CAREM PROTOTYPE CONSTRUCTION AND LICENSING STATUS

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CAREM is a CNEA (Comisión Nacional de Energía Atómica) project.

This project consists on the development, design and construction of a small nuclear power plant.

First, a prototype of an electrical output of about 27 MW, CAREM 25, will be constructed in order to validate the innovation of CAREM concept and then developed to commercial version.

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Presidential Resolution 1107/2006

On the 24th August 2006, the president declares of national interest the construction and start up of CAREM prototype.

After several years of development the CAREM Project reached such a maturity level that the Argentine government decided the construction of CAREM prototype.
Several activities are ongoing with the purpose of obtaining the Construction License for CAREM Prototype.

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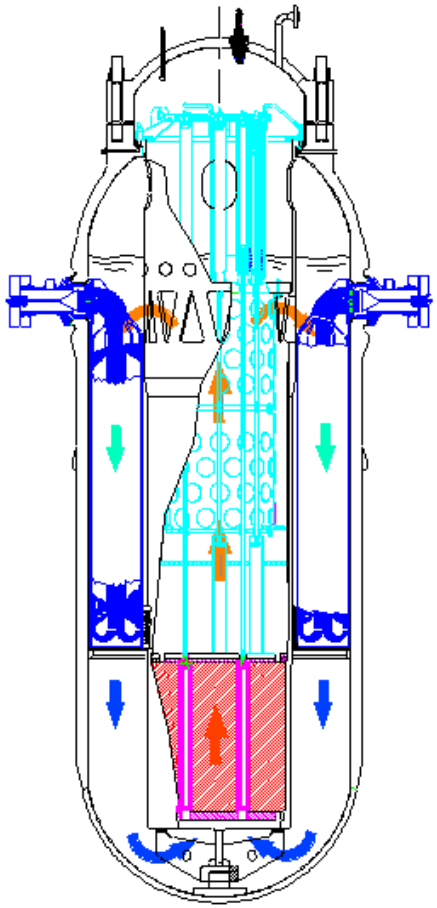
CAREM -25 Distintive Features



- Integrated primary cooling system
- Primary cooling by natural circulation
- Self-pressurized
- Safety systems relying on passive features

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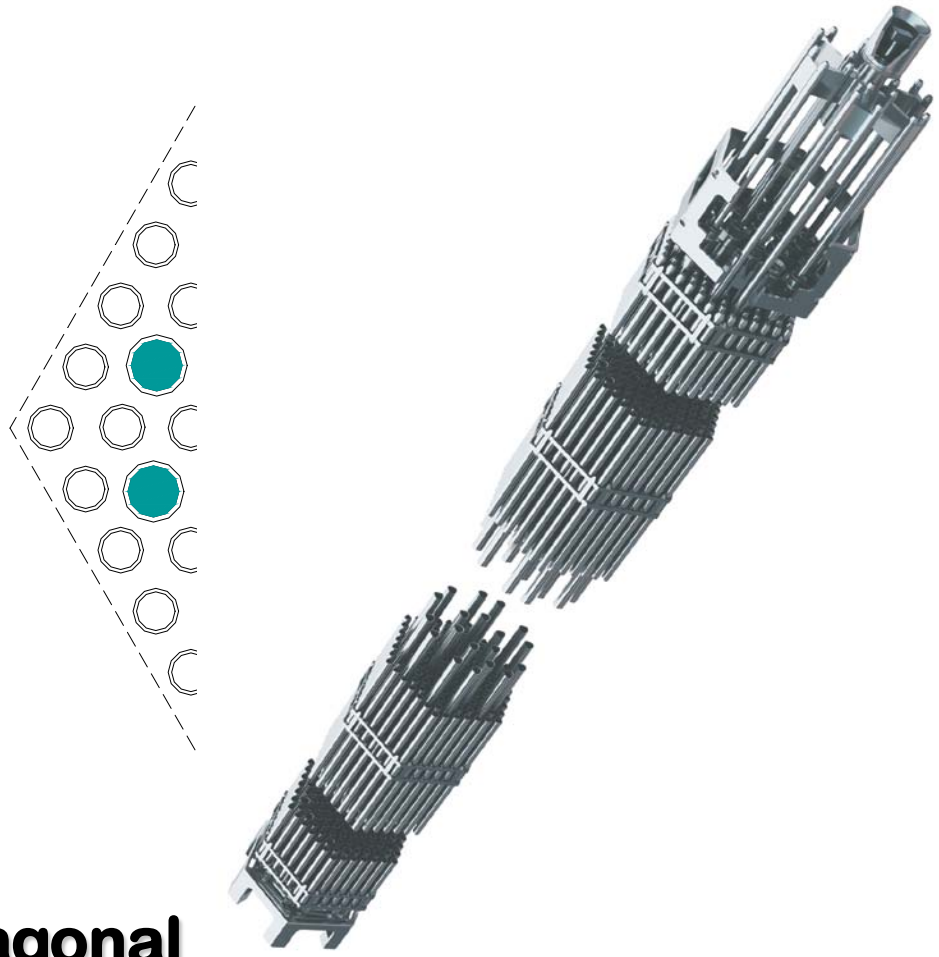
Core and Fuel Assemblies



