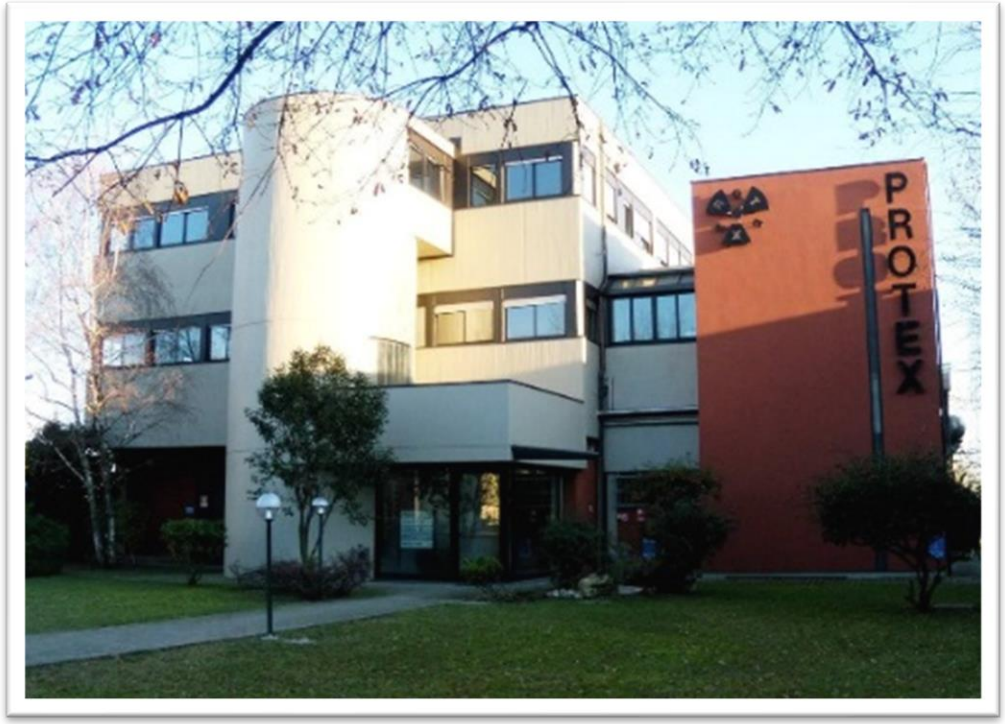
THE ROLE OF PROTEX ITALIA IN THE NUCLEAR INDUSTRY



PROTEX ITALIA

LABORATORI PROTEX

GRUPPO LABORATORI PROTEX

- OCCUPATIONAL MEDICINE
- CONSULTING HSEQ
- REMEDIATION
- NUCLEAR
- LABS

PROTEX ITALIA

GRUPPO LABORATORI PROTEX

NUCLEAR DIVISION

- COLLECTION AND DISPOSAL OF RADIOACTIVE WASTE
- TRANSPORT RADIOACTIVE MATERIALS - AUTHORIZED CARRIER
- AUTHORIZED WAREHOUSE FOR RADIOACTIVE MATERIALS
- PHYSICS LABORATORY AND RADIOCHEMISTRY
- RADIOACTIVE RECLAMATION
- DECOMMISSIONING

REMEDIATION DIVISION

- ASBESTOS REMEDIATION
- CLEARING OF POLLUTED SITES
- SITES CHARACTERIZATION

PROTEX ITALIA – CERTIFICATION AND QUALITY ASSURANCE

Attestazione
n. 22847/11/00

Cat.	Class.	
OG1	II	**Edifici industriali**
OG12	IV	**Bonifiche e protezione ambientale**
OS23	II	**Demolizione di opere**

Attestato di adesione al
SERVIZIO INTEGRATO
Per la gestione dei rifiuti radioattivi
di origine non-elettronucleare

Member of CISQ Federation
CERTIFIED MANAGEMENT SYSTEM
ISO 9001 - ISO 14001
ISO 45001

Certificato n. 1411/98/S - **ISO 9001:2015**
Certificato n. EMS-5154/S - **ISO 14001:2015**
Certificato n. OHS-3016 - **ISO 45001:2018**

