



РОСЭНЕРГОАТОМ

ПРЕДПРИЯТИЕ ГОСКОРПОРАЦИИ «РОСАТОМ»

# **Quality issues related to the equipment manufactured for NPPs. Technical requirements of the operating organization (TR OO)**

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## SITUATION WITH EQUIPMENT QUALITY AS OF BEGINNING OF 2011

Causes of approx. 80% of all reported operating events are equipment failures.

Annual underproduction due to equipment failures is 5–6 bln. kW-h, which is equal approx. 5–6 bln, roubles of lost profit.

Only from 6% to 55% of all equipment items manufactured pass successfully through the acceptance control (AC) on the first try at NPPs under construction (ref. to Novovoronezh-II, Leningrad-II, Rostov units 3&4, Beloyarsk-II NPPs)

Meanwhile, the supply volumes are:

- in 2011 – ca. 50 bln. roubles (ca. 30 bln. roubles – equipment of Safety Classes 1–3)

- in 2012 – ca. 70 bln. roubles (ca. 42 bln. roubles – equipment of Safety Classes 1–3)

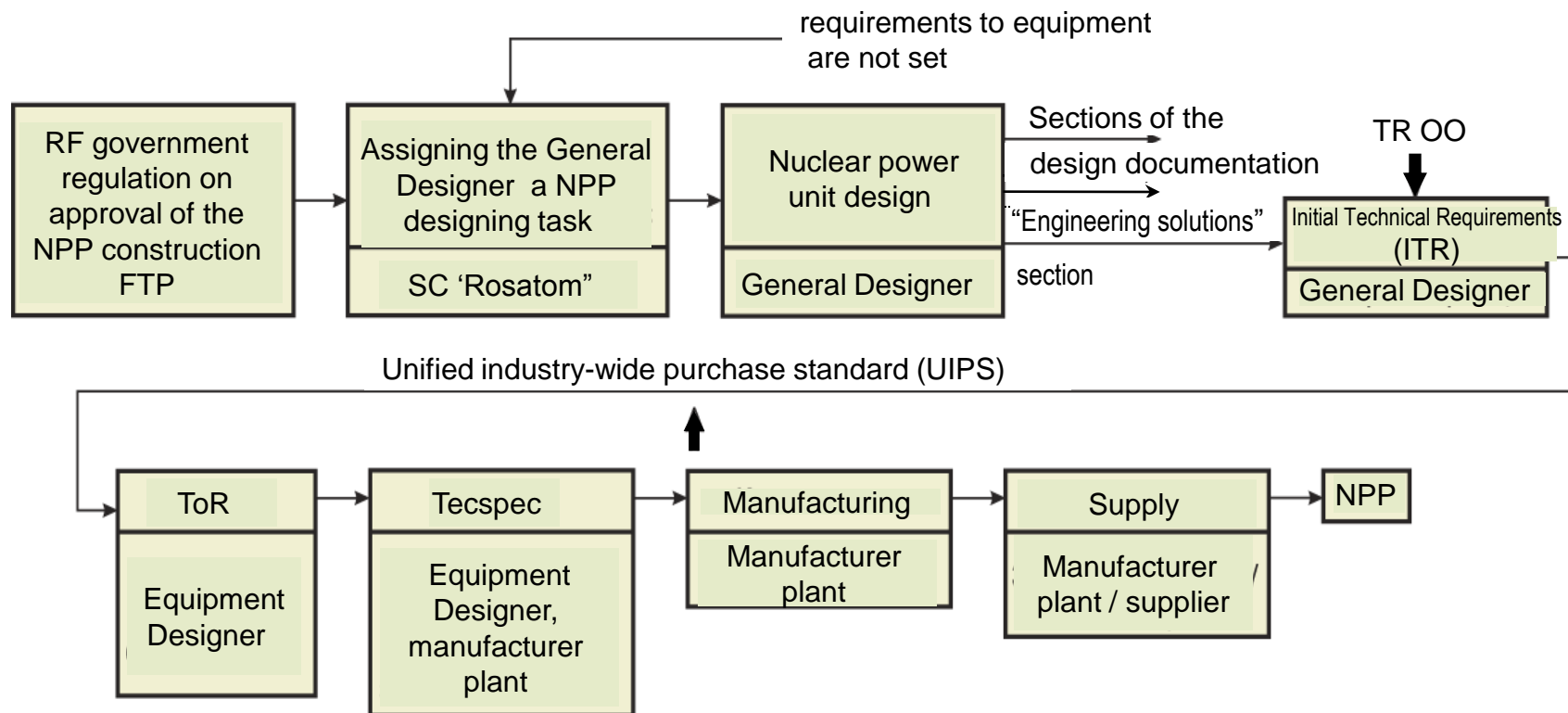
Equipment is manufactured at 400 - 500 plants (about 100 of them are foreign manufacturers).

