



**NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"**

**RROG 2019 Meeting**

**COUNTRY PRESENTATION - GREECE**

**15 – 17 May 2019  
Mainz, Germany**

**INSTITUTE OF NUCLEAR & RADIOLOGICAL SCIENCES & TECHNOLOGY, ENERGY & SAFETY  
(INRaSTES)**

# RROG 2019 Meeting, 15 – 17 May, Mainz, Germany

## GRR-1 milestones

- AMF Atomics design
- First criticality: July 1961
- Last operation: July 2004
- HEU shipped to US end 2005
- 2004 – 2006: Refurbishment
  - replacement of the lead block shielding the thermal column
  - procurement of fission & ionization chambers
- 2005 – 2006: Conversion study HEU → LEU
- Planned to restart Fall 2006
- Decision for PCS replacement – started May 2009 – not completed
- Since 2013 GRR-1 formally in extended shutdown



## The GRR-1 fuel

- ❑ MTR-type fuel, silicide U-oxide

- ❑ Only LEU fresh & irradiated fuel with low burnup existed

(16 fresh & 22 irradiated Fuel Assemblies with burnup from 2 to 27%)

- ❑ **The existing nuclear fuel has been shipped to the USA to meet the May 2019 deadline** (political decision)

- ❑ Some of the fresh Fuel Assemblies will be loaded to the McMaster Research Reactor (Canada)

The GRR-1 fate

No clear decision taken about the future of the reactor

Most probable development (extremely high probability):

**Definite closure of GRR-1**

Greece risks to progressively lose the accumulated know-how

## Lessons learned

Process of phased depreciation of the Reactor until the "achievement" of its closure. Could be used to distinguish "early warning signals" of approaches leading to closure.

The process comprises an overstatement of unfounded arguments & a systematic ignorance of the positive ones.

Many arguments have been occasionally made by the political leadership of the Research & the Center's leadership.

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## Negative arguments 1/2

### The Reactor is old

**Comment:** May the year of commissioning be in 1961 but from then on

- ❖ The Reactor has been fully modernized,
- ❖ The frequent inspection of its accessible systems did not show any problems, and
- ❖ During Reactor's extended shutdown an examination for possible degradation due to ageing of the in-pool components that are not accessible during normal operation was performed, including:
  - The reactor pool liner
  - The core support structure
  - The PCS piping that crosses the pool liner & the concrete wall at the bottom of the reactor pool

### Findings:

- Important deformation of the lead block due to thermal creep caused by very high radiation level from Reactor core; some deformation of the core support structure too leading to slightly wrong alignment. **A new "creep resistant" lead block in an Al-case was procured**
- Liner in perfect condition (visual and ultra-sound inspection)
- PCS piping in excellent condition (visual and ultra-sound inspection)



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## Negative arguments 2/2

### **The Reactor is useless**

**Comment:** A self-fulfilling prophecy: depriving of the facility by the elementary means to produce work & then "punishing" it for inertia

### **The Reactor produces Argon and is dangerous**

**Comment:** The Reactor does not produce more Argon than the standard Open Pool Reactor. INSARR mission of the IAEA has not identified a problem

### **Re-running the Reactor requires money that does not exist**

**Comment:** Some limited funds were allocated for a while from the State budget & a proposal for re-commissioning was made by the Reactor staff at a cost that did not exceed the available amounts. The proposal was never discussed at the Center's Board of Directors while the available funds were spent on other needs

### **The Reactor does not focus on a scientific goal and proposes to deal with many issues**

**Comment:** This is the result of an assessment by Domestic Referees of the first proposal for inclusion in the list of major national research infrastructures. It was known that the evaluation committee included many nuclear physicists and no nuclear engineer while supported a similar proposal by the Institute of Nuclear Physics



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## Positive arguments

**The Reactor has a very good program & should be included in the list of Major Research Infrastructures of the Country in order to be substantially funded**

This was the result of an evaluation by foreign Evaluators of a second proposal of the Reactor for inclusion in the list of major National Research Infrastructures. The proposal was rejected secondarily by a Committee of unknown composition appointed by the Ministry of Research

**The Reactor is a national capital & must be supported in all ways with scientific & technical staff & State funding**

This was the conclusion of an International Commission proposal appointed by the Ministry of Research to evaluate Greek research Institutes. The evaluation result was completely ignored





# THANK YOU



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