LAB N° 1619L
Membro degli Accordi di Mutuo
Riconoscimento
EA, IAF e ILAC
Signatory of EA, IAF and ILAC
Mutual Recognition Agreements

Cat.4/5 Classe E **Trasporto rifiuti pericolosi e non**
Cat.8 Classe E **Intermediazione rifiuti**
Cat.9 Classe D **Bonifica Siti**
Cat.10 A-B Classe A **Bonifiche da Amianto**
Iscrizione n. BO/01313

Iscrizione all'albo degli autotrasportatori
di cose per conto terzi al **n.**
FO/3951705/F/

TRANSPORT OF RADIOACTIVE MATERIALS

PROTEX ITALIA
NUCLEAR DIVISION

NUCLEAR WAREHOUSE: SITES

PROTEX ITALIA
NUCLEAR DIVISION

Site 1: Via Cartesio

- **Liquid radioactive waste tanks**
  - 8 x 25 m^3 external containers with safety containment tank
  - 4 x 25 m^3 underground containers
  - 4 x 5 m^3 underground containers

Site 2: Via Bellenghi

- **Low and medium activity waste warehouse**
- **Radioactive sources**
- **High-Activity Sealed Radioactive Sources (HASS)**
- 1310 m^2
- > 20.000 60 lt. drums capacity

Site 3: Via Keplero

- **Low and medium activity waste warehouse**
- **NORM – TENORM**
- 720 m^2
- Storage flexibility

COLLECTION AND DISPOSAL OF RADIOACTIVE WASTE
WAREHOUSE

PROTEX ITALIA
NUCLEAR DIVISION

AUTHORIZED WAREHOUSE FOR RADIOACTIVE MATERIALS

- **3 WAREHOUSES IN FORLI'**

CURRENT CAPACITY

- **> 20.000 BARRELS 60 liters**
- **1310 m²**
- **720 m²**

MEMBERS OF THE INTEGRATED SERVICE

ENEA
Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

COLLECTION AND DISPOSAL OF RADIOACTIVE WASTE

PROTEX ITALIA
NUCLEAR DIVISION

- Classification
- Traceability
- Hazard Class
- Compiliance checks and verifications

COLLECTION AND DISPOSAL OF RADIOACTIVE WASTE

PROTEX ITALIA
NUCLEAR DIVISION

RADIOACTIVE MATERIALS WITH HIGH POTENTIAL RISK

LONG HALF-LIFE

SHORT HALF-LIFE

MEDIUM HALF-LIFE

DIVISION OF THE WAREHOUSE DEPENDING ON THE HALF-LIFE

COLLECTION AND DISPOSAL OF RADIOACTIVE WASTE

PROTEX ITALIA
NUCLEAR DIVISION

MANAGEMENT OF THE WAREHOUSE

TAKING CHARGE

INCLUSION IN THE DATABASE

TRACKING SYSTEM

PROTEX ITALIA

RACCOLTA RIFIUTI RADIOATTIVI

Protex Italia S.p.a - 47100 FORLI' - Via Cartesio, 30
Tel. 0543 724747 - Fax 0543 724655 e-mail: protex@protexgroup.com
CF e P.Iva 00746550409
Vettore matricola 80394F

RINA

CONTENITORE BB 41976 numero _____ del committente

fusto per [X] solidi [ ] liquidi [ ] vials
capacità di 60 litri

Committente:
HERA
VIA RAIBANO
CORIANO

Data di chiusura

Data di consegna alla PROTEX 16-11-2010

FUSTO					SOSTANZA RADIOATTIVA					
Peso Kg	Dimensioni cm	Indice trasporto	Tipo imballo	Categoria	Nuclide	Numero di massa	ATTIVITÀ µCi	ATTIVITÀ MBq	Periodo di riferimento	Stato fisico
15	H: 60 Ø: 40		[ ] E [X] A [ ]	[ ] E [ ] B [ ] GII [ ]	I	131		1	DAL: _____ AL: _____	[X] S [ ] L [ ] VIALS

