

German Nuclear Security Regime

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Basic facts on Germany

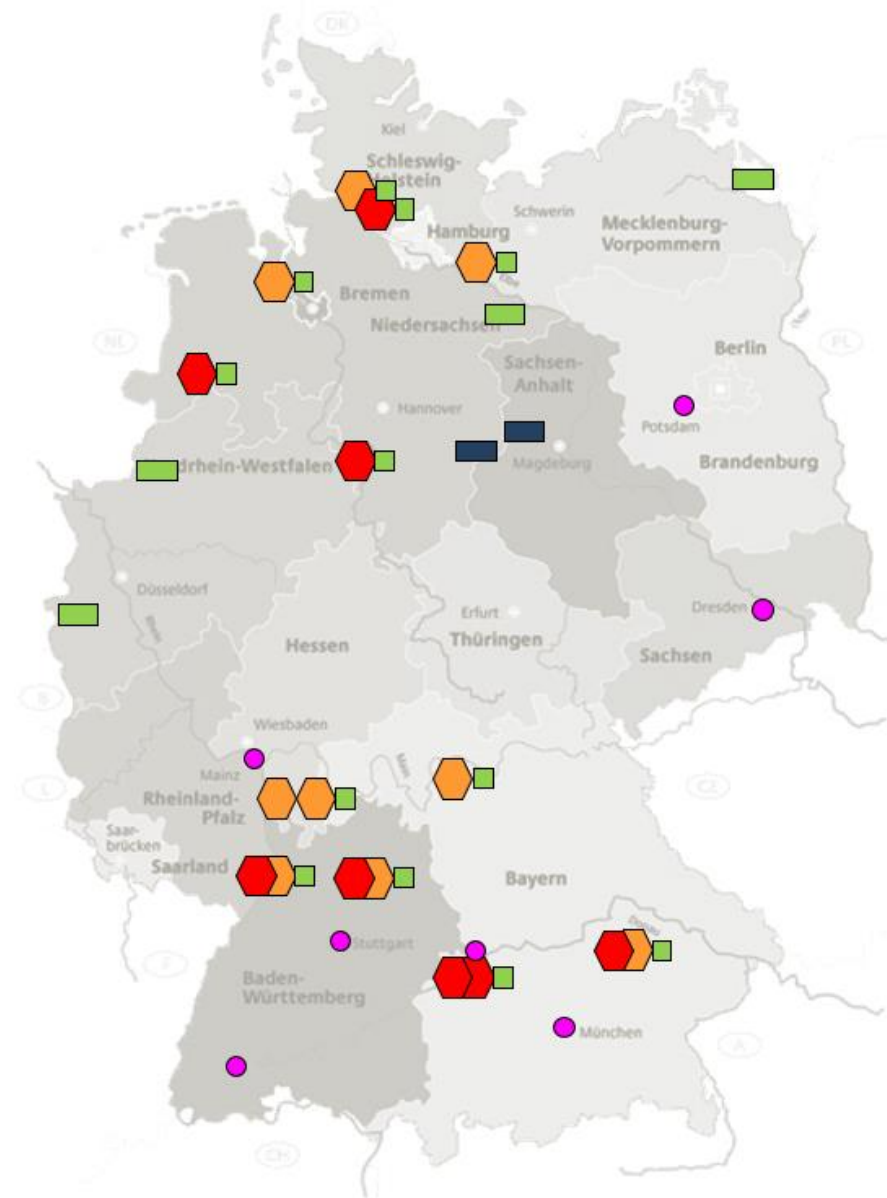
Germany - a federal republic

- 16 *Länder* (German for “federal states“)
- 5 *Länder* with NPPs
- Most *Länder* have nuclear installations
- Federal Government: Chancellor + 16 ministers
- Legislation: parliament and federal council
(represents the *Länder* on the federal level)
- *Länder* governments have an analogue structure
- Atomic Energy Act is executed by the *Länder* with supervision of the Federation (“*Bund*”)
 - “Federal executive administration”



