



## PERSPECTIVES

THE BEGIN-SADAT CENTER FOR STRATEGIC STUDIES

# What the Smuggled Archive Tells Us About Iran's Nuclear Weapons Project

by Lt. Col. (res.) Dr. Raphael Ofek

BESA Center Perspectives Paper No. 1,233, July 22, 2019

**EXECUTIVE SUMMARY:** As an apparent act of defiance against Western countries' reluctance to support it against US sanctions, Iran has begun to enrich uranium beyond the level permitted by the nuclear deal. This fact, together with the information revealed by the smuggling out by the Israelis of Iran's nuclear weapons program archive, belies Tehran's oft-expressed claim that its nuclear program was always for peaceful use and shows the hollowness of the nuclear agreement.

On July 7, 2019, Iran announced that in light of Western countries' reluctance to support it against the newly imposed US sanctions, it will enrich uranium above the maximum 3.67% level agreed upon in the 2015 nuclear agreement (the JCPOA). According to Ayatollah Khamenei aide Ali Akbar Velayati, Iran will enrich uranium to 5% from now on, which is the level of enrichment of nuclear fuel at the Bushehr nuclear power plant. Iranian officials have since signaled that their country might in fact increase uranium enrichment to 20% (the level in the fuel of Tehran's research reactor).

This would represent Iran's second violation of the JCPOA. On July 1, it crossed the maximum amount of 300 kg UF<sub>6</sub> (uranium hexafluoride), which, according to the agreement, is allowed to be enriched to 3.67%.

Furthermore, on July 11 – ten months after PM Benjamin Netanyahu identified the “secret atomic warehouse” at Turqzabad in Tehran – it was reported that soil samples taken from the site by IAEA inspectors were found to contain traces of radioactive material. This proves that the warehouse was indeed a nuclear storage facility, and that Iran's failure to report it to the IAEA was a violation of the Non-Proliferation Treaty (NPT) to which it is a signatory.

Despite all this, EU foreign policy chief Federica Mogherini announced at the meeting of EU foreign ministers in Brussels on July 15 that Iran's recent breaches of the JCPOA are insignificant and can be reversed. The EU ministers, scrambling to salvage the nuclear deal, stressed that it is the only option available by which to curb Iran's nuclear program.

Although Tehran can theoretically break out to produce nuclear weapons within six months or so, it is more inclined to take slow, measured steps to withdraw from the agreement. It threatens Western Europe with its intentions while being careful not to categorically break the rules in the hope that Europe will circumvent Trump's sanctions. This form of brinkmanship is reminiscent of Iran's conduct in 2003 after its military nuclear program was exposed: it cooperated with the IAEA with regard to nuclear facilities that could be presented for civilian purposes, such as the uranium enrichment facilities and the Arak heavy water reactor, while at the same time concealing activities of a nuclear-military nature.

The Iranian nuclear archive that Israel seized at the beginning of 2018 proves that by 2003, Iran had a well-planned and advanced program of developing nuclear weapons capable of launch via ballistic missile. The bottleneck since then has been to accumulate enough fissile material, high-enriched uranium or plutonium, for nuclear weapons.

The nuclear archive contains a wealth of new information about Iran's accelerated efforts to develop nuclear weapons. Investigation of the information suggests that Iran's nuclear capability had progressed far beyond what the Western intelligence services and the IAEA had estimated so far. This effort was carried out within the framework of the 110 Project of the Amad program. The program began in 1989 with the aim of producing five nuclear bombs at 10 kilotons each that can be installed with ballistic missiles.

In the second half of 2002, Iran violated its commitment to the NPT. This was revealed via the exposure of the uranium enrichment plant that Iran established in Natanz and its plan to build a heavy water reactor for plutonium production near Arak, which Iran had refrained from reporting to the IAEA.

The extensive documentation in the archive indicates that notwithstanding the IAEA's demand for full disclosure of the Iranian nuclear program, senior Iranian defense officials and senior Iranian nuclear scientists were discussing how to proceed with the nuclear weapons program in mid-2003. The most prominent scientists were Mohsen Fakhrizadeh and Dr. Fereydoon Abbasi, former president of the Atomic Energy Organization of Iran. They concluded that a complete separation should be made between 1) nuclear R&D activities that could be presented overtly as purely civilian in nature; and 2) nuclear R&D

activities that should be camouflaged and kept covert; e.g., neutron physics studies. The activities classified as secret were to be linked to legitimate research at Iran's universities and technological research institutes.