- **Hexagonal**

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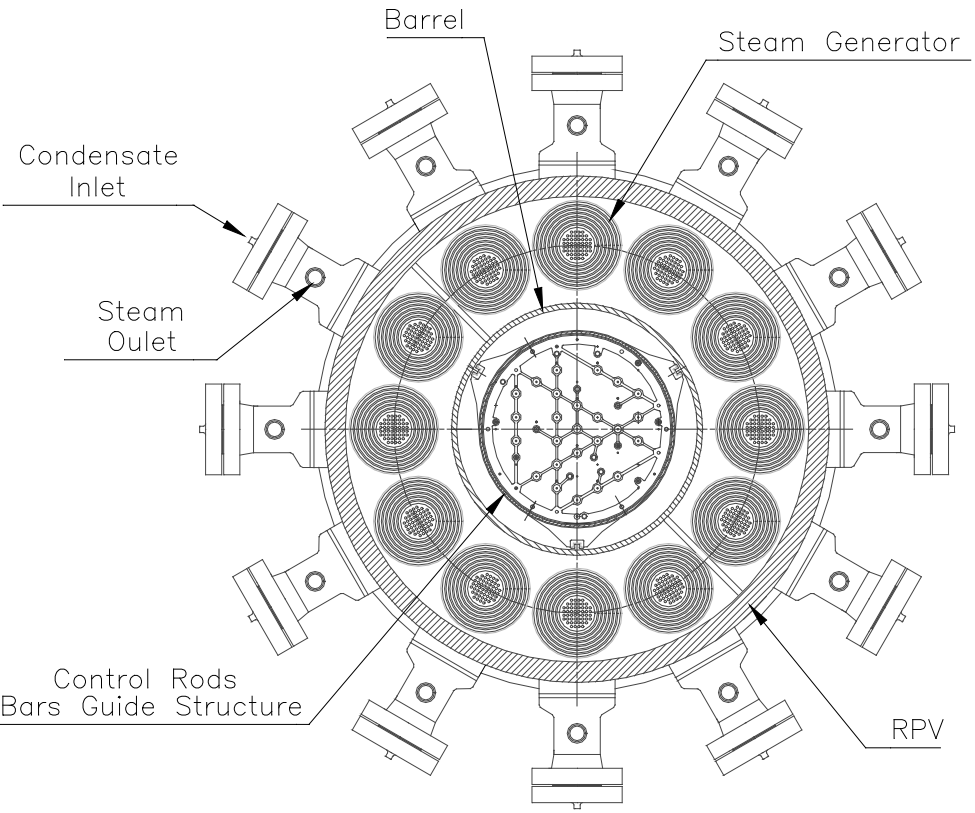
Steam Generation



- 12 identical “Mini-helical” vertical steam generators
- “Once-through” type
- Superheated steam

