

EXAMINING 10 WARNING SIGNS OF IRAN NUCLEAR WEAPONS DEVELOPMENT

NOVEMBER 20,2014

Dr. Alejo Vidal Quadras, Former Vice-President of European Parliament, Professor of Atomic and Nuclear Physics: "An objective, thoroughly researched report on the core issue of the nature of Iranian nuclear program and its status".

Bob Jospheh, Former US Under Secretary of State for Arms Control and International Security, Senior White House Security Council staff on weapons of mass destruction: "A critically important report at a critically important time".

John Bolton, former US Ambassador to the UN, former Under Secretary of State for Arms Control and International Security: "A timely and well document report with alarming findings on Iran's nuclear program."

Contents

Executive summary

Chapter 1: SPND (organ in charge of weaponization)

Chapter 2: Procurement of dual purpose equipment and its possible use for military dimensions of nuclear program

Chapter 3: Secret enrichment of uranium

Chapter 4: Enrichment using laser technology

Chapter 5: High explosives tests and trigger mechanism

Chapter 6: Neutron initiator

Chapter 7: Manufacturing uranium metal (uranium hemisphere)

Chapter 8: Hydro-dynamic tests and explosion vessels at Parchin site

Chapter 9: Research on nuclear warhead

Chapter 10: Key scientists and researchers engaged in possible military dimensions of nuclear program

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Executive Summary

In its September 2014 report on Iranian nuclear program, IAEA stated: "The Agency remains concerned about the possible existence in Iran of undisclosed nuclear related activities involving military related organizations, including activities related to the development of a nuclear payload for a missile."

Answering the question of whether Iran's nuclear program has a military aspect is central to the crisis related to that program. An accurate, correct, and detailed answer to this lingering question is of paramount significance and is an indispensable part of any possible comprehensive agreement between Iran and P5+1.

In its November 2011 report that has been the most detailed study of possible military dimensions of Iran's nuclear program, IAEA underscored "The Agency has serious concerns regarding possible military dimensions to Iran's nuclear programme. After assessing carefully and critically the extensive information available to it, the Agency finds the information to be, overall, credible. The information indicates that Iran has carried out activities relevant to the development of a nuclear explosive device."

Three years later, the IAEA stated in paragraph 56 of its November 7, 2014 report: "The Annex to the Director General's November 2011 report (GOV/2011/65) provided a detailed analysis of the information to the Agency at that time, indicating that Iran has carried out activities that are relevant to the development of a nuclear explosive device. This information is assessed by the Agency to be, overall, credible. The Agency has obtained more information since November 2011 that has further corroborated the analysis contained in that Annex."

In its September 2014 report the IAEA had also stated: "The Agency is not in a position to provide credible assurance about the absence of undeclared nuclear material and activities in Iran, and therefore to conclude that all nuclear material in Iran is in peaceful activities."

The following study provides a review of the most prominent and most essential aspects of this question, which has now remained open for more than a decade. Furthermore, this report details the current status of each of these topics, and scrutinizes Tehran's statements and actions with regard to them.

The study established that two systems have been fully functional during the whole period of the study. A civilian system includes Iran's Atomic Energy Organization and universities, while a military system constitutes the secret aspect of this program. These two structures resemble two concentric circles, working in tandem. Over the years, the military part of the program has gone through reorganization or name changes but has

moved forward including recent activities. According to available information, records, and documents, the military aspect of the program has been and remains at the heart of Iran's nuclear activities.

The report has drawn on all IAEA reports since 2003 (the year in which Iran's clandestine nuclear program was placed under the spotlight following the revelation of secret sites at Natanz and Arak by the National Council of Resistance of Iran in 2002), on reports by the Iranian opposition, and on studies and reports by credible think tanks and non-governmental organizations.

In this study, 10 of the 12 primary issues of the most important aspects of possible military dimensions of the Iranian nuclear program are scrutinized. These are among the most important issues that IAEA has been pursuing over the years, on which it has sought answers directly from Iran.

The 10 topics under review are:

- 1- SPND (organ in charge of weaponization)
- 2- Procurement of dual purpose equipment and its possible use for military dimensions of nuclear program
- 3- Secret enrichment of uranium
- 4- Enrichment using laser technology
- 5- High explosives tests and trigger mechanism
- 6- Neutron initiator
- 7- Manufacturing uranium metal (uranium hemisphere)
- 8- Hydro-dynamic tests and explosion vessels at Parchin site
- 9- Research on nuclear warhead
- 10- Key scientists and researchers engaged in possible military dimensions of nuclear program

Conclusions

None of the main topics of dispute with Iran have been completely resolved. Even if some issues seemed to have been close to resolution at some stage, the emergence of new information generated new concern about the same issues. Meanwhile Tehran on several occasions tried to create the impression that all matters of concern have been resolved and that the time had come to close the nuclear file.

