ROSATOM

STATE ATOMIC ENERGY CORPORATION "ROSATOM"

Rosatom Engineering & Construction Division

Ninh Thuan 1 NPP project implementation

ATOMEX-Asia 2014
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ASE-NIAEP

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1. Introduction

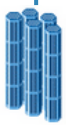
ASE-NIAEP

1.1 ASE-NIAEP – Engineering & Construction Division of Rosatom

Anniversary of Russian Nuclear Industry 2010

Uranium production

Uranium enrichment



Fuel fabrication

Power equipment manufacturing

NPP Design, Engineering and Construction

Electricity generation

Services and modernization

1.2 ASE-NIAEP' diversified business portfolio

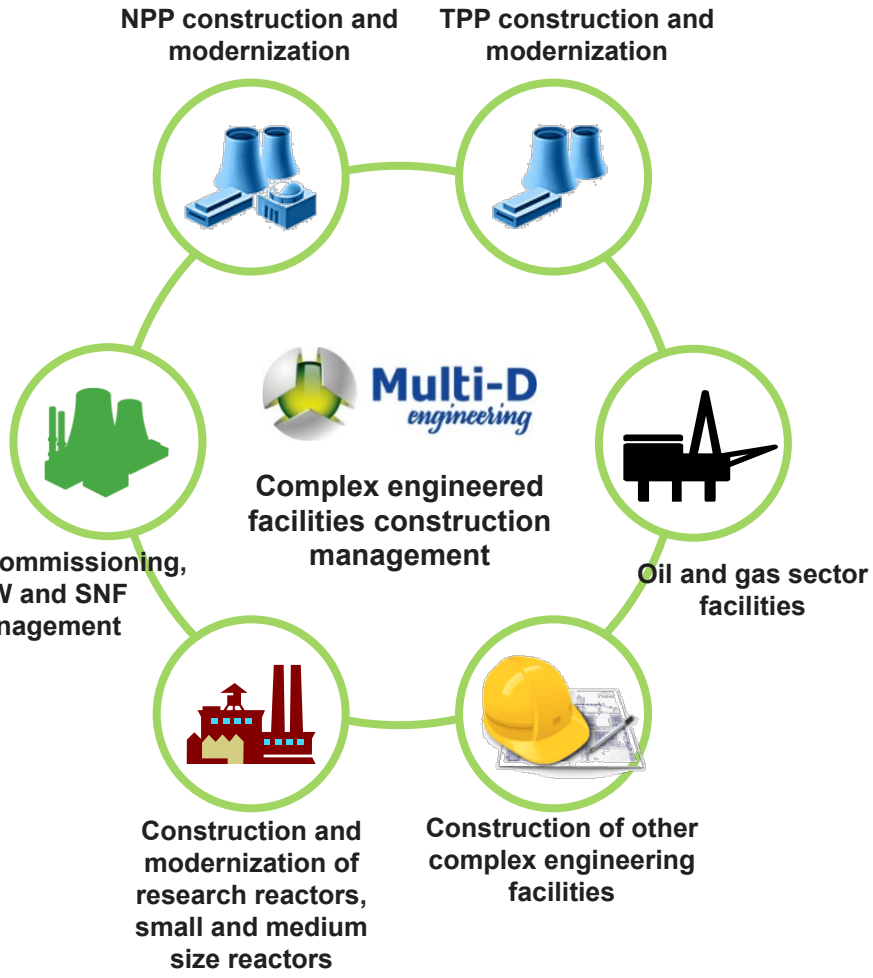
NIAEP-ASE

- **NPP Design, Engineering, Construction, Modernization**
- **TPP Design, Engineering, Construction, Modernization**
- **Waste & Spent Fuel Management, Decommissioning**
  NUKEM Technologies
- **SMR, Research Reactors & Scientific Centers**
- **Oil, Gas & Petrochemical facilities**
- **Project Management Consulting (PMC) Services**
  Multi-D engineering




1.3 Core competencies of ASE-NIAEP

- EPC, EPCM
- PMC
- Design
- Technical assistance
- Licensing
- Training
- Financing services

