AN ASSESSMENT OF THE APPLICATION OF INTERNATIONAL NUCLEAR LAW ON NIGERIA'S NUCLEAR ENERGY PROGRAMME*

Abstract

This paper assessed the viability of Nigeria's nuclear energy programme by interrogating the efficacy of the available international legal framework that regulates nuclear energy. Using doctrinal methodology, the paper analysed the obligations imposed by international nuclear law on countries like Nigeria for the purpose of achieving highest degree of safety; safeguard; security and compensation in case of liability for nuclear damage. The paper finds among other things that the international legal framework on nuclear energy is a mix-up of both binding and advisory norms, thereby rendering the law susceptible of being easily flouted by nations. The paper concludes with recommendations on the way forward.

Keywords: International Nuclear Law, Nuclear Energy Programme

1. Introduction

The pursuit of peaceful use of nuclear energy is a field considered to be within the green border of the international security system. For this reason, many developing countries argued and are now permitted to pursue an array of nuclear activities including the expansion of energy alternatives which Nigeria is currently pursuing.[1] However, the volatile nature of nuclear assets makes it necessary for a legal regime of regulation to be put in place so that any country wishing to expand its electricity supply through nuclear energy may do so without endangering human lives and the environment.[2] Consequently, the regulation of nuclear energy programme under international law became necessary in order to achieve highest degree of safety; safeguard; security and establish a compensation regime for determining liability for nuclear damage. While it remains doubtless that an international legal regime on nuclear energy exists in the form of institutions, treaties, legislation and codes of conduct, it is however uncertain as to just how effective these regulatory regimes are. Evidence of the aforementioned uncertainty is demonstrable in a number of ways which include among others: the very nature of the international system which upholds the sovereign status of states with all its attendant attributes of allowing nations to pursue activities in a manner that is largely unrestrained; the mix up of the global legal order on nuclear energy with binding norms and advisory regulations[3] thereby rendering the legal framework to be susceptible of being cherry picked by nation states.

With all the uncertainties stated above, Nigeria has now gone far in its preparations to expand its electricity supply through the addition of nuclear into its energy mix. Consequently, one may be tempted to demand inquisitively whether the international legal framework on nuclear energy is effective enough to tame Nigeria to observe reasonable degree of safety and security in its planned nuclear energy programme. This is because there are already, fears[4] that are not yet doused on the efficiency of the international nuclear regulation following the Fukushima nuclear power plant accident in 2011. Similarly there are concerns on how little agreements existed on questions of liability and state responsibility for nuclear damage.[5] With all these fears, the question that comes to mind is: is Nigeria, its people and neighbours safe with nuclear as an energy option? The answer to the above question no doubt demands an in-depth study into the legal regime on nuclear energy at international level. This paper, therefore, discusses these issues with a view to unravelling the viability of Nigeria's nuclear energy programme from a legal point of view.

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[1] Just recently, President Buhari reaffirmed the right of Nigeria to use nuclear energy at the 4th Nuclear Security Summit held in Washington DC.
<http://www.nnra.gov.ng/postpresident_buhari_to_reaffirm_nigeria_s_right__to_use_nuclear_energy_for_development_at_washington_summit__30th_march_2016. > accessed 5th April, 2017.

[2] The amount of radiation produced in a single nuclear plant is staggering. Consequently, radiation effect operates on a time scale that may go beyond an individual life span, thus extending in time to entire generations. See: Varis, .Z. Catherine, 'Convention Treaties and Other Responses to Global Issues' Vol II: 1-19 CISDL <http://www.eolss.net/Eolss-SampleAllchapter.aspx.> accessed 3, November, 2017.

[3] El Baradei Mohammed, Nwogugu E, et al. 'International Law and Nuclear Energy: Overview of the Legal Framework' (1995) ((3) *IAEA Bulletin;*16.

[4] Birnie Patricia and others , *International Law and the Environment* (Oxford University Press New York 2009) 492.

