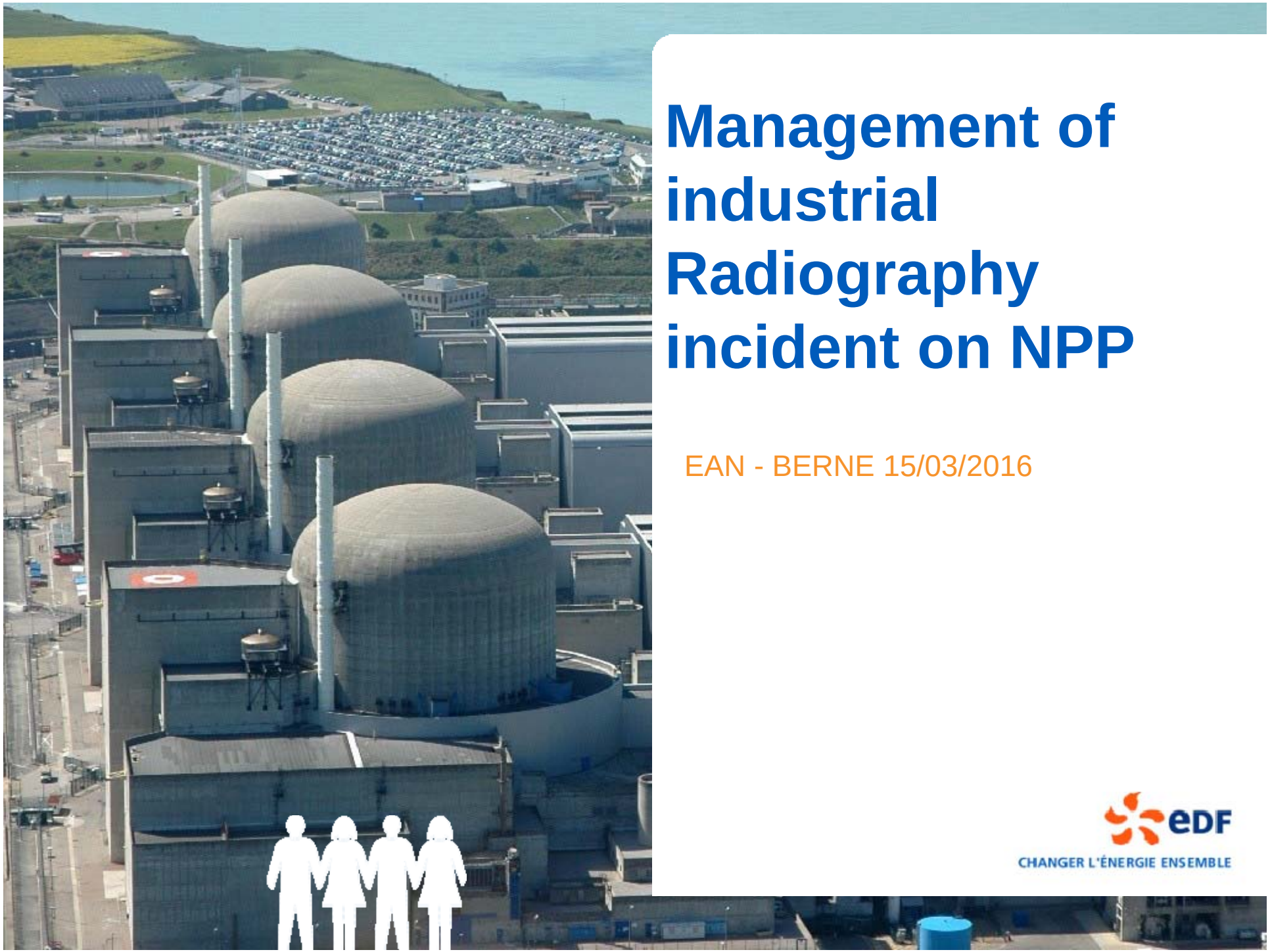
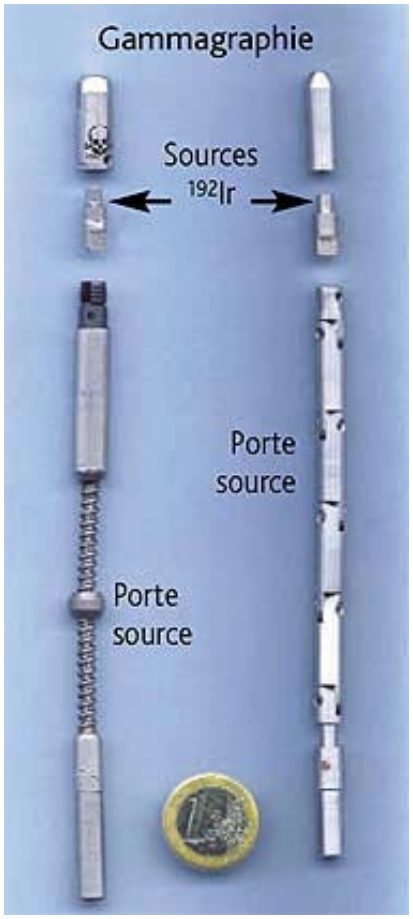


