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Verification under the terms of Article 35 of the Euratom Treaty

Technical Report

ITALY

**Colonna di Fabro
Tito Scalo**

Radioactivity monitoring arrangements

10-12 December 2018

Reference: IT 18-04

**VERIFICATIONS UNDER THE TERMS OF ARTICLE 35
OF THE EURATOM TREATY**

FACILITIES	Monitoring of NORM radioactivity on the sites of Colonna Di Fabro and Tito Scalo. The goal of this verification was to obtain complete information and to verify certain installations involved in the environmental radioactivity monitoring of the sites.
LOCATIONS	Rome, Potenza, Tito Scalo, Matera
DATES	10-12 December 2018
REFERENCE	IT 18-04
TEAM MEMBERS	Mr A. Ryan (team leader) Ms C. Bayley
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- Annex 1 Verification programme
- Annex 2 Related European parliament questions and answers

TECHNICAL REPORT

1 INTRODUCTION

Under Article 35 of the Euratom Treaty, all Member States must establish the facilities necessary to carry out continuous monitoring of the levels of radioactivity in air, water and soil and to ensure compliance with basic safety standards¹. Article 35 also gives the European Commission the right of access to such facilities to verify their operation and efficiency. The radiation protection and nuclear safety unit of the European Commission's Directorate-General for Energy is responsible for undertaking these verifications. The Joint Research Centre Directorate-General provides technical support during the verification visits and in drawing up the reports.

The main purpose of the verifications under Article 35 of the Euratom Treaty is to provide an independent assessment of the efficiency and adequacy of monitoring facilities for:

- liquid and airborne discharges of radioactivity from a site into the environment;
- levels of environmental radioactivity at the site perimeter and in the marine, terrestrial and aquatic environment around the site, for all relevant pathways;
- levels of environmental radioactivity on the territory of the Member State.

Taking into account previous bilateral protocols, a Commission Communication² describing practical arrangements for Article 35 verification visits in Member States was published in the *Official Journal of the European Union* on 4 July 2006.

2 PREPARATION AND CONDUCT OF THE VERIFICATION

2.1 PREAMBLE

The Commission notified Italy of its decision to conduct an Article 35 verification in a letter addressed to the Italian Permanent Representation to the European Union. The Italian Government subsequently designated the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN) to lead the preparations for the visit.

2.2 DOCUMENTS

To assist the verification team in its work, the national authorities supplied an information package in advance³. Additional documentation was provided during and after the visit. The information thus provided was used extensively in drawing up the descriptive sections of the report.

2.3 PROGRAMME OF THE VISIT

The Commission and ISIN discussed and agreed on a programme of verification activities in line with the Commission Communication of 4 July 2006.

¹ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom (OJ L 13, 17.1.2014)

² Commission Communication *Verification of environmental radioactivity monitoring facilities under the terms of Article 35 of the Euratom Treaty — Practical arrangements for the conduct of verification visits in Member States* (OJ C 155, 4.7.2006)

³ Replies to the preliminary information questionnaire addressed to the national competent authority, received on 15 November 2018

The opening meeting included presentations on monitoring systems and other environmental radioactivity monitoring arrangements. The verification team pointed to the quality and comprehensiveness of all the presentations and documentation.

The team carried out the verifications in accordance with the programme in Appendix 1. It met the following representatives of the national authorities and other parties involved:

ISIN

Name	Position
Luciano Bologna	Head of radiation protection area
Lamberto Matteocci	Deputy Director
Sonia Fontani	Art. 35 delegate radiometric laboratories
Solaria Venga	Radiation protection expert
Leandro Magro	Responsible for radiometric laboratories
Giuliana Bevilacqua	Press officer

ARPA Umbria

Name	Position
Paola Sabatini	Head of ionising radiation unit
Matteo Marconi	Ionising radiation unit expert

Potenza Prefecture

Name	Position
Maria Rita Cocciufa	Vicarious
Marisa Di Vito	Deputy Prefect
Adele Rita Meneghini	Official

Consortium for Industrial Development of the Province of Potenza

Name	Position
Guido Bonifacio	Director
Gerardo Soldo	Official
Alberto Cassiano	Radiation protection expert

ARPA Basilicata

Name	Position
Carmela Fortunato	Director
Michele Epifani	Technician
Rocco Marchese	Technician
Marco Serra	Technician
Filomena Ciarfaglia	Technical assistant
Duilio Fossanova	Technician
Dario Uras	Technician
Arianna De Stena	Technician

Basilicata Fire service

Name	Position
Emanuele Franculli	Regional Director
Saverio Laurenza	BAS Director
Romeo Gallo	Director Deputy Manager Matera Provincial Command

Regione Basilicata

Name	Position
Carlo Gilio	Official

3 REGULATORY CONTROL

The most important provisions established in the Italian regulatory system concern work activities which involve the presence of natural radiation sources (such as radon, processing of ores and cosmic rays) leading to a significant increase in exposure of workers or members of the public.

Specific requirements concerning exposure to natural radiation sources are established in the Legislative Decree n. 230/1995, that in the Title III-*bis*, art. 10-bis thus defines the activities that are within the scope of this Title:

- work activities involving the use or storage of materials, not usually regarded as radioactive, but which contain naturally occurring radionuclides, causing a significant increase in exposure of workers and, where appropriate, members of the public;
- work activities involving the production of waste not usually regarded as radioactive, but which contain naturally occurring radionuclides, causing a significant increase in exposure of members of the public and, where appropriate, of workers.

According to the provisions of paragraph 1 of Annex I-*bis* of the Legislative Decree No. 230/1995 existing exposure situations are those identified as worthy of concern in the following list:

- industry using phosphate ores and storage for wholesale of fertilisers;
- processing of ores by mining of tin, iron-niobium by pyroclore and aluminium by bauxite;
- processing of zircon sands and production of refractory materials;
- processing of rare earths;
- processing and use of thorium compounds, as regard welding electrodes with thorium, production of lenses or optical glasses and mantles for gas lamps;
- production of titanium dioxide;
- extraction and refining of oil and gas, as regards the presence and removal of scale and sludge in pipes and containers.

In relation to work activities with natural radiation substances identified as worthy of concern in Annex I-*bis* of Legislative Decree No. 230/1995, operators are obliged to carry out measurements and to assess, with the help of a qualified expert, doses to workers and, where appropriate, to reference groups of the public. Depending on the results of the assessment of doses three cases may occur:

- if the assessed effective doses do not exceed 0.8 mSv/y for workers or 0.24 mSv/y for reference groups of the public (80% of the action levels, i.e., 1 mSv/y for workers and 0.3 mSv/y for the public) the operator is only required to keep his activity under control; in particular it is required to repeat measurements and assessments every three years or to review the situation if there are significant variations in the production process;
- if the assessed effective doses are higher than 80% of Action Levels, but does not exceed 1 mSv/y for workers and 0.3 mSv/y for reference groups of the public, measurements and assessments must be repeated the next year;
- if the assessed effective doses exceed either 1 mSv/y for workers or 0.3 mSv/y for reference groups of the public, the operator is required to investigate the work processes to evaluate the exposure of workers and of reference groups of the public. The operator is required to submit a report to the local authorities and to adopt intervention measures within a three-year time limit, with a view to keeping exposures below action levels. If, despite the adoption of remedial actions, the assessed effective dose remains higher than the action level for workers or for reference groups of the public, the operator must adopt some specific

provisions provided in Titles VIII and IX of the Legislative Decree No. 230/1995 for health protection of workers and for public (planned exposure situations).