[5] Ibid.

2. Clarification of Terms

The terms nuclear law and nuclear energy programme is clarified in this segment of the paper in the context of the prevailing realities in Nigeria. In this regard, Boulanger[6], defined nuclear law, thus: 'in speaking of nuclear law, I suppose to define it as the law related to the peaceful uses of nuclear science and technology'. By this definition, it can be discerned that nuclear law is all out to promote the development of nuclear science and technology in fields like energy, agriculture and health. Secondly, while promoting the peaceful use of nuclear science, nuclear law is conscious of its dangers and therefore seeks to protect mankind against any hazards possibly connected to nuclear technology. Handolica[7] broadened the definition of nuclear law by identifying the sources of nuclear law and also the link between nuclear law and atomic law. In his words:

> The terms 'atomic law' and nuclear law' are regularly being (to a certain part as synonymous) used in both scientific and popular literature to refer to a body of legal norms, governing peaceful uses of nuclear energy and ionizing radiation as provided by sources of international law ('international atomic law' or international nuclear law'), national legislation and complex body of unbinding norms (soft law).[8]

Yet in another definition by Stoiber[9], nuclear law is defined as 'the body of special legal norms created to regulate the conduct of legal or natural persons engaged in activities related to fissionable materials, ionizing radiation and exposure to natural sources of radiation.' On the meaning of nuclear energy programme, Han[10], defines it as a tool through which the government or its designees regulate nuclear activities to ensure public safety. In this regard, the Nigerian government through the Nigeria Atomic Energy Commission decided to venture into nuclear energy. This plan became crystallised with the selection of sites for the building of nuclear power plants in 2015.

3. Analysis of International Legal Framework on Nuclear Energy

The international legal framework on nuclear energy consists of wide range of agreements that cover the salient aspects of nuclear and radiation safety, security, safeguard and liability for nuclear damage.[11] Each of these salient aspects will be addressed distinctly.

3.1. International Instruments For Nuclear and Radiation Safety

The key elements of the international legal framework on nuclear safety are its legally binding and non-binding instruments.[12] To date, there are four international legally binding instruments in this area. However, since the adoption of these instruments, the international legal framework on nuclear safety has been broadened through an alternative approach to the normative control of nuclear risks by the adoption of two new legally non-binding codes of conduct, namely the Code of Conduct on the Safety and Security of Radioactive Sources and the Code of Conduct on the Safety of Research Reactors.[13] Below is an analysis of aforementioned legal instruments.

Nuclear Safety Convention[14]

The Nuclear Safety Convention's objectives are targeted towards maintaining a high level of nuclear safety in civil nuclear power plants and related facilities, to protect individuals, society and the environment from harmful

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[6]Boulanger, Werner. 'Developing Nuclear Law'.
<https://www.iaea.org/sites/default/files/publications/magazines/bulletin/bull10-3/10305080308.pdf> accessed 12 March 2019.

[7] Handolica J ' 'Atomic Law' or 'Nuclear Law'? An Academic Discussion Revisited' (2018) (5) *Brics Law Journal* <https://www.researchgate.net/publication/328279966_Atomic_Law_or_Nuclear_Law_An_Academic_Discussion_Revisited> accessed 27 March 2019.

[8].Ibid.

[9] Stoiber Carlton and others *Handbook on Nuclear Law* (International Atomic Energy Agency, Vienna 2003), 4.

[10]Han K.I (2000) 'Development of Safety-Related Regulatory Requirements of Nuclear power in Developing countries': in IAEA (ed) *Nuclear Power in Developing Countries: Its Potential Role and Strategies for its Development* PP. 323-339. Proceedings to the International Seminar on Nuclear Power, Mumbai, India12th-16th October, 1998.

[11] It must be noted that the whole edifice of nuclear regulation is anchored on certain principles whose main theme includes safety, security and liability for nuclear damage. See: Stoiber, C. *opcit* p. 3.

