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## **Crisis exercises in transport of radioactive materials in France**

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### **Abstract**

An efficient emergency preparedness is an essential part of the defense in depth for all nuclear activities, including the transport of radioactive materials. Such preparedness should involve operators and public authorities. In the event of a transport accident, the crisis would have specific characteristics when compared to an accident occurring within the perimeter of a nuclear facility. Crisis exercises are an invaluable tool in learning how to manage such an event.

### **Introduction**

Accidents in radioactive material transport may occur everywhere and possibly near populated areas. Contrary to events taking place on sites of nuclear facilities, in case of a transport accident, trained personnel are usually unable to intervene immediately, or even trigger the alert if the driver is incapacitated. Populations have no raised awareness of radiological or chemical hazards and first aid workers are not always trained to these hazards. Moreover, the situation is more complex because of the multiple actors and responsibilities: the consignor is responsible for the load and its conditioning, the transport broker organizes the transportation on behalf of the sender and the carrier handles the means of transportation and the itinerary.

The different actors (consignors, carriers, public authorities) must be well prepared to a potential crisis. In this context, organization of crisis exercises on a regular basis is crucial. In France, such exercises involving local administration (prefectures), first aid personnel, actors of nuclear transport and the authorities are organized up to three times a year.

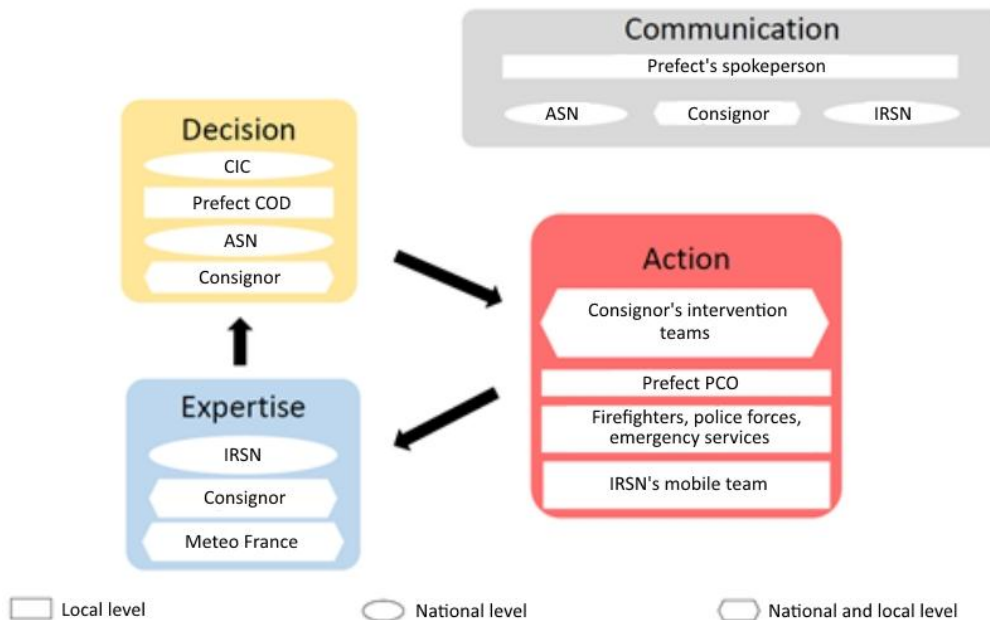
### **1. Institutions and the organization of crisis management in France**

The organization of crisis management in France is prescribed by the interministerial instruction published on the 7<sup>th</sup> April 2005, and described in the national response plan to “major nuclear or radiological accidents” [1], published in February 2014. This plan takes into account recent models in order to anticipate the possible consequences of such an accident and incorporates post-accidental

doctrine elements.

Crises during a transport of radioactive material are managed at both local and national levels. The head of regional administration (called the prefect) is in charge of handling the crisis. He supervises the first responders, police, firemen and medical personnel acting on the site of the accident.

The French nuclear safety authority, the ASN (*Autorité de Sûreté Nucléaire*), gives advice to the prefect to help him in his decision-making process. The ASN is assisted by its technical support organization the IRSN (*Institut de Radioprotection et de Sûreté Nucléaire*), which uses the available pieces of information to diagnostic the state of the packages involved in the accident and to simulate the possible evolutions of the simulation. The consignor, who has the knowledge of the content of the package, provides assistance to the expertise process.



