

## **Proposal of IAEA Coordinated Research Project (CRP) on**

### **“Potential of High-Temperature Gas-Cooled Reactors for Process Heat Applications”**

#### **1. Title of CRP**

“Potential of High-Temperature Gas-Cooled Reactors for Process Heat Applications”

#### **2. Problems to be addressed**

The CRP will address the status of R&D on technical and economic prospects of coupling High-Temperature Gas-Cooled Reactors (HTGR) to process heat applications and update the status of related R&D. The main focus will be on nuclear hydrogen production and seawater desalination, representing high-temperature and low-temperature process heat applications, respectively.

#### **3. Background**

High-Temperature Gas-cooled Reactors (HTGRs) continue to attract interest in several member states as candidates for the next generation of nuclear power plants. Fuelling this interest is their claimed safety and economics features and their competitive co-generation potential in process heat applications such as the production of hydrogen and seawater desalination. Since there is growing interest in a new hydrogen economy and at the same time, an alarming shortage of potable water sources in many corners of the world, the potential exists for HTGRs to play a role in both of these vital applications.

Already, plans exist in several member states, such as the US, South Africa, Russia, China, Japan, France and the Republic of Korea to design and construct demonstration plants of the HTGR type, and in some cases couple them to hydrogen production units. An example of such potential projects is the Next Generation Nuclear Plant (NGNP), sponsored by the US Department of Energy (DOE), and foreseen to be operational in Idaho, by the middle of the next decade.

However, there are still challenges facing these process heat applications, related to design and engineering aspects, coupling schemes and safety aspects. The CRP will review and update the state of the art of R&D related to all these aspects.

#### **4. Specific objective**

The CRP will serve as a platform for collaborative research on technical and economic aspects of coupling High-Temperature Gas-Cooled Reactors (HTGR) to process heat applications, in particular hydrogen production and seawater desalination, and will update the status of related R&D.

#### **5. Potential Member State Participation**

Member states and organizations that have expressed interest in joining this CRP, include China, the EC, France, Germany, Indonesia, Japan, Korea (Rep. of), NL, Russia, South Africa and the US.

## **6. Expected outputs/outcomes**

Expected outputs include working material on the addressed subjects and a final document in the form of an IAEA-TECDOC. Outcomes include better understanding by member states of the potential and challenges facing HTGR process heat applications and a degree of progress in collaborative research efforts towards achieving that goal.

## **7. CRP duration**

A period of 4 years is proposed for the CRP (2006-2009).