[X] UN 2910 MATERIE RADIOATTIVE, COLLI ESENTI - QUANTITÀ LIMITATE, 7, ADR
Trasporto che non oltrepassa i limiti liberi prescritti nel 1.1.3.6
[ ] UN 2911 MATERIE RADIOATTIVE, COLLI ESENTI - STRUMENTI O ARTICOLI, 7, ADR
Trasporto che non oltrepassa i limiti liberi prescritti nel 1.1.3.6
[ ] UN 2912 MATERIE RADIOATTIVE DI DEBOLE ATTIVITÀ SPECIFICA (LSA I), non fissili o fissili esenti, 7, ADR
[ ] UN 2913 MATERIE RADIOATTIVE, OGGETTI CONTAMINATI SUPERFICIALMENTE (SCO-I o SCO II) non fissili o fissili esenti, 7, ADR
[ ] UN 2915 MATERIE RADIOATTIVE, COLLO DI TIPO A, non in forma speciale, non fissili o fissili esenti, 7, ADR
[ ] UN 3332 MATERIE RADIOATTIVE, COLLO DI TIPO A, FORMA SPECIALE, non fissili o fissili esenti, 7, ADR
[ ]

WAREHOUSE: BELLENGHI

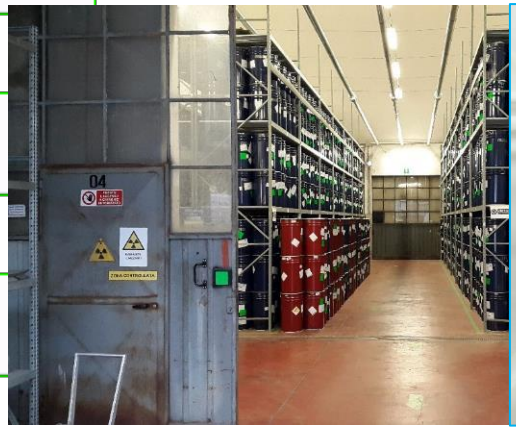
PROTEX ITALIA
NUCLEAR DIVISION

1 Reception Area

1 Processing Area

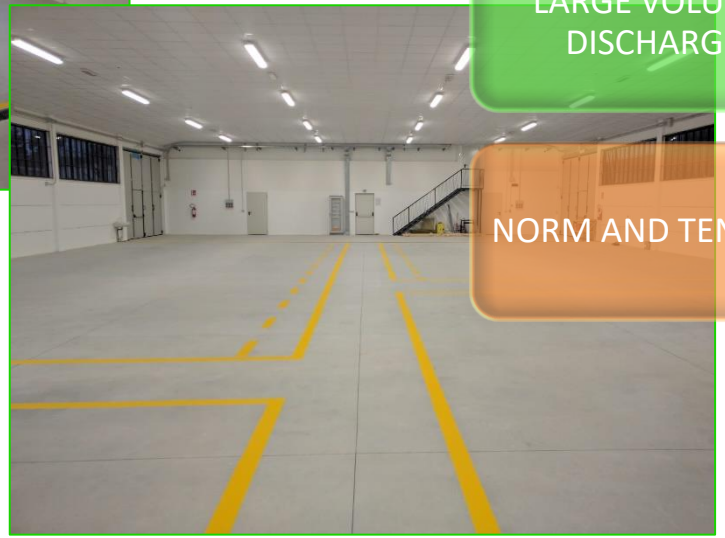
1 BUNKER

4 Storage Areas



WAREHOUSE: KEPLERO

PROTEX ITALIA
NUCLEAR DIVISION



4 «OPEN» STORAGE AREAS

LARGE VOLUME DISCHARGE

NORM AND TENORM

WAREHOUSE: KEPLERO

PROTEX ITALIA
NUCLEAR DIVISION

- 4 «OPEN» STORAGE AREAS
- LARGE VOLUME DISCHARGE
- NORM AND TENORM
- STORAGE FLEXIBILITY
- DIFFERENT TYPES OF CONTAINERS

GARIGLIANO NUCLEAR POWER PLANT

- Dismantling of the reactor building
- Dismantling and demolition of the system treatment of radioactive liquid effluents radwaste and GECO

