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RADIOMETRIC MONITORING OF CONTAMINATED SCRAP METALS IMPORTED IN ITALY. TECHNICAL AND REGULATORY FEATURES

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ABSTRACT

During these last ten years there have been occasional reports of mishaps from trafficking of contaminated scraps or containing radioactive sources. Recently an increase of events indicated that the problem becomes more important as to generate possible consequences, from a radiation protection standpoint, for workers and general public.

Following the detection of contaminated metal scraps in some recycling industries and in some consignments entering the Italian borders, the competent Authorities laid down rules to put the matter under control.

In this paper technical and regulatory features are discussed.

INTRODUCTION

In April 1990, during a routine monitoring of Po river waters it was discovered an increase of Cs-137 concentration. This increase could not be attributed to a release from the Caorso nuclear power plant as the same results were obtained upstream and downstream the plant itself, nor to the Chernobyl fallout as the ratio Cs-137/Cs-134 was well above a factor 2. The Cs-137 concentration detected in river water is reported in Fig. 1.

Systematic monitoring of sediments was undertaken along the path of the Po river down to a small tributary Lura (see Fig. 2), where the source of contamination was found. A foundry factory located in Rovello Porro (Regione Lombardia) dealing with aluminium metal scraps was found to be contaminated with cesium inside and in the courtyard where the incoming scraps were temporarily stored.

The investigations carried out by the local Authorities (Presidio Multizonale di Igiene e Prevenzione della Regione Lombardia) showed that a joint firm, which used the materials from the first factory, was contaminated although to a lesser extent.

Inspections were carried out by ANPA inspectors in most of the factories which received materials by the two contaminated ones.

Only two firms located in Northern Italy were found to be contaminated by cesium and radioactivity contaminated metal scraps were also found in some toxic waste repositories nearby.

The episode had no health consequences both for the workers and general public, but it resulted in a large waste of working time and money, due to the decontamination activities. Great concern was also created in workers and population living in the surrounding.

Efforts, made at international level to single out the country of origin of the material, did not allow to identify the primary shipper, but it appeared that the material was imported from Eastern countries. The total activity estimated around 4000 MBq supported the hypothesis of the presence of a therapy or industrial source in the scraps.

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It appeared clear to the Italian Authorities that, in the future, radiation protection regulations should require a registration system for dismissed radioactive sources as well as that the users of scraps have to monitor the incoming materials.

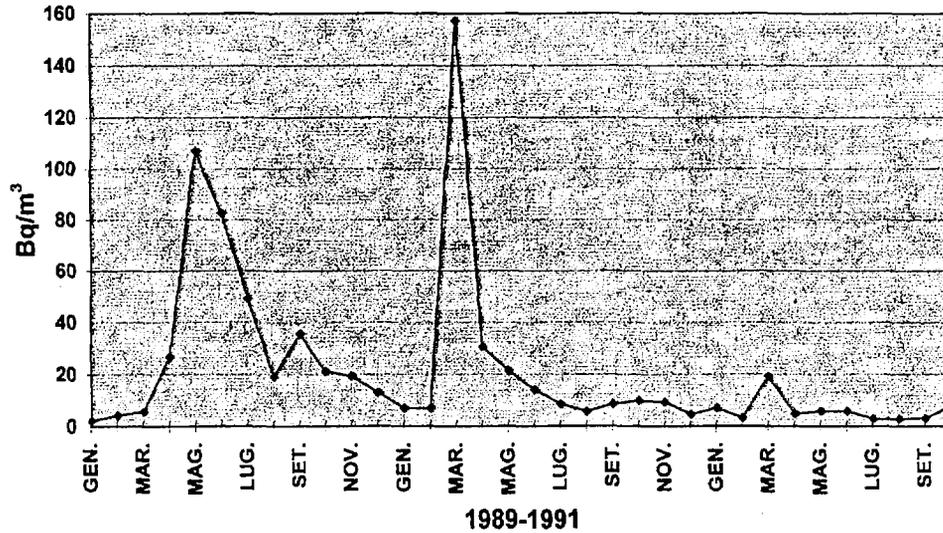


Fig. 1: Cs-137 in Po River.

