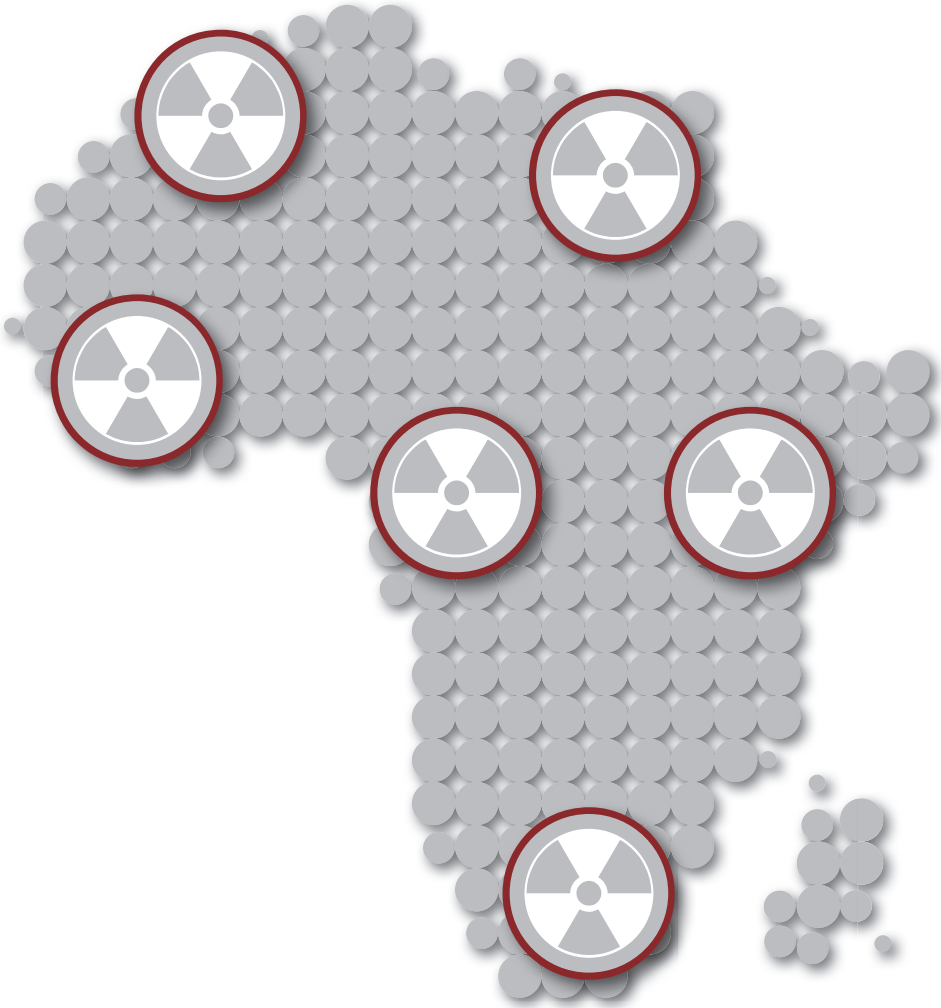
SECURING AFRICA'S NUCLEAR RESOURCES



Compiled by Amelia Broodryk and Noël Stott

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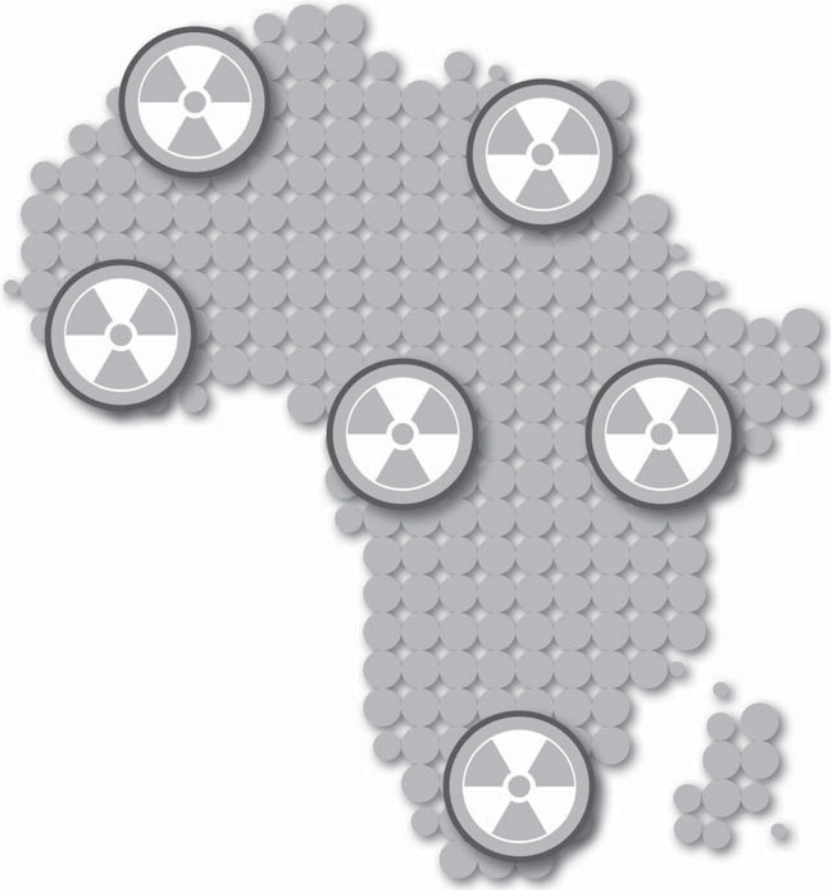

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Foreword

Although the need to better secure nuclear and other radioactive material and associated technologies has been on the international agenda for many years, it has taken on heightened significance in recent times.[1] This is as a result of the uncovering of an international nuclear smuggling ring – the A.Q. Kahn network[2] – in 2004, implicating a number of citizens of various countries in spreading sensitive nuclear technologies without authorisation; and, post-9/11 evidence suggesting that al Qaeda-linked groups may have an interest in acquiring or developing a weapon of mass destruction (WMD) and in particular a nuclear or radiological explosive/dispersal device.[3]

Radiological dispersal devices (RDD) or 'dirty bombs' combine a conventional explosive device, such as TNT, with radioactive material. Compared with a nuclear explosive device (any nuclear weapon or other explosive device capable of releasing nuclear energy) RDDs generally require limited technical knowledge to develop and the radiological isotopes can be obtained from a wide variety of sources, including nuclear weapon arsenals, nuclear research reactors, nuclear power plants and orphan sources – discarded and abandoned redundant industrial products and waste from medical facilities – as well as uranium mines and other mines that produce uranium as a by-product.

In response to the growing demand for a nuclear weapon-free world, in April 2009, US President Barack Obama presented an ambitious three-part strategy to generally address international nuclear threats and in particular the increase in the risk of nuclear material diversion and illicit trafficking by: 1) proposing measures to reduce and eventually eliminate existing nuclear weapon arsenals; 2) strengthening the Non-Proliferation Treaty (NPT); and, 3) preventing 'terrorists' from acquiring nuclear weapons or materials.[4]

Despite the differences between these types of sources, clearly small and insignificant (from their potential to be used in a malign manner) sources greatly outnumber larger and more hazardous sources, while fissile material (in the form either of nuclear weapons or of nuclear power related materials) is under tighter control at a much smaller number of sites than radiological sources.[5]

Nuclear Security Risks

With respect to the latter, the International Atomic Energy Agency (IAEA) has categorised four potential nuclear security risks:

- Theft of a nuclear weapon;
- The acquisition of nuclear materials for the construction of nuclear explosive devices;
- The malicious use of radioactive sources, including in so-called 'dirty bombs'; and,
- The radiological hazards caused by an attack on, or sabotage of, a facility or a transport vehicle.[6]

The responsibility for securing nuclear and radioactive materials ultimately rests with individual states. However, countries tend to rely on a number of international instruments and acknowledged principles to guide the control of nuclear and other radioactive materials. These instruments and principles include: the Convention on the Physical Protection of Nuclear Material and its 2005 Amendment; the International Convention for the Suppression of Acts of Nuclear Terrorism; the International Convention for the Suppression of Terrorist Bombings; the International Convention for the Suppression of the Financing of Terrorism; UN Security Council Resolutions 1373 and 1540; various IAEA documents such as the Code of Conduct on Safety and Security of Radioactive Sources[7]; the Guidance on the Import and Export of Radioactive Sources (INFCIRC/663); the Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.4); and, the Physical Protection Objectives and Fundamental Principles (GC(45)/INF/14).

According to the IAEA, '*this broad range [of] instruments (many developed under IAEA auspices) provides a framework for using such material safely and securely in ways that protect all States – both those with active nuclear programmes*

and those conducting only limited nuclear activities'.[8] The IAEA has also noted that, 'illicit trafficking in nuclear materials is a potential threat to the security of states and international security. Nuclear trafficking could be a shortcut to nuclear proliferation and to nuclear terrorism. And loss or unauthorized disposal of nuclear material or nuclear waste may result in grave economic and environmental consequences'.[9]

However, not all states adhere to the existing body of regulations governing nuclear security, and many have not implemented them effectively through their national legal and regulatory frameworks. This has led to gaps in the global system that could potentially be exploited by armed non-state actors or other criminal networks.

Although terrorism and organised crime have traditionally been considered distinct threats to peace and security, there is a growing body of evidence to suggest that their interests, *modus operandi* and motivations might overlap. Organised crime networks already possess many of the resources sought by nuclear and radiological 'terrorists' including mechanisms for illicit transport, circumventing control regimes and access to prohibited goods.[10]

Researching the African nuclear security environment

It is with this in mind that the Institute for Security Studies (ISS), with support from the British High Commission in South Africa, undertook preliminary research into the topic and hosted an experts workshop on 'Securing Africa's Nuclear Resources' bringing together a range of African stakeholders including officials from various South African government departments, African national nuclear regulators, power plants, atomic energy commissions and radiation protection authorities, the Africa Regional Co-operative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), the African Union (AU), and the Forum of Nuclear Regulatory Bodies in Africa (FNRBA).

The United Kingdom's interest lies in its belief that an armed attack using nuclear devices represents one of the most destructive risks to global security. The UK was influential in shaping the outcomes of the Washington Nuclear Security Summit, which aimed to generate agreement on a common understanding of the threat posed by nuclear terrorism, to agree to effective measures to secure nuclear material, and to prevent nuclear smuggling, and is playing its

part by setting the highest domestic security standards and encouraging the adoption of comparable standards elsewhere, including through its support of the IAEA.

