this political anti-nuclearism. Individual issues include responding climate change and democratization of South Africa's energy supply, ecological threats to disadvantaged communities from the nuclear industry, patronage and state capture, and lack of information and accountability regarding South Africa's nuclear practices past and present. Together, these struggles constitute a continuation of the struggle for *democracy*. Lingering effects of apartheid South Africa's nuclear ambitions have yet to be exorcised from South African public life, and have contributed to the country's difficulties in building a robust and consensual democracy. Although the role of nuclear *weapons* themselves in propping up apartheid is widely recognized in mainstream discourse, they are treated as exceptional and separate from the wider infrastructures and social contexts from which they emerged—and many of which remain. The global nuclear order and its attendant nuclear exceptionalism, despite Pretoria's progressive global nuclearity, are therefore implicated in South Africa's incomplete democratic transition.

[857] Cock, 'Connecting the Red, Brown and Green: The Environmental Justice Movement in South Africa', 17.
[858] Koeberg Alert Alliance, 'About KAA'; Koeberg Alert Alliance, 'Costs', 2011, https://koebergalert.org/costs/. Since its re-founding, Koeberg Alert has somewhat broken from its past cross-cutting alliances with the liberation movement, becoming more of a single-issue group that focuses on public education and demystifying the basics of nuclear and renewable energy.

The most visible anti-nuclear struggle of recent years has been the opposition of the government's aforementioned 9.6GW proposed nuclear build, plans for which were eventually found to be illegal in court. The two major NGOs at the forefront of this fight have been SAFCEI and Earthlife Africa, the former of which is rooted in multifaith religious organisations and both of which are concerned with environmental justice as it is defined by Cock. A senior SAFCEI organizer pointed to one theological text that had been particularly influential on the group's work: 'The Olive Agenda' reiterates many of the points made by Jacklyn Cock in emphasizing the importance of combining 'green' and 'brown' environmental issue-areas to the success of South African 'social regeneration'.[859] SAFCEI's work initially began with a traditionally 'green' focus on ecological issues, but shifted towards a more integrated vision of environmental justice when a scientist working on fracking in the Karoo region stumbled upon an open-cast uranium mine. Concerns about contaminated run-off and the potential effects on regional farmers and their livelihoods sparked broader conversations about social justice and the extent to which South Africa since apartheid has been willing to sacrifice other dimensions of living standards in favour of job creation.[860] SAFCEI organizers also identified barriers to participation in struggles for environmental justice which resulted from South Africa's centuries-old divides; a lack of education and social inclusion among poor and Black people meant that the environmental movement was largely the preserve of middle-class white people—who were also better able to go 'off grid' with their own renewable energy generation solutions, leaving the poor to foot the nuclear bill.[861] As Carl Death notes, these informal divides betray a striking continuity with apartheid nuclear decisions: in 1979, sites within 50km of white communities were ruled out for the construction of the Vaalputs nuclear waste dump, though the facility was eventually constructed within 24km of indigenous villages.[862] Similar boundaries were drawn with regard to proposed nuclear testing. Although both apartheid and the weapons programme are over, SAFCEI acknowledges that the inequities that enabled nuclear harm in the past still persist. SAFCEI's approach to opposing the nuclear build has therefore been anchored in increasing participation across racial and socioeconomic lines, as well as in mobilizing South Africa's large religious communities.

Earthlife Africa's approach to opposing the nuclear build has taken a similar trajectory. One senior organiser reports that Earthlife has always been at heart an anti-nuclear organisation, and that anti-

[859] Steve de Gruchy, 'An Olive Agenda: First Thoughts on a Metaphorical Theology of Development', *The Ecumenical Review* 59, no. 2–3 (2007): 4.
[860] Kate Davies, Personal interview in Cape Town, interview by Tom Vaughan, (15 July 2019) (15 July 2019).
[861] Davies, Personal interview in Cape Town.
[862] Death, 'Resisting (Nuclear) Power?'

nuclearism was 'stamped on [its] birth certificate' upon its formation in 1988.[863] Not necessarily representing the views of the organisation at large, his report suggests that the issues for which Earthlife Africa was funded, such as 'climate change, gender, energy policy and grassroots mobilisation' were' 'not Earthlife Africa's core mandate'.[864] However, a strategic decision was made not to 'push the safety aspect or harp on too much about the dangers of nuclear waste', but rather to

> [hammer] home on the finances' […] Most people don't want to see a lot of money disappear into the hands of the corrupt or get just plain wasted. People would rather see their taxes spent on education, housing, healthcare, and other social services.[865]

This passage recognizes that approaching environmental and specifically nuclear issues through the lens of social justice, transparency, and democracy has a much more widespread appeal in South Africa—and is therefore much more open to cross-societal participation—than traditional 'green' concerns like conservation. Makoma Lekalakala, one of the leaders of Earthlife's anti-nuclear campaign who were awarded the prestigious Goldman Environmental Prize in the wake of their success, places concerns around democratic participation at the centre of her thinking on activism. She also draws explicit links to the previous regime, highlighting the continued, informal democratic deficit in nuclear policy:

> Historically, South African policy and legislation, there's a legacy of the past, where, in the apartheid era, it was more patriarchal and male-dominated. And in […] the so-called new democracy, we still have that kind of legacy going through the ranks in around policy and legislation. At the moment, when policy is being developed in the country, the language that has been spoken there, it's of megawatts and macroeconomics, rather than what would people want […] And also, we have left [behind] much of the promises and legislation [concerning democratic participation in policymaking].[866]

Lekalakala refers to two related ideas of 'democracy' here. There is the aforementioned aspect of participation: there still remain structural barriers to those wishing to access and participate in policy and politics, which in many spheres still remains the preserve of a rump elite. This remains true of the South African nuclear sector and especially the pro-nuclear lobby, and the transition to

[863] Tristen Taylor, 'Earthlife Africa Johannesburg's Victory against Russian Nuclear Power' (Johannesburg: Rosa Luxemburg Stitung, April 2017), 8.
[864] Taylor, 'Earthlife Africa Johannesburg's Victory against Russian Nuclear Power', 10.
[865] Taylor, 'Earthlife Africa Johannesburg's Victory against Russian Nuclear Power', 11.
[866] 'South Africans Question the Push to "Go Down the Nuclear Road" to Meet Rising Energy Demand', Democracy Now!, 16 March 2011, https://www.democracynow.org/2011/3/16/south_africans_question_push_to_go.

constitutional democracy has not heralded the anticipated participatory model of policymaking. Second, the emphasis on 'megawatts and macroeconomics' rather than 'what people want' gestures towards the spectre of the 'megabuild': the top-down, centralised approach to new power generation pursued by the ANC in government. Earthlife and SAFCEI argue that renewable sources of energy have the potential to be more 'democratic' in that they 'allow the skills of installing and maintaining these systems to be disseminated throughout urban and rural communities', and that small, decentralized generation solutions permit greater community control over energy.[867] Remote and rural communities in particular, who are often cut off from the power grid, are likely to benefit from such arrangements.[868] In contrast, current-generation nuclear power plants require huge, centralized, resource-intensive build projects with long lead times, and do little for disadvantaged off-grid communities.[869] This is another aspect of continuity not only with apartheid's nuclear programme but also its other large 'strategic' projects such as Sasol, which the ANC's Science and Technology Group argued were colossal wastes of money—prioritising shows of technological prowess and rugged independence over the needs of the country's majority.[870] Though the nuclear weapons programme—which some would argue was the primary justification for the building of Koeberg in the first instance[871]— is over, activists point out that certain anti-democratic aspects of apartheid continue to linger on via the ANC's choice to reinvest in nuclear power generation.

Access to information

Arguably the most significant way in which South Africa's young democracy is hampered by global nuclear exceptionalism, however, is through the secrecy and limits on access to information mandated by the global nuclear order. Access to information in South Africa has been a key post-apartheid battleground, and in the particular national context is a more important and immediate issue than an abstract commitment to the ideals of liberal democracy. In many ways, activists fighting for transparency are continuing the unfinished business of the Truth and Reconciliation Commission (TRC). Mamdani surveys many of the problems with the TRC in an important contemporary critique. He argues that, although the TRC explicitly recognized apartheid as a 'crime against humanity', it focused almost exclusively on individual rights violations. According to

[867] Fig, 'A Price Too High: Nuclear Energy in South Africa', 194.
[868] Davies, Personal interview in Cape Town.
[869] One argument often heard from PBMR advocates was that the technology could be deployed in a modular fashion, with small reactors deployed to remote locations for off-grid power generation or water desalination—though it was never clear that the technology was capable of delivering upon this vision.
[870] Grobicki, 'The Formulation of a Democratic Science and Technology Policy in South Africa: The ANC Policy Process 1990-1992'.
[871] Fig, *Uranium Road: Questioning South Africa's Nuclear Direction*.

Mamdani, by being '[r]educed to "the context" or "the background" of gross human rights violations, apartheid was effectively written out of the report of the TRC'.[872] When institutional enquiries did take place, they served only to provide further 'context' to individual abuses. The end result, argues Mamdani, was a narrow 'political reconciliation between state agents and political activists, individual members of a fractured political elite, rather than the "national unity and reconciliation" mandated by the legislation that set it up'.[873] In the eyes of many activists, this left a tremendous amount of work to do in uncovering and evaluating the systemic abuses and harms of apartheid.

As a consequence, the nuclear weapons programme went more or less completely unexamined by the TRC—a remarkable decision given the widely recognized extent to which it propped up the power of the apartheid state. Project Coast, the apartheid chemical and biological weapons (CBW) programme, was investigated, having involved numerous and severe individual human rights violations largely at the hands of its head, Wouter Basson.[874] By contrast, 'where there were no statements by victims or applications for amnesty by perpetrators […] the TRC did not have an obvious or clear mandate to investigate'.[875] The latter condition applied to the nuclear weapons programme. Most information regarding the apartheid nuclear programme has therefore remained secret; much of it was destroyed prior to the ANC taking power, and whatever remains is subject to a complex mass of legal restrictions on information—some of which are apartheid hangovers, some of which are more recent legislative measures. As contributors to the excellent *Paper Wars*, a study of access to information in post-apartheid South Africa, argue:

> the digging out of old records is not just of passing academic interest for historians, but also about establishing accountability for past deeds and abuse of power, and that part of the task of establishing accountability in the future is also, therefore, about settling the account of the past.[876]

Put another way, it is evident that a proper historical accounting of the practice of the apartheid nuclear programme is a necessary component of any South African democratic settlement—however one chooses to define 'democracy'.[877] Where the TRC has failed to provide this, it is left to

[872] Mahmood Mamdani, 'Amnesty or Impunity? A Preliminary Critique of the Report of the Truth and Reconciliation Commission of South Africa (TRC)', *Diacritics* 32, no. 3/4 (2002): 38.
[873] Mamdani, 'Amnesty or Impunity?', 34.
[874] Jeffrey M. Bale, 'South Africa's Project Coast: "Death Squads," Covert State-Sponsored Poisonings, and the Dangers of CBW Proliferation', *Democracy and Security* 2, no. 1 (2006): 27–59.
[875] Gould, 'The Nuclear Weapons History Project', 89.
[876] Richard Calland, 'Illuminating the Politics and the Practice of Access to Information in South Africa', in *Paper Wars: Access to Information in South Africa*, ed. Kate Allan (Johannesburg: Wits University Press, 2009), 12.
[877] Verne Harris, 'Conclusion: From Gatekeeping to Hospitality', in *Paper Wars: Access to Information in South Africa*, ed. Kate Allan (Johannesburg: Wits University Press, 2009), 202.

activists to do the painstaking work of scouring archives (or even doing the archiving themselves, in the case of SAHA), and submitting endless PAIA (Promotion of Access to Information Act) requests.

However, even from the extremely restricted and tangential TRC coverage of the nuclear programme, it is evident that another, external force was already exerting pressure on the extent to which apartheid nuclear history could become public knowledge: the global nuclear order. A body of work is developing in nuclear studies which aims to take more seriously the ways in which nuclear order and nuclear weapons are often conflictual with democratic choice.[878] As Cooke and Futter observe, transparency is incompatible with deterrence because deterrence requires a state to keep up the appearance of being willing to use nuclear weapons at all times. This rules out the possibility of any position other than a 'hawkish' pro-deterrence stance ever being democratically adopted as part of a political party's manifesto.[879] Grand notes that this and other concerns over conflicts between transparency and nuclear secrecy have tended to be concerns held by NWS governments.[880] Non-proliferation obligations are often held up as a reason to restrict access to information about nuclear programmes past and present within NWS; i.e. potentially sensitive information should not be made accessible to 'would-be proliferators'.[881] This puts South Africa in a unique position: it (presumably) still possesses information from a historic weapons programme which—though technologically dated—may still be of interest to a state or other party seeking to build a weapon. However, given the extent to which the programme was intertwined with the system of apartheid and its manifold abuses, there is also a significant South African public interest in openness and transparency regarding it.

The conflict between non-proliferation and transparency can be seen in the TRC hearing on the CBW programme which took place in 1998. In attendance was Abdul Minty, in his capacity as the chair of the South African Council for the Non-Proliferation Weapons of Mass Destruction. Minty's mandate was to ensure that nothing in the hearing contravened South Africa's legal obligations under the NPT and other multilateral agreements concerning weapons of mass destruction, by then reflected in domestic statute law as well. Perhaps surprisingly given the intended function of the TRC hearings, Minty requested that the CBW hearing be held *in camera*, and relevant, non-sensitive information

[878] for example, Steve Cooke and Andrew Futter, 'Democracy versus Deterrence: Nuclear Weapons and Political Integrity', *Politics* 38, no. 4 (2018): 500–513, https://doi.org/10.1177/0263395717733978; Benoît Pelopidas, 'The Birth of Nuclear Eternity', in *Futures*, ed. Kate Kemp and Jenny Andersson, Oxford Twenty-First Century Approaches to Literature (Oxford: Oxford University Press, 2021).
[879] Cooke and Futter, 'Democracy versus Deterrence: Nuclear Weapons and Political Integrity', 505.
[880] Camille Grand, 'Nuclear Weapon States and the Transparency Dilemma', in *Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions*, ed. Nicholas Zarimpas (Oxford: Oxford University Press, 2003), 32–49.
[881] Grand, 'Nuclear Weapon States and the Transparency Dilemma', 42.

be publicly disclosed at a later date.[882] He justified this request not only on the basis of South Africa's legal obligations, but also in terms of South Africa's reputation as a global exemplar of non-proliferation best practice, technical competence, and multilateralist orientation. 'All these achievements and our future role in global negotiations', he warned, 'can be undermined if the international community is to perceive us as not acting with the responsibility [sic] in a matter as grave as risking the proliferation of weapons of mass destruction'.[883] Minty's warnings laid bare Pretoria's dilemma. In acceding to the NPT and subsequently carving for itself a highly specialist role in nuclear diplomacy, South Africa accepted a heavy burden of responsibility. Despite being the only country in the world to have voluntarily disarmed and willingly participating in a bevy of verification, inspection, and supply agreements, the stringent measures necessary to protect its reputation and prestige far outstripped the obligations of the NWS and other NPT parties—even as the South African people cried out for accountability and justice over apartheid. That these imperatives conflicted with even the limited form of democracy pursued by the TRC was not lost on others present. Activist and lawyer Nicholas Haysom noted the irony that a movement which had campaigned so hard to expose the nuclear and CBW transgressions of apartheid (within which Minty himself had been perhaps the most important figure) was now required by non-proliferation rules to cover them up again. 'We therefore stand here inheriting the sins of the past […] which placed certain obligations on us to act as a responsible member of the international community […] It is very ironic that we are here to put that case before you'.[884] Another representative opined that 'the very fact we have this kind of hearing is because secrecy breeds proliferation'—as, of course, it had during apartheid.[885]

Minty's request to have the hearing held *in camera* was accordingly denied, and the CBW hearings produced little in the way of proliferation-sensitive information. As we have noted, the nuclear programme practically escaped scrutiny altogether, but the arguments put forward by Minty demonstrate how the standards of global nuclear order can interact with 'local' dynamics to generate negative outcomes for domestic transparency and democracy. Postcolonial critics of nuclear order have explored the many ways in which Southern states are expected to display standards of nuclear behaviour over and above that which is required of the NWS, in order to prove

[882] Western Cape TRC, 'Truth and Reconciliation Commission: Chemical and Biological Warfare Hearing' (Cape Town: Department of Justice, 8 June 1998), 22.
[883] Minty in Western Cape TRC, 30.
[884] Haysom in Western Cape TRC, 'Truth and Reconciliation Commission: Chemical and Biological Warfare Hearing', 32–33.
[885] Vally in Western Cape TRC, 'Truth and Reconciliation Commission: Chemical and Biological Warfare Hearing', 39.

their standard of nuclear civilization.[886] In the case of South Africa, the discussions at the Western Cape TRC suggest that this includes remaining silent on historic abuses, sacrificing an important element of democratic transition to prove fealty to the ideals of non-proliferation. However, this is only part of the story. This global imperative overlaps rather conveniently with other, powerful local incentives to keep the secrets of the apartheid bomb. Non-proliferation aside, successive ANC governments have been reluctant to make any revelations that might be politically damaging. There are a number of reasons for the obstructionist approach adopted by many government departments to the declassification of relevant information. One is the suspected involvement of other countries: Harris et al. single out Israel as one party likely to be upset with being officially exposed as a 'collaborato[r] with the apartheid state', and note that overseas firms involved in the apartheid weapons programme would also be 'disturb[ed]'.[887] While it is debatable how much diplomatic damage would be done in the long term by such revelations, it is conceivable that Pretoria's cherished image as a moderate bridge-builder in nuclear politics could take a hit, especially given the challenges that Israel poses to the non-proliferation regime.

It is more likely, however, that domestic factors have been behind the ANC's silence. 'The failure of the state to make the TRC archives fully and promptly available to the public has fostered speculation that ANC officials fear the domestic political fallout from the exposure of colleagues with compromised pasts'.[888] It is important to note that, especially during the immediate post-apartheid years, South Africa's domestic nuclear establishment still relied on officials who had worked directly or indirectly on the nuclear weapons programme, since these men possessed all of the institutional knowledge and technical expertise necessary for the maintenance of the remaining infrastructure. The aforementioned nuclear policy vacuum and 'sunset clauses' further helped to entrench their positions.[889] Even in 2021, nuclear groups and engineering departments in South Africa remain peppered with personnel associated with Eskom, Armscor, or the AEC during apartheid, who continue to play an important role in educating the next generation of nuclear technicians and advancing nuclear research. Extending access to information about the apartheid nuclear programme would therefore risk denting South Africa's domestic nuclear industry, parts of which such as medical isotope production are increasingly lucrative, and which as a whole contributes

[886] e.g. Gusterson, *People of the Bomb*; Biswas, *Nuclear Desire*; Demetrios Stroikos, 'Failure and Denial in International Society', 18 October 2015, http://www.lse.ac.uk/internationalRelations/Journals/millenn/pdf/conferencePapers/D.%20Stroikos-Failure%20and%20Denial%20in%20International%20Society-Modernity2c%20Technology2c%20and%20the%20Global%20Nuclear%20Order.pdf.
[887] Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past', 472.
[888] Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past', 273.
[889] Marquard, 'The Origins and Development of South African Energy Policy'; Christie, Personal interview in Cape Town.

significantly to Pretoria's official nuclearity. Additionally, a maze of apartheid-era legislation combined with new laws (like PAIA) intended to increase access to information makes opening the archives painstaking and frustrating work.[890] It is acknowledged that large amounts of information have been destroyed, and while more doubtless remains it has not been systematically catalogued. Organizations like SAHA notwithstanding, there is little appetite or state capacity to perform this work. The non-proliferation obligations outlined by Minty in the context of the CBW hearings, argue activists, have not so much prevented the government from releasing information as provided a pretext for continued secrecy. According to Gould, although 'non-proliferation concerns in relation to the documents [sought by freedom of information activists] seem baseless'—especially in light of some very detailed first-hand memoirs of the programme that have since emerged—government departments and bodies routinely refuse requests for information citing non-proliferation concerns.[891] The overriding sense among transparency advocates is that the South African government is using non-proliferation obligations as a convenient excuse to avoid having to confront politically awkward revelations. Harris et al. note that while non-proliferation obligations are likely to be 'unproblematic for disclosing nuclear history', disclosures might 'ripple into areas of even greater domestic political and diplomatic sensitivity'.[892]

'Boundary work' and the civil/military divide in South Africa

This point has proved prescient since the ANC's ill-fated nuclear power expansion plans have been of extreme domestic political sensitivity during the past decade. Alongside its role in the continued restriction of information about the history of the apartheid bomb, the norms of global nuclear order have contributed significantly (albeit in a more abstract manner) to the political turmoil and civil society unrest surrounding the continued use nuclear power in South Africa. At its core, the dispute over South Africa's nuclear future boils down to what Abraham calls nuclear 'ambivalence' and the corresponding 'impossibility of controlling the meanings of nuclear power'.[893] Accession to the NPT and adoption of the broader norms of global nuclear order, as discussed in the previous chapter, means accepting the possibility of a durable divide between 'civil' and 'military' nuclear technology. According to the rules of nuclear order, the former is an important tool for economic development and social upliftment, to be accessed 'democratically' by any state requiring it; the latter is only permitted to be held by a handful of elite states and its potential spread beyond them is

[890] Gould, 'The Nuclear Weapons History Project'; Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past'.
[891] Gould, 'The Nuclear Weapons History Project', 107.
[892] Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past', 473.
[893] Abraham, ''Who's Next?', 53.

tightly controlled at the international level—by force if necessary. Unauthorized nuclear weapons are an affront to the ideals of a democratic and multilateral nuclear order. Since South Africa has disarmed, forsworn future nuclear development, and committed itself to an activist stance on non-proliferation, it is free to pursue advanced nuclearity through a robust civil nuclear industry. In other words, NPT accession marked a rupture in which concerns about nuclear proliferation were made separate to nuclear power for development—giving the ANC government a free hand, at least with regard to its international obligations. However, controlling the meaning of nuclear power even in the most favourable circumstances requires constant policing and re-inscribing of the civil/military divide. This 'boundary work' is complicated by the fact that secrecy is a necessary aspect or, as Kinsella has it, a 'master theme' of nuclear discourse in nuclear weapons-states—but it is also at work in South Africa, justified as we have seen by concerns about proliferation. In the name of secrecy, he argues:

> an elite and self-regulating community authorizes itself to command public resources, constrain public discourse, and make crucial decisions autonomously in the name of the excluded public […] although secrecy limits public knowledge about nuclear matters, the resulting lack of knowledge provides a further justification for excluding the "uninformed" public from decision making. Thus, nuclear mysteries re-main mystified, sustaining the hierarchical relationship between experts and the public.[894]

South Africa is a country with searingly recent memories of nuclear secrecy intersecting with social hierarchy. 'Controlling the meaning' of civil nuclear technology would be a difficult task for any government, let alone one embroiled in scandal over unlawful procurement deals and white elephant projects staffed by former weapons scientists. The global nuclear order has imposed a one-size-fits-all framework upon South Africa for the management of nuclear technology. This framework assumes that the civil/military boundary is easily maintained and relatively uncontroversial, and allows the ANC to have its cake and eat it: to expand the domestic nuclear industry and enhance its own official nuclearity while enjoying its privileged status as a non-proliferation poster child. However, the global nuclear order and its multilateral non-proliferationism do not sufficiently equip the ANC to confront this reality. It permits and even encourages the government to embark on its controversial projects, which have further inflamed societal grievances and the sense that the transition to democracy has stalled.

[894] William J. Kinsella, 'One Hundred Years of Nuclear Discourse: Four Master Themes and Their Implications for Environmental Communication', in *The Environmental Communication Yearbook*, ed. Susan L Senecah (Mahwah, NJ: Lawrence Erlbaum, 2005), 49–72.

