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International Atomic Energy Agency

Quality management in the supply chain in international nuclear projects

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What are the most important trends and how to try to cope with them, how to deal with different legislations, regulation and standards.

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Why is it so difficult to achieve Quality?



- 1) **Inadequate understanding of the concepts of quality, quality assurance and quality product** – what did you ask in the first place?
- 2) **Interfaces** – each interface increases “broken telephone” uncertainty – Deming said: **“Understand the whole system”**
- 3) **Obsessive and inadequate goals by customers and suppliers** – you cannot have more, better, faster at the same time all the time and **you are in this together**
- 4) **Human performance – are the prerequisites of success there (e.g. IT systems may do something but can people follow)?**
 - Inadequate knowledge of the product, programs, processes.
 - Inadequate understanding of the reasons for the quality programs or even the need to comply.
 - Inadequate adherence to the processes and quality programs.
 - Etc.

Edited from Richard Barnes presentation at the MSQI conference 2018

Current Supply Chain and Procurement Trends and Challenges 1

- **Nuclear industry situation**
 - What used to be: strong supply chain with steady flow of orders
 - Procurement and supply by original equipment manufacturers (OEMs) used to play a key role in nuclear reliability, sustainability and safety
 - Now this basis is eroding in some countries – e.g. obsolescence, spare part availability problems, unidentified changes in products
 - > *Re-engineering, design information and use commercial/replacement items (?)*
- **Globalization**
 - Longer supply chains with increased amount of players -> difficult to oversee
 - Supply of piece parts may come even from other continents
 - Strict nuclear quality assurance requirements and risk of neglecting them to cut costs
 - > *Justification to use commercial/repl. items in risk-informed manner (?)*
- **Localization**
 - Local supply chain is easier to oversight (e.g. manufacturing) and is a priority for Member States
 - However, may also increase risks (ability to supply) especially at the beginning with inexperienced suppliers
 - > *Early involvement of industry in talks & realistic planning (?)*



Current Supply Chain and Procurement Trends and Challenges 2

- **Technical challenges**

- New materials & additive manufacturing technologies
- Undeclared design changes, obsolescence
- How to detect CFSIs (counterfeit, fraudulent and suspect items), including service-related fraud (e.g. test certificates)?
- Digitalization, e.g. digital I & C, product information systems, ...

-> *Trustworthy “Produce-from-design printing” centres with design information, use of SIL (safety integrity level) etc.*

- **Challenges with people**

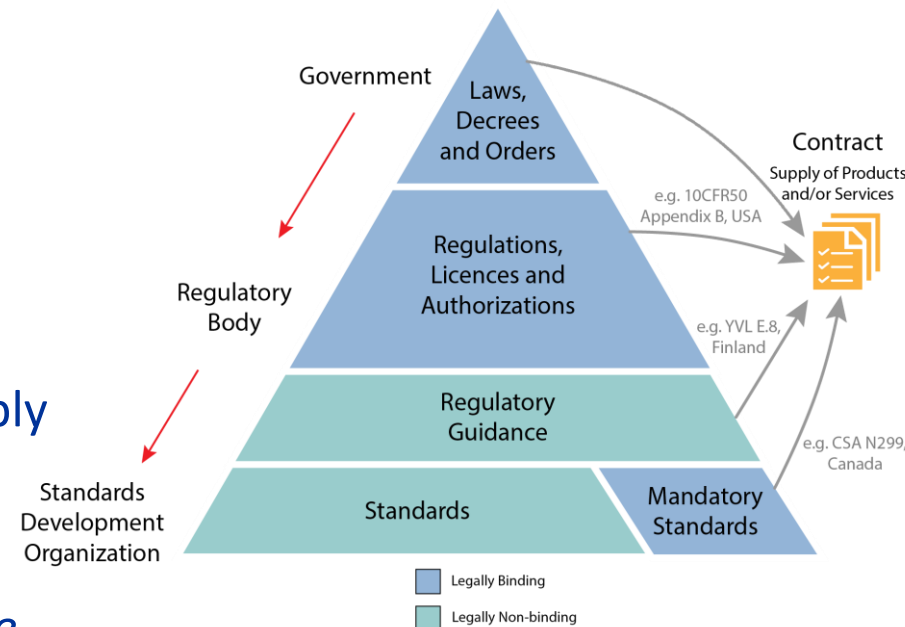
- New generation in old/new companies (nuclear knowledge preservation)
- “Oldtimers” faced with new technologies / practices
- Challenges with people – nurturing nuclear quality culture in the “extended enterprise” supply chain