The operating organization (OO) spent for the quality control:

- in 2010 – ca. 1.35 bln. roubles (DIs + Eng.Cos + ACs), including for Designated Institutions (DIs) – ca. 1.0 bln. roubles;

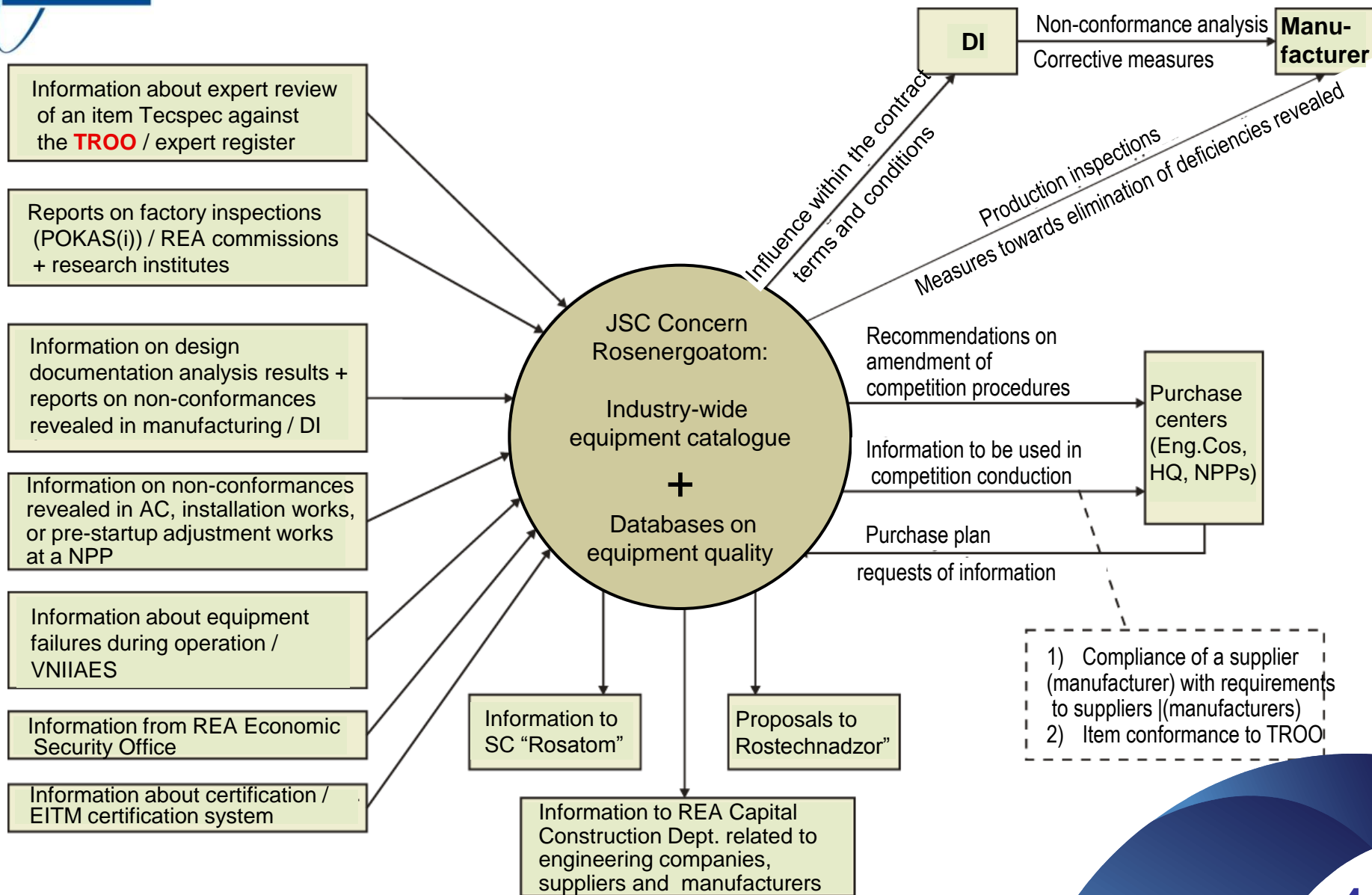
- in 2011 – ca. 1.5 bln. roubles (DIs + Eng.Cos + ACs), including for DIs - ca. 1.150 bln. roubles.

