On the ethical imperative of self-reflection in radiation protection research

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1 The framing of future radiation protection research in Europe

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Recall: the mission of EURATOM

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observation 1 From the EURATOM Treaty

(preamble) *[...] Recognising that nuclear energy represents an essential resource for the development and invigoration of industry and will permit the advancement of the cause of peace, [...]*

[...] Resolved to create the conditions necessary for the development of a powerful nuclear industry which will provide extensive energy resources, lead to the modernisation of technical processes and contribute, through its many other applications, to the prosperity of their peoples, [...]

(article 1) *[...] It shall be the task of the [EURATOM] Community to contribute to the raising of the standard of living in the Member States and to the development of relations with the other countries by creating the conditions necessary for the speedy establishment and growth of nuclear industries. [...]*

source *EURATOM Treaty*

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from o1 → All research and outreach activities done in EURATOM funded context are aimed to serve the mission of EURATOM: *[...] to create the conditions necessary for the development of a powerful nuclear industry [...].*

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The use of nuclear technology seems to be a-priori justified

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observation 2 From the Report of the High Level and Expert Group on European Low Dose Risk Research (2009)

→ *[…] Both natural and man-made sources of ionising radiation contribute to human exposure and constitute a hazard for human health. Exposure of the population to natural radiation is to some extent unavoidable and medical use of radiation is now an indispensable part of modern healthcare. The exposure of workers, and to a smaller extent of the public, to low levels of radiation from nuclear energy production and other industrial uses of ionising radiation have become an integral part of industrialised society. […]*

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o1 + o2 → The three pillars of radiation protection are justification, optimisation and individual dose limitation, but the EURATOM vision on radiation protection research is not concerned with justification, as it assumes nuclear to be an a-priori acceptable technology in all three application contexts (energy, medical, industrial).

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The motivation for the orientation towards 'Low Dose Risk Research'

observation 3 From the Report of the High Level and Expert Group on European Low Dose Risk Research (2009)

→ *[…] Although current radiation protection standards are generally judged to be acceptably robust there remains considerable scientific uncertainty particularly with regard to health risks at low doses and/or low dose rates. Consequent upon these uncertainties, the issue of low dose risk is controversial in both scientific and political circles. […]*

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o3 → The ambition of future radiation protection research as envisioned by EURATOM is to reduce the scientific uncertainty with regard to health risks at low doses and low dose rates and thus, consequently, to resolve the 'controversies' around those risks.

The impression is given that controversies only originate from scientific uncertainty and that critical risk assessments based on values are unjustified.

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On the way to a new technocracy?

Conclusion

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Conclusion

Observations 1, 2 and 3 together give at least the impression that the ambition of EURATOM is to **scientifically prove** that **nuclear technology** (and especially nuclear energy technology) **is a societally acceptable technology**.

Problems with this ambition

→ it is perceived as unrealistic (also by involved scientists);

→ it can be used to relativise the importance of the precautionary principle (and consequently the Linear Non-Threshold hypothesis) to guide decision making;

(the precautionary principle is an ethical principle, which means that the Linear Non-Threshold hypothesis is based on ethics and not on science);

→ it can be used to relativise the importance of public participation and even of democracy in decision making itself.

2 The challenge of science

2

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the scientific method

Ask a Question

Do Background Research

Construct a Hypothesis

Test Your Hypothesis
by Doing an Experiment

Analyze Your Data
and Draw a Conclusion

Communicate Your Results

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Face the Impossibility to
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? and Draw a Conclusion ?

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Taking this complexity serious, the idea is that the traditional governing modes of international politics, democracy, the market and science we inherited from modernity are not longer able to grasp the complexity of these challenges.

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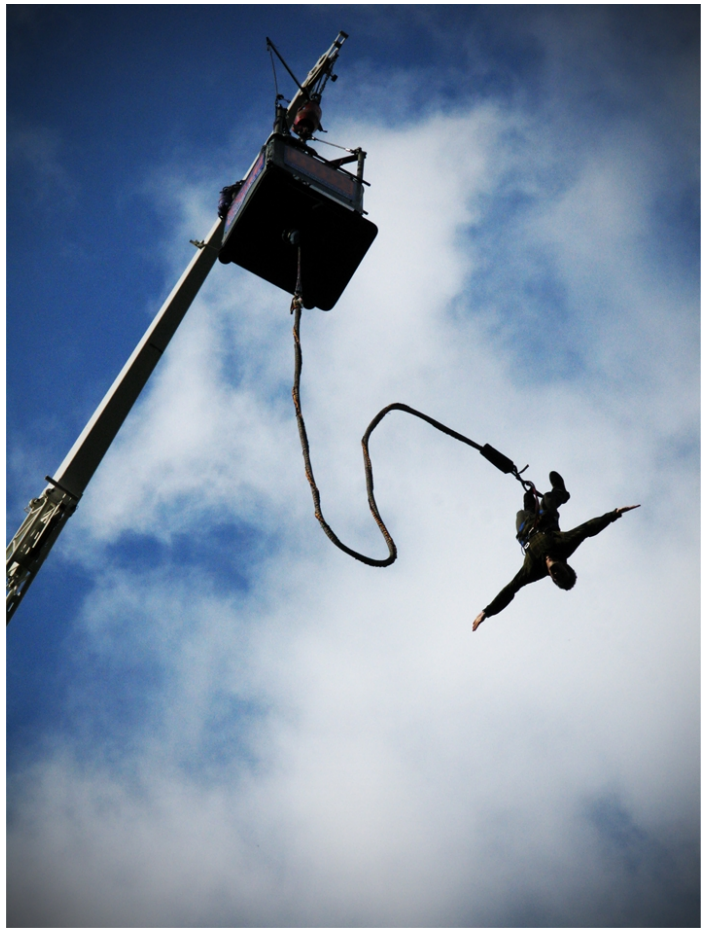
do we need calculation
to support informed consent?