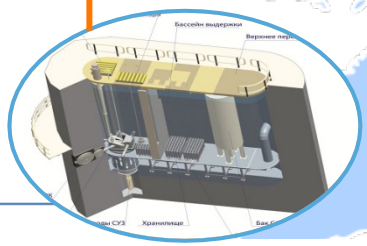


1.4 Global references and ongoing projects of ASE-NIAEP

NPP construction & modernization / servicing	TPP construction & modernization / servicing	RAW & SNF solutions, decommissioning	Construction & modernization of research reactors	PMC/Multi-D services
30 units	20 units	>100 large projects	>10 projects	Multi-D engineering
• Russia • Armenia • China • India • Iran • Slovakia • Turkey • Belarus • Bangladesh • Vietnam	• Russia	• Russia • Ukraine • Bulgaria • Czech Republic • Hungary • Lithuania • Germany • UK • France • South Africa • China • Japan • Italy • Switzerland • etc.	• Vietnam • Netherlands • South Africa • Russia	• Russia • Middle East • Asia
• VVER-1000 • VVER -1200 • VVER-TOI	• Coal-fired TPP • CCGT	• Treatment centers & storages for RAW, SNF • Engineering solutions • Turn-key decommissioning	• R&D centers • Research and isotope production reactors • Local solutions	• Oil & gas sector facilities • Construction and decommissioning of nuclear facilities

Overall installed capacity of power units by NIAEP-ASE up to now – 17 GW

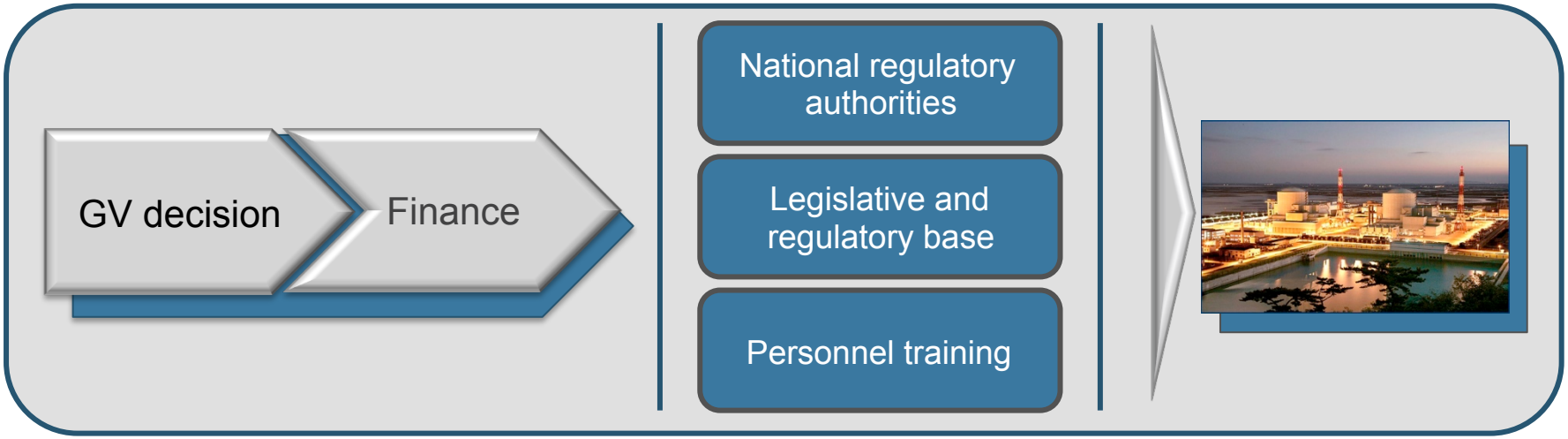



2. Atomic energy development

General approach to
the construction of the atomic industry
object

2.1 Required terms and conditions



1. Taking the critical decision on NPP construction by the government of the country
2. Determination of the source of financing for NPP construction
3. Establishing of national regulatory authorities in the field of the atomic energy industry
4. Elaboration of the legislative and regulatory base in the field of the atomic energy industry
5. Personnel training (the Owner of the plant, supervisory authority, technical personnel of the atomic energy facilities, scientific personnel)