[12] Tonhauser Wolfram and Wetherall Anthony 'The International Legal Framework on Nuclear Safety: Developments, Challenges and Opportunities'. In: OECD, (Ed) *International Nuclear law History, Evolution and Outlook* (NEA Montpellier, 2010) 157-170.

[13] Ibid.

[14] Adopted in Vienna on 17th June, 1994 but entered into force in 1996.

radiation and to mitigate nuclear accidents.[15] It seeks to pursue the above objectives by enhancing national measures and international cooperation rather than by fully internationalizing the regulation and supervision of the nuclear industry. It therefore reaffirms that responsibility for nuclear safety rests with the state having jurisdiction over a nuclear installation, and requires each party to establish and maintain a national legislative and regulatory framework for the safety of nuclear installations, including a system of licensing, independent inspection and enforcement of applicable regulations.[16] It must be noted that the principal obligations embodied in the convention are based largely on the International Atomic Energy Agency's (IAEA) safety fundamentals for nuclear installations.[17] Thus, the provisions of the convention only take significant step towards defining the obligations of states in fairly general terms leaving IAEA's safety fundamentals as a model reference for state parties. In this regard, the Convention is described as elaborating the general rule of customary international law regarding diligent regulation and control of potentially harmful activities already embodied in IAEA safety guidelines.[18] Article 20 provides for the parties to meet periodically to review reports on measures they have taken to implement their international safety obligations. The purpose of the review meeting is to allow experts to identify problems, concerns, uncertainties or omissions, in national reports.[19] It must also be noted that that the review meeting is not meant to enable parties to review the safety of individual installation, but to learn from each other through a constructive exchange of views after a thorough examination of national reports. However, this provision is criticised for an apparent omission to afford a more robust transparent review process. This is because only intergovernmental organizations but not N.G.O's may be invited to send observers to participate in meetings of the parties.

As far as ensuring transparency in information and public participation in environmental matters is concerned, the Convention is a far cry. And it is noteworthy that transparency of information and public participation in decision making are critical elements of environmental governance since the public is considered to be the best guardian of the interests of the environment.[20] But provisions relating to access to environmental information and public participation in environmental decision making have only been incorporated hesitantly in the convention. Thus Article 17 of the Nuclear Safety convention amply illustrates this when it provides thus:

> Each contracting party shall take the appropriate steps to ensure that appropriate procedures are established and implemented for consulting contracting parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing the necessary information to such contracting parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation.

This means that Consultation with the public is entirely left to the discretion of the affected contracting parties.

Convention on Early Notification of a Nuclear Accident[21]

Prior to the Convention on Early Notification of a Nuclear Accident, treaties on early notification were limited in scope as they were mostly bilateral in nature and were also limited to installations within 30km, or in the vicinity of an international border.[22] It was the catastrophic Chernobyl nuclear accident which resulted in the opening of signature in 1986 of the Convention on Early notification of a Nuclear Accident.[23] With the adoption of the Convention, it imposes on state parties a duty to notify other states likely to be affected by transboundary releases

[15] Ibid. Article 1.

[16] Ibid, Article 7.

[17] IAEA safety fundamentals are codes of conduct adopted under the auspices of the IAEA to serve in ensuring safety of nuclear installations and ensure health protection of individuals around nuclear installations. They are however generally considered as not binding.

[18] Birnie Patricia and others (2009) *Op Cit* 502.

[19] Ibid.

[20] Emerechts Sam. 'Environmental Protection under Nuclear Law: Still a Long Way to Go'. in OECD, (Ed) *International Nuclear law History, Evolution and Outlook* (NEA, Montpellier, 2010) 121-157.