However if the industrial activity is no longer in place the remedial actions that are required to protect workers and members of the public are regulated by Title X of the above mentioned Legislative Decree. Title X of Legislative Decree No. 230/1995 establishes the general principles for interventions that must be met for the purposes of the decisions regarding the possible implementation and the extent of intervention in cases of radiological emergencies or in cases of long lasting exposure situations.

In particular, according to article 126-*bis* of the Legislative Decree No. 230/1995, concerning long lasting exposure situations resulting from the after effect of a nuclear or radiological emergency or a past practice or a working activity (within the scope of Title III-*bis*) with natural radiation sources, which is no longer in place, the authorities responsible under the Act No. 225/1992 shall take appropriate actions in relation to the risk of exposure, taking into account the general principles set out in article 115-*bis*. It should also be noted that for such situations the legislator did not establish possible actions or reference levels in terms of effective dose, or derived quantities, to individuals of the reference groups of the public, also in view of the wide variety of situations that may arise in practice. Reference levels shall be adopted in the light of the general principles of justification and optimisation of intervention referred to in article 115-*bis* and can be identified based on the claims and of the technical guidelines provided by the European Union and at international level.

It should be pointed out that specific requirements in relation to reference levels, including also for radionuclides in commodities, will be introduced into Italian radiation protection legislations during the transposition process of the EU BSS. As far as reference levels for radionuclides in drinking water is concerned, it should be pointed out that the Legislative Decree No. 28/2016, which transposes the directive 2013/51/Euratom laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption, has established requirements for health protection of the general public with regard to radioactive substances in water intended for human consumption. The decree also lays down parametric values, frequencies and methods for monitoring radioactive substances in water.

According to article 126-*bis* of Legislative Decree No. 230/1995, the responsibility for the establishment and adoption of protection strategies are within the exclusive jurisdiction of the State, namely the National Department of Civil Protection or prefectures (territorial offices of government), depending on the extent and urgency of the intervention or emergency (see paragraph 1 of art. 126-*bis*). The authorities responsible for intervention under the Act No. 225/1992 shall take appropriate action to reduce the risk of exposure and, in particular those concerning the delimitation of the affected area, the establishment of an exposure surveillance system, the implementation of appropriate interventions, taking into account the real characteristics of the situation, the regulation of access to the lands or buildings situated in the delimited areas, as well as their use.

Usually prefects set up a technical commission, which includes local, regional and national technical authorities (such as ISIN). Prefects, supported by the technical commission, define the safety criteria and the level of remediation on a site-specific base.

Generally, interested parties (operators, local community representatives, etc.) are involved in the definition of a remediation plan by means of technical meetings set up by prefects in order to analyse the specific site situation.

The authority shall ensure that remedial actions and protective actions are justified and that protection and safety is optimised, in fact art. 126-*bis* of Legislative Decree No. 230/95 refers directly to art. 115-*bis*, that sets general principles concerning interventions, in particular:

- intervention shall be undertaken only if the reduction in detriment due to radiation is sufficient to justify the harm and costs, including social costs of the intervention;

- the form, scale and duration of the intervention shall be optimised so that the benefit of the reduction in health detriment less the detriment associated with the intervention, will be maximised.

In particular, it should be noted that paragraph 2 of art. 126-*bis* states that “provisions of Title VIII of Legislative Decree No. 230/1995, concerning workers protection, shall apply to workers involved in the implementation of interventions related to long lasting exposure situations” (physical surveillance is put in place).

Environment protection can be considered an indirect goal that is achieved in the aim to guarantee the public protection, though the above-mentioned Legislative Decree does not directly refer to this issue.

Generally, persons or organisations responsible for areas with residual radioactive material are identified during the re-enactment of the site history; in most cases they are the site or plant owner(s).

In all those cases in which the owner(s) or operator(s) cannot be identified the responsibility is on the national authorities. When organisations or persons responsible for the contamination cannot be found, the government is responsible to assure the source of funding, though the legal framework doesn't ensure the funding mechanism.

Generally, as soon as an existing exposure situation is identified, according to paragraph 1 of art. 126-*bis* restrictions to the access and use of the contaminated areas are required by Prefects. The duration of the restrictions relies on the type of remediation, and they could also be applied after remediation.

Inspections performed by means of local, regional or governmental technical offices ensure that remedial actions are in compliance with approved remediation plans. The regulatory body has the authority to take enforcement actions if the remediation activities are not in accordance with the remediation plan. The regulatory body imposes further remedial actions if inspections show that compliance with the requirements of the remediation plan has not been achieved.

As far as the situation of Colonna di Fabro is concerned, it should be noted, as previously said, that the work activity (residues coming from a coal power plant) is not mentioned in the above described list of Annex I-bis of the Legislative Decree n. 230/1995, that provides all the work activities that are of radiological concern; as such, the management of such situation related to the residual ashes is not actually ruled by the Italian radiation protection legislation but will be introduced with the transposition process of the EU BSS.

4 COLONNETTA DI FABRO

4.1 SITE DESCRIPTION

The industrial area of Colonnaetta was built in the 1980s on an embankment consisting of coal ash transported from the ENEL thermoelectric power plant of La Spezia (Italy). The area is about 13 Ha. The maximum thickness of the ashes is about 6 metres, and then it gradually decreases. Below is a photo of the area.



Figure 1. Colonnaetta di Fabro site aerial view

Time line of the site development is the following:

1982: Fabro City Council approves the "Project for development in zone D". In the project, it is established to realise an industrial area and to fill the height differences with coal ashes from the ENEL thermal power plant of La Spezia.

The technical project included:

- for the layer in contact with the natural substrate: about 50 cm of bottom ashes with draining function;
- for the embankment: layers of about 30 -40 cm of mixed type ashes (bottom and fly) up to less than 1.5 metres of the final level of project;
- for the upper layers: mixtures of mixed ashes, hydrated lime and water (73,5% ashes, +2,3% lime, +24% water);
- final cover with natural soil for the restoration of green areas.

The project involved construction of a watertight ditch around the area to direct rainwater into the sewage system and the realisation of piezometers for the control of groundwater. Available documentation only provides physical controls of the ashes undertaken.

1986-1987: Work began. Disposal tests performed by the local health body indicate abnormal values of selenium, copper and zinc on landfill. The regional administration asks to carry out monitoring of heavy metals on the ashes.

1988-1989: Following the results of analysis on groundwater performed by local health body, which indicate abnormal values of metals, an Ordinance of the Mayor interrupts ashes transfer operations. Radiological analysis were performed by ENEL (Fig. 2).

1990 and 1991: Some modifications of the project take place.

