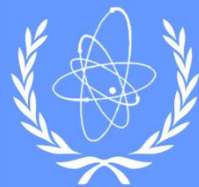




Example of Safety Technical Review

International Atomic Energy Agency



Step by step review of the safety assessment

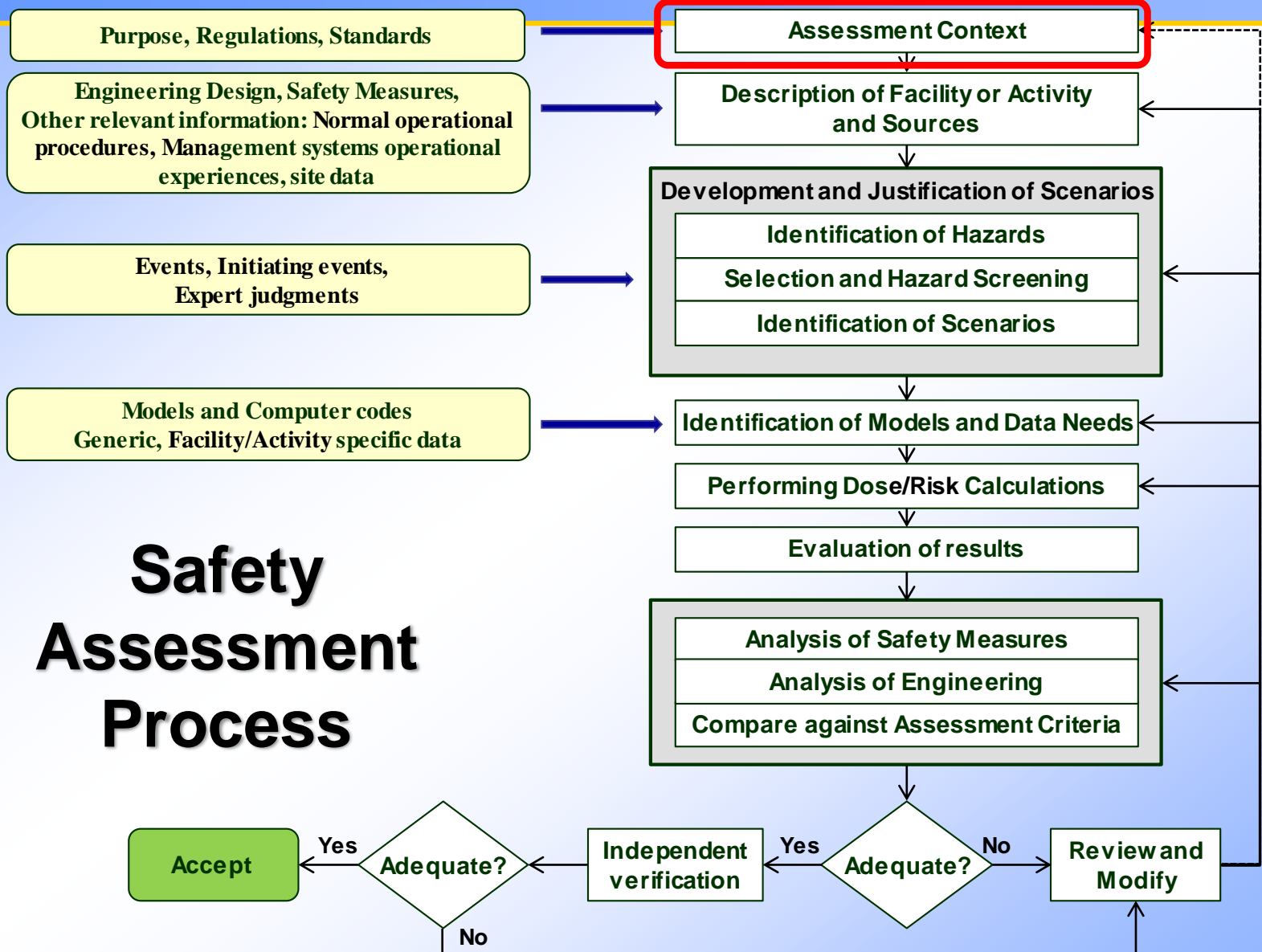
Will be illustrated using some of the main components of the safety assessment:

- *Assessment context,*
- *Description of the system,*
- *Development and justification of scenarios,*
- *Formulation and implementation of models,*
- *Analysis of results.*

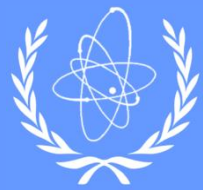




Safety Assessment Process



Safety Assessment Process



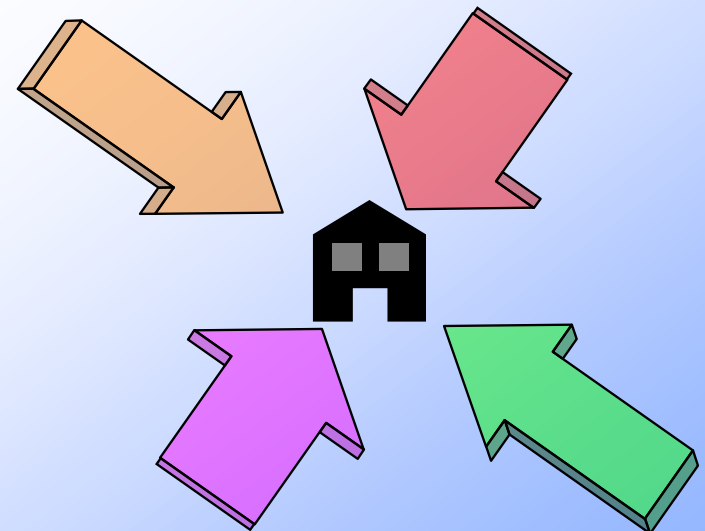
Review of the assessment context

The review should verify that:

- *The scope and context of the assessment is clearly defined.*
- *The implementer understands the key components of the assessment context, particularly the existing regulatory requirements set by the regulatory body.*

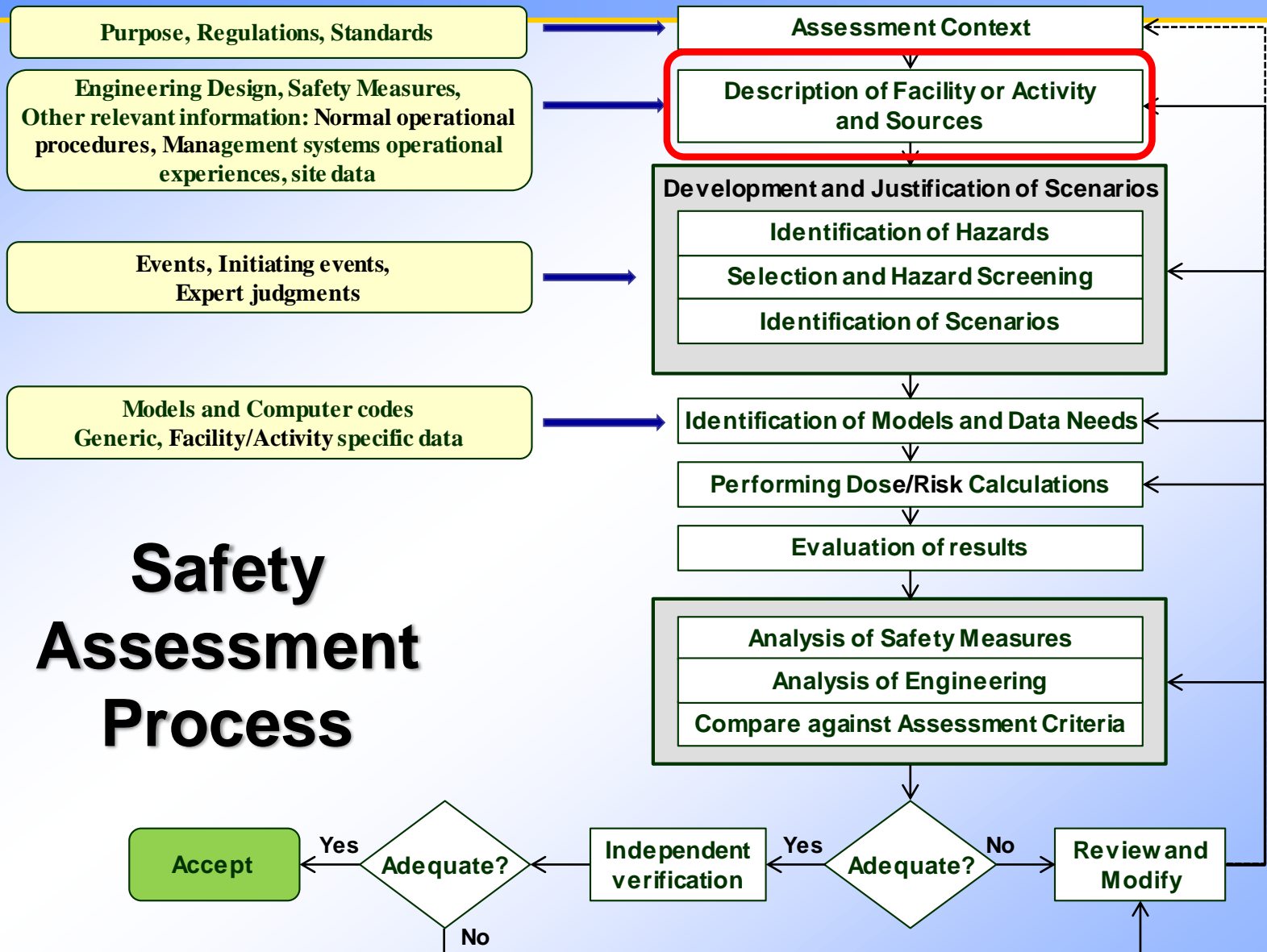
The components of the assessment context are:

- *Purpose of performing the assessment;*
- *Regulatory framework;*
- *Assessment end-points;*
- *Assessment philosophy;*
- *Timeframes.*

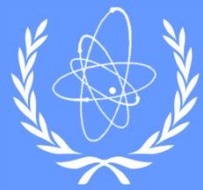




Safety Assessment Process



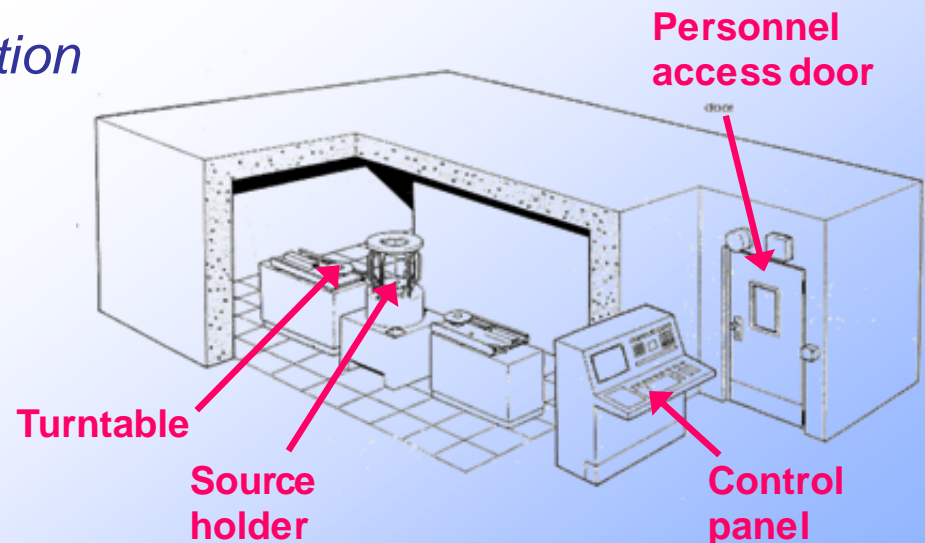
Safety Assessment Process

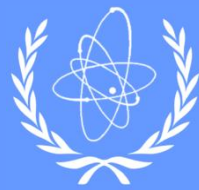


Description of the System

The review should verify that the following elements **are adequately described**:

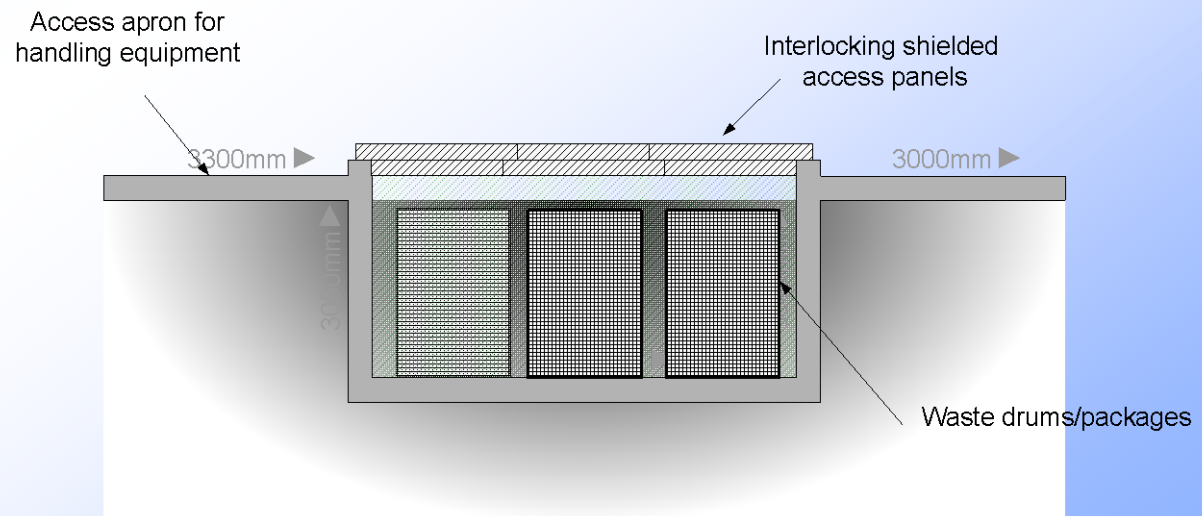
- *Radiation sources including radioactive waste, volume, characteristics, inventory;*
- *Engineered systems,*
- *Installation design, and*
- *The environment.*
- *May include facility inspection*

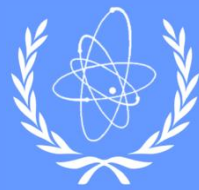




Examples of questions to be answered

- Are the components of the systems significant for safety and their interfaces clearly defined?
- What are the safety functions of each system component?
 - In case of normal operation of the system?
 - In case of less likely events?
- Can they be verified?