-> *On-the-job learning – competent human resources are a long lead item*



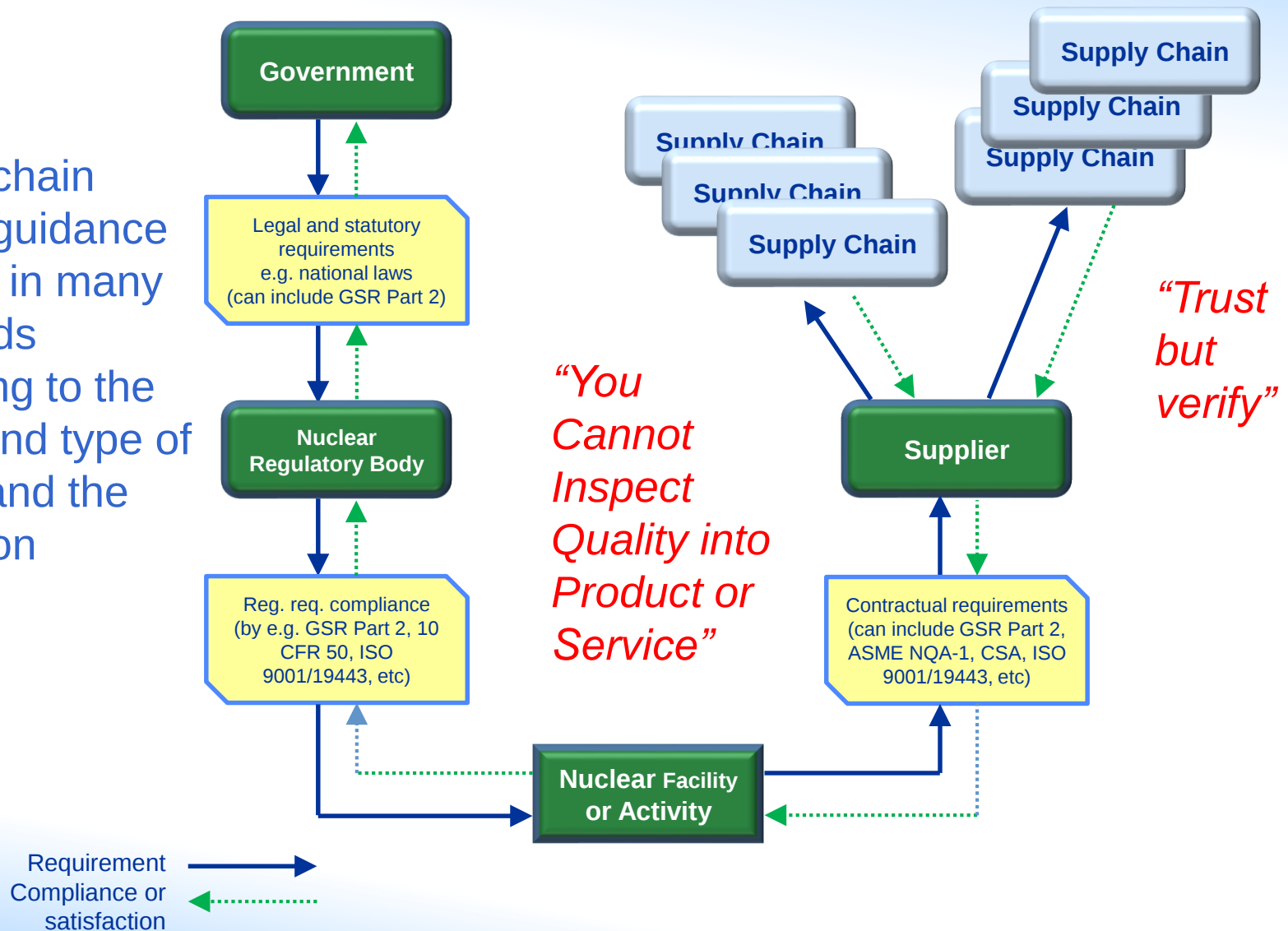
Current Supply Chain and Procurement Trends and Challenges 3