The ISS is an independent African human security research institution, working towards a stable and peaceful Africa characterised by sustainable development, human rights, the rule of law, democracy and collaborative security. Staff are spread across five offices; two in South Africa (Cape Town and Pretoria), an office in Nairobi, Kenya, one in Addis Ababa, Ethiopia and a newly established office in Dakar, Senegal. As such, the ISS is well placed to undertake research outlining the African nuclear security environment, identifying the current threats as well to determine the status of implementation of nuclear security regimes in Africa. In addition, as a non-governmental organisation, the ISS is in an ideal position to provide a 'safe' platform for operators to share lessons and experiences on strengthening nuclear security in Africa and to explore the feasibility of co-ordinating their actions to secure vulnerable materials from unauthorised persons or organisations.

In February 2011, the experts workshop was hosted by the ISS' *Africa's Development and the Threat of Weapons of Mass Destruction Project* (WMD Project). The WMD Project aims to identify and broaden Africa's role in international efforts to strengthen disarmament and non-proliferation as they relate to weapons of mass destruction (WMD) in the context of Africa's developmental imperatives. The project's objectives include:

- To build African capacity to engage positively and effectively in international disarmament fora.
- To engage with members of the scientific community and industry in discussion and debate about the risks, rules and their responsibilities in relation to their activities.
- To stimulate discussion and dialogue about how Africa can positively balance its development needs with non-proliferation concerns.

Africa and the Threat from Organised Criminal Elements and from Acts of Terrorism

Notwithstanding the African perception that there is little or no risk of an imminent radiological device or weapon of mass destruction (WMD) attack on

the continent, nor a significant threat of nuclear trafficking through the region by domestic or transnational armed non-state actors, according to the IAEA's Illicit Trafficking Database (ITDB), from January 1993 to December 2009, a total of 1773 incidents globally were reported by participating states and some non-participating states.

Of the 1773 confirmed incidents, 351 involved unauthorised possession and related criminal activities. Incidents included in this category involved illegal possession, movement or attempts to illicitly trade in or use nuclear material or radioactive sources. Fifteen incidents in this category involved highly enriched uranium (HEU) or plutonium. There were 500 incidents reported that involved the theft or loss of nuclear or other radioactive material and a total of 870 cases involving other unauthorised activities, including the unauthorised disposal of radioactive materials or discovery of uncontrolled sources.

For the period July 2009 to June 2010, 222 incidents were confirmed by the ITDB. Of these, 21 involved possession and related criminal activities, 61 involved theft or loss and 140 involved other unauthorised activities. During this period, five incidents involved highly enriched uranium or plutonium, one of which was related to illegal possession and four were related to other unauthorised activities.[11] Globally, between 1972 and 2007, 17 major terror attacks or acts of sabotage were carried out against nuclear power stations.[12]

According to the report, 'Minimizing Threat Convergence Risks in East Africa and the Horn of Africa: Prospects for Achieving Security and Stability' there have been reports of smuggling of nuclear source material in Africa:

> Of the illicit nuclear trafficking cases reported from the region, the majority point to the Democratic Republic of Congo (DRC) as the point of origin. The DRC has uranium mines and the Regional Centre for Nuclear Studies in Kinshasa, a nuclear research facility known as CREN-K, which possesses low-enriched uranium (LEU) and spent fuel, but which has not been operational since November 2003. The IAEA stated in 2008 that CREN-K's material is 'not a proliferation concern, but could be used to make [an]…RDD, or 'dirty bomb'. Two fuel rods were stolen from CREN-K in the 1970s, one of which was never recovered. The other was recovered in Italy almost a decade later, and was reportedly found in the hands of a group linked to the mafia. Tanzania and Kenya have also been used for transiting materials,

including two recent incidents, one in Tanzania in mid-2007 and one in Kenya in late 2008.'[13]

Eastern Africa, and the Horn as a whole, presents numerous opportunities for sub-state actors to acquire or transit the region with radiological material.[14] A report by a Maplecroft, a UK-based risk advisory consultancy, indicates that Eastern Africa remains a fertile ground for terrorism. The report finds that Kenya, Uganda and Tanzania are all at risk. The group puts Uganda among countries that are top targets of al Qaeda or other regional extremist groups like al Shabaab of Somalia. Kenya is rated as 'high risk' while Tanzania, though it is put under 'low risk' countries, is considered by virtue of its proximity to Somalia a potential target. Somalia, which has been without a properly functioning government for almost two decades, occupies the top position among the 'extreme risk' countries, and states neighbouring Somalia appear to be at serious risk of being the foremost targets, according to *Terrorism Risk Index 2010*.

In Southern Africa, in November 2007, armed men entered the Pelindaba nuclear facility in Pretoria, South Africa, which is surrounded by an electrified security fence and intrusion detectors. The teams were able to shoot a worker and spend forty-five minutes within the facility without being engaged by security forces.

Existing and Potential Sources of Radiological Material in Africa

According to the IAEA, Algeria, Egypt, Ghana, Libya, Morocco, Nigeria and South Africa have operational nuclear research reactors. South Africa also has two nuclear power reactors. The DRC research reactor is no longer in operation. A number of African countries have uranium ore deposits, including: Algeria, Botswana, Central African Republic, DRC, Guinea, Equatorial Guinea, Malawi, Mali, Mauritania, Morocco, Namibia, Niger, Nigeria, Somalia, Tanzania and Zambia. Gabon has been a significant uranium supplier in the past. In 2009, Namibia was the fourth-highest generator of mined uranium with an annual production rate of approximately 5000 tons.

Nuclear material has been recognised as an alternative source of energy for Africa by the New Partnership for Africa's Development (NEPAD) and a number of African countries are thus in the process of investigating the feasibility of

developing nuclear power plants for electricity generation. These include: Namibia, Algeria, Egypt, Ghana, Libya, Morocco, Kenya, Nigeria, Tunisia and Senegal. The IAEA has been providing research assistance to Algeria, Egypt, Ghana, Libya, Morocco, Nigeria and Tunisia, amongst others, regarding the adoption of nuclear energy as a means of generating electricity by these countries.

Both South Africa and Namibia have publically announced plans to seek a uranium enrichment capability covering the entire nuclear fuel cycle – uranium exploration, mining, milling and nuclear energy (generation). These two countries, together with Niger, are amongst the main suppliers of uranium to the international community.[15]

As such, African states are key to implementing President Obama's pledge to lead an international effort 'to secure all vulnerable nuclear material around the world within four years' which he concretised during the Nuclear Security Summit held in Washington DC in April 2010. The 47 participating nations present, which included Algeria, Egypt, Nigeria and South Africa, and three international organisations, made commitments to take concrete measures towards ensuring that nuclear materials under their control are not stolen or diverted. They pledged to continue to evaluate the threat and improve security as changing conditions may require, and to exchange best practices and practical solutions for doing so.[16] In addition, processes to train African officials in nuclear detection have already started. In February 2011, for example, representatives from seven West African states took part in a one-week border security workshop on deterring trafficking of nuclear and radiological materials, at the Kofi Annan International Peacekeeping Training Center in Accra, Ghana. Participants included specialists from Burkina Faso, Gambia, Ghana, Mali, Nigeria, Senegal and Sierra Leone.

Conclusion

This publication consists of two main sections with two annexes. Section 1 consists of an outline and initial assessment of nuclear security with particular reference to Africa. This assessment addresses the central research question of how the challenge of securing nuclear materials on the African continent is currently being addressed by investigating existing and future activities undertaken by African governments together with the implementation support and compliance bodies of the various treaties governing the control of nuclear

material, such as the IAEA. Section 2 is the Chairperson's Summary of the expert workshop on 'Securing Africa's Nuclear Resources' referred to above. The summary, prepared by the organisers, provides an overview of the issues and themes discussed at the workshop as well as the outcomes, recommendations and a proposed way forward.

As the sections in this report indicate, from both preliminary research and the results of the experts workshop, it is apparent that:

- There is a need to be committed to ensuring the safety and security of nuclear and other radioactive materials without impeding the continued delivery of the developmental benefits that such materials and related applications provide. In other words, African states need to develop the necessary legal and regulatory frameworks that would allow for the safe and secure development of uranium resources, as well as for the peaceful applications of nuclear technology. Thus, one needs to find a balance between security and development.
- Despite the general African perception that there is little or no risk of an imminent radiological device or weapon of mass destruction attack on the continent nor a significant threat of nuclear trafficking through the region by domestic or transnational armed non-state actors and criminals, amongst operators of nuclear facilities the prevailing view is that it is imperative that African states do not wait for a nuclear incident to occur, and that the continent must focus on implementing preventative measures aimed at both the strengthening of controls and developing appropriate strategies to address the root causes of terrorist and/or criminal acts.
- There is a need for an independent threat assessment to be conducted on the continent and for this assessment to be then used to improve safety and security standards and controls, upgrading physical protection and improving detection equipment both on-site and at ports of entry, as well as to align training and capacity building initiatives, domestic legislation, and importantly, to inform the development of a continental framework document that spells out African needs in the area of nuclear security while at the same time assisting in national design-basis threat assessments.
- The strengthening of controls to curb activities that may contribute to the development of radiological dispersal devices should take place through close co-operation and the sharing of information amongst states, that is, at a multi-lateral level.

- African domestic legislation and regulations with regard to nuclear security should be more in line with international best practice. Research into the shortcomings of existing national nuclear security laws in Africa needs to be undertaken. In addition, it may be appropriate for best practice guidelines for nuclear security laws, regulations and infrastructure to be drafted.
- African states need to support the full implementation of the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba) and, in particular, Article 10 (Physical Protection of Nuclear Materials and Facilities) where States Parties undertake to '… maintain the highest standards of security and effective physical protection of nuclear materials, facilities and equipment to prevent theft or unauthorized use and handling…' and the soon to be established African Commission on Nuclear Energy (AFCONE).
- There ought to be greater participation of African states, including the African Union, in the follow-up meeting of the international nuclear security summit to be held in Seoul, South Korea in 2012.
- Accession to, and compliance with, relevant international legal instruments on terrorism and international organised crime, such as the International Convention for the Suppression of Acts of Nuclear Terrorism, the International Convention for the Suppression of Terrorist Bombings and the International Convention for the Suppression of the Financing of Terrorism; as well as the implementation of relevant UN Security Council resolutions, such as UNSC 1540, is crucial.
- The ratification of and compliance with existing international nuclear security conventions, such as the Convention on the Physical Protection of Nuclear Material and its 2005 Amendment, is also vital.
- The capacity of national law enforcement officials to deal with the trafficking of nuclear and other radioactive material needs to be reinforced through appropriate training on investigative procedures and the upgrading of border control equipment and resources.

