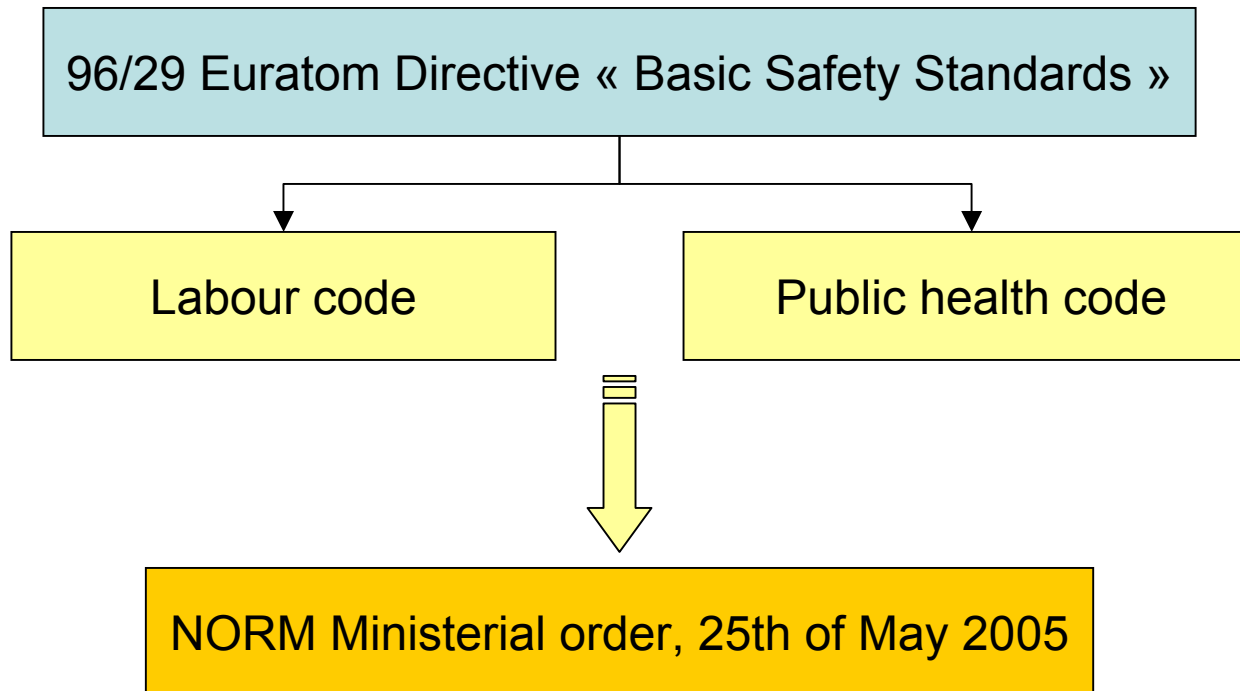




# Experience in France

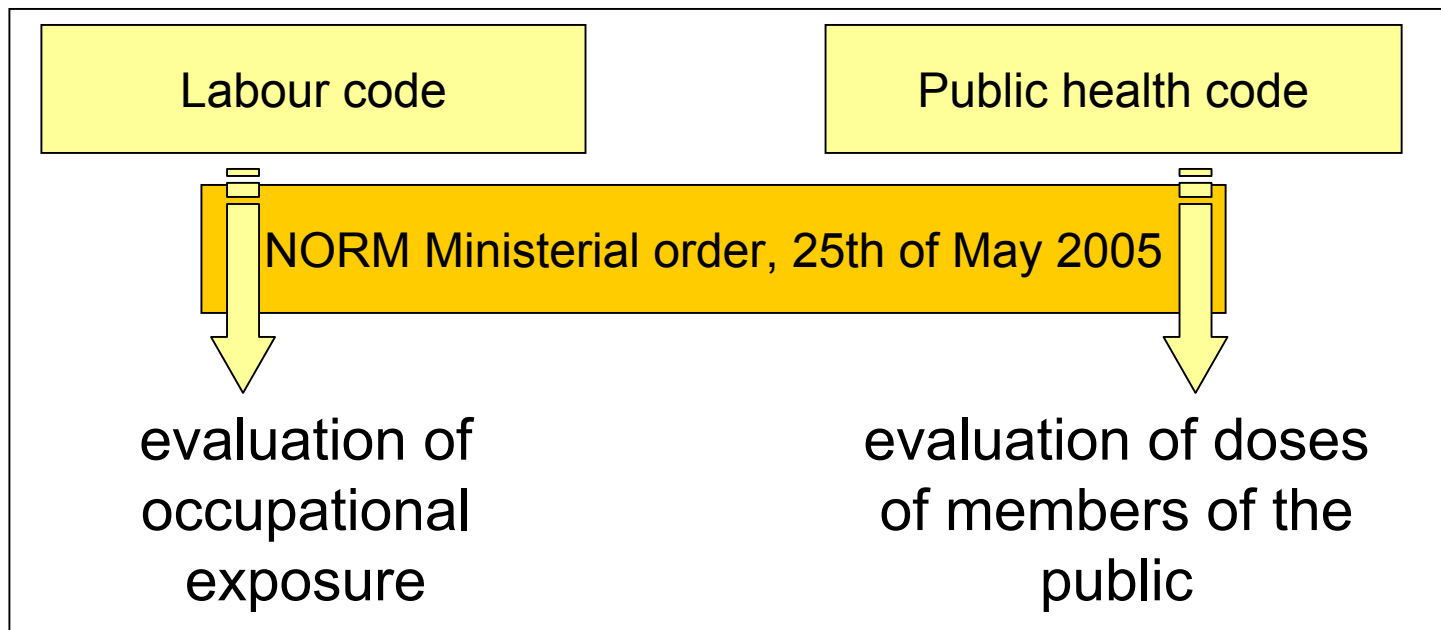
Enforcement of the French radiation protection regulations in the NORM Industry

