Response by Sweden to correspondence ODA/14-2013/FMCT, circulated by the Office of Disarmament Affairs at the United Nations, regarding the solicitation of views of Member States on a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices (FMCT), including possible aspects thereof, in accordance to UNGA Resolution 67/53, entitled “Treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices,” adopted on 3 December 2012.

Detailed account

Sweden regards the early negotiations and establishment of a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices (FMCT) under effective international verification as a key disarmament and non-proliferation element. An FMCT would be integral to any framework of mutually reinforcing legal instruments for the achievement and maintaining of a world without nuclear weapons.

Sweden looks forward to the establishment of the Group of Governmental Experts with the task to make recommendations on possible aspects which could contribute to an FMCT. If given the opportunity, Sweden would be ready to take active part in the deliberations of the GGE.

Over the years Sweden has demonstrated a long-term interest and significant technological competence by contributing with technological and scientific expertise to arms control verification arrangements. This was not least the case during the preparatory work paving way for the Comprehensive Nuclear-Test-Ban Treaty. Swedish experts actively contributed to the work of the Group of Scientific Experts which laid the foundation for the verification regime of the CTBT. Today, Sweden is heavily involved in the on-going build-up of this regime. Based on these experiences and on-going research work, Sweden is well equipped to add to efforts towards preparing the ground for an FMCT, both technologically and otherwise.

Sweden has continuously addressed FMCT related issues, among others things by presenting a Joint Working Paper on an FMCT together with Bulgaria, Germany, Mexico, Netherlands, Romania, Spain, and Turkey, dated 9 June 2011 (CD/1910), which remains valid. Swedish technical experts have regularly attended and actively contributed to FMCT activities in the margins of the Conference of Disarmament in Geneva in recent years.

In the context of submitting national views on an FMCT pursuant to UNGA Resolution 67/53, Sweden would like to provide the following preliminary and non-exhaustive comments on some central FMCT related issues as ’food for thought’ for future discussions.

It is important to define and agree on how expected utility best can be maximized by a future FMCT. This is of direct relevance to any subsequent discussions on issues like scope and definitions which may be informed by the findings of the FMCT-GGE.
Since the Shannon mandate leaves the scope of an FMCT open for negotiations, the basis for discussions within the GGE will most likely be broad. We find, however, that it is possible to identify several important technical and organizational issues that the GGE could address, and in so doing create a more solid basis for further substantive work and future negotiations. This is important since many of the technical questions related to an FMCT are indeed very complicated. Questions that have a particular bearing for future negotiation efforts, such as assessing the feasibility of necessary verification measures, need to be investigated carefully. The work of the GGE could contribute to increased understanding of technical and other implications of different scopes and definitions. Open questions related to scope and definitions include the definition of fissile material, whether or not existing stocks of fissile material should be included, and how stocks should be defined and classified. Relevant technical issues of this type include for example:

- Discussions on possible definitions of military and civilian stocks. The choice of definitions will impact the effectiveness and/or intrusiveness of an FMCT verification regime. The verification of fissile material flows between facilities using different stock definitions could also be investigated.
- The term “fissile material” is not formally defined or used in any verification regime. Possible definitions of fissile material and their implications for FMCT verification and scope are among relevant issues for the GGE to discuss.
- What is meant by “production” of fissile material?
- An FMCT verification regime would most likely include many of the verification techniques already part of the IAEA nuclear safeguards toolbox, tailored to fit an FMCT.

Ideally, the outcome of the work of the GGE should result in a set of recommendations for scope, definitions, and verification of a future FMCT. We would like to address some of these and other aspects in further detail.

**Production of fissile material for nuclear weapons and other nuclear explosive devices**

The definition of fissile material included in a future FMCT is a key aspect to such a treaty. The IAEA definition of “direct use material” is suitable also for an FMCT, with the addition of Neptunium. The element Americium could in principle be used in a nuclear explosive device, although the manufacturing process would be complicated due to internal heating and radiation. It should be noted that when more materials are included in the definition of fissile material for an FMCT, the complication and costs for verification increases. The definition need to harmonize with envisaged treaty objectives. In order to account for the technical development of the nuclear fuel cycle, treaty provisions for future amendments of the definition of fissile material for weapons purposes should be considered.

**As a minimum the following materials would need to be included:**
Uranium (235 and 233). Highly enriched uranium is defined as containing more than 20% of U-235. It is also known that U-233 is usable for weapons, and this isotope should also be included in an FMCT. A U-233 enrichment of 12% is equivalent to HEU, i.e. 20% enrichment of U-235.