[21] Adopted by the General Conference at its special session, 24-26 September 1986, and was opened for signature at Vienna on 26 September 1986 and at New York on 6 October 1986. It entered into force on 27 October 1986,

[22] Agreement between Spain and Portugal on Cooperation in Matters Affecting the Safety of nuclear Installations in the vicinity of the frontier, Ruster and Simma, xxvii, 420. <https://inis.iaea.org/search/search.aspx?orig_q=RN:11571831>. accessed 12 June, 2017

[23] Cemeron P and others (eds) *Nuclear Energy Law After Chernobyl*, (Trotman Inc. United States, 1988) 19 .

of radiological safety significance.[24] Furthermore, information on the occurrence and on means of minimizing its radiological consequence must be supplied to enable other states to take all possible precautionary measures.[25] According to Bernie et al there is lack of clarity as to what amounts to a release which qualifies the threshold of 'radiological safety significance' as specified in Article 1 of the convention.[26] This non-clarity according to Birnie, leaves substantial discretion to states where incidents occur.[27] There is therefore fears that lack of the definitive status of the aforementioned article may lead to serious abuse as any contracting party which is unable to give notice of radiological incidence occurring in its domain may claim that it has not reached the acceptable threshold demanded under the convention. It must also be noted that the early notification convention is also limited to the obligation to notify other states parties (and the IAEA) of 'nuclear accidents' as foreseen therein. However, today's realities, such as the rise in terrorism and the increased threat of malicious acts involving radioactive material or devices or attacks against nuclear facilities demands the expansion of circumstances that require notification which the convention did not originally recognize. Consequently, in accordance with relevant decisions and resolutions of the IAEA policy-making organs (i.e. the Board of Governors and the General Conference), the scope of the practical operation of the system and the role of the IAEA Incident and Emergency Centre has been expanded.[28] Thus, the IAEA's Incident and Emergency System, though being a non-binding supporting document, now covers not only nuclear accidents as provided for in the Early Notification Convention but also on timely notification and response in the event of nuclear or radiological emergencies resulting from criminal or intentional unauthorized acts from which release of radioactive material occurs or is likely to occur and that could be of radiological safety significance for another state.

Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency[29]

The ability to adequately respond to a nuclear accident or radiological emergency continues to remain a central element of the international legal framework on nuclear safety. Participation in an international system of emergency preparedness and response provides the practical means by which this can be achieved. In view of this, the Convention on Assistance in Case of a Nuclear or Radiological Emergency was adopted to form part of the legal foundations to ensure prompt assistance in case of nuclear accidents. Thus Articles 1-3 of the aforesaid conventions are very instructive on the objective of the convention. Thus, the system of assistance as specified in the convention is through cooperation of state parties between themselves on the one hand and the IAEA on the other. In effect, State parties shall cooperate between themselves and with the International Atomic Energy Agency to facilitate prompt assistance in the event of a nuclear accident or radiological emergency so as to minimize its adverse effect on life, property and the environment.[30] The cooperation between state parties may be built upon bilateral or multilateral arrangements. At the center of this, the role of the IAEA has been made profoundly robust in ensuring that the objectives of the convention are achieved.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management System[31]

The Content of the convention under review follows the model of the Nuclear Safety Convention as it has the same objective of ensuring high safety standards and prevention of accidents. The Convention recognises the intergenerational implications of nuclear waste disposal.[32] Accordingly, the Convention applies to both radioactive-waste disposal and spent-fuel management[33] but with two notable exceptions being reprocessed spent fuel and secondly spent fuel or waste from military installations. Note however, in the case of the former exception, the Convention may still apply only if the relevant contracting party so declares while in the case of the latter, the convention may apply where the said waste from military installation is transferred to permanent civilian control or where the relevant contracting party so declares. The Convention also has one of the strongest provisions on intergenerational equity compared with any other environmental treaty when it boldly provides that

[24] Article I (1) of the Convention on Early Notification of a Nuclear Accident.

[25] Ibid, Article II(b).

[26] Birnie P, Boyle, *Op.cit* .514

[27] Ibid.

[28] Tonhauser Wolfram and Wetherall Anthony *Op Cit*..45.

