IAEA 與 NEA 動態報告

2018/06/25 - 07/06

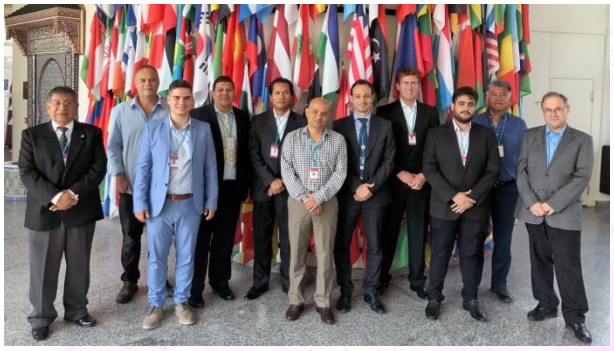
報告摘要(KEY INFORMATION)

1. 流量計係用來測量管線中之液體流量，需採週期性校準方式去確保數值精確。放射性示蹤劑技術理想上適合用於流量計校準並能在不同流量系統中正確測出氣體及液體之流量。參與國際原子能總署新合作計畫之參與者利用放射性示蹤劑，就石油和天然氣工業上所使用之流量計加以校準及證明。
2. 來自越南、柬埔寨、寮國之代表跨出重要一步，以支持國際原子能總署於 2018 年 6 月所舉辦之核能技術方面之三邊合作會議。考量三國間之需求與現行技術不同，將以 1.非破壞性核能技術 2.工業輻射(輻射處理)3.核醫學 4.輻射安全 5.突變育種等作為初步合作項目。
3. 在增加核能效率之議題上，其藉由核電廠產生熱力及其他能源形式用來海水淡化、氫氣生產、區域供熱及工業上之使用方向已受到重視。使用核能廢熱並採汽電共生能增加 30%熱效率，並降低熱能對環境之影響達 35%。合併閒置熱能及電力成單一程序能該降低碳排放及能源成本。另核能海水淡化已成為產生飲用水之可行選項。
4. 國際原子能總署近期在厄瓜多爾針對用以評估民間建築架構之非破壞性檢測技術(NDT)，舉辦技術合作課程以協助拉丁區域國家建置一批人。該相關人等應被訓練成合乎 ISO9712 及 ISO17024 規定之非破壞性檢測資格，並能夠執行民間及工業建築物檢測。非破壞性檢測包含核能技術使用，用來評估民間建築架構完整性並診斷工業成份之狀態，將可以幫助驗證受到地震、洪水及龍捲風損害之建築物安全性。
5. 入侵寄生之蒼蠅幼蟲在其中幾種陸生鳥類產生破壞性效應，尤其對世界上最受歡迎之但卻瀕臨危機且數目下降之達爾文雀造成威脅，包含紅木樹雀等。廣泛之潛在策略於 2018 年 6 月 11 日至 13 日所召開之會議上由相關單位及國際原子能總署參與討論，包含採用昆蟲絕育技術(SIT)及參與未來之相關研究。
6. 管理廢棄放射源指導指南已於 2017 年 9 月舉辦之國際原子能總署第 61 屆大會獲得認可，現可透過國際原子能總署網站上下載。此文件係作為放射源安全及保安行為準則暨放射源書輸出入口指導指南之補充指導指南。這個指南將輻射安全及保安提升至更嚴格之狀態，進而強化成員國將所規定之建議應用於實際情形上。
7. 核能署署長第 1 次以官方名義參加於 2018 年 5 月 28 至 29 日假波蘭舉行之會議。會議上提出閣名國際組織之支持對於波蘭準備建造第 1 座核電廠相關程序很重要以及與核能署合作基本上對於核能電廠之規劃是重要的。波蘭現在正規畫建立兩座核電廠，其容量為 6000MWe。相關規劃係確保波蘭長期電力供應保安及降低碳排放，以配合氣候變遷目標。

國際原子能總署近日新聞

GOING WITH THE FLOW: FIRST COORDINATION MEETING ON PROJECT TO APPLY RADIOTRACERS TO OIL AND GAS FLOW METERS

順其自然:第一個應用放射性示蹤劑於於石油和天然氣流量計之協商會議



Particpants at the first coordination meeting for the new project. (Photo: IAEA)

Participants in a new IAEA technical cooperation project to apply radiotracers to calibrate and certify the flow meters that are used in oil and gas industries in Latin America met in Vienna from 28 May to 1 June.

