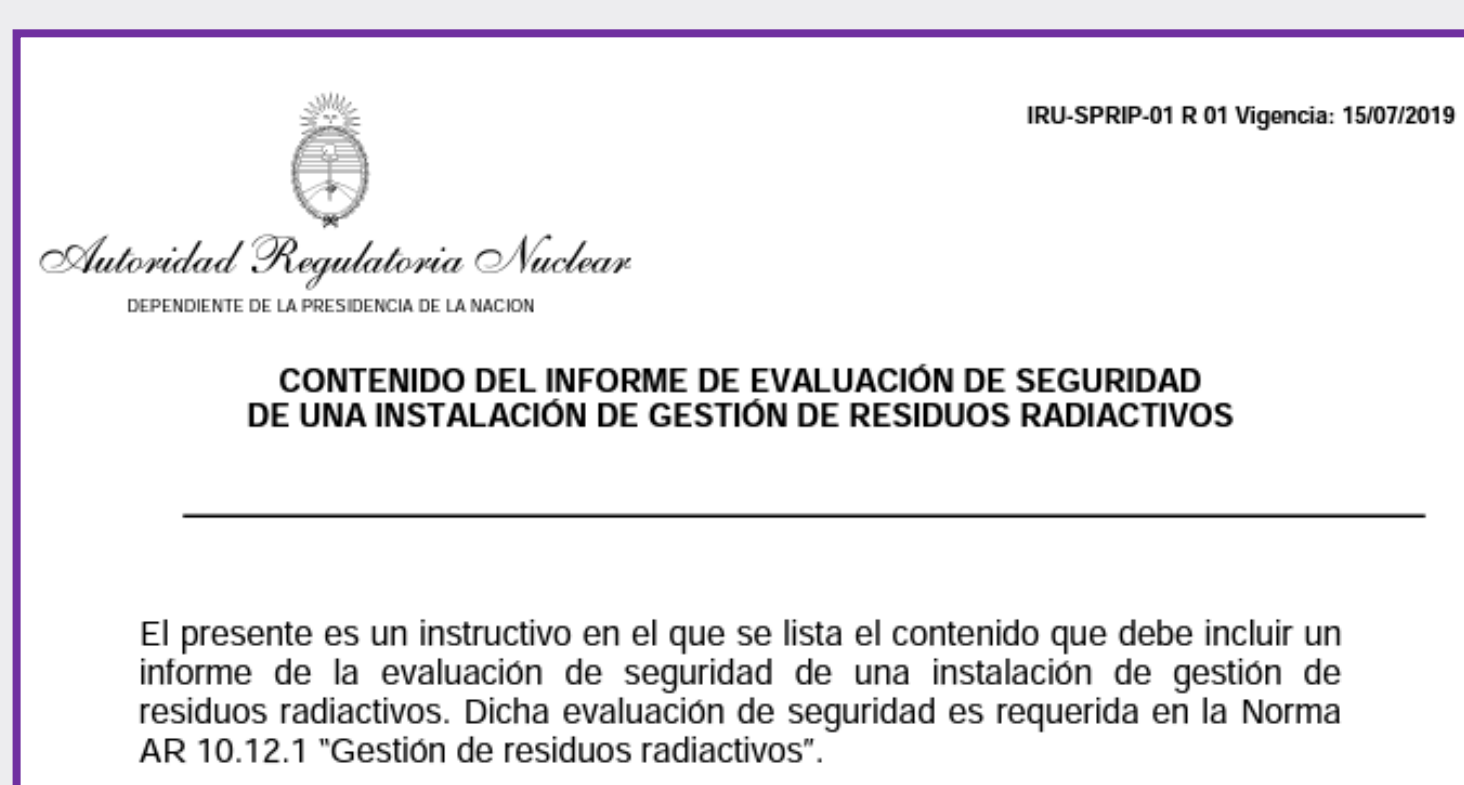




### 1. Background

Radioactive Waste Management standard AR 10.12.1 rev. 3 of the Nuclear Regulatory Body from Argentina, published on 2016, in line with IAEA GSR Part 4, requires that radioactive waste storage facilities develop a safety assessment, prior to operation, in order to ensure safety among the lifecycle of these facilities and guarantee that radiation protection measures to the public and the environment are accomplished, as well as dose limits and constraints.

