



# Italian WAC Policy and RLOW Approaches

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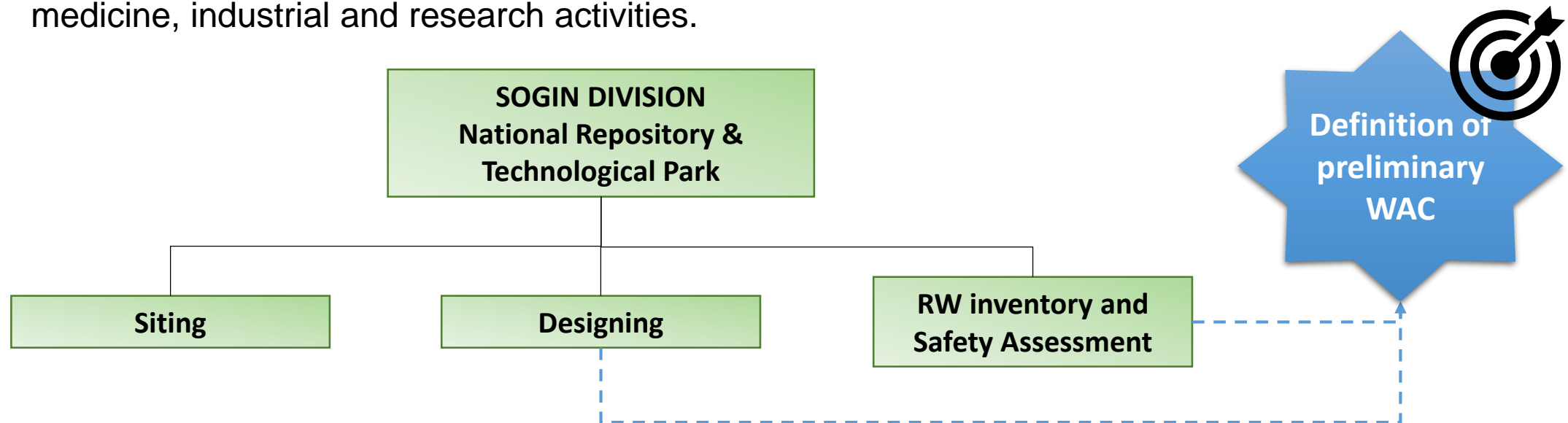
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*PREDIS WP5 Webinar "Innovations in liquid organic waste treatment and conditioning"*

# The role of Sogin

- Sogin has been **entrusted by law** (Legislative Decree no. 31/2010) with the siting, designing, building and operating of the National Repository for disposal of VLLW/LLW and long-term storage of ILW/HLW. The **National Map of Potentially Suitable Areas has been published on January 2021**
- The National Repository is a structure with **engineering and natural barriers placed in series**, designed following the best international practices and according to the most recent IAEA standards.
- About 60% of the total amount of waste disposed in the Repository will be originating from the operation and decommissioning of nuclear power plants, while the remaining 40% from nuclear medicine, industrial and research activities.



# Sogin Preliminary WAC

- A set of preliminary WAC is defined by **Technical Guide 26** issued by the Regulatory Body in the 80's and the **Italian Std UNI 11193** (2006); such documents **include the qualification process tests for waste conditioning** (e.g. radiation resistance, fire resistance, thermal cycles, biodegradation, leaching, etc.)
- Sogin defines **additional preliminary WAC** based on waste characterization and dialogue with waste producers, repository preliminary design, preliminary 'site independent' safety assessments, IAEA std (IAEA, SSG 23 – 2012 ), international best practices
- The **Regulatory Body (ISIN)** is responsible for approving the Qualification Process for conditioning specific waste streams; **Sogin is involved in the approval procedure** and is required **to issue** so called '**Letters of Compliance**' (LoC) for the potential disposability of waste conditioned with the approved process
- Such procedure minimizes the risk of re-conditioning waste for future acceptance

# Some examples of Sogin Preliminary WAC

**Waste**

**General**

**Non  
Acceptable**

**Acceptable  
with limitation**

- **Mixing**
- **Compressible Waste**
- **Waste distribution**

- **Explosive**
- **Liquid**
- **Flammable**
- **Highly reactive**
- **Putrescible**
- **Oils**
- .....

- **Corrosive**
- **Reactive**
- **Complexing and chelating agents**
- **Fermentable**
- **Paraffin**
- **Heavy Metals**

- **Asbestos and fibers**
- **Free Liquids**
- **Spent sources**
- **Powders and ashes**
- .....

# Some examples of Sogin Preliminary WAC

## Container

- Dimension
- Shape
- Hooking devices

## Waste Form

- Qualification of Matrix

## Package

- Voids
- Activity Concentration
- Dose Rate
- Surface Contamination
- Fissile Radionuclide
- Center of Gravity