## PROCEDURE FOR NPP EQUIPMENT DEVELOPMENT AND MANUFACTURING



- ➔ **NEW** Within the UIPS:
- The first phase of competition – Expert reviewing of the Tecspec against the TROO reqs. + checking manufacturer capability to execute the order
  - The second phase of competition – price and terms

# SYSTEM OF MEASURES TOWARDS NPP EQUIPMENT QUALITY IMPROVEMENT



## **NOMENCLATURE OF TECHNICAL REQUIREMENTS OF OPERATING ORGANISATION (TR OO) FOR GROUPS OF EQUIPMENT**

1. Pipelines and pipeline components, pressure vessels.
2. Heat exchange equipment (including internals).
3. Valves.
4. Electric equipment.
5. I&C, automated means, computerized process control systems, data-computing networks, water chemistry control means.
6. Pumping equipment.
7. Turbine equipment.
8. Generator equipment.
9. Handling equipment and hoisting machines.
10. Chemical purification and water treatment equipment.
11. Vessels, tanks, reservoirs.
12. Compressors.
13. Diesel generators.
14. Climate control equipment (ventilators and air-conditioners).
15. Sealing systems (airlocks, doors)
16. Accident Confinement System equipment, sealed penetrations.
17. Reinforcing tendons.
18. Cable articles.
19. Firefighting devices and systems.
20. Communication and video control devices, technical guarding means.
21. Thermoinsulation.
22. Radiation protection equipment.

## TROO OUTLINE

### 1. General provisions

- 1.1. Purpose and application area
- 1.2. List of abbreviations
- 1.3. Terms and definitions
- 1.4. Quality assurance

### 2. Requirements to a particular equipment item

#### 2.1. Equipment item name

##### *2.1.1. Designing*

- 2.1.1.1. Requirements to the design and the main technical characteristics
- 2.1.1.2. Requirements to resistance to external influencing factors

##### 2.1.1.3. Seismic requirements

##### 2.1.1.4. Reliability indicators

##### *2.1.2. Manufacturing*

- 2.1.2.1. Materials and semi-manufactured articles

##### 2.1.2.2. Welding joints and surfacing

##### 2.1.2.3. Control

##### 2.1.2.4. Tests

##### 2.1.2.5. Completeness

##### 2.1.2.6. Labeling, preservation and packaging

##### 2.1.2.7. Requirements to documentation

##### 2.1.2.8. Transportation and storage

##### 2.1.2.9. Guarantee

#### *2.1.3. Assemblage and operation*

##### 2.1.3.1. General provisions

- 2.1.3.2. Periodicity and scope of maintenance and repair

- 2.1.3.3. Requirements related to taking into account operation time and repair records

##### 2.1.3.4. Allowable standby time without testing

##### 2.1.3.5. Technical safety

##### 2.1.3.6. Recommended decontamination options

##### 2.1.3.7. Life extension

## PHASES OF TROO INTRODUCTION

1. TROO inclusion into the “Index of the main existing normative documents regulating provisions for nuclear power unit safe operation”.
2. Creation of a section within the official website of the operating organization where full texts of TROO will be posted.
3. TROO incorporation into competition procedure (bid documentation).
4. TROO introduction in engineering companies, General Designer and Scientific Supervisor organizations.
5. TROO introduction in the manufacturing process (at manufacturer plants).
6. Proposals to Rostekhnadzor management regarding TROO inclusion into the “List of normative legal acts and regulatory documents related to the responsibility sphere of the Federal Service for Ecological, Technological and Nuclear Supervision” P-01-01 Section II “The State Regulation of Safe Use of Atomic Energy”.

# THE MAIN DIRECTIONS OF JSC CONCERN ROSENERGOATOM ACTIVITIES AIMED AT ACHIEVEMENT OF THE OPERATING ORGANIZATION GOALS IN THE QUALITY DOMAIN