However, the campaigns of groups like Earthlife, SAFCEI, and Koeberg Alert, as well as the dedicated transparency organization Right2Know, all reflect a domestic environment wherein nuclear technology and its attendant secrecy are inextricably bound up with the history of apartheid. A spokesperson for Right2Know told me that the organization was born in 2010 in response the so-called 'Secrecy Bill' (formally the Protection of State Information Bill), and spurred on by the 2012 Marikana Massacre in which 34 striking mineworkers were killed by police. Organizers believed that the ANC's promises to open up South African society and comprehensively break with the secrecy of apartheid had been neglected. With regard to the proposed nuclear build and in particular the procurement deal with Rosatom, Right2Know's position closely recalls Kinsella's description of how nuclear secrecy works. The spokesperson recounted that the conversation was increasingly 'confine[d] to elite spaces' due to its reliance on highly technical knowledge, a problem that was compounded by ANC 'astroturfing' in the form of bussing supporters of nuclear power to community meetings.[895] Nuclear secrecy helped to lock out excluded demographics from the policy process, while the government tried to lock them into strategic nuclear 'megabuilds' that would take years to complete and, once the process started, be extremely difficult to challenge at a civil society level. Right2Know has also drawn explicit connections between apartheid-era nuclear secrets and contemporary fights over transparency. Referring to both secrecy over the nuclear build and the ANC's infamous post-1994 arms deal, in which many senior figures were damningly implicated,[896] R2K said:

> we believe that the democratic government dismally failed the nation by letting apartheid corruptors go free, and in many cases following in their footsteps. The current crisis of secrecy, corruption and state capture embodied by Zuma and his cabal, are the results of this failure. We demand the full release of the millions of apartheid documents buried in government archives – no more secrets! We demand investigation and prosecution on apartheid-era and present-day corruption![897]

While Earthlife and SAFCEI took an anti-nuclear stance on principle even before the 'secret nuclear deal' emerged as a news story, they too seized on the 'secrecy' and 'corruption' surrounding the plans and warned that the scheme endangered South Africa's fragile democracy. The

[895] Right2Know organizer, Personal interview in Cape Town, interview by Tom Vaughan, (26 July 2019) (26 July 2019).
[896] detailed from a first-hand perspective in Andrew Feinstein, *After the Party: A Personal and Political Journey Inside the ANC* (Cape Town: Jonathan Ball, 2007).
[897] Busi Mtabane, 'Statement: We Demand the Release of Apartheid-Era Secrets!', Right2Know, 8 April 2019, https://www.r2k.org.za/2017/05/19/statement-we-demand-the-release-of-apartheid-era-secrets/.

Earthlife/SAFCEI coalition has consistently deployed the lens of human rights in mounting their arguments against nuclear power.[898] As organizers said in one press release:

> The arrogant assumption that South Africans have no right to such critical information that impacts on our future and in such a serious matter as nuclear energy raises grave concerns about the government's commitment to constitutional rights and public participation.[899]

And:

> Such secretive deals can cover up a number of risks and it is the people of South Africa who will carry the liabilities of any nuclear build for many generations to come.[900]

Countless statements along these lines demonstrate how activists perceive anti-democratic practices around civil nuclear technology as legacies of apartheid, or as threats to South Africa's young democracy. Furthermore, just as nuclear power secrets are associated with apartheid, they are associated equally with nuclear weapons—as one might expect given the extent to which the two are interlinked. Activist blogs and posts on social media often refer to struggles against 'nukes' and 'nuclear' without the qualifiers 'energy' or 'power', reflecting a broader rejection of nuclear technology altogether. This is not a uniquely South African phenomenon, of course—it is partly a result of the impossibility of controlling the meanings of nuclear technology, and a rejection of the civil/military binary that promises 'atoms for peace'.[901] However, with the particularities of the South African historical experience, I posit that this reflects more specific memories of the apartheid bomb—and an acute awareness that, in theory at least, nuclear energy always comes with the looming threat of proliferation. David Fig worries that 'while the current politicians have supported a non-proliferation stance, this same technological nationalism could one day be extended to the reacquisition of nuclear weapons', since 'South Africa's democracy is young and fragile, and there are no guarantees that our current constitutional values will be upheld indefinitely'.[902] Ironically, the global nuclear order which encourages Pretoria to continually develop its nuclear technological capacity probably precludes any radical upheaval in the international security environment that would necessitate a new South African bomb, and is extremely well-placed to nip any hypothetical proliferation efforts in the bud. While Fig may be concerned with unlikely eventualities here, the point is not probability: rather, it is that South African public trust in the civil/military divide in

[898] Natasha Adonis, 'Are SA's Energy Plans a Threat to Citizens' Human Rights?', SAFCEI, 10 December 2016, https://safcei.org/are-sas-energy-plans-a-threat-to-citizens-human-rights/.
[899] Brown in SAFCEI, 'Appeal to Minister over DoE's Refusal to Reveal Nuclear Secrets', SAFCEI, 20 February 2015, https://safcei.org/appeal-minister-refusal-reveal-nuclear-secrets/.
[900] Simjee in SAFCEI, 'Appeal to Minister over DoE's Refusal to Reveal Nuclear Secrets'.
[901] Abraham, ''Who's Next?'; Peoples, 'Redemption and Nutopia'.
[902] Fig, 'In the Dark: Seeking Information about South Africa's Nuclear Energy Programme', 67–68.

nuclear technology is low, such that continued ANC efforts towards nuclear power expansion evoke widespread public distrust, memories of authoritarianism, and an acute awareness of nuclear ambivalence.

Directly comparing the ANC's nuclear build plans with the apartheid weapons programme is, for obvious reasons, poor form in South Africa. However, in August 2020, SAFCEI published an article in which faith leaders marked the anniversary of the nuclear bombings of Hiroshima and Nagasaki. Referring to fresh government plans to extend the life of the Koeberg plant, they encouraged South Africans to 'consider this technology's ability to do extensive harm' and 'to speak out about the moral and ethical reasons to reject nuclear'.[903] One Cape Town church minister appealed:

> Let us […] prevent events like Hiroshima and Nagasaki from re-occurring […] so that we may reverse the devastating effects of human activity on planet Earth that we are now witnessing and living through.[904]

This intervention from religious leaders amounts to a rejection of the quasi-religious faith in 'nutopianism', which Peoples defines as the belief that the merits of civil nuclear technology can redeem the horrors of nuclear weapons.[905] South African anti-nuclear activists, quite apart from their former comrades in the ANC, clearly do not believe in the separability of civil and military nuclear technology. Nuclear power, which is durably associated with authoritarianism, minority rule, secrecy, and atomic horror, is redeemed neither by its potential to power the South African economy, nor the ANC's non-proliferation activism. While the government participates enthusiastically in multilateral non-proliferation and disarmament initiatives, it leaves intact the broader structures of nuclear order and exceptionalism which encourage the development of civil nuclear technology. Unfortunately, in the eyes of many South Africans, nuclear technology remains by its very nature incompatible with democracy—regardless of whose hands it is in. For all of its advocacy around strengthened non-proliferation instruments and multilateral disarmament, the ANC will not find within the global nuclear order the tools to fully exorcise the demons of South Africa's nuclear past.

[903] SAFCEI, '"The Anniversaries of Hiroshima and Nagasaki Is Cause for Serious Reflection about the 'Merits' of Nuclear" - Cape Town Unitarians', SAFCEI, 12 August 2020, https://safcei.org/the-anniversaries-of-hiroshima-and-nagasaki-is-cause-for-serious-reflection-about-the-merits-of-nuclear-cape-town-unitarians/.
[904] Malan in SAFCEI, '"The Anniversaries of Hiroshima and Nagasaki Is Cause for Serious Reflection about the 'Merits' of Nuclear" - Cape Town Unitarians'.
[905] Peoples, 'Redemption and Nutopia'.

Conclusion

At the beginning of the thesis I posed two central research questions. These were:

- How have distinctly 'local' social and political factors within South Africa contributed to processes of global nuclear ordering?
- Conversely, how has the global nuclear order informed 'local' social and political dynamics within South Africa?