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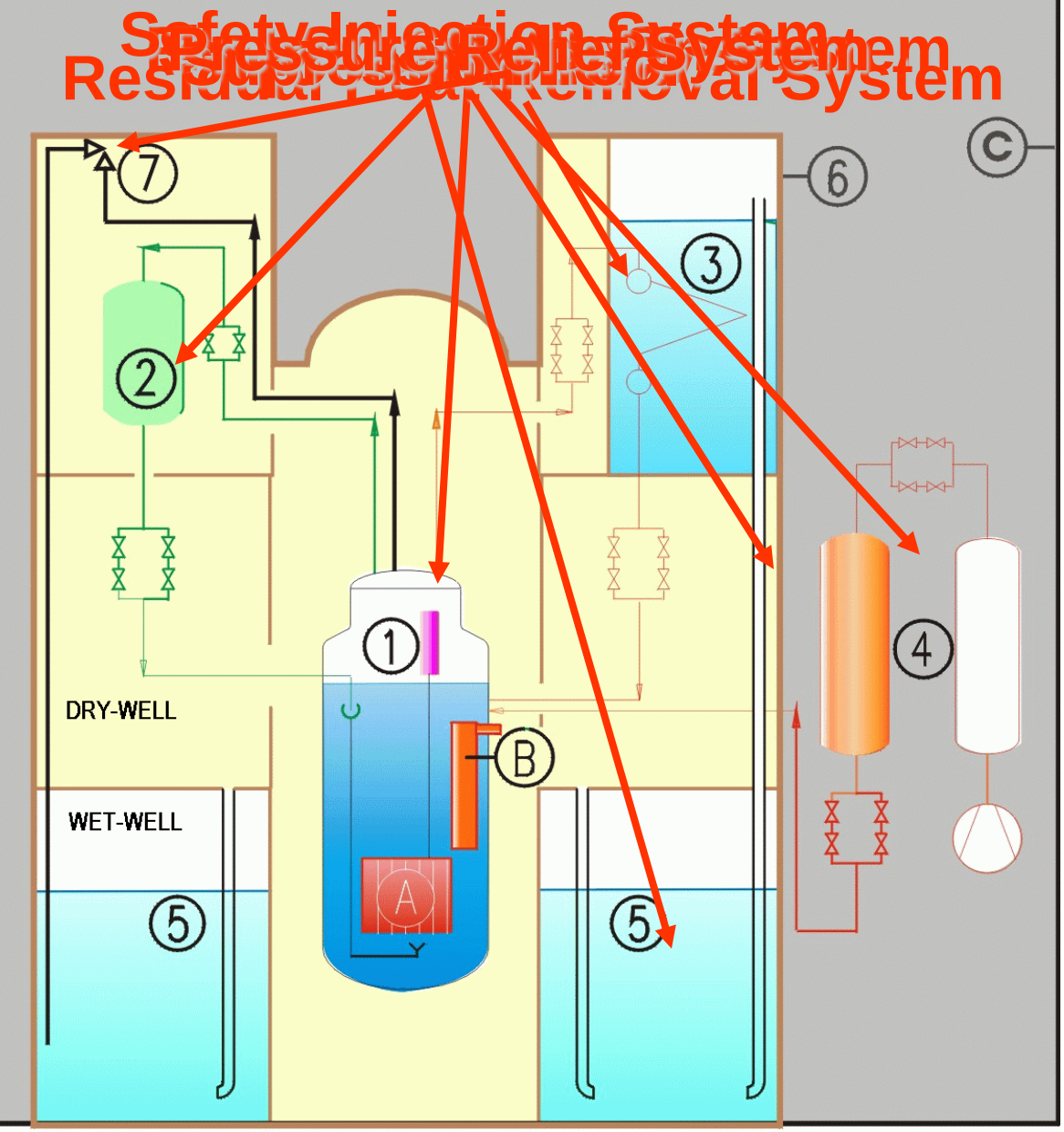

- Redundancy
- Independence
- Physical separation
- Diversification
- Safe failure