Management of industrial Radiography incident on NPP

EAN - BERNE 15/03/2016

CHANGER L'ÉNERGIE ENSEMBLE



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1. Event's description

- In the Nuclear Power Plant in Blayais, a radiography activity is planned without collimator during the night between 19/03/12 to 20/03/2012 with 2.37 TBq (64 Ci) of Ir 192.
- Keys' steps :
  - - **20/03 : source's incident :** after an exposure, it's impossible to remove the source in its shield device.
  - - 21/03 : constructors, EDF and radiography experts come in Blayais.
  - - 23/03 : We ask our regulation body to recover the source.
  - Discussions with Safety Authority during 3 weeks.
  - - 17/04 : regulation body allowed us recovering the source.
  - **- 18/04 : Recovering is done.**

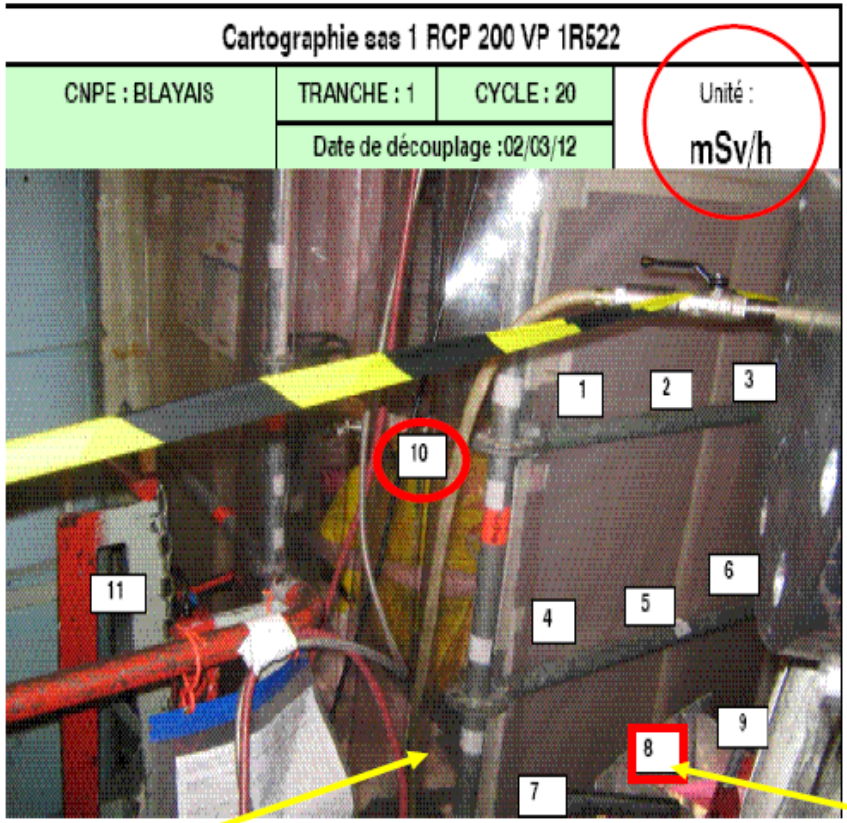
1. Event’s description

- Situation :
  - The area is « dirty »(contaminated) : ➔ it’s impossible to see something inside from outside.
  - Access is blocked, tight area : ➔ robots can’t be use.
  - Access by a ladder near the source : ➔ dose rate very high, humans can’t be sent.