Facility and Transports

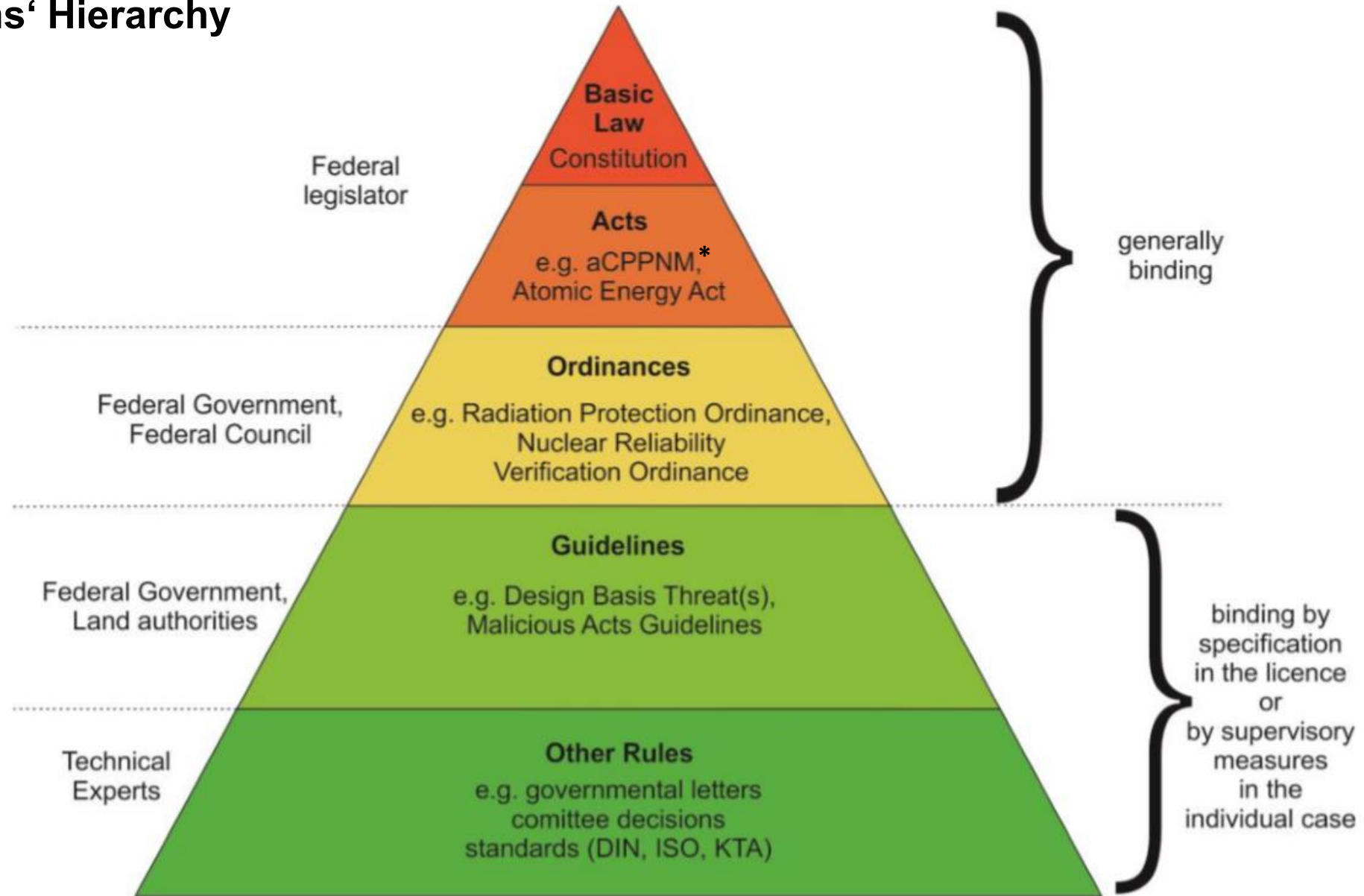
- 17 NPPs at 12 sites (7 still in operation)
 - 7 research reactors
- 12 on-site storage facilities (at the NPP sites)
- 4 central storage facilities
- 2 repositories for low and intermediate level radioactive waste
- 1 uranium enrichment plant
- 1 fuel assembly fabrication plant
- ~ 400 transports/year of NM
- ~ 13,000 licences to use other RM
- ~ 10,000 high radioactive sources
- ~ 400 licences/year for transports of other RM



The Nuclear Security Regime

Concepts

Regulations' Hierarchy



Physical Protection: a Licence Prerequisite

- “A licence for a nuclear installation can only be granted if ... the *necessary protection against malicious acts or other illegal interference by third parties* is ensured.”

