



The Activities of ENEA

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ENEA

**The Integrated Service for the
Collection of Industrial and Healthcare
Radioactive Wastes
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Introduction and Role of the «Integrated Service»



CIPE(The previous Interministerial Committee for Economic Planning), on proposal of the Ministry of Industry Commerce and Craftmanship), through a resolution of 11 July 1980, approved the establishment of a limited company between CNEN (now ENEA) and Agip Nucleare (stake purchased by SOGIN IN 2004), named NUCLECO for the low and medium activity radioactive waste management. It is retained the exclusive jurisdiction of CNEN relatively to the confinement of the conditioned radioactive wastes. It is further confirmed the priority that CNEN must assign to the activities regarding the control of the safety standards to assure the maximum levels of health protection in the processing and storage of the radioactive wastes.

CIPE on 11 March 1980 assigns additional tasks in the sector of low and medium activity radioactive wastes produced in the national field to guarantee the collection, storage and management.

The CIPE resolutions OF 20 March 1986 and 30 march 1989 widen the action field and confirm the ENEA and NUCLECO role in the national framework.

The ENEA Board of Directors, with a resolution of 4 June 1986 Doc. ENEA, (86) n. 33/CA Rev.1 approved the establishment of an «Integrated Service» for the management of low and medium radioactive wastes generated by external operators and defined that such a Service were undertaken partly directly by ENEA and partly entrusted to NUCLECO. The relations between the parties, to apply such a resolution are regulated through a specific Convention of 15 June 1989, registered at n. C/46007 at the Registration Office of private acts in Rome on 27 September 1989.

THE INTEGRATED SERVICE



- **D.Lgs. 52/2007** Implementation of the **Directive 2003/122/CE EURATOM** on the control of the HASS (High Activity Sealed radioactive Sources) and orphan sources.
- **Art. 2 paragraph 1 letter m).** «Integrated Service» technical operative tool able to take charge of all the phases of the management cycle of the disused source.
- **Art. 17 paragraph 3,** The Integrated Service guarantees all the phases of the management cycle of the disused sources like the preparation for shipment, the transport, eventually the conditioning and the temporary storage. All the plants and operators which undertake collection activities and eventual temporary storage of disused sources are allowed to join the Service. (They must be in possession of the relevant authorizations issued by the Ministry of Economic Development as per **230/95** act.

Legislative Decree (D.Lgs.52/07)



The **D.Lgs. 6 February 2007, n. 52 G.U. n.95 del 24 April 2007** states:

Art.14

- 1. The Prefect prepares action plans for the implementation of safety in the case in which orphan or suspected sources are found.**
- 3. L'ENEA provides consultancy and specialistic technical assistance, to protect the workers and the population, to individuals performing radiological activities when they suspect the presence of an orphan source.**

Note: The Prefect is hierarchically under the Ministry of the Interior Affairs, and it is the general representative of the Government on the territory.

The Integrated Service



Art.17 paragraph 4

The Manager of the Integrated Service is ENEA

Art.17 paragraph 2

The National operator is Società gestione impianti nucleari (SOGIN S.P.A.).

The National Operator (**art. 17 par. 1**) must guarantee the long period disposal in safe conditions of the disused sources in order to achieve the future disposal, ensuring a safe storage for a 50 years period.

INFORMATION ACTIVITIES



Attenzione ai rottami

Cosa fare

Gli oggetti metallici a fianco possono contenere materiali radioattivi. Se vengono allungati, possono rischiare di essere contaminati. In tal caso, si deve evitare che il materiale radioattivo si spargano.

Non toccare l'oggetto.

Tenerlo a distanza e, se possibile, schermarlo. L'oggetto con cemento, metallo o sabbia.

Avvicinare il carico o l'oggetto in una zona sicura. SOLTANTO se siete in grado di misurare e valutare il livello di radiazione.

Informazioni

Quali che contengono materiali radioattivi, si presentano in forma di rifiuti, liquidi o solidi. Devono essere prima adatti ad essere smaltiti. Gli oggetti possono essere smaltiti in un container o in un contenitore speciale. Gli oggetti possono essere smaltiti in un container o in un contenitore speciale. Gli oggetti possono essere smaltiti in un container o in un contenitore speciale.

