
 **The French Nuclear Safety Authority**


French Policy and Methodology for Responding to Residual Radioactivity in Soil and Groundwater






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 **Outline**

1. ASN, the French regulatory authority
2. Policy & methodology for decommissioning
3. The French National Network of Environmental Monitoring (RNM)
4. Conclusions and perspective

 **1. ASN, the French regulatory authority**

Medical uses of ionizing radiation  <ul style="list-style-type: none">• Radiotherapy• Scanners• Dental examination• etc...	Basic Nuclear Installations  <ul style="list-style-type: none">• NPP• Research centers• Fuel cycle facilities• Irradiators• Decommissioning	
Waste Management 	Industrial uses of radioactive sources  <ul style="list-style-type: none">• Gamma radiation• Food irradiation	Transport of radioactive substance 


asn 1. ASN, the French regulatory authority

■ Staff : 470 industrial and medical engineers, physicians and pharmacists, human scientists as well as legal and administrative specialists.

- 240 persons in the Montrouge Headquarters
- 230 persons in 11 regional offices divisions with competence for one or more administrative regions
- -15 ASN staff work on decommissioning

■ Budget : 75 M€

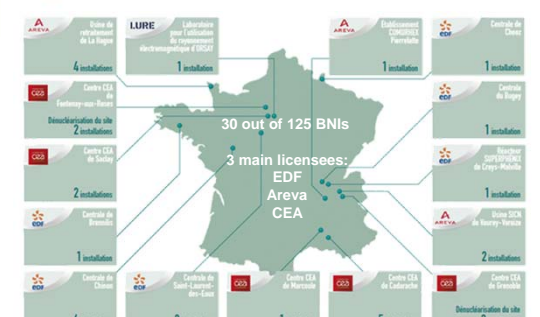
■ Additional experts: ~ 400 within ASN's Technical safety organization IRSN (Institute for Radiation Protection and Nuclear Safety) which provides expert analysis – with an additional dedicated budget of 80M€.



IRSN

→ Civilian nuclear facility supervision: ~ 870 pers. and 155M€

asn Overview of installations in decommissioning in 2013

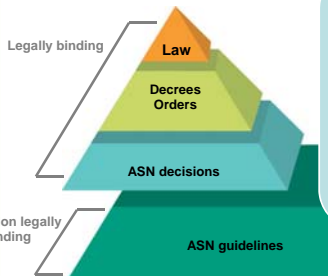


30 out of 125 BNIs

3 main licensees: EDF, Areva, CEA

~ 30 nuclear facility sites (BNIs) in various stages of decommissioning

asn 2. Policy & methodology for decommissioning



- ASN policy concerning the decommissioning and de-licensing of basic nuclear installations (BNI) in France – April 2009
- Guide # 6 on final shut down, decommissioning and de-licensing of BNI in France – Revision expected 2015
- Guide # 14 on acceptable and complete clean-up methodologies in BNI in France – Final version expected 2015
- Guide # "X" about the remediation of soils at nuclear facilities (Publication expected 2015)

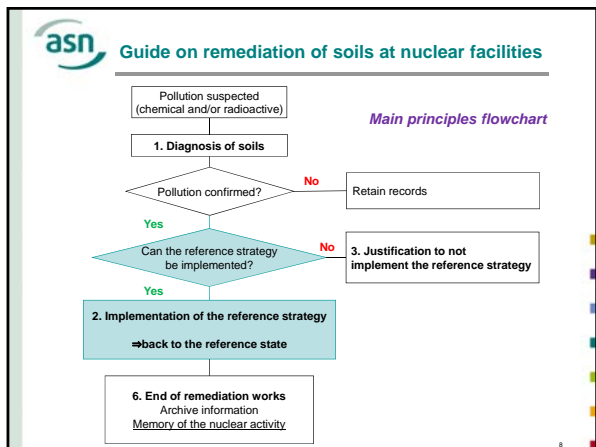
ASN defines national decommissioning policy in line with IAEA safety requirements

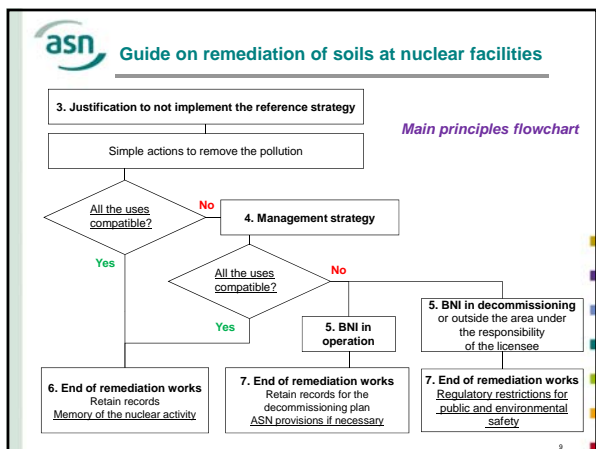
[available on asn's website](#)

asn Guide on remediation of soils at nuclear facilities

The reference strategy = the key concept:

- Back to the reference state = state of the environment before the nuclear activity starts
- Should be the first objective when defining a remediation project in order to avoid coming back in the future to re-establish a reference state
- Any other strategy shall be justified in comparison to the reference strategy
- Reasoning which is only based on residual impact shall be banned
- Residual impact must be as low as possible and may include regulatory restrictions on land and water use





asn 2. Policy & methodology for decommissioning

The "Site des Monts d'Arrée" example

- Heavy water reactor (HWGCR),
- Power production 70 MWe,
- Industrial prototype of the CEA for power production,
- It operated with low enriched uranium, was moderated by heavy water and cooled with carbon dioxide,
- Was jointly operated by the CEA and EDF from 1967 to 1985.

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asn 2. Policy & methodology for decommissioning

Radionuclides initially surveyed for in the channel: ^{60}Co , ^{108}mAg , ^{125}Sb , ^{137}Cs , ^{152}Eu , ^{154}Eu , ^{155}Eu , ^{239}Pu , ^{240}Pu , ^{241}Am , ^3H , ^{14}C , ^{55}Fe , ^{63}Ni , ^{90}Sr (+ 90Y), ^{241}Pu

Surface screening (^{137}Cs and ^{60}Co)

Drilling campaign taking into account the preceding identified areas of interest and history of the site:

- more than 140 boreholes with a depth varying from 0.30 to 1.60 m,
- more than 280 radiological analyses and 100 chemical analyses by accredited laboratories

Reference Spectro	Radionuclides detected
1	^{137}Cs
2	^{137}Cs
3	^{137}Cs , ^{60}Co
4	^{137}Cs , ^{60}Co
5	^{137}Cs
6	^{137}Cs , ^{60}Co
7	^{137}Cs
8	^{137}Cs
9	^{137}Cs
10	^{137}Cs

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27/06/12 17/09/12

Surveillance platform station equipped with 2 gamma spectrometry probes

Final survey

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Recontouring of the channel (November 2012)

Vegetative restoration (June 2013)

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asn 3. The French National Network of Environmental Monitoring (RNM)

Presidency of the different bodies
Certification commission secretariat

Steering committee secretariat
Inter-comparison organization
Information system development and administration

IRSN
Institut de Radioprotection et de Sûreté Nucléaire

Ministries	Government agencies in charge of health controls	Health safety agencies Public institutes	Nuclear operators	Associations
Health (DGS) Environment (DGFPR) Consumer Affairs (DGCCRF - SCL) Agriculture (DGAJ) Defense (EMM - SPRA)	Regional Directors for the Environment, Town and Country Planning and Housing (DREAL) Regional Health Agency (ARS) Departmental Directorate for Public Health and Safety (DDSP) and Departmental Directorate for Social Cohesion and Public Health and Safety (DDSCSP) Regional governments	Agency for Food, Environmental and Occupational Health and Safety (ANSES) Institute for Public Health Surveillance (InVS) Institute for Radiological Protection and Nuclear Safety (IRSN)	EDF AREVA Alternative Energies and Atomic Energy Commission (CEA) National Radioactive Waste Management Agency (ANDRA) French Navy Lue-Langevin Institute (LLI)	Organization of Scientists for Information about Nuclear Energy (OSIEN) Association for Radioactivity Monitoring in Western France (ARMO) Approved Air Quality Monitoring Associations (AAQA) Nuclear Equipment Standardization Office (BNEQ) National Association of Local Information Commissions and Committees (ANCCLI) and Local Information Commissions and Committees

asn 3. The French National Network of Environmental Monitoring (RNM)

Objectives of the RNM:

- bring together all the environmental radioactivity measurements in a single database (including ASN inspections results)
- ensure the transparency of information on environmental radioactivity by making the measurement results available
- provide the general public with the information necessary to understand the results
- verify the quality of the measurements by implementing ASN certification of the laboratories

Transparency and monitoring environmental radioactivity

3. The French National Network of Environmental Monitoring (RNM)

réseau national Réseau national de mesures de la radioactivité de l'environnement

La carte des mesures de la radioactivité de l'environnement

Le Réseau National de Mesures de la Radioactivité de l'Environnement (RNM) est un réseau de mesures de la radioactivité de l'environnement qui permet de surveiller la radioactivité de l'environnement en France.

