



IAEA

60 Years

Atoms for Peace and Development

National Workshop on Industrial Involvement

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**Industrial Involvement and
International codes/standards - technical requirements**

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The required efforts to face a new important challenge is similar to climbing a mountain shrouded in clouds. We cannot describe its top or be certain that there may not be unforeseen and perhaps insurmountable obstacles on the way. But we must be prepared to undertake the journey in the belief that the summit will never come into view unless we begin the ascent and deal with the initial difficulties immediately before us.

US Senator Sam Nunn
US Former Secretary of State Henry Kissinger

NYT, 7 July 2009

Industry x Local Involvement

- “Industrial involvement” is defined as the sum of the entire industrial capability required to support a safe and reliable nuclear power programme, of which a subset is “local industrial involvement”, provided by local or national organizations.
- Both concepts are important for a State considering a nuclear power programme. Industrial involvement is needed to meet the depth, breadth and quality of industrial capacity necessary for a nuclear power programme. Local industrial involvement is required to make well informed decisions about which parts of industrial involvement need to be developed locally.

In a number of Member States, increasing national industrial involvement in the nuclear power programme developed over time has had spin-off benefits for other industrial sectors. These are attributable to the acquired technological capability and the high quality levels developed for the nuclear power programme.

- Turnkey Contractor
 - Secure supply chain
 - Reduction of manpower resources
 - Logistic savings
 - Local requirements
- National/Local Industries
 - Technology transfer
 - Partnerships
 - Access to world market for nuclear power/non-nuclear areas (spin-off)
- Government
 - Job creation
 - Support to high skilled job development
 - Impact on GDP growth
 - Justifying NPP project



How to develop industrial involvement

❑ Industrial involvement depends on each country's situation

 There is NO single solution.

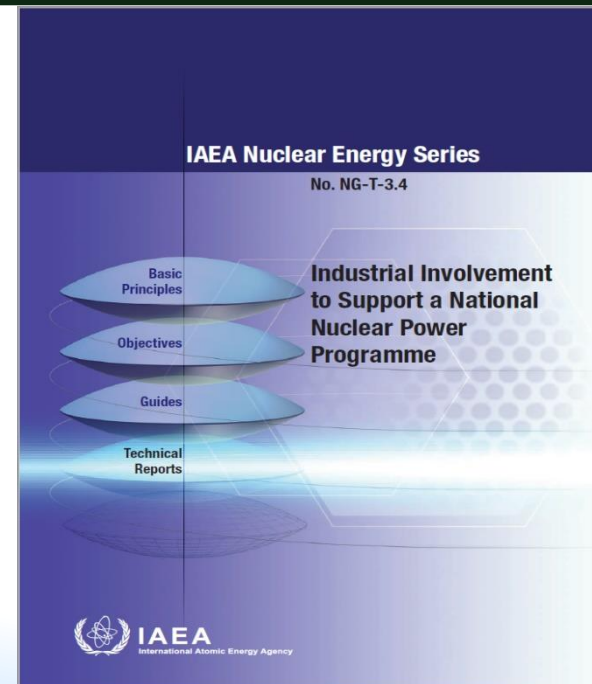
❑ IAEA assistance on Industrial Involvement

❖ Information/experience sharing



Technical Meeting in France and China (2013, 2014 and 2017)
Training Course in France (2014 and 2016)
National WS (Uganda, Turkey, Egypt and so on)