Oggetti tipici

Technical and scientific support to authorities

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Information immediately understandable to police, customs, harbors

RADIOACTIVE SCRAP - BE AWARE!

WHAT TO DO

The items pictured may contain radioactive material. If you see such items, notice radioactive warning markings on a piece of scrap metal, or if you think the material is radioactive, DO NOT HANDLE. Take the following actions:

- DO NOT TOUCH THE ITEM.
- PUT DISTANCE BETWEEN YOU AND THE ITEM AND IF POSSIBLE, SHIELD THE ITEM WITH CONCRETE, THICK METAL, OR BURN.
- WARN OTHERS AND SECURE THE AREA.
- MOVE THE LOAD OR ITEM TO A SAFE AREA ONLY IF YOU HAVE THE ABILITY TO MEASURE AND ASSESS THE RADIATION LEVEL.
- CONTACT YOUR STATE RADIATION CONTROL AGENCY IMMEDIATELY. IF UNAVAILABLE, CONTACT THE NATIONAL RESPONSE CENTER OR THE U.S. NUCLEAR REGULATORY COMMISSION (See "WHERE TO GET HELP" to the right).

BACKGROUND

Items that contain radioactive material come in different forms, shapes, and sizes. These items can turn up in scrap metal. You should be alert to the presence of items that may contain radioactive material. Be familiar with the typical markings such as the three-bladed radiation warning symbol, and the terms used to describe the radioactive materials most commonly used in these devices. Remember that some radioactive materials may not be properly marked with the radiation warning symbol, or the radiation warning symbol may be covered by dirt, oil, or rust.

Since 1945, radioactive material has been detected in scrap metal numerous times. In some cases, the radioactive material was contained in shielded devices that found their way into scrap handling facilities and was processed in normal scrap. This resulted in contamination of the facilities, radioactive products in the dust, and potential radiation exposure to the workers. The contaminated products could have been hazardous to members of the public as well.

Radiation monitors can be used to check incoming scrap for radioactive material. However, they cannot always detect radioactive material that may be contained in a load or other piece shielded from the radiation monitor. Keep in mind that items that are not normally radioactive can get on radiation monitors if radioactive contamination is present in or on the surface of the items. Note that some radioactive material is permitted to be disposed of without special requirements if you suspect radioactivity in an item, contact your State radiation control agency.

WHERE TO GET HELP

YOUR STATE/LOCAL/COMPANY CONTACTS
(See State Radiation Control Agency, Emergency Response Center, etc.)

YES! YOU HAVE INFORMATION regarding your STATE RADIATION CONTROL AGENCY
or
WWW.NRC.gov/STATE/SPC/SPC/STATE/SPC/SPC
or
WWW.NRC.gov/STATE/SPC/SPC/STATE/SPC/SPC

National Response Center
Operated by the
U.S. Environmental Protection Agency
(800) 424-8802
www.epa.gov

U.S. Nuclear Regulatory Commission
"Nuclear Emergency Operations Center"
(301) 816-5100
www.nrc.gov

TYPICAL LABELING

The following are examples of terms normally used in association with the radiation warning symbol to indicate the type of radioactive material and its quantity. Other terms or markings describing the type of material may also appear.

Radioactive Material	Radioactive Material	Radioactive Material
Radioactive Material	Radioactive Material	Radioactive Material
Radioactive Material	Radioactive Material	Radioactive Material
Radioactive Material	Radioactive Material	Radioactive Material

RADIATION WARNING SYMBOL

This symbol should appear on containers and devices that hold radioactive substances, and may be on a label, tag, or etched in the metal. Labels are magnets or black on yellow, and in many instances, markings and colors may be faded and worn. Please note that not all containers and devices requiring the radiation warning symbol will be properly marked with the symbol.