MISURE DI RADIOATTIVITA' NATURALE DI CENERI DI CARBONE
(Valori medi, 1σ)

Campione (Data prelievo)	Unità di misura	Potassio-40	Serie Uranio-238		Serie Torio-232	
			Radio-226	Bismuto-214	Attinio-228	Tellurio-208
Ceneri bacini La Spezia (n. 2 campioni) (16.5.1989)	Bq/g	0,39 (7×10^{-3})	0,181 ($5,4 \times 10^{-3}$)	0,154 ($1,3 \times 10^{-3}$)	0,130 ($2,0 \times 10^{-3}$)	0,126 ($1,6 \times 10^{-3}$)
	$\mu\text{Ci}/\text{kg}, \times 10^{-3}$	10,5 (0,19)	4,89 (0,15)	4,16 (0,04)	3,51 (0,05)	3,41 (0,04)
Ceneri pesanti Vado Ligure (22.4.1989)	Bq/g	0,577 (9×10^{-3})	0,155 ($4,7 \times 10^{-3}$)	0,134 ($1,4 \times 10^{-3}$)	0,105 ($2,6 \times 10^{-3}$)	0,102 ($2,0 \times 10^{-3}$)
	$\mu\text{Ci}/\text{kg}, \times 10^{-3}$	15,6 (0,2)	4,19 (0,13)	3,62 (0,04)	2,84 (0,07)	2,76 (0,05)
Ceneri leggere Vado Ligure (21.4.1989)	Bq/g	0,662 ($9,7 \times 10^{-3}$)	0,20 ($6,0 \times 10^{-3}$)	0,160 ($1,6 \times 10^{-3}$)	0,118 ($2,4 \times 10^{-3}$)	0,117 ($1,8 \times 10^{-3}$)
	$\mu\text{Ci}/\text{kg}, \times 10^{-3}$	17,9 (0,26)	5,41 (0,16)	4,32 (0,04)	3,19 (0,06)	3,16 (0,05)

Figure 2. Radiological analysis results of 1989

4.2 MONITORING OF COAL ASH RADIOACTIVITY AND ENVIRONMENTAL RADIOACTIVITY

An inspection performed by ARPA Umbria took place on 23rd September 2015. During the inspection, the following measurements were conducted:

- ambient dose equivalent $H^*(10)$ measurements in order to determine the average value of the site and to identify hot spots;
- in situ gamma spectroscopy measurements in order to characterise the natural and artificial radioactivity content of the site;

Moreover, samples were collected to conduct the following laboratory measurements:

- gamma spectroscopy measurements (soil collected off-site as background, of ashes and tuff collected in the hot spots, in order to determine the exact concentration values of identified radionuclides);
- total alpha/beta activity and tritium activity (water of irrigation wells and piezometers in order to verify the potential increase of natural radioactivity and to exclude the presence of artificial radioactivity).

The inspection report was published on the official ARPA website on 4 January 2016.

4.2.1 Ambient dose equivalent measurements

Three background measurements were performed around the site (F1, F2, F3). 22 measurements were performed in the site. The measurements were performed with an Automess 6150AD-b/H scintillation probe. The duration of the measurement was such to obtain a standard deviation of 5%.

4.2.2 In situ gamma spectroscopy measurements

The following measurements were performed with a transportable ORTEC HPGe detector (relative efficiency 50%):

- 1 measurement background
- 1 measurement at point 12
- 1 measurement at point 22. The measurement was performed on 8th October 2015: During the first investigation, the point was not accessible because it was covered by thick vegetation.
- 3 measurements of points not covered by asphalt

4.2.3 Laboratory gamma spectroscopy measurements

Gamma spectrometry measurements on the samples collected at point F1, D(12) and F(22) were performed in laboratory. Samples D and F were sealed in a stainless steel container and measured after 25 days for the determination of Ra-226 and Th-232. Measurements were performed with an HPGe detector by ORTEC (efficiency 30%). Spectra were analysed with the software Gammavision and the corrections for density, geometry and true coincidence summing with the software Gespecor.

Soil has the typical values of soils collected in surrounding areas in previous monitoring.

The values of activity concentration in ash show typical coal ash data from literature. The presence of ^{137}Cs is due to deposition resulting from the Chernobyl accident.

The values of activity concentration in tuff are in accordance with the typical data on tuff used in local construction: values are similar to those found in the radon measurement campaign of Umbria's schools.

4.2.4 Total alpha/beta activity and tritium activity measurements

Measurements were performed by liquid scintillation with a very low-level scintillation counter, Quantulus by Perkin Elmer.

4.2.5 Analytical laboratories

All the analytical measures in the area were performed by the ARPA Umbria Laboratory: the Ionising Radiation Service performed the radioactivity analysis while the chemical analysis were carried out by the Chemical Sector.

The Ionising Radiation Service of ARPA Umbria was verified under the terms of article 35 of EURATOM Treaty in September 2011 (Reference: IT-11/06).

Personnel involved in Ionising Radiation Service is reported below:

Personnel	Units	Man months/year
Responsible	1	2,4
Graduate	2	11

The following measurements techniques are available in the Ionising Radiation Service:

Available measurement techniques	Accreditation
Gamma Spectroscopy	yes
Gamma Spectroscopy in situ	no
Gamma dose rate	no
Liquid scintillation	alpha/beta in water: yes H-3 in water: no Radon in water: no, but in short time Ra-226 in water: no
U-238 by ICP-MS (Chemical sector)	yes
Gross alpha/beta by proportional counter	no
Radon by electretes	no

5 TITO SCALO

5.1 SITE DESCRIPTION

The disused industrial area of Tito Scalo (PZ) was declared a Site of National Interest (SIN) under D.M. 468 of 18 September 2001. It is located at the west side of the Italian region of Basilicata, 4 km from the town of Tito, 9 km westwards of Potenza, 765 m above sea level. Part of the industrial site was previously occupied by the former "*Liquichimica*" industrial plant, which produced chemical phosphate fertilisers between 1969 and 1989. The industrial process of the *ex-Liquichimica* was based on the production of phosphoric acid using phosphorite (a mineral with high natural uranium content) as raw material. At the end of the process, a certain percentage of waste calcium sulphate was produced, the so-called phosphogypsum, in which almost all the radioactivity present in the starting mineral was accumulated (as a precipitate of Ba(Ra)SO₄). Phosphogypsum is therefore classifiable as TENORM (Technologically Enhanced Naturally Occurring Radioactive Material).

In twenty years of activity a large amount of phosphogypsum was produced, which was progressively buried in tubs dug into the industrial area itself. The resulting landfill covers an area of about 30 000 m² and an average depth of about 3 metres, currently referred to as the "landfill of phosphogypsum".

According to the historical reconstruction, the area of ex-Liquichimica was managed as follows:

- Chimica Meridionale S.p.A. in 1969
- Liquichimica Meridionale S.p.A. in September 1976
- Consorzio per lo Sviluppo Industriale della Provincia di Potenza from 31st March 1989

The industrial production of fertiliser ended in 1989 and since 2005 Consorzio ASI (Consorzio per lo Sviluppo Industriale della Provincia di Potenza) is the public authority responsible for the site remediation, including the phosphogypsum landfill, as stated by the "Delibera della Giunta Regionale di Basilicata nr. 436 of 1.3.2005".

The area inside the SIN was previously divided into several lots, some of which were assigned to the interested operators and currently are used for various activities (offices, etc.). In other lots, including the site of interest, contaminants have to be removed before they can be reused (when possible) for different activities.

5.2 MONITORING OF ENVIRONMENTAL RADIOACTIVITY

Following a request of the Municipality of Tito (PZ) on 3/12/2012, in the years 2013-2014, CRR-ARPAB carried out several radiometric surveys, by performing sampling and analysis of the environmental matrices (and of some food matrices) that are more representative in the area of interest. The results are referred to in the CRR-ARPAB Reports No. 21/'12 of 16/01/2013, No. 11/'13 of 06/06/2013, N. 20/'13 of 10/18/2013 and No.24/2014 of 16/09/2014.