The report came to each of the following conclusions:

- Tehran has worked systematically on all the necessary aspects of obtaining nuclear weapons, such as enrichment, weaponization, warhead, and delivery system at some stage. In other words, Iran has worked on specific programs and projects to master all necessary aspects of obtaining a nuclear weapon.
- The Iranian regime has been working on five specific projects for enrichment in various quantities and methods (Natanz, Arak, Lashkar-Abad, Shian, and Fordow). Tehran did not provide IAEA with information on any of these sites and projects, much less at early stages or on its own initiative. As a pattern, the Iranian regime admitted to the existence of these sites only after their existence and activities were brought to the international community's attention by other sources, and after IAEA began to persist in requesting access to these sites.
- Two systems have been fully functional during the whole period of the study. A civilian system includes Iran's Atomic Energy Organization and universities, while a military system constitutes the secret aspect of this program. These two structures resemble two concentric circles, working in tandem. The military aspect of the program has been and remains at the heart of Iran's nuclear activities.
- The civilian section of the program has provided a very suitable and plausible conduit for procuring and obtaining dual purpose technology and equipment ultimately used in the military section. A significant portion of the equipment for the military aspect has been obtained and procured under this guise. Some organs at the highest level of the Iranian regime, including offices and centers affiliated with the President's office have all been involved in smuggling or skirting sanctions to obtain illicit or dual-purpose equipment for these projects.
- Scores of the authorities and senior officials of the two systems have exchanged positions and responsibilities over the years. It has been common practice to utilize scientists and researchers in the civilian aspect for the military program and to lend staff from the military aspect to the civilian section in order to increase their proficiency and expertise by utilizing each other's facilities and centers. Universities affiliated with the Iranian Revolutionary Guard Corps (IRGC)

and the Ministry of Defense act as a bridge between these two programs and have played a major role.

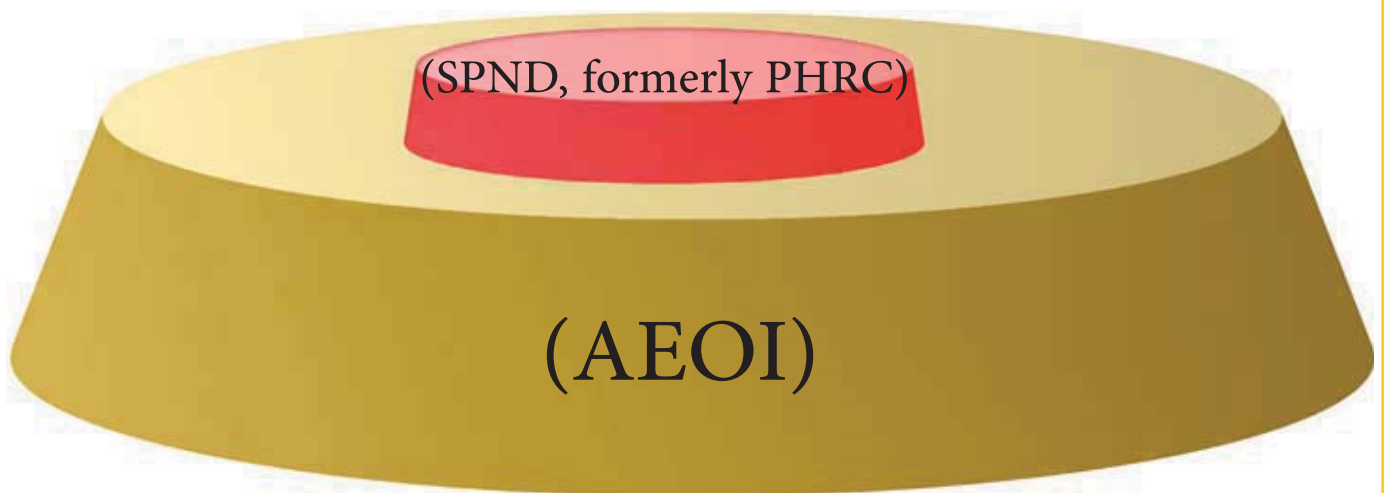
- Scores of the personnel involved in Tehran's nuclear program are from the military, and particularly from the command structure of the IRGC. This study noted several pieces of information indicating that IRGC commanders have been involved in the nuclear program from its early stages. A number of the most senior officers and top brass of the IRGC have been following this project over the years.
- Various equipment and devices that were imported and purchased ostensibly for universities remain unaccounted for and the real purpose of the equipment remains undetermined.
- Iran consistently has sought and obtained know-how and expertise from foreign countries and nuclear weapons experts. This includes networks of international smugglers such as AQ Khan and individual experts from the former Soviet Union block. This has provided invaluable assistance to the military dimension of Iran's nuclear program.
- The geographic locations of the centers engaged in design and research aspect of the program, including Mojdeh site (aka Lavisan 2), Shian site (Lavisian 1), Imam Hossein University, and the facilities involved in working on nuclear warheads, such as Hemmat, Parchin, and Metfaz site are all located in the military zone in eastern Tehran. The proximity of these sites clearly illustrates the relationship between organs and centers involved in manufacturing nuclear weapons.

As the IAEA has correctly reiterated, it would only be able to provide a full picture of this program subsequent to Tehran responding in detail to all lingering questions and unresolved issues and providing full and unhindered access to all of its centers and scientists.

