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# I-Nuclear

**ONE-STOP NUCLEAR POWER TECHNOLOGY SERVICE LEADER**

A photograph of a nuclear control room is visible in the background, showing several operators in light blue uniforms working at a desk with multiple computer monitors and control panels. The room is dimly lit, with the primary light source being the screens.

NUCLEUS GATHERING EIGHT PARTIES  
NUCLEUS PROTECTING THE FUTURE

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# 八方核护

## I-Nuclear

One-stop nuclear power technology service leader

核聚八方 核护未来

Nucleus Gathering Eight Parties Nucleus Protecting the Future

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With the advancement of science and technology and the enhancement of global consensus on the peaceful use of nuclear energy, nuclear power, a clean, efficient and low-carbon form of power, is playing an increasingly critical role in the global energy landscape

This year is the 60th anniversary of the successful detonation of China's first atomic bomb, and it is also the year of "Integration and Synergy" of CNNC. As the pioneer and leader of China's nuclear power business, China National Nuclear Power (CNNP) has always kept in mind the corporate mission of "Strengthening Nuclear Power and Powering the Nation for the Benefit of Mankind".

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**“3060”**

China has responded positively to the international community's urgent need to respond to climate change and realize green and low-carbon development, and has clearly put forward the “3060” goal of “carbon peaking and carbon neutrality” .

Under the guidance of this grand blueprint, nuclear power has become an important driving force to promote the optimization and adjustment of China's energy structure and accelerate the process of energy transformation, with its significant advantages of extremely low carbon emissions in the whole life cycle, relatively economic operating costs, and high utilization hours.

**“Carbon Peak Carbon Neutral”**

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## CNNP

NOW

- **25** nuclear power units in operation

- Installed capacity up to **23.75 million** kilowatts

- **18** nuclear power units under construction and approved for construction

- Installed capacity up to **20641 million** kilowatts

Total assets exceed **5000 billion** dollars

Total number of employees over **18000**

Became one of the **largest nuclear power operators in China and the world**

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## Carefully developed eight technical service products were officially released to the public in 2017

The whole operation and maintenance process of nuclear power plants, from personnel training to equipment maintenance, from technical support to information management, provides all-round and multi-level technical guarantee for the safe and efficient operation of nuclear power plants.

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# Eight products are fully updated and upgraded

Promoting the industry towards greener, smarter and more efficient



Each improvement is designed to meet the diverse needs of future energy markets



From revolutionizing design concepts to leapfrogging performance metrics



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核启筑基

i-Prepare

核智互联

i-Informatization

# CNNP New "Eight major products"

核锋调试

i-Commission

核技赋能

i-Tech

## 8 Fields Technical Service

核稳护航

i-Support

核育专训

i-Train

## I-Nuclear

核力大修

i-Outage

核护精修

i-Maintain



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## i-Prepare

The production preparation of a nuclear power plant is a long-term preparation work that starts from the start of the project until the power plant is put into operation. The effect of production preparation not only affects whether the unit can operate safely and stably in the first few years before commissioning, but is also a key factor in whether the unit can operate safely throughout its life cycle.



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### 1.1 EPC

We provide production preparation general contracting services for CNP300, CNP600, CNP1000, Hualong One, AP1000, VVER, CANDU6 and other reactor types, covering the entire process from production preparation planning to organizing personnel, materials, and document preparation until trial operation and commercial operation.

### 1.2 Special Support

We provide special preparation support for production personnel, documents, materials, information systems, DCS, first overhaul, nuclear power operation and maintenance document systems, and provide special expert support services.

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# i-Commission

It refers to all the commissioning work from "installation completion test acceptance" to "end of temporary acceptance of power plant", which specifically includes the construction of nuclear power commissioning system, commissioning preparation outline, commissioning outline, commissioning quality assurance outline, pre-service inspection outline and other program documents preparation.