2.2 Possibilities for country

1. Creation of a new industry, which supposes the following:
   - development of the industry on the basis of the cutting-edge technologies;
   - creation of new working places;
   - development of the technical and scientific potential;
   - education of scientific personnel.
2. Attraction of investments to the construction region
3. Modernization/development of the region infrastructure
4. Increasing of competitiveness of local companies in the world market due to competence development

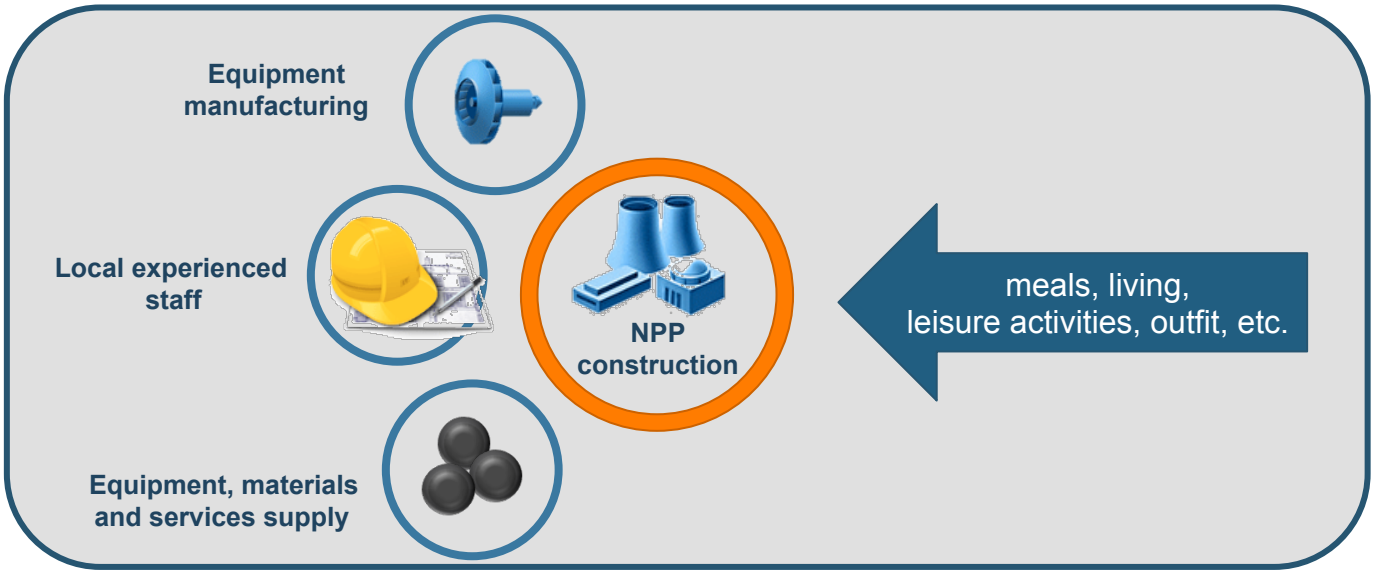
2.3 Possible areas for cooperation

In the course of NPP construction:

- localization of the equipment manufacturing;
- involvement of the local experienced staff;
- involvement of local suppliers of materials, equipment and services.

During the period of construction and operation:

- development of the package of services in the region (meals, living, leisure activities, outfit, etc.)



3. Ninh Thuan 1 NPP

Project implementation

3.1 Basis for cooperation under the Project

Russian-Vietnamese cooperation in Ninh Thuan 1 NPP construction shall be implemented on the following basis:

- Agreement on cooperation in nuclear power plant construction in the territory of the Socialist Republic of Vietnam between the Government of the Russian Federation and the Government of the Socialist Republic of Vietnam dated October 31, 2010;
- Agreement on extension of the Russian state credit for construction of the first Vietnamese NPP between the Government of the Russian Federation and the Government of the Socialist Republic of Vietnam dated November 21, 2011.

3.2 Frame of the Project

JSC Atomstroyexport is responsible for NPP construction on “the turn-key” basis, including design, development and supply of the equipment and materials, execution of construction works, erection and adjustment of the equipment, NPP commissioning as well as for training of the NPP operating staff.

On Phước Dinh site in Ninh Thuan province it is planned to construct NPP composed of two power units with VVER-1200 reactor plants.

In future it is supposed to be constructed two more Russian design power units on the same site.