Section I

An Initial Assessment of Nuclear Security in Africa

Introduction

Ensuring the security of nuclear and other radioactive materials and associated technologies has been on the international agenda for a number of years, however, due to developments such as the A.Q. Kahn network, nuclear security is now becoming a priority for many states around the world. Although African states acknowledge the importance of securing nuclear and radioactive materials, the continent currently faces a variety of other security challenges – including the proliferation of small arms and light weapons, the alleviation of poverty, and the provision of basic goods and services such as food, housing, educational facilities and healthcare. The extent of these immediate challenges makes it difficult to argue that Africa should be more concerned about the threat of nuclear weapons, or the diversion of nuclear material to armed non-state actors.

Although African participation in international legal regimes governing nuclear weapons and material has often been perceived as marginal, these [mis] perceptions often do not include an understanding of the African security context. A study of nuclear material security in Africa must include an acknowledgement of other sources of insecurity on the continent, including conflicts over natural resources, inadequate border security, ungoverned spaces, and linkages with organised crime and terrorism networks. In addition, the lack of participation by African states in international nuclear fora is often a result of a lack of capacity and resources, rather than the non-prioritisation of the issue.

This assessment will address the central research question of how the challenge of securing nuclear materials on the African continent is currently being addressed by investigating existing and future activities undertaken by African governments together with the implementation support and compliance bodies of the various

treaties governing the control of nuclear material, such as the International Atomic Energy Agency (IAEA), the United Nations Security Council Resolution 1540 Committee, and the African Commission on Nuclear Energy (AFCONE).

The assessment outlines the nuclear security environment, identifying the current threats as well exploring the current nuclear security regime. The assessment will also discuss the status of implementation of the nuclear security regime in Africa as well as the link between nuclear security and terrorism. The implications of the so-called nuclear energy revival or renaissance are also briefly described. The conclusion and recommendations section of this assessment will show that much more work can be done to improve the security of nuclear material on the African continent through the development of appropriate mechanisms that simultaneously address the developmental and safety concerns of African states. Although the threat posed by nuclear material may not be a high priority to the African continent at present, this situation is changing and the continent is increasingly engaging with the international community to ensure global security.

Nuclear Security

The present-day international security environment sets extraordinary challenges for preventing the spread of nuclear weapons and materials. There are suspicions that a number of armed non-state actors are actively seeking to acquire nuclear weapons or the material and technology required to produce them. In addition, the expansion of nuclear technology, as well as the development of civilian nuclear energy capacity, will in the future pose an increased challenge to current non-proliferation efforts.

Despite these challenges, nuclear security in many countries has improved substantially over the last 15 years, largely due to the development of national strategies and increased international co-operation in the field. According to Bunn, as of April 2010, '17 countries have eliminated all of the weapons-usable nuclear material on their soil'.[17] However, Howsley argues, 'the pervasive secrecy surrounding nuclear security means that no global mechanism is in place to identify the worst security performers and help them come up to the level of the best performers'.[18]

Added to the challenge of overcoming nuclear secrecy, the present international nuclear security framework involves a substantial number of initiatives ranging from national regulations and procedures to voluntary codes of conduct and

legally-binding international conventions. Countries may become overwhelmed by the wide range and scope of these elements, potentially leading to an over-complication of the implementation process. Given the exhaustive list of nuclear security initiatives, only a few will be discussed in this assessment, particularly those with direct relevance for Africa. The following section briefly describes current threats to nuclear security. The changing global security context means that African states have an obligation to remain vigilant and ensure that they continue to play a vital part in the international discussion on nuclear resource security.

Current International Nuclear Security Threats

There are two main categories of nuclear security threats present in the international community today. The first involves attacks on nuclear facilities, and the second is the diversion of nuclear material, through black market sales, illicit trafficking or smuggling, to state and non-state actors. The second threat type is of greater concern, evident in the steady increase in illicit trafficking cases since the early 1990s.[19]

Although it seems highly unlikely that any group would attempt an attack on a nuclear installation, given the highly sophisticated security measures present, there is still a remote possibility that armed non-state actors may, in future, target nuclear reactors. In an age of suicide bombers and hijacked commercial aircraft, representatives from the nuclear industry and governments remain confident that nuclear structures are able to withstand airplane crashes, but this may not be the case in all countries currently housing nuclear installations. An additional security threat is a possible military attack on a nuclear facility in one state by another state, as in the case where Israel allegedly destroyed a nuclear reactor in Syria in September 2007.[20]

A more pressing threat to international security is the acquisition of nuclear materials by armed non-state actors for the 'purpose of making a nuclear weapon or radiological dispersal device (RDD)'.[21] Thus as more African states embark on the development of nuclear energy programmes and the mining of, and trade in, uranium, the need to reprioritise nuclear security on the continental agenda becomes more pressing.

The International Nuclear Security Regime

In order to prevent potential threats to national security, including nuclear threats, from armed non-state actors and organised criminal groups, countries

have developed strategies in line with their international obligations. However, unlike the international nuclear *safety* framework, the international structure governing nuclear *security* is not as 'extensive, advanced or entrenched'.[22] In addition, Findlay argues that within the nuclear security framework, there are 'less widely accepted sets of recommended security principles and practices, little collaboration between nuclear plant operators worldwide, practically no peer review and an abiding sense that nuclear security is too sensitive an issue to be subject to global governance'.[23]

The Washington Nuclear Security Summit held on 12 – 13 April 2010 produced a work plan consisting of a number of (voluntary) steps that should be taken to ensure the safe 'storage, use, transportation and disposal of nuclear materials and in preventing non-state actors from obtaining the information required to use such materials for malicious purposes'.[24] The work plan represents the broad nuclear security architecture as it incorporates many of the national and international initiatives that countries can implement including the International Convention for the Suppression of Acts of Nuclear Terrorism, the Convention on the Physical Protection of Nuclear Material, and United Nations Security Council Resolution (UNSCR) 1540.

Other important initiatives that support co-operation in the field of nuclear security include: the Global Initiative to Combat Nuclear Terrorism (GICNT), an ad-hoc discussion group of 76 countries world-wide established by the US and Russia in 2006; the World Institute of Nuclear Security (WINS), created in 2008 as an open forum for nuclear security operators to exchange best practice experiences; and the G8 Global Partnership, a ten-year, $20 billion threat-reduction effort launched in 2002.[25]

Status of the International Nuclear Security Regime in Africa

Traditionally, African involvement in international nuclear disarmament and non-proliferation negotiations has been perceived as marginal. However, African countries cannot afford not to be concerned about non-proliferation and disarmament issues. In addition to reducing insecurity on the African continent, active participation in international negotiations by African states leading to global disarmament, will free up substantial resources that can be used for human and social development. Although there is a general perception that African states do not prioritise participation in international legal regimes governing nuclear

weapons and material, this conclusion is usually based on a 'northern' understanding of Africa's numerous challenges. A discussion of nuclear material security in Africa must acknowledge other sources of insecurity on the continent including the scarcity of food, unequal land distribution and perceived corrupt practises on the part of those in power. Ensuring the security of nuclear materials in Africa is thus but one element of the continent's overall security architecture.

In a Defense Threat Reduction Agency (DTRA) discussion report of April 2009, members of a working group concluded that it would be unfair to assume that African states are not concerned about nuclear security based on their lack of ratification and/or participation in international agreements.[26] African states have often contended that some of these agreements are not specifically applicable to their countries, or that they lack the resources, expertise or capacity to join these treaties. African government officials have also argued that their countries are often faced with the task of ratifying a large number of other non-security related international conventions and have not had the time to apply their minds to ratify these specific instruments. Countries have also argued that they will not sign up to a treaty until they know they can devote the necessary resources to comprehensively implement it.

Ratifying a treaty or convention does not automatically imply that a country's nuclear material will be secured. Ratification is only one step of the process that also includes domestication of international laws and actual implementation of a particular treaty or convention.

It is interesting to note that only four African states – Algeria, Egypt, Nigeria and South Africa – were invited to attend the 2010 Nuclear Security Summit. This is probably due to their relevant experiences in the nuclear field, and these four countries could also be considered leaders in the field of nuclear technology in their respective regions, and therefore could be influential in determining how this technology is managed on the African continent. The International Atomic Energy Agency (IAEA) has identified a number of emerging nuclear energy states, including Ghana, Namibia and Senegal.[27] In addition, as more African states are publicly announcing that they are considering nuclear energy, such as Kenya, Nigeria, and Tanzania, the security of radiological and nuclear material is steadily becoming more prominent. The potential impact of the nuclear energy 'revival' is discussed later in this assessment.

African states are party to a number of treaties and conventions that contribute to the global nuclear security framework. These include the Treaty on the Non-

Proliferation of Nuclear Weapons (NPT), the African Nuclear Weapon-Free-Zone Treaty (Treaty of Pelindaba), the Convention on the Physical Protection of Nuclear Material, the International Convention for the Suppression of Acts of Nuclear Terrorism and the OAU Convention on Prevention and Combating of Terrorism (Algiers Convention). The NPT, for example, is of vital importance given the developmental and security imperatives facing Africa. African states thus played a significant role in the recent NPT 2010 Review Conference, which took place from 3 – 28 May. Attended by virtually all African Union members, a number of African states made opening statements to the NPT Review Conference, in which they set out their positions, including: Algeria, Botswana, Burkina Faso, Cameroon (on behalf of the Africa Group), Congo, Egypt, The Gambia, Ghana, Kenya, Libya, Morocco, Mozambique, Namibia, Nigeria, Senegal, South Africa, Sudan, Tanzania, Tunisia, Uganda, Zambia, and Zimbabwe.[28]

The adoption, by consensus, of a Final Document, while not meeting all of Africa's expectations, was seen by many African states as a significant achievement in maintaining the three pillars of the NPT namely, to prevent the spread of nuclear weapons and weapons technology; to further the goal of nuclear disarmament; and, to promote co-operation in the peaceful uses of nuclear energy. The final document also reaffirms non-nuclear weapon states' inalienable right to pursue peaceful uses of nuclear energy in terms of Article IV of the Treaty. Most importantly for Africa, the final document states that developing states should be given preferential treatment in this area. The final document made reference to the role of the IAEA in fostering international co-operation in nuclear security, as well as in 'establishing a comprehensive set of nuclear security guidelines, and in assisting Member States, upon request, in their efforts to enhance nuclear security.'[29]

As a means to further nuclear science and technology for African development, the IAEA and its African member states established the African Regional Co-operative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA) in 1990. AFRA is an important initiative given that is 'seeks to maximize the use of the available infrastructure and expertise in Africa and assists countries to move toward regional self-sufficiency using peaceful applications of nuclear techniques'.[30] Nuclear security and radiation and waste safety is one of AFRA's six thematic focus areas, which also includes human health, food and agriculture, water resources, sustainable energy development and industrial applications. AFRA's nuclear security project, in support of the implementation of the IAEA's Nuclear Security Plan (2006-2009), ended in June 2010. The objective of the

project was to increase 'national awareness and capacities in targeted African countries for the prevention, detection and response to malicious acts involving nuclear and other radioactive materials or facilities' and the 'illicit trafficking in nuclear and other radioactive material.'[31] From 2007 to 2010, the project hosted five regional training courses with participants from 33 African countries.[32] The outcomes of the five regional courses included member states' understanding of:

- obligations related to combating malicious acts involving nuclear and other radioactive materials as described in the relevant international instruments;
- the need for nuclear security infrastructure within a country;
- the need for effective mechanisms to prevent malicious acts involving nuclear and other radioactive materials;
- the need for effective detection systems at border crossings and other 'choke' points;
- the need for effective response mechanisms, both locally and nationally, to ensure that the detection of any unauthorised nuclear and other radioactive material is responded to in such a way so as to protect people, the environment and society from the effects of nuclear terrorism, and to ensure that any evidence necessary for successful prosecution of perpetrators is properly protected; and,
- the need to have a systematic process for human resource development in the area of nuclear security in order for the state to effectively combat nuclear terrorism.[33]

Another significant African initiative is the Forum of Nuclear Regulatory Bodies in Africa (FNRBA). The FNRBA was launched in December 2009. The FNRBA was formed in response to the increasing use of radioactive material in peaceful nuclear applications such health, agriculture and energy.[34] 33 African countries are currently part of the Forum.[35] According to IAEA Deputy Director General Tomihiro Taniguchi, the launching of the FNRBA 'is a very positive step in strengthening nuclear safety and security in Africa.'[36] The FNRBA provides a mechanism for the exchange of regulatory experiences and practices among nuclear regulatory bodies in Africa, and importantly, aims to provide for the enhancement, strengthening and harmonisation of the radiation protection, nuclear safety and security regulatory infrastructure and framework among the members of FNRBA. The work of the FNRBA will complement the work of the IAEA's Nuclear Security Programme in Africa.[37]

Perhaps the most important example of Africa's commitment to a world free of nuclear weapons and from the abuse of radiological material is the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba), which was approved by African Heads of State on 23 June 1995. The Treaty declares Africa a zone free of nuclear weapons and provides for the promotion of co-operation in the peaceful uses of nuclear energy; requires complete nuclear disarmament by African states; and enhances both regional and global peace and security. As an important step towards strengthening the global non-proliferation regime, the Treaty of Pelindaba seeks to ensure that nuclear weapons are not developed, produced, tested, or otherwise acquired or stationed anywhere on the African continent or its associated islands.[38]

Twenty-eight ratifications and deposits were needed to bring the Treaty of Pelindaba into force, which occurred in July 2009. As of 1 March 2011, all 53 African states, as well as the territory known as the Sahrawi Arab Democratic Republic, have signed the Treaty, and 31 countries have deposited their instrument of ratification with the African Union. Under Articles 12 and 14, the African Union, as the Treaty Depository, is mandated to arrange a first Conference of Parties at which the composition, location and role and functions of the African Commission on Nuclear Energy (AFCONE) would be finalised, and at which matters such as the Commission's budget and the scale of assessment to be paid by the state parties should be agreed. AFCONE would be responsible for ensuring that African states and Nuclear Weapon states comply with the provisions of the Treaty.

The First Conference of States Parties took place on 4 November 2010 at the AU Headquarters in Addis Ababa. Participants endorsed the 1996 Cairo Declaration and agreed that South Africa would host the headquarters of AFCONE.[39] The Conference elected the following 12 countries as Commissioners of AFCONE: Algeria, Burkina Faso, Cameroon, Ethiopia, Kenya, Libya, Mali, Mauritius, Senegal, South Africa, Togo and Tunisia.[40]

The Treaty of Pelindaba contains specific provisions for ensuring the physical security of nuclear materials. Under Article 10 of the Treaty, States Parties are legally obliged to maintain the 'highest standards of security and effective physical protection' of nuclear materials, facilities and equipment. Each party also undertakes to apply measures of physical protection equivalent to those provided for in the Convention on the Physical Protection of Nuclear Material and IAEA security guidelines.[41]

During a workshop hosted by the Institute for Security Studies and the United Nations Regional Centre for Peace and Disarmament (UNREC) in March 2010,

delegates argued that the fact that some countries have not yet ratified Pelindaba does not mean that there is no political will to do so. On the contrary, there was consensus that all African states are committed to their nuclear disarmament and non-proliferation obligations and that it was highly unlikely that this commitment would be rolled-back. Possible reasons for non-ratification include lack of knowledge and capacity, over-stretched staff, prioritisation of other issues (such as poverty alleviation) and other treaties that are seen as being of greater importance in the African context (such as those prohibiting the use, stockpiling, production and transfer of anti-personnel mines and certain types of cluster munitions and the United Nations Programme of Action on Small Arms).[42]

The Treaty of Pelindaba is an important African initiative, and once AFCONE is operational, African states will have more control over the development of nuclear projects on the continent, which should also ensure increased security of radioactive material. AFCONE could potentially become the continent's nuclear security hub, which could assist states with the implementation of other international nuclear security instruments, including the Convention on the Physical Protection of Nuclear Material. As the only internationally legally binding instrument relating to the physical protection of nuclear material, this Convention establishes measures associated with the 'prevention, detection and punishment of offenses relating to nuclear material'.[43] As of 1 March 2011, 34 African states have ratified or acceded to the Convention.[44]

In an effort to strengthen the existing international non-proliferation regime, the United Nations Security Council adopted Resolution 1540 in April 2004. The resolution, which is legally binding on all UN member states and therefore on all African states, aims to prohibit states from providing any form of support to non-state actors who attempt to acquire or produce weapons of mass destruction. It compels states to implement and enforce effective measures in their national legislation to prevent non-state actors from being able to develop, acquire, manufacture, possess, transport, transfer or use any type of chemical, biological, radiological or nuclear and/or related materials.

While many African countries have expressed support for 1540, as of 1 March 2011, only 28 African states have submitted required reports to the 1540 Committee on progress made in implementing the provisions of the resolution. Most of the reports do not contain much detail, also suggesting either that implementing the resolution is not a high priority in Africa or that some African states do not have the capacity to fill in complicated forms or that there is simply

'reporting fatigue'. Most African countries have small 'disarmament and non-proliferation' departments and the number of reports that need to be compiled and submitted to various UN bodies is increasing. Non-reporting or late reporting then, should not be seen as a lack of political will or of non-implementation of international commitments and obligations.[45]

Many of the African states that have submitted a report state that they do not possess any type of nuclear weapon and therefore could not assist non-state actors in acquiring them. Countries have also listed existing national legislation that broadly pertains to 1540 requirements; however, much of the legislation listed is outdated and insufficient to effectively deal with contemporary nuclear threats. Generally, border controls on the continent are notoriously weak and porous, and while some reports indicate that sufficient border controls are in place, it is unlikely that these controls (which were put in place largely to curtail the illicit trafficking of small arms and other illegal substances) are sufficient for preventing the proliferation of chemical, biological or nuclear weapons, or their agents, materials and components. This is primarily because nuclear components are often more difficult for customs officials to identify without specific training. In addition, customs officials often have to do physical searches because scanning equipment or radiation detectors are not available. Although bodies such as the IAEA and AFRA have conducted training courses for customs officials in Africa, more resources are needed to really standardise this process throughout the continent.

Furthermore, the development of more effective border controls to this end could further contribute towards curbing the illicit small arms and drug trade.[46] While the 1540 Committee has also hosted a number of regional workshops on the African continent to assist states with implementation and reporting, such as in Kenya in February 2010, more work needs to be done to assist African states with meeting the demands of the Resolution.

Africa's Response to the Threat of Terrorist Acts

The threat of terrorist acts is not new to the African continent. However, 'African countries were not fully committed to implement existing regional and international strategies until the events of 11 September 2001 (9/11)'.[47] Incidents like the 1998 bombing of US Embassies in Kenya and Tanzania, the 2002 Mombasa attacks and the July 2010 bomb attacks in Uganda, made African states more aware of the dangers of transnational terrorism. Regional bodies, such as the African Union,

have taken steps to establish more effective counter-terrorism measures on the continent including the OAU Convention on the Prevention and Combating of Terrorism (Algiers Convention), the development of a Plan of Action on the Prevention and Combating of Terrorism in Africa and the establishment of the African Centre for the Study of Research on Terrorism (ACRST). [48]

Africa's approach to terrorism in all its various forms, whether domestic, international, transnational, or nuclear, has been reflective of the security priorities of the continent. With limited resources and numerous other priorities, for African states it is important to both deal with particular incidents and to focus on the root causes of all forms of terrorism as well as to develop appropriate strategies to address these challenges.

African states have shown various levels of commitment to international and regional agreements that aim to counter terrorist acts. As an important part of the global counter-terrorism framework, the International Convention for the Suppression of Acts of Nuclear Terrorism imposes an obligation on state parties to 'establish the offences within the scope of the Convention as criminal offences under their national laws and to make these offences punishable by appropriate penalties, which take into account their grave nature'.[49] The Convention also imposes the obligation to 'establish jurisdiction, territorial as well as extra-territorial, as may be necessary, over the offences set out in the Convention.'[50] Thus far, only 13 African states have ratified the Convention and 20 have signed it. There is very little public information available on the status of implementation of the Convention in Africa. As mentioned earlier, a key reason why this Convention has not been as successful on the continent could be that African states do not perceive nuclear terrorism to be a pressing threat to the continent. However, due to the increased interest in incorporating nuclear energy and technology into their domestic development strategies, African states will have to ensure that the materials used in these types of applications are not diverted to armed non-state actors.

An example of a continental counter-terrorism strategy in Africa is the OAU Convention on Prevention and Combating of Terrorism, adopted by the 35th Ordinary Session of the Assembly of Heads of States and Government in Algiers, in 1999. The Convention makes provision for fostering co-operation amongst member states, with a particular emphasis on the exchange of information on terrorist groups and their finance networks.[51] The Convention entered into force on 6 December 2002. At present, 40 African states have deposited their instrument

of ratification and a further nine countries are signatories to the Convention. A Protocol to the Algiers Convention opened for signature at the AU (successor to the OAU) in Addis Ababa on 2 July 2004. The main aim of the Protocol is to enhance the effective implementation of the Algiers Convention. It also outlines the 'need to coordinate and harmonize continental efforts in the prevention and combating of terrorism in all its aspects, as well as the implementation of other relevant international instruments.'[52] As of 1 March 2011, only nine Africa states have ratified the Protocol to the Convention, which will only enter into force thirty days after the deposit of the fifteenth instrument of ratification.[53]

Interestingly, the Algiers Convention only briefly makes mention of the 1979 Convention on the Physical Protection of Nuclear Material, and the document does not mention nuclear terrorism at all. This could be an indication that, at the time of the drafting of the Convention, the then OAU did not consider nuclear terrorism to be a great threat to the African continent. The predicted increase in the peaceful use of nuclear energy and technology, including the mining of uranium, in Africa may compel the AU to increasingly take note of the possible threat from the unauthorised use of nuclear materials and other radioactive sources. As discussed earlier, the Treaty of Pelindaba, and its African Commission on Nuclear Energy, may be the ideal instrument to monitor nuclear security trends on the continent.

