IAEA Guidance about Owner / Operator (O&O) Responsibilities, Management System and Supply Chain

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Some basic concepts

- **Owner**– the entity (registered company, government organisation) that owns the asset of the NPP (incl. project) ….
- **Operator** or Operating organisation – An organization applying for authorization or is authorized to operate a facility
- **Licensee** – The organization having **overall responsibility for safety of** a facility or activity (the responsible legal person – assumed to be the same as Owner (and having **design authority** function)
- **Shareholders** – people or companies investing equity in the owner company
- **Vendor** – Owner of the Technology/Design, may also be Designer and/or have architect **Architect Engineer (AE)** design capability
- **Owner's Engineer** – provider of comprehensive support (TSO), even EPCM (engineering, procurement, construction management)
- **Contractor** – organisation undertaking specific activities by the licensee/operating organisation

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Whatever the relationship between the Owner, Operator and the Licensee may be, the responsibilities need to be clear and continue to be clear in different NPP life cycle phases

Safety Standards Hierarchy

Provide the basis for the IAEA's safety standards and its safety related programme

Must be met to ensure protection of people and environment

Recommendations and guidance on how to meet the requirements

Practical guidance for implementation

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Fundamental Safety Principles: SF-1

Fundamental Safety Principles

To protect people and the environment from harmful effects of ionizing radiation

Principle 1
Prime responsibility for safety rests with the person or organisation responsible for facilities and activities that give rise to radiation risks

Principle 2
An effective Legal and Governmental framework for safety including independent regulatory body must be established

Principle 3
Effective leadership and management for safety must be established and sustained in organisations concerned with, and facilities and activities that give rise to, radiation risks

Principles 4 to 10

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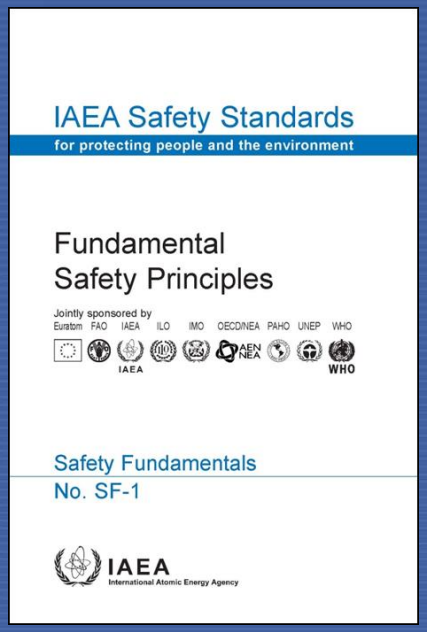
THINK: WHAT DO PRINCIPLES 1 AND 3 MEAN?

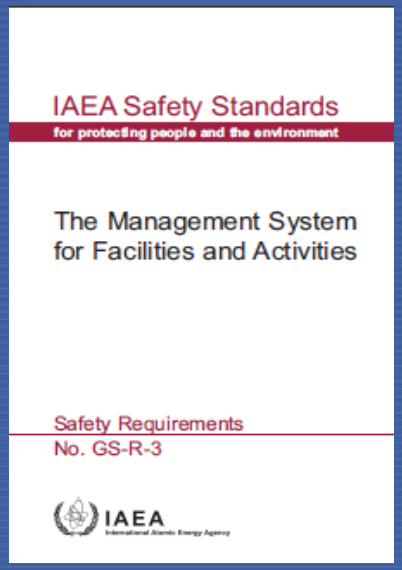
IAEA Current Safety Standards on Management System

SAFETY FUNDAMENTALS



The pillars of a safe, secure and sustainable nuclear programme

SAFETY REQUIREMENTS



The requirements for a management system ensuring safety is not compromised

SAFETY GUIDES

Guidance for implementing a management system that meets the established requirements

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Why do we have to manage all the important elements of our organization in one system?

- Which one of these two is safe, secure, environment friendly producing good quality product economically?
- If one of the strategic pillars of a company (management system) fails, the others normally also suffer
- We have to make good and well-informed decisions and base them on all accumulated information!

