Strahlenschutzkommission

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Protection strategies in case of a nuclear detonation

Protective effect of iodine thyroid blocking and particle filtering half masks

First preliminary statement by the SSK

Adopted at the 319th SSK meeting on 29 March 2022

The German original of this English translation was published in 2022 by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety under the title:

Schutzstrategien bei Nuklearwaffeneinsatz
Schutzwirkungen von Iodblockade und
partikelfiltrierenden Halbmasken

Erste vorläufige Stellungnahme der Strahlenschutzkommission

This translation is for informational purposes only, and is not a substitute for the official statement. The original version of the statement, published on www.ssk.de, is the only definitive and official version.

In response to a consultation assignment of 7 March 2022 from the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), the SSK drew up a first preliminary statement on the use of iodine thyroid blocking and particle filtering half masks.

This first preliminary statement considers radiation exposure caused by fallout, i.e., the radiation the population would be exposed to within the first 48 hours after the explosion of a nuclear weapon. It does not cover the immediate exposure from the explosion itself (gamma and neutron radiation). The radionuclides released and deposited by an explosion differ from those released during a nuclear power plant accident as, in addition to longer-lived isotopes such as ^{131}I or ^{137}Cs, large amounts of short-lived fission products occur. These fission products account for 90% of the overall activity during the first 24 to 48 hours. After the fallout, these products can lead to extremely high radiation exposure. Therefore, the most urgent protective measure is to get inside a building without delay (preferably the basement or rooms away from the outside walls and the roof). Taking into consideration current calculations and unpublished findings of members of the working group on the impacts of the use of nuclear weapons, the ad-hoc working group undertook a preliminary analysis of the literature. The working group found that the inhalation and ingestion of radionuclides, including radioactive iodine isotopes, only contribute to a very limited extent to the effective dose and thyroid dose of people during the first phase. Therefore, iodine thyroid blocking only plays a subordinate role when nuclear weapons are used and is provisionally classified as not useful.

In the opinion of the SSK, there is no need to take measures beyond the potassium iodine tablets that were procured in 2019/2020 in case of severe nuclear power plant accidents.

The main protection goal after a nuclear explosion is to reduce exposure to very high external radiation. To ensure this, the following internationally recommended measures need to be taken:

1. get inside immediately (a basement where possible)
2. stay inside (for several days)
3. stay tuned to messages from official sources.

The measures usually taken in case of a radiological emergency to reduce the intake of radionuclides and thus avoid higher doses are helpful in this scenario (avoid contaminated food or drinks, decontaminate skin and clothing). It is also possible to take additional measures like wearing particle filtering half masks (e.g. FFP2 masks or higher category).

The SSK is currently drawing up a more detailed report of the consultation that will also consider the subsequent phase.