The Implications of Nuclear Energy

South Africa is the only country in Africa currently producing electricity from nuclear power reactors. However, as mentioned earlier, a number of African countries have publicly expressed their interest in developing nuclear energy including Algeria, Egypt, Ghana, Kenya, Nigeria and Uganda, as a means of resolving their energy shortages and as a means to mitigate climate change.[54] In addition, eight countries on the continent, including South Africa, currently possess nuclear research reactors.

A Survey of Emerging Nuclear Energy States (SENES)[55] developed by the Nuclear Energy Futures Project of the Centre for International Governance Innovation (CIGI) identified ten African countries that are actively pursuing peaceful nuclear energy programmes. These countries include Algeria, Egypt, Ghana, Kenya, Libya, Morocco, Namibia, Nigeria, Senegal and Tunisia.[56] In addition, the World Nuclear Association (WNA) also includes Sudan and Uganda

Table 1: Current number of operational research reactors in Africa

Country	Reactor	Location	Responsible Body	Power	First criticality
Algeria	NUR ES-SALAM	Draria, Algiers Aïn Oussera	Commissariat à l'Energie Atomique Centre de Recherche Nucléaire de Draria (CRND)	1 MW 15 MW	1989 1992
DR Congo	TRICO-II	Kinshasa	Commissariat General a L'energie Atomique (CGEA)	1 MW	1972
Egypt	ET-RR-1 ET-RR-2	Inshas, Cairo Inshas, Cairo	Atomic Energy Authority of Egypt National Center For Nuclear Safety and Radiation Control	2 MW 22 MW	1961 1997
Ghana	GHARR-1	Legon, Accra	Ghana Atomic Energy Commission National Nuclear Research Institute Radiation Protection Board of Ghana	30 kW	1994
Libya	IRT-1	Tripoli	Tajoura Nuclear Research Center	10 MW	1981
Morocco	MA-R1	Maâmora, Rabat	Ministry of Energy & Mines, Water & Environment	2 MW	2007
Nigeria	NIRR-1	Zaria	Nigeria Atomic Energy Commission Centre For Energy Research and Training Nigerian Nuclear Regulatory Authority	30 kW	2004
South Africa	SAFARI-1	Pelindaba	South African Nuclear Energy Corporation (NECSA) National Nuclear Regulator (NNR)	20 MW	1965

Source NECSA, 2010

on the list of emerging nuclear energy states.[57] Emerging African nuclear energy states are only at the beginning stages of developing nuclear power programmes. Egypt, for example, has well-developed plans but commitment by stakeholders is still pending. According to a September 2010 report by the IAEA on International Status and Prospects of Nuclear Power, 21 (un-named) African countries 'are expressing interest in, considering, or actively planning for nuclear power'.[58]
An IAEA handbook on steps countries need to take in order to launch a nuclear power programme estimates that the development of such a programme will take 10 to 20 years from the 'pre-project phase' to the 'construction phase'.[59] Part of this process includes the establishment of appropriate security structures, systems and practices as well as the development of a suitable security culture that incorporates all stakeholders from nuclear technicians and customs officials to government representatives.[60]

There are currently eight African states that have operational nuclear research reactors including Algeria, Democratic Republic of Congo, Egypt, Ghana, Libya, Morocco, Nigeria and South Africa. Table 1 lists the number of research reactors per country and the bodies responsible for ensuring that the relevant national and international safety and security measures are implemented.
As mentioned earlier in this assessment, nuclear regulatory bodies in Africa have the opportunity to meet on a regular basis as members of the FNRBA in order to share experiences in nuclear safety as well as nuclear security. Given that nuclear safety is more relevant for the continent, the Regional Advisory Safety Committee for research reactors in Africa (RASCA) was established in June 2010 in order to advise operating organisations of their safety obligations. RASCA will also act as a nuclear safety experts' network, which will work together with the IAEA to ensure that nuclear safety standards are being met in African countries currently operating research reactors.[61] As more African countries develop nuclear power programmes, these nuclear safety fora may need to also consider the issue of nuclear security.

International experience has proven that the nuclear energy option is a far more complex undertaking than many African states may expect, and if African states want to incorporate nuclear energy into their energy mixes in future, planning has to begin now. According to Holger Rogner, head of the IAEA's planning section, 'Twenty years from now, many of these [African] countries may be ready for it', but this will take considerable time and money –

two extremely precious commodities for a continent that faces numerous other challenges.[62]

Another aspect of the nuclear energy industry that will have an impact on global nuclear security is the mining of uranium. Africa has considerable mineral deposits, including lower grade uranium. At present, uranium mining (whether in the prospect phase or fully developed) is taking place in 33 African states. Namibia, Niger and South Africa have the most comprehensive uranium mining infrastructures at present. Thus far, African governments, in collaboration with mining companies, have taken chief responsibility for ensuring the safety and security of the raw materials produced from mining activities with a reasonable amount of success. The locations of some of these mines often make them vulnerable to other national insecurities, such as intrastate conflict, bringing into question the security of these materials.

Confirmed incidents of natural uranium smuggling have been comparatively low in Africa, with only 12 such incidents occurring between 1994 and 2005. These took place in Tanzania (four incidents), and the Democratic Republic of Congo, Kenya, Namibia and South Africa (two incidents each). Most of the incidents involved stolen uranium ore, usually stored in containers, from unidentified sources. The deterioration of security around mining sites in the DRC due to political instability probably represents the most pressing nuclear security challenge in Africa today. Of particular concern is the illegal uranium and cobalt mining at the Shinkolobwe mine in Katanga Province, where the source material for the atomic bombs that were dropped on Hiroshima and Nagasaki in 1945 originated.[63] To date, there has only been one incident of lower enriched uranium (LEU) trafficking and one known theft of nuclear fuel from a research reactor in Africa. In 1997, eight fuel rods of uranium were stolen from a Kinshasa research reactor. Only one of the rods was recovered, the whereabouts of the remaining rods is still unknown.[64]

These incidents highlight the importance of securing vulnerable nuclear material in countries experiencing political instability. It is therefore vital that national, regional and international strategies take into account the local security situation when developing and implementing nuclear safety and security measures. Thus far, nuclear material smuggling incidents in Africa have been isolated, but as more countries become involved in nuclear energy development and uranium mining activities, strategies to combat illicit trafficking activities will have to adapt. African countries must work together in order to ensure the security of nuclear material on the continent.

Conclusions and Recommendations

Addressing the challenge of securing nuclear materials in Africa must take into account the local context. For example, the experiences of states in North Africa are quite different from those in sub-Saharan Africa, and therefore, the principles applied on the African continent should include an assessment of regional as well as sub-regional dynamics.

Although it is very important that these materials are safeguarded against those who would potentially want to use the material to cause harm, it would be inappropriate to argue that African states should spend a large amount of financial and human resources in order to achieve this goal. There are already a number of initiatives taking place on the continent, but more work can certainly be done using the resources currently available to African states. The most important challenge to address is demonstrating to African states why actively participating in and implementing international nuclear security agreements is important, not only to their national security, but also to their socio-economic development. It is vital that African states are made aware of benefits of complying with international conventions, which often come with assistance packages and increased inter-governmental co-operation.

The following are a few policy recommendations for not only ensuring that nuclear materials become more secure in Africa, but also that the international instruments that govern these kinds of materials are implemented effectively:

- African states must develop a comprehensive nuclear security strategy for the continent, incorporating current initiatives, in order to ensure the security of nuclear materials.
- The international donor community should offer resources in the form of legal expertise to assist in drafting reports and appropriate legislation and on the technical aspects of implementing the provisions of the NPT; the Treaty of Pelindaba; and, UNSCR 1540 either through appropriate NGOs or via government-to-government projects.
- The African Union should be engaged in relation to nuclear security issues to promote more 'buy-in' into what is largely perceived to be a concern of the developed world.
- Additional programmes, including sponsorship arrangements, should be developed to assist African states to fully participate in, for example, the

conferences of the IAEA so that they may actively participate in international non-proliferation and disarmament fora.

- Those African states that have not yet ratified the Treaty of Pelindaba should be encouraged to do so urgently.
- Regional meetings should be organised in order to provide African states with the opportunity to engage on issues of relevance for the continent with respect to nuclear security.
- Greater political support is needed to help place the NPT, the Treaty of Pelindaba and UNSCR 1540 into an African developmental context and to highlight the socio-economic benefits of full implementation of these agreements.
- States should be approached bilaterally for discussions on UNSCR 1540 and the significance of implementing its provisions. A particular focus should be placed on states that are considering developing nuclear power programmes, as well as those who possess extensive uranium deposits. A focus should be placed on those states that have not yet submitted an initial report or on those whose reports are deemed inadequate.
- Bodies such as the FNRBA and AFRA should be supported as they work towards safeguarding nuclear and other radioactive materials in African countries.

Section II

Expert Workshop on 'Securing Africa's Nuclear Resources'

Organisational Factual Summary

1. From 1 – 2 February 2011, the Institute for Security Studies held an experts workshop on 'Securing Africa's Nuclear Resources' in Pretoria, South Africa.
2. The workshop was made possible with the financial support of the British High Commission in Pretoria, South Africa.
3. Participants, while not necessarily representing their organisational views, included officials from: National Nuclear Regulator (NNR), South Africa; Department of Energy, South Africa; Nuclear Energy Corporation of South Africa (NECSA), South Africa, Africa Regional Co-operative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), the Department of International Relations and Co-operation (DIRCO), South Africa; Electricity Supply Commission (Eskom), South Africa, the African Union (AU), the Nigerian Nuclear Regulatory Authority (NNRA), Nigeria; the Forum of Nuclear Regulatory Bodies in Africa (FNRBA); the Nigeria Research Reactor, Nigeria; the Ghana Atomic Energy Commission, Ghana; the Atomic Energy and Radiation Protection Authority, Ministry of Health and Social Services, Namibia; the UK High Commission, South Africa; the 'Africa's Development and the Threat of Weapons of Mass Destruction' project of the Institute for Security Studies (ISS); and, the Embassy of the United States of America, South Africa.
4. Although invited, representatives from the Egyptian Embassy in South Africa; the Atomic Energy Commission, Libya; the Centre national de radioprotection (CNRP), Tunisia; and the Radiation Protection Board, Zambia were unable to attend due to unforeseen circumstances.