# Structure of the French regulation



# Structure of the French regulation

- Identification of 10 industrial activities



- Possibility to make only one generic survey for an entire activity (e.g. Industry of glass producers)

## Concerned industrial activities (1/2)

1. Coal combustion in power plants
2. Treatment of tin, alumine, copper, titane, niobium, bismuth and thorium ores
3. Production of refractory ceramics and glassworks, smelters, welding and metallurgy plants using them
4. Production or use of compounds with thorium
5. Production of zircon and baddaleyite, and foundry or metallurgy plants using it
6. Production of phosphated fertilizers and phosphoric acid



## Concerned industrial activities (1/2)

7. Treatment of titanium dioxide
8. Treatment of rare earths and production of pigments containing them
9. Treatment of underground water by filtration
10. Spas

Excepted 9 & 10, most of these activities are subject to authorisation for protection of the environment (ICCP Regulations)

 An impact assessment is already required for them

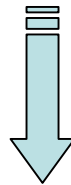
# Mandatory content of surveys

- Mandatory content of the dose assessments addressed by NORM users:
  - Description of the production site, the process and the raw materials
  - Characterisation of the “natural radioactive source(s)” ( $^{235}\text{U}$ ,  $^{238}\text{U}$ ,  $^{232}\text{Th}$  and  $^{40}\text{K}$ , radon)
  - Identification of work places subject to NORM impact
  - Dose evaluation for the workers and the public
  - If necessary, implementation of radiation protection actions

# Radiation protection of workers

Doses to workers must be assessed by the undertaking

If doses  $> 1$  mSv/y even with soft radiation protection measures



enforcement of the labour code : medical follow up of workers, ambient monitoring of radioactivity, delineation of areas

# Results of available surveys

- Distribution of doses at workplaces (IRSN data)

Industrial activities	minimum dose (mSv/y)	maximum dose (mSv/y)
1. <b>Coal combustion</b>	$5,5 \cdot 10^{-7}$	<b>0,6</b>
2. Treatment of tin, alumine, copper, titane, niobium, bismuth and thorium ores	<b>0,27</b>	<b>3,2</b>
3. Production of refractory ceramics and <b>glassworks, smelters, welding and metallurgy plants using them</b>	<b>0</b>	<b>4,5</b>
4. Production or use of compounds with thorium	<b>0,34</b>	<b>63</b>
5. Production of zircon and baddaleyite, and <b>foundry or metallurgy plants using it</b>	-	
6. Production of phosphated fertilizers and phosphoric acid	$3,4 \cdot 10^{-3}$	<b>1,9</b>
7. Treatment of titanium dioxide	<b>0,21</b>	
8. Treatment of rare earths and production of pigments containing them	<b>0,06</b>	<b>6</b>
9. Treatment of underground water by filtration	-	
10. Spas	<b>1</b>	<b>14</b>

