

Town Meeting on IFE Liquid Wall Chamber Dynamics
May 5-6, 2003
Hilton Garden Inn
2801 Constitution Drive, Livermore, CA 94550

(a satellite of the ARIES Project Meeting)

The ARIES program organizes town meetings to provide a forum for discussions between scientists from enabling technologies and power plant studies.¹ Town meetings help guide R&D programs to develop solutions to future problems identified from design studies and help design studies evolve conceptual designs on a technology basis that is consistent with the understanding of the scientists investigating those technologies. In short, town meetings are aimed as a focused venue for flow of information between the enabling technology and advanced design programs.

The behavior of liquid wall concepts under the IFE threat spectra is being addressed as part of the ARIES-IFE effort. The effort on thin liquid wall concepts is being concluded and the current focus is on thick liquid wall concepts. This is also an important R&D area being investigated under the VLT-IFE umbrella. Several issues have been identified and characterized to various degrees, mostly in relation to the liquid wall behavior under the IFE threat spectra and the ensuing clearing process dictating the chamber environment prior to the next shot. In this regard it is important to understand the factors affecting the time required for liquid wall chambers to return to conditions that allow target injection and tracking and heavy ion beam propagation and focusing for the next shot (e.g., target threat, chamber geometry, etc.). However, due to the complex nature of processes involved, it is difficult to arrive at a full understanding of the different mechanisms involved. It seems timely to organize a town meeting on this subject to help researchers working in this field arrive at a better understanding and appreciation of the basic processes involved, of the different results obtained and of the range of modeling and experimental activities currently being carried out.

The major objective of the meeting is to bring together experts in the above areas to identify the major issues, share the latest results, understand better the accuracy of (and any differences among) various modeling predictions and, through discussions, to help focus future analysis and R&D efforts. These town meetings are intended to foster a productive and focused exchange of information and a solid block of discussion time will be provided following presentations on each topic. These discussions will focus on the major issues and on what is missing between today's experimental and modeling efforts and information required to address these issues for designing future power plant systems. It is hoped that these discussions will help to envision how the required R&D activities would fit together in an overall program. The focus will be on the following topics:

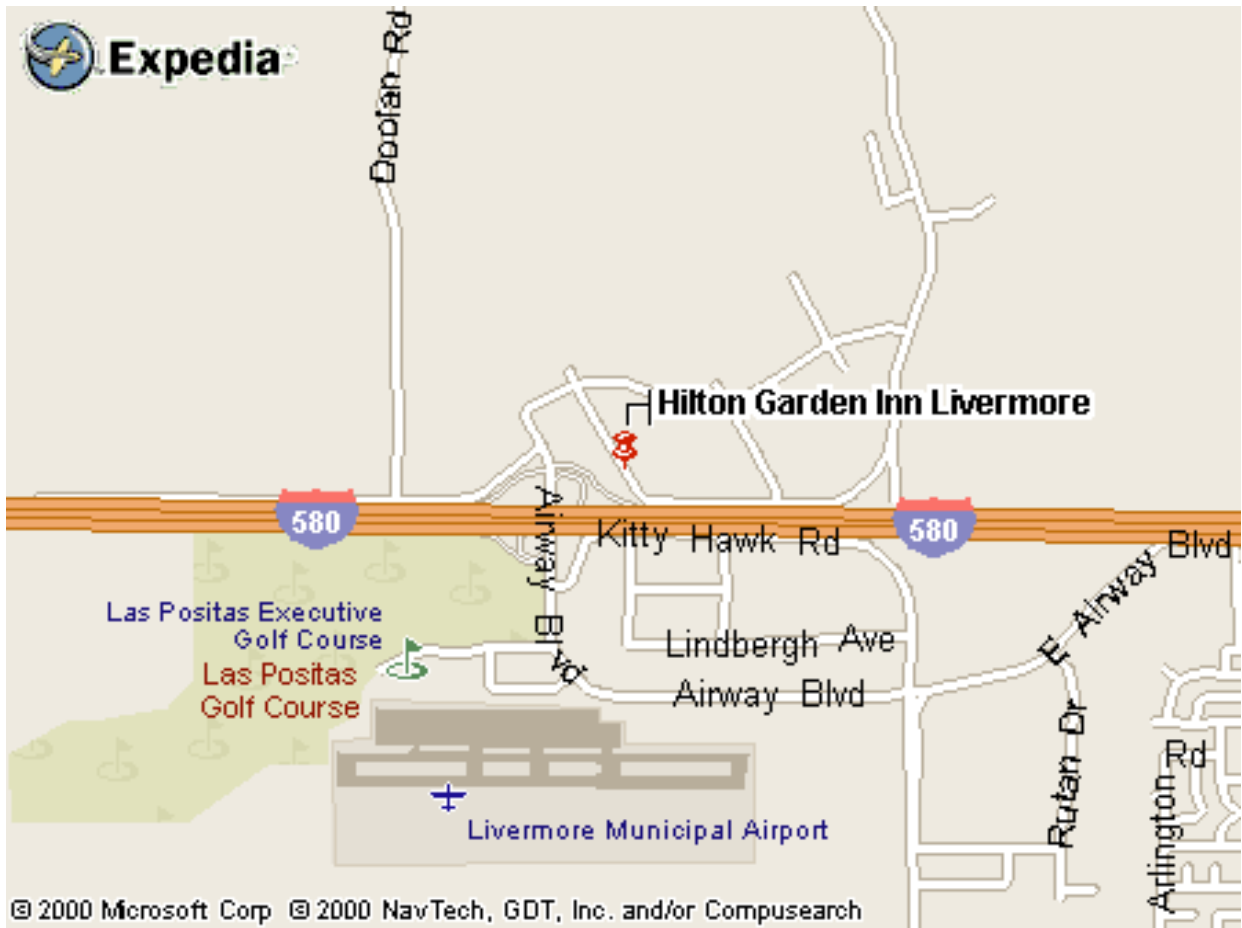
¹ The last two town meetings were held in 2000 and 2001 on the topics of SiC_p/SiC composites and tritium, respectively and enjoyed good participation including a strong international presence in the former case (see: <http://aries.ucsd.edu/LIB/MEETINGS/0103-ARIES-TTM/> and <http://aries.ucsd.edu/LIB/MEETINGS/0001-SiCSiC/>).