Subsequently and to date, CRR-ARPAB continued to monitor the surrounding areas of the SIN area of Tito Scalo, through periodic sampling and radiometric analysis of groundwater and surface water of the *Tora* stream, as potential receptors of the possible spread of the radionuclides present in landfills. The measurements are carried out annually according to what is outlined below

<i>Environmental Matrix</i>	<i>analysis</i>
Surface water (Tora torrent)	Gamma spectrometry (art./nat.) Gross Alpha-Beta
Groundwater wells upstream and downstream the SIN area (two sampling)	Gamma spectrometry (art./nat.) Gross Alpha-Beta

At present, on the basis of the radiometric data found on the monitored environmental matrices, "radiometric anomalies" are not present outside the SIN area. A characterisation plan of the area and the related monitoring programme for the area is planned, pending a subsequent safety or remediation intervention.

5.2.1 Groundwater reclamation

The monitoring of groundwater was carried out in conjunction with the reclamation works for the underground water table. Specific surveys have been carried out prior to the executive design of the reclamation work currently under way.

In the execution of the groundwater reclamation works a chemical and physical monitoring of the water table is constantly ensured, as well as monitoring of possible air leaks with the radial system.

5.2.2 Reclamation of the fluvial area included in the SIN of Tito monitoring

The reclamation intervention foreseen in the APQ (Framework Program Agreement between the Ministry of Environment and the Basilicata Region) has been transformed into a chemical and ecotoxicological monitoring project for surface waters following additional analyses requested by ISPRA. The revised monitoring plan was approved in 2016, entrusted with a signed contract on 10/05/2018. ARPAB started the sampling activity on 28.08.2018.

The hydrographic network monitoring plan involves the implementation of 4 seasonal survey campaigns over the course of a year. The stations to be monitored concern the Tora and Frascetto streams. The first sampling was carried out on 28-29 August 2018 (the first results are awaited), the second sampling took place 26-27 November 2018. Further sampling was foreseen 25-26 February 2019 and 23-24 May 2019.

5.2.3 Phosphogypsum landfill

The physical surveillance under ASI competence has been entrusted to the qualified expert Alberto Cassiano with Commission Resolution no. 72 of 2 August 2013. As part of this task, in order to evaluate over time the evolution of environmental exposure levels in the areas adjacent to the phosphogypsum landfill, the qualified expert has activated the monitoring of environmental exposure levels, starting from January 2014.

In particular, at the fence of the landfill area 40 TLD dosimeters are placed along the perimeter, in order to perform the environmental dosimetry. The period of exposure of each dosimeter is three months and the environmental dosimetry is performed throughout the year.

The detectors offer a wide spectrum of linearity in dose measurement from 1 mGy to 10 Gy. The TLD detector (LiF: Mg, Cu, P) guarantees a high sensitivity and an extremely low detection threshold (DMR T Minimum Detectable Dose or the lowest dose value detected with a 95% confidence level referred to the Thermoluminescence of 20 mGy). The dosimeters are periodically (every three months) sent to the TECNORAD srl laboratory in Verona and for information to the qualified expert.

5.2.4 Future monitoring

A specific monitoring program will be implemented following the Characterisation Plan according to the opinion of the Commission established by the Prefecture.

5.2.5 Analytical laboratories

In the years 2013-14, various radiometric surveys and analysis were carried out in order to evaluate, from the radiological point of view, the area of the site and the surrounding areas. In particular, the following were carried out:

- surveys of the environmental gamma dose rate on the landfill area, with a plastic scintillator detector, in order to evaluate its spatial trend;
- in situ qualitative measurements of gamma spectrometry on the landfill area by means of field spectrometer with Hyperpure Germanium (HPGe);
- gamma spectrometry analysis on:
 - soil (and phosphogypsum) samples taken from the landfill
 - groundwater collected in some piezometric wells inside and outside the landfill
 - surface water taken upstream and downstream of the site.

On these samples, the concentrations of some artificial radionuclides have been determined (including ^{137}Cs) and of the following natural radionuclides: (^{238}U series) ^{226}Ra , ^{214}Pb , ^{210}Pb , ^{214}Bi ; (^{232}Th series) ^{228}Ac , ^{212}Pb , ^{212}Bi ; ^{235}U ; ^{40}K .

- radon outdoor concentration measurements on the landfill area with active monitor;
- comparative measurements of radon flux coming out from the soil in landfill and in an unperturbed soil outside the landfill, through an “ad hoc” system implemented by CRR-ARPAB using passive dosimeters;
- radiometric surveys and measurements on soil samples inside the SIN perimeter but outside the phosphogypsum dump;
- downstream samplings of the SIN area of cultivated soil, vegetables and hay on which gamma spectrometry were performed and samplings of well water on which gross alpha and beta analysis were performed.

The ARPA Basilicata Laboratory performed all the analytical measures in the area. The ionising radiation service performed the radioactivity analysis while the chemical analysis were carried out by the chemical sector.

The ionising radiation service of ARPA Basilicata was verified under the terms of article 35 of EURATOM Treaty on 15 and 16 December 2015.

Personnel involved in the ionising radiation service is reported below:

Personnel	Units	Man /year
Responsible	1	1
Graduate	3	3
High school diploma	2	2

The following measurements techniques are available in the ionising radiation service:

Available measurement techniques	Accredited	Note
Gamma Spectroscopy	No	attendance at international intercomparison test
Gamma Spectroscopy in situ	No	
Gamma dose rate	No	
Liquid scintillation	alfa/beta in water: No H-3 in water: No	attendance at international intercomparison test
Gross alfa/beta by proportional counter	No	
Radon in water by emanometry	No	
Radon in air outdoor in situ	No	

5.2.6 Publication of monitoring results

The following publications concerning the Tito Scalo programme have been made available:

- "Primo rapporto sui rilievi radiometrici eseguiti presso la ex Liquichimica di Tito Scalo - Area fosfogessi" (CRR – ARPAB <http://www.arpab.it/radio/news.asp?id=226>);
- Secondo rapporto indagine radiometrica ARPAB presso discarica fosfogessi. Area Industriale di Tito Scalo - Area osfogessi <http://www.arpab.it/radio/news.asp?id=237>(CRR-ARPAB);
- Relazione N. R20/'13 del 18/10/2013: Controlli radiometrici presso ex liquichimica – zona industriale tito scalo (pz) – 3° rapporto;
- Relazione N.24 del 16/09/2014
(http://www.arpab.it/radio/Relazione%20R24_2014%20SIN%20Tito_20aree%20esterne_discarica%20fosfogessi.pdf)

6 VERIFICATIONS

6.1 INTRODUCTION

This chapter has been written to accurately reflect the verification programme (Annex 1) and in particular, to present in a succinct manner the information presented to the verification team.

A preliminary opening meeting was held with the representatives of the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN). Since 1 August 2018 ISIN has been established as the national competent authority. The personnel of ISPRA as well as the activities involved in the monitoring of radioactivity are therefore now under the responsibility of ISIN. In addition to discussing arrangements for the verifications, the issues of regulatory organization and legislative provisions were assessed.

For the Colonna di Fabro site the work of the verification team focussed on discussions with the responsible authorities on the monitoring carried out previously and the current radiological situation at the site. The ARPA Umbria laboratories were not visited but the improvements implemented since recommendations were issued following a verification in 2011 were examined.

The Tito Scalo site was visited following analysis of the presentations by all actors responsible for radiological monitoring at the site. A visit to the ARPA Basilicata laboratories began with an examination of the measures instigated since recommendations were issued following a verification in 2015, and concluded with a visit of the new premises where the latest equipment was demonstrated.