- **Supply of services on-site/off-site is important**
 - TSOs, Testing and inspection as an example of service supply – it is equally important as equipment
 - Management of on-site contractors
 - > *Induction training and working own management system*
- **Differing regulatory requirements & standards between the Member States**
 - Comprehensive procurement and supply chain oversight processes not an easy task
 - > *Vendors and equipment suppliers must face this in every new country and analyse the gap – unfortunately there is no other way (future harmonization?)*
 - > *Operators need to understand the related risks and apply graded approach*



Supply quality management

Supply chain related guidance is found in many standards according to the phase and type of supply and the regulation

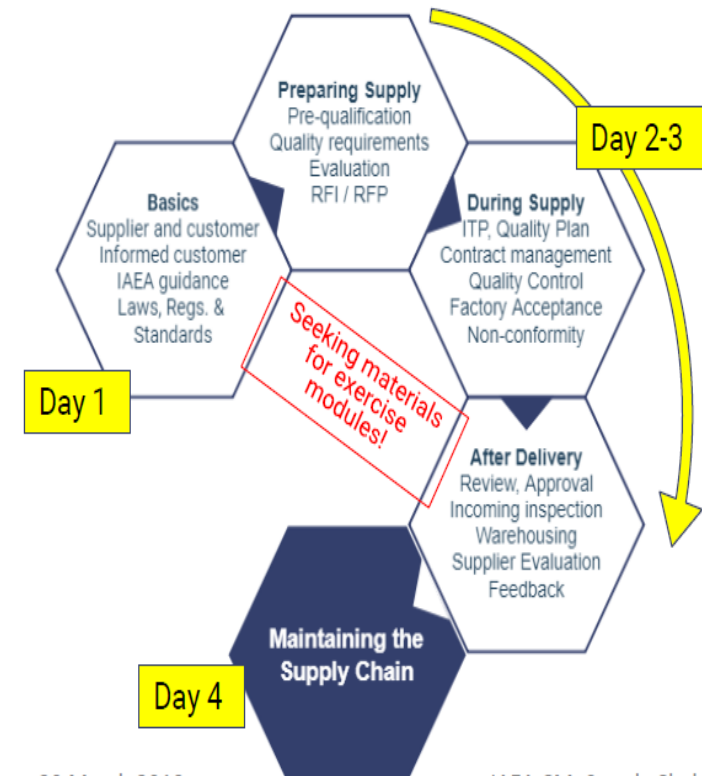


Near Future IAEA NE Work Related to Nuclear Supply Chain

Development of the Web based supply chain management toolkit, including collection of (management & quality) regulations and standards, through series of meetings

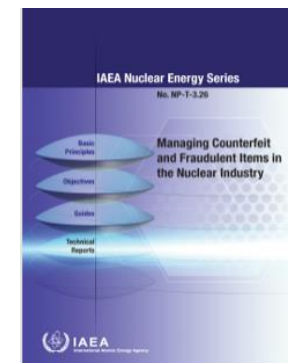
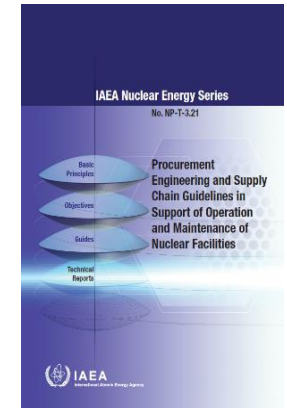
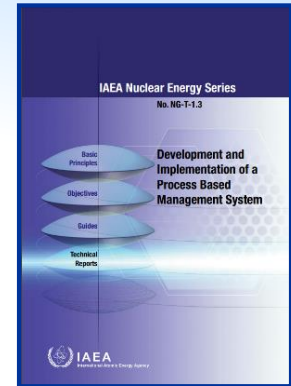
Pilot training course on nuclear supply chain management (including engineering challenges),
30 September – 4 October, Vienna, Austria

