The Club of Philosophers
about the
New World of Radiation Protection

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Much Ado About Nothing,
or World Revolution?

Ленин всегда жив: Ленин жил,
Ленин жив, Ленин будет жить!
Where's the revolution
Come on, people
You're letting me down
Where's the revolution
Come on, people
You're letting me down
The Topics

IRPA-Letter 2015
Answer of FS
Foundation of the Club
The Result
How to go on?

Every year spring is coming. Why not in Radiation Protection too?
The letter of IRPA 2015
The letter of IRPA

In September 2015 IRPA asked 5 questions:

• How should we present the uncertainty in risk estimates at low doses?

• Should we give a more prominent context to natural background exposure?

• Whilst accepting the principle of dose limitation, should we have more flexibility in how this is emphasized and presented? If so, how?

• Should we make ALARA even more central in our control hierarchy? If so, how do we ensure proportionality of effort?

• Should we make more effort to present radiation risk in the wider context of public health? Which ways would you propose?
The answer of FS

- You will find it at the Website of FS*.
- **Read it**; only 4 pages.
- The pleasure to answer was limited.
- But finally it was **The Opinion of the FS**.
- Now we have also the summed up opinion of **IRPA**.
- But **Actions have to follow**. Opinions have to be materialized. Otherwise nothing will be changed.
- It is a challenge to change things.
- Therefore we founded a “**Club of Philosophers**“.

*FS= German-Swiss Society for Radiation Protection
• Looking at the 5 answers of the FS there is this general impression:

  – **Radiation** is seen today **rather negative**.
  – But that is **not really justified**.
  – We need to do something against this.

• The Club of Philosophers takes care of it.
The Mandate:

• Critical review of the ICRP-Philosophy of Radiation Protection.
• **Discussion without constraints.**
• Positioning regarding the opinion of other RP-Societies.
• Blaming unnecessary things in RP. Coming down from the high positions of RP.
• Putting radiation into context with other risks.
• Discussion of the ICRP-Ethics of radiation protection.
• Drafting a **New Radiation Protection System.** (That’s an ambition, isn’t it?)
The Club of Philosophers

R. Michel
H. Voelkle
F. Schreiber
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World Revolution now?
The Philosophers say:

- The Club: very nice people, indeed.
- We were all dissatisfied by the current Radiation Protection!
- First Position Paper was well received by Society Members.

**Key Messages:**

- High level of safety achieved through radiation protection.
- Thus not to focus on risks, we should focus on safety instead.
- The total dose is what counts.
- Distinguishing hypothetic doses from real doses.
- Not to use collective dose for calculating death victims.
- LNT is a hypotheses, not more and not less.
- ALARA yes, but mind the full text.
- Dose Constraints are not needed, but we need a cut-off for optimization at the lower side.
- Proposing a Traffic-Light-Model for radiation protection.
The Philosophers say:

- **Further key messages:**
  - No lower general dose limits.
  - Radon: Radiation Protection has failed.
  - Lens of the eye: not appropriate change of the limit.
  - Avoiding conservativeness.
  - Lower bound of optimization: 1 mSv/a and 0,1 mSv/a, resp.
  - Epidemiologic studies may have limited value.
  - Common sense needs to gain more influence on regulations.
  - Flexibility in emergency situations.
  - Coping with radiophobia.
  - More and more professional communication.
  - Be present in the media.
  - Let the radiation protection profession become more attractive.
  - Be cautious with self-appointed experts.
The Philosophers say:

High degree of safety through radiation protection achieved.
Not talk about risk, but talk about safety instead.

- **0,07 mSv/a** average of all monitored (German data)
- **0,5 mSv/a** average of all with a reading (German data)
- **20 mSv/a** limit
- **< 100 mGy** no proven evidence [UNSCEAR]

The real exposure is far from being a threat.
The Philosophers say:

The total dose is decisive.

- **Occupational Exposure**
  - appr. 0,5 mSv/a (for those with a reading)

- **Medical Exposure**
  - appr. 2 mSv/a

- **Natural Exposure**
  - appr. 2 mSv/a

There is no benefit to chase the last Nano-Sievert in occupational exposure.
The Philosophers say:

Distinguish hypothetic from real.

- Calculated doses (e.g. from effluents) are hypothetic.
- Dose x Risk Factor = hypothetic
- Distinguish organ-dose from effective dose.
- Measured dose or calculated dose?
  - Public exposure is nearly always calculated.
  - Occupational dose is mostly measured or based on measurements.
- Over-conservatism has to be avoided.

We are often in the hypothetic dose world but take it as reality.
The Philosophers say:

No death victims out of collective doses. LNT is a Hypotheses, it is not proven and probably will never be.

- To multiply insignificant doses by large collectives is misleading.
- To calculate death victims is completely wrong.
- The dose-risk-factor is defined with assumptions, it is not "real".
- LNT is a convenient assumption for practical purposes.
- But it can also overestimate dose effects in the lower region <100 mGy.

Death victims are often calculated [not only with regard to radiation], but they are not real.
LNT-Hypotheses

- Linear Non-Threshold Dose Response = the doctrine.
- Hormesis is at least one of the alternatives, says UNSCEAR.

Source: UNSCEAR 2012
Be cautious with epidemiologic studies.