This study can only lead to the conclusion that Iran has vigorously pursued its ambitions to obtain nuclear weapons. No serious indications that Tehran has stopped or abandoned this project or intends to do so were observed.

On the contrary, all the available information points to the conclusion that it has resorted to further secrecy and concealment to keep its program intact and unhindered. Further revelations and information all point to the fact that a military program and military-related activities are at the heart of the Iranian nuclear program.

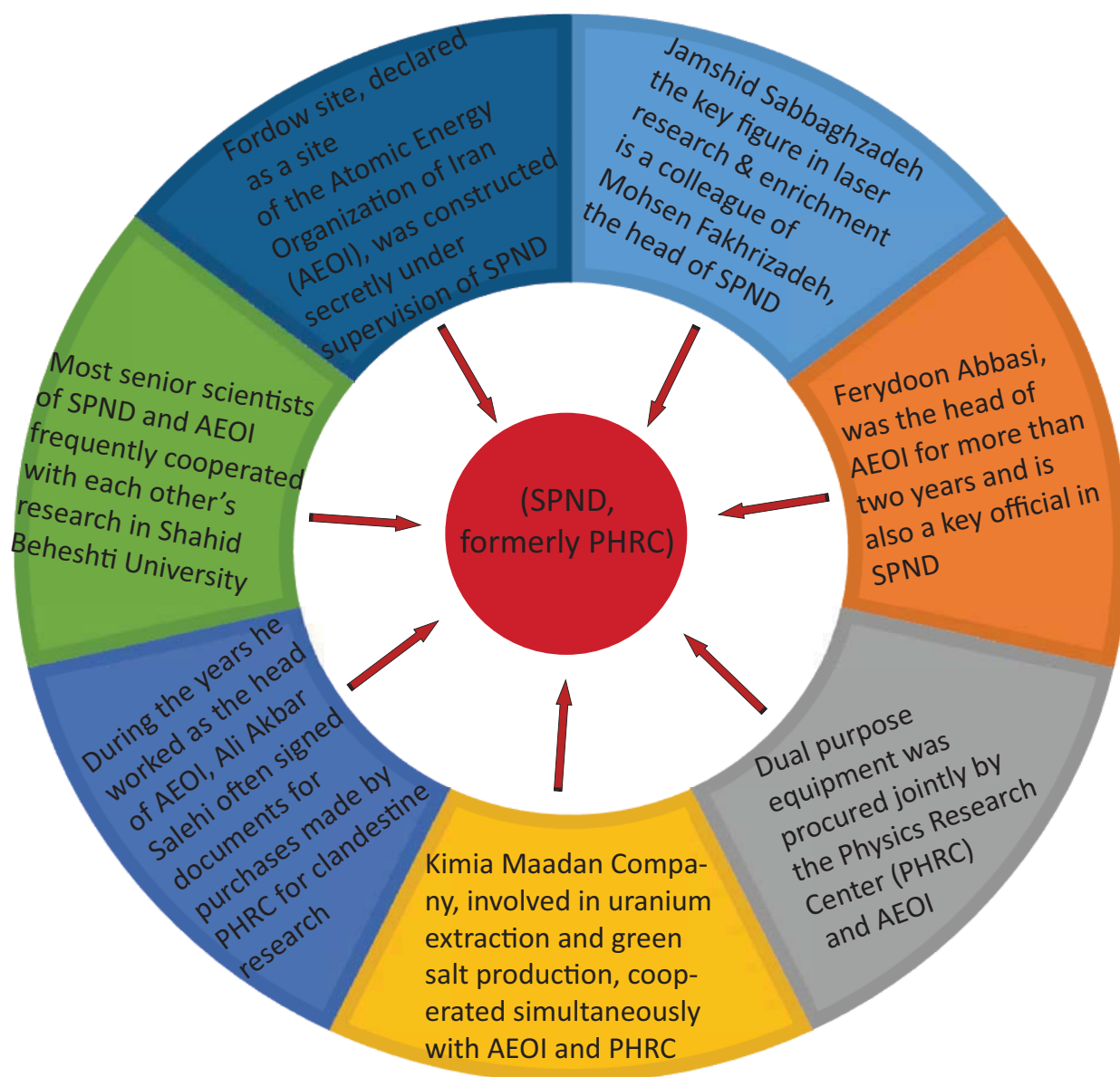
Relations between Atomic Energy Organization of Iran (AEOI) & SPND (entity in charge of military dimension)





Relationship between Structure Involved in Nuclear Weapons Development and Atomic Energy Organization of Iran

- 1- Staff are shared as key figures of the two entities
- 2- AEOI provided highly enriched uranium (HEU) for SPND
- 3- AEOI carried out purchases and procurements of equipment and devices for SPND
- 4- Personnel needed by SPND were provided from former or current personnel of AEOI
- 5- SPND (formerly PHRC) is the nerve center and command and control of all the plans and designs of Iran's clandestine nuclear program.