SEWD: Threat analysis, Design Basis Threat

Ordinances and guidelines,
legitimation by committees

- Licence prerequisite defined in the Atomic Energy Act and Radiation Protection Act

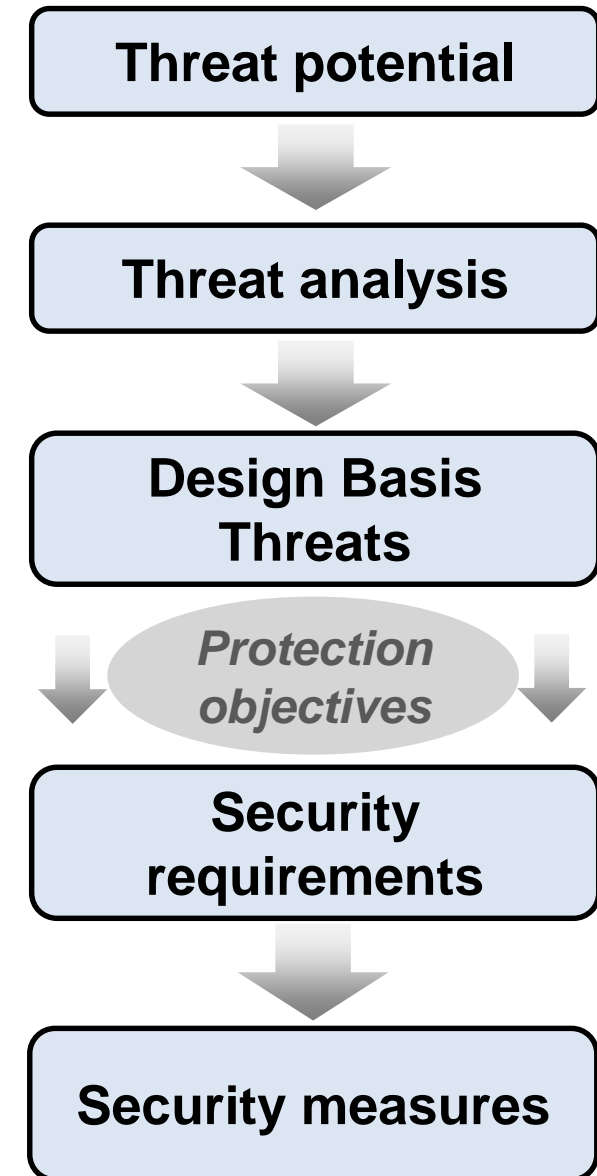
Protection Objectives

- 1) Prevention of hazards to life and health as a result of considerable direct radiation or the release of a substantial quantity of radioactive material (**sabotage → release**)
- 2) Prevention of a single or repeated unauthorised removal of nuclear material in quantities that are sufficient for the direct manufacture of a critical assembly without reprocessing and enrichment (**→ theft**)
- 3) Prevention of a single or repeated unauthorised removal of nuclear material in quantities that are sufficient for hazards to life and health as a result of considerable direct radiation or the release of a substantial quantity of radioactive material outside the facility (**→ release after theft**)

Guideline: From threat to security measure

- Security authorities perform threat analyses
- Special analysis for nuclear sector
- Specification of malicious acts to be considered by licensee
= **“SEWD” (is design-determining)**

- Requirements for security measures to ensure fulfilment of protection objectives in case of SEWD
- Security measures considering the requirements
= **“required protection”**