Le RNM est composé de plusieurs réseaux de mesures de la radioactivité de l'environnement qui sont répartis sur le territoire français.

Le RNM est financé par l'Etat et les collectivités territoriales.

Le RNM est ouvert à tous les citoyens.

Le RNM est accessible sur le site www.mesure-radioactivite.fr

3. The French National Network of Environmental Monitoring (RNM)

réseau national Réseau national de mesures de la radioactivité de l'environnement

Notre ambition : vous permettre d'accéder à l'ensemble des données de surveillance de la radioactivité de l'environnement.

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<http://www.mesure-radioactivite.fr>

The RNM website

asn Conclusions

- Number of decommissioning authorization applications is going up in the future (AREVA NC Eurodif, NPPs...)


- Maintaining a high-level of clean-up, not always linked to radioactive waste management
- Regulatory framework in the decommissioning field is being strengthened (content of the decommissioning plan, clean-up methodology, soils remediation...)

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Je vous remercie pour votre attention

Thank you for your attention


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Information Sources

- **ASN :**
 - ASN policy concerning the decommissioning and delicensing of basic nuclear installations (BNIs) in France (2009) <http://www.french-nuclear-safety.fr/index.php/content/download/39866/294693/file/ASN+policy+concerning+the+decommissioning.pdf>
 - Guide n° 6 (2010) : "Final shutdown, Decommissioning and delicensing of nuclear facilities" (in French)
- **IAEA :**
 - Safety Standard n° WS-R-5 (2006) : "Decommissioning of facilities using radioactive materials"
 - Safety Report Series n° 77 : "Safety assessment for decommissioning"
- **WENRA / Working Group on Waste and Decommissioning :**
 - Decommissioning Safety Reference Levels Report http://www.wenra.org/harmonisation/working-group-waste-and-decommissioning/WGWD_Decommissioning_SRLs_report_v2.1


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Useful links

- www.asn.fr
- www.andra.fr
- www.irsn.fr
- www.iaea.org
- **NEA / Nuclear Site Remediation and Restoration during Decommissioning of Nuclear Installations:**
<http://www.oecd-nea.org/rwm/wpdd/>
- **WENRA / Working Group on Waste and Decommissioning:**
<http://www.wenra.org/harmonisation/working-group-waste-and-decommissioning/>


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 **Typical content of a decommissioning plan (Part 1)**

A- Presentation & justification of the decommissioning strategy

B- General considerations

- Methodological principles concerning dismantling, site rehabilitation and subsequent survey.
- Provisions made during design of the facility in order to ease dismantling.
- Provisions made by the operator for ensuring the conservation of the history of the installation and the availability of this information.
- Provisions made by the operator for maintaining skills and knowledge of the facility.
- Provisions made concerning management of waste produced during dismantling, taking account of the existing or future management routes, in the framework of the national plan of radioactive waste management.


 **Typical content of a decommissioning plan (Part 2)**

C- Dismantling operations

- Definition of the steps.
- Planning, duration of operations.
- Operations & equipments necessary to conduct dismantling.
- Safety objectives and radiation protection objectives.
- Consideration of waste, effluents and classical risks.
- Description of the selected clean-up methodologies (soils, structures)
- Justification of technical choices as regards nuclear safety, radiation protection, waste management, releases and conventional risks.

D- Foreseen final state

- Presentation and justification of the selected final state.
- Provisional future use of the site.
- Uncertainties associated to the description of final state.
- Impact assessment of the facility and of the site after achievement of the targeted final state, foreseen modalities of survey.

 **Content of the application file for getting authorization for dismantling**

- Identity of the operator ;
- Description of the facility before its final shutdown and decommissioning;
- Updated decommissioning plan;
- 1/25,000 scale map showing the location of the installation ;
- 1/10,000 scale site plan;
- If necessary, modification of the installation perimeter;
- Impact assessment of the decommissioning operations (including waste management);
- Preliminary safety report concerning the shutdown & decommissioning operations;
- Risk management study;
- General supervision and maintenance rules that will be applied during dismantling;
- As applicable, public protection restrictions that the operator intends to implement, after decommissioning, on the land on which the facility is located
- Notice comprising:
 - Update of the presentation of its technical capabilities and financial capacity;
 - If the operator is not the site owner : document certifying that the owner has been informed;
 - A document demonstrating the conformity of the operations envisaged with the legislative and regulatory requirements concerning personnel health and safety (radiation protection).
