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## Nuclear Grill-lighter

Iran has apparently tested a neutron initiator, an important component in a nuclear warhead

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Munich – A metal cylinder the size of a semi-trailer is expected to be the yardstick of Iran's actual readiness to cooperate with the International Atomic Energy Agency (IAEA) in the coming weeks. During visits to Tehran, IAEA's chief inspector Herman Nackaerts has repeatedly insisted upon being allowed to examine the chamber, which was probably built in the year 2000 at the Parchin military base, 20 km [12 mi.] southeast of Tehran. The IAEA suspects that Iran conducted research there for the development of a nuclear warhead. An inspection would show the world that Iran is cooperating with the investigation into what the IAEA delicately calls the "possible military dimensions" of its nuclear program.

Diplomats posted to Vienna where the IAEA is headquartered said that Nackaerts selected Parchin because he thought it would be relatively easy for Tehran to grant his team access there. The inspectors avoid making requests based on information from intelligence services, which Iran often dismisses as forgeries, if the IAEA cannot share the original documents. They have their own sources, having interviewed Vyacheslav Danilenko, a scientist from the former Soviet nuclear weapons laboratory Chelyabinsk-70, who is said to have helped Iran to build the cylinder, a test chamber inside which it is possible to experiment with high explosives, as well as the ignition mechanisms of nuclear weapons.

So far, the government in Tehran has resisted the request. Formally, Iran's ambassador to the IAEA Ali Asgar Soltanieh has done so by insisting that Iran and the IAEA first establish modalities of inspection; in this connection, he has proposed a number of conditions that the inspectors find unacceptable.

However, there is apparently another explanation for Iran's tough stance. Some diplomats, intelligence officials, and independent experts believe that Nackaerts has stirred up a hornet's nest. They suspect that Iran used the cylinder to test a neutron initiator, a key component for a nuclear warhead. This experiment could have hardly any civil application. It would be difficult for the Islamic Republic to explain, since its Supreme Leader Ali Khamenei has rejected nuclear weapons as "un-Islamic" and maintains that they are interested only in the peaceful uses of nuclear energy.

A neutron initiator can be compared to a grill-lighter: just as it kindles the fire in a pile of charcoal, neutrons initiate fission in a nuclear warhead. The resulting chain reaction releases tremendous energy – a flash of light, deadly heat, and a tremendous blast, as well as radiation. However, for the ignition to work, several processes must occur within a split second in the proper sequence. In an implosion warhead, an arrangement of explosives and other components compresses a spherical core of highly enriched uranium so much that the metal becomes liquid. The neutron initiator, which is embedded in the center of the core, is simultaneously activated by the immense pressure.

The IAEA stated in its report of November 2011 that it has received information indicating that Iran has worked on such a neutron initiator, and may have tested it – but without establishing a direct connection to Parchin or the metal cylinder. However, a person associated with a Western intelligence agency told *Sueddeutsche Zeitung* that the IAEA has been presented with "solid evidence" that Iran had conducted

this type of secret experiment there. Another source from a different Western country stated, "That's just what Nackaerts suspects." The IAEA declined to comment and merely referred to their reports.

The experiment – or experiments – would have taken place in the year 2003 under the direction of two Iranian scientists who were the targets of simultaneous bomb attacks in Tehran on November 29, 2010. An assassin on a motorcycle fastened a bomb to the car of physics professor Majid Shahriari during the morning rush hour, killing him. His colleague Fereydun Abbasi-Davani narrowly escaped an assassination attempt perpetrated in the same way, escaping from his car with his wife; both sustained injuries in the explosion. Iran accused Israel and the United States of being behind the attacks. President Mahmoud Ahmadinejad appointed Abbasi-Davani as the head of the Atomic Energy Organization of Iran and as one of his own deputies in February 2011.

According to intelligence-service information, the two scientists were at Parchin as project managers partly responsible for developing a special array of neutron detectors and installing it outside of the test chamber. It was used during an experiment to see whether the neutron initiator worked, releasing sufficient particles. In addition, a flash x-ray camera was installed that would capture the implosion of the test system in the metal cylinder at very high resolution. The data from both sources combined allow an assessment of whether the ignition mechanism for a nuclear warhead would work.

According to intelligence sources, two other scientists whose identities are known to the IAEA assisted Shahriari and Abbasi-Davani. Mohammed Reza Sedighi Saber, allegedly an expert from the Ministry of Defense, was entrusted with the simulation and computer-assisted analysis of the experiment. According to this information, Ali-Reza Mola Heidar, an expert on instrumentation, contributed to the development of the flash x-ray system and the positioning of the neutron detectors.

Since the experiment took place about ten years ago, it is unclear whether IAEA inspectors would find anything at Parchin. The neutron initiator itself consists of a few grams of nuclear materials. Traces of it would still be detectable, provided that the cylinder is still inside the building and has not been thoroughly cleaned. Although IAEA Director-General Yukia Amano did not confirm reports about cleanup work at the military base, he spoke in this context about "information about activity that has taken place there."

Diplomats consider the clarification of the incident at Parchin to be very important, because the development of the neutron initiator is one of three areas in which Iran is said to have continued research and development activities after 2003. At that time, according to the estimate of the U.S. intelligence community, the country suspended its program for the actual creation of nuclear weapons. An inspection at Parchin "would be a very nice confidence-building step," one European diplomat said, referring to the nuclear talks this Saturday in Istanbul.

*Translation of the original German language article provided by:*

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