Containment and safety systems

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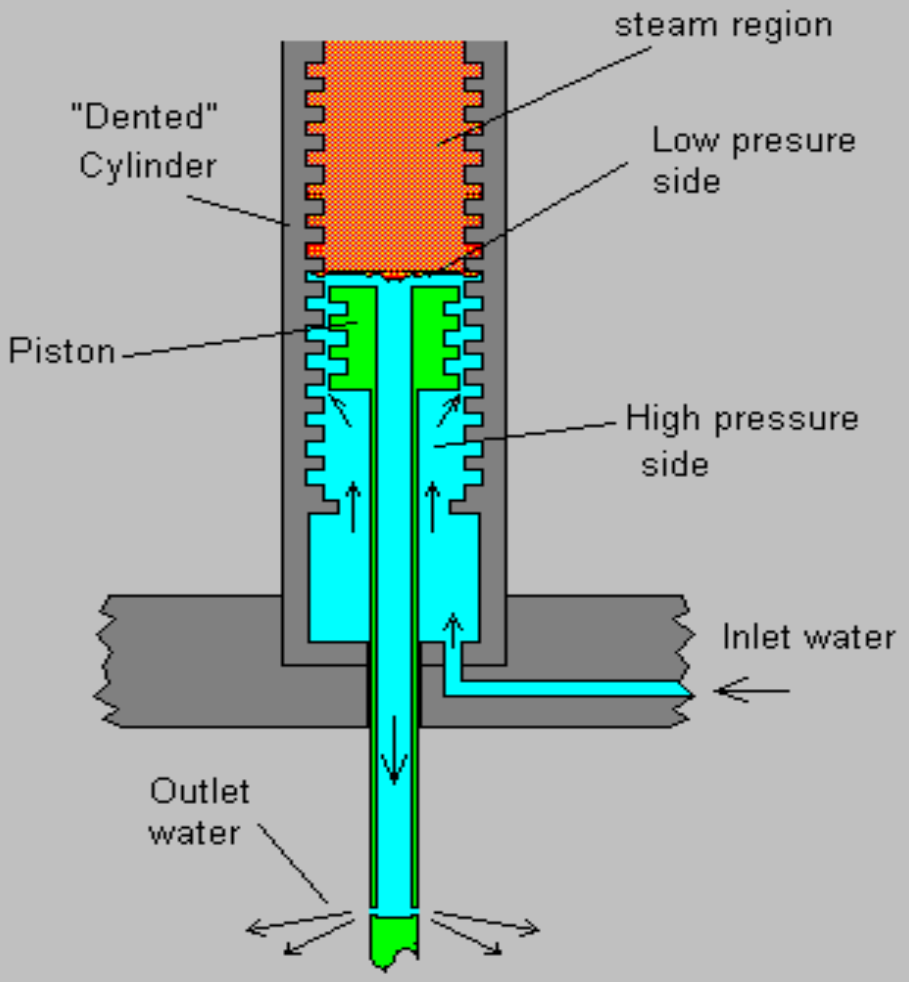
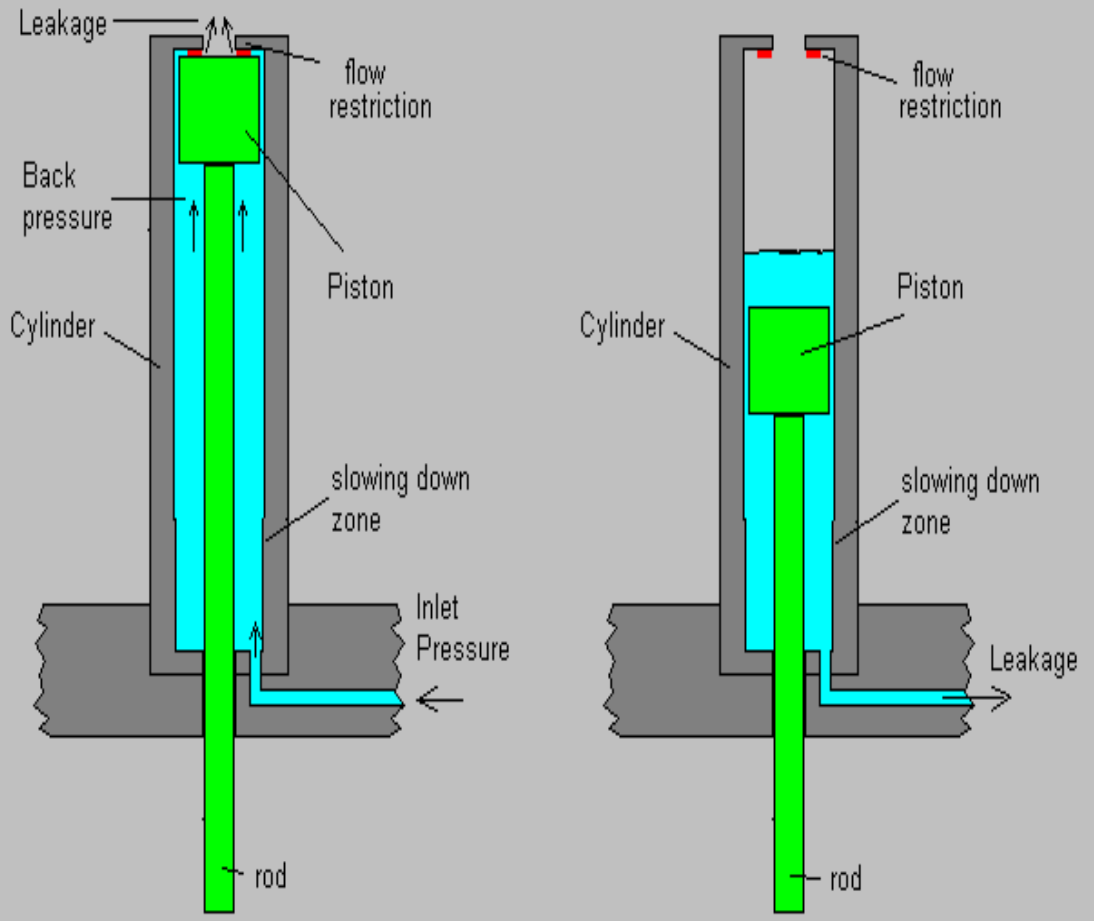


