1012-35-20   **Dan Gabriel Ghita*** (`dan.gabriel.ghita@gmail.com`), Str. N. Radian, Bloc U1, ap. 11, Targoviste, Targoviste, Romania, and **Constantin Ghita** (`constantin.ghita@gmail.com`), Str. N. Radian, Bloc U1, ap. 11, Targoviste, Romania. *Free boundary problem for the barbotage with inert gases.* Preliminary report.

We formulate a Stefan problem for a piezometric capacitym of the saturated zone during a barbotage process of molten metal. There are obtained the theoretical consequences of the directional evolution of the purificative fluid front and nonmetallic inclusions and of the dependence of the saturated zone geometry of the insufflated fluid. The directional barbotage expressed as an unilateral problem for the piezometric capacity of the saturated zone allows the introduction of some structural components: directional and rezidual piezometric capacities, which permite the control of the evolution of the gases saturated zone and the formulation of a variational equation with initial data. The weakness of the initial data regularity of the barbotage process allows the formulation an existence result of a weak solution. The regularization techniques permite to prove the existence result. In particular the weak solution is identified with a classical solution of the Stefan problem for the general case only locally, the weak solution can be identified with a classical one. (Received July 25, 2005)