Plutonium. It is possible to use reactor plutonium in a nuclear explosive device, and therefore also this material should be included. All plutonium containing less than 80% Pu-238 (IAEA definition of direct use material) should be covered by an FMCT.

Neptunium 237 is possible to use in a nuclear explosive device, and is also produced in nuclear reactors. It has no heat or radiation properties that complicate its use in a nuclear device. Future nuclear fuel cycle concepts include separation of Neptunium.

Stockpiles of fissile material for nuclear weapons and other nuclear explosive devices under the control of the Parties

According to one estimate, the total military stocks of fissile material correspond to the equivalent of 100 000 nuclear weapons. An FMCT not including stocks would be less comprehensive compared to a treaty covering stocks, since the large stocks of fissile material could result in increased proliferation risks. If stocks would not be included in a future treaty, the nuclear weapons states would need to ensure sufficient physical protection arrangements. The issue of stocks is complicated by the fact that a complete declaration of all plutonium and HEU could reveal sensitive information.

Several options have been discussed, including complete declarations of all stocks; those declared as excess only; or not including any stocks at all. In order to underpin an effective FMCT, nuclear weapons states would need to irreversibly declare all material not needed for military purposes as excess material and place that material under safeguards. This would be in line with Action 17 in the Action Plan adopted at the 2010 NPT Review Conference.

Production of fissile materials for other applications, including for military and peaceful purposes

Since reactor plutonium can be used in nuclear weapons, all plutonium production should be covered by an FMCT. This means that the nuclear weapons states should place all civil production (of e.g. MOX-fuel production) under safeguards. The arrangement for the NPT non-nuclear weapons states would remain unchanged.

Other applications include marine reactors (submarines and icebreakers) and research reactors. Most naval reactors are today fuelled by HEU. Conversion to LEU reactors on a broad scale will most likely not occur in the near future. The stocks for marine reactors should be included in an FMCT, but the verification regime must be constructed in a non-intrusive way in order not to reveal sensitive information. Research reactors still using HEU should be converted to LEU within existing programs.
Facilities related to the production and storage of fissile material for nuclear weapons and other nuclear explosive devices, including transparency aspects

Facilities related to the production and storage of fissile material for nuclear weapons and other nuclear explosive devices need to be taken into account in the context of an FMCT. Verification should be performed at such facilities used for fissile material production, including enrichment of uranium and reprocessing of spent nuclear fuel.

For verification purposes, clandestine reactor operation should also be considered as part of the production process. Old production facilities that are closed down should be declared and monitored. Storages containing excess fissile material should be declared and placed under safeguards. Furthermore, an FMCT should include provisions for increased transparency in military stockpiles.

Ban of acquisition and transfers of fissile material for nuclear weapons and other nuclear explosive devices from other countries non Parties to the Treaty

It is important to block all transfers of fissile materials for nuclear weapons both between parties to the treaty, and between treaty parties and non-party states. A ban on acquisition and transfers of fissile material for nuclear weapons as well as of assistance to third countries concerning the production of fissile material should also be included in an FMCT.

Verification (Verification provisions; funding; implementation), including the role and resources of the IAEA

Effective and credible verification is a crucial aspect in order to create confidence in the fulfillment of treaty provisions and enable detection of possible non-compliance. While there may be other options, assigning the verification tasks of an FMCT to the IAEA should be considered, as it already has many relevant mechanisms in place and a long, in-depth experience of global safeguards management. With regard to verification, an FMCT would be no different compared to today’s situation for non-nuclear weapons states already subject to safeguards under the NPT, with the possible exception of nuclear material used in military naval propulsion.

The nuclear weapons states would need to place all their civil production facilities under safeguards, and declare old facilities. Additional procedures will need to be developed in order to safeguard new types of declared facilities. Facilities that are converted from military to civil production will impose particular verification challenges.

An FMCT verification regime would also require verification of the absence of clandestine facilities. This implies that relevant agreements have to be set up between nuclear weapons states and the IAEA, and that some verification tools might need to be further developed (such as enhanced capabilities for satellite imaging, information analysis and environmental sampling). Part of this work is already performed by the IAEA.
There are however also other verification techniques used in other applications or under development that could be further investigated with respect to future FMCT verification. This is particularly true for verification of clandestine production of fissile material.

If the IAEA would be given the task to verify a future FMCT, the Agency’s budget resources would have to be adjusted accordingly. Additional costs for verification oversight would have to be borne by FMCT states parties.