In the first part of this thesis, I summarize the findings of each chapter. While their answers are empirically rich, they also produce conceptual insights. In discussing 'how' these factors have interacted, I have posited a particular conceptual relationship between the global and local in nuclear order. This leads me to highly significant conclusions and several original contributions to knowledge. In the second part, I accordingly answer the two-sub questions posed in the introductory chapter, which were as follows:

- What are the implications of such interactions for our understandings of the concept of 'global nuclear order', how it is constituted, and how it operates?
- What are the implications of such interactions for our understanding of South Africa's own nuclear history?

In this section, I review the findings of the thesis as a whole and argue that this project, driven by empirics as it is, also makes a highly significant and original contribution towards the theorizing of nuclear order, opening up further avenues for research in doing so. The 'local/global' interactions demonstrated in each empirical chapter reveal some fundamental observations into the nature of global nuclear order and its hegemonic status which are genuinely new and innovative. In the third and final section, I discuss two related aspects of the work: the methodological limitations of this project, and directions for further research.

'Local' South African technopolitics and their impact on 'global' nuclear order

Throughout the history of South Africa's interaction with the global nuclear order, aspects of South African technopolitics and highly specific 'local' dynamics have contributed to the process of nuclear ordering in substantive ways: South Africa has imprinted itself indelibly on the global nuclear order. During the late Cold War period, from the mid-1970s to the late 1980s, the apartheid nuclear weapons programme was the primary vehicle for this. One very important interaction was South Africa's role in drafting the Statute of the IAEA, which ensured that particular standards of

'nuclearity' and 'advancement' in nuclear technology that were favourable to South Africa would be embedded in the institutions of nuclear order.[906] Driven by the parochial technopolitics of Afrikaner nationalism and the myth of rugged self-sufficiency which posited apartheid South Africa as the lone outpost of civilization in Southern Africa, besieged from all sides by rebels, communists, and their enablers, an intoxicating narrative of an 'indigenous' bomb came to be associated with the programme. The idea that apartheid scientists and engineers simply raised nuclear a full-cycle nuclear capability from the earth by virtue of their ingenuity and mastery over the natural environment was an asset to the government in Pretoria, which used this mythos to galvanize its authority. As awareness increased that Pretoria might be embarking on a clandestine nuclear weapons programme, the myth of the indigenous bomb—further propagated by coy statements from South African officials—began to take root among the US policy establishment and non-proliferation advocates. It dovetailed conveniently with prevailing structural-realist explanations for proliferation and the strand of Western strategic studies which dominated Cold War security thinking. Moreover, it aligned strongly with the American desire to conceal the extent to which the US and European allies had directly assisted in South Africa's nuclear weapons programme—of which Washington was fully aware. This confluence of interests ultimately generated a durable narrative of 'local' indigeneity and nuclearization in isolation, when in fact the apartheid bomb—like all others—was a distinctly 'global' endeavour. The institutionalization of this myth spared US blushes and helped to shield the developing nuclear order from criticism at a perilous stage in its development, and the myth itself has still not been fully expunged from mainstream non-proliferation literature.

The ANC's transnational campaign against the apartheid bomb also made a distinct impact on the development of the nuclear order, alongside its formative importance for South Africa's post-apartheid nuclear policy and diplomacy. Because of the overriding domestic imperative of toppling apartheid, the ANC chose to forgo NAM-style sweeping criticisms of the non-proliferation agenda and instead align itself with the solidifying hegemonic outlook and principles of the global nuclear order. Armed with evidence of Western complicity in the apartheid bomb that would allow them to make credible, radical criticisms of the injustice and hypocrisies of nuclear order—and, indeed, having previously identified a 'conspiracy' to arm South Africa—the ANC nonetheless recognized the need to bring the institutions of nuclear order on-side in its fight against apartheid. Accordingly, though the rhetoric sounded radical at a superficial level, the content of the ANC's transnational campaign against the apartheid bomb focused on identifying individual, technical failures of non-

[906] Hecht, 'Negotiating Global Nuclearities'.

proliferation, arguing that stronger, voluntary non-proliferation measures were needed, and gesturing to the putatively exceptional nature of the apartheid regime to assert that it should not benefit from any nuclear co-operation whatsoever. This included formal accession to the NPT or participation in the activities of the IAEA. These arguments, while cloaked in the ANC's distinctly radical garb, functioned to reinforce the legitimacy of prevailing ordering arrangements and lend further authority to the NPT—a dynamic which would repeatedly be on display once the ANC took state power in 1994. As I discuss in more detail below, they also (unwittingly) contributed to the idea planted by the narrative of the indigenous apartheid bomb that South Africa's nuclear programme had somehow been unique, exceptional, and thus external to 'normal' processes of weapons proliferation.

Following on from the transnational anti-apartheid/anti-nuclear campaign, the ANC—now governing South Africa—made a critical intervention into the 1995 NPT RevCon. Though the initial position of Thabo Mbeki and his negotiating team had apparently been to support a weak compromise measure of rolling extensions, Pretoria quickly changed tack and moved to support the US-backed option of indefinite extension. This outcome would effectively remove the possibility of making future NPT extensions conditional on the NWS making substantive progress on nuclear disarmament, a state of affairs which was anathema to most of the NAM contingent. South Africa, however, fell into line quickly. While structural conditions were favourable to the US's preferred outcome due to the collapse of Cold War bipolarity, astute diplomacy on the part of Pretoria's diplomatic representatives at the RevCon was crucially important in breaking the NAM coalition. South Africa's proposition of a set of non-binding 'principles'—which essentially amounted to a restatement of the NPT—were grudgingly accepted by most sceptical parties as the best available 'compromise' under the circumstances. Although indefinite extension would likely have passed without South African help, Pretoria was instrumental in creating an appearance of mass consent for the NPT regime and, through its history of liberation struggle, forging an association between non-proliferation and a universalist conception of human rights. South Africa did not single-handedly 'save' the NPT, but it did put a progressive face on the quashing of non-aligned demands for progress towards multilateral nuclear disarmament.

Since 1995, South Africa has continued to intervene in processes of nuclear ordering—for the most part serving to cement the hegemonic power of the order by contributing to the non-proliferation agenda. Leadership within in the Humanitarian Initiative and Ban Treaty campaigns, along with helping to establish an African NFWZ, has been the most prominent aspect of Pretoria's post-apartheid nuclear diplomacy. Each of these are initiatives which challenge—at least at a discursive level—the current configuration of nuclear order and explicitly aim for progress on multilateral

nuclear disarmament. In addition, Pretoria has made some surprising unilateral interventions over non-proliferation which have constituted material challenges, albeit over individual and technical issues. These have included South Africa's opposition to requiring states to accept an IAEA Additional Protocol for access to nuclear trade, and an insistence on retaining its HEU stockpile—both of which stand in stark contrast to Pretoria's advocacy for a strong and universal non-proliferation regime. However, against the backdrop of a hegemonic global nuclear order which South Africa has chosen to support—even when there have been alternative routes available—at key junctures, these pretensions to radicalism ring rather hollow. It is also important to realize that the HI and TPNW both entail a standing commitment to existing non-proliferation measures, which necessarily leads to the preservation of the global nuclear order more or less at it stands—discursive changes or tinkering on the margins notwithstanding. Indeed, the global nuclear order in its current iteration serves South Africa quite well with material and non-material diplomatic benefits alike; South Africa's continued technological 'advancement' and enhanced nuclearity inherited from apartheid ensures, for now, that Pretoria retains a seat at the top table. This disincentivizes the radical overhaul of current non-proliferation arrangements, while also incentivizing further nuclear development at home. Overall, South Africa's activist interventions into present-day nuclear ordering serve as a 'lightning rod' for dissent and demonstrate the order's outward ability and willingness to accommodate criticism within its institutional arrangements, further contributing to its normative authority while reinforcing the legitimacy of existing non-proliferation arrangements.