5. In total, 23 participants attended the workshop over the two days – consisting of 13 men and 10 women.
6. The objectives of the workshop were to:
    i. Provide an opportunity for participants to share lessons and experiences on strengthening nuclear security in Africa.
    ii. Develop a set of concrete proposals for African states (an African Action Plan) to co-ordinate their actions needed to secure vulnerable nuclear and other radioactive materials from unauthorised persons or organisations.
    iii. Establish a network of contacts, comprised of participants of the experts' workshop, which can take the nuclear security agenda in Africa forward.
7. The Workshop Programme consisted of both presentations and parallel working groups with feedback sessions in plenary.
8. Presentations included:
    i. Are Africa's Nuclear Resources Vulnerable to Abuse? – Martin Ewi (International Crime in Africa Programme, ISS)
    ii. An overview of the Forum of Nuclear Regulatory Bodies in Africa – Shamsideen Elegba (FNRBA)
    iii. An overview of nuclear security activities in South Africa – Elsie Monale (Department of Energy)
    iv. The Nuclear Energy Corporation of South Africa's Nuclear Security Experience – Ramatsemela Masango (NECSA)
9. Working Group Sessions aimed to:
    i. Review the current status of nuclear security in Africa;
    ii. Identify the challenges to, and opportunities for, enhancing the safety and security of nuclear materials in Africa;
    iii. Propose potential initiatives that can be taken up by participants, African states and regional/sub-regional bodies.
10. A final session debated and discussed the feasibility of developing a sustainable network of nuclear security stakeholders on Africa and an 'Action Plan' or Declaration that both the organisers and the participants could use as a means to further the nuclear security agenda in the future.
11. Participants expressed their appreciation to the organisers and donors as well as to their fellow participants and resource persons for the valuable information received and the knowledge shared as well as for the opportunity to network with each other.

12. Participants also encouraged the organisers (and donors) to continue to provide opportunities and a platform for ongoing dialogue and action on nuclear security issues and to include a broader range of relevant African stakeholders in such events, in particular the nuclear industry, law enforcement agencies, custom officials and civil society.

Discussion Outcomes and 'Action Plan'

Pretoria Declaration on Securing Africa's Nuclear Resources

2 February 2011

We, the participants of an experts workshop on Securing Africa's Nuclear Resources, held from 1 – 2 February 2011 in Pretoria, South Africa:

RECALLING, that in July 1964, the then Organisation of African Unity (OAU) adopted the Declaration on the Denuclearization of Africa [AHG/Res.II(I)] and that in June 1995, at the 31st Ordinary Session of the OAU held in Addis Ababa, the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba) was agreed to;

RECALLING ALSO, that on 11 April 1996, the Treaty was signed by all OAU members in Cairo and that on 15 July 2009, the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba) entered into force;

NOTING that on 4 November 2010, the First Conference of Parties to the Treaty of Pelindaba was held in Addis Ababa and that at this meeting the first steps were taken to establish the African Commission on Nuclear Energy (AFCONE) in order to ensure compliance with Africa's undertakings not to develop, produce, test, or otherwise acquire or station anywhere on the African continent or its associated islands nuclear weapons and to promote co-operation in the peaceful uses of nuclear energy [as] an important step towards the strengthening of the non-proliferation regime, complete disarmament, and the enhancement of regional peace and security;

NOTING ALSO, that the Pelindaba Treaty supports the use of nuclear science and technology for peaceful purposes and in this respect each Party undertakes to conduct all activities for the peaceful use of nuclear energy under strict non-proliferation measures; to provide assurance of exclusively peaceful use; to conclude a comprehensive safeguards agreement with IAEA

for the purpose of verifying compliance; and, not to provide source or special fissionable material, or equipment or material especially designed or prepared for the processing, use or production of special fissionable material for peaceful purposes to any non-nuclear weapon state unless subject to a comprehensive safeguards agreement concluded with IAEA;

RECALLING FURTHER, that in Article 10 (Physical Protection of Nuclear Materials and Facilities) of the Treaty of Pelindaba, States Parties undertake to:

> … maintain the highest standards of security and effective physical protection of nuclear materials, facilities and equipment to prevent theft or unauthorized use and handling. To that end each Party, inter alia, undertakes to apply measures of physical protection equivalent to those provided for in the Convention on Physical Protection of Nuclear Material and in recommendations and guidelines developed by IAEA for that purpose.

DETERMINED to promote international and regional co-operation for the development and practical application of nuclear energy for peaceful purposes in the interest of sustainable social and economic development of the African continent;

DETERMINED to ensure the safety and security of nuclear and other radioactive materials in Africa, without detracting from the continued delivery of the developmental benefits that nuclear materials and related applications provide, for example, radionuclides intended for use in life-saving medical applications;

COMMENDS the work of the African Regional Co-operative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), which includes nuclear security and radiation and waste safety as one of its thematic focus areas; and, the recent formation of the Forum for Nuclear Regulatory Bodies in Africa (FNRBA), which provides an important mechanism for the exchange of regulatory experiences and practices among nuclear regulatory bodies in Africa, and importantly, in the context of this workshop aims to provide for the enhancement, strengthening and harmonisation of the radiation protection, nuclear safety and security regulatory infrastructure and framework among the members of FNRBA;

HAVING CONSIDERED the various documents made available to participants and presentations made at the workshop, including a review of the communiqué of the 12 – 13 April 2010 Washington Nuclear Security and the Summit Work Plan (which

provides guidance for national and international actions to carry out US President Obama's pledge to lead an international effort 'to secure all vulnerable nuclear material around the world within four years', including: co-operating through the United Nations to implement and assist others in connection with relevant Security Council resolutions such as UNSC Resolution 1540 (which legally requires all countries to provide 'appropriate effective' security and accounting for any nuclear stockpiles they may have) and that the risk of nuclear material diversion and illicit trafficking is growing both globally and potentially on the African continent;

HAVING ALSO CONSIDERED the numerous studies that indicate that:

- It is plausible that a sophisticated non-state organisation could develop a crude nuclear explosive device if it obtained the needed materials.
- There have been a high number of recent cases of theft or loss of plutonium or highly enriched uranium (HEU), the essential ingredients of nuclear explosive devices.
- The porous nature of Africa's borders, the scale of legitimate trade across African countries, and the small size and weak radiation signal of the materials needed to make nuclear explosive devices make nuclear smuggling difficult to detect.

HAVING ALSO REVISITED the IAEA Nuclear Security Plan of Activities which has three main points of focus:

- Prevention – requiring: effective physical protection of these materials in use, storage and transport; protection of related nuclear facilities; and strong State systems for accounting for and control of nuclear material. This requires: training workshops and technical guidance documents — on nuclear security, physical protection, 'design basis threat' assessments, and nuclear material accounting.
- Detection – ensuring that systems are in place that can identify, at an early stage, illicit activity related to nuclear materials or radioactive sources. This involves training customs officials, installing better equipment at border crossings, and ensuring that information on trafficking incidents is shared effectively.
- Response – to establish and strengthen programmes to ensure that, in the event that illicit activity occurs (including acts of terrorism involving nuclear material

or radioactive sources) the response can be prompt, well co-ordinated and includes the recovery of radioactive sources that have been stolen or lost.[65]

HAVING RECOGNISED the importance of the original and subsequent revisions of the IAEA's Physical Protection of Nuclear Material and Nuclear Facilities document (INFCIRC/225/Rev.4), which rests on *inter alia* the understanding that the effectiveness of physical protection depends on states collectively implementing measures to prevent malicious acts on nuclear facilities and materials in transport;

HAVING NOTED THAT:

- It is imperative that African states do not wait for a nuclear incident to occur, and that the continent must focus on implementing preventative measures.
- African domestic legislation and regulations with regard to nuclear security should be more in line with international best practice.
- African regional bodies can assist in developing a more constructive engagement between African states and the international community.
- Political leadership ought to realise that nuclear security has to be central to national and regional security frameworks.
- There is a need for a proper threat assessment to be conducted on the continent and for this assessment to be then used to both improve safety and security standards, as well as to align training and capacity building initiatives, domestic legislation, etc.
- Human resource development should form a major part of African national nuclear security strategies.
- There is an urgent need to look at the status of security of transport of nuclear materials in the waters surrounding Africa.
- The Forum for Regulatory Nuclear Bodies in Africa (FNRBA) is a unique organisation from which other pan-African bodies can draw lessons from mandate, structure and its *modus operandi*.
- The African region should make use of its own safeguards inspectors – IAEA, AFCONE, FNRBA and AFRA could assist in training additional African inspectors. African states may feel more comfortable being inspected by their peers.
- There is an urgent need for a platform that ensures that African countries can move beyond national regulatory frameworks to inter-regional/regional

frameworks, which can act as bridge between international discussions and actions and those at the African domestic/national level.

- There is a need to develop an African framework document that spells out African needs in the area of nuclear security – AFRA already has a regional framework that could possibly inform an AFCONE position on nuclear security.
- There is a need to actively support AFRA's training and educational programmes in order to ensure that they remain both sustainable and appropriate.
- There seems to be a disconnect between national and international approaches to nuclear security.
- It is imperative that African states make use of every opportunity to engage with the IAEA Africa Programme in a constructive and assertive manner.
- National Nuclear Regulators have formed the FNRBA and operators network under AFRA. However, these two groups do not often have an opportunity to engage with each other and as such there is a need to bridge the gap between regulators and operators.

COMMITTING ourselves to strengthen our country and continent's nuclear safety measures in order to reduce the threat of criminal elements, armed non-state actors or other unauthorised persons or organisations acquiring nuclear and radiological materials;

THEREFORE AGREE to *encourage, promote and/or implement* the following actions amongst relevant national, continental and international authorities and/or workshop participants:

At the INTERNATIONAL LEVEL,

a. Greater participation of African states, including the African Union, in the follow-up meeting of the international nuclear security summit to be held in Seoul, South Korea in 2012.
b. The submission by African states of appropriate country programme documents (the tool by which the IAEA engages with member states) to the IAEA, which articulates a country's developmental needs.
c. The active participation of African states in existing international norms established by the United Nations (UN) and the IAEA.

d. Those African states that have not yet done so to conclude comprehensive safeguards agreements with the IAEA and to conclude additional protocols to their safeguards agreements on the basis of the Model Additional Protocol approved by the Board of Governors of the IAEA on 15 May 1997.
e. All African states to accede to, and comply with, relevant international legal instruments on terrorism and international organised crime, such as the International Convention for the Suppression of Acts of Nuclear Terrorism, the International Convention for the Suppression of Terrorist Bombings and the International Convention for the Suppression of the Financing of Terrorism as well as to implement relevant UN Security Council resolutions, such as UNSC 1540.
f. All African states who have not yet done so, to sign and/or ratify relevant international disarmament and non-proliferation agreements including the Comprehensive Test Ban Treaty (CTBT).
g. The ratification and compliance with existing international nuclear security conventions, such as the Convention on the Physical Protection of Nuclear Material and its 2005 Amendment.