Above situation

1. Event's description

- Localisation and dose rate:



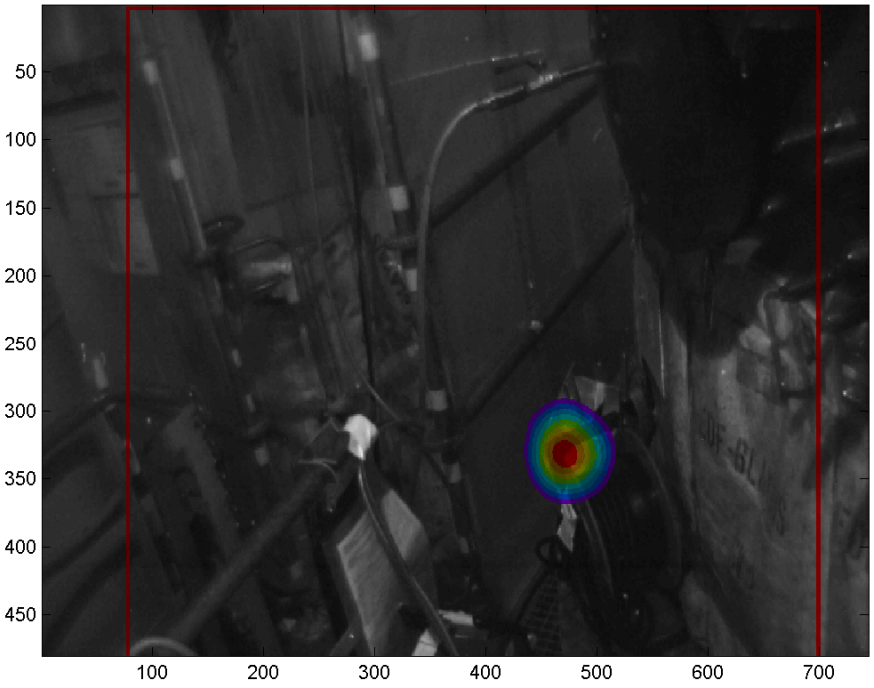
POINTS	DDD Contact	DDD Ambiant
1	150	
2	110	
3	144	
4	179	
5	263	
6	316	
7	423	
8	2000	
9	750	
10		300
11		50

Source position?

Device's position

1. Event’s description

- By using a « gamma-caméra » :



The source is settle in the guide tube about 700 mm of the connexion between device and guide tube