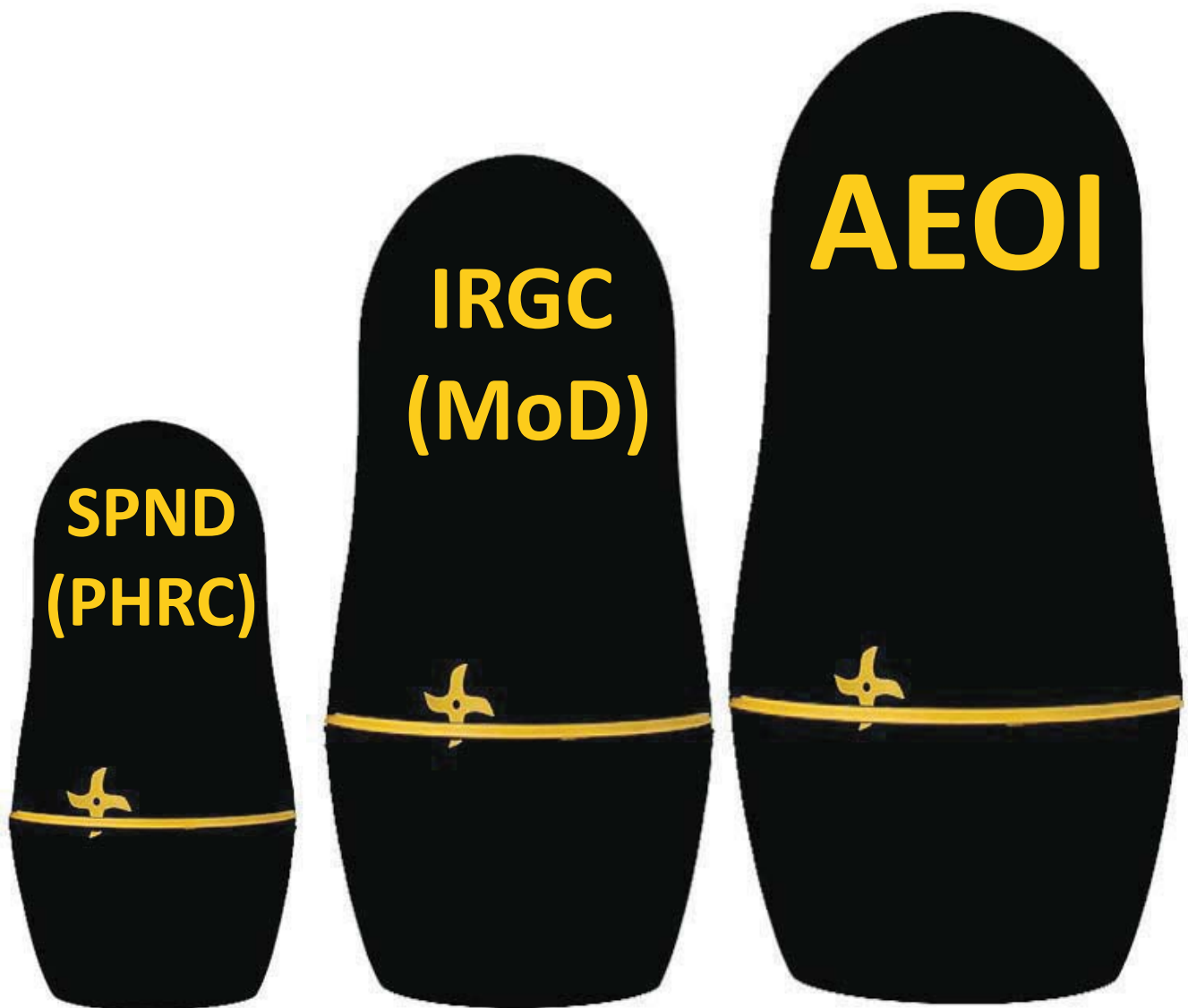


AEOI: Atomic Energy Organization of Iran

IRGC: Iran Revolutionary Guards Corps

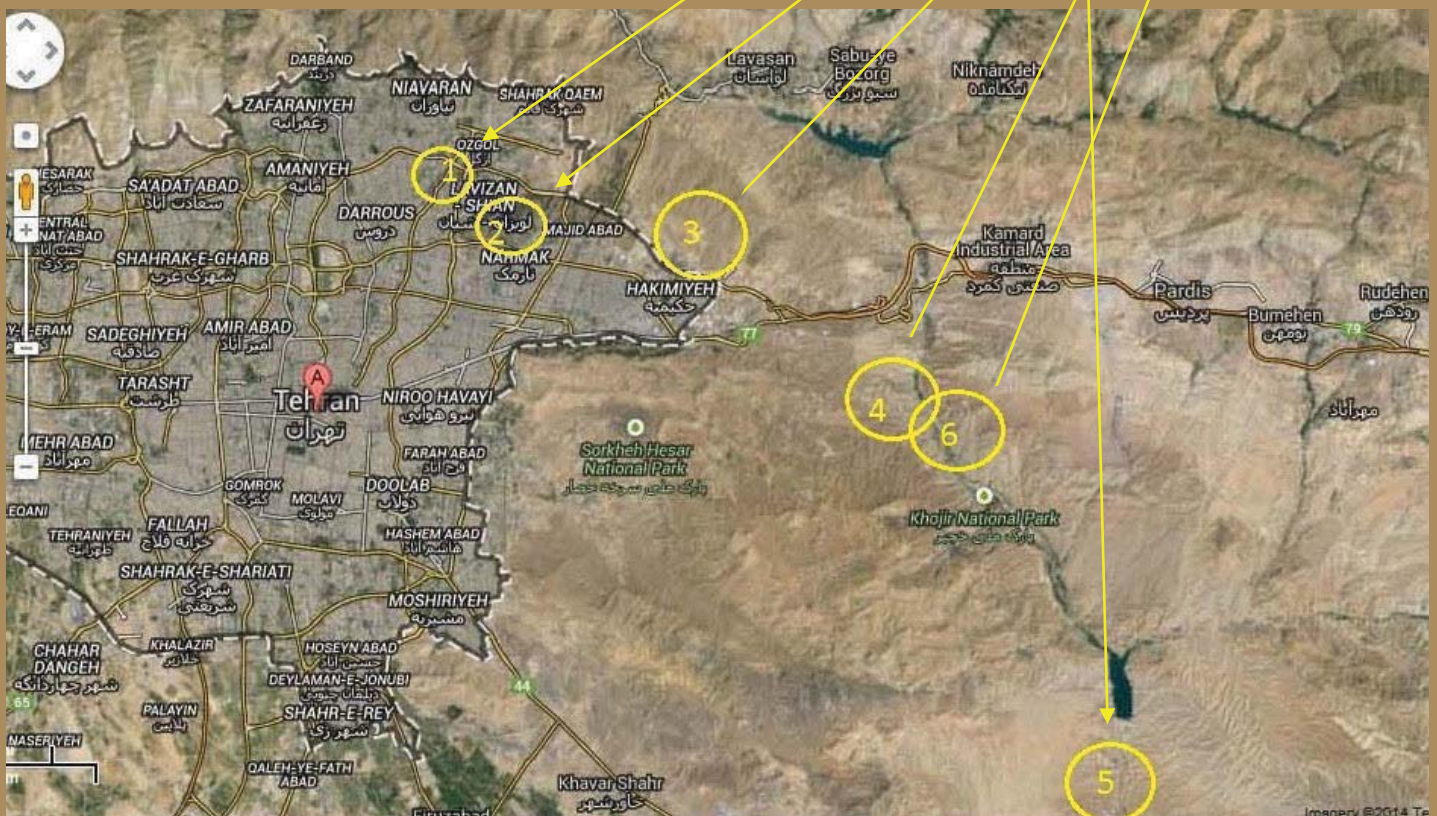
MoD: Ministry of Defense

SPND (PHRC): Structures Involved
in Nuclear Weapons Development



Concentration of key sites involved in military related nuclear activities in East Tehran