3.3 Arrangements implementation

For substantiation of Ninh Thuan 1 NPP construction in 2011 a contract for elaboration of the Feasibility Study was signed between the customer of Ninh Thuan 1 NPP construction (EVN) and independent Company JSC «E4 Group».

In October 2014 the elaborated FS was submitted to EVN.

On FS:

- the most contemporary Russian design – AES-2006 has been proposed as the basic one;
- schedule for implementation of the project has been proposed;
- the cost of the plant construction has been estimated.

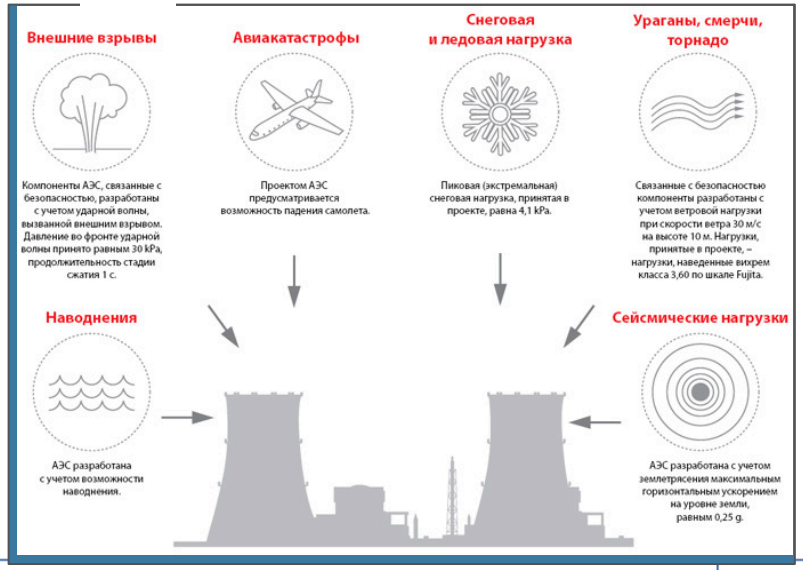
3.4 Customer's selection of the basic technology

In the period between 2013 and 2014 in Hanoi and in Ninh Thuan province seminars due to the efforts of State Corporation Rosatom organizations have been held, where AES-91, AES-92, AES-2006 designs developed by Moscow and St.-Petersburg design institutes have been presented, and substantiation documents on Russian design projects have been elaborated.

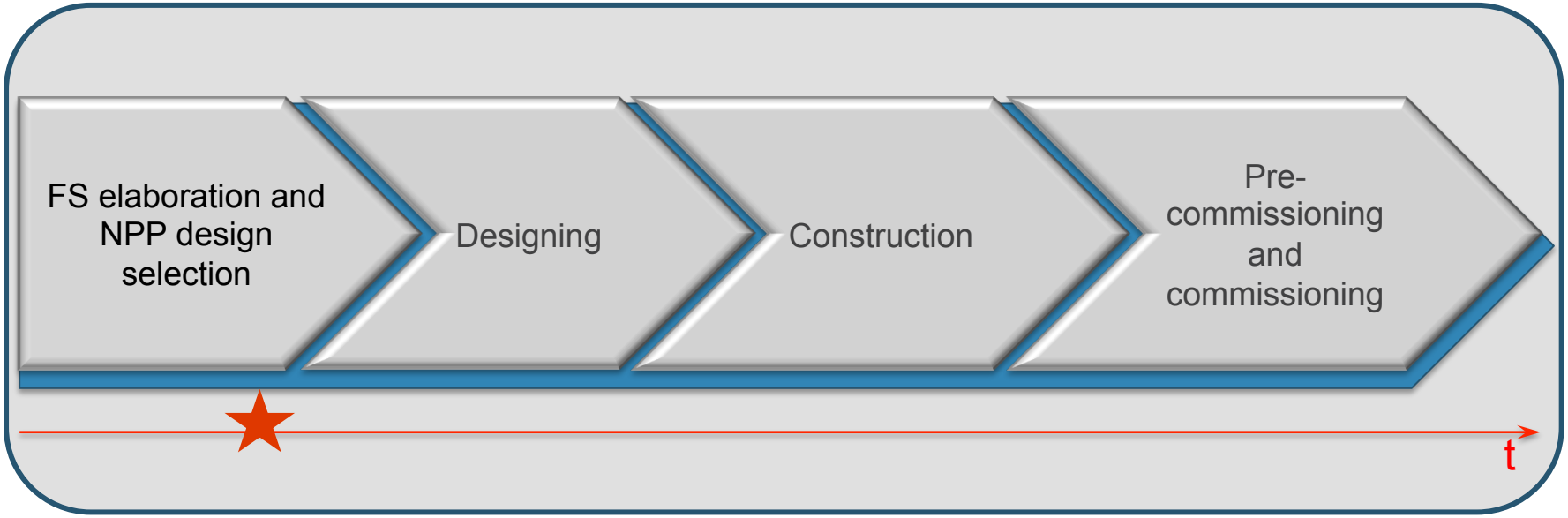
Upon the results of seminars EVN considers AES-2006 as the NPP basic Russian technology for implementation in Vietnam.

