

# XV МЕЖДУНАРОДНАЯ КОНФЕРЕНЦИЯ СТУДЕНТОВ, АСПИРАНТОВ И МОЛОДЫХ УЧЕНЫХ «ПЕРСПЕКТИВЫ РАЗВИТИЯ ФУНДАМЕНТАЛЬНЫХ НАУК»

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## MITIGATION STRATEGY AGAINST NUCLEAR AND RADIATION TERRORISM IN NIGERIA

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## СТРАТЕГИЯ СНИЖЕНИЯ РИСКОВ ПРОТИВ ЯДЕРНОГО И РАДИАЦИОННОГО ТЕРРОРИЗМА В НИГЕРИИ

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***Аннотация.** Распространение оружия массового поражения несёт угрозы миру и национальной безопасности каждого государства. Террористическая активность в мире ставит новые требования к обеспечению физической безопасности ядерных и радиоактивных веществ для развитых государств. Нигерия – член МАГАТЭ, развивающий ядерные технологии для образования и промышленности, а в будущих планах страны – для выработки электроэнергии. Действия террористической исламистской секты «Боко Харам» в северо-восточной части страны вынуждают серьёзно рассматривать угрозу атаки на объекты ЯТЦ с целью завладеть ядерными материалами и радиоактивными веществами. В этой работе проведён анализ угроз террористических атак в Нигерии с учётом местоположения объектов и маршрутов перемещения ЯМ и РВ между ними. Рассмотрена деятельность группировки «Боко Харам», национальное законодательство Нигерии в области обращения с ЯМ и РВ, а также участие в международных договорах и соглашениях по нераспространению.*

**Introduction.** An attack by terrorist on radiological or nuclear facilities could result in the release of radiation and/or possible loss of control of radioactive material; this in turn, could result in harm to the public and the environment. Considering the activities of the radical Islamic sect “Boko Haram” north eastern Nigeria and their affiliation to the terror group al-Qaeda, there is a need to secure and safeguard nuclear facilities and radiation sources. Appropriate plans aimed at ensuring that terrorist groups do not gain possession of radioactive materials that could be used in the production of weapon of mass destruction WMD need to be implemented.

This paper seeks to highlight the security challenges to nuclear technology applications in Nigeria. The use of nuclear and radioactive source in the country is on the increase. This paper will identify applications of Sources in education and industry within Nigeria. The Sources used, industry and application of this Sources are highlighted. Furthermore, the paper demonstrates Nigeria’s commitment to the safety, security and safeguards of nuclear and radioactive facilities and activities. Strategies aimed at bolstering security and eliminating threats to nuclear facilities were discussed.

**Brief overview of nigeria.** Nigeria is the most populous nation in Africa with over 170 million, situated on the Gulf of Guinea, with capital city-Abuja,36 states,6 geopolitical zones, with 3 major languages comprises of (Hausa, Igbo, and Yoruba),the country has four major International Airport through which goods and services are imported into the country, namely: ( Abuja, Lagos, Port-Harcourt and Kano) with major sea ports ( Port-Harcourt, Calabar, Lagos and Warri) the country also has neighbouring countries (Benin, Niger, Cameroon and Chad). Figure 1 shows the Maps of Nigeria.

**Brief history of boko haram terrorism in nigeria.** Nigeria is the most populous black Nation of Africa that has been known to be relatively peaceful and free from terrorism until the rise of Boko Haram in 2009 after the death of their leader Mr Mohammad Yusuf Mohammed who was killed by Nigerian police. Since then, the group has been fighting the government; his death took a different magnitude through an increase of bomb detonation in many locations such as villages, towns, religious gathering and market places amongst others[1].

Boko Haram was discovered to have an international affiliation with the broader al-Qaeda network. Members of Boko Haram are also believed to have trained in Afghanistan with the help of al-Qaeda [2]. In 2002, Osama bin Laden send one of his aides to Nigeria to distribute the sum of \$3 million to sympathetic Salafi groups, among the recipients was late Mohammed Yusuf who was the Boko Haram's founder [3]. Intelligent data gathered by the United States Government, suspects there could be communications training, and weapons links among the group known as Boko Haram, and al-Qaeda in the Arabian Peninsula in Yemen, al-Shabaab and al-Qaeda in the Islamic Maghreb (AQIM) [4]. "The activities of Boko Haram poses enormous threat to Nigeria's high risk nuclear facilities."

