CFD Analysis of Pot Room

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Introduction and background:

Reduction of fluoride emissions over roof from pot room is prioritized at Hydro Karmøy, both in AP18 and at KTP. While KTP has emissions under control, AP18 has seen a gradual increase in emissions over roofs in early 2021. The interplay between mechanical encapsulation of cells through good covers, collars, drain doors and the use of forced extraction, along with extraction volume and proper balancing of cells, forms the interface with gas purifier, the one that traps the exhaust gas from the electrolysis cells and therefore it is essential to keep the leakage area to a minimum.

Problem description and objective:

Hydro is interested determining the flow structure in the pot room, to find the optimum location for the HF monitor. To solve this, an exact and robust CFD model is needed, which will be controlled by a FLUENT model, created by Erik Manger. By comparing these two models, we can also determine if openFoam is as accurate as FLUENT.

Technology and Operational Support has already started evaluating the situation using Boreal HF laser and measured air velocity in the top of the pot room. The task will be to set up a model for one section in the pot room, containing 28 electrolysis cells, and evaluate the room to determine how the airflow moves

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