**Figure 1: Responsibilities during a transport crisis**

Should an accident occur, the driver is responsible for alerting both the public emergency services and his employer. The ASN will then be alerted, either by the public emergency services or by the carrier or a witness through the public ASN crisis hotline. If the driver is not able to give the alert (injured, etc.), then it will be given by the first on-site responders once they notice that they are dealing with a transport of radioactive materials. They will contact the local prefect, who will alert the ASN and IRSN on his own.

Of course, during the first moments of such a crisis, ASN and IRSN's national crisis centers might not be rigged yet. The first responders are trained to apply some basic reflex protective actions. The prefect

has then at his disposal some crisis index cards, detailing the first actions to take to mitigate the accident consequences while awaiting expert advices. These index cards are based on the types of package, identified by their UN number.

Once the national crisis centers are operational, all the actors coordinate by videoconferencing regularly during the crisis, both to ensure that all available information is properly shared in order to take the appropriate decisions, and to synchronize their communication to the public. Both the ASN and IRSN have crisis center dedicated to responding to such event, as have the main consignors. ASN's crisis center consists of a technical pole and a public communication pole. During a crisis concerning transport of radioactive material, the technical pole, headed by a technical director, is organized in 3 hubs, staffed with specialized agents: a transport hub, a radioprotection hub and an environment hub, along with an agent in charge of logging all communications and decisions. The communication pole, situated in another room, is headed by a communication director in charge of redacting press reports and giving out interviews, with assistants handling social media presence, transmitting information once verified by the technical pole, and press officers answering phone calls.

The prefect can choose to deploy some specialized mobile teams on the accident location, to carry out radiological measurements, perform the first medical actions and to assess the package state. There are specialized firemen units that are trained to this mission. Besides, some consignors have their own teams. Finally, the IRSN has also a mobile team, equipped with material to assess in details the package state and provide the national experts with the relevant pieces of information. Some ASN agents can also be sent to the prefect's center of command to provide local assistance.

Until the package has been recovered and the strategy for dealing with possible contamination has been chosen and validated, the crisis organization remain operational to deal with possible complication and to communicate with the other actors and with the public.

## **2. The proceedings of a national crisis exercise**

Crisis exercises, as part of the preparation to a real nuclear crisis, are regulated by an annual interministerial instruction. The prefecture coordinates the exercise preparation at the local level and sets the goals of the exercise. The ASN coordinates the organization at the national level and prepares the general dossier of the exercise: description of the national crisis organization, objectives and characteristics of the exercise, as well as record sheets describing the missions, objectives and assessment criteria for every actor. The scenario is prepared either by the IRSN or by the consignor, who decides the conditions of the crisis (type of transport, actual contents of the package, and consequences of the eventual impact on the environment, the public and workers) based on the defined objectives.

The exercises mobilize the crisis organization that would be put in place in the event of a real accident. This allows the assessment of coordination between actors, coherence and efficiency of taken actions and means of actions on the ground.

From a fictional accident scenario which remains unknown to the participants, the exercise must lead the actors concerned with safety and civil security to

- understand the state of the affected transport, anticipate its evolution and ensure a quick re-turn to a satisfactory safety level;
- assess nature and extent of actual and potential radioactive rejections, restrict their amount and evaluate health hazard on surrounding populations;
- if necessary, propose a plan for package recovery.

Each year, at least one national crisis exercises in transport of radioactive material is organized, but the total number can vary: 2016 had three such national exercises (two dealing with transports by road and one with transport by train). Most national crisis exercise deal with high-stake transports, such as type B containers and UF6 cylinders.

On the date of the crisis exercise, the alert is usually issued by the carrier, following the crisis procedures. The carrier contacts directly the public emergency services, the ASN and the consignor. The crisis centers of the prefect, the ASN, the IRSN and the consignor are then activated, the agents waiting to receive the alert to join their positions.

The first step for the players is to gather information about the situation. Depending on the particulars of the exercise, a simulation can be held on the field with models and photographs handed over to firefighters and police. In any case, scenarists are present to give information to the local emergency services about the state of the vehicle and the packages, the number of injured people, the results of the measurements that are carried out and to answer any specific question. The pieces of information are then transmitted to experts and decision-makers using the tools that would be used in reality in the event of an accident. If the exercise is played without physically simulating the accident on-site, the field can be simulated in a room with photographs. This room is separated from the crisis centers so that the communications can be performed in a realistic way. When there is no simulation on the field, the mobile IRSN cell is not deployed, but it is considered to be en-route as soon as IRSN learns of the accident, with a realistic time of arrival. Depending on where the accident took place, it can take many hours between their departure and the moment the first simulated measurements are transmitted to the players.

