

The International Centre for Environmental and Nuclear Sciences (ICENS) as a TSO in Enhancing Nuclear Safety and Security in Jamaica

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Abstract

The existing and potential capabilities of the International Centre for Environmental and Nuclear Sciences (ICENS), formerly the Centre for Nuclear Sciences (CNS), as a Technical and Scientific Support Organization (TSO) are reviewed here. It is envisaged that ICENS will enhance nuclear and radiation safety regulations through capacity building in Jamaica and the Caribbean.

Introduction

The International Centre for Environmental and Nuclear Sciences (ICENS) formerly Centre for Nuclear Sciences (CNS) (FIG.1) was conceived as a multi-disciplinary facility based on "Peaceful Uses of the Atom". The centre has been strongly supported by the University of the West Indies (FIG.2) and successive Governments of Jamaica. The work of ICENS has been regarded as an asset to national and regional growth by placing nuclear science in the service of socio-economic and environmental development. The main research programmes of ICENS have involved the investigation of Jamaica's environmental geochemistry, particularly its relationship to the health and safety of Jamaican foodstuffs, and in mineral exploration, with the overall objective of contributing to critical socio-economic challenges including environmental protection, development of natural resources and the development and retention of local scientific talent.

30 Years Of Safe Operation And Technical Scientific Support

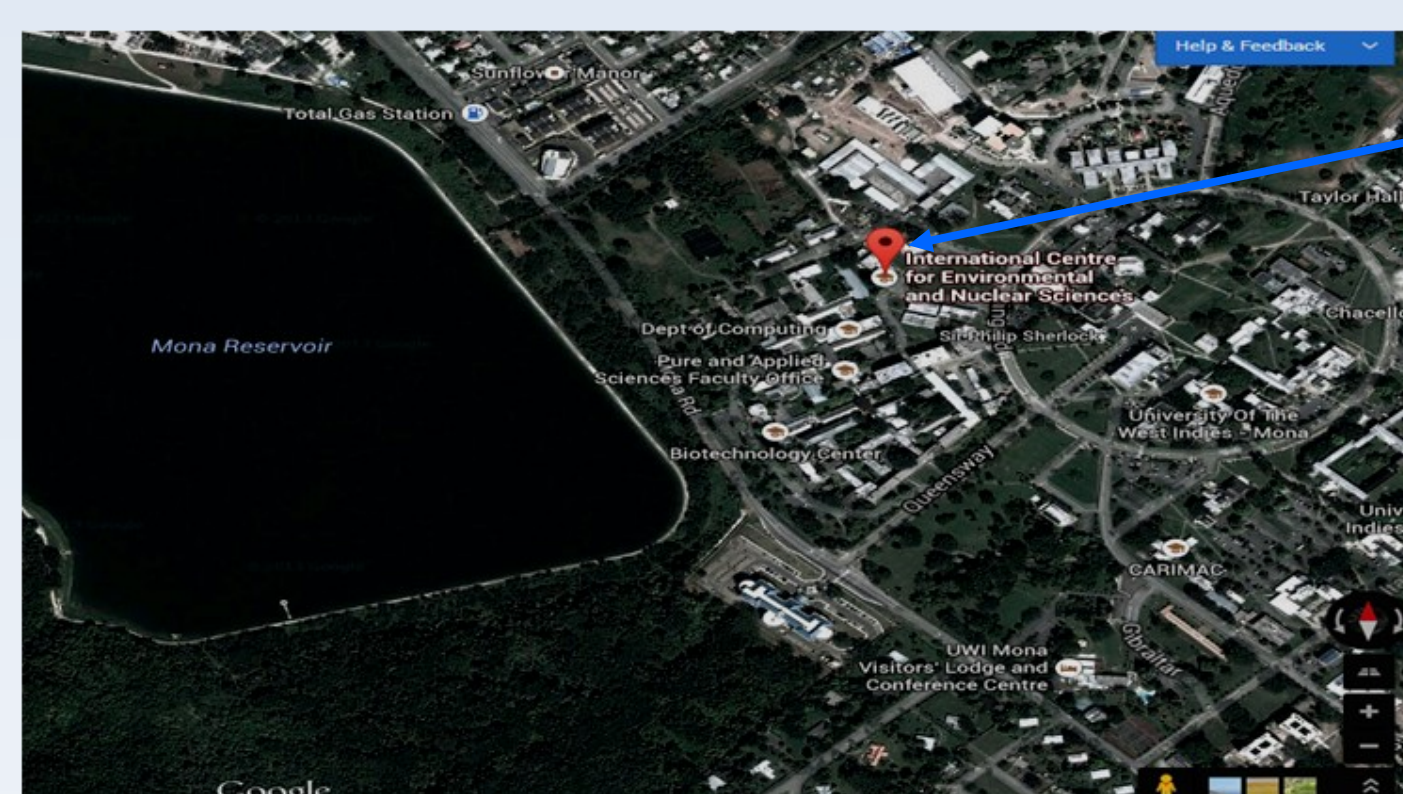


FIG.1 Google image of the Mona Campus of the University of the West Indies, where the SLOWPOKE-2 Nuclear Reactor Facility is Located



FIG.2 International Centre for Environmental and Nuclear Sciences (ICENS) formerly the Centre for Nuclear Sciences (CNS)