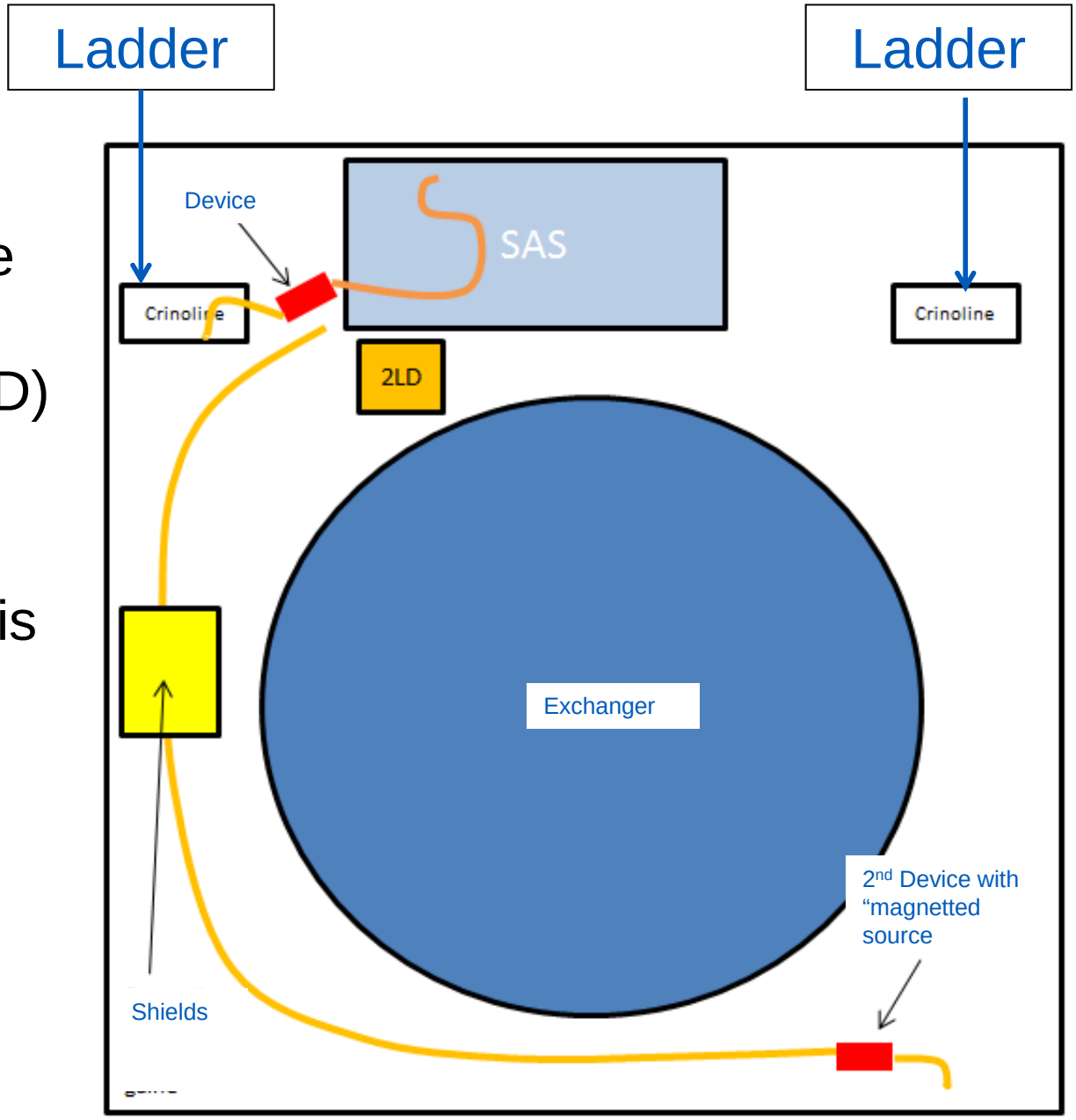
2. Recovery

- First Step : Decrease the dose rate (dose rate > 300 mSv/h at 1 m) :
  - Without exposing workers,
  - Taking account of the environnement.

By cutting the roof, and using small lead bags

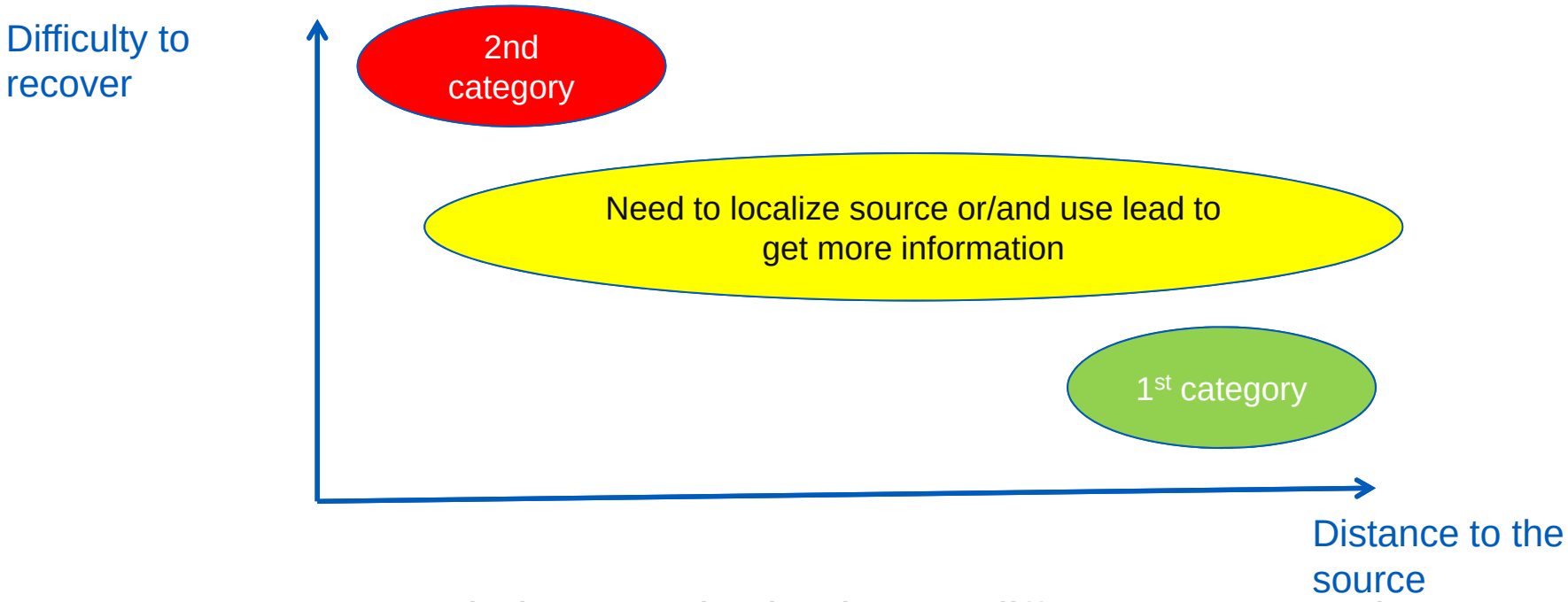
2. Recovery

- The goal : get the source in a shielded box (2LD)
- Dose associated with the incident is 13 man.mSv
- Cost : 25 days of inactivity in this area = 25 M€.