1. SHIAN
2. MOJDEH
3. IMAM HOSEIN
4. HEMAT
5. PARCHIN
6. METFAZ



Unresolved issues on Iranian nuclear program and possible military dimensions

Row	Issue	Tehran's reponse	Facts	Latest status
1	Regime Structures Involved in Nuclear Weapons Development (Physics Research Center, ..., Organization of Defensive Innovation & Research (SPND).	Physics Research Center was established to prevent damages in the event of a nuclear attack and had no plan to build bomb. It played no role in nuclear and enrichment activities.	Research on nuclear weapons was initiated in the IRGC research center. Research on 11 aspects of nuclear weapons and nuclear related activities continued clandestinely at PHRC until the destruction of Lavisan-Shian site in 2003. Staff transferred research facilities to a different location known as the Mojdeh site where activities were resumed. Lavisan-Shian was totally razed, the IAEA was only allowed in after complete destruction. Organization has gone through several structural and name change (currently SPND) the key personnel remain the same. IAEA has several documents baring the signature of Mohsen Fakhrizadeh, head of SPND, an IRGC Brigadier General.	Little progress (concealing real objective of the entity)
2	Procurement of dual purpose equipment by Physics Research Center (Lavisan-Shian)	Equipment was procured to be used in a technical university. It has nothing to do with nuclear related research. The reason for destruction of Lavisan-Shian was the dispute between the MoD and municipality.	Local municipality has rejected any dispute with the MoD. In the environmental sampling, traces of highly enriched uranium were found. Purchased equipment and tests all could have been related to various aspects of the regime's nuclear weapons program. When showing one of the equipment, IAEA inspectors were taken to the University affiliated to IRGC, but it was depicted a technical university. The dual use equipment was purchased under the guise of Sharif or Iran University of Science and Technology but was turned over the PHRC.	Little progress (concealment & deception)
3	Secret enrichment of uranium	Enrichment of uranium was done for peaceful purposes. All enrichment activities that were carried out by AEOI and the Physics Research Center had nothing to do with it.	All five currently known sites that were engaged in enrichment process were constructed in secret and Tehran only acknowledged them after opposition or other parties exposed them. The structure in charge of weaponization (PHRC, SPND,...) has had close relations with AEOI. The key officials of AEOI and SPND have been common individuals and have moved between the two organs.	Little progress (concealing all the sites)
4	Enrichment via laser	AEOI carried out research on enrichment by laser that was subsequently stopped. The regime has the technology, but has not utilized it. Lashkar-abad center is for laser activities not related to nuclear activities.	The regime only acknowledged laser enrichment when its site in Lashkar-abad was exposed. The Lashkar-abad site was reactivated to be engaged in enrichment related activities. The structure in charge of weaponization worked on enrichment by using laser based techniques. A key expert on laser research, Sabbaghzadeh, is a close associate of Mohsen Fakhrizadeh, the head of SPND.	Little progress (concealing the sites, lack of response)
5	High explosives tests and trigger mechanism	The experiments involving high explosives and related devices were for research associated with oil exploration and have nothing to do with preliminary experiments pertaining to a nuclear test. The documents are forged.	Scores of documents show that the structure in charge of weaponization pursued explosive detonators for preliminary work on nuclear explosion and has carried out the test on detonators at least once. Center for Explosion and Impact (METFAZ) is one of the sub-divisions of SPND. It has secret offices for planning, as well as a hidden test site and workshop.	No progress (covering up &deception)
6	Neutron initiator	The design and blueprint of the nuclear hemisphere was transferred to Iran by accident from documents that were purchased from Pakistan in 1987.	The regime has worked on a neutron initiator in Imam Hossein University and at the Mojdeh site. The regime has worked on production of a neutron initiator by using Polonium 210 and Beryllium. Tehran has tried to illicitly import Beryllium through a myriad of covert methods. Documents show that Tehran worked on neutron initiator calculations.	No progress (concealment)

Unresolved issues on Iranian nuclear program and possible military dimensions

Row	Issue	Tehran's reponse	Facts	Latest status
7	Manufacturing of uranium metal (uranium hemisphere)	The documents regarding the neutron initiator are forged. Iran has not worked on developing this technology.	Tehran procured the design and drawings of nuclear weapons from Pakistan and only when Tehran could no longer deny the fact that it had obtained the drawings due to insurmountable hard evidence, their procurement was acknowledged. Tehran has set up a clandestine workshop and special press machines to manufacture the metal hemisphere. The structure in charge of weaponization has centers to conduct research on advanced metals and metallurgy and a center to conduct research on manufacturing of a metal hemisphere.	Little progress (not revealing the truth)
8	Hydro-dynamic tests and explosive vessels in Parchin	Parchin is a site for production of chemical material and conventional ammunition and has nothing to do with nuclear activities. This site has already been visited by the IAEA. It is a military site and the IAAE inspectors have no access to it.	Saeed Borji, the key expert in the field of explosives carried out tests in Parchin with the help of Ukrainian experts. Saeed Borji was the head of sub-division of SPND in charge of Center for Explosion and Impact (METFAZ) for several years. Parchin was the site in which the Center for Explosion and Impact (METFAZ) carried out some of its tests.	No progress (destroying the evidence)
9	Research on the development of a nuclear warhead	The documents regarding warheads and the re-entry vehicle are fake.	A number of documents that point to work on nuclear warheads have already been revealed. At the Hemmat site, located in Khojeir area, the regime worked on manufacturing a nuclear warhead. The structure in charge of weaponization has a center for new and advanced aerospace research, devoted to work on development of a nuclear warhead. Kamran Daneshjoo, the former Minister of Science was the head of Center for R&D of Advanced Aeronautical Technologies from 2002 to 2005 and has signed documents in that capacity.	No progress (deception, covering up)
10	Key scientists and researchers engaged in possible military dimensions of the nuclear program	The regime has allowed an interview with Abbas Shahmoradi, the former director of Physics Research Center (PHRC).	The regime has not provided any access to the IAEA vis-à-vis an interview with Mohsen Fakhrizadeh, the subsequent head of PHRC and current head of SPND. Tehran has not provided the IAEA access to any other nuclear experts. In his interview with the IAEA, Shahmoradi did not answer any of the IAEA questions on PHRC. Scores of key personnel engaged in nuclear weapons production are from the IRGC.	No progress (providing no access)

Chapter 1 – Regime Structures Involved in Nuclear Weapons Development

Introduction:

Research on the Iranian regime organizations and institutions that pursue nuclear activities for military purposes has been a serious issue under scrutiny by the IAEA.

When the Shian site was exposed in May 2003 and subsequently the Iranian regime fully razed the site, this issue became a fundamentally important topic. Shian was inspected by the IAEA in June 2004 and since then numerous questions were raised regarding the Iranian regime's military nuclear activities. These questions were partly characterized as 'claimed research' in IAEA reports. Questions regarding the organization in charge of the weaponization effort, its projects, and its experts have been lingering throughout the past decade.