'Global' nuclear order and its operation inside South Africa

As I have argued throughout the thesis, the 'global' and 'local' in nuclear order are not easily separable. I outlined above the ways in which South African 'locals' and their technopolitics have imprinted upon global nuclear ordering arrangements; in turn, South Africa has imported and incorporated in various ways elements of nuclear order into its domestic nuclear technopolitics—with interesting socio-political ramifications. Although during the apartheid years South Africa stood outside of most formal structures of global nuclear order, the order still reverberated through its domestic politics. The most obvious way in which this happened is that the regime in Pretoria was able to take advantage of the separation between 'civil' and 'military' nuclear technology and the guaranteed right of access to peaceful nuclear technology—both enshrined in the NPT—in order to develop a domestic nuclear infrastructure which eventually diverted resources to a weapons programme. The apartheid nuclear programme was in all likelihood never intended for strategic use, i.e. to deter a nuclear attack from the Soviet Union or any of its allies, but to shore up the regime's authority and goad the US into intervening in the Border Wars should Pretoria's grip on power

become too tenuous. In short, as Renfrew Christie pointed out in 1994, the apartheid bomb (enabled by the global nuclear order) was used as a tool of domestic oppression.[907] The failure of the institutions of nuclear order to stop the weapons programme in this sense implicates the global nuclear order, however indirectly, in sustaining the system of apartheid.[908] The ultimate significance of this dynamic is of course debatable, since the apartheid bomb was never used for any of its imagined strategic missions. It may be credibly argued that it even somewhat hastened the fall of the regime by compounding Pretoria's status as a global pariah. Nonetheless, the permission of the nuclear weapons programme by the global nuclear order planted the seeds of technopolitical conflict that would define South Africa's nuclear future. Even as South Africa formally and publicly eschewed participation in the NPT, then, its imbrication with the global nuclear order, including within the IAEA, reverberated domestically in a manner that was felt directly by its oppressed population.

As South Africa moved towards full accession and integration into the global nuclear order—which was simultaneously solidifying, clarifying its mission, and cementing its hegemony— 'local' manifestations of nuclear order intensified, and relations thickened. This thesis has pinpointed the ANC's involvement in transnational anti-apartheid campaigning during the late 1970s through the early 1980s as the period in which the direction of South Africa's future domestic nuclear policy was decided. I have shown that this campaign carried significant implications for Pretoria's post-apartheid nuclear diplomacy, but during its course the ANC also began to assemble, in conversation with the global nuclear order, the rudiments of its 'local' nuclear technopolitics. On one hand, opposition to the apartheid bomb appeared to rule out a nuclear-armed democratic South Africa—although the ANC's anti-nuclearism was highly contingent on the specific nature of the apartheid regime, and anecdotally, the weapons question was not quite settled within the ANC's ranks. On the other, however, the ANC's enthusiastic adoption of the non-proliferationist technopolitics (or, indeed, anti-technopolitics) of global nuclear order prefigured a future in which the space for technopolitical freedom in domestic nuclear policy would be limited. The 1994 *Nuclear Debate* conference in Cape Town would therefore take place within tight technopolitical constraints, given the commitment to non-proliferation—and its requirements for domestic nuclear policy—already forged by the ANC. Although there were high hopes around the construction of a 'bottom-up', democratic science and technology policy which would inform the direction of a nuclear sector repurposed for the public good, the reality of South Africa's attachment to the global nuclear order began to bite. Although a wide variety of critical anti-nuclear perspectives were expressed at the

[907] Christie, 'The Military Dimensions of Nuclear Development in South Africa'.
[908] Christie, Personal interview in Cape Town; Christie, 'Speech to Winelands Mensa'.

conference, including many which explicitly linked civilian nuclear technology with apartheid and nuclear weapons, non-proliferationist technocracy prevailed. It became clear that, despite the radically democratic trappings of *The Nuclear Debate* and the appearance of considering alternative nuclear futures, there was only one realistic option on the table. South Africa would follow it.

'Importing' the anti-technopolitics of the post-Cold War global nuclear order satisfied many within the ANC and the broader progressive movement by ruling out the kind of local technopolitical freedom that might risk resulting in weapons proliferation. Accordingly, the nuclear fuel cycle capability was dismantled, and the government enthusiastically submitted to a bevy of safeguarding and confidence-building measures which went beyond the normal requirements of the NPT. However, it also ruled out the kind of technopolitical independence required to chart an independent (anti-) nuclear technopolitics—such as the complete forswearing of nuclear technology altogether, as advocated by many on the left of the ANC and in South Africa's broad environmental movement. 'Importing' has been accompanied by what I call 'outsourcing'—specifically of the ambivalent characteristics of nuclear technology. Outsourcing is an illustrative example of how assumed categories of 'local' and 'global', constructed though they may be, can be of great technopolitical use in nuclear politics: accession to the NPT and associated instruments of global nuclear order, in the South African case, functioned to outsource the possible military implications of nuclear development to the 'global' level. Submitting to non-proliferation agreements designed to monitor proliferation risk and verify compliance functions—ideally—to remove the responsibility for 'managing' nuclear ambivalence from national governments and place it in the hands of global institutions. This outsourcing arrangement is of course dependent on good, compliant behaviour—something which South Africa has little problem with. The benefit of this arrangement from the South African perspective is the ability to pursue a domestic nuclear programme, within the bounds of acceptability, without suspicion of diverting nuclear technology or material for weapons purposes.

In one sense, this 'importing/outsourcing' dynamic can be understood to have been helpful in smoothing the path to democracy. It resolved, at least in part, the conflict between the competing progressive technopolitical regimes within the ANC, by offering only one available technopolitical future. Accordingly, it also resolved the conundrum of how the incoming government should deal with the nuclear legacy left over by apartheid, providing the ANC with a solid justification for retaining most of South Africa's advanced nuclear infrastructure and even embarking on new nuclear development. However, these resolutions have been incomplete, and the introduction of global nuclear order technopolitics into South Africa has generated a host of other tensions, against the backdrop of a divided society stricken by poverty and distrust. There have been several consequences of accession to the global nuclear order for South Africa's young democracy.

Importing the technopolitics of the global nuclear order has also (re-)imported, ironically, an aspect of apartheid technopolitics that had been previously cut adrift from South Africa: the standards of nuclearity prescribed in the statute of the IAEA. The ANC found the level of its official/conventional nuclearity defined by measures in large part drafted by apartheid-era South African diplomats, with the intention of maintaining South Africa's privileged position in the institutions of nuclear order. To maintain this position would accordingly require the ANC to maintain and continue to develop its civilian nuclear capabilities. In this way, an element of global nuclear order historically informed by 'local' South African technopolitics presented an incentive for South Africa to continue embarking on a nuclear journey that was unpopular and viewed with significant public suspicion. In in the absence of a clear ANC nuclear policy upon taking power, this encouraged a rump of pro-nuclear officials in the South African civil service and nuclear complex—themselves apartheid hangovers—to fill the vacuum with plans for further nuclear development. Additionally, adherence to non-proliferation obligations and the desire to press on with civil nuclear development has necessitated (or at least offered a pretext) for secrecy over South Africa's nuclear past and present, with activists fighting for increased transparency. The role of the nuclear weapons programme in maintaining apartheid, by the same logic, went uninvestigated by the Truth and Reconciliation Commission.

Any remnants of all-out anti-nuclearism in the ANC's political programme have long fallen by the wayside as Pretoria has recommitted itself to civil nuclear development, first through the ill-fated PBMR programme—a direct legacy of apartheid and its weapons engineers—and then through plans to expand nuclear power generation capacity. These continue to develop as of summer 2021. The ANC remains committed to such plans even as they fail to efficiently meet South Africa's acute energy needs, necessitate further secrecy, and generate scandal after scandal—even contributing to the fall of President Jacob Zuma, the aftershocks of which are currently (July 2021) spreading through South Africa with devastating effect. All of this has spawned an impressive domestic anti-nuclear movement, which has enjoyed some success in opposing government plans to build more nuclear power stations—even as it traces its roots back to the same liberation struggle as its former comrades in the ANC. Even outside of the anti-nuclear movement, however, nuclear energy in South Africa is viewed with great suspicion, and this is where outsourcing has failed to resolve the fundamental characteristic of nuclear ambivalence. Despite the fact that South Africa's nuclear infrastructure is now in the hands of the erstwhile liberation movement, there is an enduring understanding among activists and the South African public alike that 'peaceful' and 'military' uses of nuclear technology are barely separable. In South Africa, this boundary was breached by apartheid, and the recent accession to the global nuclear order has not sufficiently repaired this boundary to restore public confidence in civil nuclear development.