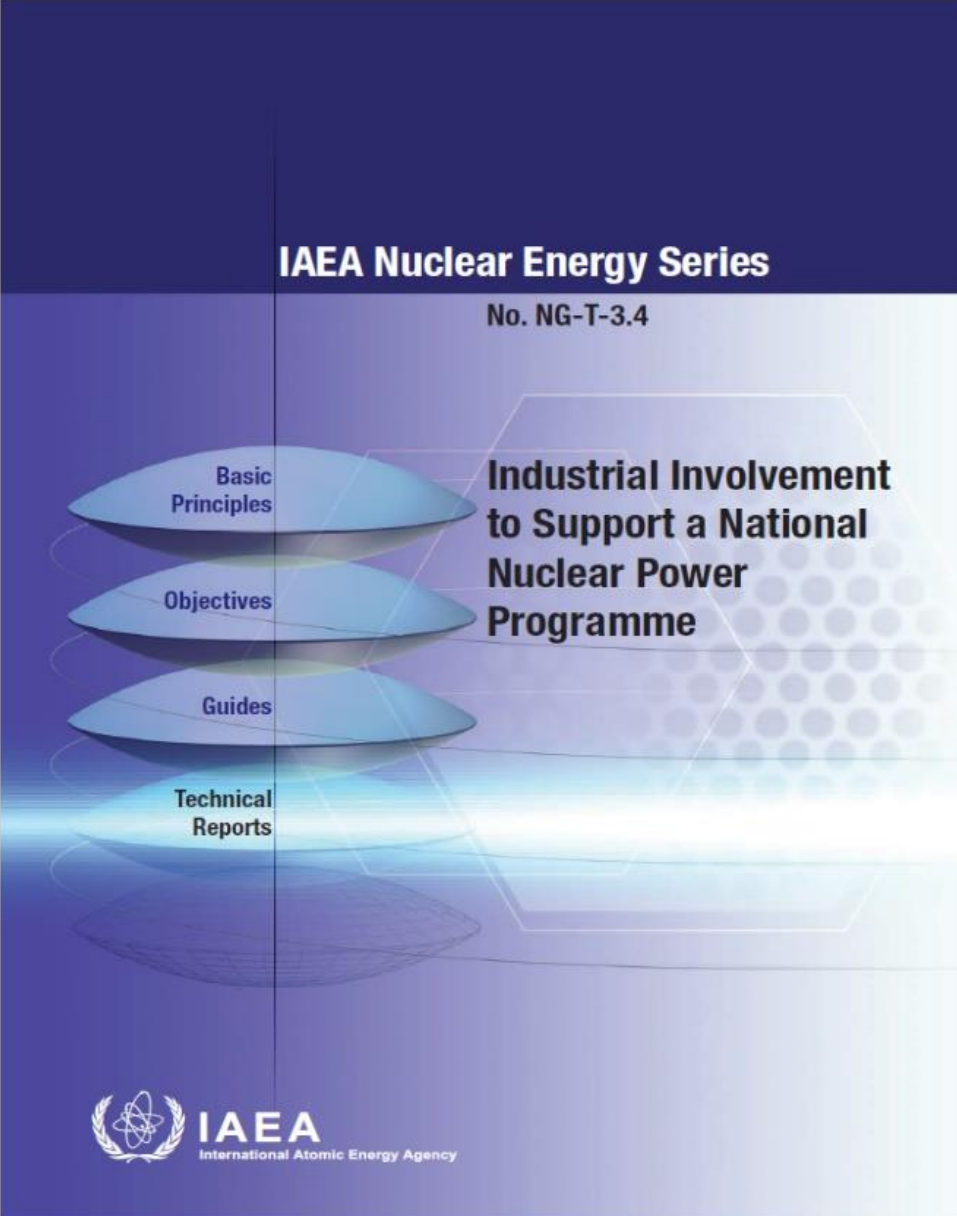
❖ Publishing Technical document



NG-T-3.4

Country needs to develop/prepare/conduct;


- ❑ national/local **industries' capacity surveys**
- ❑ **establishing policies, identifying target areas**
- ❑ **establishing industrial standards and quality assurance mechanisms**
- ❑ **capacity building activities and incentives**
 - national R&D programme
 - establishing partnership with experienced companies for technology transfer
 - official long-term and low-interest loan for capital investment
- ❑ National/local, **governmental/industries' investment**
- ❑ **negotiation with EPC contractor, strategic partner**