Integrated Concept

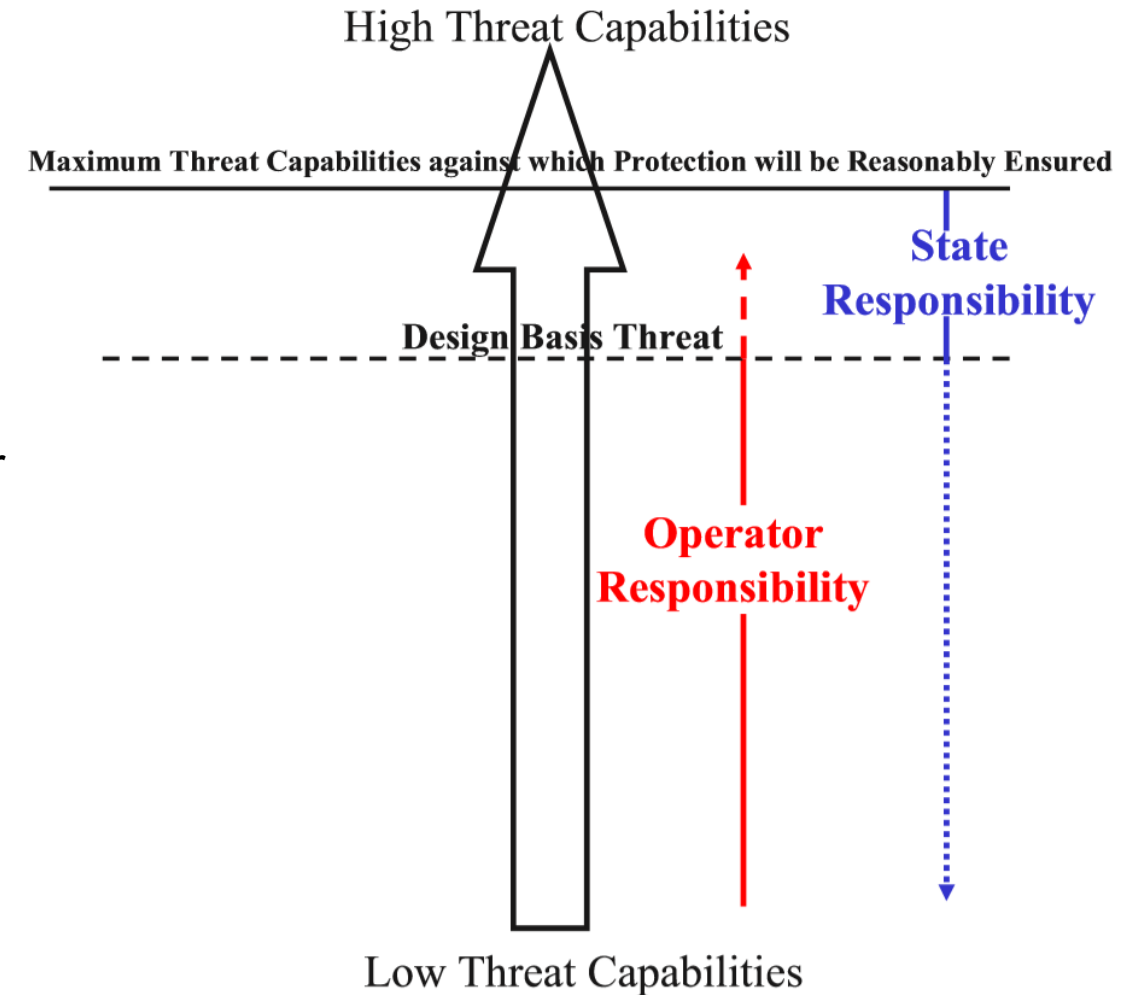
The so-called Integrated Security- and Protection Concept intertwines measures of the operator/shipper and the State

Operator/Shipper:

- Structural and technical protection measures and security guards must protect the facility/transport providing delay for a defined time

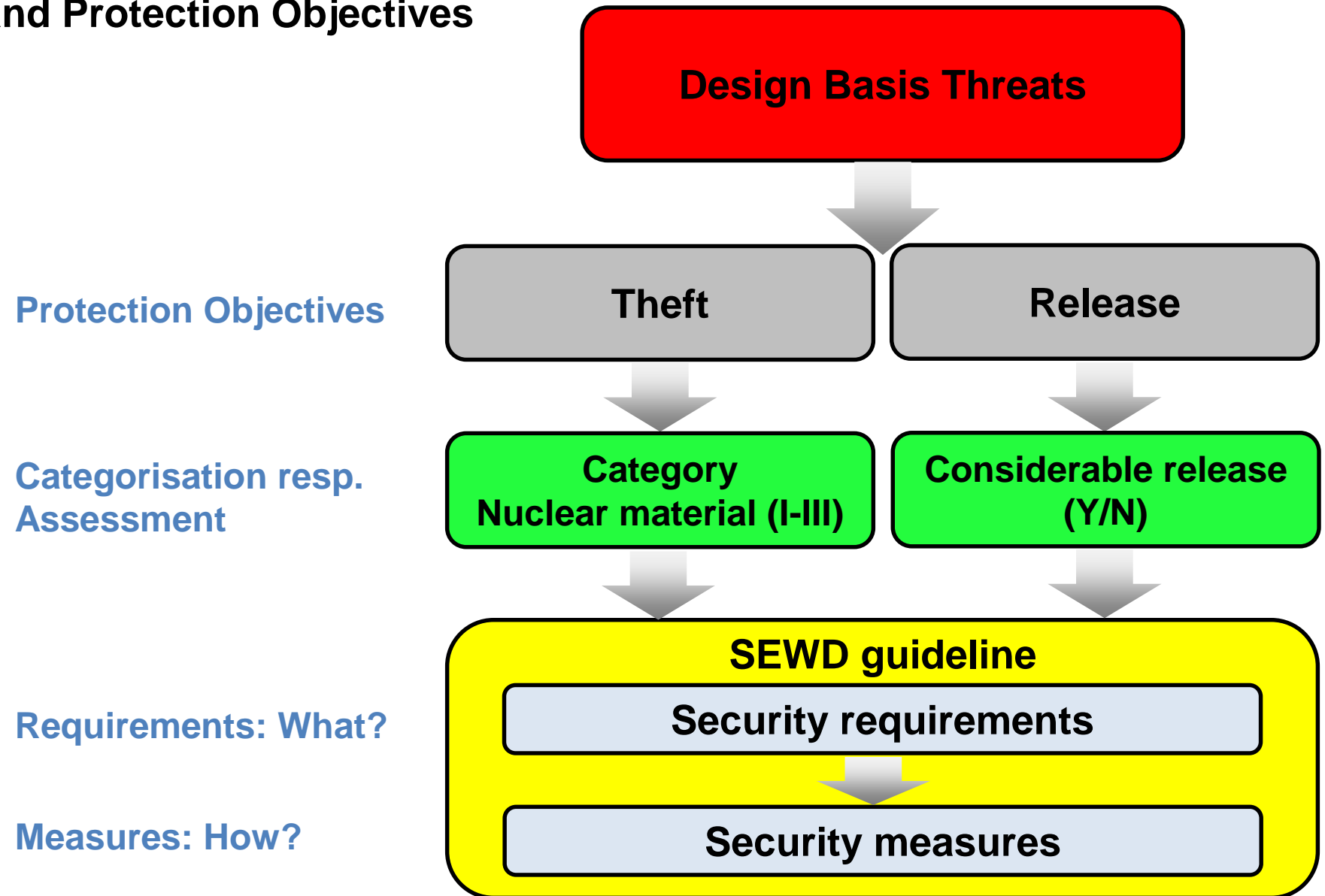
State:

- Response forces must take over within the defined delay time
- Protection against threats not included in the DBT



Roles and responsibilities for protecting against threats, from IAEA NSS No. 10

Security Framework and Protection Objectives



Relevant Guidelines for Nuclear Security

	Nuclear material	Other radioactive materials
Facilities	<p style="text-align: center;">Design Basis Threats (SC I)</p> <p>NPP Storage facilities Other nuclear facilities</p>	<p style="text-align: center;">Design Basis Threats</p>
Transport	<p style="text-align: center;">Design Basis Threats</p> <p style="text-align: center;">Road/railway Waters (draft)</p>	<p style="text-align: center;">Use Transport IT security</p>
IT security	<p style="text-align: center;">Design Basis Threats</p> <p style="text-align: center;">SC I + II SC III (draft)</p>	

SC - Security Category

Security areas of German NPPs

Staggered lines of defence (Defence in Depth)

Fencing of the limited access area

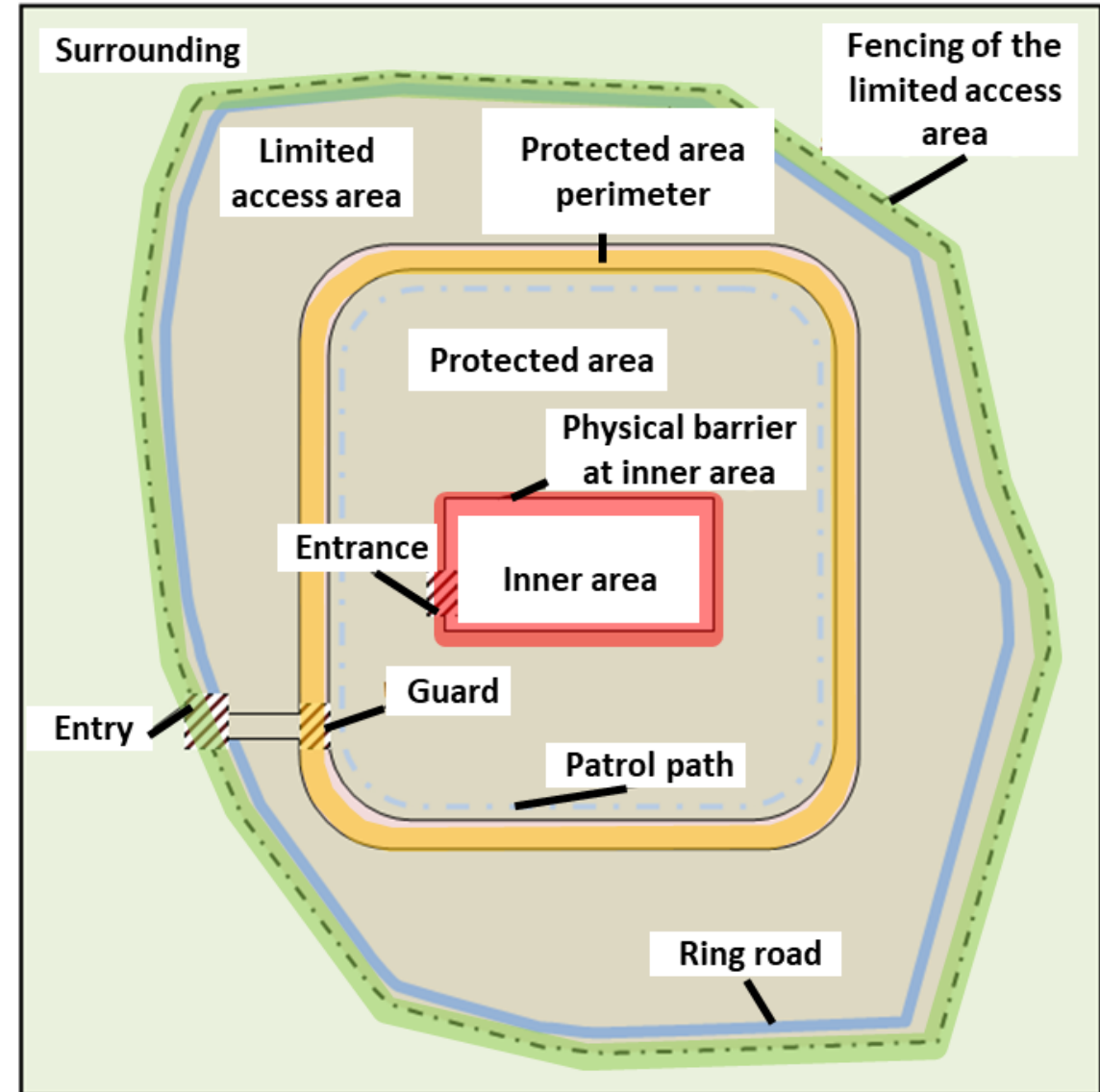
- hampers the intrusion of a violent crowd to the facility area

Protected area perimeter / Protected area

- prevents the violent penetration of a truck
- detection/localisation of intrusion attempts

Physical barrier at inner area / Inner area

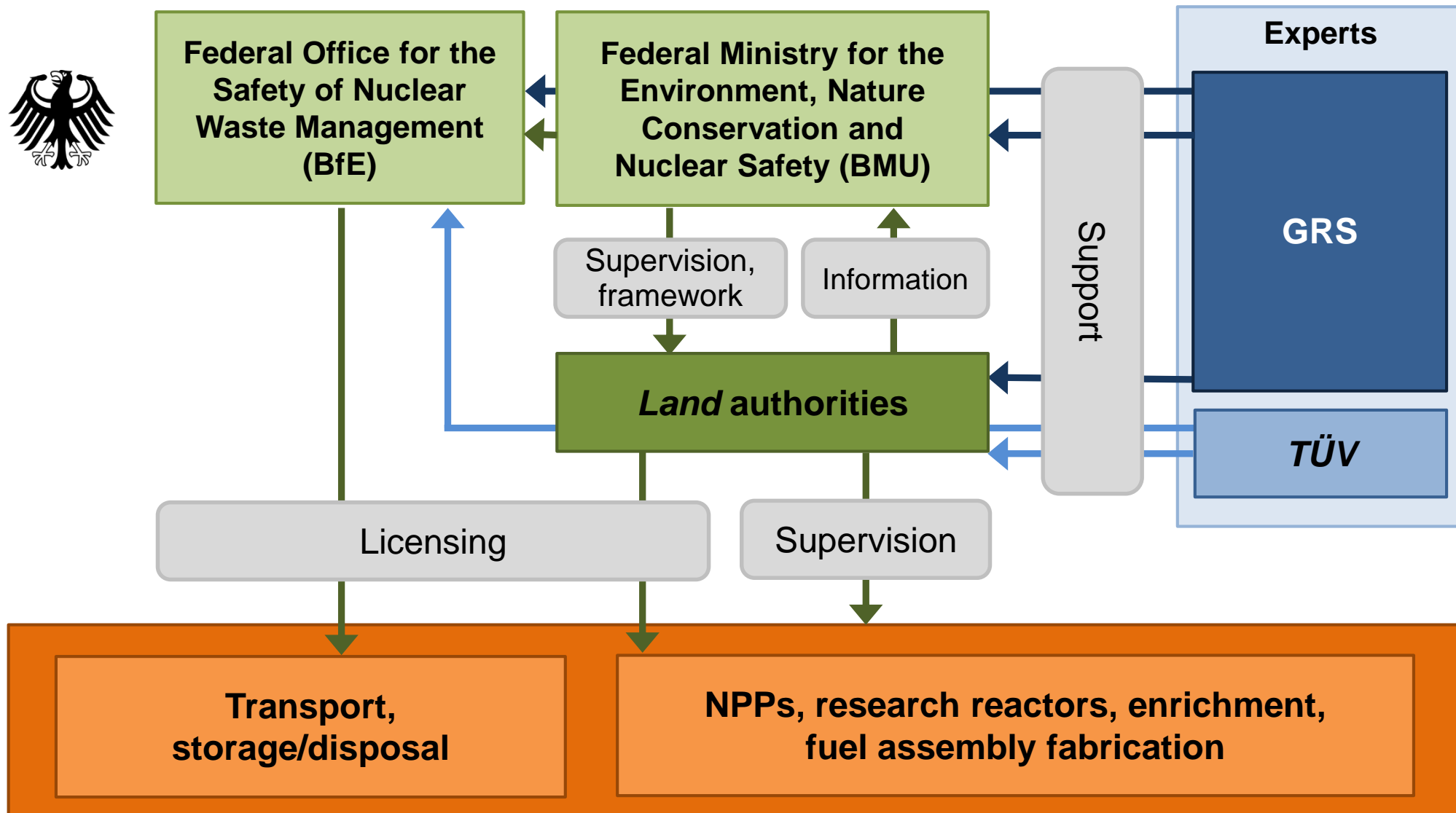
- prevents the intrusion of violent offenders
- houses the main security office



