

# **PUBLICLY AVAILABLE INFORMATION ON THE IRIS REACTOR**

This CD contains a selection of published material on the IRIS reactor. The papers included in this collection represent only a fraction of the literature available on the IRIS reactor, and they have been selected since they provide the most coherent and complete overview of the current status of the IRIS design.

All the attached documentation is submitted to provide a non-proprietary overview of the IRIS concept, and to allow familiarization with the plant design.

The papers are divided in three groups:

## **Design Status and Overview**

## **Systems and Components Design**

## **Additional Information**

## ***IRIS REFERENCE DESIGN INFORMATION***

### **DESIGN STATUS AND OVERVIEW**

- ♦ **IRIS Plant Overview Document** – This non-proprietary document, originally prepared by Westinghouse Electric Co. for the IAEA Advanced Light Water Reactor Report, provides an overview of the IRIS reactor, and has been used as a non-proprietary introductory material to the IRIS design.
- ♦ **The Design and Safety Features of the IRIS Reactor** – This (draft) paper for the ICONE 11 conference provides an overview of IRIS integral reactor coolant system and safety features, and present the status of the design as of 02/2003.

Reference: M.D. Carelli, L. Conway, L. Oriani, C. Lombardi, M. Ricotti, A. Barroso, J. Collado, L. Cinotti, M. Moraes, J. Kozuch, D. Grgic, H. Ninokata, R. Boroughs, D. Ingersoll, F. Oriolo, "The Design and Safety Features of the IRIS Reactor", ICONE 11 conference, Tokyo, Japan, April 2003

### **SYSTEMS AND COMPONENTS DESIGN**

- ♦ **IRIS Reactor Pressure Vessel** – Provides a description of IRIS pressure vessel and internals, and summarizes results of the preliminary ENSA design activities

Reference: J. Collado, "Design of the Reactor Pressure Vessel and Internals of the IRIS Integrated Nuclear System", Proceeding of International Congress on Advanced Nuclear Power Plants (ICAPP03) Congress Palais, Córdoba (Spain), May 4-7, 2003

- ♦ **The IRIS Spool-type Reactor Coolant Pump** – This paper provides a description of the innovative immersed spool pumps adopted as the reference design for IRIS reactor coolant pumps, and summarizes results of the Curtiss-Wright EMD design

Reference: J.M. Kujawski, D.M. Kitch, L.E. Conway, "The IRIS Spool-type Reactor Coolant Pump", Proc. 10th Int. Conf. on Nuclear Engineering (ICONE-10), Arlington, USA, April 14-18, 2002, ASME.

- ♦ **Steam Generator of the International Reactor Innovative and Secure** – Provides a description of IRIS helical coil steam generator. Although this paper does not contain the most updated information available (as provided in the papers in the overview section), it gives an overview of the development effort by ANSALDO and ANSALDO-CAMOZZI.

Reference: L. Cinotti, M. Bruzzzone, N. Meda, G. Corsini, L.E. Conway, C. Lombardi, M.E. Ricotti, "Steam Generator of the International Reactor Innovative and Secure", Proc. 10th Int. Conf. on Nuclear Engineering (ICONE-10), Arlington, USA, April 14-18, 2002, ASME.

- ♦ **IRIS Pressurizer** – Provides an overview of CNEN and NUCLEP design and analyses of the IRIS pressurizer

Reference: A. C. O. Barroso, B. D. Baptista F, I. D. Arone, L. A. Macedo, P. A. B. Sampaio, M. Moraes, "IRIS Pressurizer Design", , Proceeding of International Congress on Advanced Nuclear Power Plants (ICAPP03) Congress Palais, Córdoba (Spain), May 4-7, 2003

- ◆ **IRIS plant arrangement** – Provides an overview of Bechtel and Westinghouse studies on IRIS plant layout. The studies summarized in this report were part of the ESP input for IRIS

Reference: J. Robertson, J. Love, R. Morgan, L.E. Conway, "*The IRIS General Plant Arrangement*", Proc. 10th Int. Conf. on Nuclear Engineering (ICONE-10), Arlington, USA, April 14-18, 2002, ASME.

- ◆ **IRIS Internal Shielding** – The large downcomer region that is characteristic to the IRIS design provides not only a significant reduction in the vessel fluence over other nuclear reactors vessel, but introduce also flexibility in the design. The option of locating internal shields in this region has been considered as a design option and this paper provides an overview of the studies developed to evaluate this option.

Reference: C. Lombardi, E. Padovani, A. Cammi, J. Bucholz, R. Santoro, D. Ingersoll, B. Petrovic, M. Carelli, "*Internal Shield Design in the Iris Reactor and its Implications on Maintenance and D&D Activities*", Proc. 4th Intl. Conf. on Nuclear Option in Countries with Small and Medium Electricity Grids, Dubrovnik, Croatia, June 16-20, 2002

## **ADDITIONAL INFORMATION**

- ◆ **Computational Issues in IRIS Safety Analyses** – This paper provides an overview of the anticipated challenges expected in the development of appropriate evaluation models for the IRIS reactor. It also provides an overview of the approach used in the preliminary safety assessment of the IRIS concept.

Reference: L. Oriani, L.E. Conway, D. Grgic, T. Bajs, A. Barroso, M. Ricotti "Overview of Computational Challenges in the Development of Evaluation Models for IRIS", American Nuclear Society Topical Meeting in Mathematics & Computations (M&C), April 6-10, 2003, Gatlinburg, TN, USA

- ◆ **Thermal Hydraulics of IRIS Helical Coil Steam Generators** – Provide an Overview of studies in the thermal-hydraulic behavior of IRIS helical coil Steam Generators.

Reference: A. Cioncolini, A. Cammi, L. Cinotti, G. Castelli, C. Lombardi, L. Luzzi, M.E. Ricotti, "*Thermal Hydraulic Analysis of Iris Reactor Coiled Tube Steam Generator*", American Nuclear Society Topical Meeting in Mathematics & Computations (M&C), April 6-10, 2003, Gatlinburg, TN, USA

- ◆ **IRIS RELAP5 Nodalization for Preliminary Safety Analyses** – The RELAP5 code has been used in preliminary safety analyses, to provide an insight in the transient response of the plant and thus provide sufficient information for the development of IRIS Phenomena Identification and Ranking Tables (PIRTs).

Reference: D. Grgić, T. Bajs, L. Oriani, L.E. Conway, "Development of RELAP5 Nodalization for IRIS Non-LOCA Transient Analyses", American Nuclear Society Topical Meeting in Mathematics & Computations (M&C), April 6-10, 2003, Gatlinburg, TN, USA