Latest Status:

The regime structures that have been focused on building a nuclear weapon during the past three decades have gone under various names and different forms, all seeking a specific goal of obtaining the necessary technology for making an atomic bomb. These structures have at various times been forced to change locations or even change the organization of their work due to revelations regarding their activities, or as a result of circumstances affecting the regime as a whole. However, through all these years of change, key personnel have remained fixed.

The various structures involved in nuclear weapons development were consolidated into a new organization, the Organization of Defensive Innovation and Research (SPND), in 2011. Organized and focused under this new entity, those structures have officially become an organ of the Ministry of Defense. The regime continues to refuse to provide any information to the IAEA regarding this entity, its research, or its personnel, some of which are extremely sensitive personnel for the regime's nuclear projects.

Review of IAEA Reports on Nuclear Project Weaponization Center

IAEA Inspection of Lavisan- Shian Site

Excerpts from IAEA September 2004 Report:

42. The Lavisan-Shian site in Tehran was referred to in the June 2004 meeting of the Board of Governors in connection with alleged nuclear related activities and the possibility of a concealment effort through the removal of the buildings from that site.

43. As indicated above, in response to an Agency request, Iran provided access to that site. Iran also provided access to two whole body counters, and to a trailer declared to have been previously located on that site and to have contained one of the whole body counters. The Agency took environmental samples at these locations. Iran also gave the Agency a description and chronology of activities carried out at the Lavisian-Shian site. According to Iran, a Physics Research Centre had been established at that site in 1989, the purpose of which had been “preparedness to combat and neutralization of casualties due to nuclear attacks and accidents (nuclear defence) and also support and provide scientific advice and services to the Ministry of Defence.” Iran provided a list of the eleven activities conducted at the Centre, but, referring to security concerns, declined to provide a list of the equipment used at the Centre. Iran stated further that “no nuclear material declarable in accordance with the Agency’s safeguard[s] was present” and that “no nuclear material and nuclear activities related to fuel cycle [were] carried out in Lavisian-Shian.”

Excerpt from IAEA November 2004 report:

100. Iran provided a description and chronology of three organizations that had been located at Lavisian-Shian between 1989 and 2004. As described by Iran, the Physics Research Centre (PHRC) had been established at that site in 1989, the purpose of which had been “preparedness to combat and neutralization of casualties due to nuclear attacks and accidents (nuclear defence) and also support and provide scientific advice and services to the Ministry of Defence.” Iran provided a list of eleven activities conducted at the PHRC, but, referring to security concerns, declined to provide a list of the equipment used at the Centre.

IAEA Detailed Report on History of Organizations for Nuclear Weapons Production

The annex of the IAEA November 2011 Report detailed the basic organization of Iranian regime structures related to nuclear weapons development.

Excerpts from IAEA November 2011 report:

C.1. Programme management structure

19. The Agency received information from Member States which indicates that, sometime after the commencement by Iran in the late 1980s of covert procurement activities,²⁴ organizational structures and administrative arrangements for an undeclared nuclear programme were established and managed through the Physics Research Centre (PHRC), and were overseen, through a Scientific Committee, by the Defence Industries Education Research Institute (ERI), established to coordinate defence R&D for the Ministry of Defence Armed Forces Logistics (MODAFL). Iran has confirmed that the PHRC was established in 1989 at Lavisian-Shian, in Tehran. Iran has stated that the PHRC was created with the purpose of “preparedness to combat and neutralization of casualties due to nuclear attacks and accidents (nuclear defence) and also support and provide scientific advice and services to the Ministry of Defence”. Iran has stated further that those activities were stopped in 1998.

20. According to information provided by Member States, by the late 1990s or early 2000s, the PHRC activities were consolidated under the "AMAD Plan". Mohsen Fakhrizadeh (Mahabadi) was the Executive Officer of the AMAD Plan, the executive affairs of which were performed by the "Orchid Office". Most of the activities carried out under the AMAD Plan appear to have been conducted during 2002 and 2003.