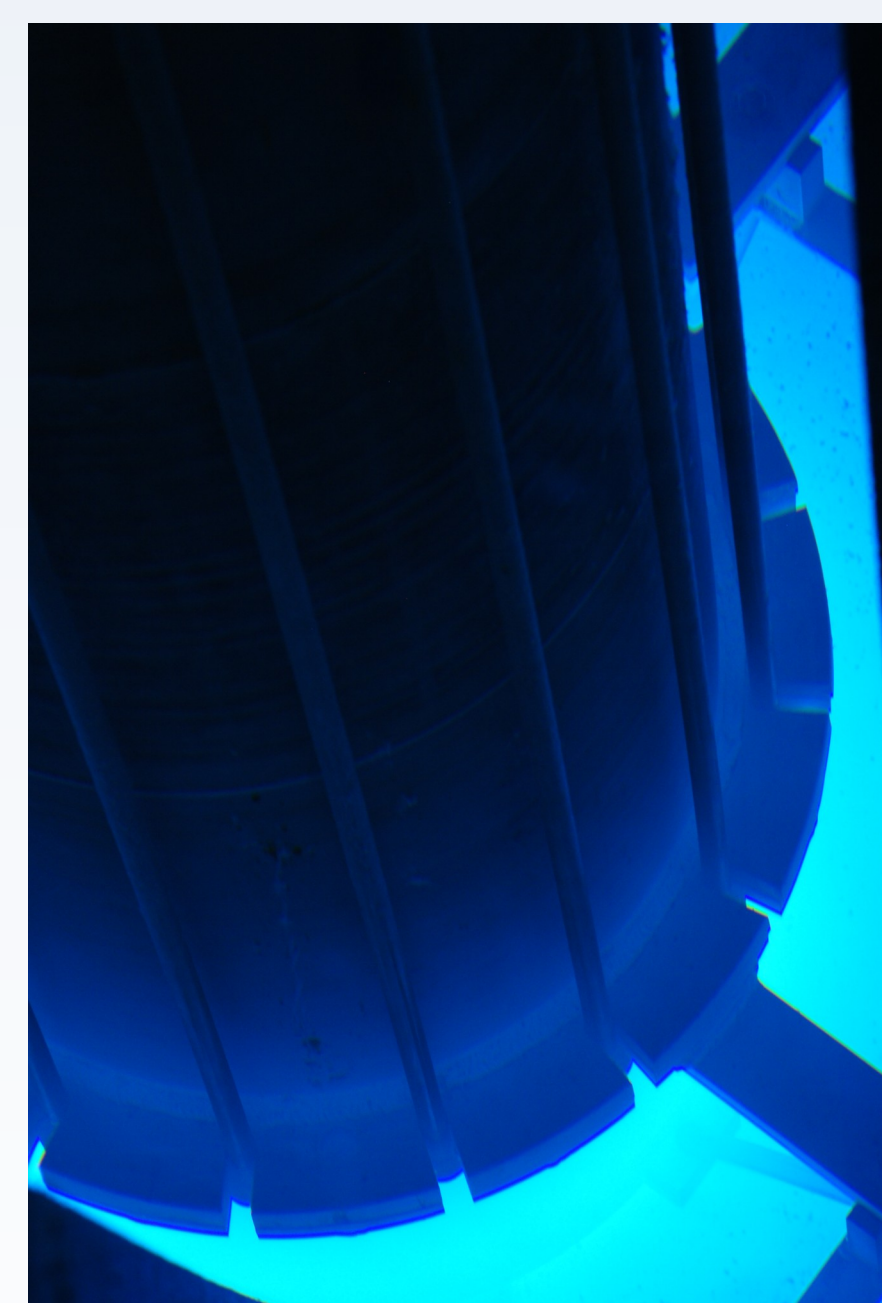


FIG.3 SLOWPOKE-2 20kW Research Reactor at ICENS

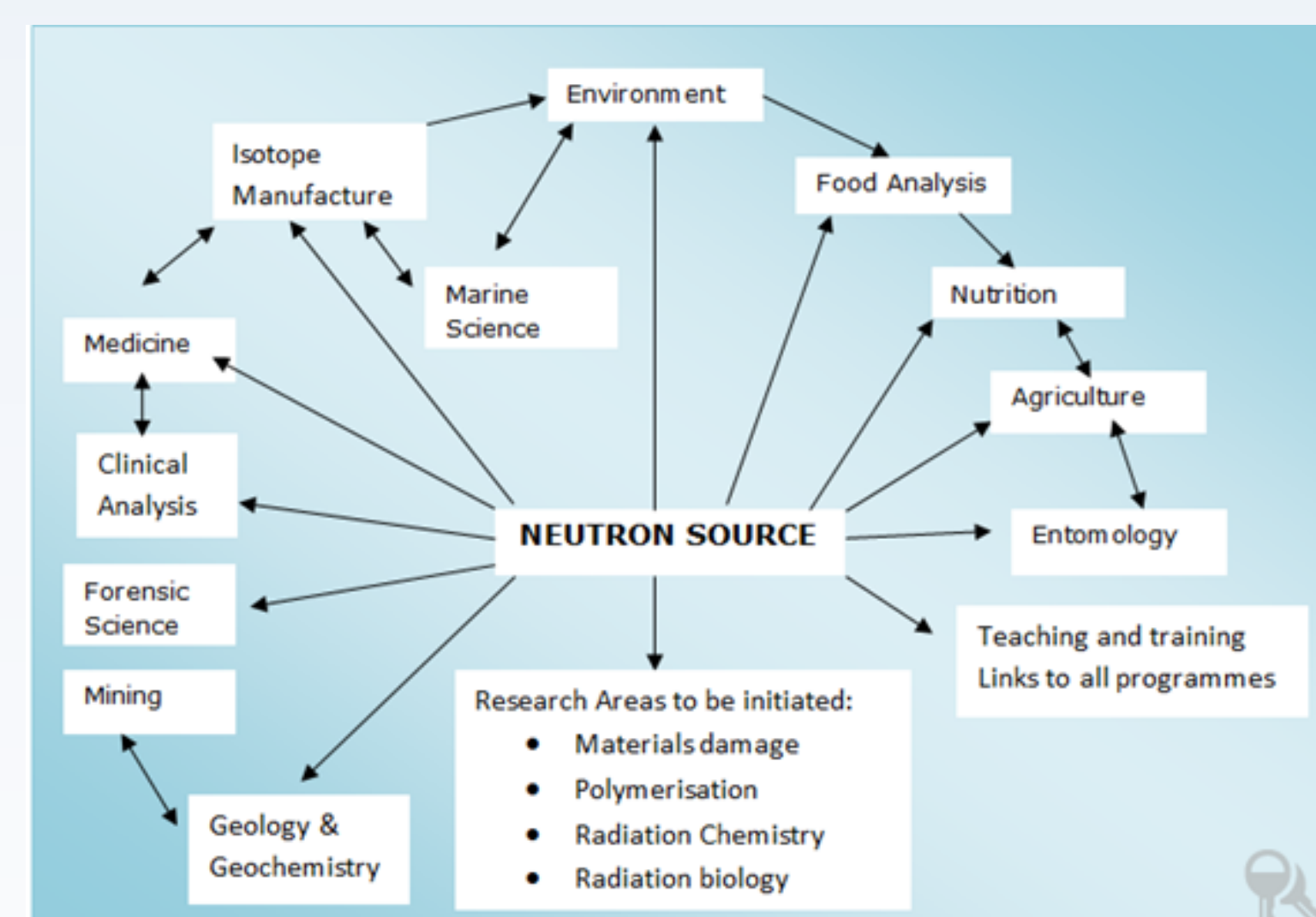


FIG.4 Concept map for the CNS prior to 1984, showing significant interconnections among scientific disciplines and a range of application for Science and Technology, source [1]

Challenges Envisioned for the Next 30 Years

- Adopting the draft legislation
- Finalize the Formation of the Regulatory Body
- Education and training
- Human Resource Development
- Safety and Security at Nuclear Facilities
- Strengthening the Safety and Security of Facilities having Category 1 and 2 Sources
- Developing a Safety and Security Culture

Legal and Regulatory Framework

- The Bureau of Standards Jamaica (BSJ) in the Ministry of Industry Investment and Commerce (Fig.5) was declared the Radiation Safety Authority (RSA) by a Cabinet approved decision No. 01/11 on January 10th, 2011.
- The authority of the BSJ is to be extended to regulate the importation, storage, usage, transportation and disposal of radioactive sources.
- Under the general theme of "Radiation Safety Infrastructure" the RSA has enacted the "Jamaica Action Plan" (2012-2014) for managing the national nuclear security regime.
- Cooperation agreements are being established between the RSA and other competent authorities. One of the RSA's first duties was the establishment of an independent reactor oversight committee to act as the de facto nuclear regulator.
- ICENS was involved in an IAEA-led regulator training programme for the BSJ's RSA personnel for authorization and inspection of its research reactor facility.