TYPICAL ITEMS

Research
activities

Industrial
processes

Healthcare
waste

Sources

ENEA

Private operators participating in the Integrated Service

nucleco



ENEA

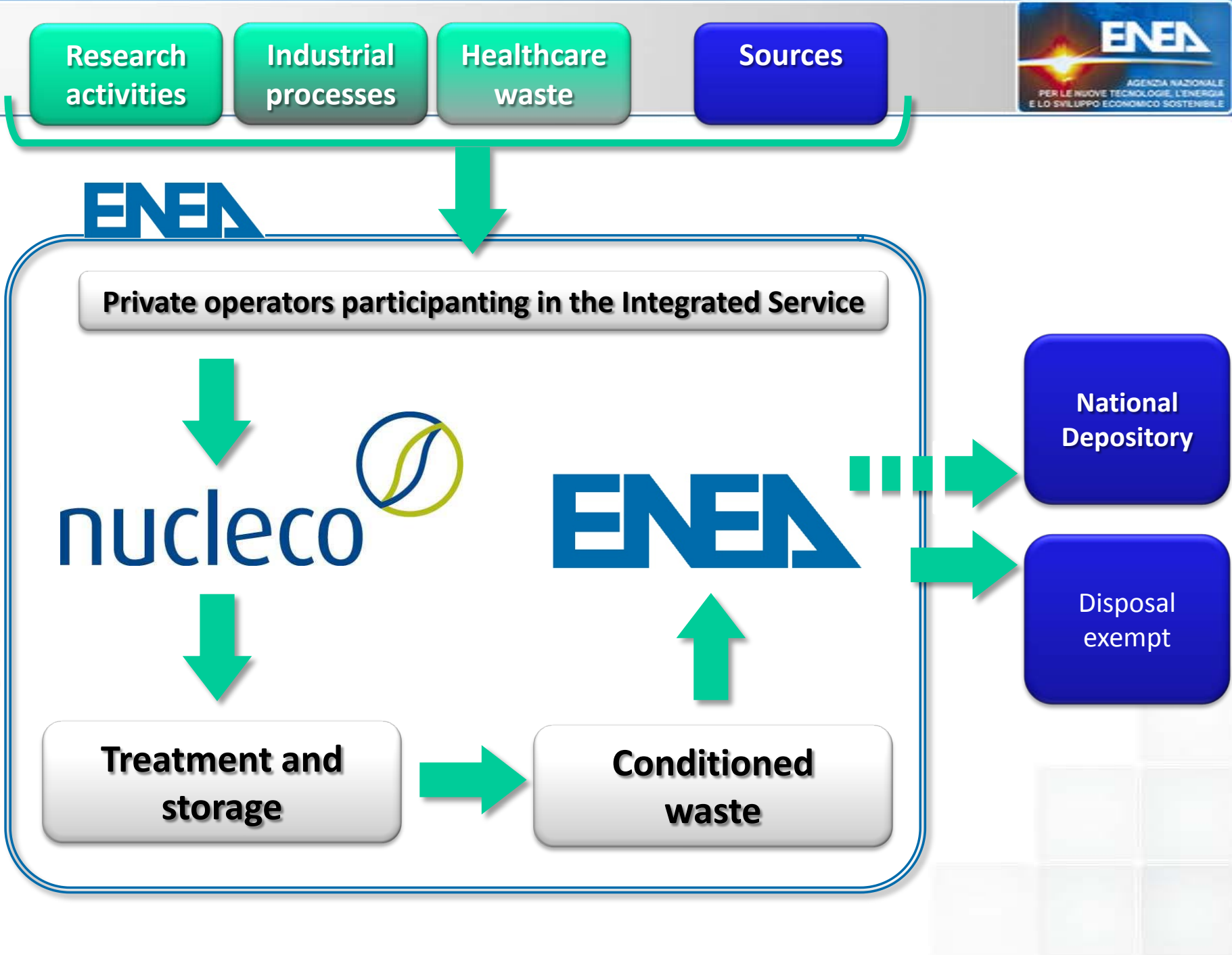
Treatment and
storage

Conditioned
waste

National
Depository

Disposal
exempt

INTEGRATED SERVICE



Medical and industrial Sector Supervision



ORPHAN SOURCES MANAGEMENT



Lightning rods: Am-241, (2-1000 MBq), Ra-226 (4-400 MBq)