1. IFE Target Threats
 - X-rays, ions and neutrons (spectra, pulse width, time-of-flight spreading)
2. Constraints
 - Target injection and tracking
 - Heavy ion beam propagation and focusing
3. Chamber/Liquid Wall Dynamics Under Threats (short term, $\sim \mu\text{s} - \text{ms}$)
 - Early chamber dynamics
 - X-ray and ion attenuation/reradiation
 - Vapor shielding of ions
 - Evolution of density and temperature
 - Liquid wall response to threats
 - Explosive boiling
 - Spalling
 - Induced shock
 - Isochoric neutron heating
 - Jet response (possible breakup and drop formation)
 - Possible dry out for thin film
4. Chamber/Liquid Wall Dynamics (long term, to $\sim 0.1 \text{ s}$)
 - Chamber clearing mechanisms
 - In-flight-condensation
 - Aerosol and droplet formation
 - Film condensation
 - Aerosol behavior
 - Chamber conditions prior to next shot
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 - Liquid re-establishment
 - Full recovery of jet flow configuration for thick liquid wall
 - Multi-jet stability
 - Possibility of droplet formation
 - Nozzle requirements
 - Thin liquid film re-establishment
 - Injection methods (radial or tangential)
 - Film stability and coverage

Dr. Wayne Meier of LLNL and Dr. René Raffray of UCSD are the meeting organizers. The meeting will be held at the Hilton Garden Inn Hotel in Livermore over one and a half day (May 5 and 6, 2003). We believe that IFE liquid wall issues are important for both near term R&D programs and also for the attractiveness of IFE liquid wall configurations for power plants. For this reason, we will like to invite you, and/or your colleagues, to attend this town meeting.

Distribution List:

Said Abel-Khalik	Georg.Tech.	said.abdelkhalik@me.gatech.edu
Charlie Baker	UCSD	cbaker@ucsd.edu
Sam Berk	OFES	Sam.Berk@science.doe.gov
Riccardo Bonazza	UW	bonazza@engr.wisc.edu
Patrick Calderoni	UCLA	patcal@fusion.ucla.edu
Debbie Callahan	LLNL	callahanmiller1@llnl.gov
Christophe Debonnel	UCB	debonnel@nuc.berkeley.edu
Laila El-Guebaly	UW	elguebaly@engr.wisc.edu
Dan Goodin	GA	dan.goodin@gat.com
Ahmed Hassanein	ANL	hassanein@anl.gov
Don Haynes	UW	dahaynes@facstaff.wisc.edu
Jeff Latkowski	LLNL	latkowski1@llnl.gov
John Lindl	LLNL	lindl1@llnl.gov
Grant Logan	LLNL	BGLogan@lbl.gov
Wayne Meier	LLNL	wmeier@llnl.gov
Ralph Moir	LLNL	moir1@llnl.gov
Neil Morley	UCLA	morley@fusion.ucla.edu
Farrokh Najmabadi	UCSD	najmabadi@fusion.ucsd.edu
Gene Nardella	OFES	Gene.Nardella@science.doe.gov
Craig Olson	SNL	clolson@sandia.gov
Al Opdenaker	OFES	Albert.Opdenaker@science.doe.gov
Bob Peterson	LANL/UW	rrpeter@engr.wisc.edu
Per Peterson	UCB	peterson@nuc.berkeley.edu
Ron Petzoldt	GA	ronald.petzoldt@gat.com
Rene Raffray	UCSD	raffray@fusion.ucsd.edu
Susana Reyes	LLNL	reyessuarez1@llnl.gov
Roman Samulyak	BNL	rosamu@bnl.gov
Phil Sharpe	INEEL	SHARJP@inel.gov
Dai-Kai Sze	UCSD	sze@fusion.ucsd.edu
Mark Tillack	UCSD	mtillack@ucsd.edu
Alice Ying	UCLA	ying@fusion.ucla.edu
Minami Yoda	Georg.Tech.	minami.yoda@me.gatech.edu
Simon Yu	LBNL	ssyu@lbl.gov
Les Waganer	Boeing	lester.m.waganer@boeing.com
Dale Welch	MRC	drwelch@mrcabq.com
Mofreh Zaghoul	UCSD	zaghoul@fusion.ucsd.edu



Hilton Garden Inn
2801 Constitution Drive
Livermore, CA 94550

Tel: 1-925-292-2000
Fax: 1-925-292-2001

HOTEL DIRECTIONS:

From all airports get directions to I-580 East.
Take I-580 East to Airway Blvd exit in Livermore

Expanded view maps on the following page.

