HERCA

HEADS OF THE EUROPEAN RADIOLOGICAL PROTECTION COMPETENT AUTHORITIES

Contaminated Non-Food Products

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Regulatory Deficit Regarding Contaminated Non-Food Products

Executive Summary

An INES 7 event in Europe will generate tremendous amounts of class 7 goods. From roofing tile to motor cycle, everything becomes a surface contaminated object and therefore a dangerous good.

Along with the classification as a *dangerous good* goes the classification as waste. Who would buy a commodity that cannot be shipped without special care? Thus, ADR/RID induce a *de facto* dose limit for commodities, whether intended or not.

Within the present ADR/RID this regulatory checkmate can hardly be avoided. National exemptions are impossible and with a view to the European internal market even pointless.

Here we present a harmonised description of this particular checkmate. We discuss two specific scenarios and the corresponding regulatory issues.

1 Regulatory Framework

Contaminated objects are exempted from ADR/RID regulation (1.7.1.4 f) if they do not exceed the definition of contamination (2.2.7.1.2):

> *Contamination*
>
> *Contamination* means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm² for all other alpha emitters.

Failing this condition, any piece of cargo is considered as dangerous good of class 7, at the very least a surface contaminated object of group I (SCO-I) (2.2.7.2.3.2):

> […]
>
> (a) SCO-I: A solid object on which:
>
> > (i) the non-fixed contamination on the accessible surface […] does not exceed 4 Bq/cm² for beta and gamme emitters and low toxicity alpha emitters, or 0.4 Bq/cm² for all other alpha emitters; […]

SCO-I is the strongest classification that may still be carried unpackaged or in a Type IP-1 package. The conditions on the latter are rather weak and might be fulfilled by default (6.4.5.1).

Failing requirements for SCO-I leads to classification as SCO-II or stronger. SCO-II goods need at least Type IP-2 packaging which requires dedicated testing (drop, penetration etc. from 6.4 or 6.1[1]).

Thus, there is a strong interest to meet the SCO-I requirements.

2 Case studies

The working group identified two scenarios that are particularly susceptible to a regulatory grid lock: an INES-7 event abroad-afflicting entry points-and a domestic INES-7 locking down large parts of the European mainland.

The first case study below summarises the Belgian post-Fukushima experience, the second case study is based on a severe accident in a fictional nuclear power plant in Poland.

2.1 Remote Accident: Belgian experience with the importation of manufactured goods originating from Japan

The contamination of manufactured goods originating from Japan has been addressed by FANC in collaboration with the customs and Belgian seaports authorities (Antwerp, Zeebrugge, Ghent and Ostend). It was decided to submit the first ships to leave Japan after the disaster to close inspection.

By the end of 2011, limited increases in radioactivity levels (above the value of 0.4 Bq/cm² for radiocaesium over a surface of 300 cm²)[2] were detected in a total of 17 containers as they

[1] Packaging qualified to carry non-class-7 dangerous goods would probably meet the 6.1 condition.

[2] According to TS-R-1 §504 “Packagings, including IBCs, and tanks used for the transport of radioactive material shall not be used for the storage or transport of other goods unless decontaminated below the

passed through the radiation detection systems (Megaport project). Their contents were not contaminated. Because these containers had to be used for the transportation of any kind of goods they were isolated, decontaminated by hand and certificated for unrestricted use. By the end of 2011, authorities returned to the normal inspection regime.