[29] The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency was adopted by the General Conference at its special session, 24-26 September 1986, and was opened for signature at Vienna on 26 September 1986 and at New York on6 October 1986.

[30] Article I (1) Convention on Assistance in case of Nuclear Accident or Radiological Emergency.

[31] The above named Convention was adopted by IAEA member states in 1997.

[32] Article 1 of the joint Convention.

[33] Ibid, Article 3

radio-active waste must be kept to a minimum and parties must aim to avoid imposing undue burdens on the future generations including burdens that are greater than permitted for future generations.[34]

3.2. International Instruments for Nuclear Security

The term 'nuclear security' is generally accepted to mean 'the prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.[35] There are a number of international instruments set forth to achieve the objectives of nuclear security. Just like the international instruments under nuclear safety, the instruments under this head compose of both binding and non-binding legal instruments under the auspices of the IAEA, the UN Security Council and of course other international organizations.

Convention on the Physical protection of nuclear Material (CPPNM)[36]

The CPPNM was adopted on 26th October, 1979 and was opened for signature on 3rd of March, 1980. It is one of the notable counter-terrorism instruments and indeed the only internationally legally binding undertaking in the area of physical protection of nuclear material.[37] As regards the scope of the convention, the obligation set out in the CPPNM applies to nuclear materials used for peaceful purposes while in international nuclear transport.[38] The obligation set forth by the convention on States Parties is that they shall identify and make known to each other directly or through the IAEA their central authority having responsibility for physical protection of nuclear material and for coordinating recovery and response operations in the event of any unauthorized removal, use or alteration of nuclear material or in the event of a credible threat thereof.[39]In the case of theft, robbery or any other unlawful taking of nuclear material or of a credible threat thereof, States Parties shall, in accordance with their national law, provide cooperation and assistance to the maximum feasible extent in the recovery and protection of such material to any State that so requests.[40] With respect to penalties, the Convention obliges state parties to make certain offences punishable.[41] This is made possible, as the convention permit state parties to establish its jurisdiction to prosecute and punish where such offences are committed in the territory of the relevant state party or on board a ship or aircraft registered in that state.[42]

International Convention for the Suppression of Acts of Nuclear Terrorism (Nuclear Terrorism Convention)[43]

The Nuclear Terrorism Convention seeks to prevent and punish acts of nuclear terrorism.[44] One notable advantage of the present convention is the expansive nature of its scope such that unlike the CPPNM which is restrictive to nuclear material, the Nuclear Terrorism Convention extends its application to radioactive material.[45] Accordingly, states parties shall make every effort to adopt appropriate measures to ensure the protection of radioactive material taking into account relevant IAEA recommendations and functions.[46]Upon seizing or otherwise taking control of radioactive material, devices or nuclear facilities, following the commission of an offence under the Convention, the State Party in possession of such items shall (a) take steps to render harmless the radioactive material, device or nuclear facility; (b) ensure that any nuclear material is held in accordance with applicable IAEA safeguards; and (c) have regard to physical protection recommendations and health and safety standards published by the IAEA.[47] Furthermore, States Parties involved in the disposition or retention of radioactive material, a device or

[34] Ibid, Articles 4(v)-(vi),5(vi)-(vii)

[35]Anonymous 'The International Legal framework on Nuclear Security' (IAEA Publication, Austria, 2011) <http://www.iaea.org/books. Last accessed 7/11/2017.> accessed 7 November, 2017.

[36] Adopted on 29th October, 1979 and opened for signature on 3rd March 1980.

[37] ibid

[38] Article 2 (1) CPPNM

[39] Ibid, Article 5(1)

[40]Ibid, Article 5(2)

[41] Ibid, Article 7(2)

[42]Ibid, Article 8(1)-(2)

[43] Adopted in April, 2005 and entered into force in June, 2007.

[44] Anonymous 'The International Legal Framework for Nuclear Security' (IAEA international law Series No 4 Vienna, 2011). 13

[45] Ibid.

