IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Technical Meeting on Efficient Energy and Water Management in Nuclear Power Plants: Strategies, Policies and Innovative Approaches

IAEA Headquarters

Vienna, Austria

18–20 June 2018

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Information Sheet

A. Background

Energy and water are strongly interlinked elements that are critical for human well-being as well as for sustainable socio-economic development. The efficient management of energy and water in nuclear power plants (NPPs) has to be one of the important targets to be considered by Member States embarking on the use of nuclear energy for the first time, as well as by Member States with operating plants. The management approaches should consider the conversion, conservation, distribution, recovery and reuse of energy and water in the plant, whenever possible, to meet the requirements and demand of the plant with minimal losses, taking into account the environmental and economic aspects of any necessary system integration or retrofitting.

The recovery of waste heat from NPPs for cogeneration applications is one of the energy management approaches in NPPs. The reuse of recovered energy leads to a direct reduction of the overall plant losses and brings benefits in terms of economic, environmental and sustainable energy aspects. Based on the type of nuclear reactor, the recovered heat can be used to produce a range of products such as fresh water, hydrogen, industrial process steam, district heating or cooling applications, or also a

combination of these applications. As a result, many applications which are primarily dependent on the use of conventional fossil fuel as heat sources, such as desalination plants, would be able to make use of the recovered nuclear waste heat. This would be a key step in the elimination of dependency on fossil fuels, which are the main source of greenhouse gas emissions, and it would also be accompanied by improved energy and water security. Similarly, using the recovered nuclear waste heat in industrial applications leads to a drastic reduction in the environmental impact caused by fossil fuel based systems. Another key element for reducing carbon dioxide emissions is replacing cooling towers in NPPs with district heating systems, instead of burning fossil fuel to support the conventional heating systems.

Efficient water management is an important subject for all NPPs during their entire lifetime (i.e. throughout the construction, operation, maintenance and decommissioning phases), and even during shutdown or during an accident. Water management involves ensuring that there is a reliable water supply for condenser cooling during operation, for construction (including during the flushing phase) as well as for inventory control, including make-up to primary coolant systems and discharge from radioactive liquid waste treatment systems. Current operating water cooled NPPs consume large amounts of water, typically some 35 to 65 million litres per day. However, water needs for NPPs vary depending on several parameters, including the cooling system used, the thermal efficiency of the plant, the required type of service water, safety and non-safety system designs, as well as the waste disposal strategies and techniques. Moreover, water outfalls/outflows from NPPs require certain control and management, as they are relatively warm and can have adverse local impacts in bays and gulfs, in addition to being potentially contaminated with heavy metal and salt pollutants.

This meeting seeks to establish a forum for information exchange to discuss the water–energy nexus as it applies to nuclear power programmes, as well as the various strategies/policies and innovative approaches that can be adopted to ensure efficient management of energy and water in NPPs, including the application of cogeneration i.e. electricity generation and process heat production for non-electric applications. Hence, the meeting will address the technical and economic benefits of nuclear energy and its role as a driver of sustainable development in the energy and water sectors, as well as its contribution to climate change mitigation efforts.

B. Objectives

The purpose of the meeting is to:

- Address the benefits of the water–energy nexus in NPPs, with an emphasis on the role of nuclear desalination and water management in enhancing sustainability in the energy and water sectors;
- Facilitate the exchange of operating experiences related to various strategies and policies that have been applied to achieve efficient water and energy management in NPPs; and
- Discuss innovative approaches to be considered for adoption at currently operating and/or future NPPs in order to enable the reuse of waste heat for water production.

C. Expected Outputs

The expected outputs of this meeting are:

- Assessment of nuclear cogeneration as a viable option for mitigating climate change;
- Strengthening the public acceptance of nuclear cogeneration; and
- Publication of a meeting report summarizing the discussions and identifying areas where improvements are required in NPPs in order to facilitate the use of waste heat for non-electric applications in Member States.

D. Administrative and Financial Arrangements

Designating Governments will be informed in due course of the names of the selected candidates and will at that time be given full details on the procedures to be followed with regard to administrative and financial matters.

The costs of the meeting are to be borne by the IAEA; no registration fee is charged to participants. Travel and subsistence expenses of participants will not be borne by the IAEA. Limited funds are, however, available to help meet the cost of attendance of certain participants. Such assistance may be offered upon specific request to normally one participant per country provided that, in the IAEA's view, the participant on whose behalf assistance is requested will make an important contribution to the meeting. The application for financial support should be made at the time of designating the participant.

The organizers of the meeting do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is travelling to and from or attending the meeting, and it is clearly understood that each Government, in designating participants, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.

E. Application Procedure

Designations should be submitted using the attached Participation Form (Form A). Completed forms should be endorsed by the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) and returned through the established official channels. They must be received by the IAEA not later than **30 April 2018**. Designations received after that date or applications sent directly by individuals or by private institutions cannot be considered. Designating Governments will be informed in due course of the names of the selected candidates and at that time full details will be given on the procedures to be followed with regard to administrative and financial matters.

For Member States receiving technical cooperation assistance, applications for financial support should be made at the time of designating the participant.

F. Working Language

The working language of the meeting will be English with no interpretation provided. All communications, abstracts, and papers must be submitted in this language.

G. Venue

The meeting will commence at 9.30 a.m. on Monday, 18 June 2018 in Room M0E07, Building M, of the Vienna International Centre (VIC). Meeting participants are requested to arrive at Checkpoint 1/Gate 1 of the VIC one hour before the start of the meeting on the first day in order to allow sufficient time for the issuing of grounds passes, which are necessary for official visitors to the VIC.

H. Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria as soon as possible.

I. Organization

Official correspondence with regard to the technical aspects of the meeting should be addressed to the Scientific Secretary:

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