2.2 Accident in Europe

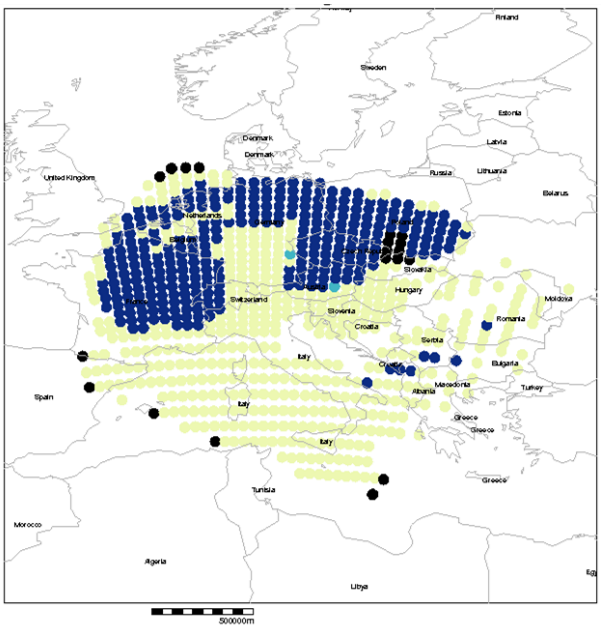
This case study postulates a very severe accident in a fictional nuclear power plant in southern Poland (near Bielsko-Biala). Two different release dates were considered (08th of July 2014 and 18th of July 2014). Both were chosen with a view to provoking a wide spread contamination.

The results of a RODOS-calculation are given below. Dark blue areas show a contamination of more than 4 Bq/cm² summed over aerosols (iodine is neglected).

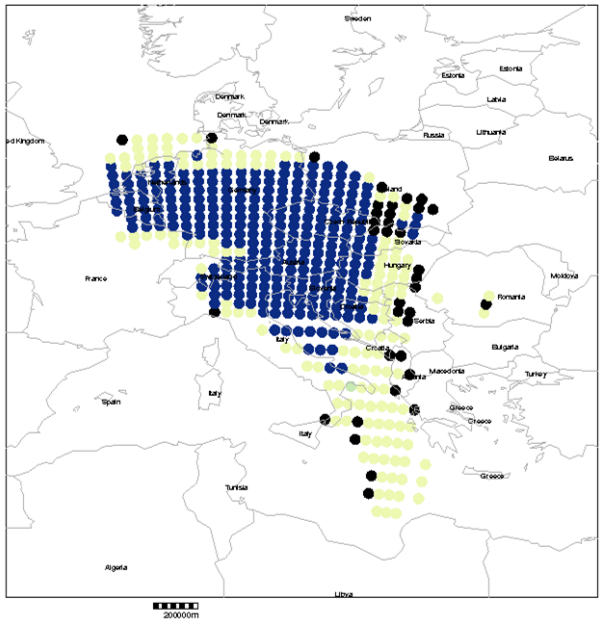
Depending on the prevailing weather conditions large areas of cis- and transalpine Europe are contaminated with more than 4 Bq/cm². In direct consequence, nothing stocked outside could be qualified as SCO-I. This includes cars, trucks and building products.

The limit stated by ADR/RID is very low and probably not justified in terms of radiological risk.

Weather from 2014-07-08



Weather from 2014-07-18



Source term:	Noble gases	Iodine	Aerosoles
	7.7E+18 Bq	2.4E+18 Bq	4.8E+18

level of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm² for all other alpha emitters."

3 Conclusion

A far distant accident (like the Fukushima case) is a hindrance for commercial traffic and ties human resources, mostly without a profound radiological justification[3]. By extrapolation, a distant accident would seriously inhibit commercial traffic. By consequence, a significant number of public officials would have to be kept from tasks with a-radiologically-higher priority.

A severe accident in Europe would submit most of European traffic to ADR/RID. Treating all commercial traffic in Europe as SCO-II or stronger would obviously lead to a regulatory gridlock. Apart from the physical impossibility of actually qualifying all cargo as IP-2 or better, the administrative issue is insurmountable.

ADR/RID were not drafted with a view to global scenarios, the regulations are obviously inappropriate. However, exemptions from ADR/RID are not possible on national levels and, currently, there is no mechanism in place that would allow for timely exemptions on the European or international scale.

While the scientific problem of finding appropriate dose criteria is probably solved, the regulatory issue persists. The challenge is to allow for exemptions from ADR/RID.

[3] The WGE is aware that a lot of significant efforts are made to establish reasonable dose criteria (e.g.: T. van Dillen; Radiat Prot Dosimetry. 2015 Apr; 164(1-2):160-4)