Smoke detectors, Am-241



ORPHAN SOURCES MANAGEMENT



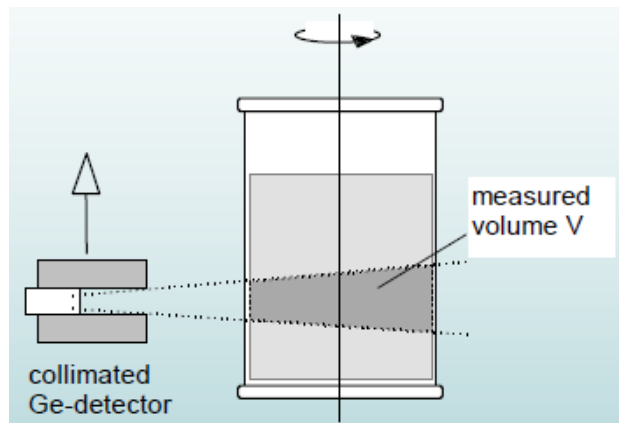
Findings in metallic scraps for metallurgy, extra U.E. military or medical surplus etc.



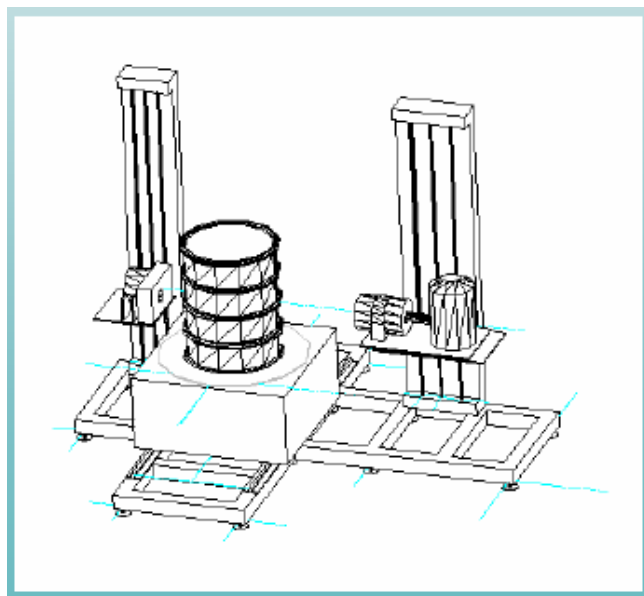
Through the subsidiary company NUCLECO:

1. Custody of solid waste materials: 4400 mc, liquid waste materials: 500 mc (2014)
2. Collection of radioactive wastes produced by Casaccia Research Centre (about 10 mc per year)
3. Financial Turnover about 1,3 M€/a
4. Facilities for the treatment of solid and liquid wastes (ICS 42 and ITLD22 Plants).

CHARACTERIZATION TECHNIQUES



Gamma-segmental and tomographic techniques



OPERATIONAL LAB. INSTRUMENTATION IN ENEA



SRWGA (Sea Radioactive Waste Gamma Analyser):
System for the characterization of potentially containing γ -emitting materials.
It implements different measuring techniques that allow the reconstruction of the radionuclides activity distribution in handworks containing radioactive materials, furthermore the distribution of the density of the containment matrix.



Spettrometry α
Detection of α -emitters activity located in potentially contaminated samples suspected of illicit trafficking



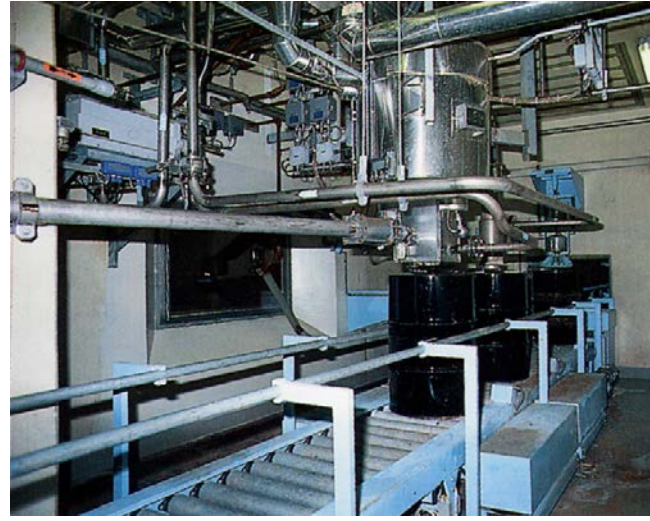
Sistema Anti-Compton
Thanks to the minimization of the Compton background, this instrument is used to detect radioactive materials in extremely low concentrations (activation analysis and forensic science).



