

According to knowledgeable Russian sources, Iranian middlemen associated with Iran's clandestine nuclear weapons program are in the advanced stages of negotiations with commercial companies in Russia to purchase deuterium gas. The negotiations are reported to be in the final stages before the **signing of the** contract with a Russian company. The sources note that Iran has attempted to produce deuterium-tritium gas on its own inside Iran - with the help of Russian scientists - but has so far been unable to do so, and due to pressures by the Iranian **leadership** to accelerate the weapons production program, decided to try to purchase this substance abroad.

Deuterium gas, in combination with tritium, is used as a neutron source in nuclear **fission** bombs of the implosion type. It serves to insure a more effective and complete **use** of fissile material in a bomb (highly-enriched uranium-235 or plutonium) and therefore to boost the effect ("more bang for the buck"). The process works thus: a tube containing a small amount of deuterium-tritium gas (D-T) is placed inside the core of a fission device. It achieves fusion, emitting an intense burst **of** high energy neutrons in a precisely synchronized fashion, as the fission chain reaction reaches critical mass. This ensures diversions of the chain reaction, enabling more complete fission of the surrounding fissile material. In this way, the process, known as "boosting", can, as noted increase the yield of a nuclear weapon for a given amount of fissile material (a process especially important for countries, like Iran, which possess or anticipate possessing only small **amounts** of fissile material and wish to ensure is optimal use).

The role of D-T in a nuclear weapon as a booster is similar to that of polonium-beryllium. The IAEA discovered early this year that Iran had carried out between 1989-1993 undeclared research and development activity regarding the irradiation of bismuth metal samples in order to produce polonium-210, which according to the June Director General Report to the IAEA Board of Governors, "**in** conjunction with beryllium, serves as a neutron **initiator** in some **designs** of nuclear weapon". The report also notes that regarding the polonium issue "the explanations provided by Iran thus far are not detailed enough and therefore not entirely adequate".

D-T is a much more advanced and efficient booster than polonium-beryllium. Polonium-210 is much more radioactive than D-T and therefore is more difficult to handle; in addition, its half-life is shorter and it therefore decays more quickly. It appears likely that Iran's polonium R&D may be superseded eventually by the more advanced D-T route.

Iran in mid-May presented the IAEA with what it described as a comprehensive report on all aspects of its nuclear program, which

comprised over one thousand pages. The D-T procurement was not mentioned in the "comprehensive" report. It is not alone in this regard: since June, a large number of Iranian nuclear activities not admitted to by Tehran, have been reported, notably the attempts to sanitize a suspected nuclear facility in the Lavizan neighborhood of Tehran.