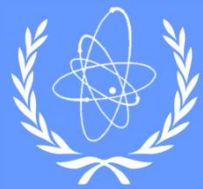




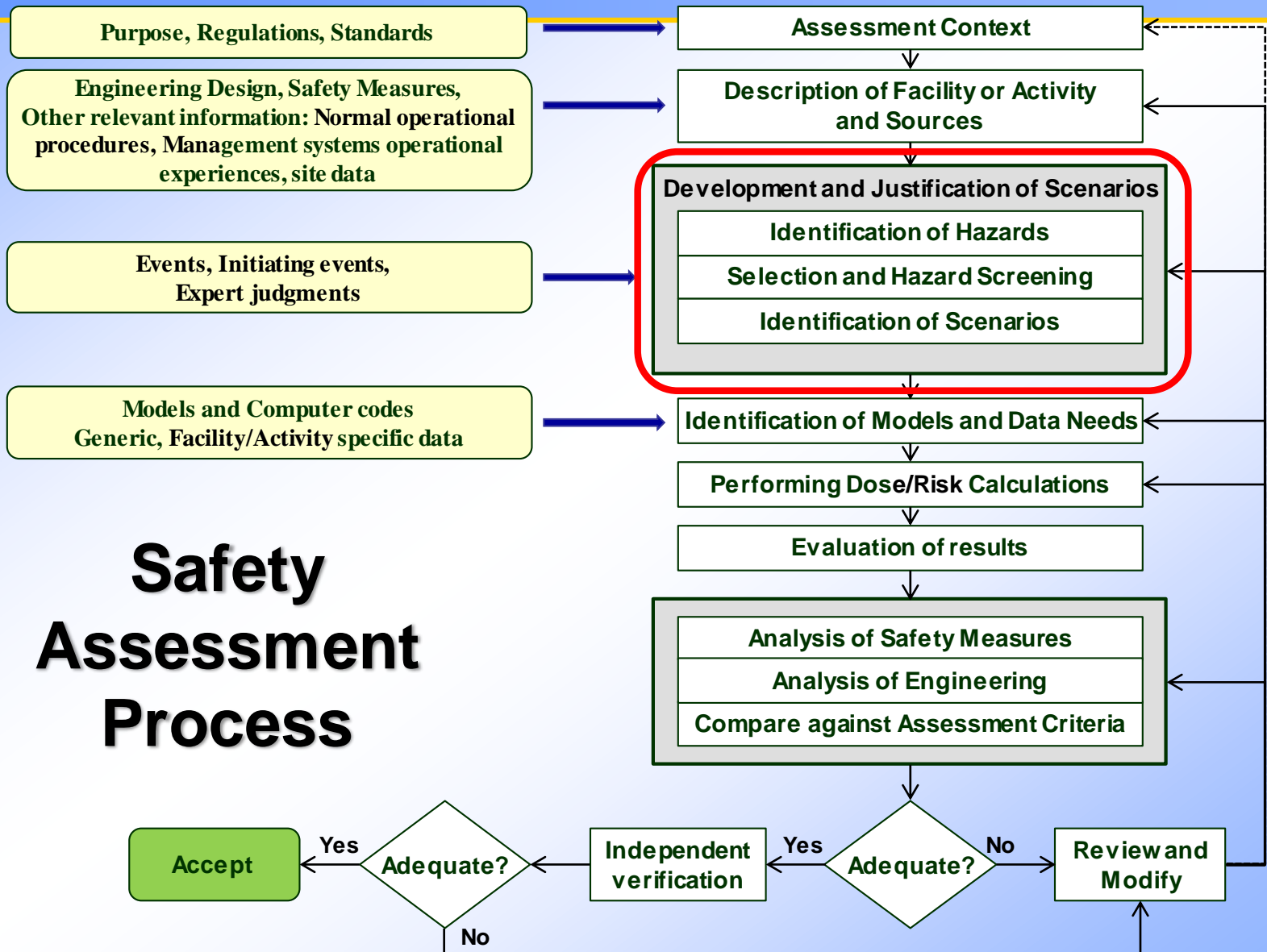
Examples of questions to be answered

- What support is there for the long-term effectiveness of the system components?
- Is the level of available data adequate for the current stage of the facility development?
- What are the uncertainties in the data and parameters used in the assessment?





Safety Assessment Process



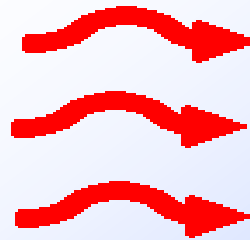
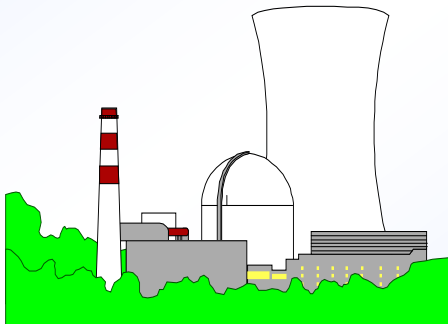
Safety Assessment Process

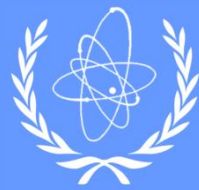


Development and justification of scenarios

Review of scenarios should verify that:

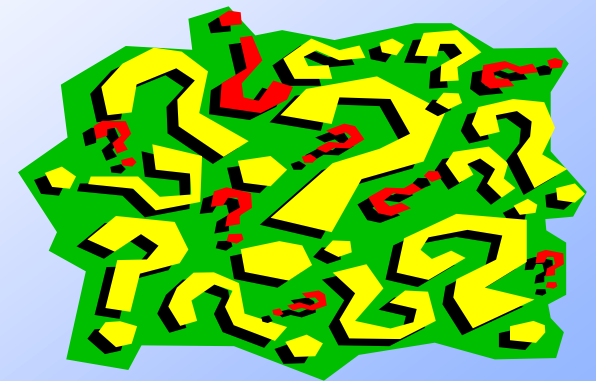
- *The selected scenarios adequately cover the assessment time frame;*
- *The set of scenarios developed is credible, comprehensive and has been developed in a systematic, transparent and traceable manner;*
- *The approach and screening criteria used to exclude or include scenarios are justified, well documented.*

