

First Quarterly Report Contract No. DE-FG03-99SF21901/A000
"The Secure Transportable Autonomous Light Water Reactor – STAR-LW"

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Administrative

Because of program startup inevitable delays, this first quarterly progress report covers four months, from September to December 1999. Consequently, the subsequent report will cover only two months, January-February 2000 and we'll set on a regular quarterly basis in March 2000.

The major effort was to expand the international basis of the program in line with DOE objective of encouraging international participation to NERI programs and with our belief that development of a new reactor concept must rely on a vast international basis to be successful. We have been able to add major international partners and following is the current list of participating organizations and their lead representative. Organizations are listed in the order they joined the team.

Westinghouse Science & Technology (W)	USA	M. D. Carelli
Polytechnic of Milan (POLIMI)	Italy	C. L. Lombardi
Massachusetts Institute of Technology (MIT)	USA	N. E. Todreas
University of California at Berkeley (UCB)	USA	E. Greenspan
Japan Atomic Power Company (JAPC)	Japan	R. Yamazaki
Mitsubishi Heavy Industries (MHI)	Japan	A. Nagano
Commissariat a l'Energie Atomique, Cadarache (CEA)	France	P. Dumaz
British Nuclear Fuels plc (BNFL)	UK	T. Abram
Tokyo Institute of Technology (TIT)	Japan	H. Ninokata

The first four organizations comprise the initial team which prepared the NERI proposal. An invitation to join was extended to CNEA, Argentina and it was declined, at least for the present time. Some degree of interest in participating has been expressed by CRIEPI and JAERI in Japan and by the University of Pisa in Italy. Informal conversations have been initiated with EURATOM.

In recognition of its international stature, this program has been renamed IRIS (International Reactor Innovative and Secure) and it will be referred to in the future as the "IRIS Program".

This change of name also underlines the abandonment of the STAR concept, a logical conclusion of the fact that out of the four STAR reactors proposed this was the only one accepted. Thus, the IRIS Program is intended to run for the full three years without any distinction of Phases I and II and no downselection after 18 months as in the original STAR-LW proposal.

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Technical

Task 0, Definition of Objectives, was completed and a list of IRIS development objectives (attached to this report) was sent on November 30, 1999, to DOE (email to F. Ross) for review and concurrence.

Work was initiated on the following tasks:

Task 1a. This task was redefined to focus on the neutronics design. It was decided that the fissile material will be Pu, to address the plutonium disposition concern. Two designs are carried in parallel, a metal (led by UCB) and an oxide (led by CEA) fuel.

Task 1b. This task was renamed "Materials investigation" to address also the fuel issues, no longer in Task 1a, in addition to the cladding. An assessment of candidate cladding materials was initiated.

Task 1c. Before initialing the investigation of novel fuel rod geometries, it was decided to perform an assessment of the thermal hydraulic behavior of traditional cylindrical rods in a triangular pitch array. This will provide a baseline design as well as a reference point of comparison for alternate geometries.

Task 2c. A preliminary layout of the in-vessel configuration was prepared by POLIMI for the case of full natural circulation, based on NILUS experience. An alternative layout representing mixed convection (i.e., including primary pump) is being performed.

A paper was prepared for presentation at the ICONE8 Conference in April 2000 in Baltimore, USA.

Meetings

Three conference calls involving USA and European members were held. Minutes of these calls were prepared and sent to all team members. They can also be sent to the DOE technical contact, if so desired.

A try at a video conference between W and the Japan team members was unsuccessful; it will be tried again in January.

A meeting between CEA and POLIMI was held at Cadarache, France, on December 8, 1999. A meeting between Westinghouse at MHI was held at Pittsburgh on December 2, 1999. A meeting between Westinghouse and TIT was held during the ANS meeting at Long Beach, CA, on November 21, 1999.