6.2 COLONNETTA DI FABRO SITE

The delegation from ARPA Umbria gave a very comprehensive and informative presentation of the site and the radiological monitoring carried out. The verification team discussed and reviewed the monitoring undertaken and the current radiological situation at the site, in the absence of an on-site visit.

Construction of this industrial area was approved by Fabro City Council in 1982 whilst on-site work began in 1986/7.

6.2.1 Ambient dose equivalent and gamma spectrometry measurements

ARPA Umbria performed an inspection on 23 September 2015, measuring ambient dose equivalent, at 25 points, to determine the average values for the site and identify hot spots. Additionally in-situ gamma spectroscopy measurements were performed to characterise the natural and artificial radioactivity content of the site. The aerial view map below shows the measurement points.



Figure 3. Colonna di Fabro site dose rate monitoring points

The results for ambient dose equivalent identified two hot spots.

Measuring points	Ambient dose equivalent (H)*10 microSv/h	Measuring points	Ambient dose equivalent (H)*10 microSv/h
F1	0,120	11	0,107
F2	0,110	12-D	0,195
F3	0,100	13	0,130
1	0,110	14	0,125
2	0,128	15	0,115
3	0,127	16	0,150
4	0,115	17	0,147
5	0,130	18	0,135
6	0,126	19	0,115
7	0,119	20	0,115
8	0,122	21	0,127
9	0,118	22-F	0,400
10	0,120		

Points F1, F2 and F3 represent the background measurement, whilst point 12D is an area of exposed coal ash and point 22F is composed of tuff, a porous rock which is naturally radioactive used for building (since demolished). The results of the gamma spectrometry measurements for the 3 points gave the following values:

Radionuclides	SOIL (point F1)	ASH (point 12-D)	TUFF (point 22-F)
	Bq/kg		
K-40	427±44	267±24	1129±213
Cs-137	4,5±0,4	0,82±0,31	< 5,8
U-238 (from Pa-234m)	n.d.	130±35	171±49
Ra-226	23,2±4,2	143*±10	88,8±19,1
Pb-210	n.d.	105±51	< 87
Ra-228 (from Ac-228)	35,8±9,3	157±13	320±60
Th-228 (from Ra-224)	33,8±4,6	151±16	324±62
U-235	2,0±0,9	8,7±1,7	11,4±3,2

*from Bi-214 and Pb-214

6.2.2 Total alpha, total beta and tritium measurements in water

Measurements of total alpha, total beta and tritium activity were performed in water from irrigation wells and piezometers in order to verify the potential increase of natural radioactivity and to exclude the presence of artificial radioactivity. The aerial view map shows the water sampling points.



Figure 4. Colonna di Fabro water sampling points

Measuring point	Total Alpha Bq/l	Total Beta Bq/l	Tritium Bq/l
ZIF1	0,078±0,006	0,19±0,02	<1,9
ZIF2	0,15±0,01	0,25±0,02	<1,9
ZIF3 (piezometer)	0,11±0,01	0,30±0,02	<1,8
ZIF4	0,11±0,01	0,38±0,02	<1,9

An overall evaluation of the situation with regard to the potential radiological hazard demonstrates that:

- values of dose ambient equivalent in the area are in the range of the background values detected in the region (Perugia=0,16 microGy/h, Orvieto=0,36 microGy/h);
- increment of dose ambient equivalent in point 12-D is related to the presence of coal ashes
- increment of dose ambient equivalent in point 22-F is related to the presence of waste tuff;
- values of the radionuclides concentration in coal ashes are below the clearance level of the Council Directive 2013/59/EURATOM;
- ¹³⁷Cs is related to Chernobyl accident;
- total alpha/beta radioactivity concentrations in groundwater are in the range of the values measured in the region (T alpha=0,16 Bq/l, T beta=0,36 Bq/l).

Based upon the results above ARPA Umbria has concluded that the situation in the area is not of radiological concern. Specific evaluation will have to be performed in case of excavation works or asphalt removal operations, presently not envisaged. Future developments at the site would require planning permission and an environmental impact assessment.

The site is owned by about fifteen units divided between individuals, companies and the Municipality of Fabro. ARPA Umbria will acquire the list of owners. ARPA Umbria will submit to the Municipality of Fabro the definitive report of the inspection visit together with the binding indication to communicate to ARPA any type of intervention will be carried out on the site. Every five years ARPA Umbria will carry out a visual inspection of the site and monitor any radioactive contamination of the water by determining the concentration of tritium activity and the total alpha and beta activity on the water of wells already identified.

The verification team acknowledge the conclusions reached by ARPA Umbria that the current situation in the area is not of radiological concern. Nevertheless, the Italian authorities are requested to promptly inform the Commission of any planned on-site activities, which could give rise to a potential increase in radioactive releases to the environment. Whilst the current radiological situation does not appear to warrant regular monitoring, this should be reviewed periodically, through ad-hoc monitoring.

6.2.3 ARPA Umbria laboratories

The ARPA Umbria laboratories were visited in 2011. The verification report recommended ISO 17025 accreditation for analytical methods not covered at that time. The presentation made to the

verification team on this occasion demonstrated that gamma spectrometry is covered by ISO 11665-2017 certification and liquid scintillation by ISO 11704-2015 certification. Equipment and staffing levels are adequate. Furthermore, the laboratory has regularly participated in proficiency tests in the period since the last verification.

The measures implemented since 2011 demonstrate that the recommendations made at that time have been adequately addressed.

6.3 TITO SCALO SITE

6.3.1 Introduction

The Tito Scalo former industrial area was declared a Site of National Interest (SIN) by Ministerial Decree no. 468 of 18 September 2001. It is located 4 km from the town of Tito and 9km west of Potenza, the regional capital. It is located 765 m above sea level. The last company to manufacture phosphate fertilisers here was Ex-Liquichimica which operated from 1969 to 1989. The SIN represents a total area of 75 000m², and the landfill site with phosphogypsum is 34 000m² and an average depth of about 3 metres.

The industrial process of the “ex-Liquichimica” was based on the production of phosphoric acid using phosphorite (a mineral with high natural Uranium content) as raw material. At the end of the process, a certain percentage of calcium sulphate waste was produced, the so-called phosphogypsum, in which almost all the radium present in the starting mineral was accumulated (as precipitated from Ba(Ra)SO₄).

In twenty years of activity a large amount of phosphogypsum was produced, which was progressively buried in tubs dug into the industrial area itself. However, as fertilisers of different qualities were produced the overall quantity does not reflect the amount of raw materials employed. In particular, the incorporation of a percentage of phosphogypsum in certain fertilisers intended to improve soil quality reduced the amount buried.

In order to adequately prepare the on-site visit a preliminary meeting was held in Potenza with representatives of the Prefecture, the Basilicata region, the Consortium for Industrial Development of Potenza Province (ASI), ARPA Basilicata and ISIN.

6.3.2 Prefecture

The role of the Prefect can be summarised as follows:

- assures according to paragraph 1 of art. 126-bis of Legislative decree 230/1995 restrictions to the access and use of contaminated areas
- sets up a technical commission which includes local, regional and national technical authorities (such as ISIN) which supports the Prefect in the definition of the intervention strategy for a site
- sets up technical meetings with involved stakeholders
- approves the safety criteria and remediation plan on a site specific base (supported by the technical commission)
- takes enforcement actions if the remediation activities are not in accordance with the remediation plan.
- imposes further remedial actions if inspections show that compliance with the requirements of the remediation plan has not been achieved.