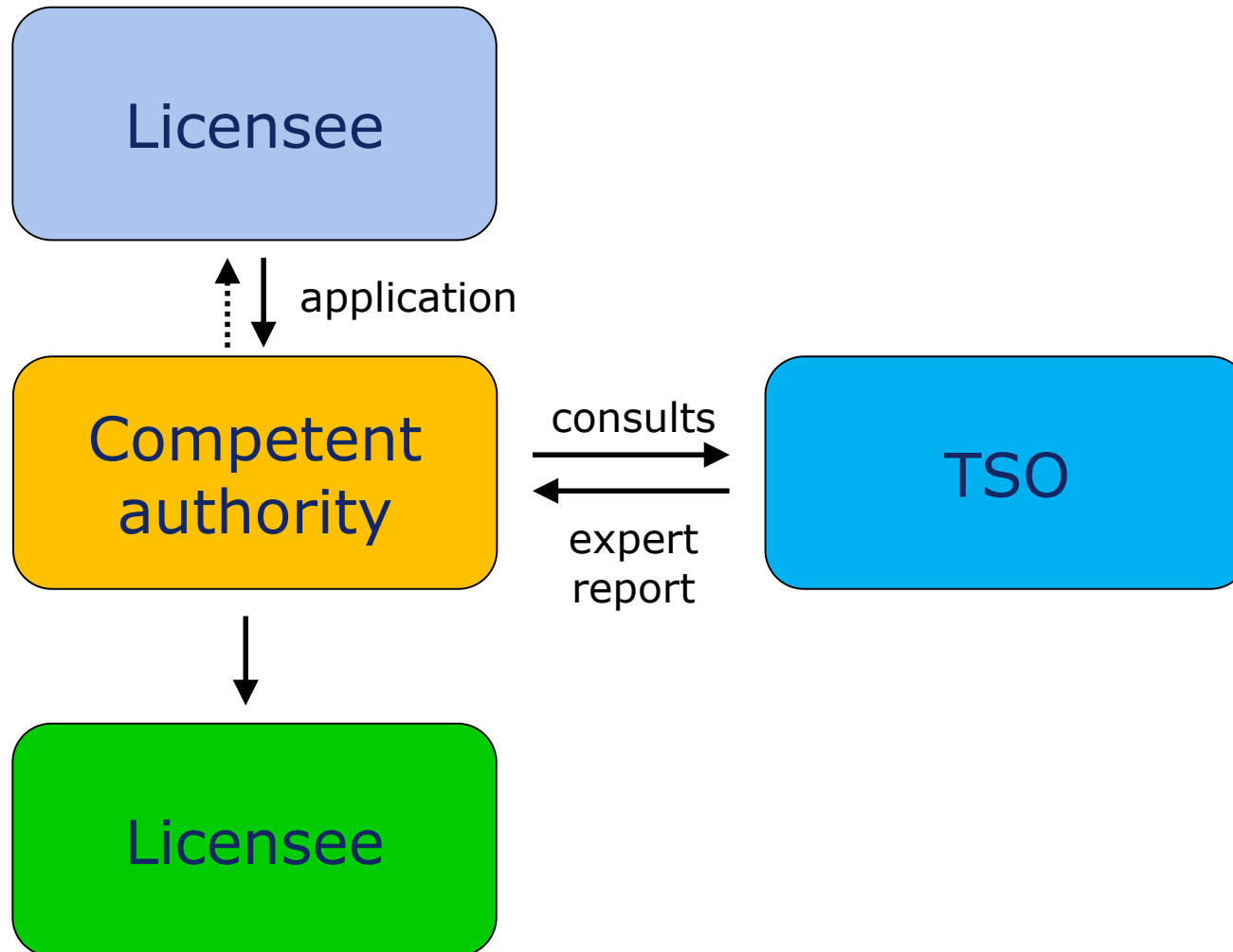
The Nuclear Security Regime

Responsibilities

Tasks and Responsibilities



Licensing Procedure



1. Written licence application submitted to the competent licensing authority
2. Examination of the application
Common practice: TSO is consulted
3. Participation of the general public
4. Environmental impact assessment

Evaluating nuclear security effectiveness (1/3)

- Nuclear facilities are subject to continuous regulatory supervision by the *Länder* over their entire lifetime (*Länder* are assisted by independent authorised experts e.g. TÜVs or GRS, just as in the licensing procedure)
- On-site supervisory activities are performed, on average, once per week and installation (during plant revisions and after reportable events on-site supervision takes place every working day or permanently)
- Subject to monitoring:
 - the measures taken against malicious acts
 - the reliability of the licence holder
 - the performance of in-service inspections of relevant components and systems
 - the evaluation of reportable events
 - the implementation of modifications of the nuclear installation or its operation
 - the technical qualification and the maintenance of the qualification of the responsible persons as well as of the knowledge of personnel otherwise engaged in the installation
 - the quality assurance measures

Evaluating nuclear security effectiveness (2/3)

- The experts of the supervisory authority have access to the nuclear installation at any time and are authorised to perform necessary examinations and to demand pertinent information
- The licence holders have to submit written operating reports to the supervisory authorities at regular intervals
- Any security-relevant event must be reported to the supervisory authorities

- Comprehensive periodic safety reviews are performed every ten years (§ 19a of the Atomic Energy Act)
 - Do the nuclear security measures still correspond to the state of the art in science and technology ?
 - Are back-fitting measures needed to reach the objectives of nuclear security ?

Evaluating nuclear security effectiveness (3/3)

Inspections

- Inspections can be announced or unannounced, if appropriate
- Also the police inspects those parts of the physical protection system which are relevant to their response plans

In-service inspections (subject to nuclear supervisory process)

- Testing manual (safety standard KTA 1202) regulates the frequency and procedure of the in-service inspections on safety- and security-relevant systems and their components
 - Specifies testing schedule and testing instructions (includes tolerance ranges, rules of conduct regarding compliance with test instructions, appointment of external experts etc.)

IPPAS Mission to Germany

IPPAS Mission to Germany (1/2)

Background

- IPPAS Mission (International Physical Protection Advisory Service) took place in autumn 2017
- Scope
 - National review: German nuclear security legislative and framework (implementation of the amended CPPNM, amendment effective in Germany since 2016)
 - Nuclear facility review: implementation of physical protection measures at NPP Emsland and the Lingen storage facility
 - Evaluation of computer security
- GRS supported BMU in the preparation and implementation of the mission (GRS contributed both technical expertise and organisational support)

IPPAS Mission to Germany (2/2)

Results

- *“The team observed that the nuclear security regime in Germany is well established and incorporates the fundamental principles of the amended CPPNM“ **
- *“Germany’s example in applying IAEA Nuclear Security guidance and using IAEA advisory services clearly demonstrates its strong commitment to nuclear security and its enhancement.” ***
- IAEA expert team provided 3 recommendations, 28 suggestions and 10 good practices
- Recommendations/suggestions aim at enhancing the nuclear security framework, optimising single security measures and the international exchange of knowledge/experiences

* IAEA webpage <https://www.iaea.org/newscenter/pressreleases/iaea-completes-nuclear-security-advisory-mission-in-Germany>

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Thank you for your attention !