- Much of what we know or believe about radiation is based on epidemiologic studies.
- But there are statistical pitfalls (e.g. confounder) that are not easy to handle.
- We are all exposed by nature and nearly all of us are medically exposed.
- Many if not all studies do not take that into account. But can we expect profound results then?
- INWORKS, e.g. ignored the large differences in medical exposure between UK and US, but claimed to have found effects for workers receiving 1 mGy only.

To prove a radiation effect from 1 mGy millions of people would be needed that differ in this radiation dose only. That will never be.
The Philosophers say:

Dose Constraints are not needed. ALARA is o.k., but mind the whole phrase, please.

The current RP-System is too complicated.

What we need is a simple shelter.
As low as reasonably achievable.

A question of the standpoint and of interests.

“societal and economic factors taken into account”

This is often kept out and “low” dominates.
The Philosophers say:

Cut-off for Optimization

<1 mSv/a (measured dose) end* of optimization for occupational exposure

<100 µSv/a (calculated dose) end* of optimization for public exposure

*That does not mean that simple radiation protection rules and procedures are left out.

It makes no sense to further reduce tiny fractions of natural background.
The Philosophers say: Use the „Traffic-Light-Model“.

The tolerance-level is identical to the limits. Values above are not to tolerate, they are inacceptable. **Red means to be above the tolerance-level.** Then something has to be done.

In the yellow region exposure is tolerable when anything was done to keep them low, societal and economic factors taken into account. **Yellow is the ALARA-region.**

The **unavoidable natural exposure** is the acceptance region. 10% of this acceptance dose is a trivial dose which can be neglected totally.

We want to be understood. Everybody understands the traffic-light.
The Philosophers say:

Radiation phobia needs to be beaten instead to stoke it.

- Radiation is part of life, ever since mankind exists.
- A world without radiation does not exist.
- This has nothing to do with the atom bomb or NPPs.
- Nobody needs to be afraid of radiation at the level of natural background.

Radiation need not be feared, but it deserves our respect.
A little „German Angst“ during the dinner?
The Grumbacher stood up early this Tuesday to get heard. In their community (conventional land fill) lies since this day the first load of debris from the decommissioning of the Stade NPP.

SMUL, the authority, was eager to calm down the excitement by a measurement demonstration. But no-one came.
The Philosophers say:

Radiation protection has failed with regard to Radon.

- The change of the risk-factor by ICRP is not properly founded.
- Important studies have been excluded [Wismut-Study].
- IAEA, WHO and EC followed ICRP, not acknowledging the consequences.
- The public is scared, fears have been stoked.
- Dose coefficients are discussed that may destroy the system.

The propagated radon protection is in reality smoker protection.
The perhaps most complex issue: RADON

- "Member States shall establish national reference levels for indoor radon concentrations in workplaces. The reference level for the annual average activity concentration in air shall not be higher than 300 Bq/m³, unless it is warranted by national prevailing circumstances." EU-BSS, Article 54
- IAEA-BSS: 300 Bq/m³, before that 600 Bq/m³
- 300 Bq/m³ may result in anxiety and costly countermeasures for a large number of homes (e.g. in Germany perhaps 200,000 homes).

Source: FS-Kompakt
The Philosophers say:

Mind over-conservatism, more attention to common sense.

- Stockpiling of conservatism leads to unnecessary measures.
- More knowledge is needed in interpretation of regulations.
- We must not do what we can, but do what we need to do.

More practical background in elaboration of regulations is needed.
The Philosophers say:

Reduction of the dose limit for the lens of the eye is inappropriate.

- The new assessment of radiogenic influence to the cataract does not justify this drastic reduction.
- >1% of cataracts due to radiation shall be avoided, said ICRP. „One percent is a good number“ quotation J. Hendry
- There remain many other causes of the cataract.
- And: The cataract can be healed very easily.

A problem was created, especially for medical radiology, which would be in reality no problem, but engages now worldwide many people.
The Philosophers say:

No further reduction of limits.

Flexibility in emergency situations.

- Limits are the borderline between tolerable and not-tolerable.
- They have been reduced several times in history.
- At the same time ALARA is working.
- The result: the lowest exposures ever since.
- Further reduction leads to waste of resources.

- Emergency situations are different. Any predefined value may be the wrong one.
- No-one died from radiation in Fukushima.
- Evacuation resulted perhaps in more than 150 death victims.

Reduction of limits is inappropriate, having the high degree of safety in mind. Emergencies have to be treated with flexibility on a case by case basis.
The Philosophers say:

Be cautious of self-appointed experts.

- Internet allows everybody to deliver a message.
- Whom can I trust?

- What about the FS? What do we deliver?
- The appearance of the FS in the media is still insignificant.
- FS tried to change this, but was not so successful.

There is prejudice in the media. Those who see radiation critical are much more present.
Past, present and future

- The position paper of the philosophers is available, even in English. See website of FS.
- A shortened version was published in StrahlenschutzPRAXIS Heft 4/2018.
- FS-Members commented, basically positive.
- Publication also in Austria.
- The Dutch Society discussed it in workshops with pros and cons.
- SSK listened.
- Presentation at IRPA-Conference 2020 planned.
- And ICRP 2028? Will it be reflected there?

*Die Hoffnung stirbt zuletzt.*

German proverb: Hope dies last.
“The philosophers have only interpreted the world, in various ways. The point, however, is to change it.”

Four interested readers of the position paper of the Club of Philosophers.