Flow meters are devices that measure the rate of flow of fluids in pipes. They must be calibrated periodically to ensure that measurements are precise. Radiotracer techniques are ideally suited for calibrating flow meters, and can be used for the accurate measurement of both gas and liquid flow rates under operating conditions in a wide range of flow systems.

The event – the first coordination meeting for the new project[1] – was attended by experts from Argentina, Brazil, Cuba, Ecuador, Mexico, Panama, Peru and Venezuela. Over the course of the week, each participating country presented its capabilities to use radiotracers to measure the flow of different fluids such as water, gas and hydrocarbons. Analyses which examine strengths, weaknesses, opportunities and threats (SWOT) were also carried out for each country.

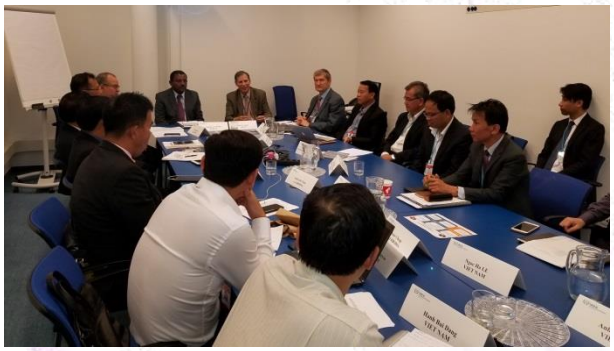
Discussions included the status of the current International Organization for Standardization (ISO) standard for water flow measurement (ISO 2975) and how to extend it to other fluids.

The plan of activities for the 2018-2019 period was discussed and elaborated. Planned training events will cover the preparation of radiotracers, as well as flow measurements in closed conduits for water and hydrocarbons.

[1] RLA1016, 'Certifying Flow Measurement Methods and Calibration Techniques of Flow Meters Used in the Oil and Gas Industries by Radiotracers (ARCAL CLXI)'(原文鏈結)

TRIANGULAR COOPERATION ON NUCLEAR TECHNIQUES: VIET NAM, CAMBODIA AND LAO PDR TAKE STEPS TO FOSTER MUTUAL ASSISTANCE

有關核能技術方面之三邊合作:越南、柬埔寨、寮國設法促進互助合作



Representatives from Viet Nam, Cambodia, Lao People's Democratic Republic and the IAEA met in Vienna, Austria, 11-13 June 2018. (Photo: IAEA)

Representatives from Viet Nam, Cambodia and Lao People's Democratic Republic took an important step forward in support of triangular cooperation on nuclear techniques at a meeting hosted by the IAEA in June 2018. The meeting is the latest in a series of IAEA-supported activities to enable South-South cooperation between these three neighbouring countries.

In August 2016, authorities in Viet Nam expressed interest in developing triangular cooperation with its neighbouring countries, Cambodia and Lao People's Democratic Republic, with the goal of fostering technical cooperation among developing countries and encouraging South-South cooperation. Viet Nam approached the IAEA for support with facilitating such cooperation, and the Agency subsequently carried out consultations with national authorities in Cambodia and Lao PDR.

Working together, the three countries and the IAEA took a series of steps to develop a framework and facilitate collaboration. These steps include the establishment of a road map to guide the development of such collaboration, and the conduct of a trilateral meeting between Viet Nam, the IAEA and Lao People's Democratic Republic to agree on priority areas for cooperation. In addition, the IAEA supported a mapping exercise to identify capacity building and expertise needs in Cambodia and Lao People's Democratic Republic, and to categorise available technical and human capacity in Vietnamese institutions.