6.3.3 Basilicata region

Ownership of the Tito Scalo site is held by the Basilicata region, which decides on the strategy for intervention. They finance intervention actions and contracts assigned following tendering procedures.

6.3.4 Consortium for Industrial Development of the Province of Potenza

The Consortium for Industrial Development of the Province of Potenza is, pursuant to art. 36, paragraph 4, of the law of 5 October 1991, n. 317 and article 10 paragraph 1 of the regional law n. 18 of 5.2.2010, an economic public body. As such, the Consortium has regulatory, organisational, administrative, patrimonial, accounting and financial autonomy, as well as entrepreneurial autonomy.

The Consortium operates in compliance with the dictates of the law of 5 October 1991, n. 317, to the dispositions of the Regional Laws 5 February 2010 n. November 18th 2014 n. 32, as well as their subsequent amendments and additions.

The Consortium for Industrial Development of the Province of Potenza, operational since 1961, manages nine industrial areas located throughout the provincial territory: Balvano, Baragiano, Isca Pantanelle, Melfi, Potenza, Senise, **Tito**, Viggiano and Valle di Vitalba, which cover a total of about 2000 hectares. Approximately 500 companies operate within the agglomerations, employing over 17,000 people.

The Consortium's mission responds to the promotion of industrial growth over the entire area of relevance, in order to build more and more settlements, redevelop and strengthen the existing industrial agglomerations located in the areas of the province of Potenza, possibly also foreseeing their increase and expansion.

The Consortium has its registered office, management and offices in the Municipality of Tito - Zona Industriale.

6.3.5 ISIN

ISIN's roles are as follows:

- participate in the technical commission (Prefecture);
- cooperate with ARPAs;
- ensure independent monitoring of the area and the surroundings (water, air, soil): field measurements, sample collection, laboratory measurements, in addition to ARPAs monitoring activity, if needed;
- undertake inspections, if needed.

To date no monitoring of this site has been conducted by the ISIN as it has not been deemed necessary.

6.3.6 On-site monitoring by ARPAB-CRR Basilicata

Four preliminary reports were produced in 2013 and 2014 based on measurements performed at the locations shown on the map below.

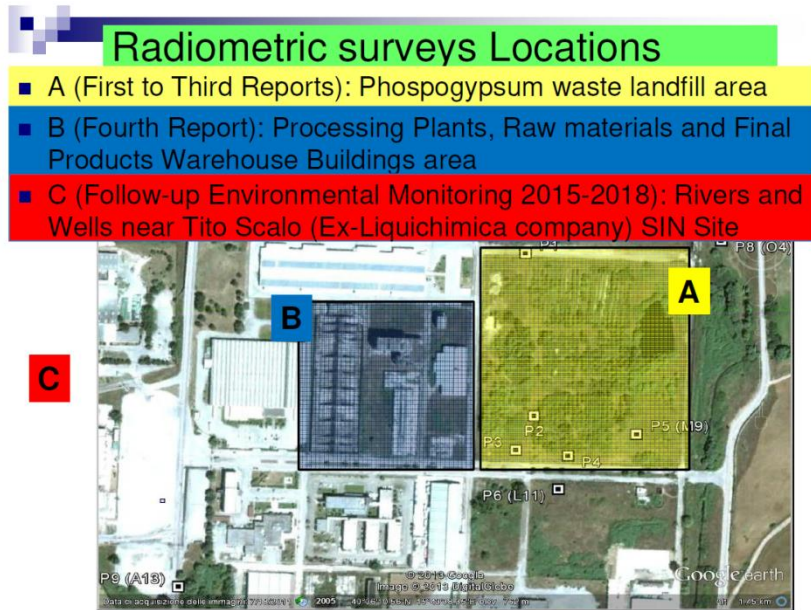


Figure 5. Tito Scalco monitoring areas

The first report (no. 21/12 of 16/1/2013) showed that average environmental gamma dose levels were quite uneven. Gamma dose rate values ranged from 65-300 nSv/h as shown below



Figure 6. Tito Scalco dose rate monitoring results

The second report (no. 11/13 of 6/6/2013) which covered gamma spectrometry measurements of soil and underground water indicated that radioactivity levels were above background and reference levels. In particular ²²⁶Ra (and daughters) in soil at points P2, P3 and P4 ranged from 459-2461 Bq/kg

were above regional and historical average values. ^{226}Ra (and daughters) measured in underground water at wells M9, L11 and I4 ranged from 8-11 Bq/litre. The measurement points are shown below.

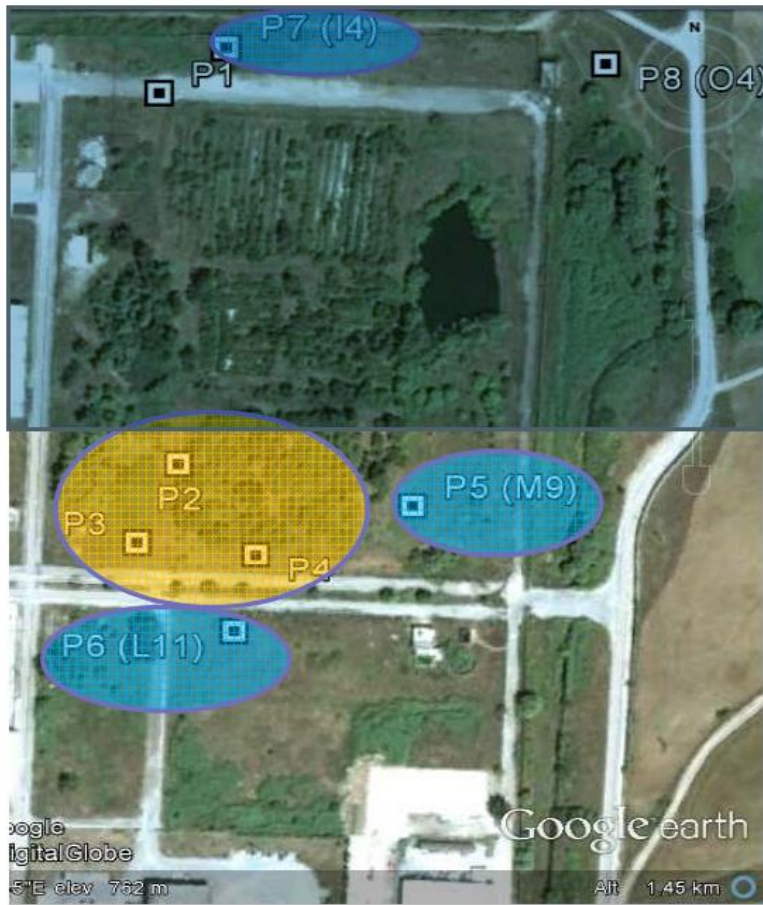


Figure 7. Tito Scalo ground water monitoring points

The third report (no. 20/13 of 18/10/2013) revealed radon levels higher than local background.

Between May and July 2013, two campaigns of outdoor radon measurements were undertaken. ARPA Basilicata installed 39 passive dosimeters in “ad-hoc” housings for measuring radon gas exhaled from soil. Results from the phosphogypsum waste tanks spot (with highest gamma dose rate) showed $1158 \text{ Bq/m}^3 \pm 10\%$, whilst a neighbouring field (“blank”) showed $335 \text{ Bq/m}^3 \pm 10\%$. The ratio is thus around 3.5.