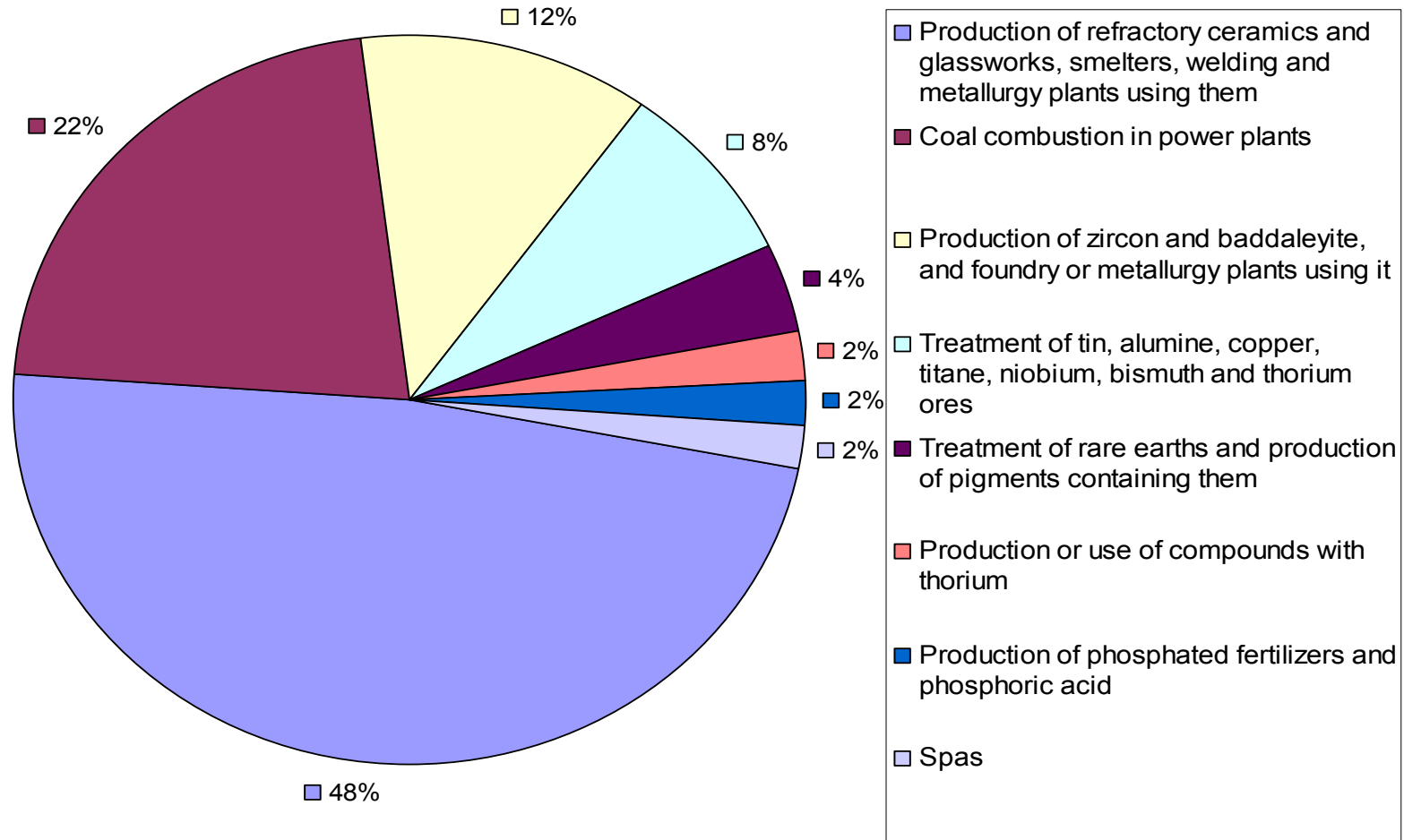


# Results of available surveys

- Distribution of doses to the public (IRSN data)