During 2019, an instructive of the content of the safety assessment was developed by the Radioactive Waste Management Control Section of Nuclear Regulatory Authority (NRA), in order to facilitate to operators the process of preparation of the documentation needed to perform the safety assessment and harmonize with recommendations of IAEA GSG Part 3.



*Regulatory Instructive:  
"Contents of the safety  
assessment report of a  
radioactive waste  
management facility"*

### 2. Safety Assessment documentation

#### 2.1. Facilities safety assessment

During 2020, NRA reviewed the safety assessment documentation from the **RW** storage facilities located within the NPP's sites and an atomic center site.

On each case, the safety assessment was developed by the responsible entity. In total, 13 operating RW storage facilities and 2 new constructed storage facilities were evaluated. The last two were conditioned to operate upon the approval of the safety assessment.

The documentation received by the NRA consisted on the description of the facilities, a risk matrix identifying the potential initiating events (PIEs) for each storage facility, the inventories and the calculations of the associated scenarios and impacts.

#### 2.2 Safety assessments content information

The different documents covered the information in line with the instructive:

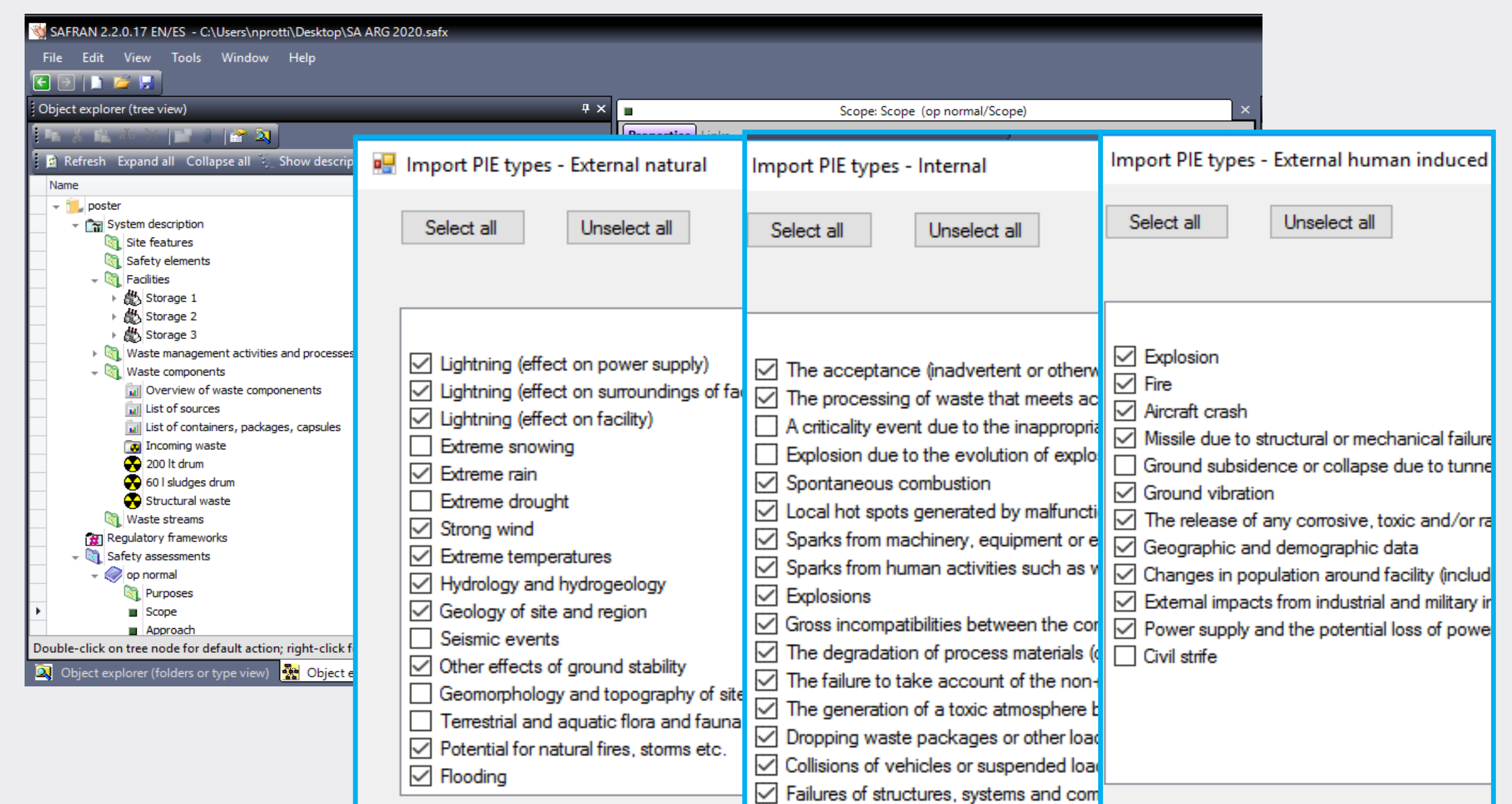
- General information: Objective, scope, justification, description of the facilities (general, information of the site, building, inventories, safety functions, associated documentation and procedures)
- Methodology (assumptions, data, models, codes, criteria, identification of PIEs, scenarios, impacts, end points and dose calculations). Information about the different conducted assessments:
  - \* Normal operation: identification of the activities on each facility (e.g. waste reception and manipulation, stowage, measurements, inspections, housekeeping), the duration and frequency of each one, associated procedures, reference dose rates.
  - \* Accidental situation: a master logic diagram with natural external events, induced by human and internal events and their probability. The determination of the scenarios and impacts associated with the events.
- Results, conclusions (safety level of each facility, identification of improvement opportunities on safety, procedures, barriers, etc.) and references.