IAEA Nuclear Energy Series
No. NG-T-3.4

Industrial Involvement to Support a National Nuclear Power Programme

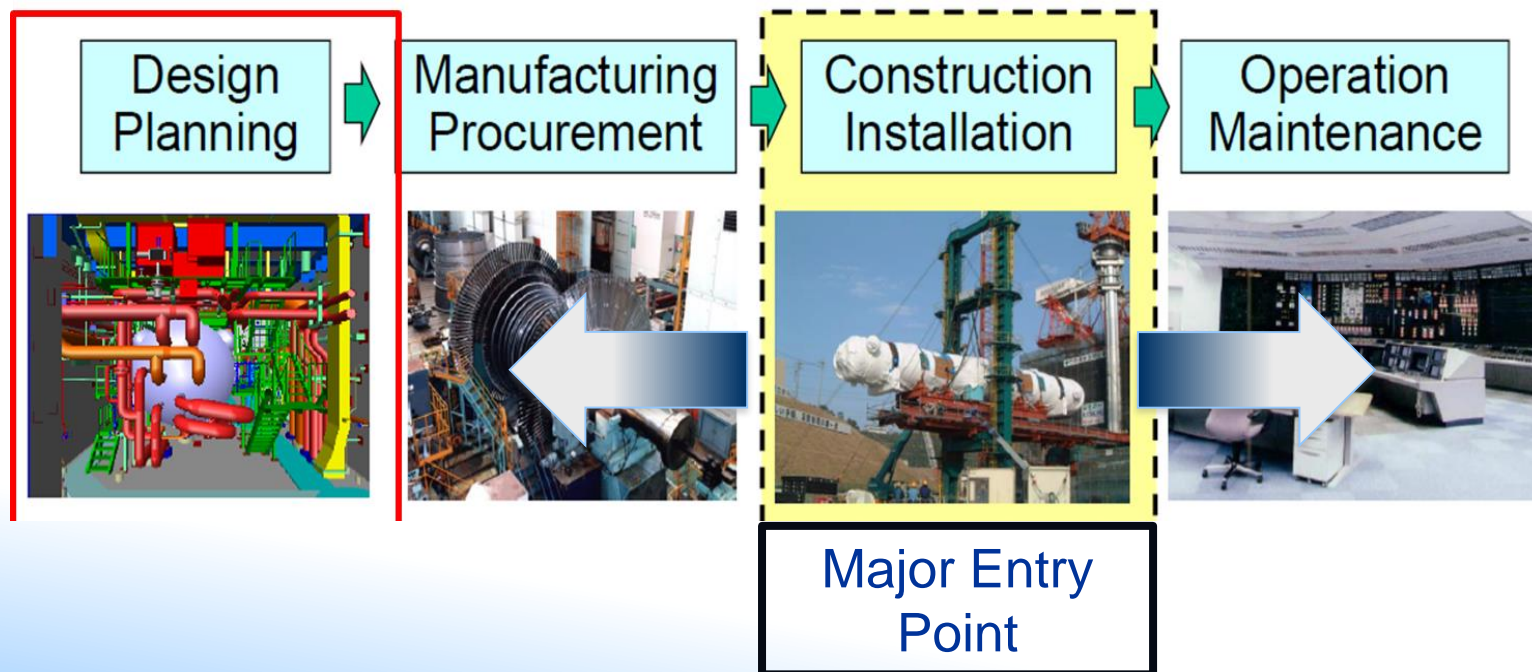
Basic Principles
Objectives
Guides
Technical Reports