Technical Meeting on Supply Chain Management and Oversight of Service Suppliers, 3-6 December 2019, Paris, France



Some IAEA NE Series Publications

- Development & Implementation of a Process Based Management System (NG-T-1.3, 2015)
- Procurement Engineering and Supply Chain Guidelines in Support of Operation & Maintenance of Nuclear Facilities (NG-T-3.21, 2016; contains procurement guidance, including proactive actions for new NPP contracts)
- Industrial Involvement to Support a National Nuclear Power Programme, NG-T-3.4 (2016)
- Managing Counterfeit and Fraudulent Items in the Nuclear Industry (NP-T-3.26, March 2019)
- *Developing a publication on asset management*
- *Developing a draft IAEA Technical Document on inventory control of spare parts and obsolescence management for operating nuclear power plants*
- *Management of supply chain? (first a web toolkit) ...*



Supply chain is part of your whole system and you need to care for it

Informed customer(s) need to operate to anticipate things before they happen, and (in an ideal world they would):

- Agree on a common regulation, management system and quality requirements for operating organizations and suppliers;
- Agree on a common set of NPP requirements (specs) that was easy for experienced/newcomer countries to adopt and suppliers to bid to
- Share supplier audit/assessment results among operating/supplier organizations within a country, a region, or globally
- Share freely information on discovered counterfeit and fraudulent etc. items of risk
- Share freely event lessons learned within and outside of the industry, **etc.**



HOW CAN WE GET TOWARDS THE IDEAL WORLD?



- There are **different regulations and owners** – this is not going to change in short term – understand and plan accurately early on how to handle things in practice (and ask those who are more experienced)
- **Customer role and oversight responsibility** (pre-qualifying, assessing, auditing, contracting, witnessing, controlling, approving, ...) – no standard or third party takes that role away “**Trust but verify**”
- **Qualification of suppliers** (face-to-face and in their premises) is the key thing rather than any certification
- **Traceability of in the design and supply chain** becoming more and more important – suppliers role to pass the requirements on and exercise oversight of sub-suppliers
- The only way to make the amount of oversight work reasonable in supply chain is **the use of graded approach**
- It is not just about the management system or quality (management or assurance) standards – also **the engineering standards** may have relevant requirements
- **Industry** cooperation, **commercial item** justification and any **cooperation** sound all good ideas – keep on going!



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Thank you!

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Website Structure (1/2)

0 Preamble (IAEA's Role and Standards)

1 Introduction

2 Legislations and Regulations

3 Standards

4 The Standards Landscape

5 Practical Applications

6 Glossary

1 Introduction

1.1 Background

1.2 Purpose

1.3 Scope

1.4 Users

1.5 Structure

2 Legislations and Regulations

2.1 Legislation

2.2 Regulation

2.3 Level of Prescription in
Legislations and Regulations

2.3.1 Goal Setting

2.3.2 Detailed Requirements

2.4 National Differences

2.4.1 Description of Regulation



Website Structure (2/2)

3.1 Generic

3.1.1 What are the Standards and Who Develops Them?

3.1.2 Why Use Standards?

3.1.3 The Role of Standards in Demonstrating Compliance - Conformity Assessment and Certification

3.1.4 Concepts and Terminology

3.2 Types of the Standards

3.2.1 Management System Standards

3.2.2 Quality Assurance and Quality Management Standards

3.2.3 Technical Standards

3.2.4 Other Standards

3.3 Specific

3.4 Descriptions of Standards

3.5 Standard Templates - Country Position

4 The Standards Landscape

4.1 Stakeholder (Interested Parties and Their Requirements

4.2 Standards in Supply Chain

5 Practical Applications

5.1 Examples of How Users Have Met Regulatory Requirements

Guidance on Actions to Take When Considering Adopting a Standard

5.2 Examples of How Users Have Implemented Arrangements to Comply With the Requirement of Standards

6 Glossary