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COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Proposal for a Council Directive

amending Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations

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1. INTRODUCTION

Nuclear energy currently generates close to 30% of all electricity in the EU and about two-thirds of its low-carbon electricity. Nuclear safety is of the utmost importance to the EU and its people. The costs of a nuclear accident could be so large, that they are potentially ruinous to national economies. It is therefore essential for society and the economy to reduce the risk of a nuclear accident in a Member State of the EU by applying high nuclear safety standards and a high quality of regulatory oversight. The Fukushima nuclear accident in Japan in 2011 renewed political attention worldwide on the measures needed to ensure robust levels of nuclear safety.

Based upon a mandate from the European Council in March 2011[1], the European Commission (EC), together with the European Nuclear Safety Regulators Group (ENSREG), launched EU-wide comprehensive risk & safety assessments of nuclear power plants ('Stress Tests'). The results identified differences in nuclear safety approaches and industry practices in the participating countries[2].

The mandate from the European Council included the request to the EC to review the existing legal and regulatory framework for the safety of nuclear installations and to propose any improvements that may be necessary. Any legislative proposals should take into account the conclusions of the Stress Tests and the lessons learned from the Fukushima nuclear accident, as well as the input from an open public consultation and stakeholders' views. The consultation showed that a large majority are in favour of reinforcing the EU legislative framework.

This Impact Assessment takes into account the above-mentioned factors, describing the challenge of ensuring sufficient levels of nuclear safety in the EU. It defines the general and specific objectives for the enhanced prevention and mitigation of nuclear accidents. A number of policy options are proposed and analysed, ranging from maintaining the current situation to more profound reforms. Each option has been assessed for its estimated safety, economic, environmental and social impacts.

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1 European Council, EUCO 10/1/ 11

2 Peer Review Report – Stress Tests performed on European nuclear power plants, 25 April 2012 (http://www.ensreg.eu/node/407)

The selected option amends the existing *Council Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations*[3] (*'Nuclear Safety Directive'*), by strengthening existing / introducing new general nuclear safety principles and requirements, complemented by harmonised Euratom nuclear safety criteria and procedures to verify their implementation at national level. It also provides for greater independence of the regulators and increased public transparency about the performance of the industry and the regulators. While some of the underlying measures of the preferred option can be implemented without delay, others require technical development work with input from Member States.

2. PROBLEM DEFINITION

The accident at the Fukushima Daiichi nuclear power plant (NPP) in 2011 resulted in significant environmental, economic and social damage, and raised concerns about possible health effects in the affected population in Japan. Although triggered by an earthquake and tsunami of an immense magnitude, investigations of the causes of the accident reveal a range of foreseeable factors which combined to produce a catastrophic outcome. The analysis of the Fukushima accident reveals quite substantial, and recurring technical issues as well as persistent institutional failures similar to the ones from the post-accident evaluations of the Three Mile Island and Chernobyl nuclear accidents decades ago. This latest nuclear accident once again undermined public confidence in the safety of nuclear power; and particularly so at a time when use of nuclear power is being debated as possible option to meet global energy demands in a sustainable manner.

The EU has 132 operating reactors, representing about one-third of the 437 operating nuclear power reactors in the world. Many of the EU NPPs were constructed already three to four decades ago, and are based on designs and safety provisions that were continuously updated since then. In May 2011, the "stress-tests" were launched to assess if current safety margins are sufficient to cover various unexpected events. The results show various strengths and weaknesses across all NPPs, including the clear need to implement for a number of plants measures to increase the robustness against several types of internal and external hazards. The tests also showed significant differences in national approaches to the assessment of beyond-design basis accidents that make an adequate assessment of current safety levels difficult or impossible. For example, in some cases earthquake risk was not considered in the original design basis but only introduced at a later stage, and/or underestimated. New approaches to seismic hazard and risk assessment have since been developed, but not all operators have reassessed site hazards and seismic risks with recent methodologies, data and criteria.

3. SPECIFIC ISSUES TO BE ADDRESSED

Based on various sources of expertise, such as corresponding initiatives by the IAEA and WENRA as well as lessons learned from the EU Stress Tests and Fukushima accident investigations, key areas for improvement of nuclear safety have been identified. These problem areas concern technical issues (in particular plant siting and design), the regulatory oversight, aspects related to nuclear safety governance (regulatory independence and transparency) as well as the issue of emergency preparedness and response.

- Technical issues
- Regulatory oversight issues

[3] OJ L 172, 2.7.2009

•	Regulatory independence issues
•	Transparency issues
•	Emergency preparedness and response issues

The main shortcomings identified include gaps in ensuring comprehensive and transparent identification and management of key safety issues, failure to implement important safety measures and the absence of a consistent approach among Member States to the regulation of nuclear risks despite their transboundary nature.