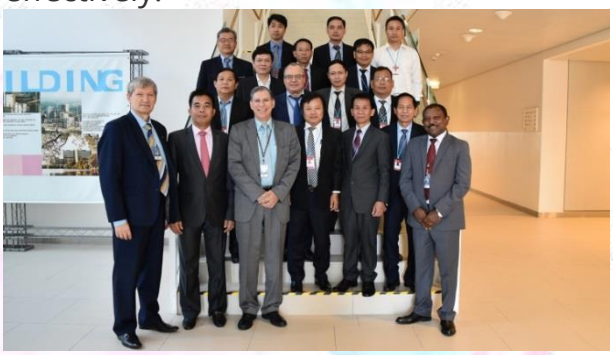
Taking into consideration the needs of Cambodia and Lao People's Democratic Republic and the available technical and human capacity in Vietnamese institutions, the following topic areas were identified as priorities for initiating cooperative activities:

1. Non-destructive nuclear techniques
2. Industrial irradiation (radiation processing)
3. Nuclear medicine
4. Radiation safety
5. Mutation breeding

As a next step, the IAEA conducted a consultative meeting at IAEA Headquarters from 11 to 13 June this year, with the goal of developing triangular cooperation between Viet Nam, the IAEA and Cambodia, and between Viet Nam, the IAEA and Lao PDR. At this meeting, the participants discussed the priority needs of Lao People's Democratic Republic and

Cambodia in each of the identified areas, reviewed the available institutional and human capacity in Vietnamese institutions, and identified and outlined concrete activities for triangular cooperation and implementation arrangements that could be supported through IAEA technical cooperation (TC) projects as part of the ongoing 2018–2019 TC programme cycle. A framework, together with specific triangular cooperation activities, was also outlined and developed for the 2020–2021 TC cycle.

These concrete meeting results set a good example for promoting substantive cooperation among Member States, and for utilizing the TC programme platform to facilitate this kind of cooperation efficiently and effectively.



(原文鏈結)

NUCLEAR POWER BEYOND ELECTRICITY: TOWARDS GREATER EFFICIENCY IN ENERGY PRODUCTION AND WATER MANAGEMENT

超越電力之核能:朝向有效之能源產出及用水管理

The Kudankulam Nuclear Power Plant in India uses nuclear desalination to supply water for both the power plant and the town it is located in. (Photo: India Water Portal)

Non-electric applications powered by nuclear energy offer increased energy efficiency and represent sustainable solutions for a number of energy challenges current and future generations will have to face. There is growing interest in increasing nuclear energy efficiency by using heat and other forms of energy generated by nuclear power plants as a by-product for seawater desalination, hydrogen production, district heating and various industrial applications. At a meeting at the IAEA last week, experts reviewed the status of harnessing this energy that would otherwise go to waste and dissipate as heat.

"Cogeneration could increase the overall thermal efficiency of a nuclear power plant by more than 30% by reusing waste heat and could decrease the environmental impact of heating and transport by up to 35%," said IAEA Senior Nuclear Engineer Ibrahim Khamis.

Nuclear power plants produce a large amount of both electricity and heat. Cogeneration merges the production of usable heat and electricity into a single process that can substantially reduce carbon emissions and energy costs. It is a more efficient use of fuel because otherwise wasted heat from electricity generation is put to productive use in district heating, desalination or hydrogen production.

Currently there are more than 70 nuclear power plants operating in cogeneration mode and the potential for applying this technology more widely appears promising, Khamis said.

Cogeneration benefits include:

- **Efficiency**: Cogeneration requires less fuel than separate heat and power generation, to produce a given energy output. Cogeneration also avoids transmission and distribution loses that occur when electricity travels over power lines from central generating units.
- **Reliability**: Cogeneration can provide high-quality electricity and thermal energy to a site regardless of what might occur on the power grid, decreasing the impact of outages and improving power quality for sensitive equipment.
- **Environmental impact**: Because less fuel is burned to produce each unit of energy output, cogeneration reduces

emissions of greenhouse gases and other air pollutants.
- **Economic benefits**: Cogeneration can save facilities considerable money on their energy bills due to its high efficiency, and it can provide a hedge against unstable energy costs.

Water management

For more than two decades, the support for seawater desalination using nuclear energy has been repeatedly stressed at the IAEA General Conference and supported by many Member States. Nuclear desalination has been demonstrated to be a viable option to meet the growing demand for drinking water around the globe, including areas in arid and semi-arid zones that face acute water shortages, Khamis said.

Reactors in Japan, India and Kazakhstan have gathered over 200 reactor years of experience in desalination, and have demonstrated it as a viable option.

Better water management not only means introducing nuclear desalination applications, but also more efficient practices in the use of the water supply needed to run power plants.