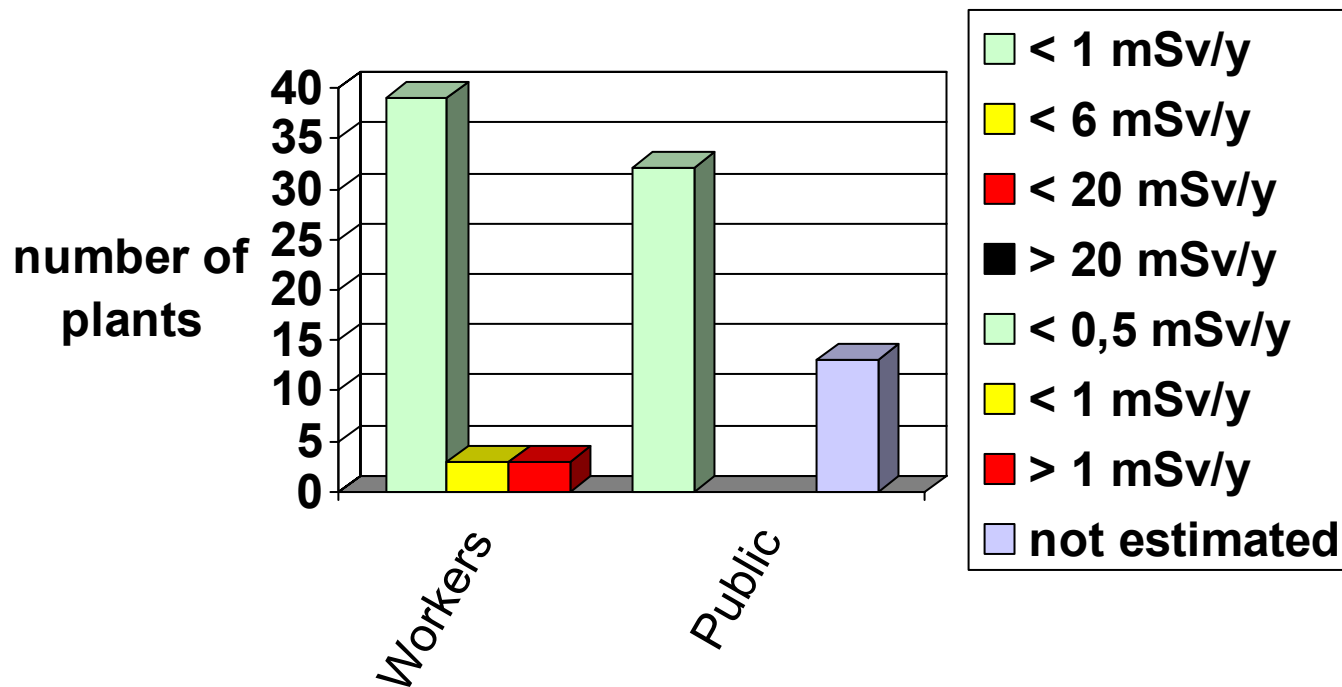
Industrial activities	minimum dose (mSv/y)	maximum dose (mSv/y)
1. <b>Coal combustion</b>	<b>7,8.10<sup>-7</sup></b>	<b>6,1.10<sup>-5</sup></b>
2. Treatment of tin, alumine, copper, titane, niobium, bismuth and thorium ores	<b>0,16</b>	
3. Production of refractory ceramics and <b>glassworks, smelters, welding and metallurgy plants using them</b>	<b>0</b>	<b>0,48</b>
4. Production or use of compounds with thorium	<b>0,04</b>	<b>0,36</b>
5. Production of zircon and baddaleyite, and <b>foundry or metallurgy plants using it</b>	-	
6. Production of phosphated fertilizers and phosphoric acid	<b>0</b>	<b>0,48</b>
7. Treatment of titanium dioxide	-	
8. Treatment of rare earths and production of pigments containing them	<b>0,04</b>	<b>0,36</b>
9. Treatment of underground water by filtration	-	
10. Spas	-	

# Results of available surveys on occupational exposure



# Results of available surveys

- Distribution of level of doses



# NORM waste management

- Identification of NORM waste producers by the mean of:
  - Identification as a “NORM user”
  - Activation of a portal detector
  - Acceptance studies sent
- Can be eliminated in non radioactive waste repositories only if a study for the acceptance of NORM waste on the storage site has been performed...
- ...but use of non radioactive waste repositories is still an intermediate solution



**Solutions for NORM waste management have to be found in 2009 (law n°2006-739 of 2006, 28th of June)**



# Enforcement of the French regulation

- Industries often discover radioactivity when they hear about NORM
- More than 50 studies received today, only a few before the deadline set up by the regulation
- The number of plants concerned by NORM issues is hard to know
- The list of industrial activities may change depending on the results of the studies and new activities of concern

## Conclusion

- The impact assessments have been received on the late...
- ... but having more than 50 allow to begin an evaluation of NORM issues in France
- Most of them present doses below 1 mSv/y for workers
- Public impact seems to be almost far below 1 mSv/y



NORM issues are a new field for “radiation protection inspectors”, more results to come