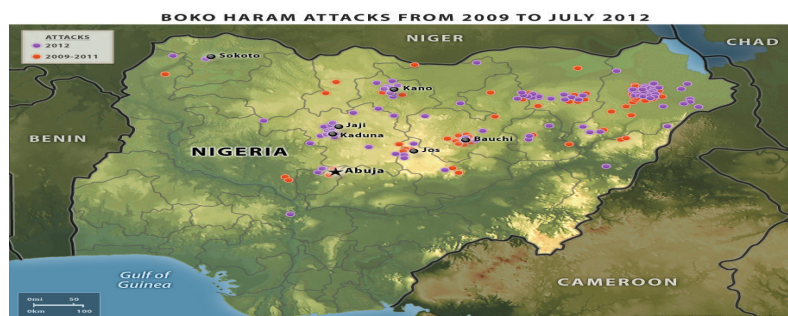


Fig. 1. Area of Boko Haram terrorist attack in North east Nigeria [5]

**Uses of radioactive source and nuclear materials in nigeria.** Nuclear applications are growing fast in Nigeria. Currently, there are over four thousand radioactive sources used in various applications in the country. Radioactive sources mostly used are Cs-137, Co-60, Am-241, Tc-99 among others. Nuclear materials are widely used for oil exploration in the southern region for oil explorations and non-destruction testing NDT. Also, Nigeria has a 30kw tank in pool miniature neutron source reactor MNSR known as NIRR-1 built by China which uses 1085 kg and 90% of highly enriched uranium HEU as fuel. NIRR-1 is used for research and training, neutron activation analysis and for the production of isotopes.

In October 30<sup>th</sup> 2017, the Government through the Nigeria Atomic Energy Commission (NAEC) signed a memorandum of understanding with the ROSATOM to built Russian design nuclear reactor VVER 1000 [6].



Fig.2. Map showing locations and transport routes of radioactive sources

**Nuclear security and safeguards in Nigeria.** Regulatory oversight is one of the core functions of the Nigerian Nuclear Regulatory Authority (NNRA) as provided by the Act of 1995, which establishes the Authority [7]. Nigeria signed and ratified the Convention on Physical Protection of Nuclear Material and Nuclear Facilities (CPPNM/NF) which came into force in May 2016. In order to domesticate the provisions of the CPPNM, the NNRA commenced the development of Regulations on Physical Protection of Nuclear Material and Nuclear Facilities in 2013. In year 2013/2014 and 2015/2016 under review, the NNRA conducted depleted Uranium (DU) survey across Nigeria as part of country's commitment with respect to its obligation to the IAEA on nuclear material accounting and control (NMAC) [8].

**National and international legal framework.** Nigerian Government has made a decision to generate electricity from nuclear power plant and also has ratified necessary instruments and is committed to international best practices and requirements for nuclear safety, security, safeguards and liability regimes.

**Mitigation strategy against nuclear and radiation terrorism attack by Nigeria government.** The following effort made by the government of the above: "Existence of effective and independent regulatory body, sustained implementation of return to supplier principle, acceptance of replacement of HEU with LEU for the research reactor, establishment of portal monitoring at the ports, continued training of staff, frontline officers, the lawyers and the Press, maintenance of regular inspections and sustaining the licensing process"

**Conclusion.** There has been existence of effective and independent regulatory body. Nigeria has signed and rectified various conventions and treaties of the (IAEA). The Government of Nigeria has signed MOU with the (U.S.DOE), in collaboration with the IAEA and the Chinese government for core conversation of NIRR-1 from HEU to LEU as a means to minimize the possible risk of terrorist attack in the facility. Physical security upgrades are also carried out quarterly with the help of U.S DOE in Nigeria high risk nuclear facilities.

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