The current Euratom nuclear safety legislation, in particular the *Nuclear Safety Directive*, sets up a legally binding Euratom framework based upon internationally recognised general principles and obligations. However, the scope of this Directive being limited to these overall principles, its main weakness is that it has no means to address at a sufficiently detailed level the technical safety issues arising from the Fukushima nuclear accident and identified in the course of the Stress Tests. Furthermore, the current provisions of the Directive do not appear to be sufficient in the area of the independence of national regulatory authorities. Moreover, the Stress Tests show that cooperation and coordination mechanisms between all parties having responsibilities for nuclear safety, for example in the form of as peer reviews, should be strengthened. The current provisions of the Directive concerning transparency should also be further enhanced. In addition, the issue of adequate on-site emergency preparedness and response should also be considered.

Notwithstanding the role of the Stress Tests in enhancing the safety of EU NPPs, their weakness is related to their non-binding nature. As a voluntary, one-time exercise they do not guarantee that the identified measures will be fully implemented and regularly updated.

Through the IAEA, safety principles, standards and international Conventions[4] governing nuclear safety have been developed and agreed. However, these safety standards are not legally binding, while the international Conventions are legally binding but not enforceable. Euratom legislation benefits from clear and strong mechanisms for sanction for its proper transposition and implementation. Following the events at Fukushima, IAEA Member States generally acknowledge the need to enhance the effectiveness, governance and enforceability of the international legal framework for nuclear safety.

4. EURATOM COMPETENCE, SUBSIDIARITY AND PROPORTIONALITY

Any legislative revision should build upon and enhance the approach of the current Nuclear Safety Directive. The legal basis remains Articles 31 and 32 of the Euratom Treaty.

Any revision proposal should aim at strengthening even further the role and independence of the competent regulatory authorities as it is clear that only strong regulators endowed with all the necessary powers and independence guarantees can oversee and ensure the safe operation of nuclear installations in the EU. Close cooperation and information-sharing between regulators, taking into account the potential cross-border impacts of a nuclear accident, should be encouraged.

Given the wide consequences of a nuclear incident and particularly the public need for information in such a case, an EU wide approach on transparency issues is essential. This can ensure that, irrespective of state borders, the public is properly informed on all relevant nuclear safety matters to ensure uniform level of transparency and information throughout the EU.

[4] In particular the *Convention on Nuclear Safety (*INFCIRC/449 of 5 July 1994)

In Europe, the Stress Tests have confirmed that there are not only continued differences between the EU Member States in ensuring comprehensive and transparent identification and management of key safety issues, but that also significant gaps remain. Strengthened Euratom legislation could include a set of technical provisions at an appropriate level of detail for a framework legal instrument. These provisions should ensure a common EU approach to nuclear safety.

The experience from the Fukushima accident and the valuable insights coming from the Stress Tests have clearly shown that a strong and transparent monitoring system (including peer-reviews) is an essential element to ensure the effective and continuous implementation of any safety regime.

In accordance with the proportionality principle, the envisaged revision should not go beyond what is necessary to achieve the objectives. Furthermore, taking into account the different situations in the Member States, a flexible and proportionate approach as regards the level of applicability should be defined. A mechanism of developing EU-wide technical criteria with special regard to the principle of proportionality should be envisaged in which the knowledge and practical experience of the experts from the Member States is fully used.

5. OBJECTIVES

General objectives

- To protect workers and the general public from dangers arising from ionising radiations from nuclear installations, by achieving proper operating conditions, preventing accidents and mitigating accident consequences;
- To maintain and promote the continuous improvement of nuclear safety and its regulation at Euratom level;

Specific objectives

- To continuously improve the overall nuclear safety architecture (e.g. by strengthening existing / introducing new general nuclear safety Principles and Requirements).
- To continuously improve the specific nuclear safety architecture (e.g. by complementing the above-mentioned safety principles and requirements by Euratom Nuclear Safety Criteria).
- To continuously improve the nuclear safety assessment methodologies (e.g. by encouraging the consistent and comprehensive use of risk-informed methods for decision-making support);
- To ensure cooperation and coordination between all parties having responsibilities for nuclear safety on technical matters, including peer-reviews;
- To strengthen the role of the national regulatory authorities;
- To strengthen the effective independence of the national regulatory authorities;
- To enhance nuclear safety transparency;

- To reinforce on-site emergency preparedness and response arrangements.

6. POLICY OPTIONS

POLICY OPTION 0

- Leaving the current Euratom framework Directive (Nuclear Safety Directive) unchanged.
- Using the existing mechanism of cooperation between the EC and the Member States on the implementation of the measures arising from the Stress Tests process through ENSREG.