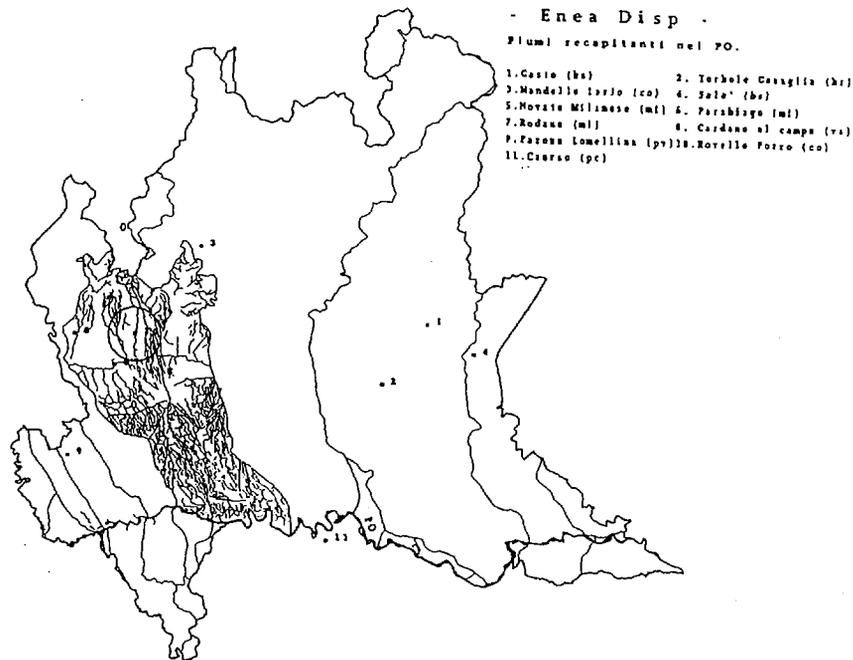


Fig. 2: Schematic view of contamination diffusion through waterway.

SYSTEMATIC CONTROLS OF IMPORTED SCRAPS AT THE ITALIAN BORDERS

Two years after the cesium contamination in Lombardia Region, the Ministry of Health was informed about the import in Sweden of ferrous materials, slightly contaminated, and on the possibility that potential contaminated materials could be introduced in Italy. The country of origin of the material was ex-URSS. Great was the concern of Health Authorities, which decided to alert the Health Offices existing at the borders, in order to carry out monitoring on all the incoming shipments of metal scraps from non EU countries.

First measurements carried out by various institutions (ANPA, ISPELS and Regional Environmental Radioactivity Laboratories) showed the existence of CO-60 contaminated scraps coming from Eastern Countries either by sea but mainly by rail.

The experience gained after three months of monitoring showed that around 1% of incoming cargoes resulted to contain scraps contaminated with Co-60, Cs-137, Ra-226. The countries of origin of the material were usually Eastern Countries. The range of contamination was of the order of some Bq/kg to some thousands; moreover only a small part of the cargo was contaminated (around 100 kg over 40 - 50 tons).

The concentration of artificial radionuclides was of no health significance either for the workers and for the public. No resuspension took place and the external radiation levels were also rather low. However the psychological impact could not be neglected, as well as the potential risk connected with the possible existence of dismissed radioactive sources or highly contaminated pieces in scraps.

REGULATORY PROVISIONS

For the above mentioned reasons, the Italian Ministry of Health issued a circular on June 29, 1993 (1), concerning the procedures to be adopted to allow the ingress of metal scraps.

The presence of radioactivity in metal scraps was considered not justified and therefore no clearance levels have been established. All the shipments showing external radiation levels higher than the natural background shall not be allowed to enter the Italian territory and are sent back to the shipper.

This procedure, however, cannot exclude the presence of radioactive sources inside the cargo, owing to the shielding properties of the material, nor the presence of α or β sources. In the same time monitoring of incoming materials at the borders can cause the slowing down of the traffic and it is very expensive in terms of manpower. A change in the policy adopted appears necessary. Monitoring shall be carried out at the receiving point i.e. at the factory, although this procedure might cause difficulties when the material has to be sent back.

The installation of automatic control systems at the borders should also be foreseen.

Place	Interventions	Wagons, Trucks (number)	Shipment not admitted (number)
Opicina	743	996	---
Rabuiese	9	15	---
Ferneti	9	46	---
Scalo Legnami	21	364	8
Gorizia F.S.	18	117	5
Gorizia S. Andrea	84	198	---
Udine	31	787	4
Osoppo	29	2113	31
Tarvizio (Autoroute)	3	24	---
Tarvisio Coccau	2	4	---
Tarvisio (Railway)	103	6866	41
Pontebba	15	45	---
S. Giorgio Nogaro	2	5	---
Sea-port	2	18	---
Total	411	11608	89

Table 1: Results of monitoring carried out at the North-East border in the period May 1993 - December 1994.