### 3. Regulatory review process

**3.1** The Control of Radioactive Waste Management Section conducted the main review process with an independent verification approach. The first step was a general revision in line to verify the general items:

- Facilities and site information and comparison with inspection reports.
- Inventories according to the periodic information received from the facilities and calculations of a full storage situation.
- Preliminary PIEs exclusion and selection of the specific ones.
- Comparison with PIEs facilities selection according with the site and building characteristics and an appropriate graded approach.
- Identification of the scenarios, end points and impacts.

- Loading data into SAFRAN project.



Example of SAFRAN review project and selected PIEs by category (external natural, internal and external human induced)

**3.2** The Radiation Protection Division reviewed the specific documentation through three multidisciplinary working groups: Modelistic, Radiation Protection and Shielding.

**Modelistic Section:** considering data facility and the inventories provided, this group modeled the different identified scenarios for accident situations using codes PC-CREAM and HotSpot softwares. Their final output was an assessment of the **release of radionuclides to air and groundwater radionuclides migration**.

**Shielding Section :** was in charge of verifying the dose rates on normal operation scenarios, taking into account the building characteristics and the inventory of each facility using MCNP software. In addition, external doses in case of foreseen internal events (e.g. waste package drop) were calculated using Microshield Software.

**Radiation Protection Section:** verified that the activities related with normal operation, in particular, their duration and frequency were coherent with the realistic situations according to the inspection reports. The doses of the workers were also compared with dose restrictions.

**Radioactive Waste Section:** was in charge of coordination of the SA review, verification of all the different scenarios and impacts using IAEA SAFRAN TOOL.

#### 3.3 Final Steps

The Radioactive Waste Section analyzed all the documentation reviewed and the working groups inputs in order to verify that the safety level and safety functions of each facility were adequate, taking note of the improvements needed to fulfill the safety objectives. Finally, a comparison with the safety assessment developed by the facilities owners was performed, paying particular attention in dose calculations. Every scenario dose were compared with the correspondent dose restriction (normal operation) and the criterion curve (dose vs probability on accidents situation) according to Regulatory standards.

### 4. Conclusions

The results of implementing the NRA new standards and procedures for the reviewing of safety assessments of radioactive waste facilities are considered to be truly successful for the Country. The process allowed to detect and promote safety improvements, as well as to harmonize the safety functions of each NPP's radioactive waste storage facility.

Nuclear Regulatory Authority has now a well-established procedure for the review and assessment of SA from predisposal RWM facilities. It is coordinated by the Radioactive Waste Management Section with strong contribution from other specialized groups within the regulatory body.