 **IAEA**
International Atomic Energy Agency

Nuclear Power Project and National Involvement

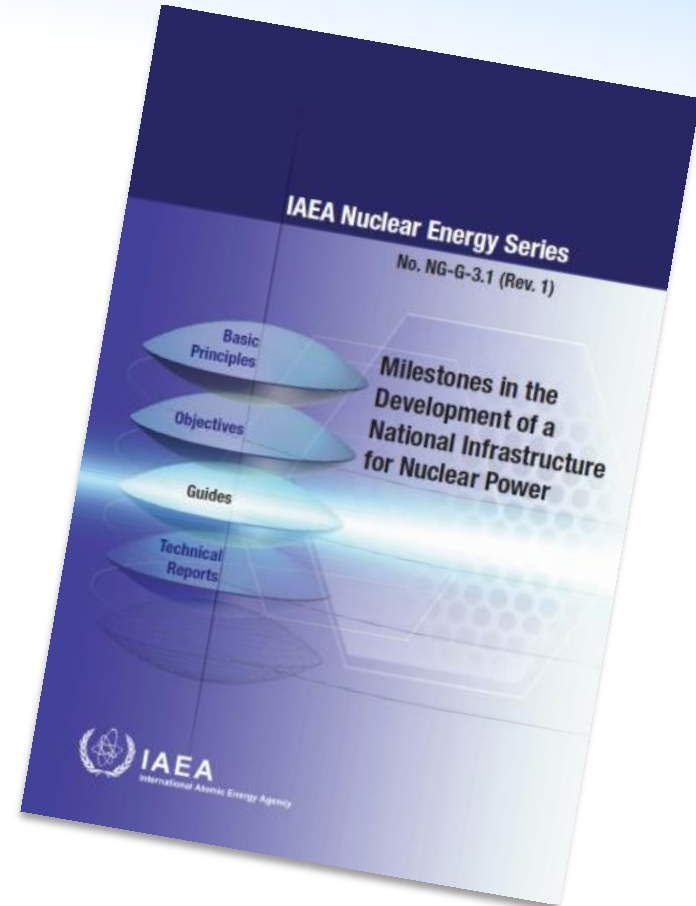
These are all goods and services that are needed to initiate a NP programme. For most new programmes these goods and services are in support of getting the first NPP units in operation.

Industrial involvement includes following areas; Engineering, Manufacturing, Construction, Commissioning, Operation and maintenance, Technical support Services

