



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

January 24, 2001

IRIS
1-1-01

MEMORANDUM TO: ACRS Members

FROM: P. Boehnert, Senior Staff Engineer 

SUBJECT: PROPOSED ADVANCED PLANT DESIGN - "IRIS"
(INTERNATIONAL REACTOR INNOVATIVE AND SECURE)

Attached is a set of slides from a presentation made to NRC staff representatives in November 2000 on the IRIS advanced nuclear power plant design. The IRIS design was one of the winning entries of DOE's solicitation to develop a new generation of reactor designs capable of satisfying four objectives: proliferation resistance, enhanced safety, improved economics, and reduced nuclear waste. IRIS is the result of the collaboration of an international consortium of vendors, universities and laboratories (Figure 7)¹.

Some key aspects of the IRIS design include:

- Modular LWR (100-300 MWe), integral primary system (SGs located in-vessel), accident initiators prevented by design (so-called "Generation IV" (Figure 23) reactor design).
- Proliferation resistant design (8-year straight-burn core - 70 GWd/t average discharge burnup - Figure 19, fuel delivered and taken back by the Consortium, (minimum) four-year run before maintenance, high-proliferation-resistant fuel used (LEU or high-burnup MOX).
- "Safety by design" approach uses design features to negate physical occurrences of most accidents. Passive systems used to counteract accidents which can still occur; for example: integral reactor vessel (RCPs SGs, control rod drive lines, etc.) eliminates additional sources of vessel ruptures, high containment pressure design (220 psig - Figures 31-33) mitigates LOCA phenomena. Analyses of "worse-case" accidents have shown substantial margin to core uncover (Figures 35-42).

¹ Figure number located in bottom left-hand corner of the slides.

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- The economic design objective is to be competitive with fossil generation costs at ~ 3 cents/kWh (Figures 44-46).
- Westinghouse projects that the first IRIS module plant could be deployed in 2010.

Also attached is an excerpt from a recent issue of "Inside NRC" that discusses the Agency's plans to begin rulemaking in anticipation of new plant orders. Aside from the possibility of an IRIS design submittal, mention is also made of a possible license application submittal for a pebble-bed reactor by the Exelon Corporation², pending results of the expected construction of this plant design in South Africa.

Attachments: As Stated

cc: R. Savio

cc w/o attach (via E-mail):

J. Larkins

J. Lyons

S. Duraiswamy

ACRS Technical Staff & Fellows

² Exelon owns an interest in the South African pebble bed reactor project.