At the REGIONAL LEVEL,

a. To support the full implementation of the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba) and its soon to be established African Commission on Nuclear Energy (AFCONE).
b. To view the Treaty of Pelindaba, and hence AFCONE, as the inter-regional/regional framework through which, inter alia the following can be performed:
    1. The development of an African framework document that spells out African needs in the area of nuclear security;
    2. To act as a bridge between the IAEA Safeguards regime and nuclear security of undeclared material;
    3. To develop as a centre of excellence in the area of nuclear security (together with AFRA etc.);
    4. To raise awareness amongst the general public on the socio-economic benefits of nuclear energy;
    5. To develop an African Union-level policy and programme on disposing of nuclear waste;
    6. To investigate the need for, and feasibility of, the harmonisation of African nuclear safety rules; and,

7. To facilitate strong regulatory infrastructure at the national level within a broad continental framework.

c. To encourage the African Commission on Nuclear Energy to liaise closely with both the African Regional Co-operative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA) and the Forum for Nuclear Regulatory Bodies in Africa (FNRBA) so as to both avoid duplication of effort and to prevent gaps.
d. To further encourage the African Commission on Nuclear Energy to play a central role in bridging the gap between the political and technical understandings of the concept of nuclear/radiological security and to act as a mechanism of weaving bilateral and multilateral agreements and activities together.
e. To encourage AFCONE and/or civil society to provide the opportunity and space for national nuclear regulators and operators to engage with each other and act as a bridge between regulators and operators.
f. To strengthen regional and continental co-operation among police, customs and border control services to address the potential trafficking of nuclear and other radioactive materials. These efforts should include, but not be limited to, training, the exchange of information to support common action to contain and reduce such trafficking across borders, and the conclusion of the necessary agreements in this regard;
g. To give active support to the IAEA and AFRA's programmes on nuclear security, including personnel training as well as to other initiatives to strengthen the physical protection of nuclear and other radioactive material.
h. To encourage more African states to become members of the Forum for Nuclear Regulatory Bodies in Africa, and to actively participate in its activities and programmes.
i. To advocate that the African Union, with the support of other regional/sub-regional bodies, host a meeting before the next nuclear security summit (in Seoul) in order to develop a broad African position on nuclear security.
j. To support regional bodies, such as AFRA, FNRBA and AFCONE, in their quest develop nuclear security norms together.
k. Sub-regional bodies, such as SADC, should consider developing regional protocols on safeguards and security.
l. Regional and sub-regional bodies should promote the ratification of the Treaty of Pelindaba.

m. A regional/sub-regional nuclear security threat assessment should be conducted to obtain an accurate picture of the status of nuclear security in Africa. This assessment should be accessible to African politicians.
n. There urgently needs to be a regional meeting (AU level) to discuss nuclear fuel bank models currently under review internationally. Africa must consider the development of a regional fuel bank taking into account the risks.

At the NATIONAL LEVEL,

a. To become parties to relevant conventions on nuclear security and the domestication of these agreements – especially the Treaty of Pelindaba and those referred to above.
b. To make better use of continental experts from AFRA, the FNRBA and AFCONE in order to promote nuclear security within the context of the need for sustainable socio-economic development on the continent.
c. To put in place, where they do not exist, national nuclear regulators and the appropriate institutional infrastructure responsible for policy guidance, research and monitoring on all aspects of the peaceful application of nuclear and other radioactive materials.
d. To enhance the capacity of national law enforcement officials to deal with the trafficking of nuclear and other radioactive material, including appropriate training on investigative procedures, border control and the upgrading of equipment and resources.
e. To put in place effective policies, legislation and regulatory frameworks for nuclear security, and to take steps to ensure the safety of nuclear and other radioactive materials and facilities, as well as to improve import and export controls.
f. To adopt, as soon as possible, where they do not exist, the necessary legislative and other measures to establish as a criminal offence under national law, the illicit possession of, trafficking in, and use of nuclear and other related materials.
g. To take appropriate measures to control the transfer by manufacturers, suppliers, traders, brokers, as well as shipping and transit agents, of such material.
h. To upgrade HEU-fueled research reactors on the African continent that do not meet IAEA recommendations, and, where possible to convert these to LEU-fueled reactors.

i. To identify the key national institutions that can take custody of all nuclear materials and activities. These institutions include handlers, processors, users, and transporters of nuclear and radioactive materials.
j. To evaluate existing national laws in Africa in order to determine whether they meet international standards and legal instruments, and whether they are implemented effectively.
k. To develop national design-basis threat assessments – taking into account nuclear threats unique to that particular country.
l. To encourage bodies such as the FNRBA to assist members to develop appropriate national standards.
m. To encourage, where appropriate, the active involvement of civil society in efforts to prevent the acquisition of nuclear and other radioactive materials by unauthorized persons or organisations.
n. To promote the above Pretoria Declaration on Securing Africa's Nuclear Resources through already existing bodies, such as AFRA, FNRBA and AFCONE, and to improve and maintain communication between these bodies in order to facilitate the exchange of best practices, strengthen security culture, and ensure African co-operation in improving nuclear safety, security and accounting. In this regard, the organisers should play an important role.

Recommendations for the Organisers in co-operation with bodies such as the FNRBA,

a. To undertake national or continental threat assessments.
b. To undertake research into the existing national nuclear security laws in Africa to ascertain their shortcomings.
c. To draft best practice guidelines for appropriate domestic nuclear security laws, regulations and infrastructure.
d. To assist bodies, such as AFRA, FNRBA, and AFCONE, with improving and maintaining communication in order to facilitate the exchange of best practices, strengthen security culture, and ensure African co-operation in improving nuclear safety, security and accounting.

Annex A

Status of Conventions and Treaties Related to Nuclear Security in Africa

African State	1540 Reports	Convention on Physical Protection of Nuclear Material	International Convention for the Suppression of Acts of Nuclear Terrorism	OAU Convention on the Prevention and Combating of Terrorism	Treaty of Pelindaba	Forum for Regulatory Nuclear Bodies in Africa (FNRBA)
Algeria	X	X		X	X	X
Angola	X			X		X
Benin	X			X	X	
Botswana		X			X	X
Burkina Faso	X	X		X	X	X
Burundi			X	X	X	
Cameroon	X	X			X	X
Cape Verde		X		X		
Central African Republic		X	X			
Chad				X		X
Comoros		X	X	X		
Congo (Republic of)				X		
Côte d'Ivoire	X				X	X

African State	1540 Reports	Convention on Physical Protection of Nuclear Material	International Convention for the Suppression of Acts of Nuclear Terrorism	OAU Convention on the Prevention and Combating of Terrorism	Treaty of Pelindaba	Forum for Regulatory Nuclear Bodies in Africa (FNRBA)
Djibouti	X	X		X		
Democratic Republic of Congo (DRC)	X	X				X
Egypt	X			X		X
Equatorial Guinea		X		X	X	
Eritrea	X			X		
Ethiopia				X	X	X
Gabon		X	X	X	X	X
Gambia				X	X	
Ghana	X	X		X		X
Guinea		X		X	X	
Guinea-Bissau		X	X	X		
Kenya	X	X	X	X	X	X
Lesotho				X	X	
Liberia						
Libya	X	X	X	X	X	X
Madagascar	X	X		X	X	X
Malawi			X	X	X	X
Mali		X	X	X	X	X

African State	1540 Reports	Convention on Physical Protection of Nuclear Material	International Convention for the Suppression of Acts of Nuclear Terrorism	OAU Convention on the Prevention and Combating of Terrorism	Treaty of Pelindaba	Forum for Regulatory Nuclear Bodies in Africa (FNRBA)
Mauritania		X	X	X	X	X
Mauritius	X			X	X	
Morocco	X	X	X			X
Mozambique		X		X	X	X
Namibia	X	X				X
Niger	X	X	X	X		X
Nigeria	X	X		X	X	X
Rwanda		X		X	X	
Sao Tome & Principe						
Senegal	X	X		X	X	X
Seychelles	X	X		X		X
Sierra Leone	X					X
Somalia						
South Africa	X	X	X	X	X	X
Sudan	X	X		X		X
Swaziland		X			X	
Tanzania (United Republic of)	X	X		X	X	X
Togo	X	X		X	X	
Tunisia	X	X		X	X	X
Uganda	X	X		X		X
Zambia					X	X
Zimbabwe					X	X

Annex B

Select List of Conventions, Protocols, Documents, and Initiatives on Nuclear Security [66]

1. **African Nuclear Weapon-Free Zone Treaty (Treaty of Pelindaba).** Under Article 10 (Physical Protection of Nuclear Materials and Facilities) of the Treaty of Pelindaba, States Parties undertake to: '… maintain the highest standards of security and effective physical protection of nuclear materials, facilities and equipment to prevent theft or unauthorized use and handling. To that end each Party, undertakes to apply measures of physical protection equivalent to those provided for in the Convention on Physical Protection of Nuclear Material and in recommendations and guidelines developed by IAEA for that purpose'.
2. **Convention on the Physical Protection of Nuclear Material and 2005 Amendment.** The Convention on the Physical Protection of Nuclear Material (CPPNM) is an international, legally binding initiative that aims to ensure the physical protection of nuclear material. Its components are divided into three categories including: prevention, detection and punishment of offenses. The 2005 Amendment legally binds States Parties to protect both nuclear facilities and nuclear material, whether the latter is for peaceful domestic use, in storage, or during transport. It requires increased cooperation among States Parties in the areas of locating and recovering nuclear material, alleviating the consequences of radiological damage, and preventing and combating radiological incidents.
3. **International Convention for the Suppression of Acts of Nuclear Terrorism.** The Convention outlines multiple binding obligations for Member States including: punishment for individuals attempting to sell nuclear materials for the purpose of sabotaging property, inflicting human casualties, or extortion and the need to apprehend nuclear terror suspects, and share accurate and verifiable intelligence regarding those suspects.
4. **International Convention for the Suppression of Terrorist Bombings.** The Convention strives to improve the international response to terrorism by extending the legal obligations of state actors. Convention obligations are based

on previous counterterrorism conventions; however, the rules are expanded to include terrorist acts that occur in the public sphere. The Convention also strengthens cooperation among law enforcement agencies spanning multiple countries, and it dictates the regulations by which states are permitted to establish jurisdiction for cases involving terrorist bombings.