[46] Article 8 Nuclear Terrorism Convention.

[47] Ibid, Article 18.1

nuclear facility pursuant to the present article shall inform the Director General of the IAEA of the manner in which such an item was disposed of or retained.[48]

3.3. International Instruments on Nuclear Safeguard

Nuclear safeguard otherwise referred to as non-proliferation regime represents the collection of policies, treaties and institutions intended to stem the spread of nuclear weapon. Within the safeguard regime, there are carefully drafted legal instruments in form of treaties, resolutions and code of conducts. Below is an examination of the legal instruments under nuclear safeguard.

Treaty on the Non-Proliferation of Nuclear Weapons (Non Proliferation Treaty, NPT)[49]

Each nuclear weapon state party to the NPT undertakes not to transfer, to any recipient whatsoever, nuclear weapons or other nuclear explosive devices or control over such weapons or devices directly or indirectly; and not in any way to assist, encourage or induce any non-nuclear weapon State to manufacture or otherwise acquire such weapons or devices or control over such weapons or devices.[50]Pursuant to Article II, each non-nuclear-weapon State party to the NPT undertakes not to receive the transfer, from any transferor whatsoever, of nuclear weapons or other nuclear explosive devices or control over such weapons or devices directly or indirectly; not to manufacture or otherwise acquire such weapons or devices; and not to seek or receive any assistance in the manufacture of such weapons or devices. Pursuant to Article III.1, each non-nuclear-weapon State party to the NPT undertakes to accept IAEA safeguards on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere. Furthermore, each State party to the NPT undertakes 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, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material is subject to the safeguards required by Article III.1. Article III.4 requires each non-nuclear-weapon State party to the NPT to conclude a safeguards agreement with the IAEA, either individually or together with other States, within 18 months of the date on which the State deposits its instruments of ratification of or accession to the Treaty. Pursuant to Article VI, each of the parties undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control. It must be noted that there are certain observations made on the limitation of nuclear safeguard to prevent proliferation. Some of these limitations on the ability of nuclear safeguards to prevent nuclear proliferation are built into the Non-Proliferation Treaty, such as the fact that production and stockpiling of nuclear weapon- capable materials are permitted as long as they are under safeguards.[51] A practical example is the recent controversy of Iran nuclear disarmament.

African Nuclear-Weapon-Free Zone Treaty (Pelindaba Treaty)[52]

Each State party to the above Treaty is required to declare any capability for the manufacture of nuclear explosive devices; to dismantle and destroy any such device that it has manufactured prior to the coming into force of the Treaty; and to destroy or convert to peaceful uses the manufacturing facilities, subject to the IAEA's verification of the dismantling, destruction or conversion. Each State party to the Treaty undertakes to conclude a comprehensive safeguards agreement with the IAEA required in connection with the NPT or equivalent in scope and effect to such an agreement; 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 with the IAEA. There are three protocols to the Pelindaba Treaty and it is asserted that those protocols codified certain principles already enshrined in other soft law instruments. On the 18th of June, 2001, Nigeria ratified the Pelindaba Treaty.

3.4. International Instruments on Liability for Nuclear Damage

Since a nuclear accident might have transboundary consequences, States with nuclear power programmes recognised the need to conclude an international agreement that would govern compensation for damage both domestically and transnationally. Within a few years, two main conventions were adopted on civil liability in the

[48] Ibid,Article 18.6

[49]The Treaty on the Non-Proliferation of Nuclear Weapons (Non-proliferation Treaty, NPT) was opened for signature in 1968 and entered into force in 1970.