# i-Commission

## 2.1 Commissioning Contract

Provide general contracting services for commissioning of pressurized water reactors and heavy water reactors, including preparation of commissioning organization, personnel, materials, documents, plans, etc., and all commissioning and trial operation general contracting work from the end of installation, flushing and pressurization to temporary acceptance of the power plant.

## 2.2 Commissioning Sub-Contract

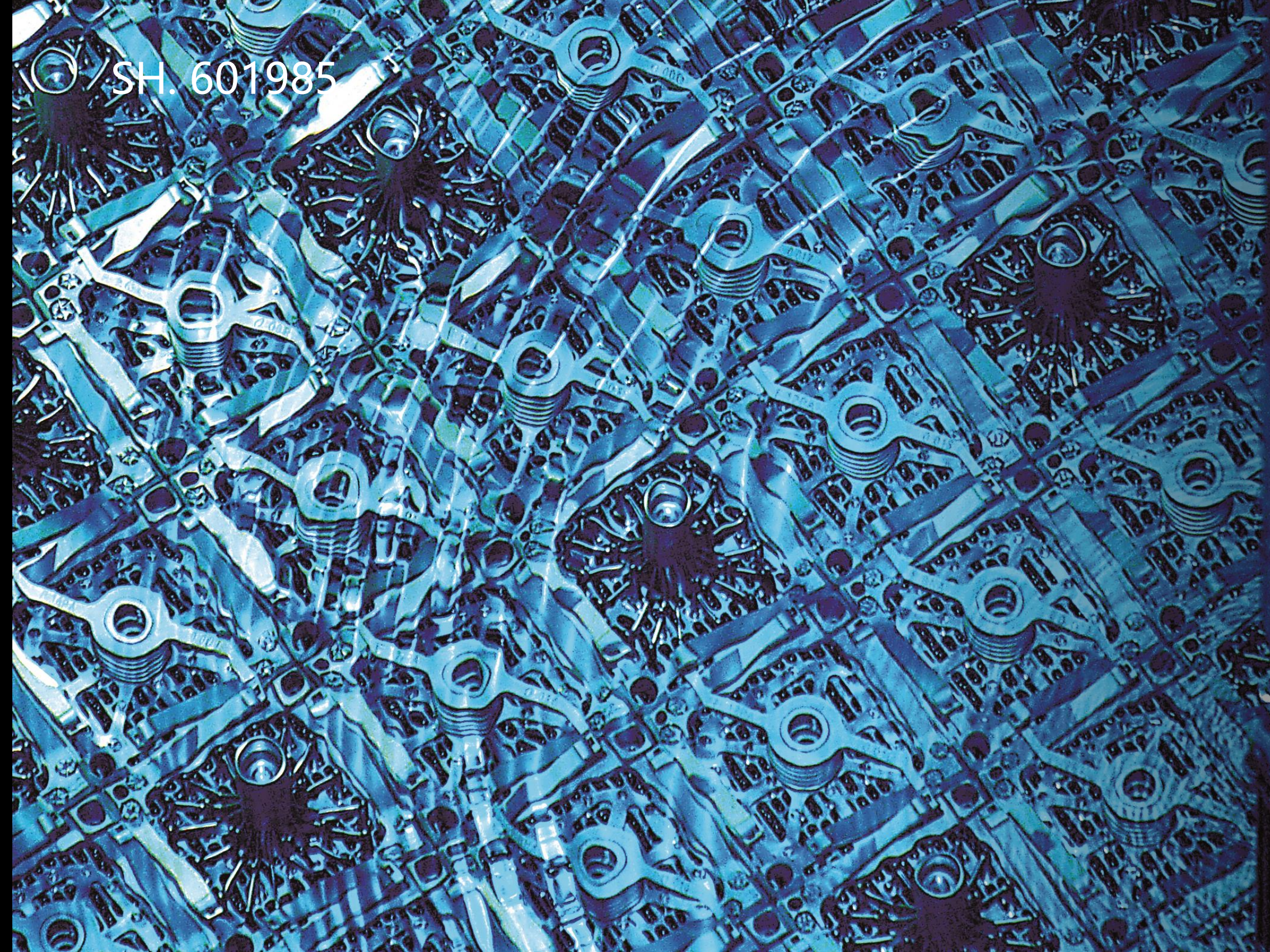
Provide pressurized water reactor and heavy water reactor commissioning subcontracting services, including trial operation (management), process system, equipment commissioning and special tests.

