Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Phase-Change Modelling in Severe Nuclear Accidents[1] CHRISTOPHER PAIN, DIMITRIOS PAVLIDIS, ZHIHUA XIE, JAMES PERCIVAL, Imperial College London, JEFFERSON GOMES, University of Aberdeen, OMAR MATAR, MOJI MOATAMEDI, Imperial College London, ALI TEHRANI, Office for Nuclear Regulation (UK), ALAN JONES, PAUL SMITH, Imperial College London — This paper describes progress on a consistent approach for multi-phase flow modelling with phase-change. Although, the developed methods are general purpose the applications presented here cover core melt phenomena at the lower vessel head. These include corium pool formation, coolability and solidification. With respect to external cooling, comparison with the LIVE experiments (from Karlsruhe) is undertaken. Preliminary re-flooding simulation results are also presented. These include water injection into porous media (debris bed) and boiling. Numerical simulations follow IRSN's PEARL experimental programme on quenching/re-flooding.

[1]The authors wish to thank Prof. Timothy Haste of IRSN. Dr. D. Pavlidis is funded by EPSRC Consortium "Computational Modelling for Advanced Nuclear Plants," grant number EP/I003010/1.

James Percival
Imperial College London

Date submitted: 28 Jul 2014 Electronic form version 1.4