"Economizing water and the efficient use of water resources in Jordan is a challenge for the success of the Jordanian nuclear power plant project," said Sameh Melhem, engineer at the Jordan Atomic Energy Commission. "The proposed site for the plant is located far away from any sea or river. Therefore, it is important for us to discuss technical, economic, and environmental aspects of water management, in forums such as IAEA technical meetings."

In support of the SDGs

"The technological advances and interest in non-electric applications not only fulfil our IAEA mandate but such activities are in line with United Nations Sustainable Development Goals (SDGs)," said Mikhail Chudakov, IAEA Deputy Director General and Head of the Department of Nuclear Energy. Cogeneration is relevant for the following SDGs:

- SDG 6: Ensuring access to water and sanitation for all
- SDG 7: Ensuring access to affordable, reliable, sustainable and modern energy for all
- SDG 13: Taking urgent action to combat climate change
- SDG 14: Conserving and sustainably using the oceans, seas and marine resources for sustainable development (原文鏈結)

FIRST REGIONAL TRAINING COURSE IN LATIN AMERICA AND THE CARIBBEAN ON NON-DESTRUCTIVE TESTING FOR THE EVALUATION OF CIVIL STRUCTURES TAKES PLACE

第一個於拉丁美洲及加勒比所舉辦區域性非破壞性檢測訓練課程，以用於評估民間建築架構

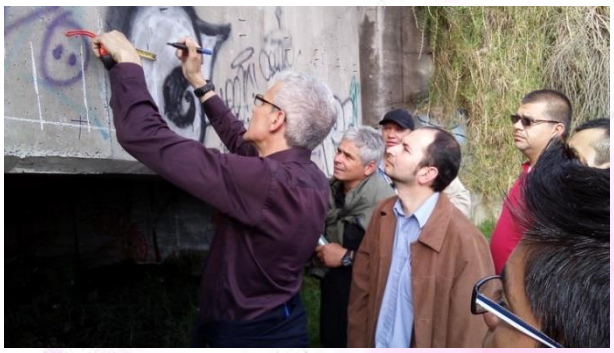
Participants of the first regional training course on non-destructive testing techniques for the evaluation of civil structures. (Photo: Eduardo Fco. Robles Piedras/ININ)

An IAEA technical cooperation course on non-destructive testing (NDT) techniques for the evaluation of civil structures, held recently in Quito, Ecuador, will help countries in the Latin America region to develop a cohort of personnel trained and qualified in non-destructive testing in accordance with ISO9712 and ISO17024, and competent to carry out inspections of civil and industrial structures. Non-destructive testing, which includes the use of nuclear techniques, is used to assess the integrity of civic structures and to diagnose the state of industrial components. This can help countries to verify the safety of damaged buildings after emergencies such as earthquakes, floods and cyclones.

The regional training course, organized by the IAEA in collaboration with the government of Ecuador, was held from 14 to 18 May 2018 in the city of Quito at the Army's Polytechnic School of the University of the Armed Forces of Ecuador. Part of an IAEA technical cooperation project[1], the course was focused on developing the NDT capacities of participating countries, using interactive workshops through which participants had the opportunity to learn about the different methods and techniques used for non-destructive testing relevant to their jobs.

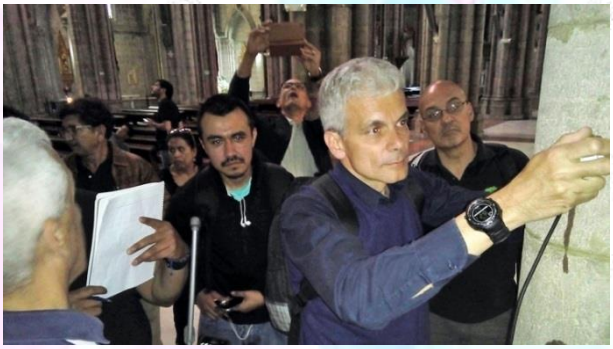
Experts from the Spanish Association of Non-Destructive Testing (AEND) and the Italian Association of Non-Destructive Testing (AIPnD), in collaboration with technical officers from the IAEA, shared their experience in non-destructive testing and explained the scope and limitations of such testing when applied to the diagnosis of civil structures. Bearing in mind existing international regulations, the course also served as a platform to teach various other non-nuclear techniques used to assess damaged buildings that are considered fundamental for inspections of buildings and industrial structures, particularly in emergency situations. These include visual inspection, ultrasound, sclerometric hardness measurement, and the determination of concrete thicknesses using electromagnetic techniques. The training also focused on the evaluation of schools and hospitals, and the general inspection and evaluation of historic buildings.