ARPA Calabria undertook active radon monitoring by forced air flux from the housing to the instrument. Results from the phosphogypsum waste tanks spot (with highest gamma dose rate) showed $222 \text{ Bq/m}^3 \pm 10\%$, whilst a neighbouring field (“blank”) showed $71 \text{ Bq/m}^3 \pm 10\%$. The ratio is thus around 3.1, which shows the consistency of the two measurement techniques.

Surface water samples taken on 12 July, two from the Tora stream, two from the Basento River and an underground water sample (M9 piezometer well) showed levels comparable to background.

Gamma dose rate measured on 15 October at the steel industry slag heaps in the neighbouring area indicated levels comparable to background.

The fourth report (no. 24/14 of 16/9/2014) which focused on soil near the industrial buildings (processing plants, raw materials storage and final products warehouse) uncovered radioactivity levels above background and reference levels. Gamma dose rate measured at point 4 ranged from 65-260 nSv/h. ^{226}Ra (and daughters) measured in soil at the same point ranged from 700-1180 Bq/kg.

Meanwhile ^{226}Ra (and daughters) measured in underground water, vegetables and hay from a nearby private garden (downstream) did not differ from upstream “blank” samples.

A follow-up environmental monitoring campaign was undertaken between 2015 and 2018, which focused on radon in surface and ground water outside the Tito Scalo SIN area. The environmental matrices and analysis methods are summarised below. All analyses gave results that lie inside environmental historical levels.

<i>Environmental Matrix</i>	<i>analysis</i>
Surface water: Tora torrent	Gamma spectrometry (art./nat.) Gross Alpha-Beta
Groundwater : wells upstream and downstream the SIN area (two sampling)	Gamma spectrometry (art./nat.) Gross Alpha-Beta

6.3.7 Site visit

In order to further the verification team’s understanding of this complex site a visit was made where notably members of the Consortium were able to provide invaluable information concerning the site, whilst staff from ARPA Basilicata informed about environmental monitoring points. The team remained on paths surrounding the landfill site, and at no point entered the actual dumpsite. Measurements using an Automess NaI scintillation counter were taken at regular intervals and were consistently below 0.100 microSv/h and thus did not give rise to any concern.

The phosphogypsum landfill site is a small part of a much larger industrial area, which today is mainly dedicated to light industry and offices. A shopping centre is located about 100m away, on the far side of a railway line, which runs along the fence enclosing the ponds. On two sides the fence is of the chain link type, whereas the other 2 sides consist of concrete slabs slotted into concrete posts. The height varies between 1.50 and 2 m. Overall the fence, particularly the chain link parts, showed signs of ageing. Vegetation consists of grass and naturally occurring trees. No cutting of the grass or trees is performed. 40 TLD dosimeters were attached along the perimeter fence. These are exchanged and analysed every three months. At regular points, signs (see below) indicated that access was prohibited and warned of the presence of natural radioactivity.



Figure 8. Public information sign

In addition to the possible dangers posed by the presence of NORM waste the overall site is contaminated by industrial chemicals resulting from the explosion of a chemical plant in 2006. Whilst this contamination is outside the scope of this report it is a major factor in any measures relating to the remediation of the phosphogypsum landfill site as the natural flow of underground water transports this pollution towards the ponds which lie slightly lower than the former chemical plant.

A series of 22 pumping stations which capture underground water at a depth of 15 m have been built at strategic points on the overall site, though none are located inside the phosphogypsum exclusion zone. A significant number, as the photo below shows, have been sited at a short distance from the boundary of the exclusion zone as the Tora stream flows some 10-15 m from the boundary (just beyond the trees seen on the right of the picture).



Figure 9. Pumping station

A sophisticated treatment plant has been built to collect groundwater from the 22 pumping stations, where pollutants and radiological contamination will be removed. Company Unirecuperi will operate the plant and ensure daily sampling of groundwater. At the time of the verification, these measures were not yet implemented, but it was expected that operations would begin in early 2019.

In terms of published monitoring data, there is an annual report by ARPAB on the whole of the Basilica region where information on this site are also contained. The consortium produces a monthly report with site monitoring, and there is continuous reporting on all issues.

<http://www.arpab.it/radio/news.asp?id=1235>

https://www.regione.basilicata.it/giunta/files/docs/DOCUMENT_FILE_3059506.pdf

https://www.regione.basilicata.it/giunta/files/docs/DOCUMENT_FILE_3059508.pdf

Of prime importance for the future is the characterisation of the overall site. A call for tender had been issued and a contractor selected. This characterisation plan is under evaluation by the technical commission. However, there was a legal challenge by a rejected bidder which has delayed implementation. Apparently, a characterisation exercise was carried out some 15 years ago but no reliable documentation can be found.

Plans were drawn up in the past to rehabilitate the phosphogypsum landfill site and construct a multimodal platform, due to the proximity of the railway line. However these appear to have been shelved and any possible future use of the lands can only be decided when the results of the overall site characterisation are known. Any developments would need to seek planning permission and conduct an environmental impact assessment.

The verification team recognises that the results of the monitoring campaigns have demonstrated that there is significant radiological contamination contained in the phosphogypsum landfill site. Off-site measurements indicate that this has not migrated into off-site areas. At present, the radiological situation appears contained and effectively managed.

An important milestone in deciding the future of the phosphogypsum landfill site, and indeed the overall area, will be the results of the characterisation exercise, which in addition to the radiological situation will also look at the chemical pollution of the site. The Commission requests to be informed, in a timely manner, of these results, together with any plans to develop the phosphogypsum landfill site.

6.3.8 ARPAB-CRR Basilicata laboratories

ARPA Basilicata played a leading role in establishing the radiological situation at the Tito Scalo site as demonstrated by the data reproduced above. These laboratories were visited in December 2015 in the course of another verification in the area. At that time, a number of recommendations were made and the visit on this occasion concentrated on improvements implemented in the intervening period.

Since the last visit, they have moved to new and more spacious offices. An inductively coupled plasma (ICP) mass spectrometer has been purchased though was not operational, as it requires a dedicated power supply. Procedures have been written for all analysis methods and ISO 17025 accreditation is expected to be obtained in mid-2019. A LIMS will also be implemented in 2019, though there are concerns regarding historical data, owing to the diverse storage media.

The verification team accepts that the improvements implemented since 2015 fully address the recommendations made in the previous report.

7 CONCLUSIONS

All planned verification activities were completed successfully. The information supplied in advance of the visit, as well as the additional documentation received during and after the verification activities, proved very useful.

The information provided and the verification findings gave rise to the following observations:

- (1) Based on the evidence presented to the verification team the facilities needed to carry out monitoring of levels of radioactivity in air, water and soil around the site of Colonna di Fabro are adequate.
- (2) The verification activities found that the facilities needed to carry out continuous monitoring of levels of radioactivity in air, water and soil around the site of Tito Scalo are adequate. The Commission ascertained that suitable facilities to monitor groundwater are in place, though operation had not begun at the time of the verification.
- (3) In relation to Colonna di Fabro, the verification team acknowledge the conclusions reached by ARPA Umbria that the current situation in the area is not of radiological concern. Nevertheless, the Italian authorities are requested to promptly inform the Commission of any planned on-site activities, which could give rise to a potential increase in radioactive releases to the environment. Whilst the current radiological situation does not appear to warrant regular monitoring, this should be reviewed periodically, through ad-hoc monitoring.
- (4) In relation to Tito Scalo, whilst the results of the monitoring campaigns have demonstrated that there is significant radiological contamination contained in the phosphogypsum landfill site, off-site measurements indicate that this has not migrated into off-site areas. At present, the radiological situation appears contained and effectively managed.

