Numerical simulation can be divided into several stages [4]:

1. formulation of the problem;
2. development of the model, the main elements of the object;
3. development of a mathematical model, i.e, creation algorithm calculation
4. conducting experiments using a specific calculation algorithm;
5. analysis, comparison of the results, conclusions.

The simulation process is similar to the results of a calculation method, and can bring the real conditions of COP operation which may allow to eliminate or prevent the consequences of potential accidents or other situations. It also allows to expand the field of knowledge about combustion chamber and to make a research for improvement units.

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COMPLEX OF TECHNOLOGIES FOR THE POWER-GENERATING EQUIPMENT ECO-FRIENDLY SHUTDOWN

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National power economy modernization requires an effective system for the power-generating equipment eco-friendly shutdown. The problem of the power unit's eco-friendly shutdown is very complicated. In this research there were selected two basis technologies and considered a possibility of their combined appliance.

Now let us proceed with the first technology. It is Nitrogen cryogenic system for hydrogen displacement from the cooling circuit of the turbine generator. Main subsystems of the nitrogen cryogenic system are the following:

1. liquefaction subsystem for the nitrogen generating and liquefaction
2. liquid nitrogen dividing subsystem for vapor recondensation
3. liquid nitrogen storage and gasification subsystem
4. liquid nitrogen continuous gasification subsystem with atmospheric evaporators

The principle structural scheme of such nitrogen cryogenic system with the Nitrogen-oxygen air-fractionating system:

1. average pressure compressor block with filter and aftercooler
2. air reversible heat exchanger
3. nitrogen turbo-expander
4. nitrogen heat exchanger
5. low pressure compressor block with aftercooler
6. gas receiver
7. block of the double rectification with acetylene filter–adsorber
8. retention basin for liquid
9. cold gasifier

It can provide the regional consumers with air-fractionating liquid products. That will allow accumulating required arrangements for power unit shutdown.

Second system is cryo gas system of the severing of the steamturbine equipment of decommissioned power units. The most optimum universal technology allowing severing of the structural materials on the open area is the flux-oxygen cutting and its modification—powder lancing. The maximum width of steels and alloys for fluxoxygen cutting is 400 mm and that for powder lancing is up to 1500 mm.

Flexibility of the types of the structural materials of the fluxoxygen cutting is provided due to the introduction of the flux into the cutting oxygen in the form of the fine granulated mixture of the iron and aluminum powder, after burning out the temperature in the cutting zone, increases up to 3500°C. The cutting of the highchromium, nickel chrome, heat proof and stainless steel, gray iron, nonferrous metals and alloys is carried out at such temperature mode.

The principle structural scheme of cryo gas system of the severing:

1. cold liquid oxygen gasifiers
2. cold gasifiers of the liquid nitrogen
3. tank with the liquid oxygen
4. tank with the liquid nitrogen
5. flask with combustible gas
6. pipes from carbon steel
7. flux feeder
8. reducing gear
9. oxygenflux cutter
10. cryo blasting unit by CO2 granules
11. nitrogen with granules
12. nozzlegun

13.container with CO2 granules

Cooperative usage of these systems for eco-friendly power-generating equipment shutdown will be more efficient, because nytrogen and oxygen, which are generated by the cryogenic system, can be used for the severing cryo gas system.

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DEFORMATION IN THE RBMK GRAPHITE STACKS

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NPP safety operation is one of the most important ways of the nuclear power engineering development. Therefore the graphite stacks deformation problem in the RBMK-1000 is the most relevant issue at the moment.

The graphite stack is the main RBMK-1000element. It is a neutron moderator and reflector. It consists of 2488 vertical graphite columns (blocks), which have height that is equal 7 m and its cross-section is 250x250 mm. Also the graphite stack contains fuel channels. [1]

Deformation in the graphite stacks is the cracks initiation and formation of fuel channels deflection. The deformation causes are the following:

- Temperature non-uniformity
- Crack initiation
- Pressure of cracked blocks on other blocks
- Additional deflection from center to the edge

There we have suggested two ways that can solve the above mentioned problem: