



Authority for Nuclear Safety and
Radiation Protection

International alignment of the nuclear safety regulatory approach in the Netherlands and in the European Union

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Euratom nuclear safety and radiation protection framework

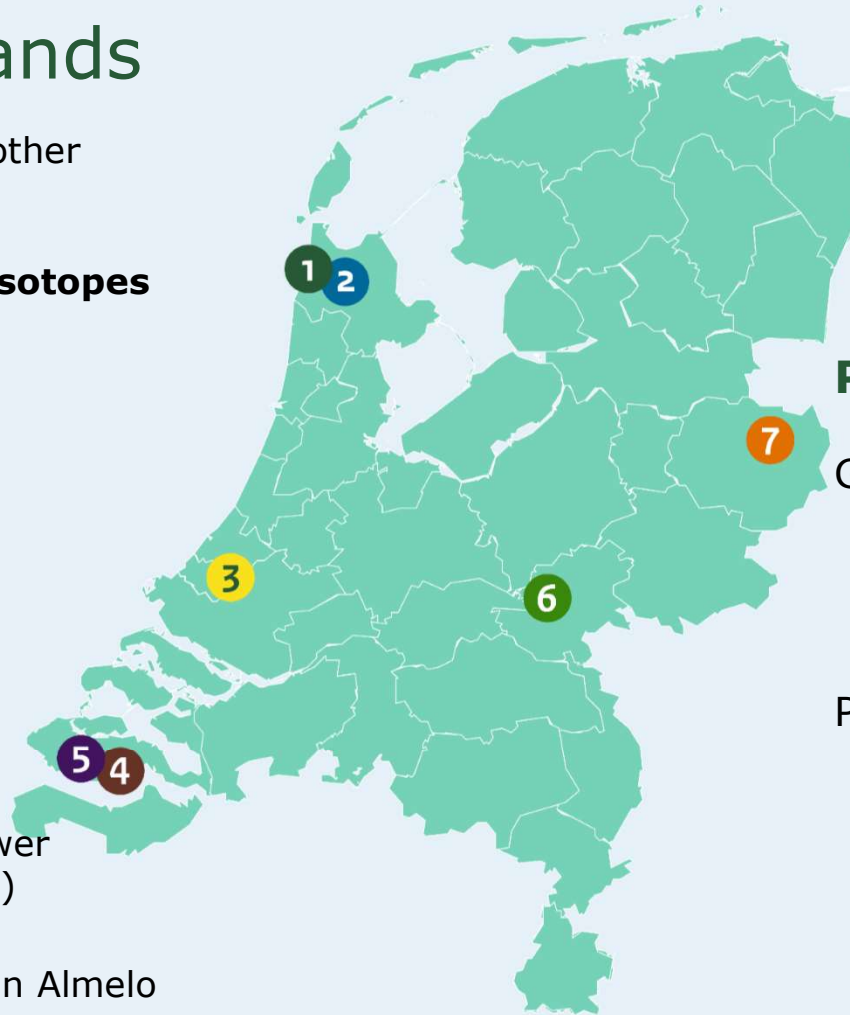
Euratom Treaty binding in member countries of the European Union (EU)

- > Nuclear Safety Directive (**NSD**)
- > Radioactive Waste and Spent Fuel Management Directive (**RWD**)
- > Basic Safety Standards Directive (**BSS**)
- > National regulators **sovereign**



Nuclear installations in the Netherlands

- 1 High Flux Reactor and other facilities in Petten
- 2 **PALLAS for medical isotopes (under construction)**
- 3 Higher Education Reactor in Delft
- 4 **Borssele Nuclear Power Plant (LTO)**
- 5 Central Organisation for Radioactive Waste in Nieuwdorp
- 6 Dodewaard Nuclear Power Plant (in safe enclosure)
- 7 URENCO (enrichment) in Almelo



Plans for new build NPPs

Government plan:

- 4 new NPPs;
current initiative to build 2 large reactors

Private initiatives for SMRs:

- 2 LWR designs
- 2 AMRs
 - **Molten salt thorium**
 - **HTGR for marine propulsion**



Safety Guidelines (VOBK)

- › Description how nuclear safety is assessed in license applications & periodic safety reviews
- › ANVS policy rule defines guideline VOBK as assessment framework
- › New revision: December 2025
- › Direct reference to IAEA standards
- › Technology neutral

2.2 IAEA Safety Requirements & Security Recommendations

The ANVS expects the IAEA requirements to be implemented as follows:

2.2 (1) *Site evaluations for nuclear installations shall be performed according to the requirements in IAEA SSR-1 [5].*

2.2 (2) *Design and operation of nuclear power plants shall be performed according to the requirements in SSR-2/1 (Rev. 1) [6] and SSR-2/2 (Rev. 1) [7].*





ANVS-Specific Requirements

- > Interpretation on certain IAEA requirements where the IAEA leaves room for national interpretations;
- > Implementation of WENRA Safety Reference Levels where these go beyond the IAEA Safety Standards;
- > Specification on how the Dutch regulatory framework relates to IAEA requirements or definitions.
- > Example:

3	ANVS-Specific Requirements
3.1	Defence in Depth
3.2	Single failure criterion
3.3	Redundancy, diversity, independence and separation
3.4	Automation
3.5	Self-sufficiency
3.6	Hazard protection concept
3.7	Safety analyses
3.8	Codes and standards
3.9	Large Early Releases
3.10	Safety documentation

3.9 (3) *When a probabilistic argument is used to support the justification¹⁹ of practical elimination, extremely unlikely shall be considered to be less than 10^{-6} /y with a target value²⁰ of 10^{-7} /y for the sum of the frequencies of all events leading to large or early releases.*

¹⁹ Examples of justification are probabilistic or deterministic arguments, engineering judgement, the complexity of the SSC, robust maintenance and/or testing, or a cost-benefit analysis.

²⁰ When reaching the 'target value' the ANVS will not require additional measures to improve this value.



International regulatory cooperation

Multinational early reviews:

NUWARD (LW-SMR)

- JER Phase 3 with 8 EU regulators

Rolls Royce SMR (LW-SMR)

- 4 EU regulators observed ONR's GDA process

Thorizon (Molten salt thorium reactor)

- ANVS and ASNR

European Union:

ENSREG SMR Task Force



- SMR dashboard published 2x per year
- Sharing lessons learned on early design review, observership, leveraging
- Interaction with technical working group on safety of the EU Industrial Alliance on Small Modular Reactors
- Coordination of SMR activities with WENRA, IAEA, OECD-NEA



Differences in legal and regulatory frameworks EU vs. USA (examples)

- › Generally, more goal based regulatory framework in EU
- › More focus on optimization and continuous improvement in EU
- › More elaborated Defense-in-Depth in EU
- › Lower radiation dose limits for workers in EU





International regulatory alignment is key for new reactors

- › Performance based national regulatory framework based on IAEA safety standards with specified additions, to more easily understand the similarities and differences in regulatory approaches
- › Joint early reviews and leveraging using previously performed reviews by other nuclear safety regulators
- › Open exchange of detailed information between national regulators subject to NDAs (export controls and IP concerns to overcome)





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**Any questions?
How to reach us.**



WENRA/IAEA/VOBK overlap Analysis

Similar analysis process for WENRA SRLs for Existing Reactors
Results:

96 % of SRLs for Existing Reactors (2020) covered by:

- > SSR-1
- > SSR-2/1 (Rev. 1)
- > SSR-2/2 (Rev. 1)
- > GSR Part 2
- > GSR Part 4
- > GSR Part 7
- > In certain cases there are specific elements that require reference SSGs > ANVS Guideline GIGO grants them 'Guideline Status'

The **remaining 16 SRLs** and unique VOBK requirements are implemented in either Guideline VOBK or license conditions, benchmark still ongoing but expected to finish in spring 2026