[50] Article 1 NPT

[51] Ibid Article III(2)

[52] It is often called, the Treaty establishing a nuclear-weapon-free zone (NWFZ) in Africa.

nuclear field. On 29 July 1960, the *Paris Convention on Third Party Liability in the Field of Nuclear Energy* was adopted under the auspices of the then OEEC (later OECD). Three years later, the *Vienna Convention on Civil Liability for Nuclear Damage* was adopted under the auspices of the International Atomic Energy Agency. Also in 1963, some of the signatories of the *Paris Convention* adopted the *Brussels Convention Supplementary to the Paris Convention* to provide state funding for compensation above the ability of the operator. After the accident at Chernobyl, the States parties to both the *Paris* and the *Vienna Conventions* adopted a *Joint Protocol* to create a link between the two instruments. It is important to point at this juncture that all the four conventions seek to harmonize important aspects of liability for nuclear accidents in national laws. They therefore create a common scheme for loss distribution among a number of stakeholders which ultimately makes the operator liable.In this wise, although, there are variations, the overall scheme of the conventions are based on some five elements which are examined hereunder:

1. Liability is absolute and requires only proof that the damage was caused by nuclear accident.
2. Liability is channeled exclusively to the operator of the nuclear installation or ship which causes the damage[53].
3. Payment up to the prescribed limit of liability is supported by compulsory insurance or security held by the operator and guaranteed by the state of installation or registry.[54]
4. Rules enshrined under the convention determine which state or states have jurisdiction over claims and all other recourse to civil proceedings elsewhere is precluded.
5. In most cases the conventions leave states some discretion to modify their basic elements. National laws may thus adopt different limitation periods or insurance and liability ceilings.[55] Some States have used this power to set much higher liability. A good example is the Federal Republic of Germany which has opted for unlimited liability in certain circumstances.
6. The Conventions cover most but not all, potential sources of nuclear damage. The Paris and Vienna Conventions apply to nuclear installations, a term broadly defined to include nuclear reactors, reprocessing, manufacturing and storage facilities where nuclear fuel, nuclear material and radioactive products or waste are used or produced.[56]
7. All the four conventions acknowledge the residual responsibility of sates to compensate for damage caused by nuclear activities where the operator is unable to do so. Therefore, if insurance fund prove insufficient, the state must step in to provide them.
8. Conclusively, except for variations amongst the four conventions in the aspect of amount of compensation, most uses and by-products of civil nuclear power are dealt with under at least one of the conventions or the other. It must be noted however, that the conventions do not apply to nuclear tests, military installations and nuclear weapons.

4. Analysis of the Binding Nature of the International Nuclear Law on Nigeria

The fact that the international legal framework on nuclear energy comprises both binding and non-binding instruments, it becomes relevant to examine just how effective is the entire framework in commanding compliance from nation states generally and Nigeria in particular. Starting with the binding norms, that is the international treaties examined above, the first point to note about them is the fact that some of them are not as yet in force in Nigeria, a fact which will go a long way in determining the extent of the effectiveness of the treaties in commanding compliance from Nigeria. Thus, while some of the treaties are ratified, others are either not ratified, not in force or not acceded to.[57] Principally, it is only a country which ratifies a treaty that may have such a treaty binding on it. However, given the volatile nature of nuclear energy as a field, can Nigeria still go ahead to launch its nuclear energy programme with some of these treaties not ratified? To answer the above question, we may borrow from the logic and reasoning of Birnie *et al* when they remark in their book[58] that the assertion that all states have the right of access to nuclear technology must be seen under some conditioned piece of light. This

[53] Article II of the Vienna Convention, Article III and VI of the Paris Convention as well as the Article II of the Brussels Convention.

[54] Article II Vienna Convention and Article III of the Paris Convention

[55] Article V of the Vienna Convention as amended, 1997 and Article 7 and 8 of the Paris Convention, as amended 2004.

[56] Article I Vienna Convention, 1997 as amended, Article 1 Paris Convention, 2004 as amended.