POLICY OPTION 1

- Legislative action (legally binding act) at Euratom level.
- Amending the Nuclear Safety Directive by strengthening existing general Principles and Requirements (e.g. role & independence of the national regulatory authorities; transparency) and adding new ones (e.g. on-site emergency preparedness and response; siting, design & construction, and operation of nuclear installations.
- Using the existing mechanism of cooperation between the EC and the Member States on the implementation of the measures arising from the Stress Tests process through ENSREG.

POLICY OPTION 2

SUB-OPTION 2.1

- Legislative action (combination of legally binding & specifying legally non-binding acts) at Euratom level.
- Amending the Nuclear Safety Directive by strengthening existing / introducing new general Principles and Requirements (as Policy Option 1) + introducing in the Directive the mandate for the EC to support these general Principles and Requirements, by developing legally non-binding Euratom Nuclear Safety Criteria (Commission Recommendations).
- These Euratom Nuclear Safety Criteria would be developed in close cooperation with experts from the Member States.

SUB-OPTION 2.2

- Legislative action (combination of a legally binding act & specifying legally binding acts) at Euratom level
- Amending the Nuclear Safety Directive by strengthening existing / introducing new general Principles and Requirements (as Policy Option 1) + introducing in the Directive the mandate for the EC to specify the general Principles and Requirements, by developing legally binding Euratom Nuclear Safety Criteria (Commission Regulations).

- These Nuclear Safety Criteria would be developed in close cooperation between expert working groups such as ENSREG and WENRA and EC experts. Subsequently, they would be adopted using a "comitology" procedure requiring the input of all Member States.

POLICY OPTION 3

- Legislative action (legally binding act) at Euratom level

- Establishing a Euratom Nuclear Safety Regulatory Agency to administrate and further develop the Euratom nuclear safety *acquis*, as developed under Policy Option 2, under the supervision of the EC, with the mission to:

-Promote the highest common standards for safe generation of nuclear power in the EU.

-To assist the EC to develop harmonised technical nuclear safety requirements / standards / criteria, which would be incorporated in proposals for new Euratom nuclear safety legislation; to conduct inspections in order to monitor the correct implementation of legislation; to develop a Euratom certification system of standard designs of nuclear facilities; to elaborate a uniform licence content & licencing procedure, to intervene in case of nuclear accidents or incidents; to formulate opinions and recommendations to the Commission on nuclear safety matters; to collect and analyse data to further improve nuclear safety.

7. ASSESSMENT OF IMPACTS

Table 1 – Comparison of the Policy Options in terms of their impacts (summary)

Policy Option	Safety Impact	Compliance costs for operators (per reactor unit)	Regulatory costs and administrative burden for Member States (per reactor unit per year)	Environmental Impact	Employment in Europe's nuclear sector	Affordability of Energy
0	Very unlikely to reduce risks	Range: ~€30-200 million	~€3 million Range: ~€1-4 million	Very unlikely to reduce risks	~500000 persons	High
1	Only some gains in safety	Range: ~€30-200 million	≤€5 million	No significant risk reduction	~500000 + ~500	High
2	Significant gains in safety at least for some	≥€200 million	≤€5 million	Significant improvements at least for some NPPs in	~500000 + ~500 + ~500	~High

	NPPs in some Member States			some Member States		
3	Significant gains in safety at least for some NPPs in some Member States	≥€200 million	≤€5 million	Significant improvements at least for some NPPs in some Member States	~500000 + ~500 + ~500 + ~250	~High

8. COMPARISON OF OPTIONS

Policy option 1 produces some beneficial effects on nuclear safety, due to the inclusion of additional legally binding and enforceable rules (even if these are only at the level of general principles and requirements). On the other hand, Policy Options 2 and 3 are likely to result in significantly further improvements to the safety of EU NPPs through the adoption of Euratom Nuclear Safety Criteria, which would provide for objective, verifiable safety benchmarks. Compared to Policy Options 0 and 1, the additional costs of Policy Options 2 and 3 of at least ~€200 million per reactor unit over the next ~5-10 years seem acceptable, especially when compared to the costs of a nuclear accident.

Policy option 3, which goes further, requires significant changes in the organisational setup of the Commission and in the current Euratom safety architecture. As it requires major changes of the safety culture and architecture of the Member States, at this time, it cannot be considered as a realistic option to achieve immediate benefits for nuclear safety.

As regards Policy Option 2, both Sub-options 2.1 and 2.2 fully address the objectives outlined in section 5. A fully binding approach, as in Sub-option 2.2, would be the most effective. However, the advantage of Sub-option 2.1 is that whilst it requires the implementation of these general principles and requirements, it offers a more flexible approach for the Member States to comply with the recommended Euratom Nuclear Safety criteria. It would allow for experience to be gained on how these criteria are applied in practice and make it possible to respond more quickly to new technical developments. Moreover, following a step-wise approach, it would also be possible, learning from this experience, to transform the recommended criteria into legally binding ones at a later stage. In conclusion, it is recommended to consider either Policy Option 2.1 or 2.2.