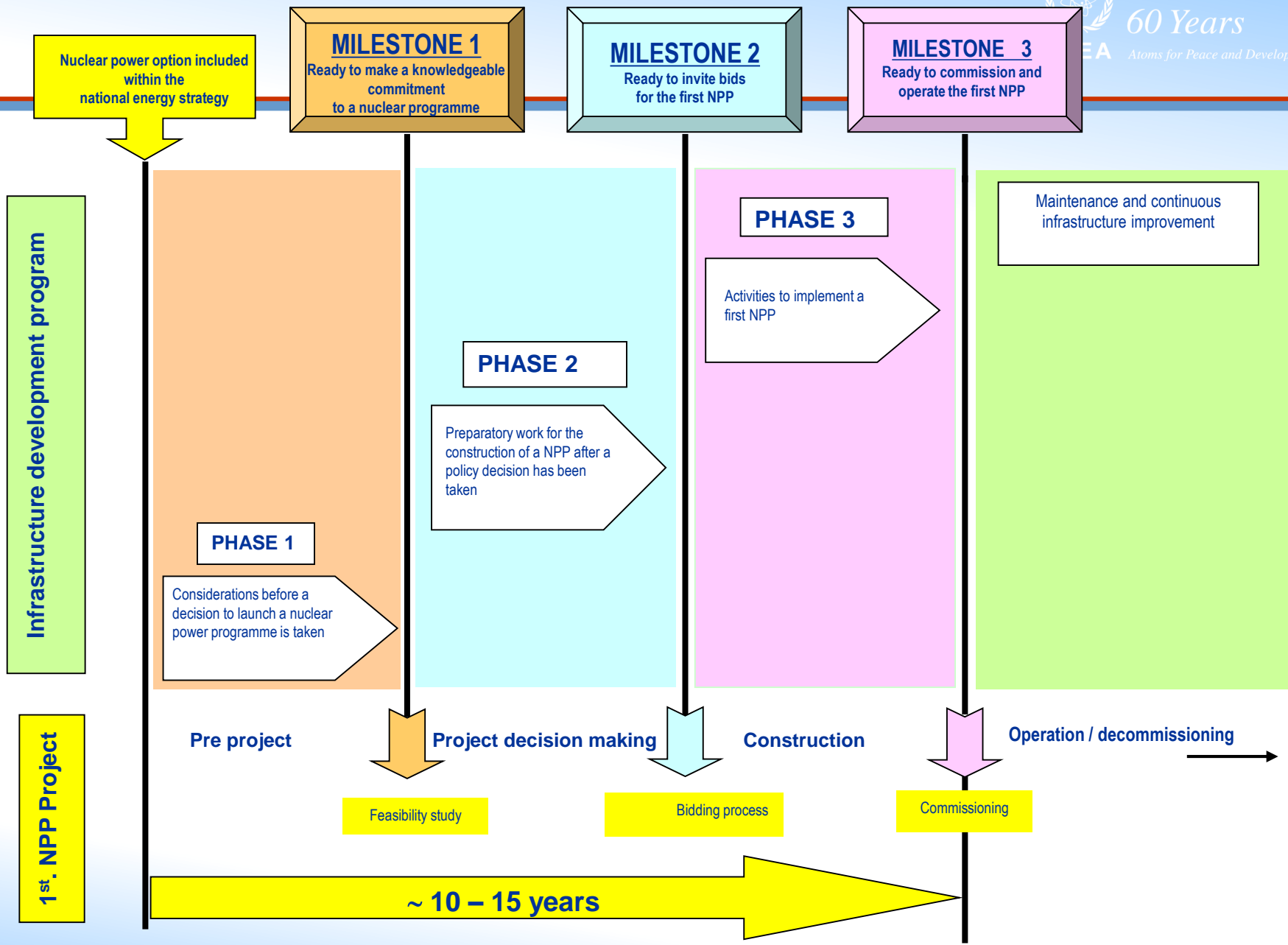


The IAEA Milestones Approach for Nuclear Power Infrastructure Development

The Milestones Approach is holistic and considers 19 specific infrastructure issues



NG-G-3.1 issued in 2007
Updated in 2015



Detail Check sheets in NG-T-3.4 (e.g. Phase 1)

Action	Responsible organization	Completed	
		Yes	No
Ensure that the NEPIO is staffed or supported by individuals who have knowledge of both local industrial capabilities and the industrial involvement needed for a nuclear power programme	NEPIO		
Include industrial involvement as a topic area in the PFS of the nuclear power programme	NEPIO		
Initiate dialogue with potential NSSS vendors	NEPIO and prospective owner/operator (if determined)		
Initiate government–government dialogue with the countries of origin of potential suppliers	NEPIO and cognizant ministries/agencies		
Invite selected potential suppliers and leading local industrial organizations to a working session to discuss industrial involvement issues such as industrial codes and standards, regulatory/licensing approaches and local industrial involvement in construction and erection	NEPIO and prospective owner/operator (if determined)		
Consider opportunities to provide key staff with knowledge of industrial involvement for a nuclear power programme through working alongside NSSS vendors or operating organization personnel for an established nuclear power programme	NEPIO and prospective owner/operator (if determined)		
Ensure PFS includes determination of realistic goals concerning local industrial involvement based upon study of associated risks and benefits of various alternatives as well as identification of technology transfer goals	NEPIO		
Establish mechanisms to build interest and support of local industry in the potential nuclear power programme	NEPIO and prospective owner/operator (if determined)		
Conduct surveys to identify local companies potentially capable of participating in a nuclear power programme	NEPIO and prospective owner/operator (if determined)		
Develop a draft policy and approach for the management system (including quality control and quality assurance) to be used for the nuclear power programme	NEPIO and prospective owner/operator (if determined)		
Determine a suitable contracting approach for the first nuclear power plant project given the industrial involvement and other considerations	Government		
Propose a government policy with respect to national or local industrial involvement if the nuclear power programme proceeds	NEPIO		

Industrial involvement : Phase 2 (BBI)

In preparation of bid specification, based on additional investigation on the local capabilities in phase 2, NEPIO should

Consider;

- **Which** national or local suppliers can reliably supply commodities, components or services to nuclear related or non-nuclear portions of the NPP,
- **What** upgrades in skills and capabilities are realistic in a time frame to support nuclear construction,

Determine;

- **Bid specification** in accordance with those decisions. Information about domestic industry capabilities and requirements related to **technology transfer** should be included in the BIS.

