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Joint ICTP-IAEA School of Nuclear Energy Management

8 - 26 August 2011

Integrated Management Systems

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IAEA, Vienna
Austria

Integrated Management Systems

Joint IAEA/ICTP School of Nuclear Energy Management

Andrey Kosilov, IAEA

(in cooperation with Jongile Majola
Nuclear Power Engineering Section, IAEA)

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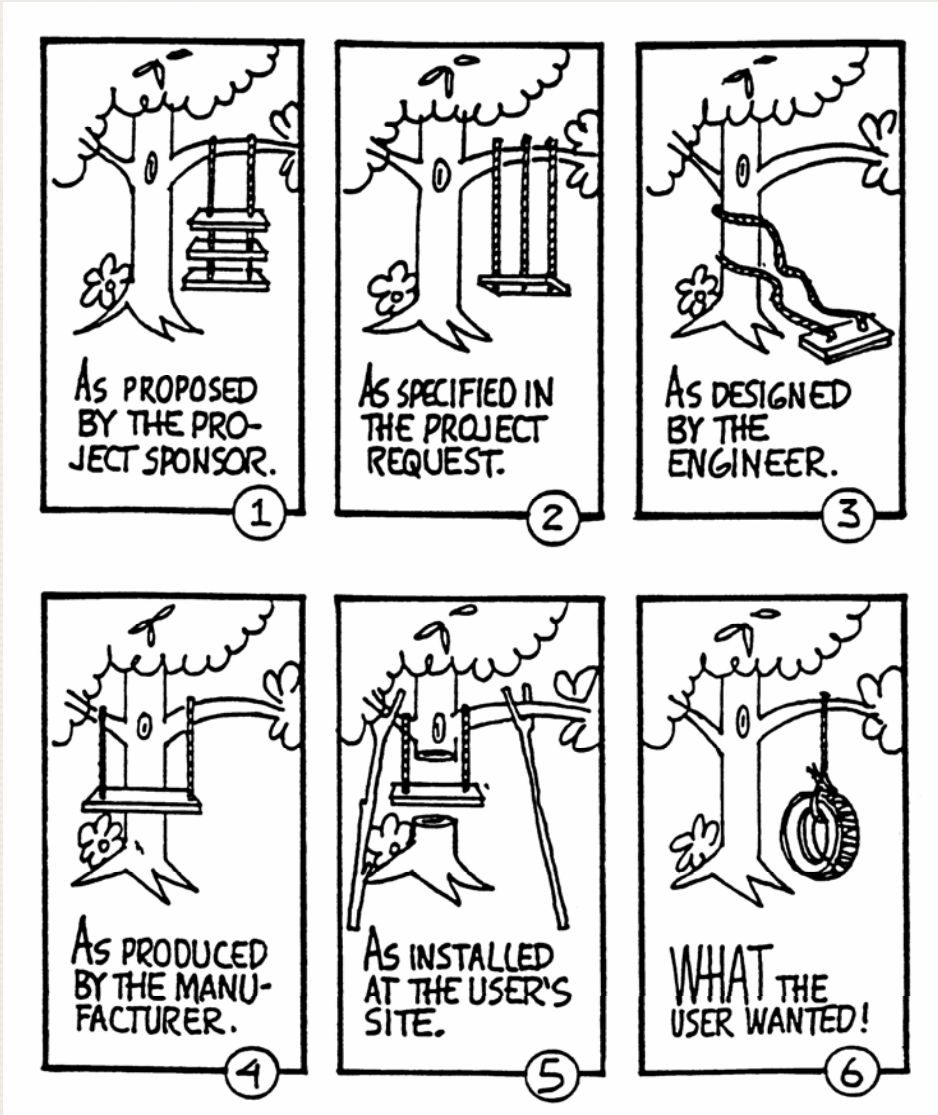
What a lack of a coherent management system can lead to



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Management

Coordinated activities to direct and control an organization

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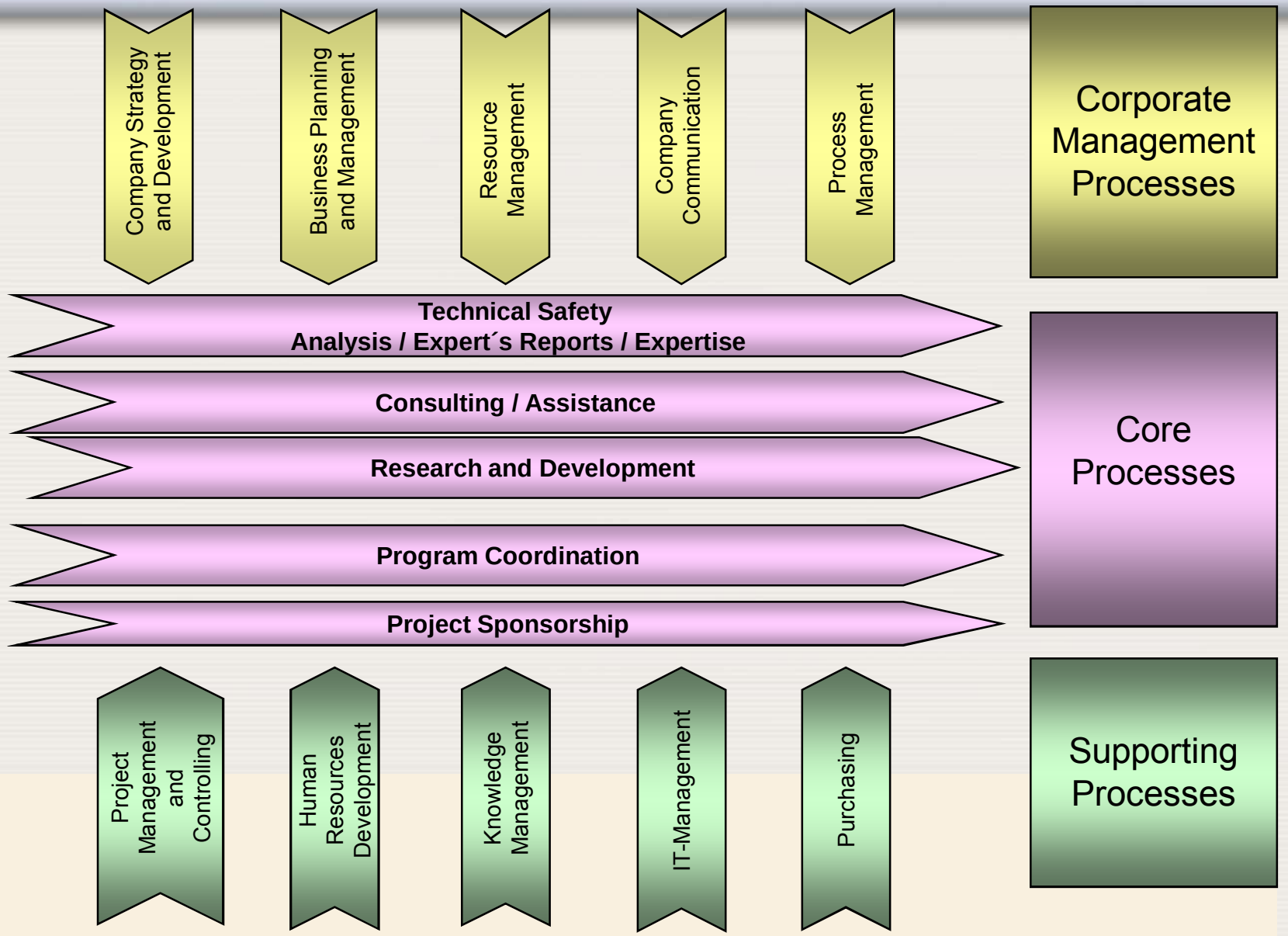
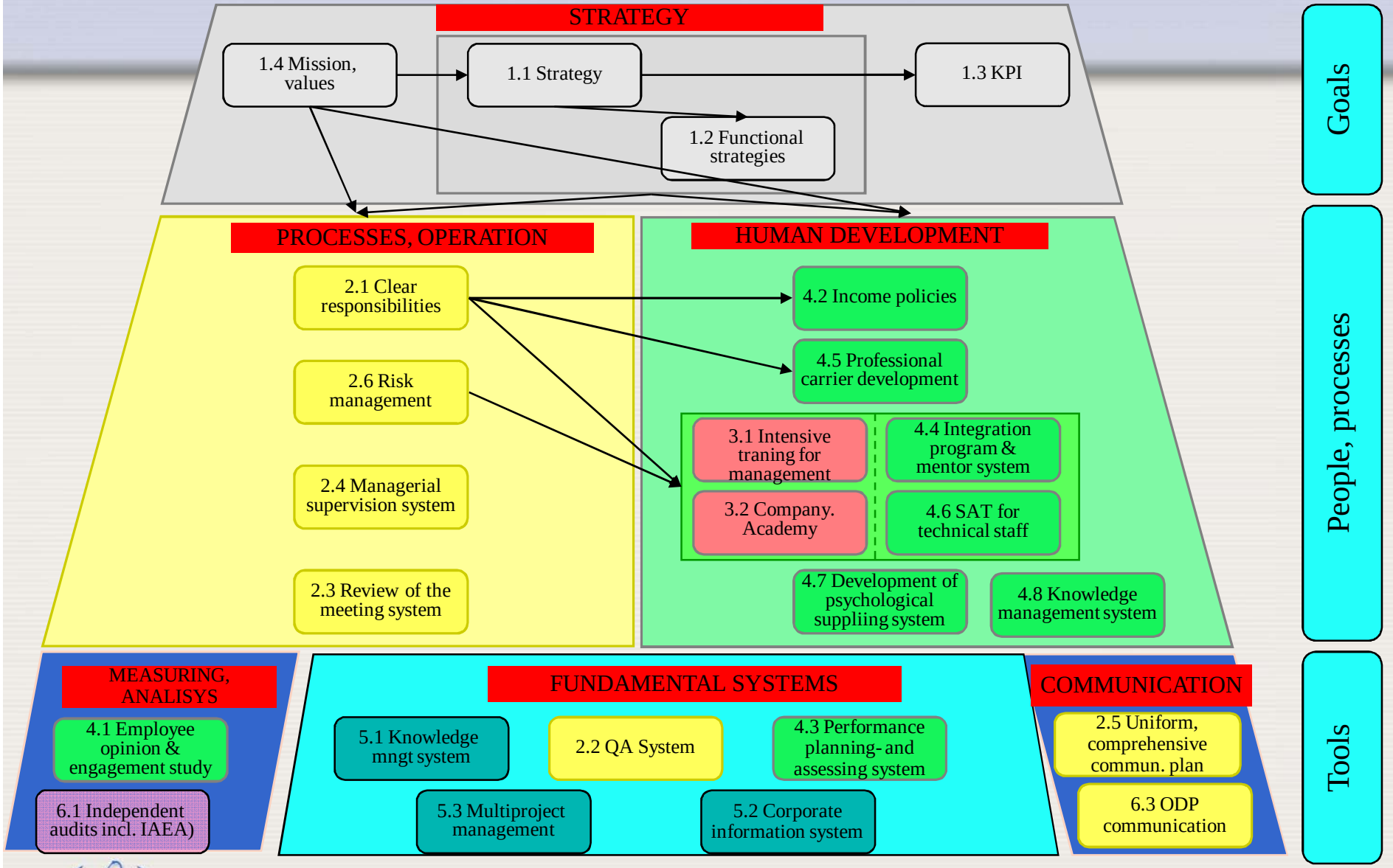
Business processes (GRS, Germany)



NPP Paks, Hungary



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Management System – IAEA definition

A set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective way.

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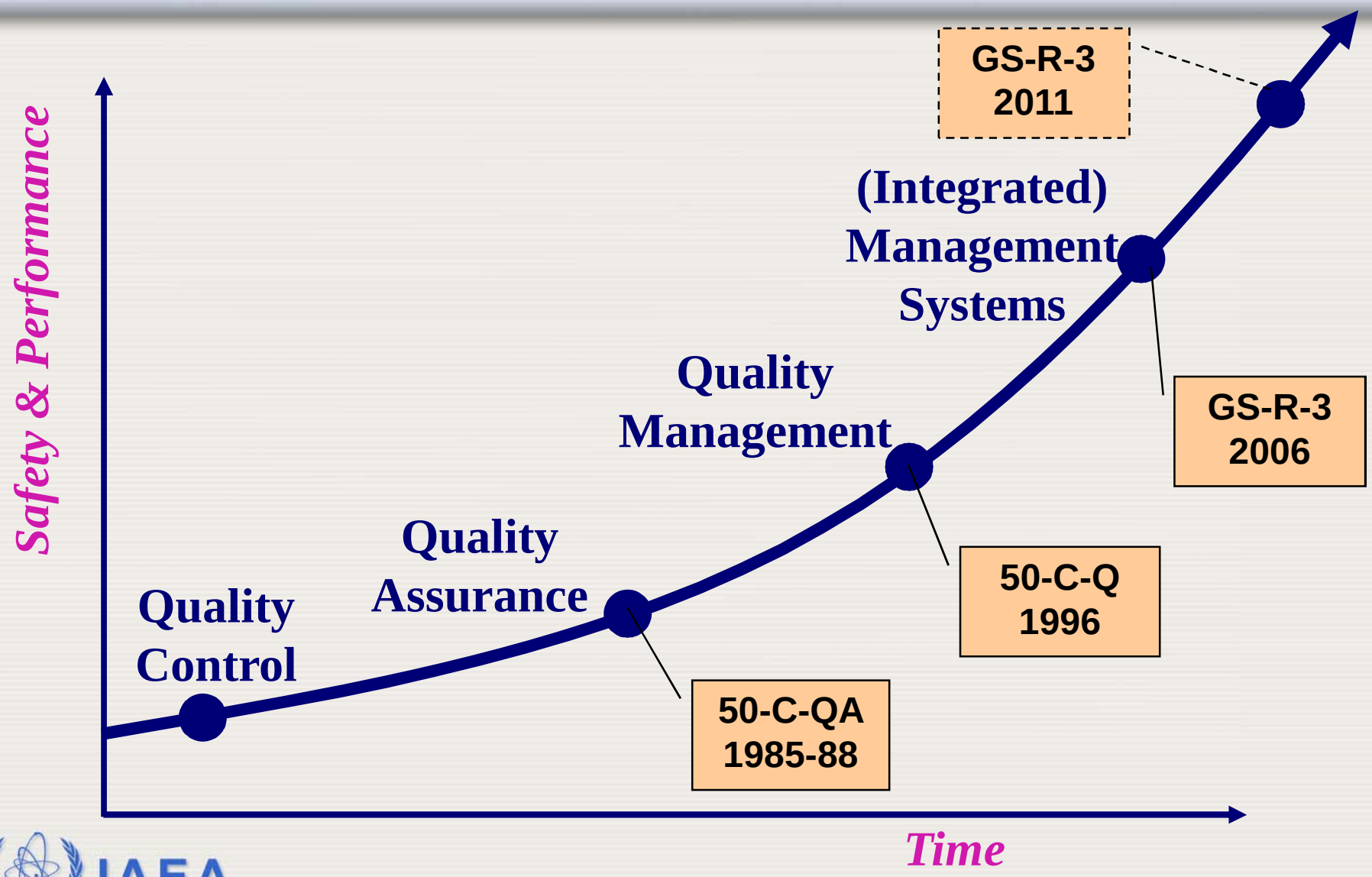
Evolution to Management Systems



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New Approach

Integrated

Management

System

Why Integrated Approach?

- **The management system integrates all elements of an organization into one coherent system:**
  - **Structure**
  - **Resources (including knowledge)**
  - **Processes**
  - **Personnel (including core competences)**
  - **Equipment**
  - **Organizational culture**
  - **Documented policies and processes**

Consideration of elements separately
may introduce a potential negative impact on safety and efficiency

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Integrated Management System - Definition

- A single coherent management system in which all the components, parts of an organization are integrated to enable the organization's objectives to be achieved
  - All management areas: safety, quality, environment, health, security, economical
  - Objectives, goals, strategies
  - Personnel, resources e.g. equipment, culture, policies, processes
  - One set of organizational processes (and their description) that address the totality of the objectives/requirements of the organization

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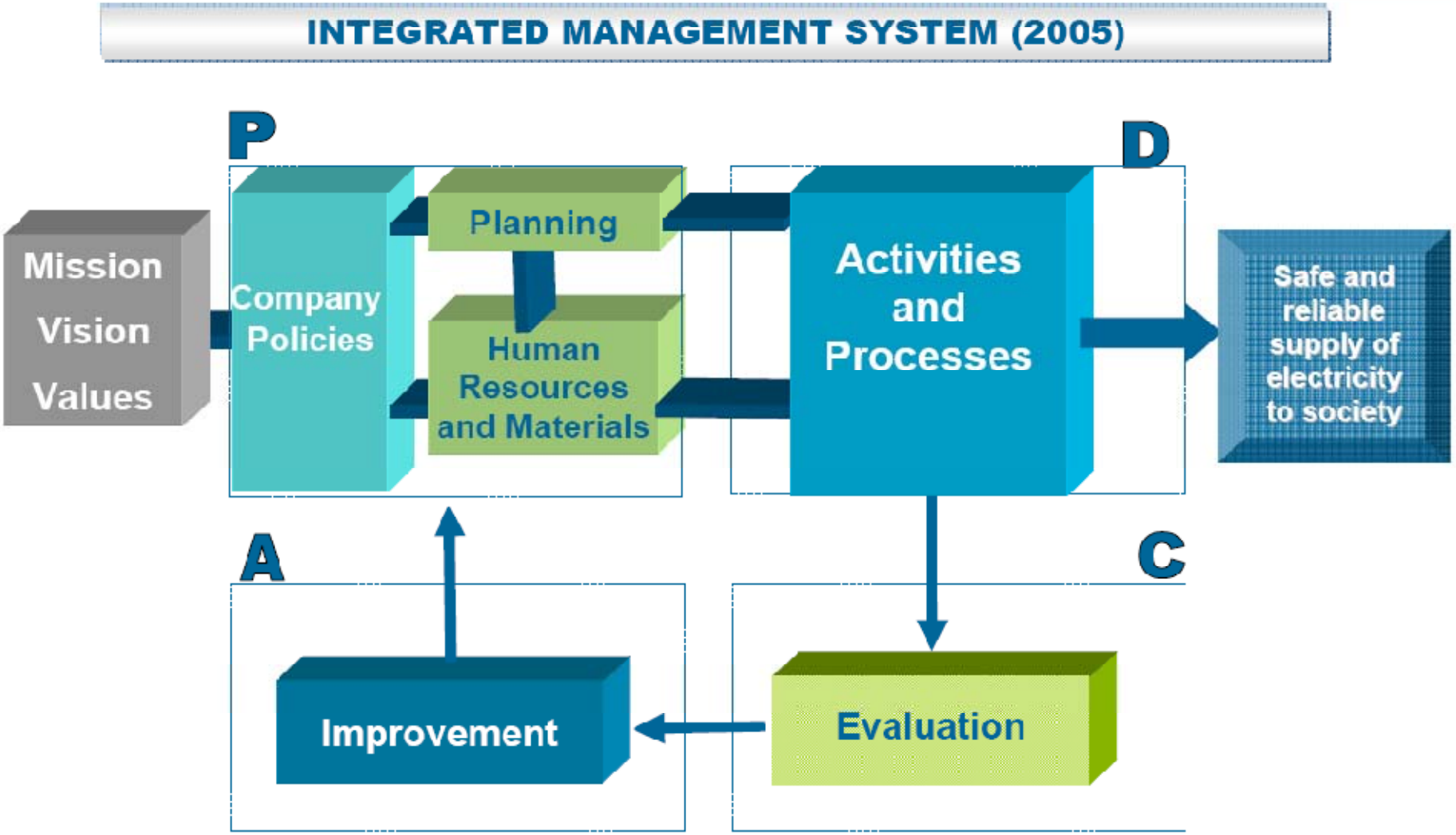
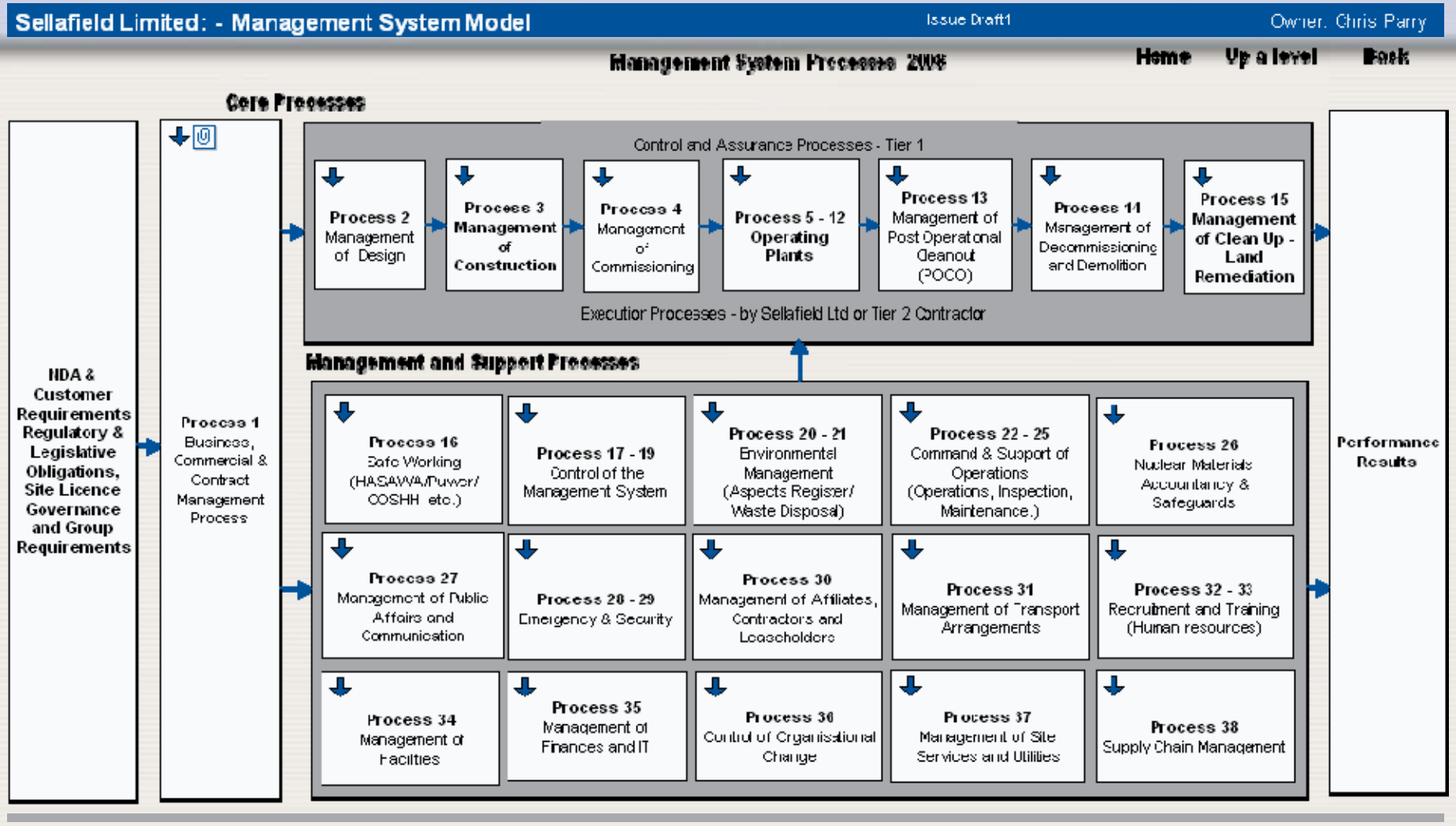
Integrated Management System,

Santa Maria de Garona NPP, Spain



Integrated Management System, Sellafield UK



These a part of the Update Handing degram, printed from the Link Map.

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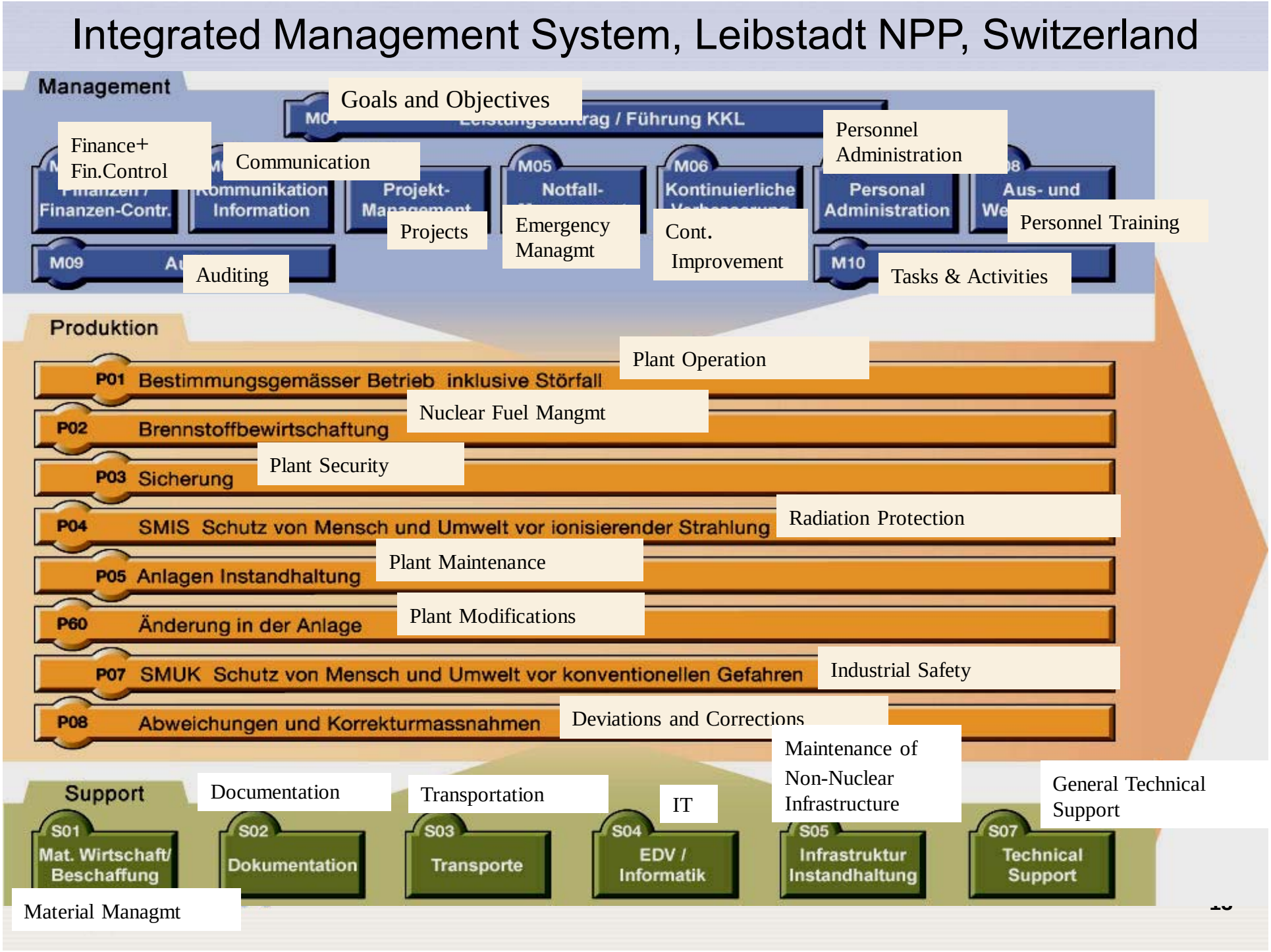
Integrated Management System, Leibstadt NPP, Switzerland

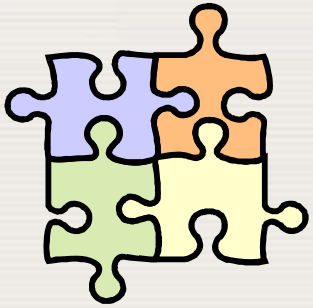


Safety Standards on Management Systems

Integrated Management Systems

Consideration of requirements separately may introduce a potential negative impact on safety

Therefore it is necessary to integrate all elements of managing nuclear facilities and activities to ensure that inter-related economic, health, security, quality and environmental, economical matters are not considered separately to safety matters.



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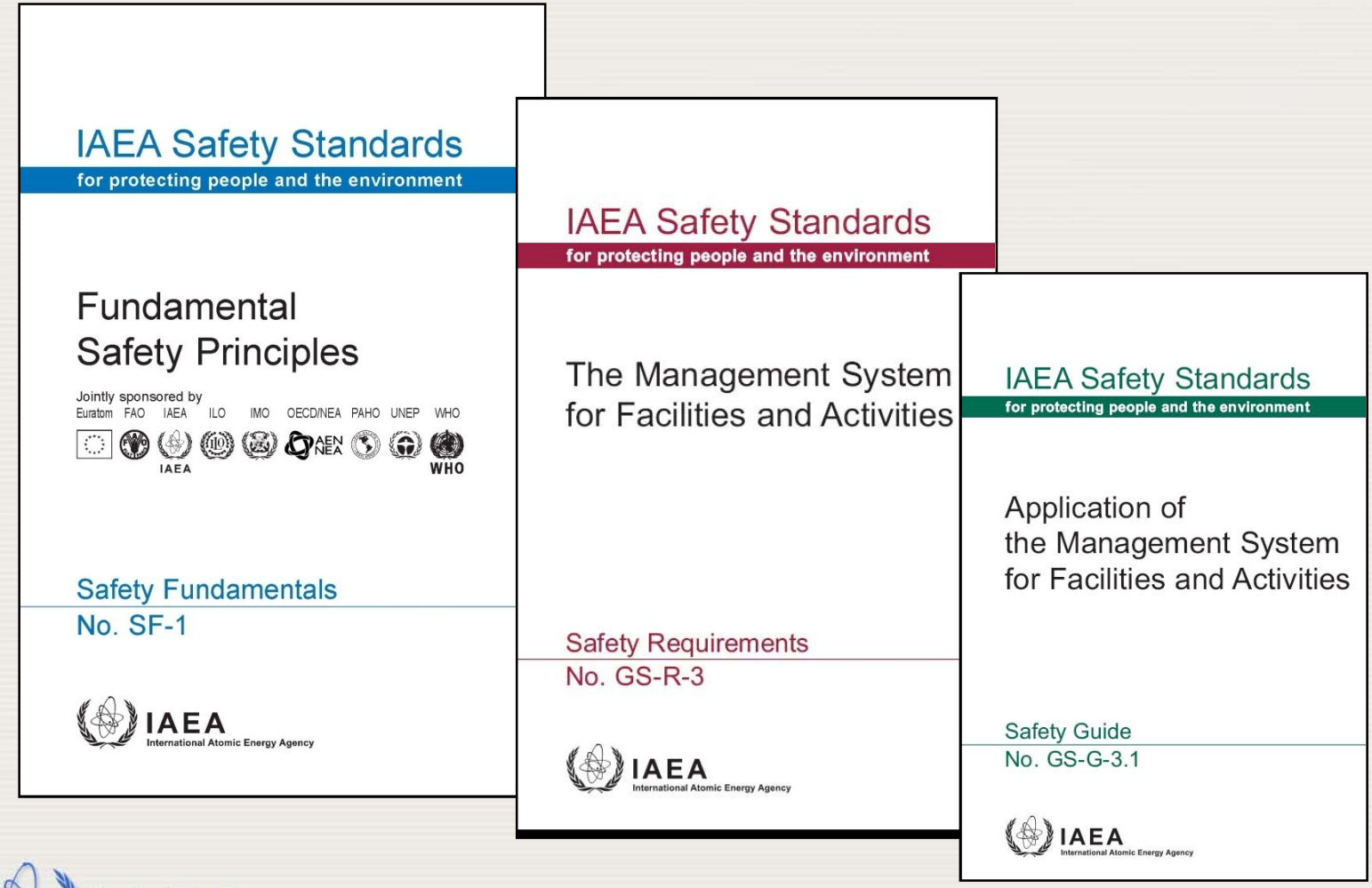
IAEA Safety Standards

Safety Fundamentals



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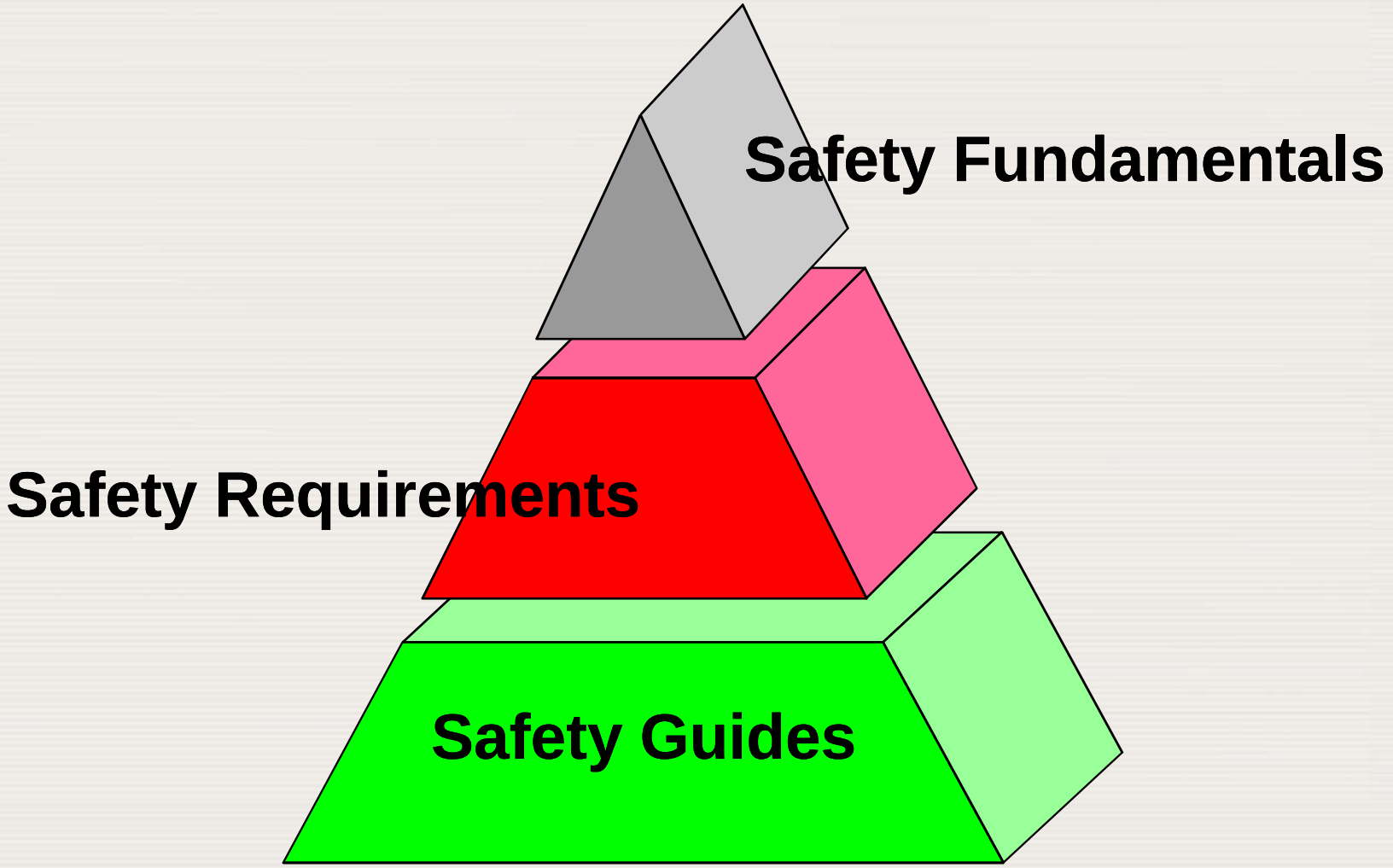
Document Hierarchy



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Structure of Safety Standards for Management Systems

SS five areas

GS-R-3: The MS for facilities and activities

General safety (applicable to all areas) ← **GS-G-3.1: The application of MS for F/A**
DS113: MS for Regulatory Bodies → GS-G-1.1

Safety of nuclear facilities ← GS-G-3.5 (DS349): MS for Nuclear Facilities

Radiation protection & safety of rad. sources ← GS-G-3.2 (DS315): MS for Tech. Ser. Rad. S.
DS319: MS in Rad. Saf. for Users (dropped/withdrawn)

Safe management of radioactive waste ← GS-G-3.3 (DS336): MS for Proc., Handl., Stor.
GS-G-3.4 (DS337): MS for Disp. of Rad. Was.

Safe transport of radioactive material ← TS-G-1.4 (DS326): M.S for Safe Transp. Rad.

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Fundamental Safety Principles

- **Principle 3 - Leadership and management for safety**
  - Safety has to be achieved and maintained by means of an **effective management system**.
  - This system has **to integrate all elements** of the management system
  - The management system also has to ensure the promotion of a **safety culture**,
  - Recognition of interactions of individuals with technology and with organizations

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GS-R-3 vs. 50-C-Q

- **GS-R-3 includes all the basic requirements of 50-C-Q**
- **Slight rewording of 50-C-Q clauses to:**
  - **aid clarification,**
  - **better align with ISO 9001:2000**
  - **reflect experience of using 50-C-Q**
  - **make requirements relevant to all 5 SS areas**
- **GS-R-3 more comprehensive to cover the broader subject of integrated Management Systems**
- **Experience of Member States reflected**
- **ISO, PNC, FORATOM, WANO involved**

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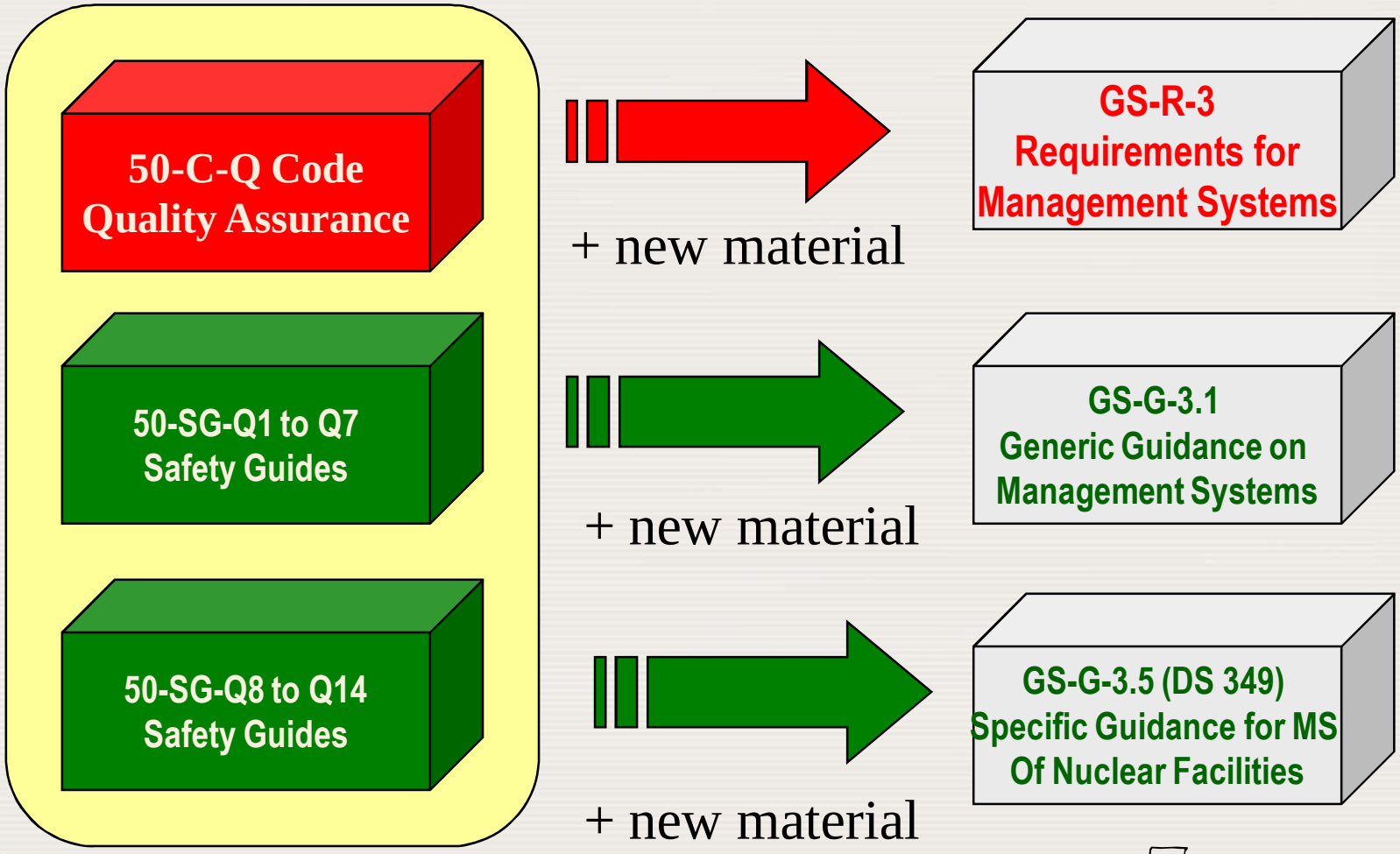
Latest IAEA MS Standards: Input Material

IAEA source material for GS-R-3, GS-G-3.1 and GS-G-3.5 (DS349)

SS 50-C/SG-Q (1996)



General Aims of GS-R-3

- To focus the performance of the organisation on achieving and improving **safety** through the planning, control and supervision of safety related activities in ***normal, transient and emergency situations***.
- To foster and support a strong ***safety culture*** through the development and reinforcement of good safety attitudes, values and behaviour in individuals, teams and the organisation so as to allow them to carry out their tasks safely.

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Scope of GS-R-3

Applicable for the establishment, implementation, assessment and continual improvement of management systems for:

- **Nuclear facilities;**
- **Activities using sources of ionizing radiation;**
- **Radioactive waste management;**
- **The transport of radioactive material;**
- **Radiation protection activities;**
- **Any other practices or circumstances in which people may be exposed to radiation from naturally occurring or artificial sources;**
- **The regulation of such facilities and activities.**

It covers the lifetime of facilities and the entire duration of activities.

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Users of GS-R-3

OPERATORS

- basis for their Management Systems to discharge their prime responsibility for safety
- basis for the interaction with the other parties

REGULATORS

- basis for licensing requirement for Operators
- basis for their own Management Systems

SUPPLIERS

- basis for additional safety requirements in contracts
- basis for introduction of additional requirements into their management systems

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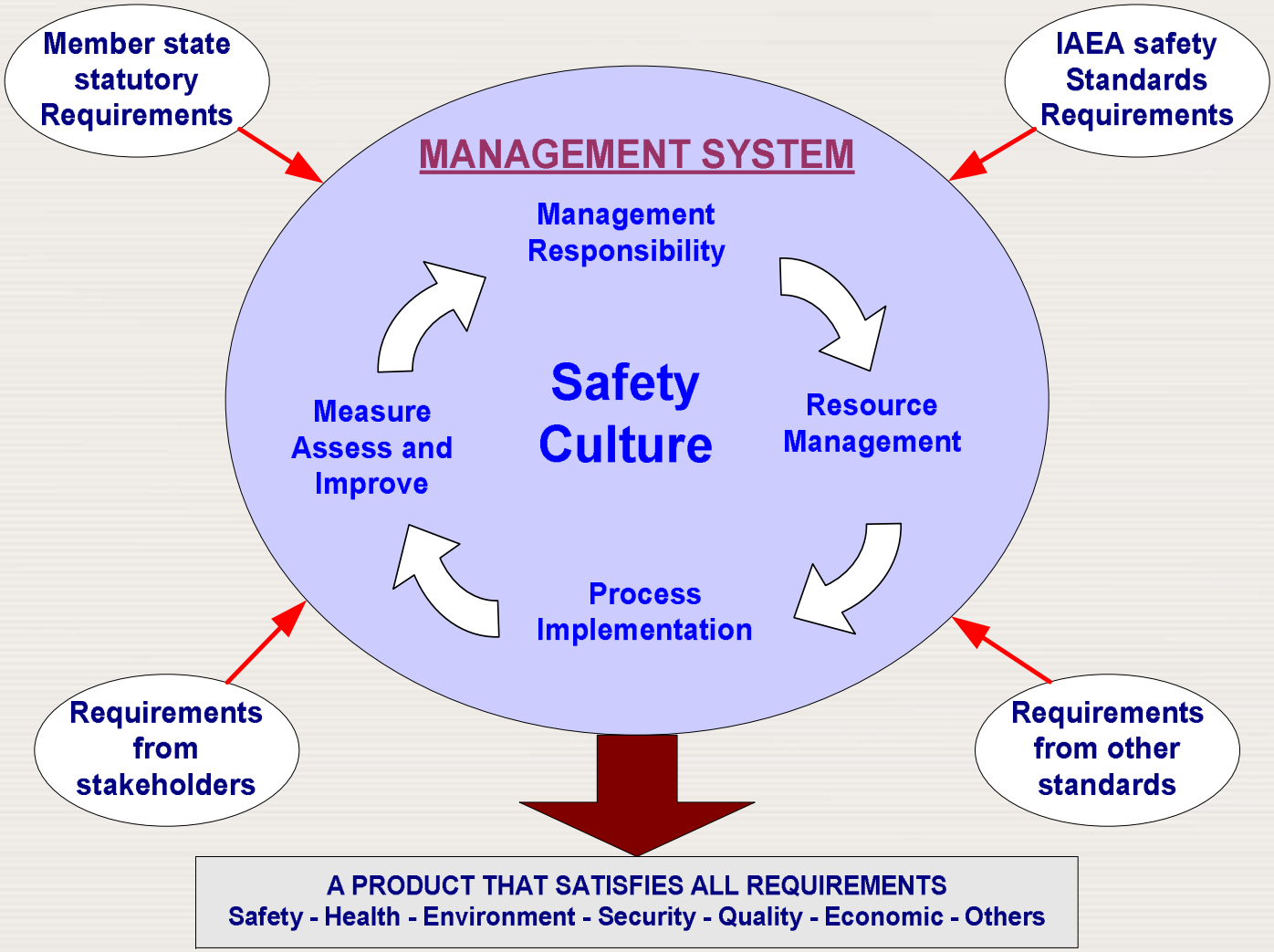
Management system model



Expected benefits

- **Increased focus on safety**
- **Integration of strategies and policies of the organization**
- **Implementation of continual improvement in all areas**
- **Creates synergy, consistency and decreases bureaucracy, more user friendly and simpler management system**
- **Faster reaction to change and challenges**
- **Easier compliance, less violations, greater staff participation and ownership**
- **Removal of barriers between organizational units**

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Requirements not in 50-C-Q (1996)

- Safety culture/leadership
- Factual approach to decision making
- Knowledge management
- Managing organizational change
- Human performance as an important contributor to safety
- Continual improvement

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Fundamental differences between GS-R-3 and 50-C-Q safety standards (1996)

GS-R-3

- Safety in general terms
- Integrated management system approach
- Explicit process approach
- Proactive strategic thinking and planning, integrating all goals, strategies and objectives

50-C-Q (1996)

- Nuclear safety
- Quality assurance (quality management)
- Weak process approach
- Mainly quality assurance requirements

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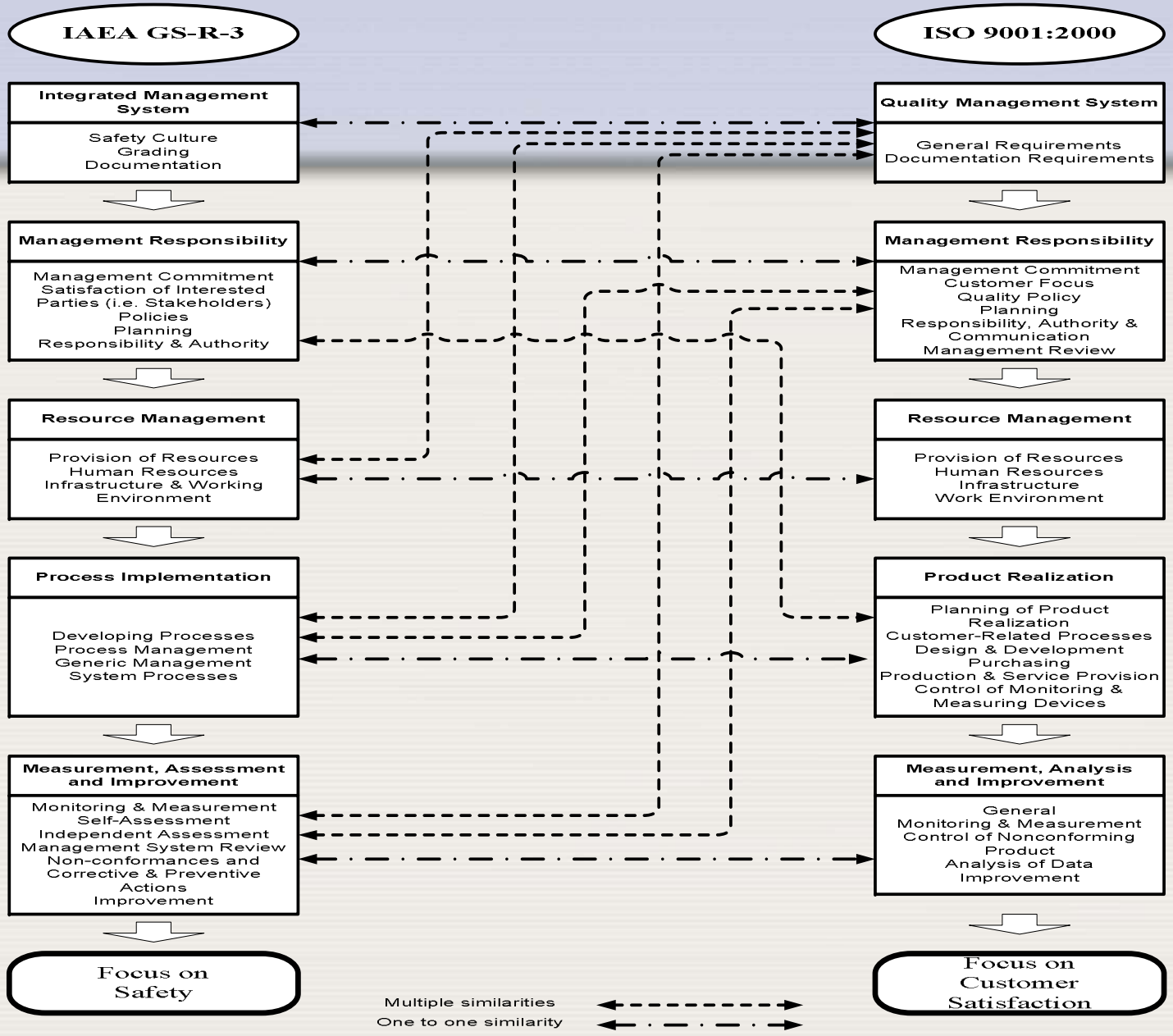
Comparison of GS-R-3 and ISO9001:2000

We do not criticize ISO9001:2000, it is different

- ISO9001:2000 is a very modern quality management system standard, but it is not a **safety** standard



Similarities of Structure and Differences of Focus between IAEA GS-R-3 and ISO 9001:2000

Fundamental differences between GS-R-3 and ISO9001:2000

GS-R-3	ISO9001:2000
• Safety standard	• Non safety standard
• Nuclear industry specific	• Applicable to any organization
• Integrated management system approach	• Quality management
• All requirements are mandatory	• Exclusion of requirements allowed
• Proactive strategic thinking and planning, integrating all goals, strategies and objectives	• Quality management requirements

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Requirements not in ISO9001:2000

- Safety
- Safety culture
- The role of Regulatory bodies (only for product quality at the end of processes)
- Knowledge management
- Self-assessment
- Managing organizational change

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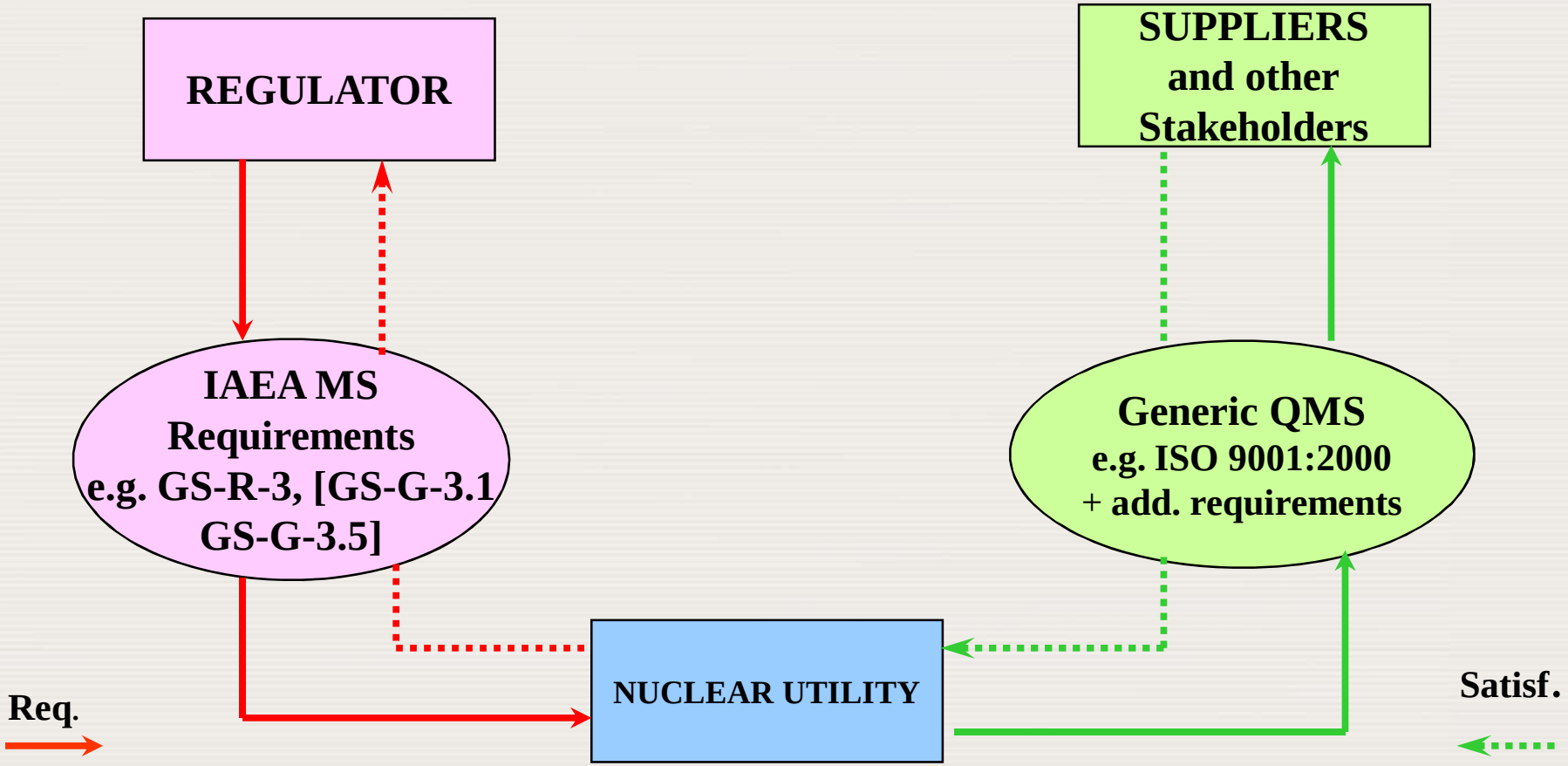
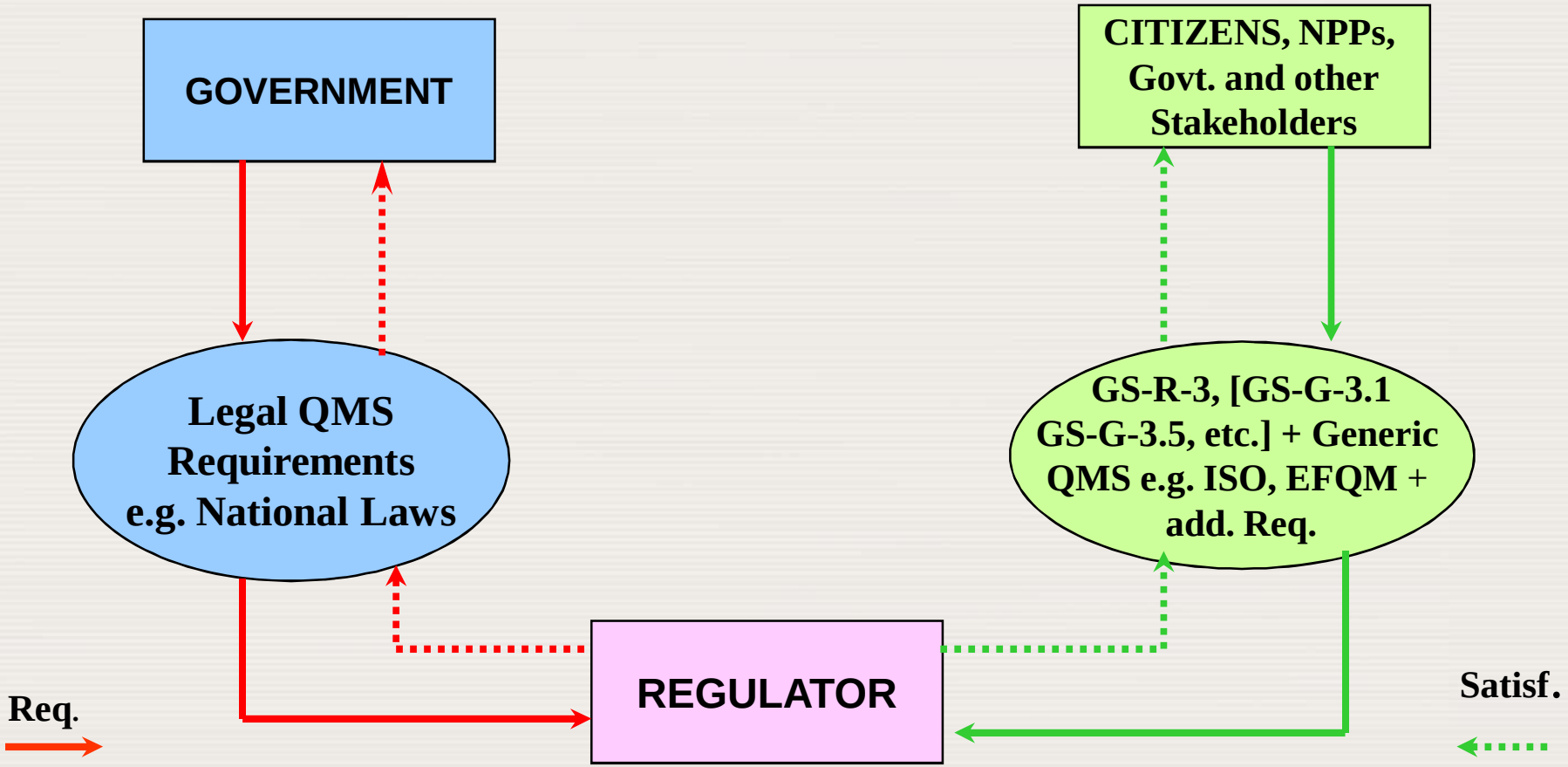
Use with other Codes or Standards

- IAEA GS-R-3 and supporting documents can be used in conjunction with other nuclear codes or generic standards
  - National standards for management systems
    - ASME NQA-1 and NIST [Baldrige] (USA), CSA N-286 and NQI (Canada), etc.
  - International generic standards
    - e.g. ISO 9001:2000 or ISO 9001:2008; ISO 14001, OHSAS 18001; European Foundation for Quality Management (EFQM)/Common Assessment Framework (CAF)
  - International safety standards
    - e.g. other IAEA standards
- Need to clearly define requirements or applicable standards to establish coherent management system

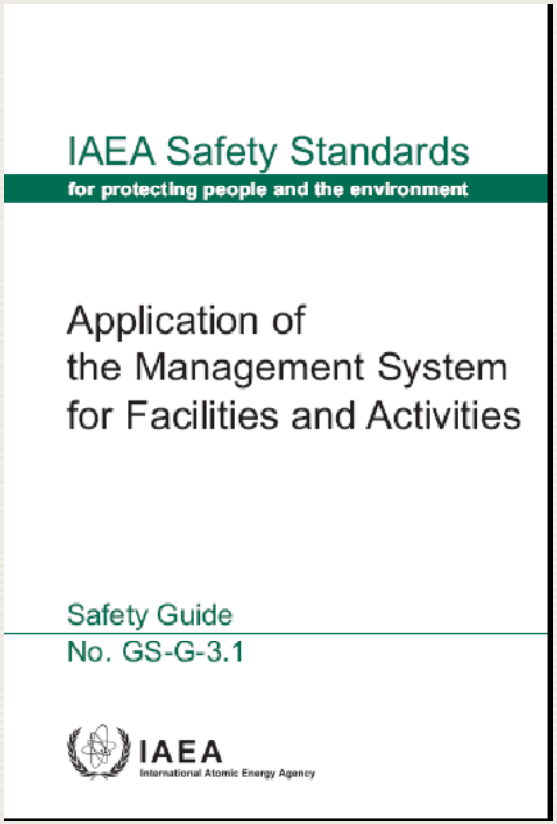
Use of IAEA and Generic Standards



Use of IAEA and Generic Standards



IAEA GS-G-3.1



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Generic Safety Guidance

IAEA GS-G-3.1

- Provides guidance on **HOW TO** comply with (i.e. to implement) GS-R-3 requirements:
  - Development of the management system
  - Exercise of management responsibility
  - Management of Resources
  - Development and implementation of processes
  - Measurement, assessment and review of performance and of the management system,
  - … etc.

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Generic Safety Guidance

IAEA GS-G-3.1

- Includes all the current thematic guidance from 50-C/SG-Q
- Provides new guidance material on the following subjects:

- Management commitment
- Interested party or stakeholder satisfaction
- Organisational policies
- Planning
- Communication
- Management review
- Managing organisational change
- Provision of resources
- Human resources
- Infrastructure and work environment
- Developing processes
- Process management
- Control of measuring and test equipment
- Management self-assessment
- Self assessment
- Improvement

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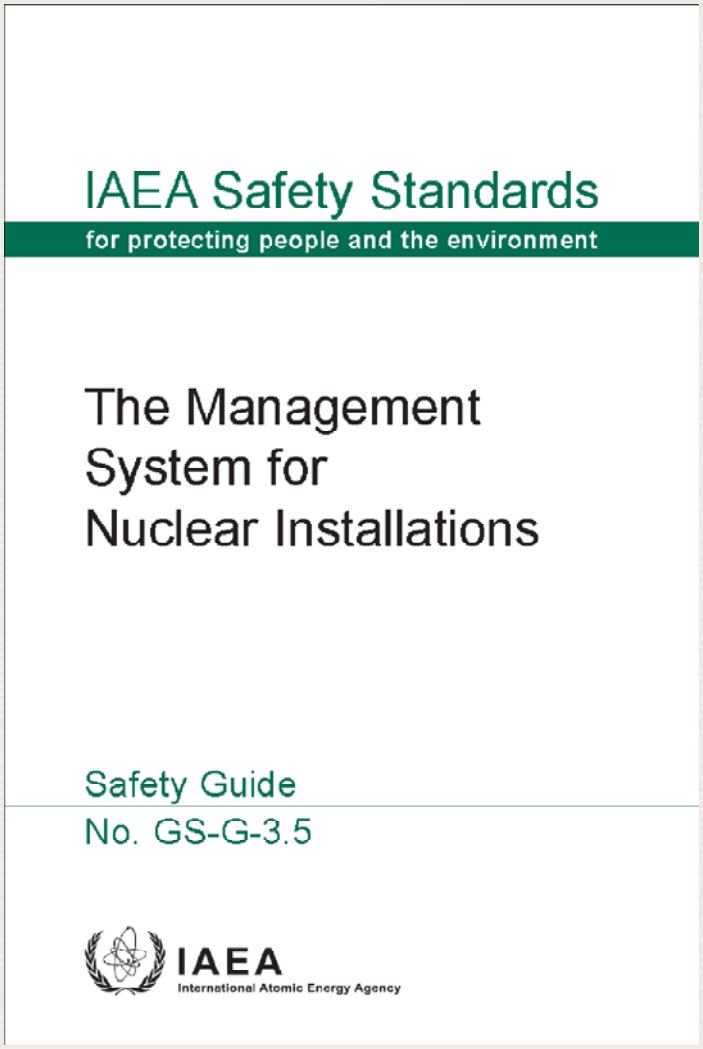
Thematic Safety Area Guidance



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IAEA GS-G-3.5

- Provides guidance for the application of GS-R-3 at nuclear facilities (includes and supersedes the guidance in 50-C/SG-Q8 to Q14)
- Provides supplementary guidance to the generic guidance in GS-G-3.1
- Extends the guidance in GS-G-3.1 topics except for
  - Management commitment
  - Planning
  - Process management
  - Management system review

Thematic Safety Area Guidance

GS-R-3 Requirement		Guidance Provided	
Area	Topic	GS-G-3.1	GS-G-3.5
Management System	General	x	x
	Safety culture	x	x
	Grading	x	x
	Documentation	x	x
Management Responsibility	Management commitment	x	
	Satisfaction of interested parties	x	x
	Organisational policies	x	x
	Planning	x	
	Responsibility and authority	x	x

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Thematic Safety Area Guidance

GS-R-3 Requirement		Guidance Provided	
Area	Topic	GS-G-3.1	GS-G-3.5
Resource Management	Provision of resources	x	x
	Human resources	x	x
	Infrastructure and the working environment	x	x
Process Implementation	Developing processes	x	x
	Process management	x	
	Generic management system processes	x	x

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Thematic Safety Area Guidance

GS-R-3 Requirement		Guidance Provided	
Area	Topic	GS-G-3.1	GS-G-3.5
Measurement, Assessment and Improvement	Monitoring and measurement	x	x
	Self-assessment	x	x
	Independent assessment	x	x
	Management system review	x	
	Non-conformances and corrective and preventive actions	x	x
	Improvement	x	x

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Other Thematic Guidance

- Thematic Safety Guides
  - **GS-G-3.2 (DS315) -** The Management Systems for Technical Services in Radiation Safety
  - **TS-G-1.5 (DS326) –** The Management Systems for the Safe Transport of Radioactive Material
  - **GS-G-3.3 (DS336) -** The Management System for the Processing, Handling and Storage of Radioactive Waste
  - **GS-G-3.4 (DS337) -** The Management System for the Disposal of Radioactive Waste
  - **DS113 -** Management Systems for Regulatory Bodies [To be part of revised GS-G-1.1]
  - **DS319 -** Quality Management Systems in Radiation Safety for Users [withdrawn]

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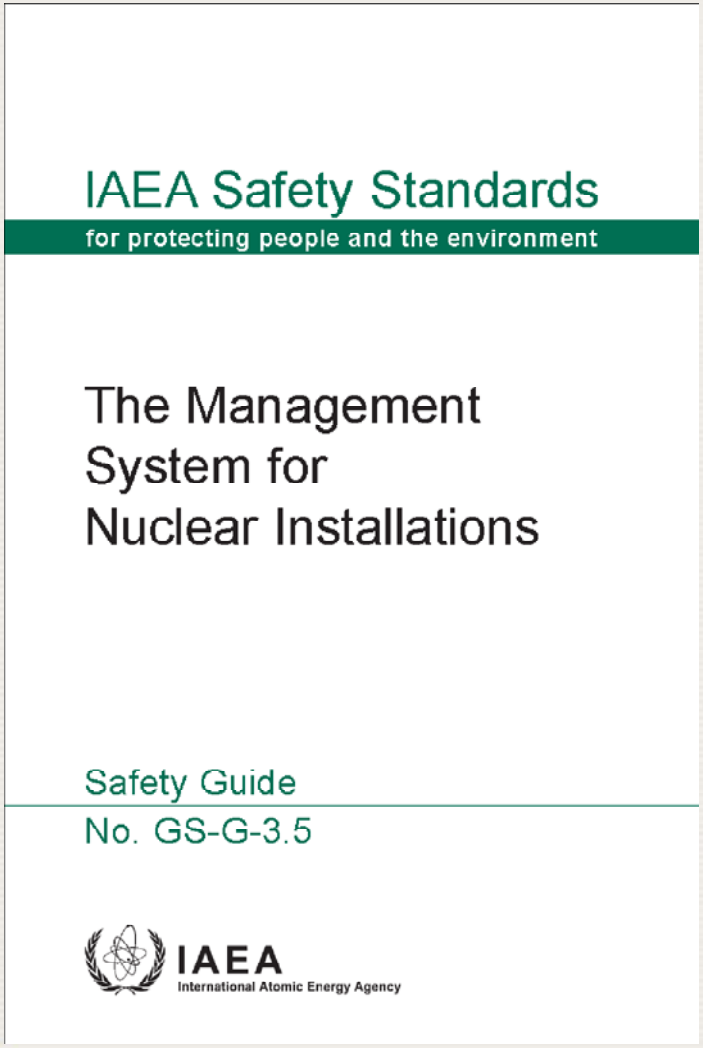
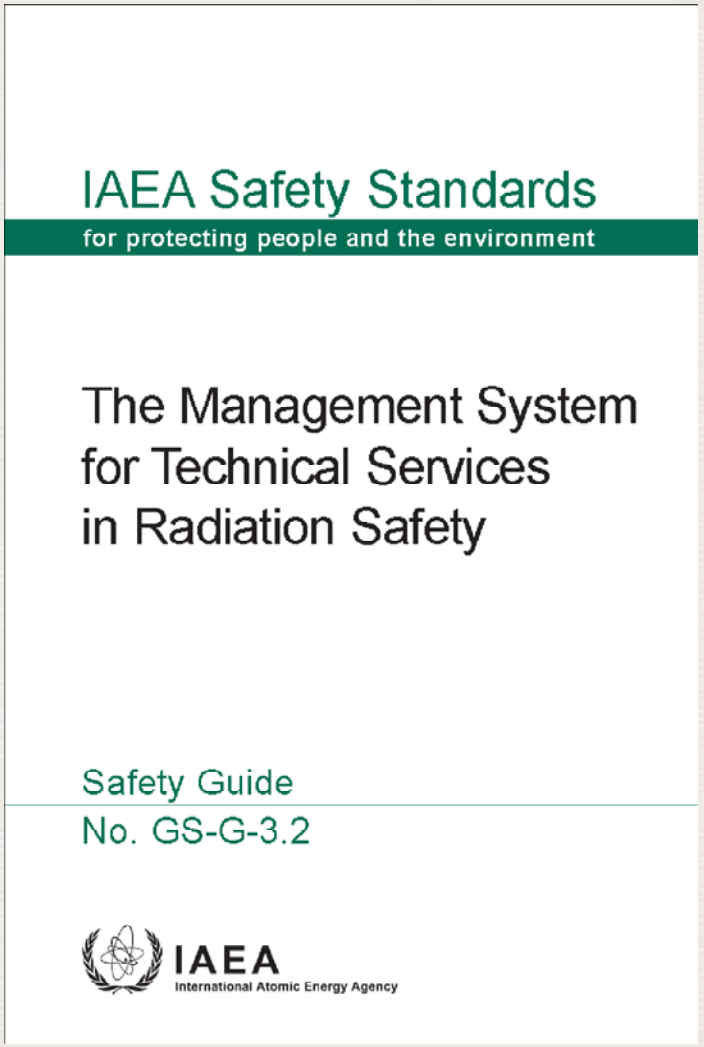
Latest IAEA MS Standards





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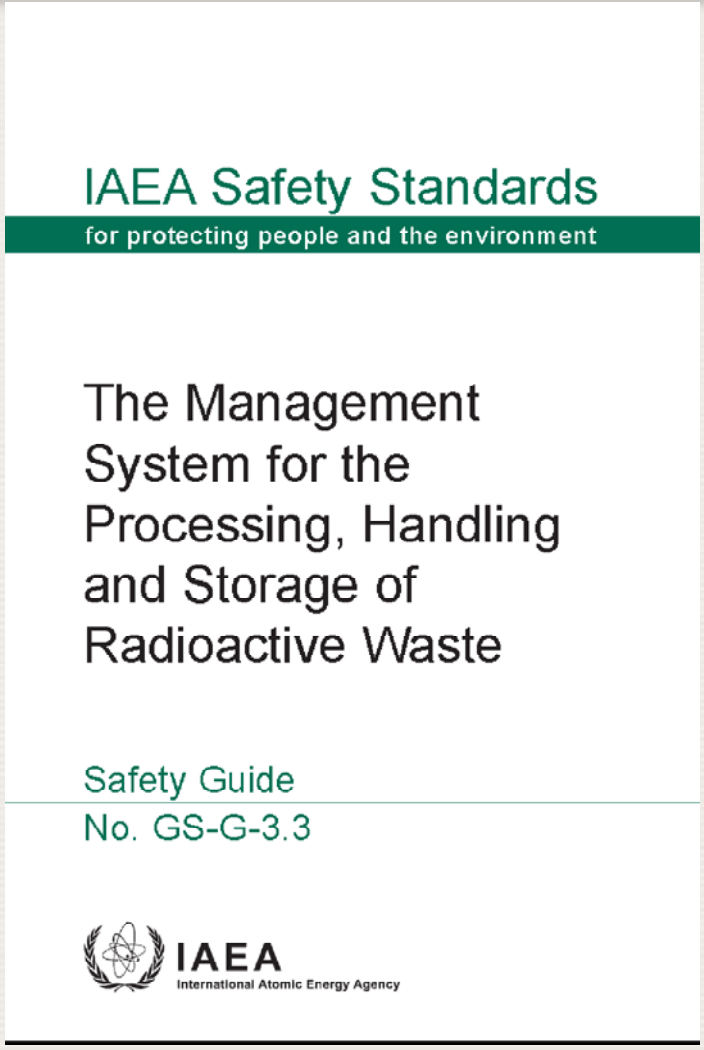
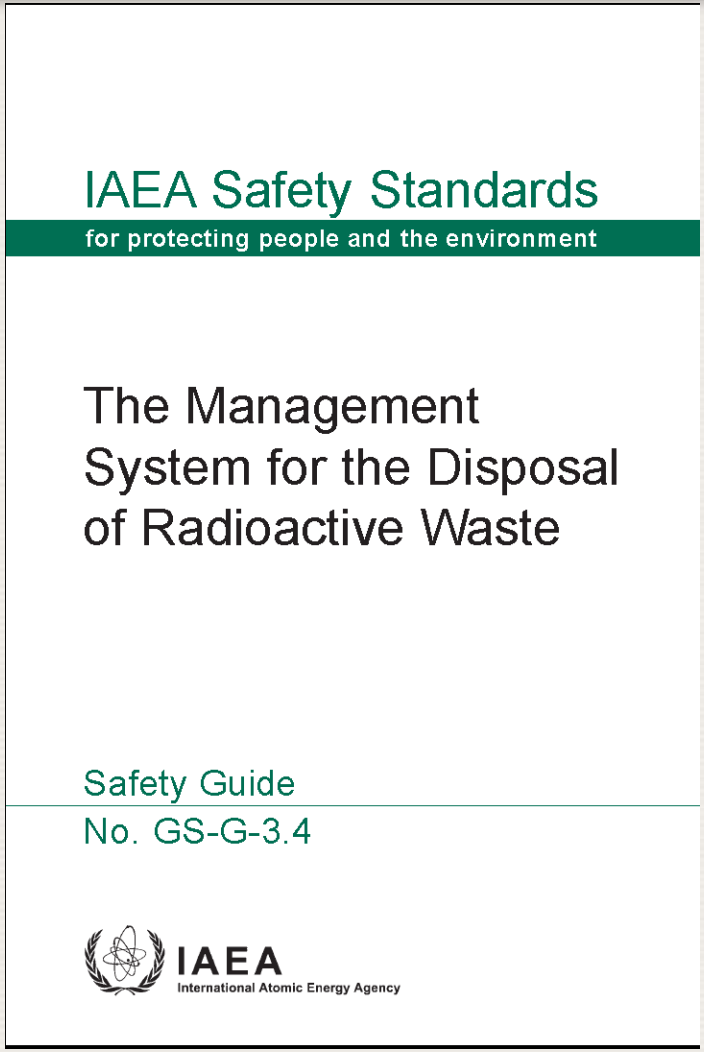
Latest IAEA MS Standards





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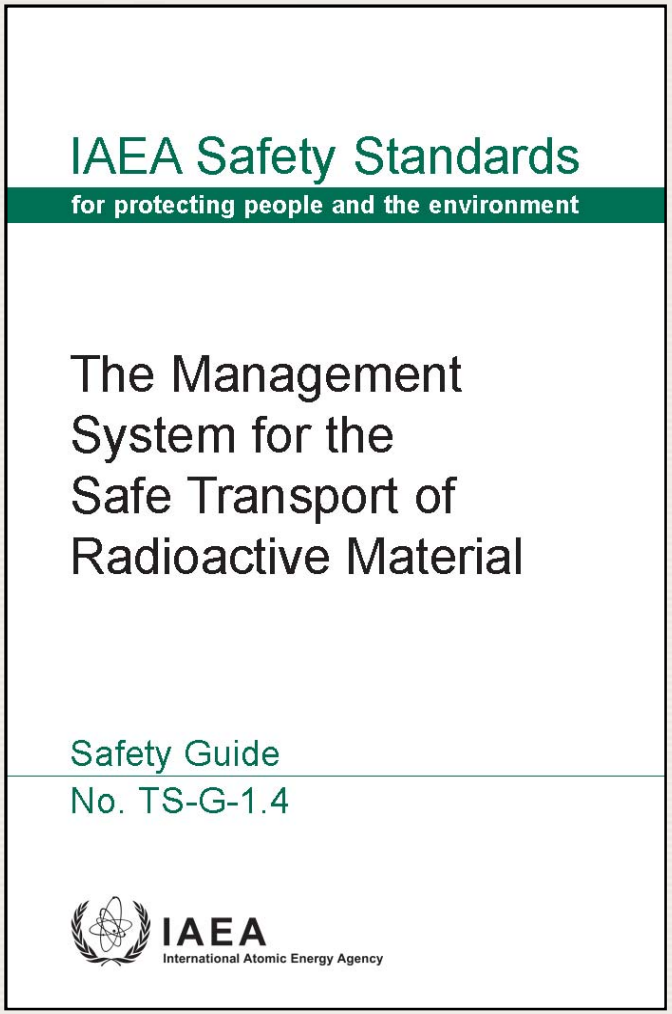
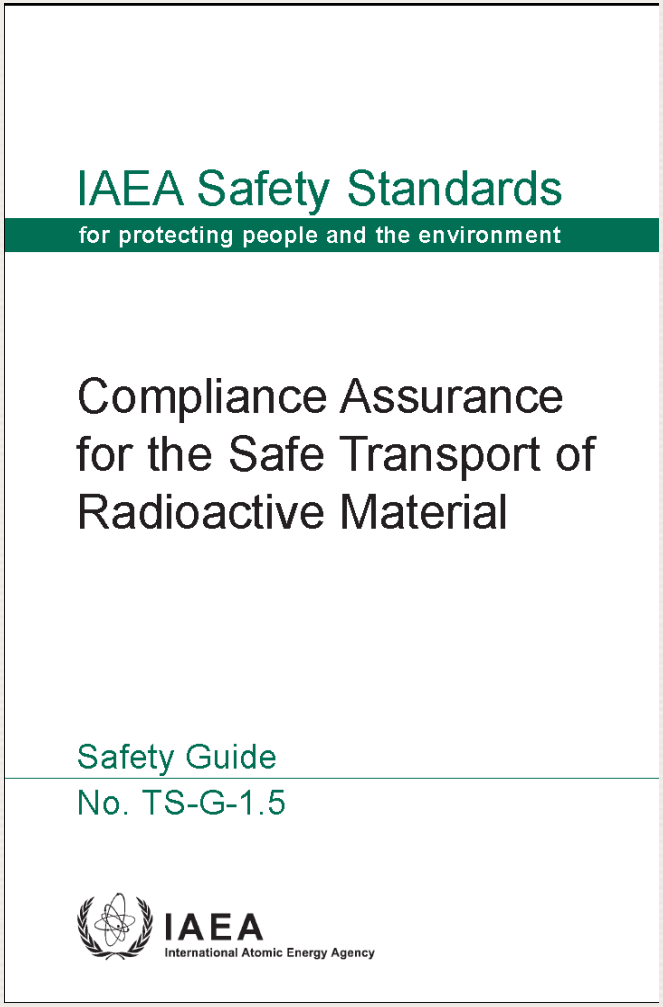
Latest IAEA MS Standards





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Conclusion-1

- **Management system and other IAEA standards**
  - **Developed using transparent and open process**
  - **Based on expert consensus, with peer and Member State review**
  - **Reflect best practices**
  - **Non-binding on Member States, but may be adopted**
  - **Binding on States in relation to operations assisted by the IAEA or those wishing to enter into project agreements with the IAEA**

Conclusion-2

- **IAEA GS-R-3 recognises that IAEA safety standards may need to be complemented by industry or other standards for practical effect and makes provision for such situations**
  - **New management system requirements and guides provide a framework for incorporation of other requirements in addition to those of the IAEA**
  - **Requirements and guides permit easy customisation to suit the local context**

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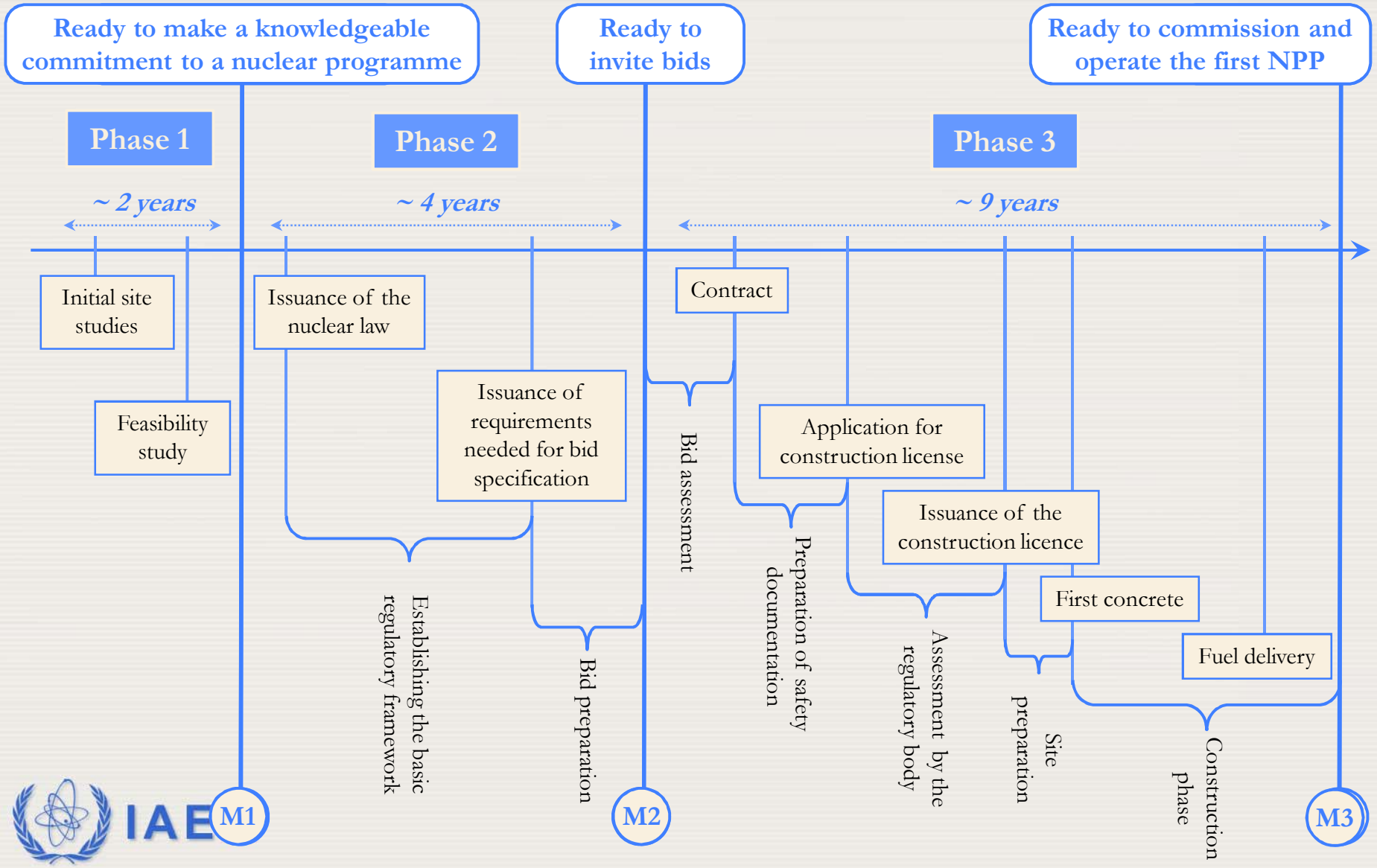
Management System needed to manage activities throughout the development of NPP



Thank you for your attention!