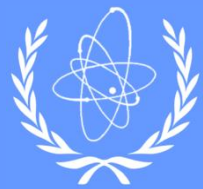




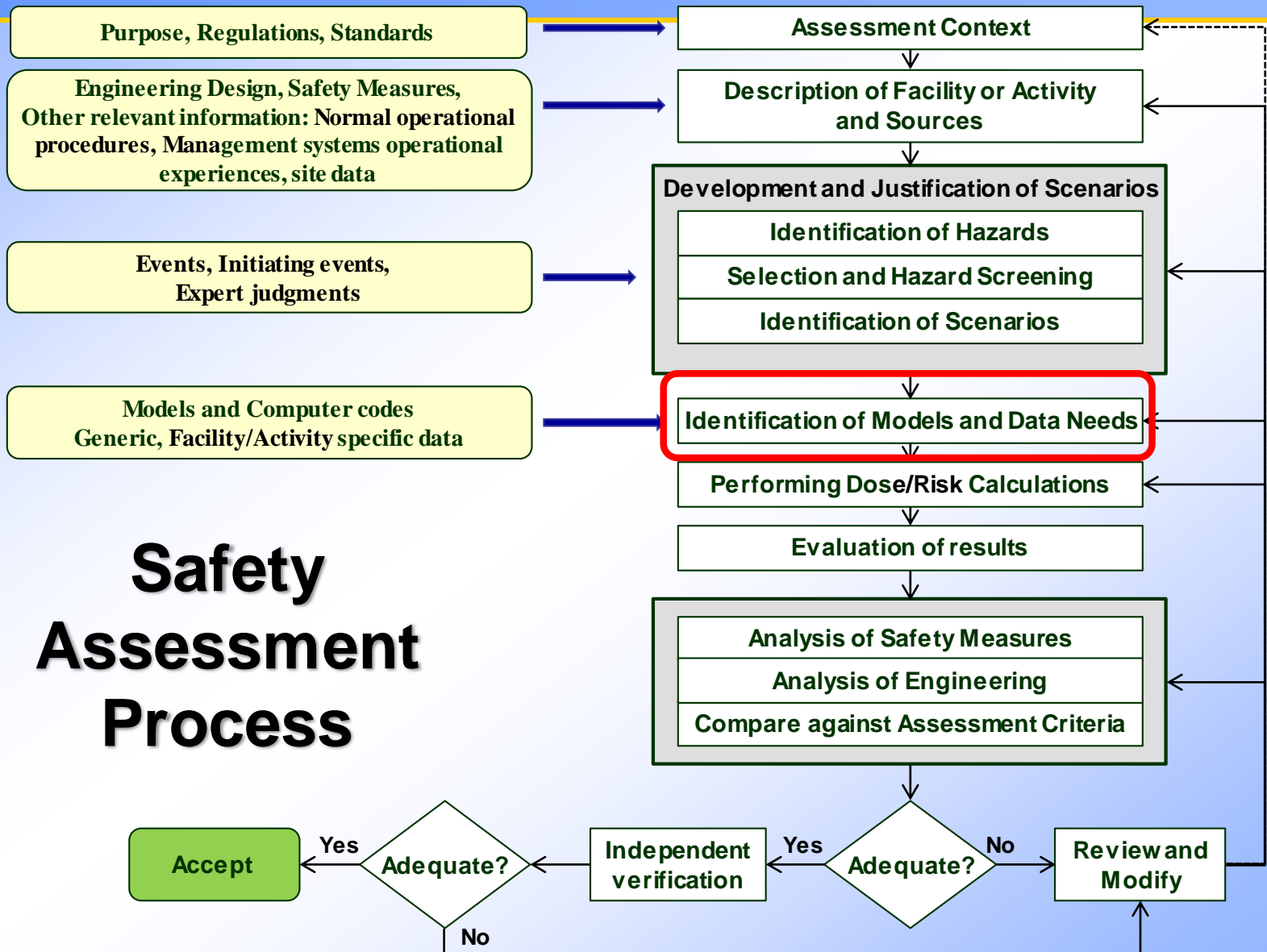
Examples of questions to be answered

- What type of intrusion scenarios have been used?
- How have “what-if” scenarios been developed and analyzed?
- What events have been considered and where did they come from?
- Is there a clear distinction between the scenarios describing the “normal” (or “design”) evolution of the system and those describing low probability events?