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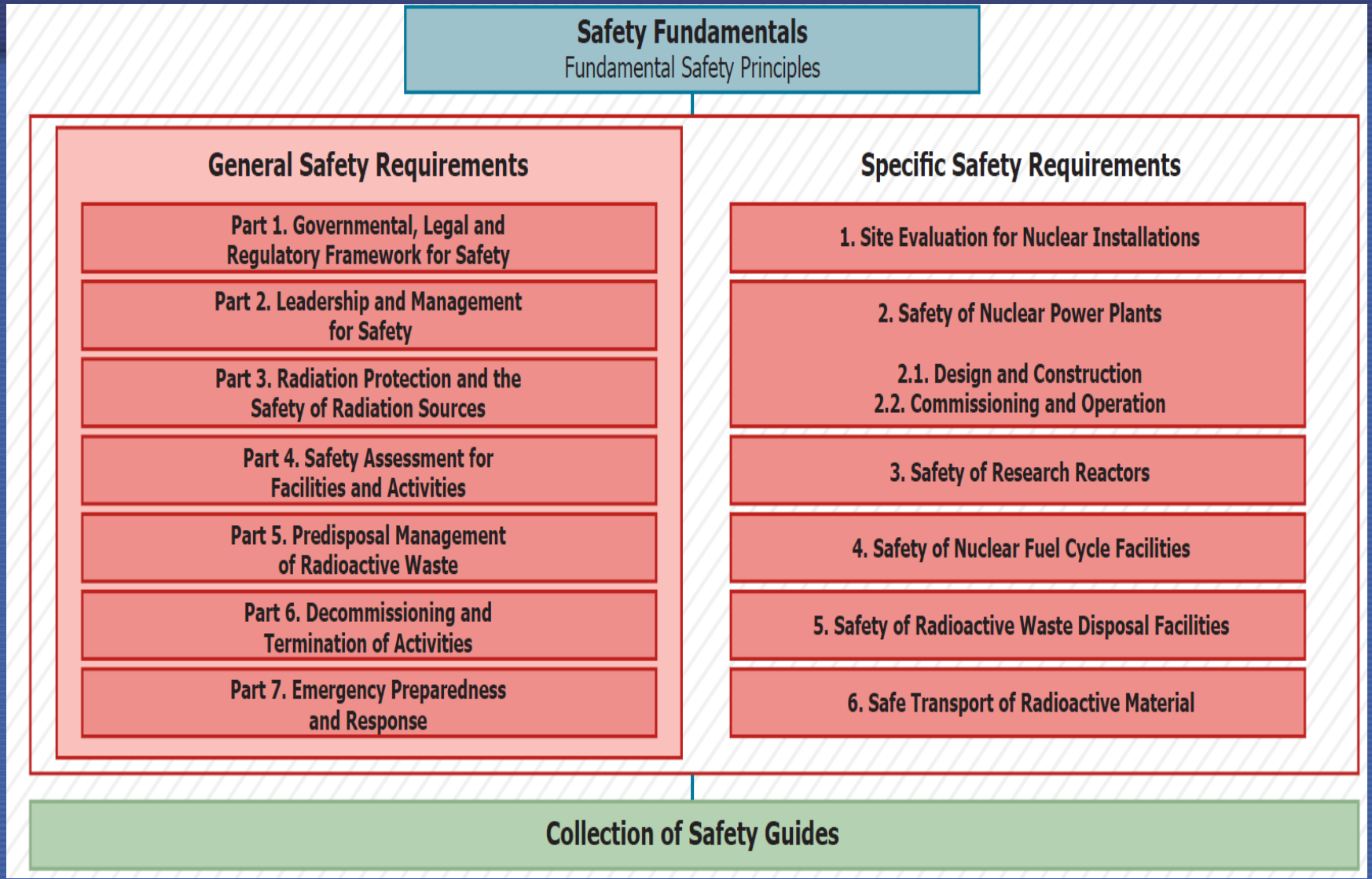
Future IAEA set of requirements



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… and NE Series practical guidance to aid in implementation

GSR Part 2 Leadership and Management for Safety (Draft)

- GSR Part 2 (NUSSC for approval in Nov 2016) establishes requirements for:

  Responsibility for safety (NEW),
  Leadership for safety (NEW),
  Management for safety (OLD) and
  Culture for safety (PARTLY NEW)

- GSR Part 2 will supersede GS-R-3, but it will include the concepts of GS-R-3 (some on more general level)

- 22 new items - Includes leadership / management for safety

- A management system seen as an essential tool to ensure adequate decision making, information flow about the objectives, safety measures and the fostering of a strong safety culture.

- GSR Part 2 consists of 5 Sections and 15 Requirements (under which are many items / sub-requirements)

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Additional IAEA literature

Management System Standards: Comparison between IAEA GS-R-3 and ISO 9001:2008, IAEA Safety Reports Series No. 69, IAEA, Vienna (2012).

Management System Standards: Comparison between IAEA GS-R-3 and ASME NQA-1-2008 and NQA-1a-2009 Addenda, IAEA Safety Reports Series No. 70, IAEA, Vienna (2012).

Management of Continual Improvement for Facilities and Activities: A Structured Approach, IAEA-TECDOC-1491, IAEA, Vienna (2006).

Managing Organizational Change in Nuclear Organizations, IAEA Nuclear Energy Series No. NG-T-1.1, IAEA, Vienna (2014).

Use of a Graded Approach in the Application of the Management System Requirements for Facilities and Activities, IAEA-TECDOC-1740, IAEA, Vienna (2014).

Development and Implementation of a Process-Based Management System, To appear soon.

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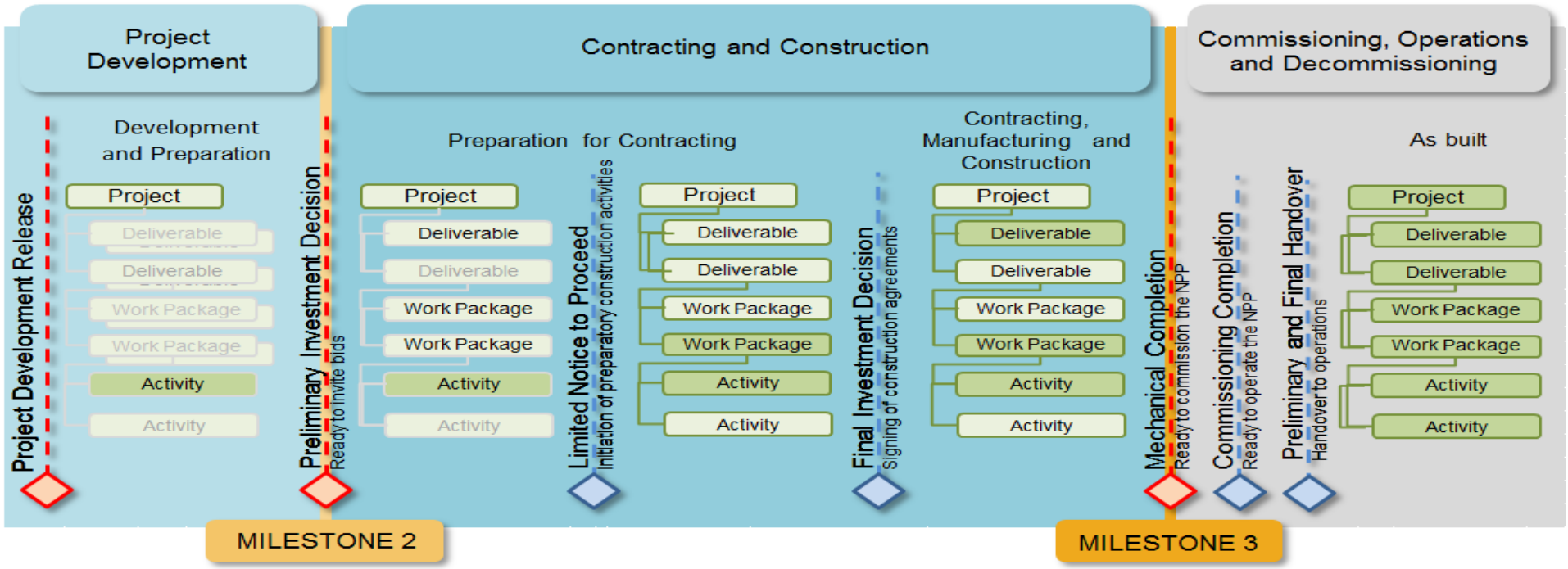
Project requires decisions & development



BIS = Bid Inquiry Specifications

There are many decision gates in a project deserving development activities and different readiness to continue – administering is not enough

These gates may slightly differ in different projects

Basis: NG-T-3.1 " Initiating Nuclear Power Programmes: Responsibilities and Capabilities of Owners and Operators" that is currently being revised

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What the O&O, at least, has to do in phase 2

1. Request the government to develop enhancements to the country's educational and research institutions (resource planning!!);
2. Understand national legislative and regulations for nuclear power, nuclear safety, nuclear security and safeguards;
3. Establish and maintain nuclear safety, security oriented work culture in the organization and all its activities;
4. Managing the interfaces with the national regulatory bodies and other stakeholders like the operating unit, including communication;
5. Assess the nuclear power available technologies and qualify the Vendors (and other main contractors) – Feasibility study
6. Develop, in conjunction with the NEPIO, a contracting strategy, a financing strategy, a fuel supply strategy and a spent fuel and radioactive waste management strategy (TECDOC-1750);
7. Develop the financing plan for the NPP project together with a strategy for managing associated financial risks;

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What the O&O, at least, has to do in phase 2

8. Complete site selection, site assessment and environmental impact assessment studies;
9. Ensure that the proposed grid design provides a sufficiently reliable grid connection;
10. Develop plan for radiation protection and industrial safety;
11. Prepare the NPP contracting activities by developing Bid Invitation Specifications (requirements!!) and evaluation criteria;
12. Establish and begin to implement the stakeholder involvement program, incl. public and media;
13. Contribute to the definition of the localization strategy by Governmentt;
14. Procure required services for pre-project activities (e.g. EIA, siting and consulting).

Observe that you may think that NPPD now is no more a newcomer and thus the IAEA milestone phases do not apply – maybe still skimming through the requirements is a good idea (?)

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What the O&O, at least, has to do in phase 3

1. Negotiate and finalize the NPP contract with selected main contractor (NPP Vendor, EPC Contractor, Consortium of Vendor with NPP Operating Organization)
2. Arrange and assure the effective financing for NPP contract;
3. Continue to implement and upgrade the appropriate Management System;
4. Build and maintain management attitude to assure a strong nuclear safety culture and nuclear security are in place;
5. Apply for construction license by issuing/reviewing the Preliminary Safety Analyses Report (see point 9!!!) with contribution from main contractor;
6. Negotiate and conclude the insurance for construction period;

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What the O&O, at least, has to do in phase 3

7. Develop and establish a Project reporting and management interface system with main contractor;
8. Review NPP design package issued by main contractor;
9. Ensure all site services (cooling water, electrical supply, offices, communications, roads, heating, etc.) are available and functioning for construction / commissioning;
10. Supervise the NPP construction and perform periodically audits of the main contractor (and supply chain) activities and quarterly/monthly Project review meetings;
11. Accept the work performed by the main contractor;
12. Participation to the factory tests of main equipment;

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What the O&O, at least, has to do in phase 3

13. Supervise and accept the individual test of the erected equipment;
14. Manage licenses and permits for NPP construction, including environmental permits;
15. Implement all safeguards measures (for documents, too!) and have the NPP safeguards system approved by national regulatory body before receipt of first nuclear fuel on NPP site;
16. Implement all necessary radiation and environmental monitoring and protection programmes before the first nuclear fuel load is transferred to the NPP site;
17. Ensure site security arrangements, environmental monitoring and emergency planning arrangements are functioning correctly before the first fuel load arrives on site at the NPP;
18. Procure and transport the nuclear fuel to the NPP site;

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What the O&O, at least, has to do in phase 3

19. Establish the procedure to identify the different categories of radioactive waste and to treat them accordingly;
20. Apply for commissioning/operation license by issuing/reviewing the Safety Analyses Report with contribution from main contractor;
21. Develop the NPP maintenance program based on the main contractor support and using the experience of the reference plant;
22. Establish the procurement strategy for operation phase - please, do it earlier (maintenance policy, external services and spare parts);
23. Establish and operate public information centers
24. Request and review Decommissioning plan (you will need to handle it probably in future)

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What the O&O, at least, has to do in phase 3

25. Accept the main contractor payment (invoices) as per agreed contract procedures and in accordance with the established Project budget;
26. Decide about that concerns safety/schedule/budget during the NPP construction;
27. Agree with the grid operator the schedule for grid upgrade projects to meet the NPP construction schedule and verify the implementation of the upgrades;
28. Perform application and obtain grid license (license for electricity generation);
29. Recruit and train appropriate operating staff by establishing a training plan and a training centre, including the accreditation of training programmes, based on the main contractor support
30. Assure the appropriate permit for operating staff, in accordance with national regulations;

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What the O&O, at least, has to do in phase 3

31. Preparation of the commissioning together with the main contractor;
32. Participate to the preparation of operating procedure and documentation together with the main contractor
33. Organize and implement the operation department, including shift routine, operating policy and practices, all associated activities (maintenance, chemistry, radiation protection and technical support groups), based on the main contractor support and using the experience of the reference plant;
34. Implement a configuration management program in the plant starting with the beginning of operation (during the first tests of equipment), based on the main contractor support and using the experience of the reference plant;

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Other project topics for O&O worth considering

- Who is responsible for which type of risks?
- Liability Limits (nuclear, business, up to what time point)
- Escalation, guarantees
- Support and main company guarantees (bankrupcy etc.)
- Localization / supply chain / national development
- Technology Transfer
- Proprietary Rights / Disputes
- Export control & safeguards
- After sales support (partnership etc.)
- Dispute management
- Etc.

"To expect the unexpected shows a thoroughly modern intellect"
Oscar Wilde

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Partnership is a good way to increase competence, and it may …

- Reduce overall time taken by providing experience soon after the decision to create a nuclear programme
- Provide training and mentoring
- Provide experienced managers, staff and management systems
- Reduce first-time errors and industrial risks
- Facilitate financing and lend credibility to the project
- Create experience sharing and synergies

- Partners may be: Operators of the reference plant, own plant or other experienced operators; A large consulting firm providing owners engineer services; A vendor able to provide training services and on-the-job experience; A consortium providing some or all of the above

- **Caveat: O&O has to understand that strong partners do not free you from the responsibility to be an informed customer / responsible licensee**

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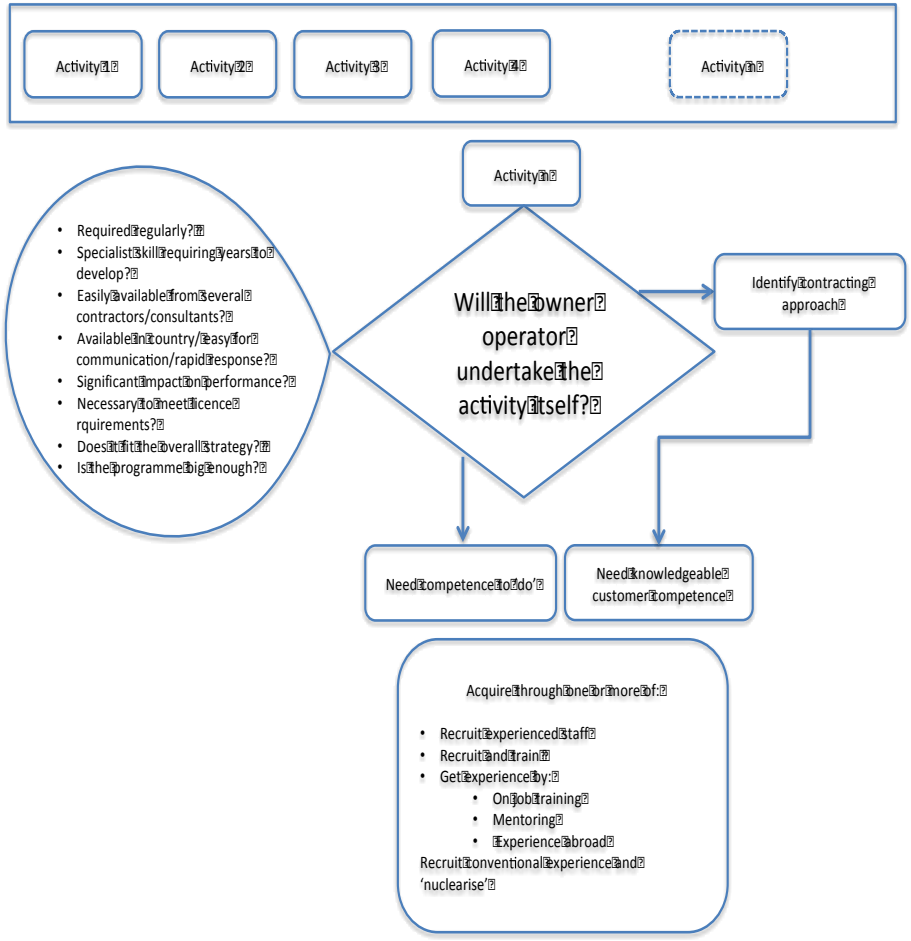
What O&O competences you may seek to develop in-house?



- Will the competence be required regularly or only once/rarely
- Is it a very specialist skill that will take years to develop
- Is it easily available from a number of contractors
- Is it available in country/ easy for communication/rapid response
- Does it have a significant impact on economy, safety, security, safeguards, environment, health, other importance e.g. licenses
- Overall contracting/KM strategy
- Size of the fleet e.g welders, reactor physicists or project management persons
- Etc.

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You may also have to have ….

- Advisors “on-site” e.g. from operating unit, ready to provide advice
- Training by experts on site and abroad with foreign trainees
- A route to a ‘back office’ in an experienced country
- Seminars and workshops between experienced peers and newcomers, including technical issues
- Shadow training (e.g. learning by working in pairs) with operating plant people
- Reference plant - Site twinning
- A local training centre serving also the project needs
- Language barrier overcome (get ready for this very early!)

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Among the key success factors are …

Whatever strategy is adopted to develop a capable organization, the following are essential:

- Put in place the right leaders who will form the objectives, lead responsibly and shape the culture
- Embed a nuclear work culture from the beginning including a **systemic and systematic management system integrating all elements**
- Develop capabilities and involve sufficiently experienced qualified people ("It is all about people") also knowing the needs of the operating unit
- Ensure transparency to the public (stakeholder involvement)
- Ensure the licensee is in control – design authority (requirements, contracts, approvals,…)
- Learn from international experience (secondments, involvement in OSART, WANO)
- Ensure any partnership to develop skills includes ongoing support for some time after startup

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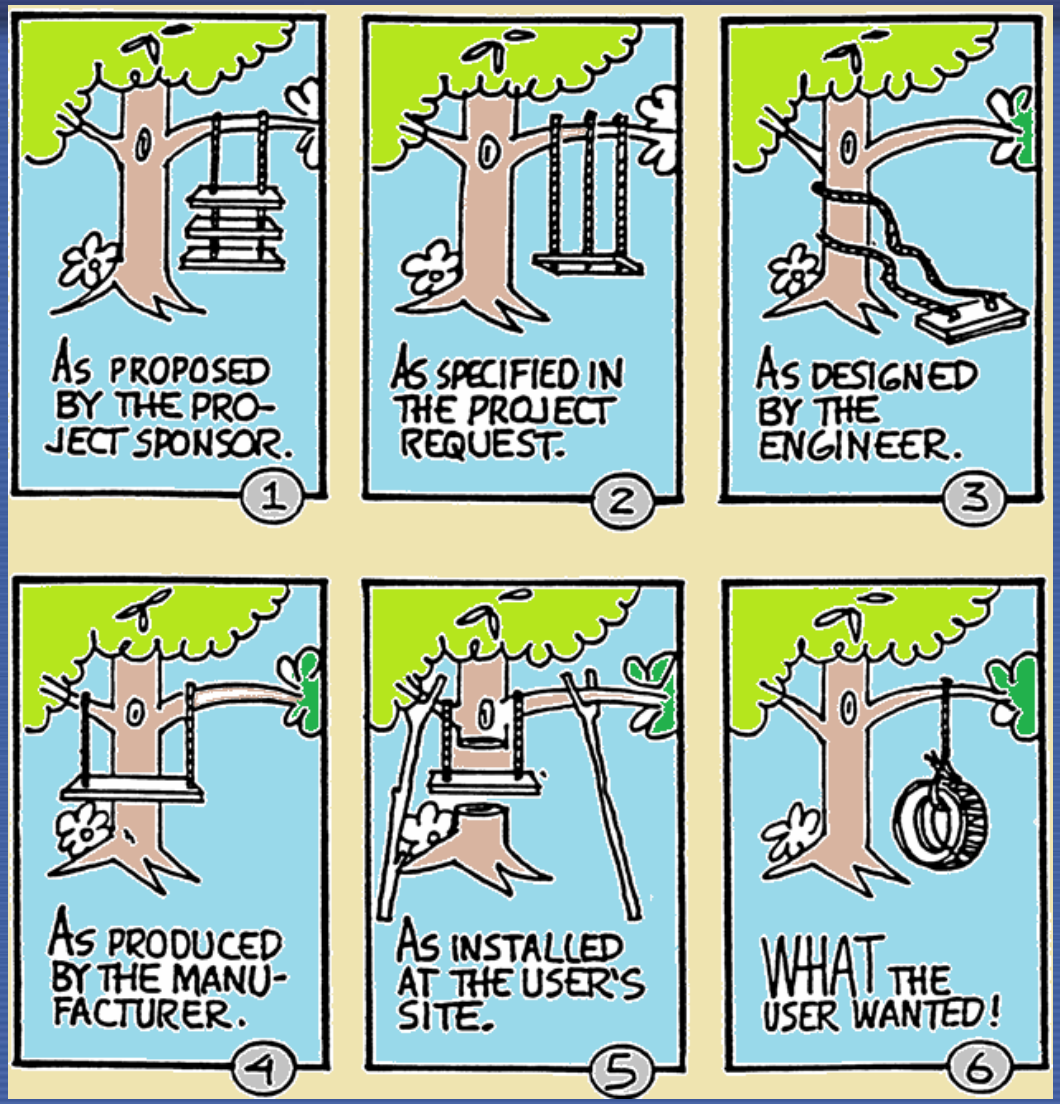
Why to be vigilant, organized and communicative early on?



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Some literature

Milestones in the Development of a National Infrastructure for Nuclear Power - NG-G-3.1, 2015.

Initiating Nuclear Power Programmes: Responsibilities and Capabilities of Owners and Operators, NG-T-3.1 (new edition 2017)

Project Management in Nuclear Power Plant Construction: Guidelines and Experience, NP-T-2.7

Workforce Planning for New Nuclear Power Programmes - NG-T-3.10

Managing Organizational Change in Nuclear Organizations - NG-T-1.1

Human Resource Issues related to an Expanding Nuclear Power Programme, TECDOC-1501, May 2006

Establishing the Safety Infrastructure for a Nuclear Power Programme – SSG-16

Safety of Nuclear Power Plants: Design, SSR-2/1

Licensing Process for Nuclear Installations Specific Safety Guide SSG-12

Construction of Nuclear Installations (Draft Safety Guide)

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5. Supply chain

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Comparison of IAEA GS-R-3 and ISO 9001

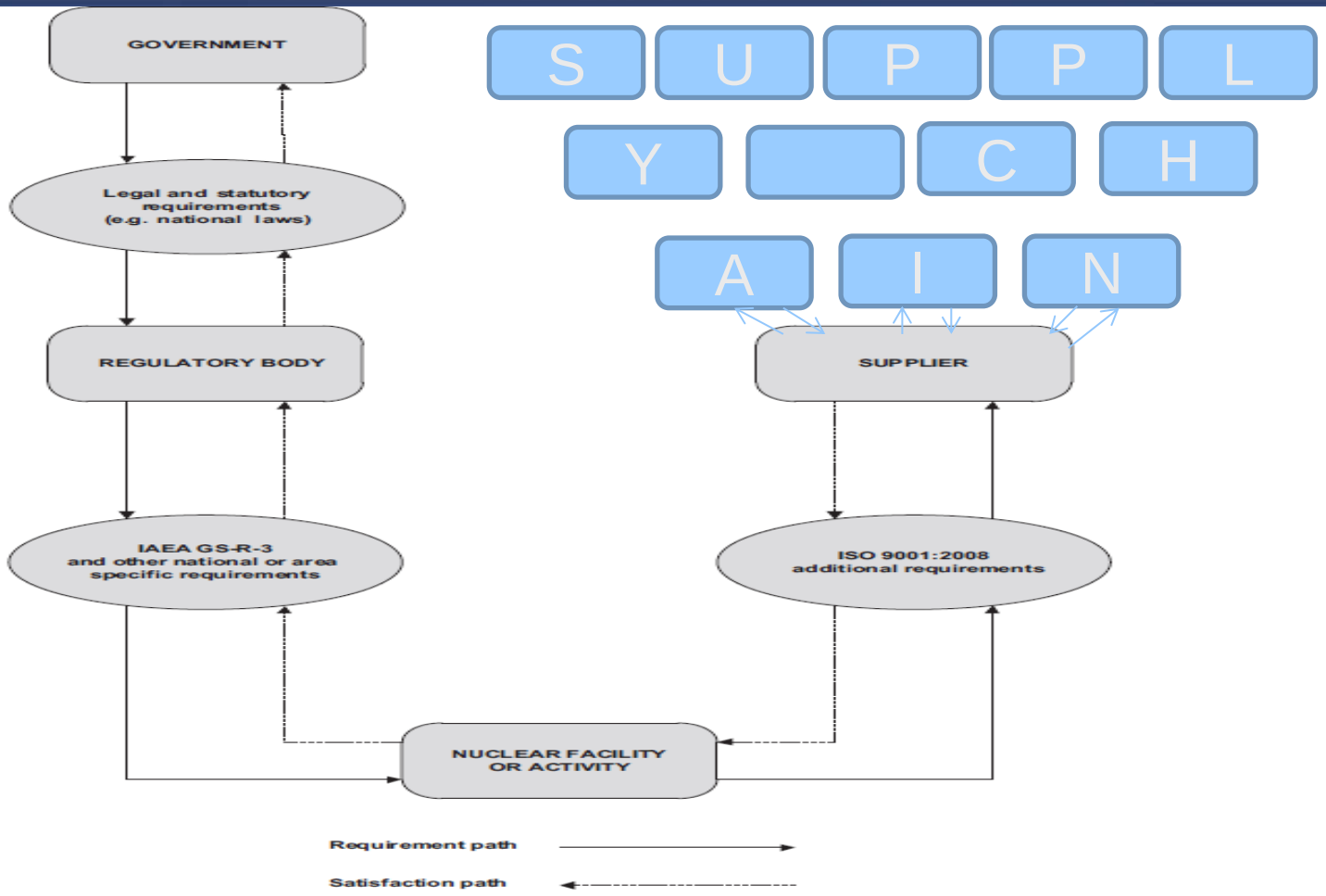
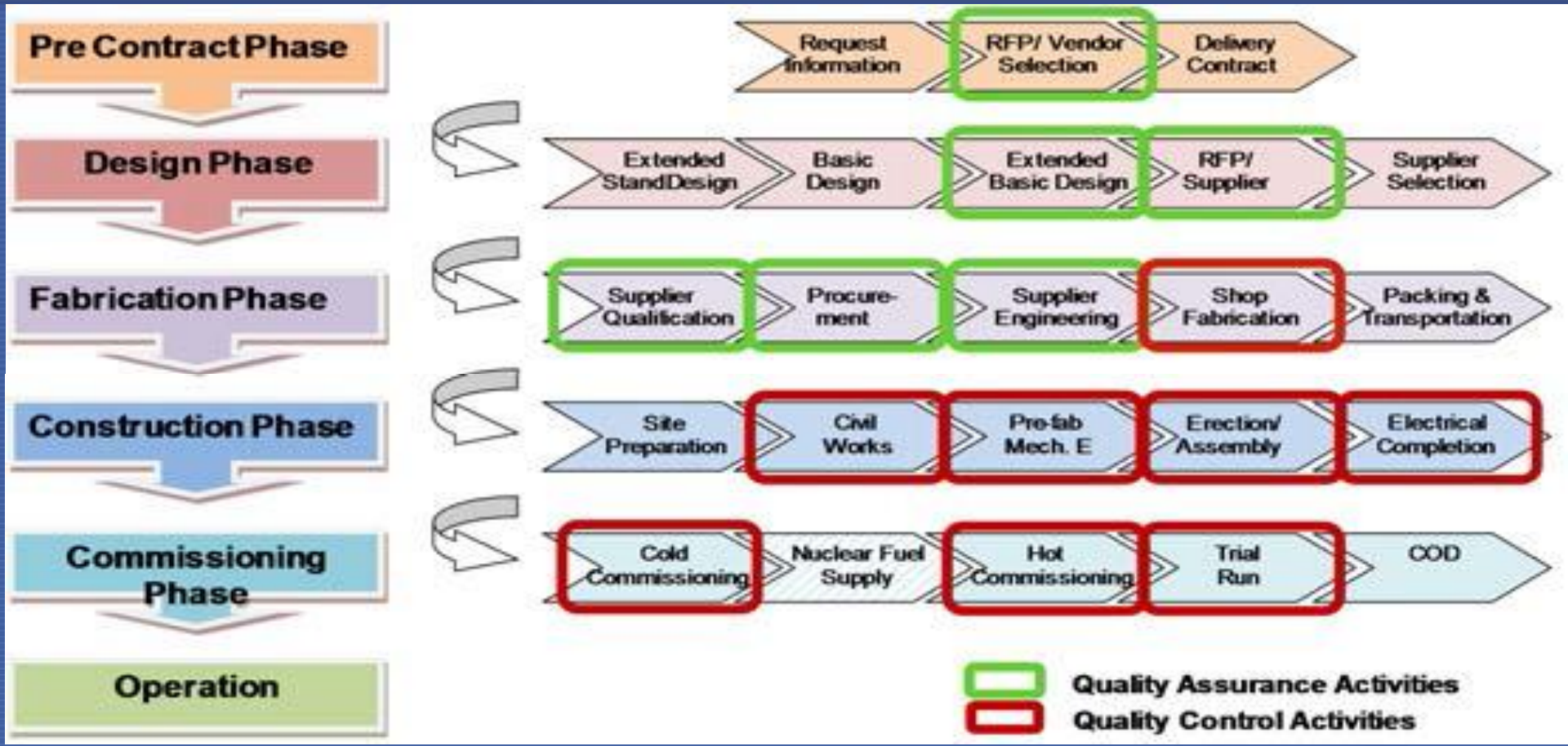


FIG. 1. Application of IAEA GS-R-3 and ISO 9001:2008. See Table 1 for examples of additional requirements.

Supply chain related guidance found in many safety standards depending on the phase and type of supply

TECDOC-1740 - use of a graded approach in the application of the management system requirements for facilities and activities



You need to grade SC oversight to be able to manage

TECDOC 1740 gives guidance about this

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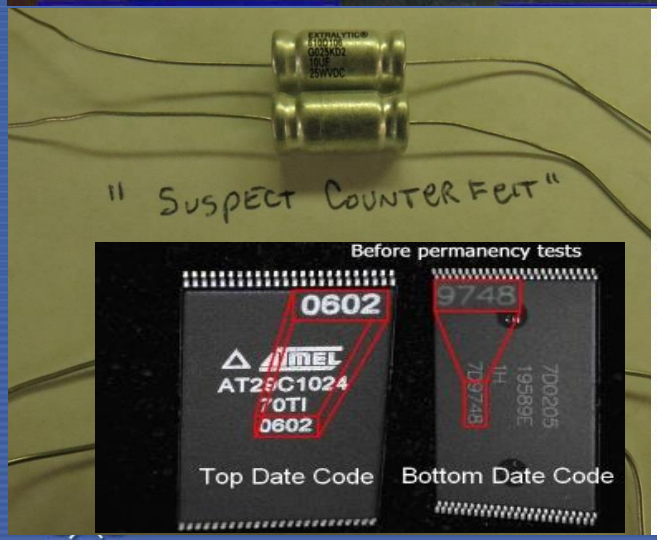
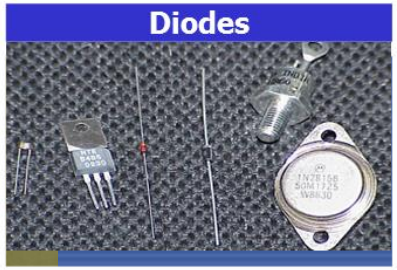
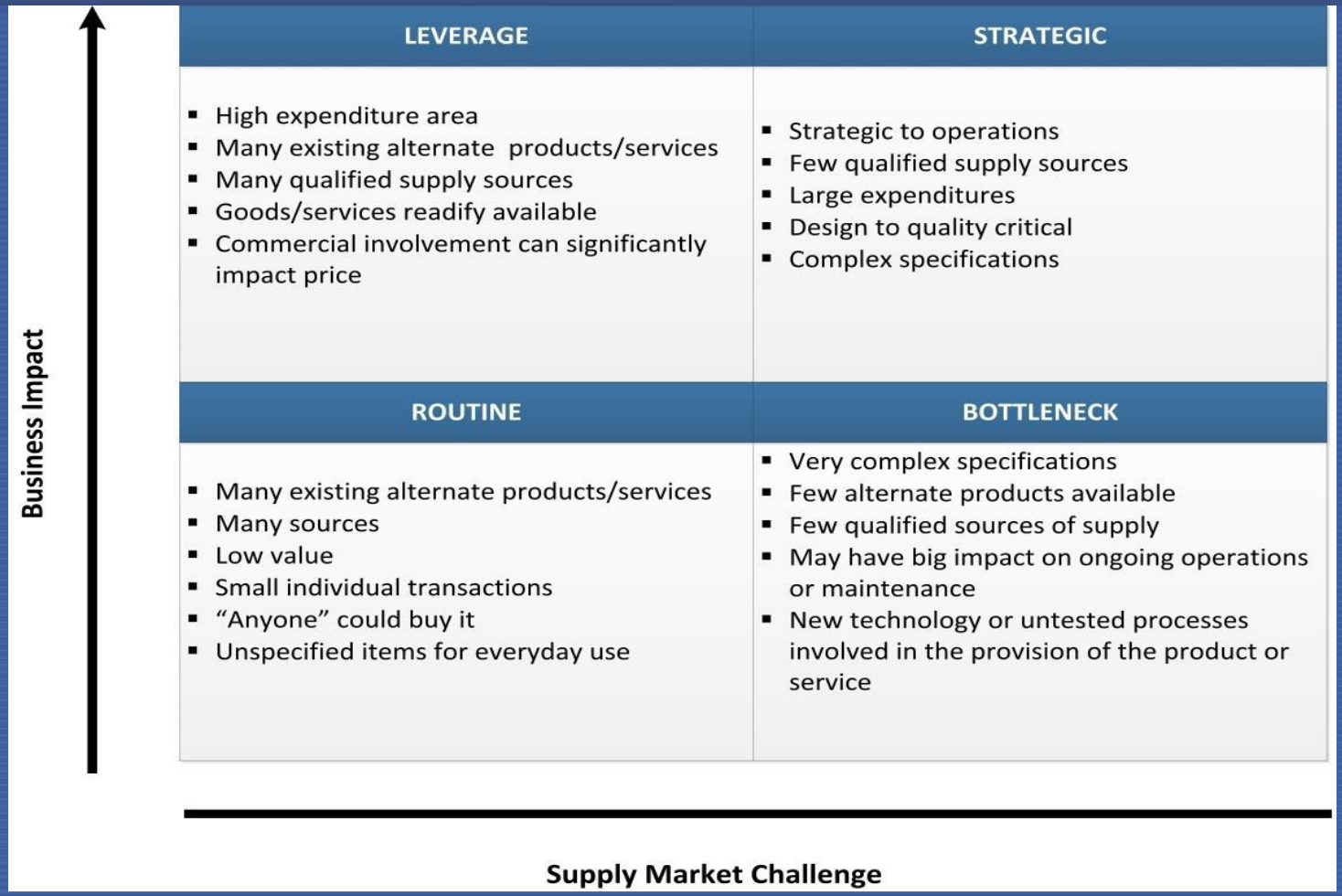
Examples of Fraudulent, Counterfeit or Suspect Items (FCSIs)– stay alert!





Supply market positioning



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A more thorough risk assessment may be necessary after this kind of preliminary identification

IAEA Literature

GS-R-3, GS-G-3.1, GS-G-3.5 + specific guides – and hopefully next year GSR Part 2 + related guides in 2017

IAEA-TECDOC-919 - Management of Procurement Activities in a Nuclear Installation, 1996 – to be superseded by ->

IAEA NE Series, NP-T-3.21 - Procurement Engineering and Supply Chain Guidelines in Support of Operation and Maintenance of Nuclear Facilities (foreseen to be published in early 2016) – gives a compendium of references to IAEA and other sources

TECDOC-1740 - use of a graded approach in the application of the management system requirements for facilities and activities, 2014

TECDOC-1169 - Managing counterfeit and fraudulent items in the nuclear industry, to appear as 2016 Edition

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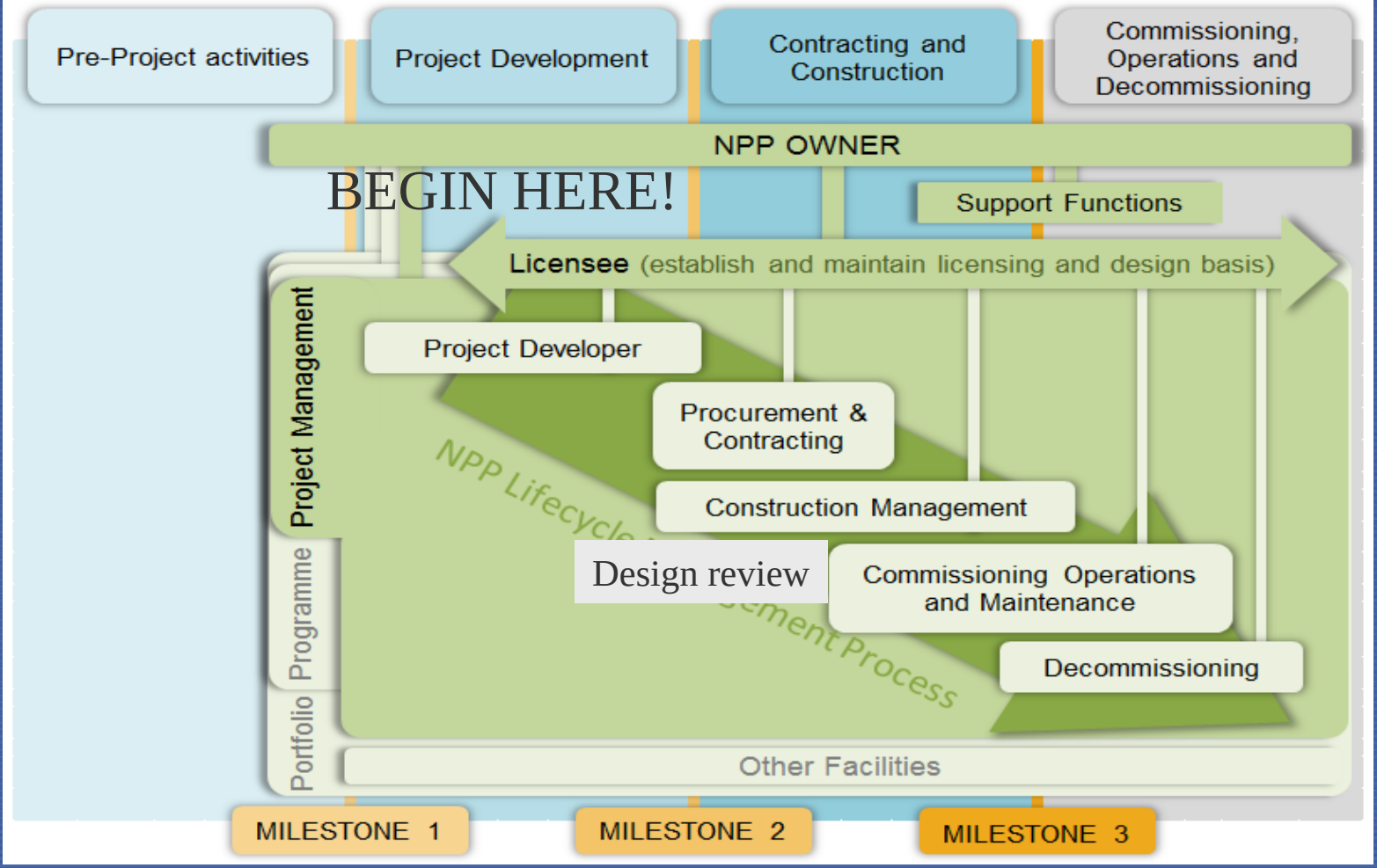
How your objective focus needs to change during your project



Begin now to lead and manage the project, if you haven't already, and make it sure you continue…

Thank you for your attention

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…Questions and comments?