During an exercise, the consignor is at the disposition of the ASN and the prefect, and is expected to

give as much information as possible concerning the nature of the affected transport, much like he would do during a real crisis.

Public communication during a crisis is simulated by hiring journalists who simulate a “press pressure”, by acting much like they would during a real crisis: publishing articles and blog posts, contacting the crisis actors to get more information, arranging interviews, etc. While those articles are never actually published, they are still visible for all of the participants in the exercises, and managing their communication with the press and the public is part and parcel of a proper exercise.

National exercises usually last around 5 to 6 hours. This is supposed to be enough to both deal with the immediate repercussions of a transport accident, and to start planning on how to handle the rest of the crisis, from the recovery of the package and its contents to the potential decontamination. Other local exercises can be shorter, as they only test some specific aspects of transport crisis (the action of first responders, contamination measurements, etc.)

### **3. Feedback and new scenarios**

An important part of playing out such exercises is getting feedback from the actors: after running such a simulation, each actor is invited to give out its impression by filling out a form allowing for commentary on what happened during the exercise. This allows to improve the crisis organization, in order to react better during a real-life crisis, but also the future exercise scenarios. Chief amongst the issues discovered during such scenarios are the facts that identifying the precise contents of the package can be a complex endeavor (papers can be hard to recover after an accident, the consignor can take time to react, and the driver can be unable to display information), and that getting measurements from the site of the accident can take time, keeping actors in the dark during the first crucial hours, without knowing if contamination is an issue or not. It was to address this second issue that the ASN have provided to the prefects with crisis index cards displaying the first actions to take.

Public communication is also an issue: it is clear that no amount of simulated pressure from hired journalists can be comparable to the sheer volume of requests from the public and the media that a real nuclear crisis could engender, even in the domain off radioactive transports. Communicating clearly and precisely, while keeping explanations easy to understand for laypersons is a hard task requiring very specific vocabulary, and training ASN agents to this work is essential.

The ASN is always seeking to prepare more thoroughly in order to be as efficient as possible should an actual crisis occur. The ASN also tries to ensure that the other actors are well prepared to handle those situations, especially consignors and prefects. As such, future exercises will be conducted with consignors that have not yet been part of a national exercise.

While prefect responsible for local administration with nuclear installations are usually well-rehearsed in dealing with a potential nuclear crisis, the same cannot be said of those who do not oversee such installations. Since transport accidents can potentially happen anywhere, crisis exercises in transport of radioactive materials usually target local administration with no nuclear installations. But organizing enough national exercises to prepare all of these prefects is logistically impossible, because there are around a hundred of prefects in France.

The ASN and the IRSN are then in the process of creating smaller exercises, mostly focusing on the very first moments of a transport crisis, with a wider range of radioactive materials (for example materials used for medical or industrial applications). These exercises are shorter and easier to organize, since they are created to be played without the intervention of national actors and crisis centers, only requiring the local prefect and ASN agents to coordinate with first responders. While such scenarios did exist in the past, they did not conform to the need of local actors, and were rarely used by the prefects. To complement these smaller scenarios, the ASN is planning on organizing seminars with prefects in order to accustom them to the specific issues of transport crises.

Conducting national and local exercises is a necessary part of preparing to handle crisis. Of course, transports of radioactive materials frequently pass through national borders, and one should not dismiss the possibility of a crisis impacting different countries. It is also important to organize international exercises, such as the 2014 PREPARE transport exercise.

## **Conclusions**

The exercises conducted to prepare all the actors of a transport crisis lay the groundwork for proper response should such a crisis occur. The ASN also regularly carries out inspections on the theme of the emergency preparedness in the transport area, and has published a guide [2] in order to help consignors and carriers to establish their own emergency plan. As with all aspects of the nuclear industry, permanent care is required to improve the organization of emergency preparedness.

## **References**

- [1] Plan national de réponse "Accident nucléaire ou radiologique majeur", 2014, published on [http://www.sgdsn.gouv.fr/site\\_rubrique146.html](http://www.sgdsn.gouv.fr/site_rubrique146.html)
- [2] Guide de l'ASN n°17 : Contenu des plans de gestion des incidents et accidents de TSR, 2014, published on the ASN website (www.asn.fr)