PROTEX ITALIA

Carlo Gavazzi Impianti
Engineering and Contracting

TRINO NUCLEAR POWER PLANT

- Asbestos Remediation
- Thermal insulation affixing on tanks

CAORSO NUCLEAR POWER PLANT

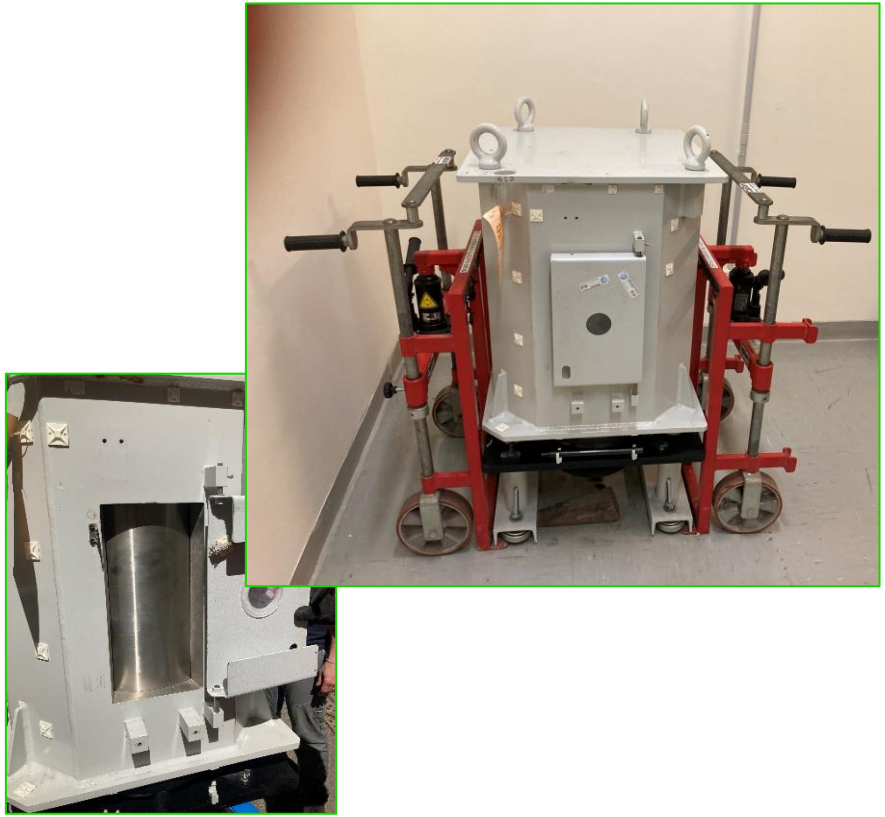
- Dismantling of Trans Elevator

MANAGING RADIOACTIVE SOURCES

PROTEX ITALIA
NUCLEAR DIVISION

MANAGING RADIOACTIVE SOURCES

PROTEX ITALIA
NUCLEAR DIVISION



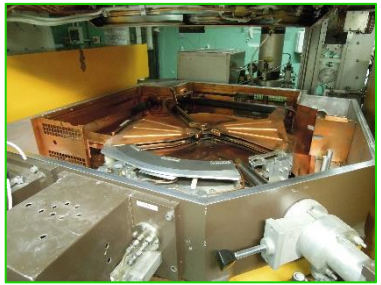
DECOMMISSIONING MEDICAL DEVICES

PROTEX ITALIA
NUCLEAR DIVISION

- Cyclotron
- Irradiator
- Cobalt Therapy

FIRST DECOMMISSIONING CYLOTRON IN ITALY

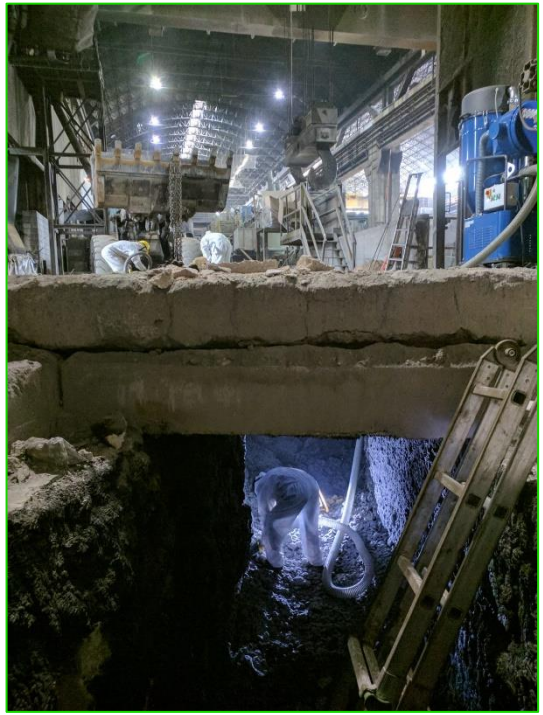
PROTEX ITALIA
NUCLEAR DIVISION



REMEDIATION OF RADIOACTIVE CONTAMINATION

PROTEX ITALIA
NUCLEAR DIVISION

Accidental melting of a Cesium-137 source



REMEDIATION OF RADIOACTIVE CONTAMINATION