ICP-MS Spectrometer
The mass spectrometry allows, through the light-matter interaction the elemental analysis in unknown samples with extremely high sensitivity (ppb e ppt).

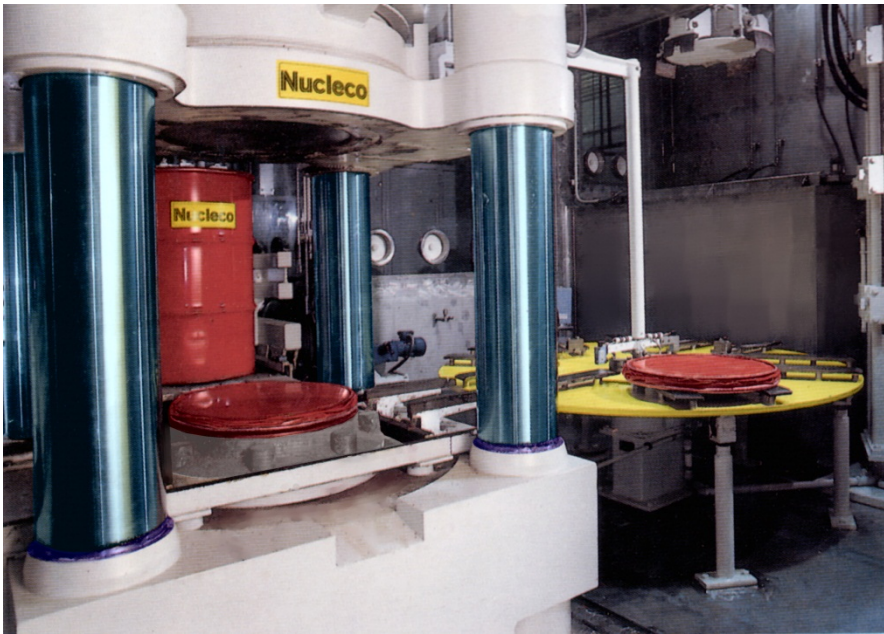
Radioactive Waste Management

Completion of the Integrated Service Activities, i.e. conclusion of the cycle.



Compaction,
drumming,
cementation
and temporary
storage of low-
activity non
energy wastes

SOLIDS TREATMENT AND CONDITIONING ICS-42 PLANT



Preparation of approved mortars by ISPRA

Supercompaction section includes a 15 000 kN component (1 500 t) able to process 200 l drums containing solid radioactive wastes obtaining low volume cylinders subsequently plunged in 400 l drums capacity named “Overpacks”

LIQUIDS TREATMENT AND CONDITIONING THE ITLD-22 PLANT



Liquid wastes



Final Handwork
MOWA 400 I drum

ITLD-22 essentially is able to process $1 \text{ m}^3/\text{shift}$ with a maximum activity of $3\,700 \text{ Bq/cm}^3$

Management and Disposal of Radioactive Wastes

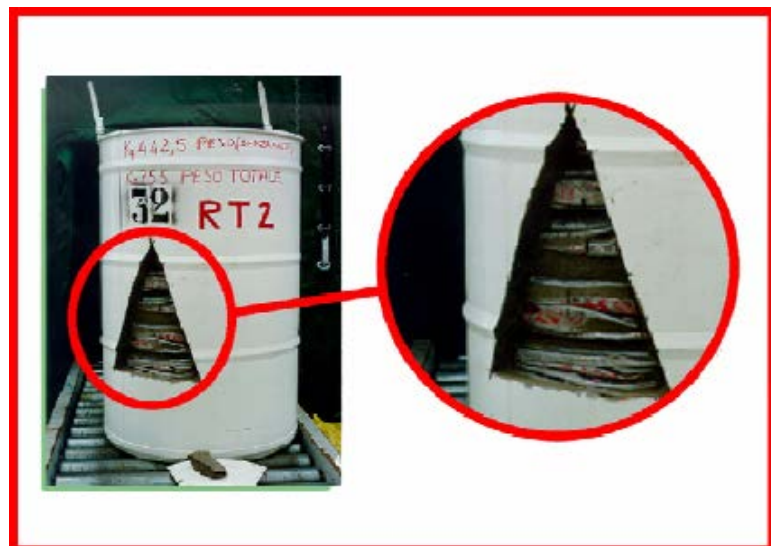
Collection, Treatment, Conditioning and Storage of radioactive wastes from no nuclear power activities

Packaging waste at the premises of the manufacturer.