Significance and contributions to knowledge

This thesis engages questions of nuclear order, processes of nuclear ordering, and the extent to which South Africa and 'local' constituencies within it have been able to intervene in the shape and trajectory of nuclear order. These processes have taken place in the context of the nuclear order's solidifying hegemony and an evolving technopolitical project from the Cold War to the present day, during which South Africa has—in one form or another—been deeply imbricated with the global nuclear order and in constant interaction within it. Amid a growing critical literature on global nuclear order which takes seriously the operation of power, hegemony, and ideology within,[909] it is nevertheless surprising that very few if any scholars have seriously interrogated how the categories of 'global' and 'local' function in building and maintaining nuclear order. Considering the centrality of 'global nuclear order' as an organizing concept to most strands of nuclear scholarship outside of structural realism, the 'global' component of the term has, until now, gone essentially unexamined. Consequently, in this thesis I have engaged with the categories of 'global' and 'local' in nuclear politics, on one hand deconstructing them and demonstrating the porosity of the boundary between them—but on the other, respecting their ontological depth and central importance to the technopolitics of nuclear ordering.

However, this thesis is both more than a case study of South Africa's engagement with nuclear order, and more than an investigation into an understudied dimension of global nuclear order. Using the case of South Africa as an empirical way into the inner workings of the order, each chapter of this thesis demonstrates how the interplay between 'local' and 'global' is fundamental to the operation of nuclear order. By examining this dynamic, I demonstrate that the construction, maintenance, and perhaps even salvation of the present-day nuclear order has not been achieved only by the great powers and NWS, but that small, 'less' nuclear states like South Africa have a crucial role to play. No other preceding study of nuclear order has made this point. I have also shown that many of the myths surrounding South Africa's putative 'uniqueness' in global nuclear order—from the 'indigeneity' and 'exceptionality' of the apartheid bomb to its 'bridge-building' brand of 'niche diplomacy'—are generated through this local-global interplay. This is highly significant because the idea of South Africa as an exceptional and unique disarmament success story has functioned to bolster the global nuclear order, especially since 1994, obscuring the ways in which the order itself failed to prevent a proliferated 'bomb in the *bushveld*'. Using the lens of local-global

[909] Biswas, *Nuclear Desire*; Egeland, 'Banning the Bomb: Inconsequential Posturing or Meaningful Stigmatization?'; Ruzicka, 'Behind the Veil of Good Intentions'; Ritchie, 'A Hegemonic Nuclear Order: Understanding the Ban Treaty and the Power Politics of Nuclear Weapons'.

interplay to disrupt these myths reveals the extent to which South Africa and the global nuclear order have, since the ANC's anti-nuclear campaign in the late 1970s, converged towards shared goals and relied on each other for the mutual servicing of interests. Nuclear ordering has been reliant, at several key junctures, on South African buy-in. In return, Pretoria both during and after apartheid has leveraged—with varying degrees of success—many of the normative, ideological, and technopolitical prescriptions of nuclear order to further 'local' and domestic agendas. I have demonstrated in detail how nuclear order has operated *within* South Africa, linking it with the apartheid state, the ANC's post-apartheid nuclear policy, the continuing condition of official secrecy and opacity, and the country's continuing struggles over energy, environment, and democracy. The latter is a key contribution: while there is a growing literature on the ways in which nuclear weapons in particular militate against democracy,[910] this thesis has offered an empirical investigation into how the global nuclear order itself can impose anti-democratic conditions within states, including the vast majority of those which are not nuclear-armed. Finally, as an empirical piece of work, this thesis makes a unique intervention into the existing literature by considering South Africa's full spectrum of nuclearity—rather than re-treading the well-worn ground of the apartheid bomb or the ANC's nuclear diplomacy. It is a corrective to the nuclear 'exceptionalism'[911]—an exclusive or overriding focus on weapons in isolation from the material and social contexts which permit them—that pervades most of the literature on nuclear South Africa, and is the only treatment which conceptually and systematically locates South Africa as an important participant in the global nuclear order. In sum, throughout this work, I am satisfied that I have stayed true to the original critical animus behind this project, which was to find a place for the 'local' in global nuclear order.

I now discuss the contributions to knowledge and to the literatures in which the thesis is located, alongside the implications for the field. This thesis contributes to two broad literatures. The first of these is that on South Africa, its nuclear history, and its nuclear future. There exists no book-length treatment on South Africa in the global nuclear order, which considering Pretoria's centre-stage position in many of its most important developments, is surprising. This work remedies that condition. However, this is not primarily a nuclear history of South Africa; to the extent that it is, it is doggedly revisionist. It is an empirical and conceptual investigation of South Africa's importance in nuclear order, and the nuclear order's importance in South Africa. The latter point, in particular, has been essentially entirely ignored in existing literature. More broadly, existing treatments of South

[910] e.g. Cooke and Futter, 'Democracy versus Deterrence: Nuclear Weapons and Political Integrity'; Benoît Pelopidas, 'Power, Luck, and Scholarly Responsibility at the End of the World(s)', *International Theory* 12 (2020): 459–70.
[911] Considine, 'Contests of Legitimacy and Value: The Treaty on the Prohibition of Nuclear Weapons and the Logic of Prohibition'.

Africa's forays into discrete elements of global nuclear order—overwhelmingly concerning the ANC's post-apartheid nuclear diplomacy—have tended to lionize individual successes and to conceive of the ANC's approach to nuclear diplomacy as an ahistorical commitment to the liberal values of multilateralism, reformism, and human rights. In addition, as I note above, there has tended to be an almost exclusive focus on nuclear weapons and weapons diplomacy, and where South Africa's civil nuclear industry is discussed, it is isolated from the broader context of South Africa's nuclearity.[912] As such, previous works have often come to inadequate and sometimes contradictory conclusions about the nature of the ANC's relationship to non-proliferation. This is the product of an overall lack of engagement with conceptual literature, and an unwillingness to consider South Africa as part of a much wider nuclear world. I also remedy this condition through this thesis, and in doing so, produce several original conclusions about the course of South Africa's nuclear history. That is not to say there is no value in these preceding studies: on the contrary, they are, and have been to me, of immense value, and have been produced in the context of an extremely challenging information environment. I hope that this work will be accepted as a contribution to this ongoing conversation. Nonetheless, I have highlighted shortcomings in the literature on South Africa's nuclear story, and further attention to them will yield more original insights of the kind I show here.

The second and perhaps more significant contribution is to the literature on global nuclear order. By examining South Africa's dialogical relationship with the global nuclear order, I have demonstrated that what is commonly understood as a 'global' multilateral project incorporates highly parochial, 'local' concerns of its constituent states. As noted early on in the thesis, the most prominent of these concerns are of course the foreign policy goals of the United States (and, at one time, the USSR), elevated to the level of 'global' hegemony, but I have demonstrated several ways in which South African (techno)politics have imprinted on the institutions of nuclear order—particularly in the realm of non-proliferation. In doing so, I address a lacuna in classical studies of global nuclear order and, by extension, in English School analyses of world order, which is the role of state and sub-state groupings (outside of a small elite cadre of great powers) in constituting order and mediating ordering processes.[913] Not only has South Africa made substantive contributions to the global nuclear order as a state, but more 'local' non-state concerns—such as Afrikaner nationalism and the anti-apartheid campaign—have also had an impact. I have charted the processes through which these interactions occur and framed them within a cohesive theoretical and conceptual framework. As such, this work represents a considerable advancement of current understandings of global

[912] See for instance van Wyk, 'South Africa's SAFARI: From Nuclear Weapons to Nuclear Medicine'; van Wyk, 'South Africa's Nuclear Future'.
[913] Walker, *A Perpetual Menace: Nuclear Weapons and International Order*; Bull, *The Anarchical Society*.

nuclear order, and a secondary contribution to the further development of English School thought in IR. I do not pretend here to have re-theorized global nuclear order, nor to have rendered obsolete any of the keystone works on the subject by William Walker in particular. I do, however, argue that the relative silence around the operation of the 'local/global' dichotomy in this literature is to the detriment of our understandings of the topic.

