

## Computational Fluid Dynamics (CFD) Engineering Services for Fuel Assemblies

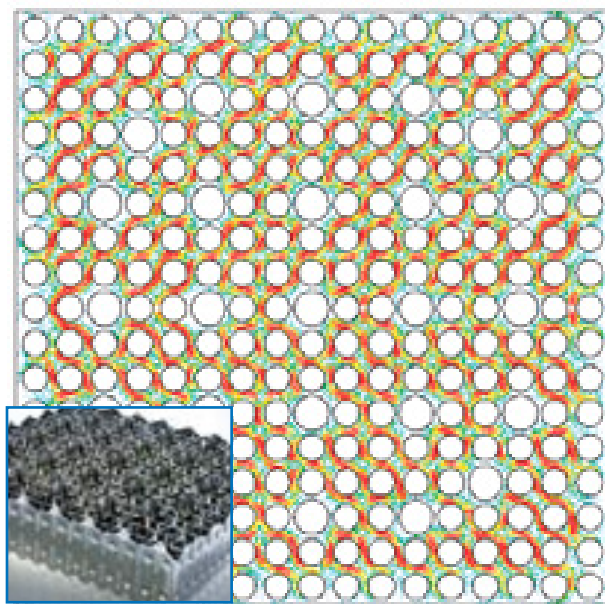
Framatome's CFD team can assist in inquiries posed by the licensing authorities, help assess your risks, or gain a better understanding of your operations

### CFD is a solution path for your current challenges

As licensing authorities increase scrutiny over changes in design or operations, it is cost-effective to use tools like CFD to address their concerns. Combining Framatome's expert nuclear knowledge with CFD allows Framatome to offer a full range of applications to assist in your needs.

### CFD and Nuclear

CFD engineering methodologies are advancing at an exponential rate for all industries, tackling full scale 3D steady or transient simulations using high-performance computing centers. CFD can solve a wide range of complex engineering problems that cannot be accurately solved by other analytical means or measurements. CFD methods in recent years have played a significant part in the design and analysis of nuclear components.



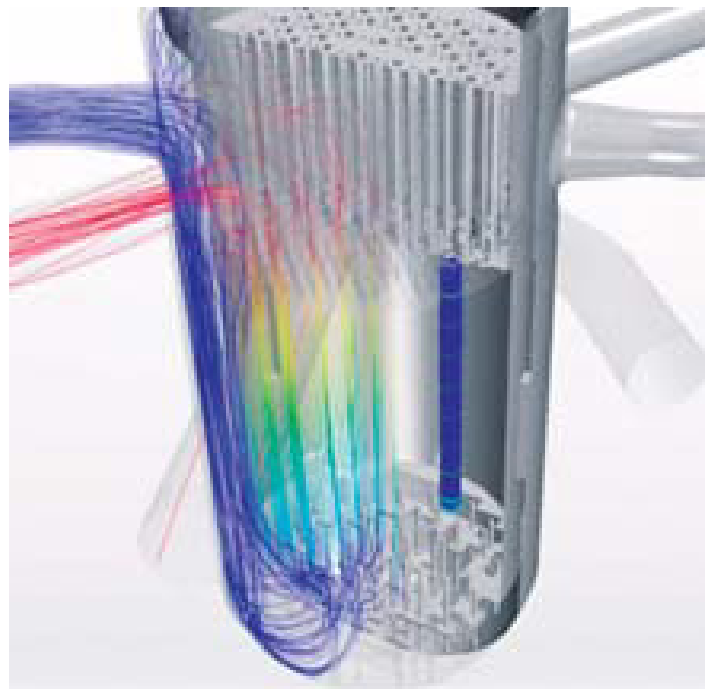
CFD analysis of the cross-flow downstream of a complete 17x17 PWR Spacer

### Features

CFD can assist in your engineering demands for example:

- Crud buildup
- Fuel rod bows
- Flow-induced Fuel Assembly (FA) vibrations
- Analysis of debris in FA
- Natural/forced convection of FA in storage

At Framatome, an important commitment when using CFD results is to have proper validation first. For example, validation work has been done for pressure drop, flow field (mixing), void generation/repartition, flow-induced vibrations and rod bow.



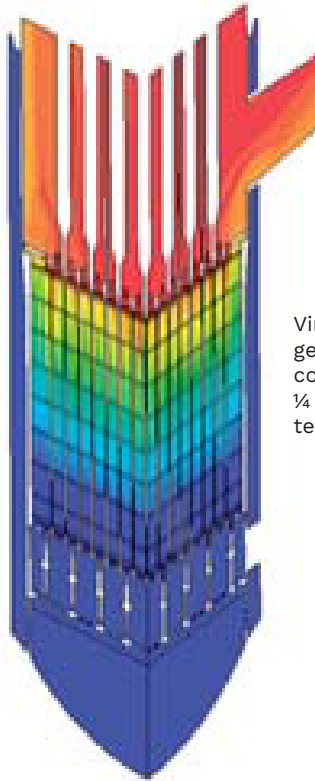
CFD analysis of fuel assembly behavior in a reactor core

**Your performance**  
is **our** everyday **commitment**

## Framatome's commitment to you:

It is our commitment for all engineering services projects to:

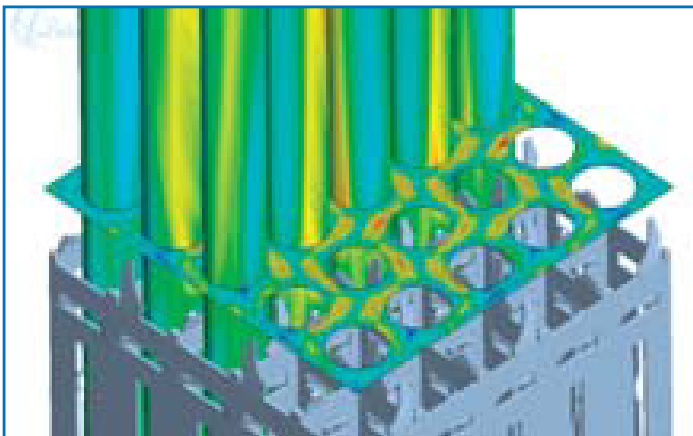
- Provide sound, quality assured engineering
- Use the latest and most advanced CFD methods and tools
- Provide validation of the CFD models based on the case of interest



Virtual Reactor to study real geometries at in-core operating conditions. Example at left is a  $\frac{1}{4}$  reactor core model showing temperature distribution.



CFD is used within Framatome to help develop and maintain our FA.



Section of a 5 x 5 full length FA, using Framatome's CFD Enhanced Boiling Framework, to show void on the rod surface and flow field in the cross-section

### Your benefits at a glance:

Framatome's CFD engineering services can assist in:

- Effectively addressing safety authorities requirements
- Increasing margins
- Assessing risks
- Diagnosing multi-physics problems and system interactions

#### Contact:

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