Transport from the producer to Nucleco plant with authorized carriers.

Reception, characterization, labelling of the materials that enter in Nucleco plant.

Temporary storage for nuclear materials pending of the construction of the Italian National Depository or pending the disposal as exempt wastes



Rad. Mat. and R&D related to the siting of Italian Radioactive Waste Surface or Sub – Surf Depository



- ENEA Performs the function of the National Integrated Service Manager for non energy radioactive wastes from hospitals and industrial origin, through a framework agreement with the company NUCLECO.

- The Body Manages relations with NUCLECO and SOGIN related to technical aspects of ENEA's Research centers.

- It researches innovative systems for the safe disposal of nuclear waste.

- This Italian Agency provides technical and scientific support to the national authorities participant to international protocols, agreements and partnership.



Management and disposal of radioactive waste

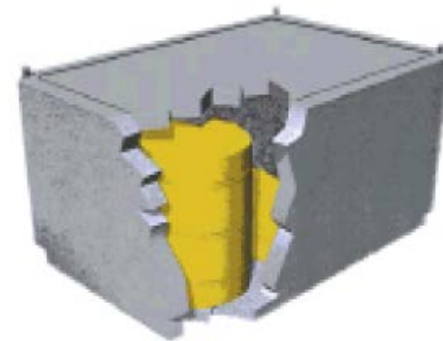
Study on conditioning and isolation of radioactive waste Contractual relationships with SOGIN.

Fusto da 380 lt con
rifiuti solidi compattati

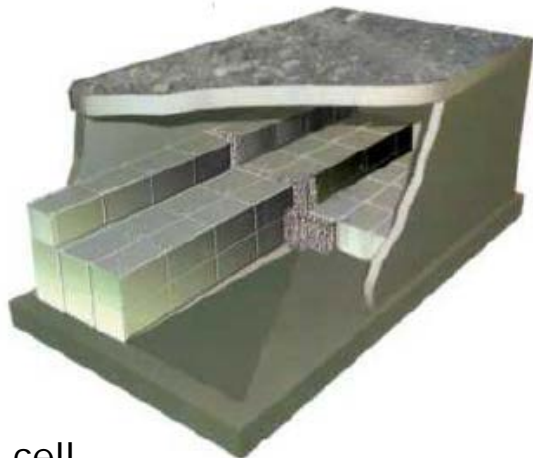
Fusto da 400 lt con
rifiuti liquidi cementati



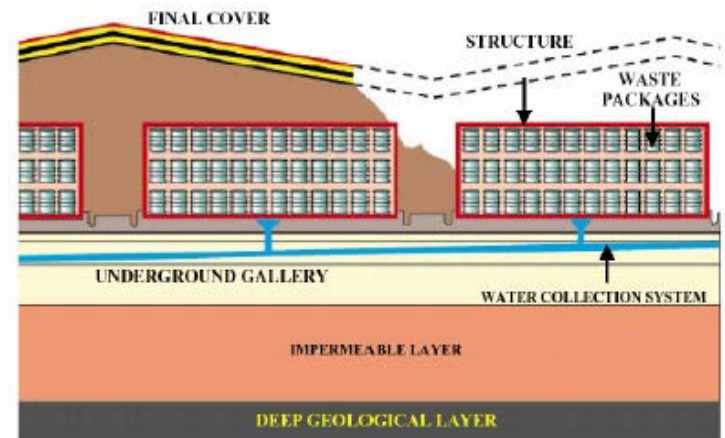
Conditioning



Isolation module



Disposal cell



Multi-barrier system

Thank you for your attention.

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