The selected design complies with the key requirements of the Vietnamese legislation:

- Safety
- Reference
- Contemporaneity
- Economic efficiency



3.5. Further stages



Preliminary consideration of the basic design allowed the authorized Russian and Vietnamese organizations (ASE and EVN to start the discussion of the contract for NPP design already in 2014.

3.6 Potential cooperation

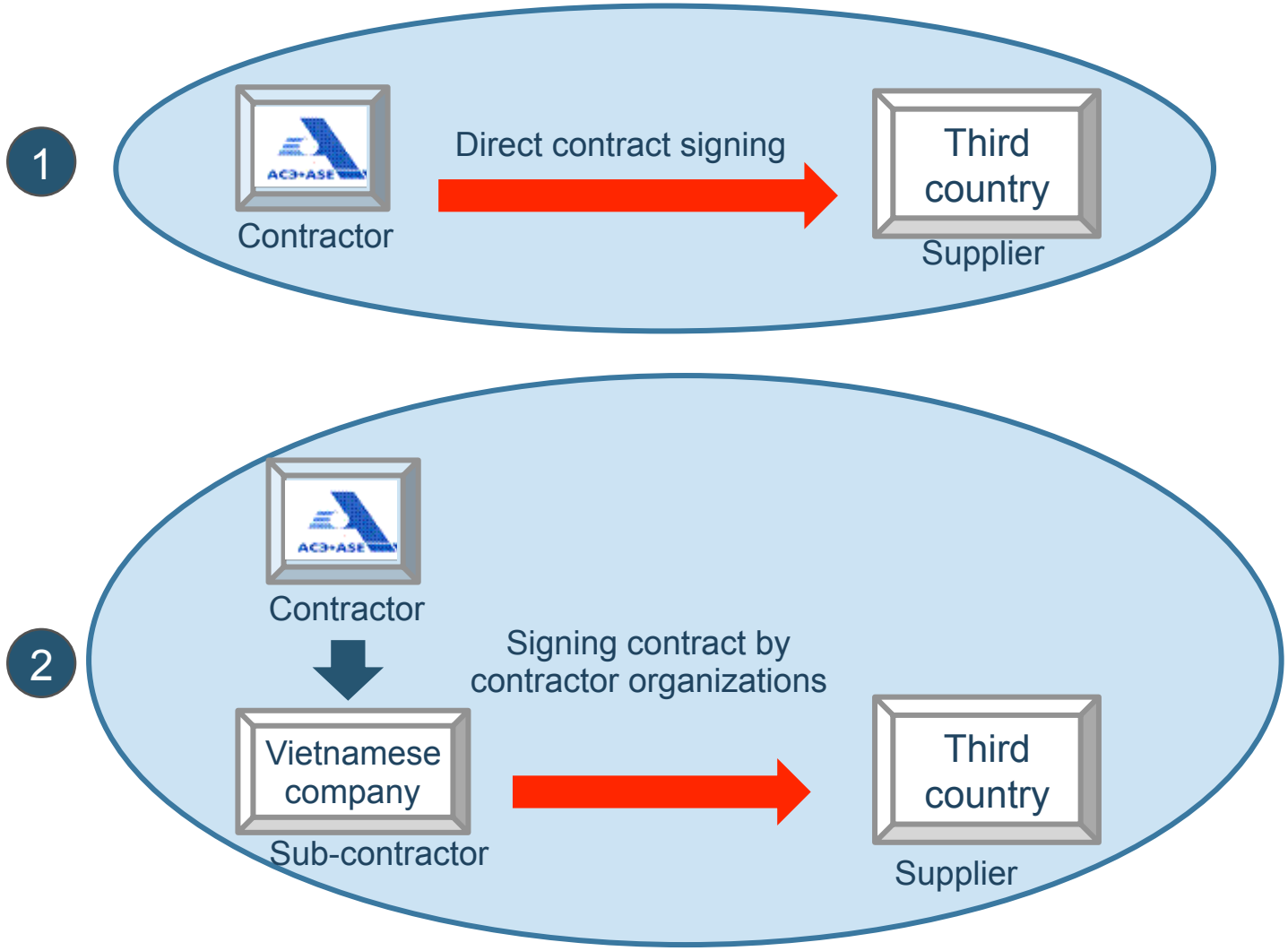
Performed works

During the FS elaboration Vietnamese company “Project Engineering Consulting Company” (PECC2) has been involved to carrying out of the site investigation works.

On-site training for potential subcontractor’s personnel

For preparation of Ninh Thuan 1 NPP construction training and probation of the Vietnamese engineers and workers at a NPP’s construction site in Russia were arranged as on-job training on the construction and installation at the units 3 and 4 of Rostov NPP in Russia.

3.8 Cooperation schemes



3. CENTER FOR NUCLEAR ENERGY SCIENCE AND TECHNOLOGY (CNEST)

Project description

PROJECT PROFILE - CONSTRUCTION OF THE CENTER FOR NUCLEAR ENERGY SCIENCE AND TECHNOLOGY (CNEST)

General layout of Nuclear Science and Technologies Center

Key Project Parameters

PROJECT CONFIGURATION

- RESEARCH NUCLEAR REACTOR WITH CAPACITY 15 MW
- MATERIAL TESTING COMPLEX WITH 18 SHIELDED BOXES
- RADIOISOTOPE COMPLEX WITH 19 SHIELDED BOXES