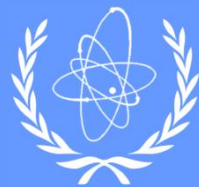




Safety Assessment Process



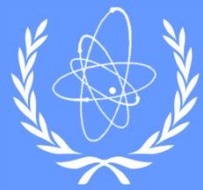
Safety Assessment Process



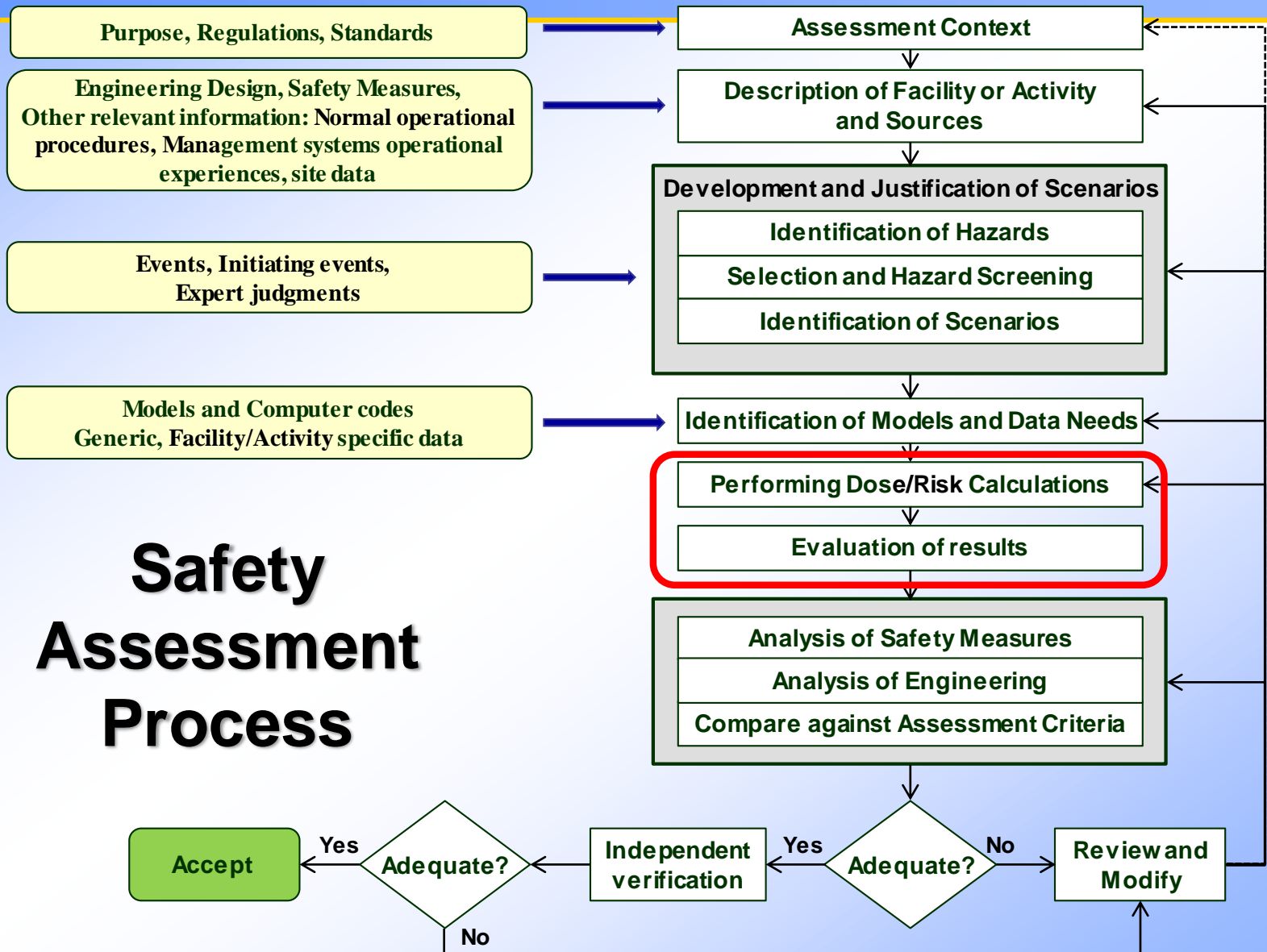
Formulation and implementation of models

Verify that

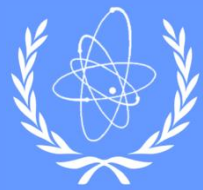
- ✓ conceptual models and data are consistent and appropriate;
- ✓ conceptual models adequately represent the system and interactions between the components;
- ✓ software tools adequately solve the problems under consideration;
- ✓ alternative models, codes and data have been considered
- ✓ models are adequately verified, validated and calibrated;
- ✓ reviewer should develop a good understanding of the inputs that have the most influence on the results;
- ✓ uncertainties and limitations of the models are clearly identified and their impact on the results assessed.



