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**REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN
PARLIAMENT**

Operation of the High Flux Reactor in year 2009

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The Council adopted on 25 May 2009 a three-year (2009-2011) supplementary research programme to be implemented by the Joint Research Centre (JRC) concerning the operation of the High Flux Reactor (HFR) located at the JRC's Institute for Energy, Petten, The Netherlands. Article 4 of this Council decision provides that the Commission will inform yearly the European Parliament and the Council by producing a report on the implementation of the supplementary research programme. This 2009 HFR activity report is the first of three yearly reports that will cover the whole supplementary research programme.

The main objectives of the programme are the following:

- (1) To ensure the safe and reliable operation of the HFR in order to guarantee the availability of the neutron flux for experimental purposes.
- (2) To allow an efficient use of HFR by research institutes in a broad range of disciplines: improvement of safety of existing nuclear reactors, health including the development of medical isotopes to answer questions of medical research, nuclear fusion, fundamental research and training and waste management including the possibility to study the safety behavior of nuclear fuels for the new generation of reactor systems.

The HFR acts also as a training facility for doctoral and post-doctoral fellows, allowing them to perform research activities through national or European Programmes.

The safe operation and research objectives were fulfilled as follows in 2009:

1. Safe Operation of the HFR

The HFR reactor is operated by NRG (Nuclear Research and consultancy Group). It has an operating licence granted by the Dutch national regulator KFD (Kernfysische Dienst). As for nuclear power plants, the HFR is subject to legally required 10-year periodic reviews which are performed by NRG. The HFR has been also the subject of an independent IAEA INSARR (Integrated Safety Assessment for Research Reactors) review in March 2005, and the next is foreseen in 2011.

In 2009 the HFR was safely restarted and was operational for 248 days and two periods of respectively 42.6 and 31.3 days were used for preventive, corrective and breakdown maintenance of all systems, structures and components of the HFR executed with the objective to enable the safe and reliable operation of the HFR.

No incident on the International Nuclear Event Scale (INES) occurred.

During 2009 two shipments of spent fuel, for a total of 66 elements, took place from the HFR to the Dutch Central Organization for Radioactive Waste.

2. Research and Isotope production

2.1 Research

The JRC kept on managing NeT, the European Network on Neutron Techniques Standardization for Structural Integrity. The main experimental activities in NeT were relative to analysis of specific welds in a stainless steel plates and beams.

The following ongoing scientific activities were performed:

- residual stress measurements by neutron diffraction
- Fuel irradiations experiments mainly within the Euratom Framework Programmes
- Investigation of fuel and reactor structural material irradiation (graphite and steel)
- Fusion reactor technology experiments concerning the post irradiation examination of steels, of welds and of beryllium degradation

2.2 Isotope Production

In mid-May 2009, the Canadian NRU Reactor (a medical isotope producer) went out of operation and remained unavailable for the rest of 2009, triggering a continuous worldwide medical isotope shortage. A disruption in the HFR would have caused similar global consequences. The HFR therefore increased its production to 180% of its nominal level to deliver 60% of the total world demand in Mo-99. The reconfiguration of the production facilities and operating priorities allowed as many as 11 Mo-99 production irradiations to be performed in parallel.

The HFR produced enough material to allow more than 50,000 patient scans per day to be performed worldwide. This amount corresponds to more than half of the 10 million medical diagnoses executed each year in Europe.

3. Financial contributions for the execution of the programme.

The Commission received in 2009 from the supplementary programme 800,000 € as provisions for the Decommissioning fund. Other expenditures (direct personnel, support HFR, utilities, spent fuel management) incurred by JRC were also paid from the supplementary programme budget.

An accompanying Staff Working Paper presents in more detail these results of the operation of the HFR in 2009.