## 2.3 Commissioning Preparedness

Provide preparation work such as preparatory documents and planning for debugging

## 2.4 Commissioning Expert Support

Provide experienced professionals for debugging support



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# i-Support

Construction and control of documentation systems, technical management and consulting, development of equipment and facility modification strategies, on-site implementation and post-assessment to ensure the construction and safe and efficient operation of nuclear power plants





## i-Support

### 3.1 Fuel Management

Provision of advanced technology, fuel management assessment services for dynamic stick engraving of nuclear power units

### 3.2 Safety Analysis

Provide PSA, PSR services for nuclear power plants

### 3.3 Equipment management

Provision of nuclear power plant facility management services

### 3.4 Materials and Aging

Provide development services for monitoring and evaluation, operation and maintenance standard system and management platform related to aging management of nuclear power plants

### 3.5 Modification

Provide technical support for change and modification management of nuclear power plants, overall project program design or provision.

### 3.6 Dose monitoring

Qualified with Certificate of Accreditation for Metrological Accreditation (CMA) for laboratories to provide personal dose monitoring services for nuclear power plants

### 3.7 Chemical and Radiochemical analysis

Provides technical services for environmental monitoring, chemical and radiochemical analysis of nuclear power plants.

### 3.8 Expert support service of digital and I&C

Provide digital instrumentation and control related services

### 3.9 CANDU Service

Provides proprietary technical services for heavy water reactors. Provides technical services for environmental monitoring, chemical and radiochemical analysis of nuclear power plants.

## i-Outage

The i-Outage work mainly includes the construction of overhaul safety management system, risk management system, quality management system and progress management system, the preparation of technical documents, the organization and implementation of overhaul, and the organization and management of overhaul major special projects.



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#### 4.1 General contracting for nuclear power overhaul projects

Form a core management and technical team to be fully responsible for the safety, quality, progress and risk control of the overhaul unit site, and undertake the general contracting of the entire overhaul project.

#### 4.3 Specialized services for nuclear power overhaul management

Provide services such as organization, management and implementation of major special projects during overhauls

#### 4.2 General contracting for overhaul of the nuclear island

Formed the core management and technical team to be fully responsible for the implementation of the nuclear island portion of the overhaul unit.

#### 4.4 Nuclear Overhaul Experts and Consulting Services

Provision of expert and information consulting services in various fields of nuclear unit overhauling

 **i-Outage**



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## i-Maintain

i-Maintain refers to the preventive or corrective maintenance of the defects of the main equipment of the nuclear power plant, so as to maintain or restore the design function of the equipment, which mainly includes the formulation of the maintenance strategy and program, the preparation of the technical documents, the preparation of the maintenance work tools, the on-site implementation of the maintenance and the quality control, the re-qualification of the function of the maintenance, and the preparation of the maintenance report, and other aspects of the work.

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# i-Maintain

## 5.1 Maintenance of nuclear-grade packagings

Provision of maintenance services for nuclear grade containers

## 5.4 Nuclear power instrumentation and control system maintenance

Provide nuclear island instrumentation and control system maintenance services

## 5.6 Maintenance-specific tools and simulators development and supply

R&D and supply of special tools and simulators for nuclear power plant maintenance.

## 5.2 Maintenance of nuclear-grade rotating equipment

Provides maintenance services for nuclear grade rotating equipment.

## 5.5 Other maintenance (including specialized maintenance)

Provision of special maintenance services for nuclear power plants

## 5.3 Valve maintenance

Provide nuclear grade valve repair and valve integration services

## 5.7 Nuclear Power Maintenance Robot R&D

Provide research and development of nuclear power plant maintenance and inspection robots

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## i-Train

i-Train is a nuclear power-specific training for nuclear power employees or nuclear power affiliates to equip them with the knowledge level, business ability and management ability appropriate to their positions, and to obtain the qualification, authorization and ability to perform the corresponding work.