PROTEX ITALIA
NUCLEAR DIVISION

Accidental melting of a Americium-241 source

PHYSICS AND RADIOCHEMISTRY LABORATORY

PROTEX ITALIA
NUCLEAR DIVISION

Internal controls

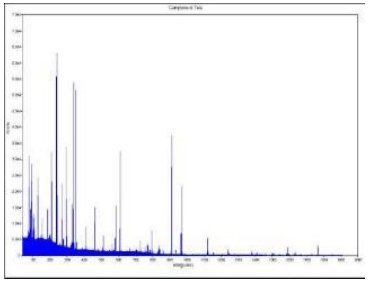
Radiometric analysis for the control of the materials managed by Protex

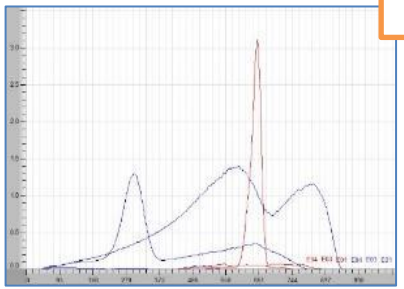
External controls

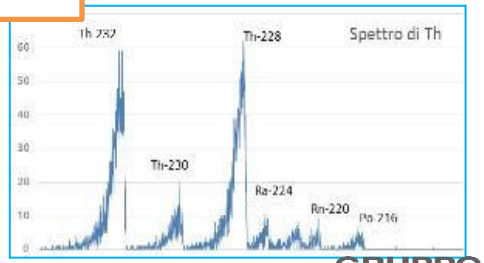
Radiometric analysis for the control of materials from reclamation and decommissioning

Analytical laboratory

Quantitative and qualitative analysis of alpha, beta and gamma emitters radionuclides







PHYSICS AND RADIOCHEMISTRY LABORATORY

PROTEX ITALIA
NUCLEAR DIVISION

GAMMA SPECTROMETRY

- **HPGe N Type eff. 32%**
- **HPGe P type eff. 25%**
- **HPGe GEM eff. 33%**
- **HPGe GEM eff. 33%**

DIFFERENT SHAPES:

- **Marinelli 1 liter, Beaker 250-150 ml, Wipe/smear test**

PHYSICS AND RADIOCHEMISTRY LABORATORY

PROTEX ITALIA
NUCLEAR DIVISION

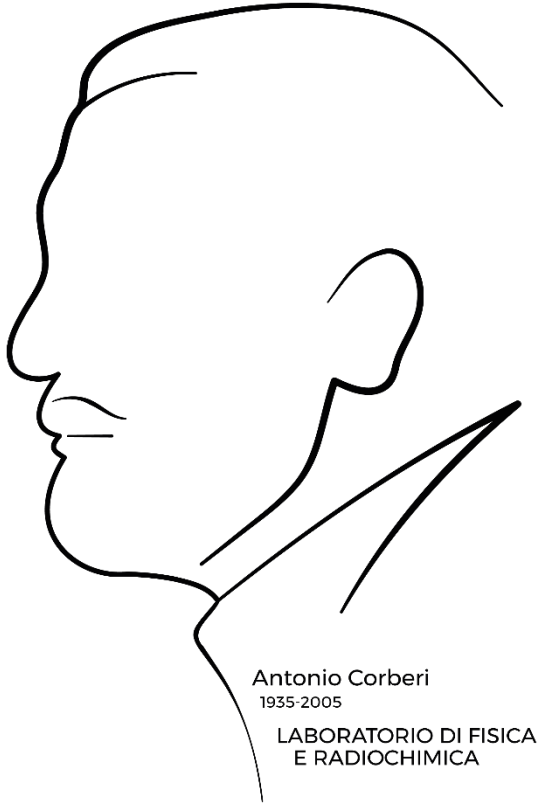
LIQUID SCINTILLATION COUNTING

- 2 Ultra low level Liquid counter
- 1 low level Liquid counter

Alpha SPECTROMETRY

- 10 alpha chamber

RADIOCHEMISTRY

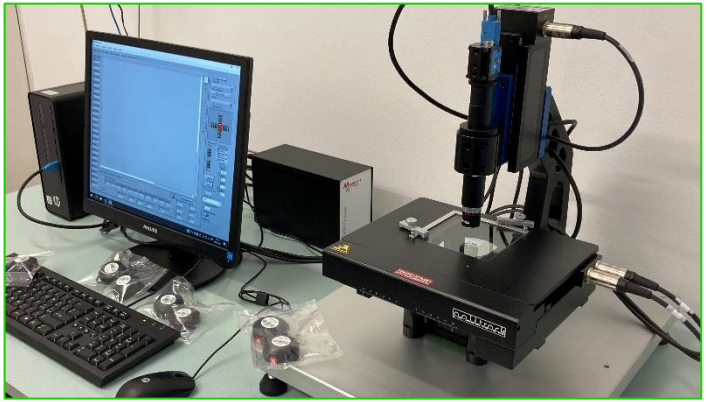


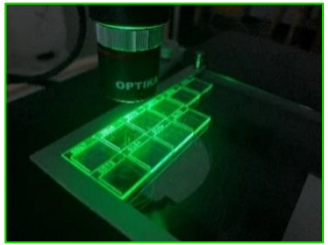
PHYSICS AND RADIOCHEMISTRY LABORATORY

PROTEX ITALIA
NUCLEAR DIVISION

RADON - CR39

PASSIVE DOSMITERY - TLD





PHYSICS AND RADIOCHEMISTRY LABORATORY

PROTEX ITALIA
NUCLEAR DIVISION

QUALITY CONTROLS AND INTERNAL AUDIT

RADIOMETRIC CHARACTERIZATION OF WASTE

CONTAMINATION SURVEYS IN SUPPORT OF NUCLEAR REMEDIATIONS

RADIOACTIVITY MEASURES IN:

- **SOIL**
- **FOOD**
- **BUILDING MATERIALS**
- **AIR FILTERS**
- **URINE**

RADIOLOGICAL CHARACTERIZATION OF WATER INTENDED FOR HUMAN CONSUMPTION

PHYSICS AND RADIOCHEMISTRY LABORATORY

PROTEX ITALIA
NUCLEAR DIVISION

Type of analysis carried out

Gamma Spectrometry

Alpha Spectrometry

Liquid Scintillation Counting

NORM/TENORM CHARACTERIZATION

RADON

TLD

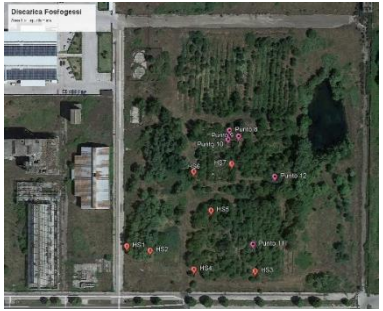
Water:	
Tritium by Liquid Scintillation Counting:	UNI EN ISO 9698:2019
Gross Alpha and Gross Beta by Liquid Scintillation Counting:	UNI EN ISO 11704:2019
Radon-222 by Liquid Scintillation Counting	ISO 13164:2015
Lead-210 by Liquid Scintillation Counting:	ISO 13163:2021
Polonium-210 by Alpha Spcetrometry:	ISO 13161:2020
Radium-226 by Liquid Scintillation Counting:	ISO 13165-1:2013
Uranium by Alpha Spectrometry:	ISO 13166:2020
Water and liquid:	
Gamma Emitters:	UNI EN ISO 10703:2021
Food, waste, soil, liquid, water, solid, building materials:	
Gamma Emitters:	UNI 11665:2017
Phosphogypsum:	
Uranium, Thorium, Radium-226, Lead-210 and Polonium-210:	IAEA/AQ/34:2014
Liquid and solid:	
Beta emitters by Liquid Scintillation Counting:	ISO 19361:2017
Surface contamination:	
Alpha, Beta and Gamma emitters:	UNI ISO 7503-2:2016
Air:	
Radon-222 by CR39:	UNI ISO 11665-4:2021