Safety Assessment Process

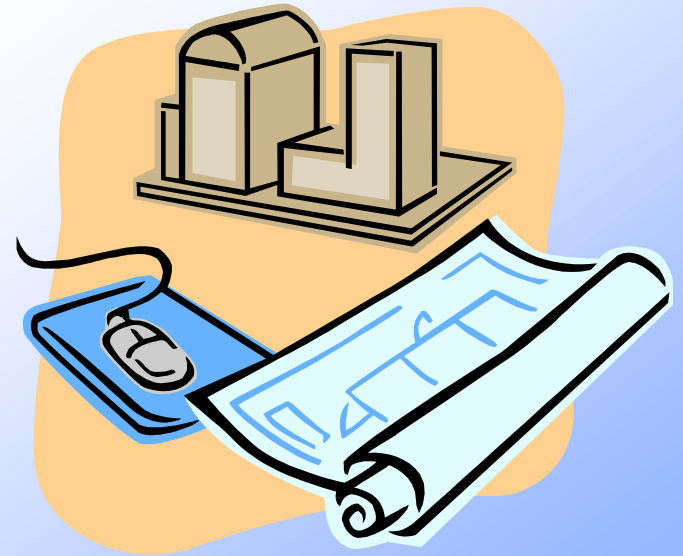


Safety Assessment Process



Analysis of results

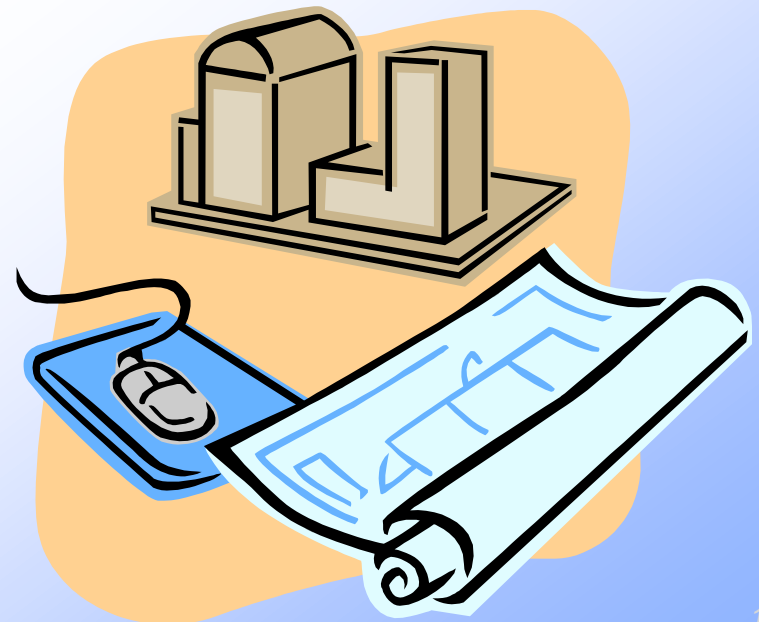
- The review should verify that a thorough understanding of the parameters and processes that govern safety assessment results has been developed;
- The safety assessment is consistent with the approach described in the assessment context;
- Associated uncertainties have been adequately considered





Analysis of results

- Compliance with the regulatory requirements;
- Assessment philosophy and approach mentioned in the “*Assessment Context*” have been applied;
- The key areas for further work – additional information, modification of design, scenarios, etc. needs to be analyzed and justified.





Examples of common deficiencies

- ✓ Lack of conservatism;
- ✓ Lack of depth of scenario analysis;
- ✓ Lack of data integration during the evolution of the facility development;
- ✓ Conceptual model representation;
- ✓ Lack of justification;
- ✓ Lack of documentation.



