# NRG PALLAS

# Internal Transport at the EHC

Safety Rules NRG PALLAS activities NRG PALLAS

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### **Problem**



EHC: no public road  $\rightarrow$  ADR (SSR-6) not applicable (Dutch regulations)

Internal transport, loading and unloading is within the perimeters defined by the nuclear act license  $\rightarrow$  no requirements regarding transport

Rest of EHC: "grey" zone

Transport regulations on the Petten site: "We closely follow the ADR"  $\rightarrow$  what means "closely"?

Mainly a list of "approved" Type B like transport packages (without certificate and without justification), and since 2006 supplement with internal permits for new packages or new use of listed packages



### **Routes in the site - Petten**





### Licence



2020/2021: renewal/revision of licence requirements  $\rightarrow$ 

"The licence holder must have a **procedure for the internal transport of radioactive substances**. This procedure must be approved by the radiation protection expert referred to in regulation C.1. Every five years, starting in 2020, the licence holder must submit the procedure **for review to the ANVS**." (competent authority)

# Scope internal transport



#### Definition

Internal transport refers to the movement of radioactive substances, fissile materials, or ores within a facility (1) or a location (2), or between two locations within a facility, provided the transport is subject to regulations applicable to the facility and does not take place via public roads (3).

1. Facility as referred to in Article 15(b) of the Nuclear Energy Act.

2.Location refers to a facility or a place where an activity is performed.

3. This is in line with the text from the Decree on the Transport of Fissile Materials, Ores, and Radioactive Substances.

# **Four pillars**



**Radiation Protection** 

Nuclear Safety

Transport Safety

Security

### **Radiation protection**

#### **Radiation Protection Aspects**

•Source term, i.e., the (maximum) activity to be transported in relation to the robustness of the packaging

•Optimisation of exposure (application of the ALARA principle)

•Dose rate during normal transport and exclusive use

•Contamination level on the outside of the packaging

•Decontaminability of the packaging, considering factors such as surface roughness and accessibility ('nooks and crannies')







#### **Nuclear Safety Aspects**

•Packaging requirements: aimed at keeping the source inside the container in both regular and accident situations, while maintaining the shielding effectiveness

- •Certification of packaging
- •Leak-tightness requirements
- •Heat production and pressure build-up
- •Criticality safety during the transport of fissile materials

•Application of the Management-of-Change procedure for modifications to transport packaging

### Other



#### **Other Transport Safety Aspects**

- •Labelling of the packaging and the transport vehicle
- •Transport documents
- •Competency requirements for the driver
- •Equipment, management, and maintenance of the vehicle
- •Stowage, use of drip trays, and protection against weather conditions
- •Competence of staff involved in transport and loading/unloading operations

#### **Security Aspects**

•Requirements from the security package and their implementation

# **Explanation of Principles**



For transport packaging intended for internal use, this means that, with regard to these aspects, particularly in the areas of radiation protection and nuclear safety, an internal approval will specify the conditions under which transport in the respective packaging can take place. This applies especially to packaging (containers) comparable to Type-B classification. As part of the application for internal approval, a dose estimation and a justification of potential transport risks are required. See further the paragraph "Internal Approval."

### **Internal Permit / Approval**



In the issued IT, the ASD specifies the conditions that must be met. This determines whether and to what extent internal or external regulations can be deviated from and also defines the implementation of the regulations in the present document. For Type B packaging with a valid certificate, the IT specifies the extent to which deviations from the certificate are allowed during internal transport, such as the use of protective shields, leak-tightness, and the quantities to be transported. For non-certified Type B packaging or similar non-certified packaging, the IT specifies the conditions under which transport in the respective packaging can take place. In both cases – with or without a certificate – this is done based on the previously mentioned graded approach, and the Safety Advisor for the Transport of Dangerous Goods (VAGS) is demonstrably consulted, for example, by having the VAGS approve the IT.

The radiation protection organisation (ASD, LSDs), together with the Transport & Logistics department, supervises compliance with and correct implementation of the regulations in the IT. In case of deviations, if the situation allows, transport is halted and a STAR moment is initiated. In case of unacceptable deviations in a transport package, it is taken out of service. An adjustment of the IT may be necessary before the respective packaging can be used again. This requires a substantiated safety analysis, preferably carried out by an independent expert, and, if applicable, compensatory measures are taken to ensure safe transport. In such situations, the advice of the VAGS is also sought.

### **Internal Permit - Example**



**5.** The data from 'Application for extension IT 2020-06 Use of Marianne container on the OLP' dated 20 October 2023 and Package Design Safety Report 00022097 are part of this approval; through a risk analysis with dose estimation, it has been sufficiently demonstrated that the work can be carried out safely; environmental risks have also been sufficiently mitigated;

6. There is an approved work instruction for the use of the container. This also includes the necessary training for the employees and the supervision of loading and unloading operations;

7. There is an inspection and maintenance programme for the transport packaging;

**8.** Prior to the transport of the Marianne container with irradiated targets in the HFR, a minimum cooling time of 16 hours is maintained. Loading can take place after 12 hours. This ensures that during transport, the thermal power remains below the value of 548 W stated in the certificate. Additionally, the amount of gaseous fission products remains below 2460 A2. Given the limited risk setting of internal transport, it is considered justified that during transport, the activity temporarily exceeds the maximum value of 19900 A2 stated in the certificate.

**9.** Before shorter cooling times can be applied at the HFR, dose estimates and potential exposures from loading and unloading the Marianne container at HCL-MPF are prepared and submitted for approval to the LSDs of HFR and HCL. In this context, it is also examined whether and how further dose reduction (ALARA) can be achieved.

**10.** For transport within the NRG and HFR facility, there is no obligation to use the drawbars and shock-absorbing shields from an ALARA perspective; outside of this, reasonable compliance with the requirements in the B-certificate of this container must be ensured; deviations from this are submitted to the Safety Advisor for the Transport of Dangerous Goods and the ASD;

**11.** The transport must be carried out via the most radiologically suitable route and without delay. To ensure this, the sender and receiver communicate about the time of dispatch and receipt.

## **Emergency preparedness**



NRG PALLAS and Curium are responsible for deviations and incidents on the EHC as they are sender or receiver of transports with radioactive or fissile material.

Laid down in a signed agreement between the parties on the EHC

Role of NRG's Quick Response Team

Two transport accident scenarios as part of the standard incident scenarios agreed on with the ANVS

# Thank you for your attention!



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