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Demonstrating the Physics Basis for the ITER 15 MA Inductive Discharge on Alcator C-Mod C.E. KESSEL, PPPL, S.M. WOLFE, I.H. HUTCHINSON, J.W. HUGHES, Y. LIN, Y. MA, PSFC-MIT, D.R. MIKKELSEN, F. POLI, PPPL, M.L. REINKE, S.J. WUKITCH, PSFC-MIT — Rampup discharges in C-Mod, matching ITE's current diffusion times show ICRF heating can save V-s but results in only weak effects on the current profile, despite strong modifications of the central electron temperature. Simulation of these discharges with TSC, and TORIC for ICRF, using multiple transport models, do not reproduce the temperature profile evolution, or the experimental internal self-inductance li, by sufficiently large amounts to be unacceptable for projections to ITER operation. For the flattop phase experiments EDA H-modes approach the ITER parameter targets of q95=3, H98=1, n/nGr=0.85, betaN=1.7, and k=1.8, and sustain them similar to a normalized ITER flattop time. The discharges show a degradation of energy confinement at higher densities, but increasing H98 with increasing net power to the plasma. For these discharges intrinsic impurities (B, Mo) provided radiated power fractions of 25-37%. Experiments show the plasma can remain in H-mode in rampdown with ICRF injection, the density will decrease with Ip while in the H-mode, and the back transition occurs when the net power reaches about half the L-H transition power. C-Mod indicates that faster rampdowns are preferable. *Work supported by US Dept of Energy under DE-AC02-CH0911466 and DE-FC02-99ER54512.*

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