Hydraulic Control Rod Drive
Adjust and Control System
(Simplified Operating Diagram)

Hydraulic Control Rods Drives



Hydraulic Control Rod Drive - Fast Extinction System

(Simplified Operating Diagram)

Hydraulic Control Rods Drives

Construction and Licensing Status

The construction of a high pressure and high temperature rig for testing the innovative Hydraulic Control Rod Drive Mechanism will be finished next year.

This rig can also be adapted for testing the structural behaviour of the FA.

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Construction and Licensing Status

Several activities are ongoing with the purpose of obtaining the Construction License for CAREM Prototype.

The Preliminary Safety Analysis Report is under development in order to be presented by November this year.

Site activities such as soil studies and environmental analysis are being performed.

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Construction and Licensing Status

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Geotechnical Studies

Construction and Licensing Status

The Universidad Tecnológica Nacional - Facultad Regional Avellaneda (UTN-FRA) is performing the Enviromental Impact Study of CAREM reactor prototype.

The Agreement between CNEA and UTN-FRA was signed the 26 of february 2009.

Construction and Licensing Status

In the fuel area, both the fuel pellets and the FA itself are under development. Uranium dioxide, burnable poison oxide and the appropriate equipment for pellet manufacturing will soon be available. FA dummies that will be used to analyze mechanical integrity and test the behaviour under different flow conditions are under construction.

The use of robotics and the development of a plant simulator are included in the developments.

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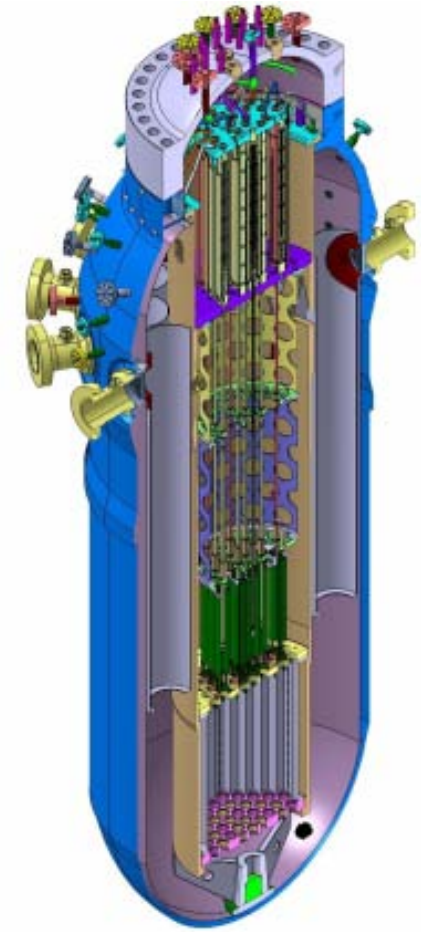
Construction and Licensing Status



Contracts and agreements are being taking with different Argentinean stakeholders to perform detail engineering.

The procurement process of main components, such as the RPV, is being started with local suppliers.

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Advantages of CAREM design

- No large LOCA
- The rod ejection accident is eliminated
- Large coolant inventory results in large thermal inertia and long response time
- Shielding requirements are reduced
- Very low fast neutron dose over the RPV wall
- The use of less active components increases plant availability and load factor, reducing the frequency and kind of initiating events.

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Conclusions

- CAREM is an indirect cycle reactor with some distinctive features that greatly simplify the design and contribute to a higher level of safety.
- Integrated primary cooling system, self-pressurized, primary cooling by natural circulation and safety systems relying on passive features.
- Therefore, many technical and economical advantages are obtained compared to conventional designs.

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Conclusions

- After several years of development the CAREM Project reached such a maturity level that the Argentine government decided the construction of CAREM prototype.
- Several activities are ongoing with the purpose of obtaining the Construction License for CAREM Prototype. The construction of the CAREM 25 is expected to be finished by the end of 2014.

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