After one year of experience the data of monitoring at the border confirmed that around 1% of the incoming cargoes show a contamination in the range 1 - 1000 Bq/kg (in one case 8500 Bq/kg were found in a single piece). In the table are summarized the data collected at North Eastern borders.

Three Regional Authorities emanated their own provisions and imposed the recipients of the materials to carry out the controls at the factory before any use of the materials (2, 3, 4).

The Ministry of Health also required the advice of National Health Council.

The views of the Council can be summarised as follows:

1. Materials shall be certified at the place of origin as free of contamination;
2. The receiving firms shall carry out the monitoring of incoming materials;
3. Monitoring shall be carried out by the Local Authorities in the framework of their routine inspection activities (random controls).

In the meantime, the Ministry of Health, through an agreement with the Ministry of Industry, planned to install automatic detectors in some custom points where in the future all the imported scraps shall be convened.

The financial support has recently been granted and in the near future it will be possible to have such apparatuses.

A workshop on "Radiation protection problems connected with the import of contaminated metal scraps" was organized by the Italian Radiation Protection Association on May 1995. The audience was very large and eterogeneous: technicians, operators, detection equipment dealers, etc.

It appeared from the discussion the need of clear regulations, of uniform procedures and of avoiding duplication of work.

NEW RADIATION PROTECTION REGULATIONS

From January 1, 1996 new radiation protection regulations will enter into force. This will impose important changes.

At present to be exempted from radiation protection regulations two conditions shall be fulfilled at the same time. Both the activity concentration and the total activity shall not exceed given values (5).

In the new decree (6) if the activity concentration levels are below fixed values of no health significance, the regulations do not apply, independently of the total quantity. This means to introduce, de facto, an exemption level which is established at 1 Bq/g.

A provision (ex art. 157) is expressly devoted to radiometric surveillance of metal scraps. The operators, who melt scraps or other metallic materials for industrial purposes, shall monitor the materials to detect the presence of dismissed radioactive sources. The same provisions also apply to those who collect or store metal scraps.

A Directive, concerning the ways according to which monitoring activities on metal scraps shall be carried out, is being prepared by a working group set out by the Ministry of Health. This Directive is of particular importance as it will assure uniform procedures in checking the incoming scraps.

The provisions contained in the preliminary draft require that each metal scrap shipment coming from non EU countries shall be accompanied by a document certifying that the external radiation levels are within the fluctuations of the natural radiation background.

Shipments entering Italy shall be registered as well as the results of the monitoring activities.

The receiver of the scrap materials from whatsoever origin, shall verify that artificial radioactive concentration, if any, shall be less than 1 Bq/g.

It has to be underlined that these represent only proposals and have to be discussed by all the interested parties.

CONCLUSIONS

The problem of the diffusion of contaminated metal scraps is undoubtedly increased during these last years. Till now no serious health problems have been created, but the concern of general public, workers and unions becomes greater and greater, mainly for the attention that mass media devote to the problems connected with radiations.

It is our opinion that efforts are needed at international level to reach a common policy towards to the introduction of these materials in the countries and in the same time a system of notification when contaminated materials are received shall be established about their circulation at least among EU countries.

One of the problems which could pose difficulties, is the ambiguity which exists in the concepts of clearance and exemption levels. It is our opinion that in order to avoid misunderstanding the two levels shall be the same. In any case, the international scientific community should face the problem and try to reach a general consensus.

As the circulation of low contaminated materials during the years will spread out, it is of vital importance that all the countries have a common approach similar to that reached for the transport of radioactive materials.

REFERENCES

1. Ministero Sanità - Circolare n. 30 del 29.06.1993.
2. Regione Veneto - Circolare prot. n. 22260/20311 del 30.05.1994.
3. Regione Friuli-Venezia Giulia - Circolare prot. 16684/IG.9 del 30.09.1993.
4. Regione Piemonte - Ordinanza del Presidente Giunta Regionale prot. 11398 del 17.12.1993.
5. Decreto del Presidente della Repubblica del 13.02.1994 n. 185: "Sicurezza degli impianti e protezione sanitaria dei lavoratori e delle popolazioni contro i pericoli delle radiazioni ionizzanti derivanti dall'impiego pacifico dell'energia nucleare".
6. Decreto legislativo del 13.06.1995 n. 230: "Decreto Legislativo di Recepimento delle Direttive Euratom n. 80/836, 84/467, 84/466, 89/618, 90/641, 92/3 in materia di sicurezza degli impianti e protezione sanitaria dei lavoratori e della popolazione contro i pericoli delle radiazioni ionizzanti derivanti dall'impiego pacifico dell'energia nucleare".