# RLOW – Sogin Approaches

TYPE	Location	Volume (m <sup>3</sup> )	Classification	Main chemical composition	Management Strategy	Final Package
<b>Extraction Solvents + Other mixed organic liquids</b>	Saluggia	14,5	LLW	Kerosene (48.6% v/v); Mesitylene+Solvesso (24.8% v/v); TBP (6.7% v/v); TCA (4.6% v/v); non-detectable organics (15.3% v/v)	Incineration abroad	CC-440 cemented
	Trisaia	2	LLW	TBP (70%) Kerosene (30%) Presence of sludge	Incineration abroad	CC-440 cemented
		0,7	LLW	Alcoholic, Xylenic and oily matrix	Incineration abroad	CC-440 cemented
	Casaccia	0,5	ILW	Extraction solvents (CMPO and TBP in Dodecane) - Organic solutions containing pyridine, MIBK and scintillation liquids - Liquids containing CCl <sub>4</sub> - Other organic liquids	Direct conditioning – Geopolymers?	TBD

# RLOW – Sogin Approaches

TYPE	Location	Volume (m <sup>3</sup> )	Classification	Main chemical composition	Management Strategy	Final Package
<b>Oily waste</b>	Bosco Marengo	1,5	LLW-VLLW	Mixed with water (55%) and with presence of sludge (30%)	Absorption on Nochar™+cementation followed by overpacking	CC-380 cemented
	Latina	5	VLLW	Presence of surfactants Presence of metal oxides	Segregation of the oily phase Organic phase: Nochar™+cementation followed by overpacking Aqueous phase: direct cementation	CC-440 cemented
	Other	Few litres	VLLW		TBD	TBD

# Oily waste – the Process

## Plant realisation and full-scale trials



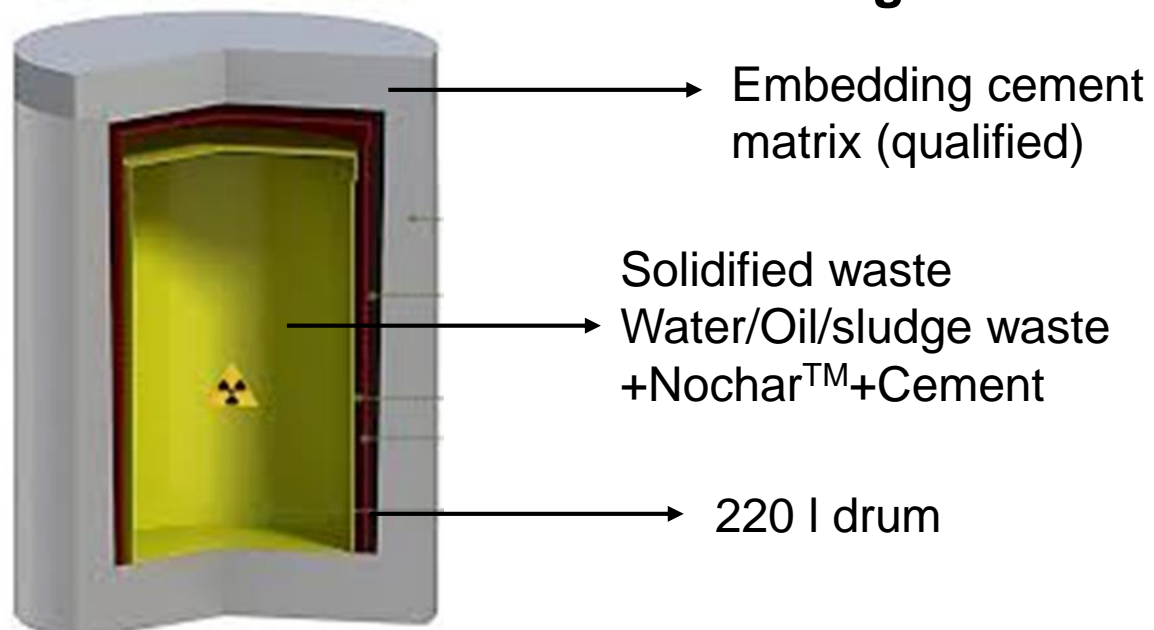
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Classes: Public Use, Internal Use, Contr



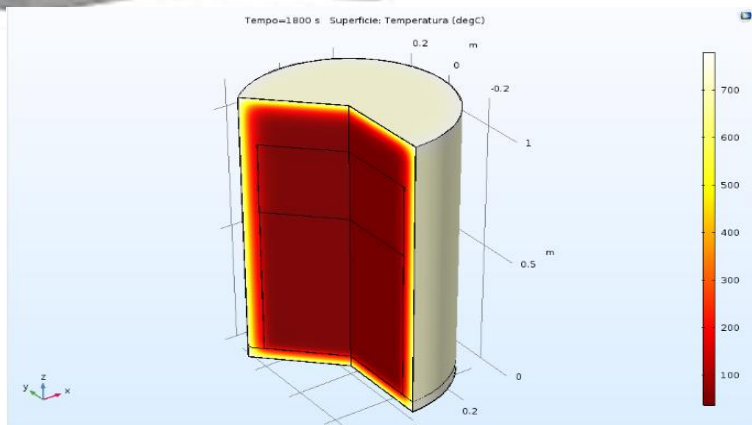
# Oily waste – the final package

## Final Package



In order to comply with the acceptance criteria for the final disposal to the National Repository, the solidified waste (into 220 liters drum) is than **embedded in cement inside an overpack.**

The embedding cement matrix has been subjected to a complete set of qualification tests.



Assessments for the verification of the potential production of gas by radiolysis and of the behavior of the package if exposed to high temperatures.

### **LoC ready to be submitted:**

*verification of preliminary WAC and Disposability Assessment completed*



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**We protect the present  
We guarantee the future**