5. **International Convention for the Suppression of the Financing of Terrorism**. The Convention bans supplying or gathering funds with the intention to utilize such funds to carry out a terrorist attack. It calls for joint efforts to identify, freeze, and seize any funds that have been collected and allocated to facilitate terrorist acts. The Convention also requires parties to prosecute terrorists or extradite them to the party that suffered as a result of their illegal actions.
6. **UN Security Council Resolutions 1373 and 1540.** Both Security Council Resolutions are binding on UN Members under Chapter VII of the UN Charter. Adopted on 28 September 2001, Resolution 1373 calls upon all UN Member States to work cohesively in order to suppress terrorist financing, share information and intelligence regarding various terrorist targets, effectively monitor borders and the crossings made at those borders, and finally to conduct relevant international conventions, protocols, and workshops to develop counterterrorism best practices.

   Resolution 1540 obliges all UN member states to implement a set of supply-side controls related to the nonproliferation of nuclear, biological, and chemical weapons, and criminalize proliferation activities within their territories. Specifically, this legally binding resolution calls upon states to: adopt and enforce laws that prohibit any non-state actor from manufacturing, acquiring, possessing, developing, transporting, transferring, or using nuclear, chemical, or biological weapons and their means of delivery; develop and maintain measures to account for and secure such items in production, use, storage, or transport; develop and maintain effective physical protection measures; develop and maintain effective border controls and law enforcement efforts to detect, deter, prevent, and combat illicit trafficking; establish, develop, review, and maintain appropriate effective national export and trans-shipment controls over such items. Importantly, in resolutions 1673 (2006) and 1810 (2008), the Security Council emphasised the importance of the regional and sub-regional dimensions of the implementation of resolution 1540, while stressing the national responsibility to take appropriate effective measures.

7. **The IAEA Code of Conduct on Safety and Security of Radioactive Sources**. Published in 2001, the Code of Conduct recognises that radiological materials are prevalent among today's technologies and that these materials must be secured in a timely manner. The Code expresses the need for proper disposal of certain radiological materials, in addition to fostering a security culture, establishing effective export controls, and taking a variety of other measures to secure these materials. The Code provides states with a list of regulations and obligations that must be met in order to establish the security of readily available radiological materials.
8. **IAEA Nuclear Security Series documents.** The IAEA commenced its Nuclear Security Series in 2006, and eleven guides have been published thus far:
    1. Technical and Functional Specifications for Border Monitoring Equipment offers instruction to Member States and equipment manufacturers in terms of the design, testing, qualifying and purchasing of radiation monitoring equipment for use at national borders.
    2. Nuclear Forensics Support lists the tools and procedures for proper forensic investigations of nuclear sites.
    3. Monitoring for Radioactive Material in International Mail Transported by Public Postal Operators explains the techniques and equipment available to detect radioactive material being carried in mail processed by public postal operators.
    4. Engineering Safety Aspects of the Protection of Nuclear Power Plants against Sabotage provides regulations for evaluating the engineering safety aspects of the protection of nuclear power plants against sabotage, including standoff attacks.
    5. Identification of Radioactive Sources and Devices assists non-specialist individuals and groups in terms of contact with and initial identification of radioactive sources, devices and packages.
    6. Combating Illicit Trafficking in Nuclear and other Radioactive Material focuses on illicit acts involving nuclear and other radioactive material and functions as an information and training resource for law enforcement personnel.
    7. Nuclear Security Culture explains the key aspects and characteristics of a nuclear security culture and how they relate to other nuclear security policies. It illustrates how nuclear security is ultimately dependent on

individuals, including policy makers, regulators, managers, and individual employees.

8. Preventive and Protective Measures against Insider Threats provides general information to the managers and operators of nuclear facilities concerning the prevention of and protection against insider threats.
9. Security in the Transport of Radioactive Material assists states in implementing, maintaining and/or critiquing nuclear security systems in order to effectively guard radioactive material (including nuclear material) while in transport.
10. Development, Use and Maintenance of the Design Basis Threat aids in the creation of a design basis threat, which is a description of the attributes of insiders and external adversaries who might attempt a malicious act, setting a facility's standard for protection.
11. Security of Radioactive Sources provides guidance and recommendations for employing various security measures for radioactive sources. This publication aims to assist countries in developing effective security policies.

9. **Guidance on the Import and Export of Radioactive Sources (INFCIRC/663).** This Guide is supplementary material aimed at equipping states to implement the Code of Conduct on the Safety and Security of Radioactive Sources; it serves to support the export and import provisions in this Code. It provides a general framework for states to use in accordance with their national legislation.
10. **The Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.4).** The original Physical Protection of Nuclear Material and Nuclear Facilities document stems from the understanding that physical protection is of international concern. It was created in 1975 in response to an anticipated need for the IEAE to have a role in helping states secure their nuclear facilities and material. Subsequent revisions occurred in 1977, 1989, and 1993. In 1997, the IAEA Secretariat decided to conduct an extensive review of the document, and national exports met during June and October of 1998 for that purpose. The fourth review seeks to clarify the document and account for technological innovation and international practices, including a provision for handling a sabotage situation. The spirit of this document rests in the understanding that the effectiveness of physical protection depends on Member States collectively implementing measures to prevent malicious acts on nuclear facilities and materials in transport.

11. **Physical Protection Objectives and Fundamental Principles (GC(45)/INF/14).** The IAEA Board of Governors created this document in September 2001, supporting it as a measure of providing security fundamentals. The physical protection objectives component seeks to guard against unauthorized transport of nuclear material, to protect nuclear facilities and nuclear materials from sabotage, reduce the consequences of radiological sabotage, and ensure that states have methods for recovering lost nuclear material. The fundamental principles are viewed as necessary for accomplishing the physical protection objectives. They include responsibility of the state, security culture, quality assurance, contingency plans, responsibility of license holders, and other principles.
12. **Handbook on Nuclear Law.** This handbook contains instruction materials used for teaching professionals, including lawyers, scientists, engineers, and government administrators, on how best to formulate a framework for managing nuclear energy.
13. **Proliferation Security Initiative.** The Proliferation Security Initiative (PSI) aims to halt the trafficking of WMD, their delivery systems, and related materials to and from states and non-state actors of proliferation concern. PSI allows for the interdicting of international shipments as nations call upon others to inspect cargo being transported abroad. Supported by some 90 countries outside of the US, PSI acts as an innovative and proactive approach to thwarting proliferation. PSI participants utilize national and international authorities to terminate WMD-related trafficking and take steps to strengthen those authorities as necessary.
14. **G8 Global Partnership.** Since its initiation in 2002, the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction has made considerable headway in restricting non-state actors and the countries that support them from obtaining, researching, or developing nuclear weapons or the materials to fashion such a weapon. The Global Partnership aims to address nonproliferation, disarmament, counterterrorism, and nuclear safety issues by hosting cooperative projects in areas such as destruction of chemical weapons, the safe dismantling of decommissioned nuclear submarines, the security of fissile materials, and the resettlement of former nuclear scientists to secure locations in order to protect and contain nuclear know-how. Progress made on the G-8 Global Partnership is announced and discussed during the annual G-8 summits.

15. **Global Initiative to Combat Nuclear Terrorism.** Originally formed in October 2006, the Global Initiative has now come to fruition and garnered support from 77 partners worldwide, including the International Atomic Energy Agency, European Union, and International Criminal Police Organization, which act as official observers. The Global Initiative's goals are defined as:
    - Bringing together experience and best-practice expertise from various fields of study, including nonproliferation, counter proliferation, and counterterrorism.
    - Integrating collective abilities and resources to reinforce the overall global effort to combat nuclear terrorism.
    - Providing the forum for countries to share information and expertise in a legally non-binding atmosphere.
    - The Global Initiative remains open to determined nations that share in its common goals and are actively committed to countering nuclear terrorism.
16. **April 2010 Nuclear Security Summit.** From 12-13 April 2010, US President Obama hosted over 40 heads of state to an international nuclear security summit to implement his pledge to lead an international effort 'to secure all vulnerable nuclear material around the world within four years.' The Nuclear Security Summit highlighted the global threat posed by nuclear terrorism and the need to work together to secure nuclear material and prevent illicit nuclear trafficking and nuclear terrorism. The leaders of 47 nations came together to advance a common approach and commitment to nuclear security at the highest levels. The Summit reinforced the principle that all states are responsible for ensuring the best security of their materials, for seeking assistance if necessary, and providing assistance if asked. It promoted the international treaties that address nuclear security and nuclear terrorism and led to specific national actions that advanced global security.

    The Summit Work Plan laid out specific steps that will need to be taken to bring the vision of the Communiqué into reality. These steps include:
        - Ratifying and implementing treaties on nuclear security and nuclear terrorism;
        - Cooperating through the United Nations to implement and assist others in connection with Security Council resolutions;

- Working with the International Atomic Energy Agency to update and implement security guidance and carry out advisory services;
- Reviewing national regulatory and legal requirements relating to nuclear security and nuclear trafficking;
- Converting civilian facilities that use highly enriched uranium to non-weapons-usable materials;
- Research on new nuclear fuels, detection methods, and forensics techniques;
- Development of corporate and institutional cultures that prioritize nuclear security;
- Education and training to ensure that countries and facilities have the people they need to protect their materials; and
- Joint exercises among law enforcement and customs officials to enhance nuclear detection approaches.

Notes

1 As a result of a series of incidents of illicit trafficking in nuclear material between 1992 and 1994, in September 1994, the IAEA General Conference adopted, as part of a major initiative to address what was seen as a growing problem, a resolution calling upon Member States 'to take all necessary measures to prevent illicit trafficking in nuclear material' and inviting the Director General 'to intensify the activities through which the IAEA is currently supporting Member States in this field'.

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The Institute for Security Studies' *Africa's Development and the Threat of Weapons of Mass Destruction Project*

The Institute for Security Studies' Africa's Development and the Threat of Weapons of Mass Destruction Project (WMD Project) aims is to identify and strengthen Africa's role in international efforts to strengthen disarmament and non-proliferation as they relate to WMD in the context of Africa's developmental imperatives.

Thematically the project engages the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), and other related Conventions such as the 1980 Convention on the Physical Protection of Nuclear Material and the Comprehensive Nuclear Test Ban Treaty; the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba); the Biological and Toxin Weapons Convention; the Chemical Weapons Convention; and relevant United Nations Security Council resolutions such as UNSCR 1540.

Project objectives include:

- To identify and report on African attitudes and interests in the international debate on nuclear, chemical and biological non-proliferation and disarmament.
- To build African capacity to engage positively and effectively in international disarmament and non-proliferation fora.
- To strengthen global security by reducing the risk of use, and preventing the spread of, nuclear, biological and chemical weapons in Africa.
- Increasing the quality and accessibility of information about threats and dual-use concerns in relation to nuclear, biological and chemical weapons.
- To engage members of the scientific community and industry in discussion and debate about the risks, rules and responsibilities in relation to their activities.
- To stimulate discussion and dialogue about how Africa can positively balance its development needs with global non-proliferation concerns.

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