3. Feed-back - Organization

- Workshop with the regulation body to :
  - Identify what kind of incidents happened,
  - Identify physical parameters of those incidents (movement possible/impossible in which direction, measures,...) to get a diagnosis for each one,
  - Define emergency process to recover the control on the source, divided in 2 categories :



Goal : to get a preliminary authorization on different emergencies process, with trained agents (not only radiographers) ➔ Time saving

3. Feed-back - Organization

- Use a detailed risk analysis to measure our sensibility in case of an incident, by answering 3 simples questions. If there's an incident, can I :
  - See the device in its working position?
  - Put some lead easily?
  - Get an access to the guide tube?

  Considering the answers, some actions are taken like the position of the device, of the guide tube, secure materials in the vicinity of the area, put some lead in prevention...

It doesn't mean that if you say "Yes" 3 times, you'll do nothing!

- We have now dedicated information to stakeholders and "what to do" listing for each one in case of emergency.

- About 200 radiographers (working on our facilities) get a dedicated information on this subject.

3. Feed-back - Equipments

- Research on an appropriate survey meter (to detect unusual situation), which:
  - Is always hold by radiographers,
  - Get sound, light and shaking alarm.

  ➔ Existing product needs some changes and only 400 “clients” is no enough.

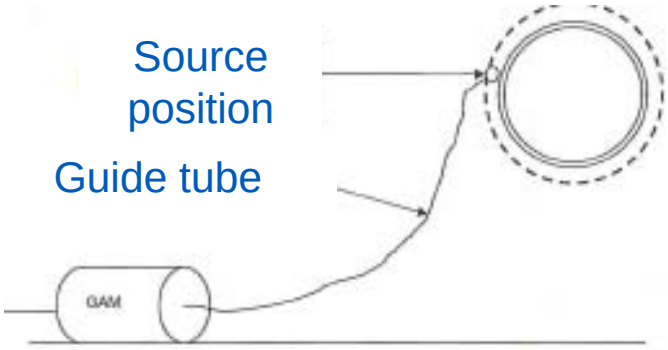
  This action has been cancelled after some field-testing.

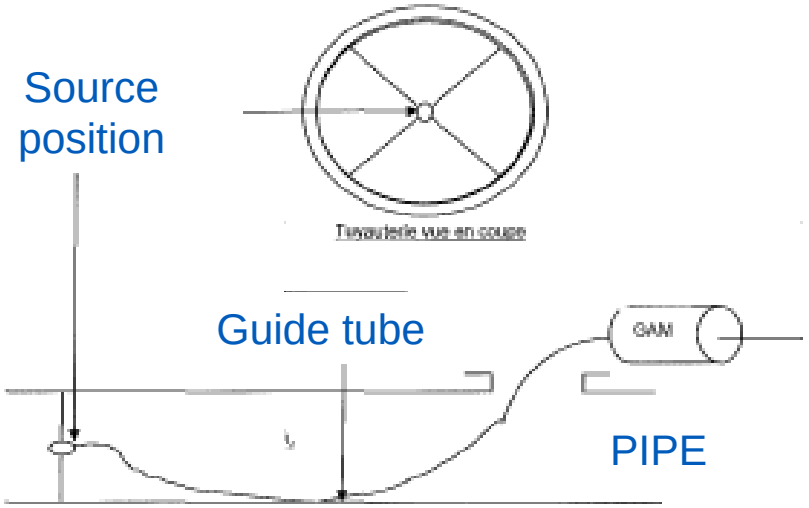
- Preparation of an easy to use response kit (small leads’ bag, mobile video camera with night vision, bolt cutters,...) usable at most in 48 hours everywhere.

- Get a “gamma-caméra” to know where the source in incident is situated (easier than a classic survey meter).

3. Feed-back - Equipments

- Doing an exposure needs to hold the collimator or the guide tube but sometimes it could be complicated to act in case of incidents





We are developing new equipments to treat the incident in a better way and to release the collimator or the guide tube when its fixed on pipe or anything else.

Finally, source holder was disconnected...but we don’t know why! (Material Failure?, Human error?)

Thank you

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