Thus, in late 2003, the Tehran authorities decided to convert Amad into a smaller, more secretive nuclear weapons program. In 2011, after taking steps to disguise the plan, Tehran assigned it the wonderfully euphemistic name "Organization for Defensive Innovation and Research" (the Persian acronym of which is SPND).

The nuclear archive operation was first exposed by Netanyahu on April 30, 2018. From October 2018 through May 2019, two institutes in Washington, the Institute for Science and International Security (ISIS) and the Foundation for the Defense of Democracies (FDD), presented a series of highly detailed reports on the archival documents, which contained information about secret facilities that had not yet been exposed. (According to the institutes, some of the information in the archive is unpublishable due to rules regarding non-proliferation of nuclear weapons technologies.)

As early as 2004, the IAEA suspected that key elements of the nuclear program were being conducted at the Parchin military site, about 30 km north of Tehran. In May 2012, satellite images detected suspicious activity there: the Iranians destroyed some of the structures previously blocked by IAEA inspectors, and the area around them was completely razed.

Information in the nuclear archive allows us for the first time to correlate the images in the archives of the two main buildings on the site, Taleghan-1 and Taleghan-2, and satellite photographs of the buildings from 2004.

In the Taleghan-1 structure, a huge cylindrical steel cell was installed for explosive detonation experiments that began in February 2003. The purpose of the experiments was to develop a neutron trigger for a nuclear explosive device. (When the nuclear device is imploding, the trigger emits a neutron flux to increase the chain reaction of the uranium core and strengthen the yield of the nuclear explosion.) The archive proves that the Taleghan-1 was designed for neutron trigger development experiments, as it contains images from inside the building of two types of neutron detectors.

A smaller cylindrical steel tank was installed in the Taleghan-2 structure to conduct "cold tests" of the compression of a non-fissile uranium core with explosives for imaging a nuclear-grade uranium-core compression. In addition, the Taleghan-2 contained a huge flash x-ray camera designed to capture the core compression process due to the implosion. Such a camera is designed to shoot with extremely fast and extremely short pulses of 20 to 35 nanoseconds.

In addition, the archive documents uncovered a previously unsuspected subterranean nuclear facility in Parchin known as the Shahid Boroujerdi project. The facility was used to convert the UF<sub>6</sub> compound into metallic uranium, then melt, cast, and machine it into hollow hemispheres designed to train future production of cores.

Another important facility that was unknown until the Iranian archive revelation was Sanjarian, adjacent to Tehran. Initial information on the facility, which has not yet been verified, was reported in 2009 by the National Council of Resistance of Iran (NCRI), an opposition organization to the Tehran regime based in Paris. The purpose of the Sanjarian facility was to produce the explosive system that surrounds the uranium core of a nuclear weapon, the function of which is to compress the core through the explosion in order to bring it to super-criticality. This process is called implosion. The explosive system is called MPI (Multi-Point Initiation system) or "Shock Wave Generator." The main explosive in the MPI envelope is Octol, a mixture of HMX and TNT. The channels inside the shell contain special exploding bridgewire (EBW) detonators that are suitable for simultaneous ignition and are ignited only when high voltage is applied.

Another critical activity in Sangjarian was the production of PETN (pentaerythritol tetranitrate), a high-risk, high-impact explosive designed to be installed inside MPI channels. By around 2002, Iran had completed about two-thirds of the tasks required for the MPI project. According to the assessment reflected in the archival documents, the third part was probably completed by the end of 2003.

Other important activities within the framework of the nuclear weapons program included the Midan Project – which involved locating and setting up a nuclear test field, apparently in a desert area in northern Iran southeast of Semnan – and Project 111, which involved integrating a nuclear bomb as the warhead of the Shahab-3 ballistic missile.

The archive revelation exposed Iran's repeated declarations that its nuclear program is solely for peaceful purposes as a bald-faced lie, and highlighted the many shortcomings of the Iranian nuclear deal. It can be assumed that a surrender by Iran to Trump's demand to reopen the nuclear agreement, which would mean a complete renunciation of its nuclear weapons development, is inconceivable to the Tehran regime.

*Lt. Col. (res.) Dr. Raphael Ofek, a BESA Center Research Associate, is an expert in the field of nuclear physics and technology who served as a senior analyst in the Israeli intelligence community.*