Develop;

- **Industrial Involvement Strategy** (Specific plan - capacity building, target areas /percentage)

Industrial involvement : Phase 3 (C)

NEPIO/Government

- Coordinate/**implement Industrial Involvement Policy and Strategy**
(capacity building, incentives)

Owner/Operator/Utility

- Reassessment of the sources of supply to support operation
- If the national and local industrial structure has progressed sufficiently, the supply of spare parts, consumable supplies, maintenance services and services can be allocated accordingly

Local manufacturer

- **Investment**
- Capacity building
- Localization (technology transfer)

National/local industries

- **Establish nuclear industrial association**

The interfaces among the partners

- To lessen the natural friction interfaces between the local supply chain and the Owners Engineer entity, it is paramount that a common/similar management system should be developed and implemented very soon in the process.
- For that, the IAEA recommends the development of a Process based Management System, where safety is considered and integrated into the processes.

The need of a Process based Management System

The requirements for a management system are established in **GS-R-Part 2 Leadership and Management for Safety** and are intended to ensure that safety is properly taken into account in all the activities of an organization.

A management system that ensures this is often referred to as an **integrated management system or simply IMS**.

The management system approach identified in the IAEA's safety standards publications also requires increased attention to organizational processes.

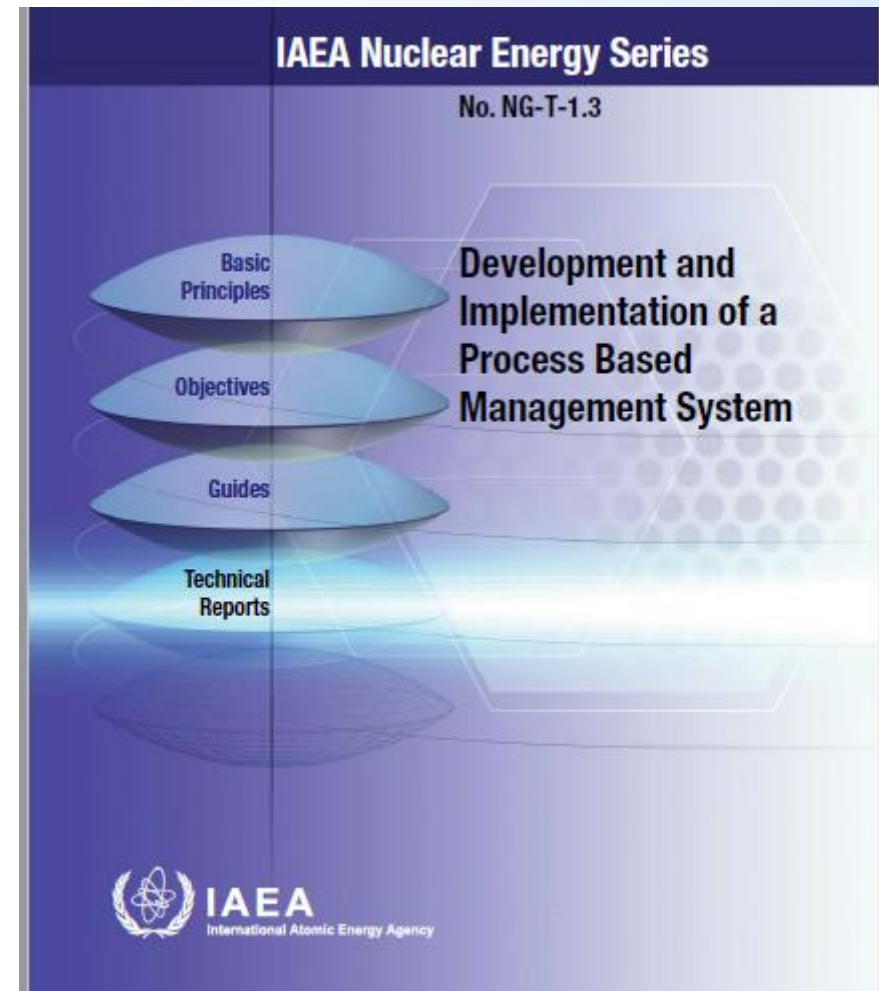
IAEA Safety Standards
for protecting people and the environment