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### 6.1 General training for nuclear power personnel

Provide nuclear general class training to equip personnel with the basic requirements for entry into nuclear power plant work.

### 6.2 Operator training

Full-stage training for operators of CNP300, CNP600, CNP1000, Hualong-1, AP1000, VVER, CANDU6 and other units.

### 6.3 Skills training for maintenance staff

Provide full-stage training for maintenance personnel of CNP300, CNP600, CNP1000, Hualong-1, AP1000, VVER, CANDU6 and other units.

### 6.4 Training of other production technicians

Provide full-stage training for other technicians of CNP300, CNP600, CNP1000, Hualong-1, AP1000, VVER, CANDU6 and other units.

### 6.5 Training of nuclear power managers

Provides professional leadership training for nuclear power managers.



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## i-Tech

i-Tech refers to technical support activities such as operation monitoring and inspection, operation assessment and demonstration, experience feedback, personnel training and digitization to ensure the safe, reliable and economic operation of nuclear power plants. China Nuclear Power (CNP) has built a complete set of technical support and back-up system to ensure the safe operation of the country's nuclear power facilities, and possesses core technologies and practical experience in various aspects and fields, which are at the leading level in the industry. Meanwhile, CNPC has also established long-term friendly working relationships with international organizations and has a long history of cooperation with the government and industry.

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# i-Tech

## 7.3 NDT Technology R&D and Services

It provides research and development of non-destructive testing technologies for nuclear power plants, implementation services for pre-service and in-service inspections, as well as research and development of various types of non-destructive testing equipment and devices used in pre-service and in-service inspections of nuclear power plants.

## 7.6 Operational experience feedback techniques

Provide feedback on operationally relevant experiences, performance indicator support and standardization.

## 7.1 Development of training equipment and facilities

Provides facility development services such as simulator development and virtual simulation product development.

## 7.4 Technical services for licensing examination of nuclear power plant operators

Provides technical services such as nuclear power plant manipulator license exams, psychological assessments and tutorial materials.

## 7.7 Digital Nuclear Power Technology

Provision of digital nuclear power-related platforms, data centers and related technology R&D services

## 7.2 Renewal of operating licenses

Provide technical support for the work related to the renewal of the operating license of a nuclear power plant, including one-stop services for application preparation, assessment and validation, change of design, report preparation, and communication and dialogue with the regulatory authorities.

## 7.5 Evaluation Guidelines Development and Implementation

Provides support services such as nuclear safety conventions, WANO operations, peer assessment, knowledge management, etc.

## 7.8 Development and delivery of public information and exhibition technologies

Provision of technology development and supply for nuclear power public outreach and exhibitions

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## i-Informatization

i-Informatization is to utilize the experience of nuclear power construction and operation and maintenance to design the informatization architecture, application system and data in line with nuclear power operation and management. The main contents include the construction and operation and maintenance of nuclear power information system, nuclear power data service, nuclear power operation characteristic software and material master data service. Utilizing more than 30 years of experience in nuclear power construction and operation, it has independently developed characteristic informatization management systems involving various fields of nuclear power plants, forming a complete informatization solution for operating nuclear power plants. Meanwhile, China Nuclear Power owns independent intellectual property rights of material coding system and standards, and can provide complete material master data support services for nuclear power plants.



# i-Informatization

## 8.1 Nuclear Power Information System Construction and Operation and Maintenance

ERP system  
EAM system  
ECM system

## 8.2 Nuclear power data information services

Provide big data services such as data management and process analytics.

## 8.3 核电运行特色软件

Provide construction, operation and maintenance and optimization of information system and tool software related to nuclear power production and operation..

## 8.4 Nuclear Material Master Data Service

Provision of nuclear material master data services



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