PHYSICS AND RADIOCHEMISTRY LABORATORY

PROTEX ITALIA
NUCLEAR DIVISION

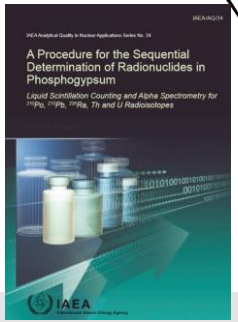
SIN – Tito Scalo REGIONE BASILICATA - South Italy

- Phosphogypsum landfill - radiological characterization



- 55 environmental survey measurements
- *277 soil samples*
- *47 ground water samples*
- *8 surface water samples*
- *8 silt-sediment samples*
- *10 vegetables samples*
- Specific accreditation and quality assurane for radiochemical sequential procedures

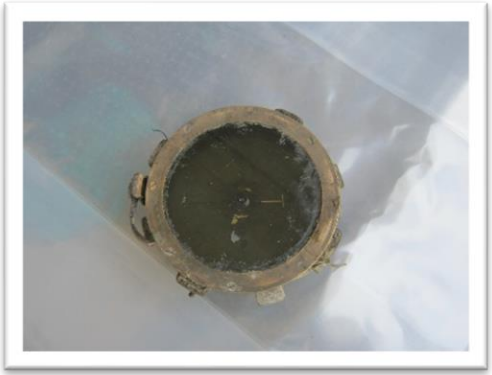
Antonio Corberi
1935-2005
LABORATORIO DI FISICA E RADIOCHIMICA



CLEARING AND SPECIAL OPERATIONS

PROTEX ITALIA
NUCLEAR AND REMEDIATION DIVISION

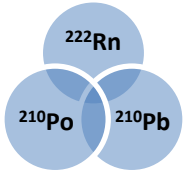
RECOVERS



CLEARING AND SPECIAL OPERATIONS

PROTEX ITALIA
NUCLEAR AND REMEDIATION DIVISION

NORM-TENORM



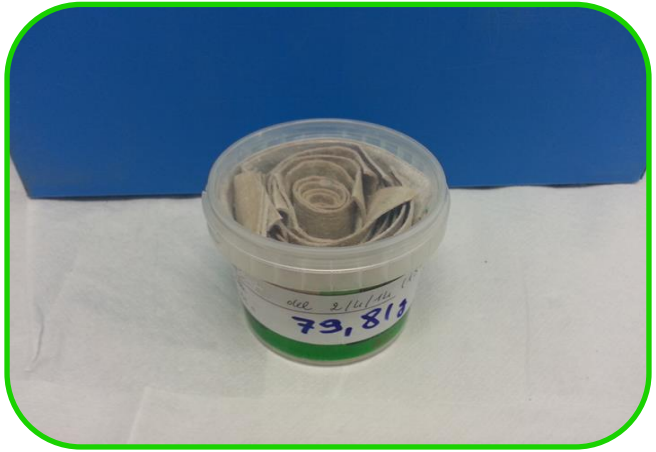
CLEARING AND SPECIAL OPERATIONS

PROTEX ITALIA
NUCLEAR AND REMEDIATION DIVISION

REMEDIATION

SMAPLING

MEASURES WITH PORTABLE EQUIPMENT



RADIOMETRIC LABORATORY ANALYSIS

TECHNICAL AGENDA

2015 edition	•3500 copies
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WEB APP FOR EACH BROWSER:

http://www.protex-app.com/app/#/tab/home

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