[57] For example: The Treaty on the Non-Proliferation of Nuclear Weapons is ratified by Nigeria; the Joint Protocol Relating to the Application of the Vienna convention and the Paris Convention is in force but not acceded to; the African Nuclear-Weapon –Free Zone Treaty (Pelindaba Treaty) is not in force while the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage is not ratified at all. see the fact sheets of the IAEA country details available at <https://ola.iaea.org/ola/FactSheets/CountryDetails.asp?country=NG.>. accessed 27 April, 2018

[58] Birnie Patricia and others *op Cit* 534.

according to the learned authors suggests that any state which cannot or will not adequately regulate its nuclear industry through legal frameworks of international standards, or make satisfactory arrangement for compensating its non-nuclear neighbours in the event of serious accident, should not be permitted the freedom to pursue nuclear activities. With respect to the binding nature of the codes and safety guidelines issued by the International Atomic Energy Agency (IAEA) on state parties, it is important to note that their status is somewhat debatable. This includes, for example, the IAEA's Incident and Emergency System which supplements the Convention on Early Notification of a Nuclear Accident among others. This is because the substantive provision of the IAEA statute did not define the legal nature of IAEA standards and codes and it is trite that documents established by experts and published by an organ of the agency have no independent legal status or any binding force on member states that adopted the statute of the IAEA.[59] Thus, in order to ensure respect of its legal status and the realization of its mandate, the IAEA evolved a number of ways to enter into and conclude mutually binding agreements with states and other international organizations within and outside the United Nations. This was made possible because the IAEA is a full subject of international law and as such, it is imbued with the powers to enter into agreement with member and non-member states to ensure respect of its legal status as well as that of its staff in terms of privileges and immunities. Owing to these agreements, it is now settled that the standards and safety codes of the IAEA can gain legal force when incorporated into bilateral or multilateral agreements of states or entered into the domestic law of a state. Nigeria, in particular, is a party to a number of bilateral and multilateral agreements which incorporate the IAEA safety codes.

5. Conclusion, Findings and Recommendations

Specific cases of compliance with the above examined international legal framework on nuclear energy have been recorded in Nigeria. In a way it can be argued that this in itself represents a valid evidence of Nigeria's readiness to comply with its international obligations. For example, with respect to the nuclear safeguard regime, in 1988, Nigeria entered into the Comprehensive Safeguards Agreements (CSA) with the IAEA. Pursuant to Article 3 of the NPT, it means Nigeria agreed to place under safeguards all nuclear materials in peaceful nuclear activities of the country and not to divert such materials to the production of nuclear weapons or nuclear explosive devices. This example also applies to other international instruments examined above. In spite of the recorded progress made, this paper, identified some areas where the application of the international nuclear law treaties on countries need to be further strengthened. This has been captured in the findings and recommendations below. A number of findings have been made: (1) The international legal frameworks that regulate nuclear energy programme involve a mixture of binding and non-binding norms. On the aspect of nuclear safety for instance, certain aspects are currently only regulated by non-binding norms developed as IAEA safety codes whose binding nature is debatable under international law. The ugly implication of this dichotomy between binding and advisory norms is that it may result in tendencies among nation states, including Nigeria to cherry pick norms for the purposes of compliance. (2) One major failing regarding the international nuclear law treaties is their lack of sufficient environmentalism especially on issues relating to public participation on environmental matters. The Nuclear safety conventions as examined above seem to place much emphasis on timely and early notification of radiological emergencies to neighbouring states. There are no specific provisions that involve the public in the planning and preparations of nuclear project so as to appraise the safety of the project even before its commencement. The international nuclear law treaties are unfortunately silent on the obligations of nation states to uphold this vital principle of access to environmental justice. In order to address the issues raised in this study, Nigeria should spare efforts to enter into agreement with the International Atomic Energy Agency for the purpose of giving effect to the binding application to the advisory norms that regulate nuclear energy programme. Nigeria has to have recourse to general international environmental law for complementary response particularly where there is a void in the international nuclear law that is adverse to the environment. Specifically, Nigeria should ratify conventions such as the Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (Aarhus Convention) in order to engender public and international support towards Nigeria's nuclear energy programme.

[59] Birnie Patricia and others *op Cit* 432.