The course incorporated practical sessions, which were conducted at the Union of South American Nations (UNASUR) headquarters. Experts presented case examples from their countries, demonstrating the correct way to perform the diagnosis and seismic analysis of various old buildings, such as bridges, industrial constructions, palaces and cathedrals.



Practical session on the structure of the bridge over the Rumiñahui River. Demonstration of the methodology to follow while using the Schmidt sclerometer. (Photo: Eduardo Fco. Robles Piedras/ININ)

All topics covered by the course were reinforced with the conduct of practical measurements in civil structures. These practical exercises provided participants with the opportunity to evaluate the infrastructures of important civil structures such as the bridge over the Rumiñahui River in the metropolitan area of Quito, and the Basilica del Voto Nacional, located in the historic centre of Quito.Among the objectives of the regional project under which the training course was held, one is to establish a group of specialists certified to ISO 9712 standard, with the necessary competences to carry out inspections of civil and industrial structures using non-destructive testing techniques, and another is to establish two sub-regional centres specializing in the inspection of civilian structures.



Practical session on the Basílica del Voto Nacional. Measurement of the strength of the structural column material using the ultrasound technique. (Photo Eduardo Fco. Robles Piedras/ININ)

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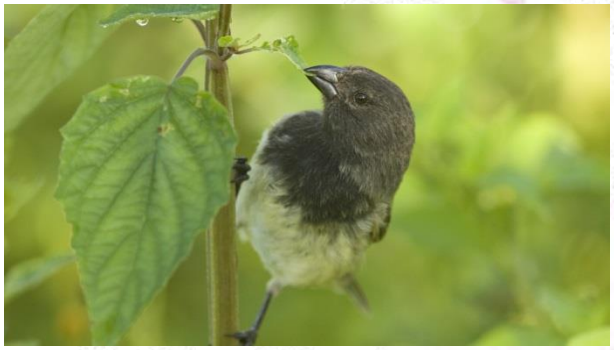
[1] RLA1014, 'Advancing Non-Destructive Testing Technologies for the Inspection of Civil and Industrial Structures' (原文鏈結).

TACKLING AN ENVIRONMENTAL EMERGENCY IN THE GALAPAGOS: IDENTIFYING STRATEGIES TO COMBAT THE INVASIVE PARASITIC FLY PHILORNIS DOWNSI

處理加拉巴哥發生之環境突發事件:對付入侵寄生蒼蠅之辨識策略



A small tree finch, a species of bird in the Darwin's finch group threatened by the larvae of the invasive parasitic fly, *Philornis downsi*. (Photo: Michael Dvorak)

Stakeholders and international experts met at IAEA headquarters in Vienna from 11 to 13 June 2018 to discuss an environmental emergency in the Galapagos Islands: a parasitic fly infestation that is causing high mortality amongst some bird species.

The meeting, held in response to Ecuador's request for IAEA assistance, brought together experts from around the world to discuss alternative pest management approaches to the fly, *Philornis downsi*, which was introduced to the Galapagos Islands in the 1960s and 70s.

The larvae of this invasive parasitic fly have a devastating effect on several small land birds, and are a significant cause of concern for conservation. The larvae are a particular threat to the world-famous – but endangered and declining – Darwin's finches, including the very rare Mangrove finch and the Floreana mockingbird.

Meeting participants included Danny Rueda, representative of the Galapagos National Park Directorate (GNDP), Charlotte Causton, representative of the Charles Darwin Foundation (CDF) and international experts, as well as other stakeholders, with the IAEA headquarters serving as a hub for discussion. The important role of the GNDP in preserving biodiversity in Galapagos was acknowledged, a strategic research plan for land bird conservation in the Galapagos Islands was considered, and the best approaches to the problem as well as the potential role of the IAEA's technical cooperation programme were identified.