I also contribute in particular to studies in critical nuclear politics, since although critical analyses of nuclear order have burgeoned in recent years, none have examined the function of the categories of 'local' and 'global' in constituting world nuclear technopolitics. I have demonstrated here that these categories are more than ontologically shallow, purely social constructions which simply mask overriding structural power relations; they do concrete political work. The categories of global and local in nuclear order can be separated or blended to serve various technopolitical ends. I have also demonstrated that, while the global nuclear order functions as a set of power relations which constitute a hegemonic project, local intervention is nonetheless possible. South Africa, constrained by various material and structural realities, has nonetheless subtly influenced the direction of nuclear ordering at various points throughout its development. While this perhaps does not constitute a full-scale 'recovery of agency', it demonstrates to critical nuclear scholars that hegemony is neither an immovable, immutable monolith, nor an exclusive product of speech and discourse.[914] South Africa has been helped in its interventions into nuclear order by the fact that, for the most part, they have been with the prevailing wind. The ANC in particular has been particularly astute at intuitively understanding the trajectory of the developing order and aligning its policies accordingly—both in government and in opposition—generating significant goodwill and diplomatic clout in the process. Finally, I make the key point throughout the thesis that the global nuclear order has often hindered democracy in South Africa: first by permitting the apartheid bomb, and later by encouraging further nuclear development in the context of severely damaged public trust in nuclear technology. The silence of the TRC on the nuclear programme, the lack of public scrutiny of proposed nuclear power development, and the continued lack of transparency over the apartheid bomb add further voice to the critical work which has identified incompatibilities between nuclear technology and democracy.[915]

Limitations and further research

[914] As understood, for example, by Bolton and Minor, 'The Discursive Turn Arrives in Turtle Bay: The International Campaign to Abolish Nuclear Weapons' Operationalization of Critical IR Theories'.
[915] E.g. Pelopidas, 'The Birth of Nuclear Eternity'.

There are some clear limitations to this project, although none that discount it as an original, innovative, and significant piece of work. The most obvious of these, which I have discussed at several points throughout the thesis, has been the difficulty in accessing information about the South African nuclear programme both past and present (itself, it should be noted, partially a product of Pretoria's engagement with the global nuclear order). Primary documents are difficult to access, as a result of both formal restrictions and a generally disorganized, hard-to-navigate information environment. Even if given more time in South Africa and financial resources to systematically declassify and catalogue documents, it is not immediately clear that I would have been able to fully overcome these obstacles, since much useful information has simply been destroyed. These issues are well-documented, and affect practically all studies of South Africa's nuclear programme.[916] As a result, while I have been able to contribute a degree of original primary research—such as engagement with the Anti-Apartheid Movement archive in Oxford—this thesis has relied in large part on engagement with secondary literature. I do not see this as a critical shortcoming: for one thing, I have explicitly not intended to set out on a full nuclear history of South Africa, but rather a conceptually-informed study of its relationship with the global nuclear order. For another, the thesis is still rich in empirical detail. Many of the secondary and tertiary sources consulted are themselves of great empirical value as intellectual artefacts of South Africa's relationship with the nuclear order, and the discussion herein benefits immensely from conversation with those scholars who have been able to unearth more details. Nevertheless, there is scope for further work here: it is possible, for example, that the ANC archive at the University of Fort Hare in Eastern Cape contains documents which may shed light on internal ANC attitudes to nuclear technopolitics while in opposition. There are also methodological limitations at play. One, as I noted in the conceptual framework, is that the choice to disregard 'levels of analysis' as they are traditionally applied in IR may militate against 'replicable' studies and, in particular, a macro-level, mechanistic understanding of the 'local' and 'global' interaction in global nuclear order. I do not consider this a particular problem, since the animating idea behind this thesis is a conception of the global nuclear order as at once a construct, reliant on the political deployment of categories of 'global' and 'local' for particular aims, as well as a processual interaction in which 'global' and 'local' interact and interbleed.

While I have focused very closely on the specific South African contribution to nuclear ordering (as well as the nuclear 'ordering' of South Africa), there is nothing in my methodology or conceptual

[916] See Harris, Hatang, and Liberman, 'Unveiling South Africa's Nuclear Past'; Gould, 'The Nuclear Weapons History Project'; van Wyk and van Wyk, 'The African National Congress and Apartheid South Africa's Nuclear Weapons Program'.

outlook that precludes their application to other cases. The analyses will inevitably look very different, but further case studies of other countries—particularly those on the periphery of nuclear order—would be valuable. This leads me to the most obvious and biggest limitation of the study, which is its singular focus on South Africa. Early research designs did assume a comparative study, with Brazil and/or Argentina to be incorporated into the analysis. I quickly concluded that this would result in a lumbering, unwieldy project—this one is already long, and one empirical chapter has been removed entirely—and would make it difficult to include the kind of granular detail which, I believe, makes this project valuable. Nevertheless, comparative studies are needed. In particular, one might infer from the conclusions here either that South Africa is 'unique' among the NNWS in the thickness of its interactions with the global nuclear order, or conversely that equally consequential interactions can be found between the global nuclear order and any given state on the planet—especially if working with a broadened conception of nuclearity. Both of these positions, I suspect, would be incorrect. I am particularly hostile, as argued, to the technopolitical fiction of South Africa as unique in the global nuclear order. However, this fiction was one of the logics behind the selection of South Africa as a case study in the first instance. South Africa is, without doubt, a state within which are condensed a great number of complex dynamics which intersect with nuclear ordering processes: colonization, nationalism, nuclear armament, war, liberation struggle and victory, disarmament, and multilateral non-proliferation/disarmament activism. In one sense, then, it was an obvious choice for further study, and there is no doubt that the project pursued here has yielded extremely valuable insights.

Nevertheless, to choose South Africa on this basis is to fall victim to some of the myths and narratives of nuclear order that are criticised herein. These include the idea that nuclear weapons—or a history thereof—make a state inherently more worthy of study from a nuclear order perspective, as well as the related notion that South Africa is 'unique' among states in 'being nuclear', experiencing a turbulent 20th century in domestic terms, and being actively engaged in nuclear ordering. I have worked hard to dispel these misconceptions throughout the thesis, but the initial choice of South Africa as a standalone case study embeds them, to some extent, in the research design of the project. The ideological prescriptions of nuclear order, unfortunately, spare none of us. With this in mind, comparative studies are sorely needed. 'Near-nuclear' middle powers in a similar league to South Africa—like Brazil, Argentina, Sweden, Egypt, or West Germany—might be obvious choices according to these same logics of nuclearity, but the net needs to be cast further. Japan is another prominent contender, not only because of its advanced nuclear programme and assumed 'bomb in the basement' but because it suffered nuclear bombings in anger in 1945. There are still more interesting options. Does Austria, in eschewing nuclear power and technology

altogether, manage to escape the clutches of the global nuclear order, or is its 'non-nuclearity' a form of nuclearity which itself tethers it to the order? The situation of the IAEA in Vienna and Austria's central role in the Humanitarian Initiative gesture towards potential responses to this question. Thailand and the Philippines, whose abortive nuclear programmes Abraham has investigated, also offer avenues for research. Indeed, it is difficult if not impossible to find a state untouched in some way by the global nuclear order and its hegemonic technopolitics. To truly complete the intellectual project I begin in this thesis, attention would need to be paid to more of these neglected corners of the nuclear world.

In addition, the aforementioned idea that *all* states might be found, to have contributed to nuclear ordering in equally important ways is not fully disproved by a singular case study. This seems like an intuitively far-fetched proposition, and would entail a significant ontological flattening of the hegemonic structures and hierarchies which make up the nuclear order and which have mediated South Africa's interactions with it. While it is likely that a diligent researcher might be able to find a number of ways in which Honduras has interacted with and been affected by the global nuclear order, the relative magnitude or importance of these interactions is difficult to gauge outside of a comparative analysis. I have argued, broadly, that even in a context of solidifying hegemonic power, South Africa and South Africans have located opportunities for agency in world nuclear politics. A comparative analysis might bring this power analysis into sharper relief, and perhaps by doing so yield more insights as to how advocacy groups, NGOs, activists, and even scholars might productively intervene in challenging the prevailing structures of nuclear order.

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