

International Nuclear Energy Research Initiative

**U.S. DEPARTMENT OF ENERGY
INTERNATIONAL NUCLEAR ENERGY RESEARCH INITIATIVE
DOE/France**

ABSTRACT

Hydrogen Process High Temperature Heat Source Coupling Technology

Principal Investigator (U.S.): C. Park, Idaho National Engineering and Environmental Laboratory (INEEL)

Project Number: 2004-001-F

Principal Investigator (France): P. Billot, Commissariat à l'Énergie Atomique (CEA)-Saclay

Project Start Date: August 2004

Project End Date: August 2007

Key Objective

Develop the technology necessary to couple a high temperature heat source to hydrogen production processes, including both the Sulfur-Iodine (S-I) cycle and the High Temperature Electrolysis (HTE) processes.

Tasks

1. Evaluate heat transmission and exchangers including technical and industrial feasibility, flexibility of coupling schemes, and conversion energy losses for the design solutions.
 2. Analyze design solution schemes to consider optimized technological options, including component connections for these interfaces: reactor/intermediate heat exchanger/high temperature step/medium temperature step/low temperature step.
 3. Develop and utilize an engineering tool to evaluate the complete heat balances for the different schemes, optimizing the use of energy (electricity and/or heat) in relation to hydrogen production. This simulation tool will permit an understanding of the process behavior during normal operation, transient, and accidental condition. The information from the models and simulations will provide the data needed to perform availability and safety analysis, as well as information and interface data for the economic evaluation and cost estimation work teams.
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