International experts, stakeholders from the Galapagos Islands and the IAEA met to discuss the best approach to mitigate the high mortality amongst some bird species caused by the parasitic fly Philornis downsi. (Photo: H.Pattison/IAEA)

A range of potential tactics were discussed during the meeting, including the possible use of the Sterile Insect Technique (SIT), with Ecuador's national authorities, Galapagos stakeholders, international experts and IAEA staff agreeing on the need to engage in further research. Noting the urgency and unique characteristics of this environmental challenge, all participants

agreed that insecticide treatment of nests and restricted captive breeding of the most endangered species can serve as a mitigation strategy until targeted nuclear technologies are developed that can effectively contribute to the pest management efforts so far conducted by the country and the international community. (原文鏈結)

IAEA GUIDANCE ON MANAGING DISUSED RADIOACTIVE SOURCES NOW AVAILABLE

國際原子能總署有關管理廢棄放射源方面之指導指南現已可提供

Disused radioactive sources stored at a waste storage facility in the United Kingdom. (Photo: D. Calma/IAEA)

The Guidance on the Management of Disused Radioactive Sources, endorsed by the 61st IAEA General Conference in September 2017, is now available via the IAEA's web site. The document stands as supplementary guidance to the Code of Conduct on the Safety and Security of Radioactive Sources, along with the Guidance on the Import and Export of Radioactive Sources.

Millions of radioactive sources are in use around the world in medicine, industry, agriculture and research. Sources may remain radioactive long after the end of their useful life so it is essential that they are safely managed and securely protected. The Code of Conduct and its supplementary documents foster management and protection by providing guidance on the development, harmonization and implementation of national policies, laws and regulations, as well as the promotion of international and regional cooperation among Member States.

"The Guidance promotes a more rigorous radiation safety and security culture, which will be further enhanced once Member States put the recommendations of the Guidance into practice," said Hilaire Mansoux, Head of the IAEA's Regulatory Infrastructure and Transport Safety Section.

The Guidance, which is not legally binding, describes a variety of options for the management and protection of disused radioactive sources and outlines the responsibilities of relevant parties, including regulatory bodies. It emphasises disposal as the final management option for disused sources and encourages countries to have national policies and strategies to manage disused radioactive sources in a safe and secure manner. It also contains provisions on bilateral relations, including advice on the return of sources in cases where such arrangements have been agreed.

Muhammed Khaliq, Head of the IAEA's Nuclear Security of Materials and Facilities Section, noted that the Guidance, once applied, will strengthen nuclear security as well.

"The effective and continuous regulatory and management control of radioactive sources, from cradle to grave, is of utmost importance for the prevention of malicious acts with harmful radiological consequences," he said.

Member States make what is called a political commitment to the Code and

its supplementary guidance inan official letter to the IAEA, in which they affirm their decision to act in line with the recommendations. Of the IAEA's 170 Member States, 137 have so far expressed commitment to the Code of Conduct and 114 to the Guidance on the Import and Export of Radioactive Sources.

The IAEA supports Member States in the implementation of the Code of Conduct and Guidance documents through projects and information exchange. This includes a formal process that was established in 2006. The first international meeting for the exchange of experience on the implementation of the Guidance on the Management of the Disused Radioactive Sources is planned for 2020 in Vienna. (原文鏈結)

核能署每月新聞稿-2018 年 7 月

DIRECTOR-GENERAL MAGWOOD'S VISIT HIGHLIGHTS NEA COMMITMENT TO SUPPORT POLAND

核能署署長之拜訪強調核能署承諾支持波蘭

NEA Director-General William D. Magwood, IV, undertook his first official visit to Poland on 28-29 May 2018 for meetings with the Ministry of Energy, the Ministry of Investment and Economic Development, the National Atomic Energy Agency (PAA) and the National Centre for Nuclear Research (NCBJ).

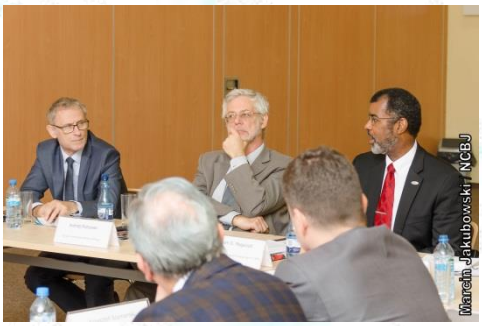
Central to his visit were meetings with **Krzysztof Tchórzewski**, Minister of Energy, **Jadwiga Emilewicz**, Minister of Entrepreneurship and Technology and **Jerzy Kwieciński**, Minister of Investment and Economic Development. Discussions covered a wide range of issues, including nuclear safety technology and regulation, the human aspects of nuclear safety, stakeholder involvement, and nuclear development.