- PROCESS COMPLEX (CHEMICAL, NEUTRON,RADIATION TECHNOLOGIES, NUCLEAR MEDICINE)
- ENGINEERING COMPLEX (PROCESS AND SUPPORT SYSTEM)
- RW MANAGEMENT COMPLEX AND SRW STORAGE

MAIN STAGES OF ESTABLISHMENT, PURPOSES AND CONFIGURATION OF CNEST IN VIETNAM

MAIN STAGES OF DEVELOPMENT AND CONSTRUCTION

- PURPOSES
  - SCIENTIFIC ASSISTANCE IN NPP CONSTRUCTION IN VIETNAM,
  - ESTABLISHMENT OF STATE-OF-THE-ART EXPERIMENTAL BASE FOR R&D IN PHYSICS,
  - TECHNOLOGY AND SAFETY OF NUCLEAR REACTORS,
  - REACTOR MATERIAL TESTING, RADIOISOTOPES,
  - RADIATION AND NUCLEAR TECHNOLOGIES,
  - MEDICINE,
  - RADIOACTIVE WASTE MANAGEMENT,
  - ENVIRONMENT PROTECTION AND STAFF TRAINING FOR IMPLEMENTATION OF THE PROJECT OF NPP CONSTRUCTION ON THE TERRITORY OF REPUBLIIC OF VIETNAM
- STAFF
  - STAFF TRAINING (EXPERTS INCLUDING RESEARCHERS, ENGINEERS, LABORATORY ASSISTANTS AND TECHNICIANS)

NUCLEAR RESEARCH CENTER TARGET IS TO ENSURE SUSTAINABLE DEVELOPMENT OF THE COUNTRY

Understanding the Center's purposes – a way to success

Purposes

- Industries
  - Natural resources,
  - Machinery construction
- Science and education
  - Education
  - Accumulation of scientific knowledge
- Social issues
  - Medical treatment and diagnostics

Nuclear object construction – a new stage in the sustainable development of the nation

Contacts in NIAEP-ASE

THANK YOU!

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