Leadership and
Management for Safety

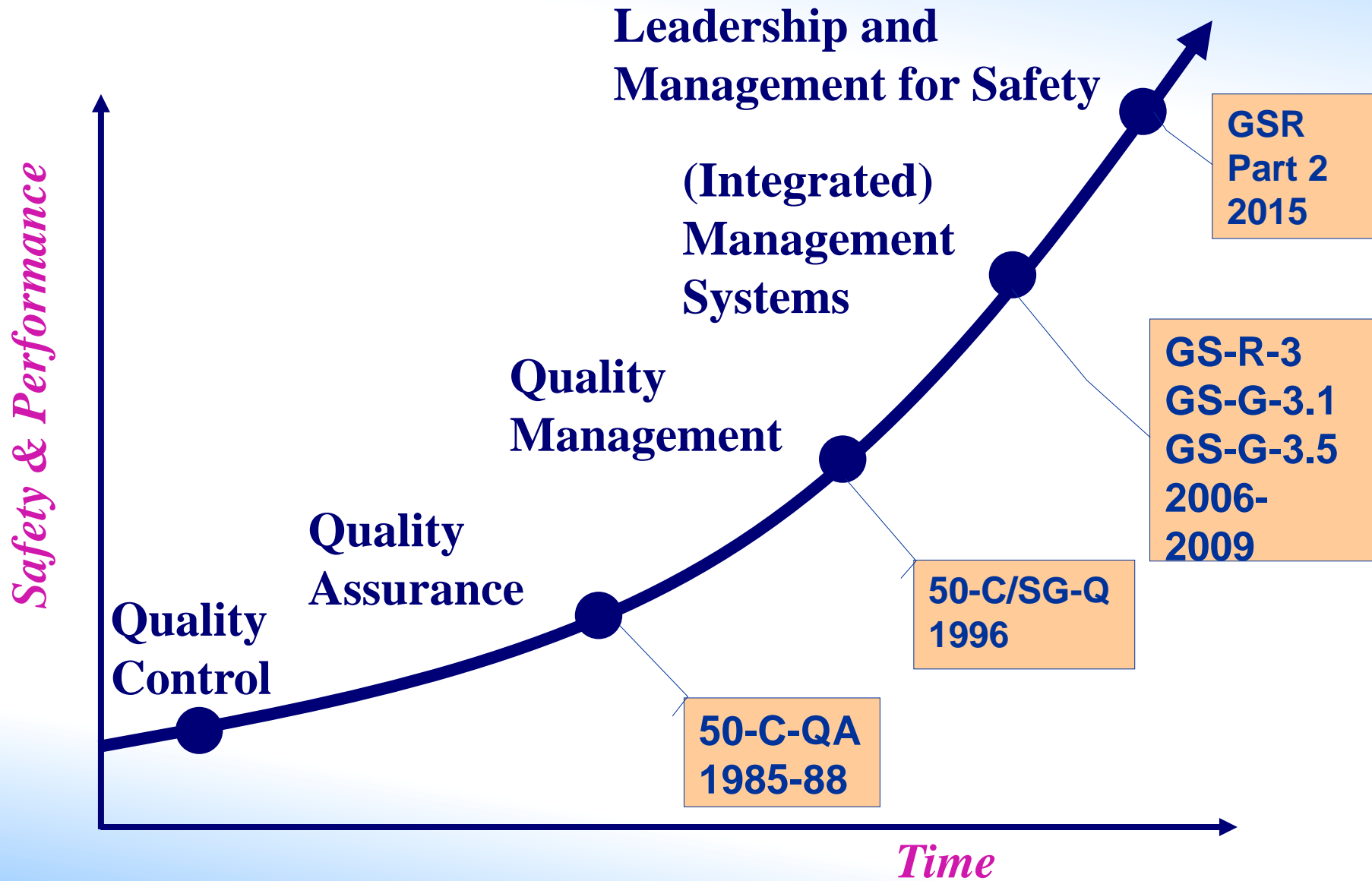
General Safety Requirements
No. GSR Part 2

NG – T- 1.3 Development and Implementation of a Process based Management System

Establishing a **process based management system** involves a transition from programmes or systems based on a hierarchical management structure with dedicated quality assurance, quality control or quality management organizations based on historical standards.