An important milestone in deciding the future of the phosphogypsum landfill site, and indeed the overall area, will be the results of the characterisation exercise, which in addition to the radiological situation will also look at the chemical pollution of the site. The Commission asks to be informed, in a timely manner, of these results, together with any plans to develop the phosphogypsum landfill site.

- (5) Based on these follow-up reports the Commission will consider the need for a follow-up verification at the aforementioned sites.
- (6) The verification team acknowledges the excellent cooperation it received from all people involved in the activities it undertook during its visit.

VERIFICATION PROGRAMME

**Art. 35 Euratom verification in Italy at the
sites of Colonna di Fabro (Terni province) and
Tito Scalo (Potenza province)**

10-12 December 2018

10 December 2018

ISPRA Premises (Via Vitaliano Brancati 48, 00144 ROME)

15:00 - Meeting with ISIN delegation to discuss verification and in particular Colonna di Fabro and Tito Scalo sites and monitoring

11 December 2018

ISPRA Premises (Via Vitaliano Brancati 48, 00144 ROME)

09:00 Meeting with ISIN and ARPA Umbria delegation to discuss verification and in particular Colonna di Fabro site and monitoring

12:00 Travel to Potenza

12 December 2018

09.00 Introductory meeting at Potenza Prefecture

11:00 Visit at the Tito Scalo site

15:00 Visit at the ARPA Basilicata Laboratory (Matera)

17.00 Final briefing

RELATED EUROPEAN PARLIAMENT QUESTIONS AND ANSWERS
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Colonna di Fabri

Question for written answer E-013888/2015 to the Commission

Rule 130

Laura Agea (EFDD)

Subject: *Radioactivity hazard in a small-scale industrial and business area in Colonna di Fabri (Terni)*

Between 1986 and 1990, in Fabri, province of Terni, Italy, more than a million tonnes of coal ash were buried over a large area that is currently used for small-scale industries and businesses.

The citizens of Fabri, alarmed by the failure of the authorities of the Member State in question to take action (when they are supposed to ensure that all landfills in the country are authorised, built and operated in compliance with the relevant EU legislation – more specifically, with Directive 1999/31/EC and Directive 2008/98/EC), sent a sample of ash they had collected from the site to a qualified laboratory in Vienna for testing.

The test results immediately sounded the alarm – the coal ash was radioactive.

The serious danger for the environment and health of the local population calls for immediate action by the authorities responsible.

What urgent measures will the Commission take to ascertain the facts as reported by the citizens of Fabri?

Should it be necessary, what measures will the Commission take, also in respect of the Member State in question, to protect the environment and health of the population?

E-013888/2015

Answer given by Mr Vella on behalf of the Commission (18.12.2015)

A comprehensive set of rules is in place in the European Union to ensure safe disposal of hazardous waste, including Directives 2008/98/EC on waste⁴ and 1999/31/EC on the landfill of waste⁵. Properly implemented, this set of rules should ensure that waste, including hazardous waste, is properly managed, without endangering the human health or harming the environment.

Regarding radiological hazards, the European Community has established a comprehensive set of radiation protection legislation under the Euratom Treaty, including Council Directive 2013/59/Euratom⁶. The Directive applies, inter alia, to all human activities which involve the presence of natural radiation sources that lead to a significant increase in the exposure of workers or members of the public. The Directive explicitly lists the operation of coal-fired plants as one of these activities. Coal ash as a residue of coal fired plants may be radioactive, depending on the origin of the coal fired,

⁴ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

⁵ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

⁶ Council Directive 2013/59/Euratom laying down basic safety standards for protection against dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom

and may pose a radiological hazard.

The situation in Fabro, Italy, may constitute an existing exposure situation in the sense of the above mentioned Directive. In case an existing exposure situation is identified, the Directive requires competent Italian authorities to take measures in order to evaluate the situation and that a strategy be established to ensure the appropriate management of the situation commensurate with the risks and the effectiveness of protective measures.

The Commission will contact Italian authorities in order to request information and seek possible solutions.

Tito Scalo

Question for written answer E-004168/2015 to the Commission

Rule 130

Piernicola Pedicini (EFDD), Fabio Massimo Castaldo (EFDD), Marco Valli (EFDD), Eleonora Evi (EFDD) and Dario Tamburrano (EFDD)

Subject: *Environmental radioactivity around the 'former Liquichimica' area in the Tito Scalo Industrial Zone (Province of Potenza, Italy)*

There is a dump containing radioactive phosphogypsums and other highly polluting materials at the Tito Scalo Industrial Zone (Province of Potenza), which is in a densely populated area. Radiometric inspections carried out by ARPAB Basilicata indicate the presence in the area of soil/phosphogypsums with an Ra-226 neutron content of between 459 and 2 461 Bq/kg, which is much higher than the legal limit. A deposit of phosphogypsums can cause pollution of aquifers due to the leaching of radionuclides, exhalation of radioactive dusts through resuspension of the dry material, and direct exposure to gamma and neutron radiation.

CIPE Resolution No 87/2012 allocated sizeable resources from the Italian Fund for Development and Cohesion (FSC 2007-2013) to clean up the SIN Tito area, but the Consorzio ASI Potenza, which was to conduct the work, has still not made the area safe.

In the light of Directive 96/29/Euratom and Directive 2004/35/EC, what is the Commission planning to do to protect the local population from exposure to radiation and radioactive contamination?

E-004168/2015

Answer given by Mr Arias Cañete on behalf of the Commission (15.6.2015)

It is the responsibility of the competent authorities of Italy to ensure that decontamination and remediation works are carried out in due respect of the EU Basic Safety Standards, as laid down in Directive 96/29/Euratom⁷.

Pursuant to Articles 35 and 36 of the Euratom Treaty, Italy has also to carry out a general monitoring of the levels of radioactivity in the air, water and soil and to communicate this data to the Commission on an annual basis. This general data provides the Commission with an overall picture on the level of radioactivity to which the public is exposed in the country.

In case of accidental contamination, information shall however be promptly communicated to the Commission through the European Community Urgent Radiological Information Exchange (ECURIE)

⁷ Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation, OJ L 159, 29.6.1996, p. 1–114. On 6 February 2018, this directive will be repealed by Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation (OJ L 13, 17.01.2014, p.1 – 73)

system⁸ when population protective measures are taken. The Commission must then forward this information to all Member States.

No specific information as regards radioactive elements that are present in the SIN Tito area has so far been communicated to the European Commission. However, the European Commission will contact the Italian competent authorities in order to get more information on the situation and will then act accordingly.

The Commission has carried out verifications of environmental radioactivity monitoring arrangements in Southern Italy, covering amongst others the Basilicata region⁹. The outcome of these verifications has been satisfactory.

Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage¹⁰ is not applicable to environmental damage caused by activities covered by the Euratom Treaty, pursuant to its Article 4 (4).

⁸ Council Decision 87/600/Euratom of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency, OJ L 371, 30.12.1987, p.76 – 78

⁹ <http://ec.europa.eu/energy/node/1221>

¹⁰ OJ L 143, 30.4.2004, p. 56