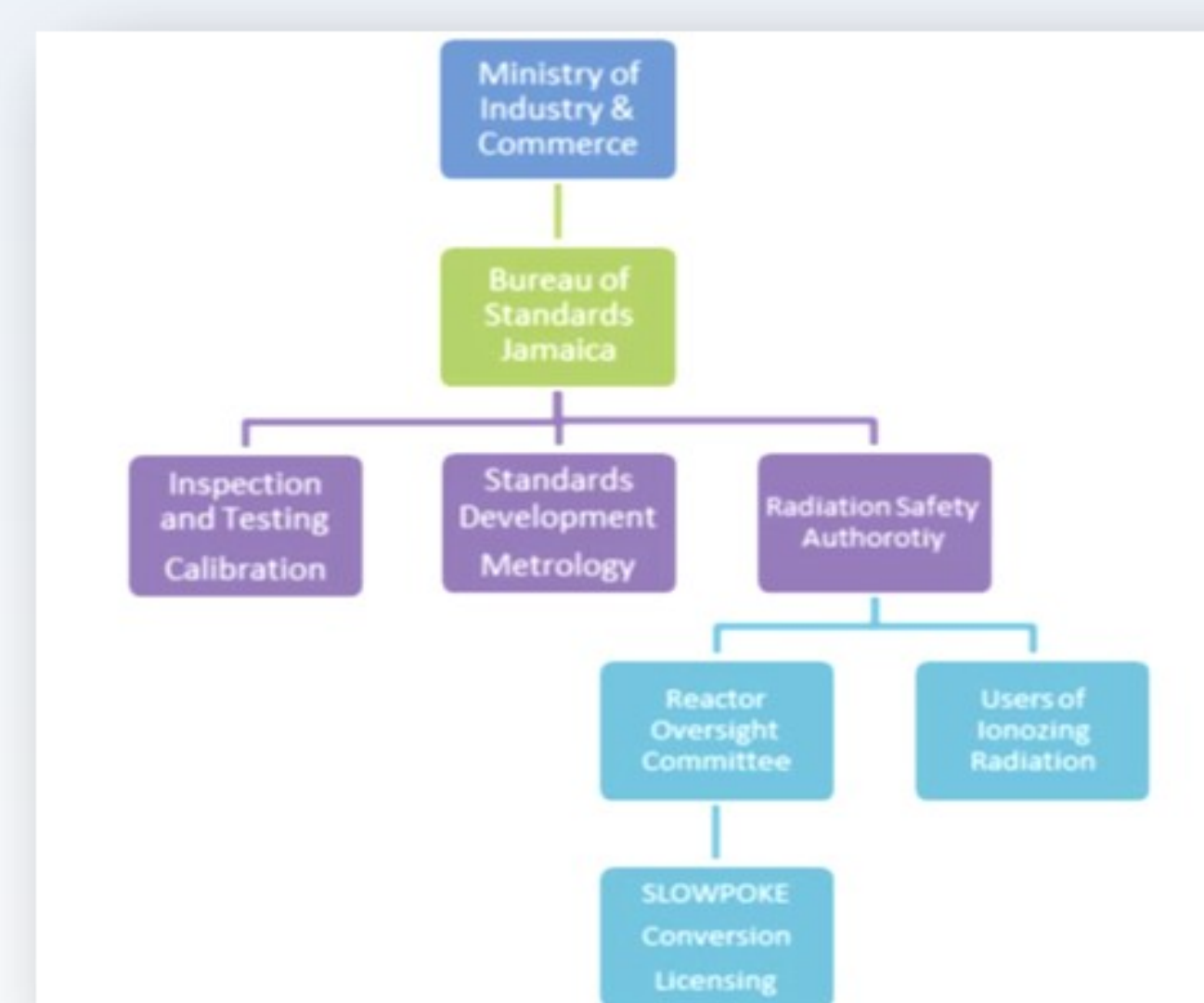


FIG.5 Position of the RSA in the Ministry of Industry Investment and Commerce, source [2]

Assumed Role of ICENS as a TSO in Establishing and Supporting Nuclear Safety and Security in the Absence of Legislation

Before the 2011 Cabinet approval of the RSA, ICENS has provided technical and scientific support for nuclear safety and security in several areas:

- Key role in Regional Radiation Safety & Protection- Personal radiation monitoring using TLD badges for workers occupationally exposed to ionising radiation in Jamaica and other small Island states
- Certification of scrap metal as free of contamination from nuclear and other radioactive materials in containers for export in the lucrative international scrap trade
- Certificate of accepted NORMs in fertilizers for import/export
- Certification of the radiological contents for international transport guidelines in sugar export
- Certification of imported goods for general contamination and from nuclear fall-out contamination associated with accidents in Chernobyl (1986) and Fukushima Daiichi (2011)
- Research collaboration with Ministry of Agriculture to determine fallout radionuclides (Cs-137, Pb-210, Ra-226) in Jamaican soil for the determination of land erosion in the context of soil conservation and food security
- Providing training in radiation safety and protection for several user institutions with radioactive sources and radiation emitting instruments, including the Jamaica Defence Force, the Jamaica Customs, the Post and Telecom of Jamaica and several Industrial Institutions
- Offering technical support in nuclear forensics and radioactive source recovery to Kingston's major transshipment port (for the period 2009-2012 one in every 90000 container TEU's occupancies proved likely to have a radioactive signature)
- Providing lectures on Radiation Protection and Radiation Biology for the University Hospital of the West Indies School of Medical Radiation Technology
- Enhanced Nuclear Security/Physical security (internal and external)
- On-going HEU repatriation under the GTRI
- Incident and Trafficking Database (ITDB) Point of Contact established at ICENS
- Until the Radiation Safety Authority (RSA) is fully established in law, and appoints a nuclear security committee (NSC), ICENS is the counterpart for the Integrated Nuclear Security Support Plan (INSSP)
- National Coordinator for IAEA Radiation Safety Information Management System (RASIMS)
- IAEA Nuclear Security Information Management System (NUSIMS) national coordinator

Conclusion

The impending legal framework to support Jamaica's nuclear and other radiological materials safety and security infrastructures will significantly enhance and strengthen the need of TSOs in Jamaica. The relevant stakeholders (Jamaica: Defense and Constabulary Forces, Customs, Solid Waste Management Authority, Maritime Authority, Health Authority, Fire Brigade and the RSA) are aware of the importance of a nuclear and other radioactive material safety and security culture as evident from their interest in lobbying for implementing legislation and other international instruments such as the Code of Conduct on the Safety and Security of Radioactive Sources, Convention On The Physical Protection Of Nuclear Material and non-binding instruments such as the INSSP. As the Jamaican TSO, ICENS has adhered to international best practices and guidelines which have contributed significantly in supporting the enhancement of nuclear and radiation safety and security. ICENS will continue to contribute to the national cause as legislative and regulatory infrastructures become installed, and continue to provide technical support as required by our regulators and the regional and international community.

References

- [1] THE INTERNATIONAL CENTRE FOR ENVIRONMENTAL AND NUCLEAR SCIENCES, ICENS. The First 20 Years 1984 – 2004, University of the West Indies (2005).
- [2] GRANT C., PRESTON J., Progress Report on Activities for the Core Conversion in Jamaica. RERTR 2012 34th International Meeting on Reduced Enrichment for Research and Test Reactors, (2012).
- [3] GRANT C., LALOR G.C., THOMAS J.E., Thermoluminescence Dosimetry in the Caribbean, West Indian Medical Journal, 52, 118-122, 2003.
- [4] STEINHAEUER H., Roles, Functions and Values that guide TSOs. Challenges Faced by Technical and Scientific Support Organizations in Enhancing Nuclear Safety and Security (Proc. Conf. Tokyo, 2010).

SLOWPOKE-2 Reactor Radiation Monitoring and Personnel Safety Support offered to the region:

- A Thermoluminescence Dosimetry (TLD) system used for personnel monitoring of ICENS staff members, in line with national and international codes of practice, since July 1984 .
- The quality of ICENS TLD badge measurements is periodically verified through regional inter-comparison; Quality Control enabled through a secondary standards laboratory [3].
- Ten years after the TLD service had been established there were more than 400 users island-wide being monitored,
- Today, ICENS provides the only service for more than 2000 users of ionizing radiation in Jamaica and five other territories in the Caribbean region.

In its commitment to exercise peaceful use of nuclear technology Jamaica has ratified several legally binding international instruments relevant to nuclear safety and security:

- The Terrorist Bombings Convention and the Convention for the Suppression of Acts of Nuclear Terrorism
- UN Security Council Resolution 1540, under Chapter VII
- The Comprehensive Safeguards Agreements and Additional Protocols
- The Convention on The Physical Protection of Nuclear Material (CPPNM)
- Political commitment given for the Code of Conduct on the Safety and Security of Radioactive Sources.