IAEA's Approach to Management Systems



The need of a Process based Management System

Consequently, users of the Quality Assurance Code¹ and of superseded IAEA safety publications on quality assurance, the International Organization for Standardization (ISO) 9001 standard or ASME-NQA-1-2008 and related addenda on quality management may at first find it challenging to implement the latest IAEA safety standards for management systems.

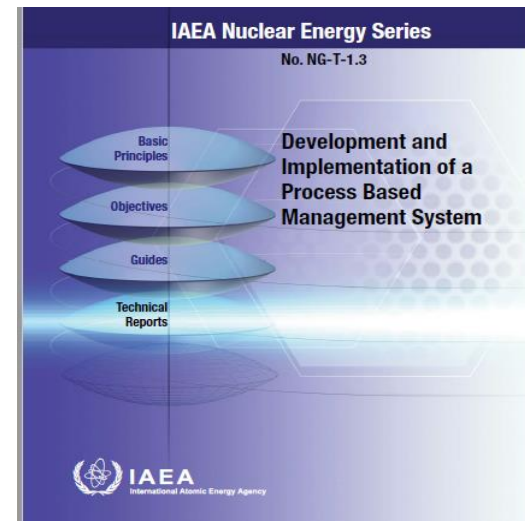
The need of a Process based Management System

In addition to the challenges associated with conceptual and scope shifts, organizations may be concerned that the adoption of a management system based on **GS-R-Part 2** may result in the loss of certifications or qualifications acquired under the ISO standards umbrella, for example.

This concern will be lessened by an understanding of the latest IAEA requirements for management systems, and of what the **transition to a process based management system** and meeting the new requirements actually entails.

The need of a Process based Management System

A process based management system enhances traditional quality programmes, and, when properly implemented, enables the organization to satisfy external agencies and registrars for certification of management systems such as ISO 9001, ISO 14001, OHSAS 18001, and regulatory acceptance of security and safeguards programmes.



The need of a Process based Management System

It also ensures knowledge retention and the retention of all important aspects of existing programmes.

As part of implementation, and to facilitate the same, organizations can develop maps, descriptions and other documents demonstrating how the certified quality assurance and quality management programmes **have been addressed in the process based management system documents.**

So, the key to this new methodology is the development of processes, with all important activities and decision points well identified, including all safety related matters into them.

Successful industrial involvement components

- Strong and stable **national commitment** to the nuclear power programme/project
 - Continuous investment under the government leadership
 - Private investment depends on governmental stable commitment
- **Synergy** between the nuclear power programme and the other national development programmes
 - Strategies for securing manpower and establishing a self-reliant education system
 - **NPP programme (Industrial involvement) and Industrial policy**
- Industry Initiative with a **business Plan**
 - Clear definition of responsibilities and rights in NPP contracts
- Establishing **close partnership with vendor and experiences suppliers** for industrial involvement and technology transfer

1. Cost

- Requiring national/local investment for capital investment (machine tools, moulds), the cost of developing industrial capability
- Technical know-how affects productivity

2. Quality and safety

3. Stability of delivery

- ✓ One day delay of the construction causes additional expenditure of more than 1 M\$ per day.

Summary

1. NP programme will trigger off developing national industries through self-efforts and technology transfer
2. NP requires high level technology and effective industrial relation. Only national/local industries that can meet such condition can join the programme.
3. NEPIO has an important role to develop industrial involvement policy, conduct industrial capacity survey and facilitate capacity building of domestic industries

4. The IAEA offers continuous services to help MS on Industrial Involvement. The document NG T 3.4 on Industrial Involvement, should be used by the newcomers.

5. Process based Management System – as described in the document NG T.1.3, when well implemented since the beginning will lessen the difficulties among the supply chain and the Owner of the asset.

6. A sound Management System – as described in the document GSR Part 2 will significantly help a comprehensive oversight control of the plant construction.

Thanks for your attention!



...atoms for peace.