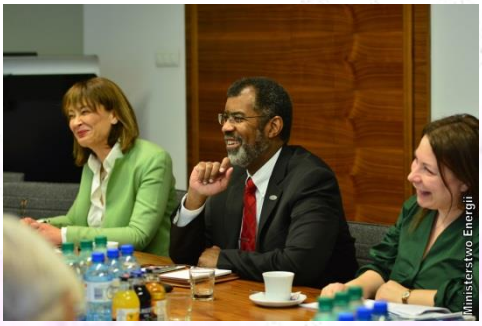
During the discussions, Minister Tchórzewski underlined the importance of international co-operation for the safe use of nuclear power. "The support of renowned international organisations is crucial in the process of preparing for the construction of the first nuclear power plant in Poland, and co-operation with the NEA is of fundamental importance for the implementation of the Polish nuclear power programme," he said.

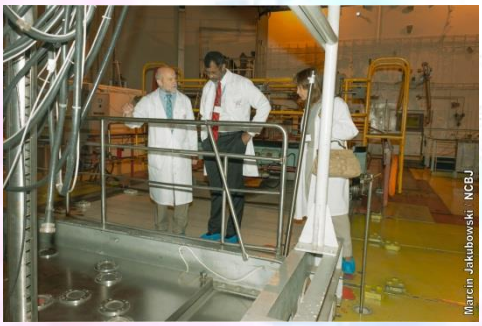
Poland currently plans to build two nuclear power plants with 6000 MWe of capacity. The nuclear energy programme aims to ensure long-term security of electricity supply for Poland, and reduce carbon emissions in order to meet climate change goals.

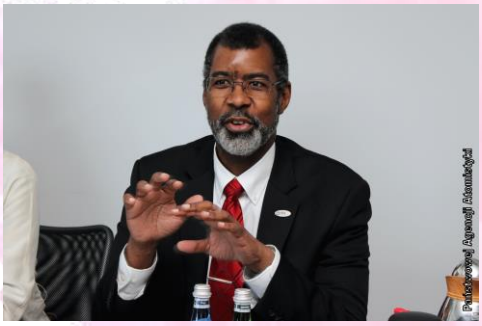
"It is up to each country to decide whether or not to use nuclear power. The role of the NEA is to help any of its member countries which choose to use nuclear power to do so safely, securely and sustainably," said NEA Director-General Magwood. "The NEA stands ready to provide our advice and analysis to Poland as it considers the implementation of a nuclear power programme."

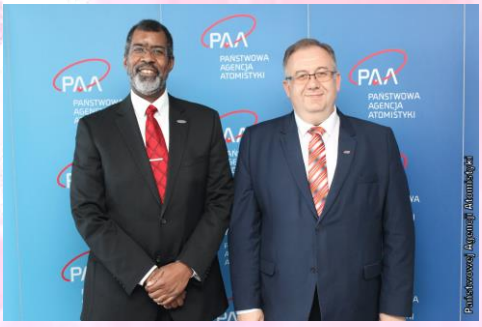
While in Poland, the Director-General also visited the MARIA research reactor and various other installations at the NCBJ. Named after Polish-French physicist, chemist and two-time Nobel Prize winner Marie Skłodowska-Curie, the MARIA reactor first began producing medical radioisotopes in 2010, thereby helping to address shortages in the global supply chain.











Notes to editors

The Nuclear Energy Agency (NEA) is an intergovernmental agency which operates within the framework of the Organisation for Economic Co-operation and Development (OECD). It facilitates co-operation among countries with advanced nuclear technology infrastructures to seek excellence in nuclear safety, technology, science, related environmental and economic matters and law. The mission of the NEA is to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally sound and economical use of nuclear energy for peaceful purposes. It strives

to provide authoritative assessments and to forge common understandings on key issues as input to government decisions on nuclear technology policies. NEA membership includes 33 countries representing 84% of the world's installed nuclear electricity generating capacity.

Poland is an important partner in many areas of NEA work, having participated in the Agency's work since 1993, and became a full member in 2010. Poland's membership of the NEA grants it access to the best international network of technical experts, and an opportunity to leverage its national resources. (原文鏈結)