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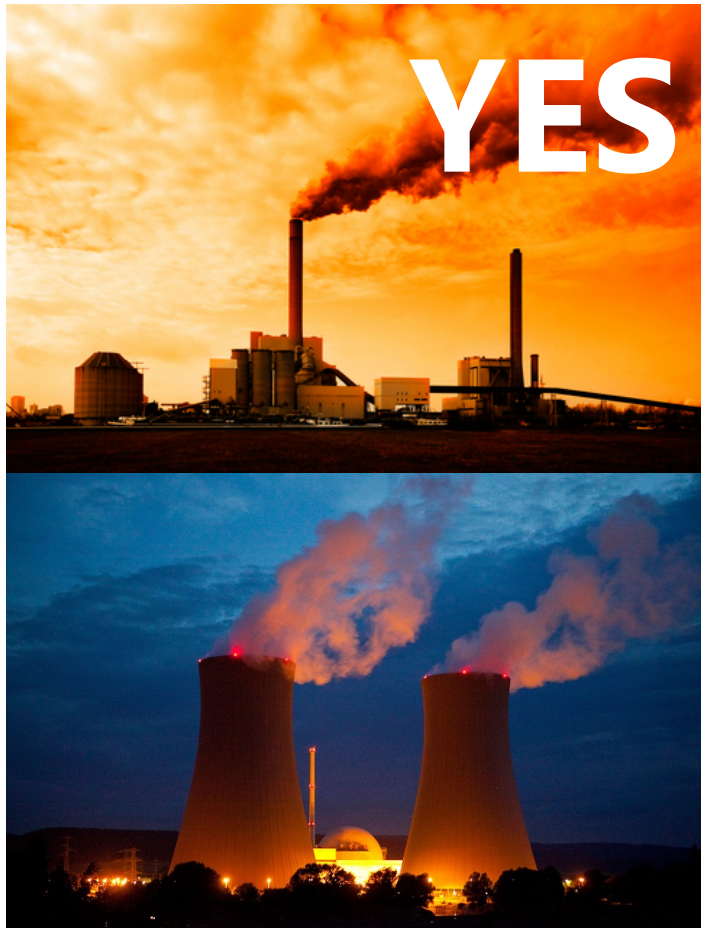

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- risk justification

- Technocracy is still among us

  it may have good intentions,
  it doesn't rule as such,
  but it functions at the service of politics.

- In the interest of a fair dealing with controversial issues of risk justification

  what is the place of science in democracy?
  what is the responsibility of science in democracy?

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- In many issues of (health) risk and well-being, science faces a dilemma between freedom and responsibility

↘ the pressure on science to deliver evidence at the service of politics, the market and society in general is higher than ever before.

↗ science should have the freedom to explore hypotheses, even if it would know that it will never be able to prove them.

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- This dilemma

→ applies to numerous areas of our modern technological society today

(nuclear technology, nanotechnology, mobile phones, pharmaceuticals, climate change, genetically modified organisms, ...)

→ is inherent to the scientific practice of today, and it cannot be resolved.

But it can be overcome

2

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- In all three application contexts (energy, medical, industrial) the evaluation of the use of nuclear technology is complex, as it is complicated by

→ the existence of **scientific uncertainties** that trouble calculation and control (especially at anticipated low radiation doses)

→ the existence of **different and often contradicting visions on the acceptability of the risk as such** (with reference to the existence of alternative technological means, or to the link with other risks or uses (such as the military))

→ the fact that **accidents can never be excluded** (due to human error, technological failure, force majeur (such as natural disasters))

→ As no scientific, political or activist authority has the truth, the only trustful evaluation of the eventual use of nuclear technology in society is a joint evaluation among the concerned.

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However, due to the inherent uncertainty that marks the relation between low doses and health effects, the science of radiological risk assessment will always have to deal with incomplete and speculative knowledge.

→ **The challenge of science** in radiological risk governance is not the production of credible proofs, it **is the construction of credible hypotheses**.

→ In the general interest of rendering hypotheses with credibility, science has no choice but **to involve civil society in general and the (potentially) affected in particular** in constructing its hypotheses.

3 There is a need to organise critical ethical (self-)reflection as part of radiation protection research

- Radiation protection research should include critical ethical (self-)reflection

→ On the motivation for radiation protection research itself and on the practical feasibility of its scientific ambition;

→ On the possible (mis)use of old and new scientific hypotheses in opinion making on risk in politics, lobbying and the media;

→ On the importance of the precautionary principle and of public participation in research and decision making, particularly based on insights in what can and cannot be done by science.

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Natural science and technology researchers cannot and should not do that critical ethical reflection alone.

It should be done together with

→ researchers from the social sciences and humanities;
→ stakeholders from informed civil society and the general public.