Technical workshop on HEU minimisation
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Welcome and Introduction – Security Risks of Highly Enriched Uranium (HEU)

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Excellencies, Ladies and Gentlemen,

It is a privilege and a great pleasure for me, on behalf of the Norwegian Government, to welcome you all to Oslo, and to this Technical Workshop on Highly Enriched Uranium Minimisation, which is arranged in close cooperation with the IAEA.

Norway has a long nuclear history. Although we have no nuclear power plants, we have an active nuclear research program which was started in the 50s, and is still running at the Institute of Energy Technology in their two LEU-fuelled research reactors. One of them is hosting the OECD- Halden Research Project.

For more than a decade, Norway has been cooperating with Russia and other Former Soviet States in the field of nuclear safety and security; we joined the G8 Global Partnership in 2003 as the first non-G8 member. Until this May, Norway chaired the Nuclear Suppliers Group.

We are increasingly engaged with the IAEA. Norway is at present a member of the IAEA Board of Governors, holds one of the vice presidencies to the Convention on Nuclear Safety, and had the opportunity to chair the Agency meeting on the further implementation of the Code of Conduct on Research Reactors, last December.

Norway's active cooperation with the IAEA dates back to 1962, when the IAEA made its first ever safeguards inspection, verifying the design of a zero power research reactor in Norway. Just two years after the USA voluntarily undertook to inform the IAEA of all its transfers of nuclear material, in April 1965, Norway agreed to notify the IAEA of all of its transfers of nuclear material.

Since 2000, after Norway was qualified for integrated safeguards in accordance with the Additional Protocol, the IAEA has performed several inspections at our nuclear facilities, testing their new inspection regime.

Over the years, Norway has taken numerous initiatives to minimise the risks associated with fissile materials – to further strengthen safeguards, increase transparency of fissile materials and complete Fissile Material Cut-off Treaty negotiations. At this point in time, given the new threats the world is facing today, and furthering our earlier agenda, Norway has put HEU minimisation at the top of the agenda.

Why this focus on HEU, and why now? What is the rationale and logic behind the title of this workshop? In a pre-September 11 world where states constituted the main nuclear proliferation challenge, it made sense to treat plutonium and HEU as roughly equivalent dangers. Today, however, in a world where non-state actors pose greater threats in terms of the likely use of nuclear weapons to create catastrophic terrorism, there is logic to an approach that focuses much more on rapidly securing, consolidating, reducing, and eliminating the vast stocks of HEU globally. The principal reason for this shift in emphasis is the much easier task for terrorists of building an HEU-based nuclear explosive.

HEU stocks demand priority because many technical experts have concluded that a "gun-type" improvised nuclear device (IND) is well within the technical reach of some non-state actors if they have access to HEU. This was noted by the Director General of the IAEA, ElBaradei and our Minister of Foreign Affairs, Jonas Gahr Støre in their recent *Financial Times* op-ed.

HEU is considered the material most suitable for use in an improvised gun type nuclear device, which is far easier to design and build than an implosion type device. The latter requires for example a high quality explosive lens made of conventional explosives, and more sophisticated

electronic detonation equipment. Weapons-grade HEU – uranium enriched to over 90% U-235 – is the most effective material for a gun-type device. However, even HEU enriched to less than weapons-grade can be used – and has been, in fact – to produce a nuclear explosion. This actually means that 'weapons-grade' is not a useful term in the present context, all HEU could be used by terrorists to create a real nuclear device such as the one dropped on Hiroshima.

Highly enriched uranium is by definition uranium enriched to minimum of 20 % U-235. Uranium enriched to only 20 -30 % is, however, difficult to use in a crude gun-type nuclear terrorist weapon. The higher the degree of enrichment, the lower the amount of material needed for creating the critical mass for detonation. Anyway, it is possibly not a fruitful approach to renegotiate the definition of HEU.

In civilian uses, highly enriched uranium is used in some nuclear research reactors, in the production of medical radioisotopes, in some fast reactors, as well as for propulsion of civilian nuclear icebreakers. Different enrichments are used for different purposes. We will learn more about the different uses of HEU during this workshop. As I understand the area, HEU can be replaced by LEU in most, if not all, of these applications. A good example is the fact that Russia has recognized the dangers of using HEU in their decision to use LEU in their planned new floating reactors.

HEU minimisation includes enhanced down-blending, reduced enrichment activities, and conversion of existing uses as soon as technically possible.

HEU necessarily originates in natural uranium. In the *enrichment* process, the fraction of U-235 is increased from the original 0.72 % to the level the application in question requires. All uranium isotopes have the same chemical properties. Several enrichment methods exist, and they generally utilise the small mass difference between U-235 and U-238. All enrichment methods require large facilities with sophisticated and expensive equipment. It is therefore highly unlikely that a terrorist group could enrich its own uranium. It would also be very hard for such a group to keep their enrichment attempts from being discovered since a large area and a lot of infrastructure is required.

When HEU is used in a reactor, the spent fuel that is eventually removed from the reactor will still contain a relatively large fraction of U-235. In that case it is possible to recover

the remaining uranium from the spent fuel by *reprocessing* it. Because spent nuclear fuel normally is initially highly radioactive, this method of acquiring HEU in most cases depends on large-scale, sophisticated, expensive equipment. However, over time spent nuclear fuel loses is radioactivity and becomes less "self-protective." Furthermore, some uses, such as the use of HEU in critical assemblies, results in only very light irradiation of the HEU, making it possible to handle this material after it has been unloaded from an installation. Therefore, a cautious approach to this material is also needed. I believe we will hear more about the recent spent nuclear fuel take-back operation from Uzbekistan completed earlier this year at this workshop.

I will not now go any further into the details of the program of this technical workshop. But before I ask Professor Goldemberg to chair the meeting, I will just remind you all that today and tomorrow, the aim of the workshop is to discuss technical ways and means for HEU minimisation. Having said this, we are all very much aware of the fact that HEU minimisation is not only a technical issue, and not only a national issue in each country. It is definitely a global political issue. That is why we have decided, in close cooperation with the IAEA, to arrange an international symposium back-to-back with the workshop. This symposium, which will focus more directly on policy issues, will be opened by the Norwegian Minister of Foreign Affairs on Monday.

Ladies and gentlemen,

We cannot be complacent about the security challenges confronting us in our everyday life. Everybody must take a strong stand on issues of common concern. We believe that failure to do so may ultimately imperil peaceful cooperation and our shared vision for a safe world.

By hosting this technical workshop and the international symposium, we invite you all to take part in the efforts that are necessary, seize this opportunity, while enjoying each other, the people and the city. Once again, a warm welcome to Oslo!