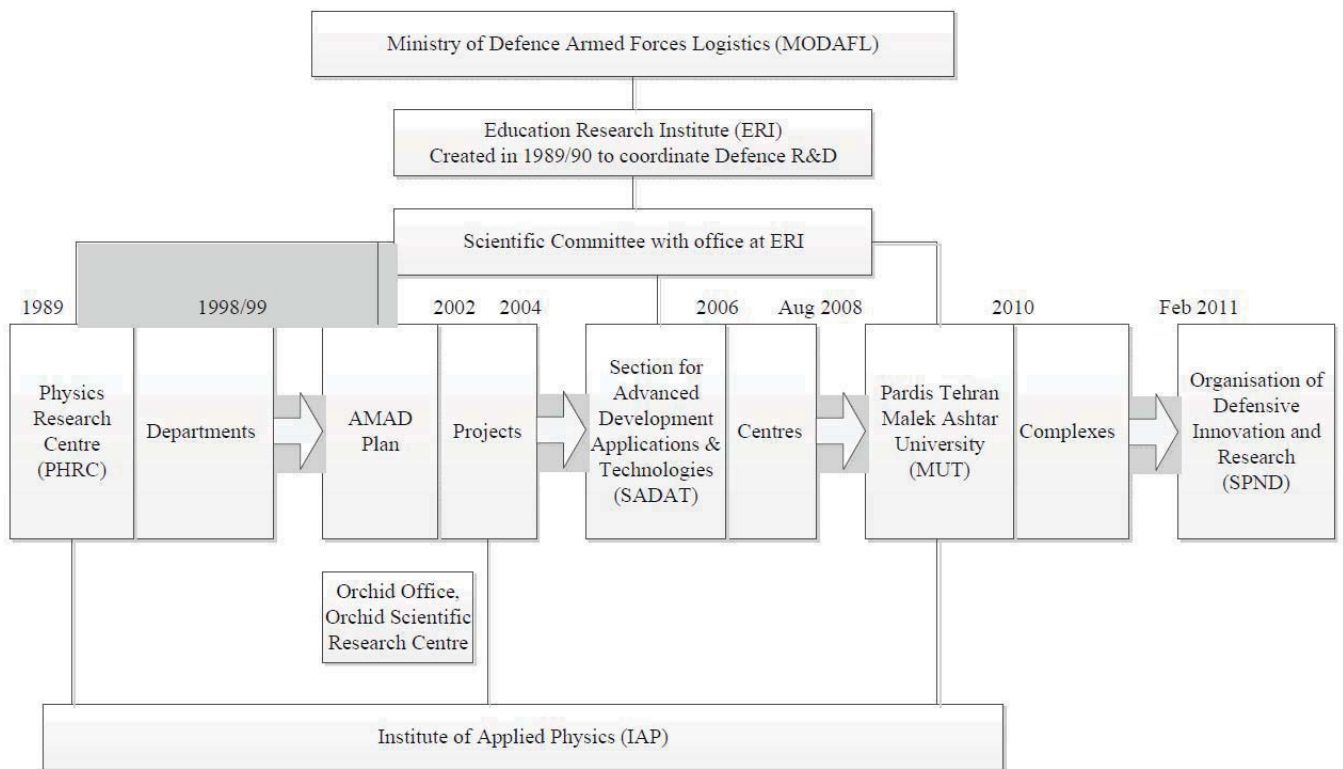
21. The majority of the details of the work said to have been conducted under the AMAD Plan come from the alleged studies documentation which, as indicated in paragraph 6 above, refer to studies conducted in three technical areas: the green salt project; high explosives (including the development of exploding bridgewire detonators); and re-engineering of the payload chamber of the Shahab 3 missile re-entry vehicle.

22. According to the Agency's assessment of the information contained in that documentation, the green salt project (identified as Project 5.13) was part of a larger project (identified as Project 5) to provide a source of uranium suitable for use in an undisclosed enrichment programme. The product of this programme would be converted into metal for use in the new warhead which was the subject of the missile re-entry vehicle studies (identified as Project 111). As of May 2008, the Agency was not in a position to demonstrate to Iran the connection between Project 5 and Project 111. However, subsequently, the Agency was shown documents which established a connection between Project 5 and Project 111, and hence a link between nuclear material and a new payload development programme.

23. Information the Agency has received from Member States indicates that, owing to growing concerns about the international security situation in Iraq and neighbouring countries at that time, work on the AMAD Plan was stopped rather abruptly pursuant to a "halt order" instruction issued in late 2003 by senior Iranian officials. According to that information, however, staff remained in place to record and document the achievements of their respective projects. Subsequently, equipment and work places were either cleaned or disposed of so that there would be little to identify the sensitive nature of the work which had been undertaken.

24. The Agency has other information from Member States which indicates that some activities previously carried out under the AMAD Plan were resumed later, and that Mr Fakhrizadeh retained the principal organizational role, first under a new organization known as the Section for Advanced Development Applications and Technologies (SADAT)

Structure for management of weaponization (from Annex of IAEA Nov 2011 report)



Information from Iranian opposition

Revolutionary Guards Research Center

In 1983 Tehran launched a strategic research project within and overseen by the IRGC on nuclear technology for military purposes. In 1986 the IRGC opened nuclear research branches in numerous Iranian universities, with the most important being in Tehran University, the Sharif University of Technology and Shiraz University. The IRGC has employed a number of physics graduates from Sharif University of Technology.

Following the end of Iran-Iraq War in 1989, all activities and experts of the IRGC nuclear research center were transferred to the Physics Research Center, chaired by Seyed Abbas Shahmoradi Zavare'i, an IRGC member, a university professor, and a member of the Jihad Research Center of Sharif University of Technology.

The center of this entity and its associated organizations were in a site in Tehran named the Physics Research Center in the Iranian capital's Lavisan-Shian region.

Turning Point: Revelation of Lavisan- Shian as a Site Focusing on WMD Production

On May 15, 2003 the National Council of Resistance of Iran unveiled new information on WMDs in Iran and unveiled the Lavisan-Shian site in the Shian 7 region. This was a turning point regarding international understanding of this entity and its activities.

Following the revelation of this location, aerial imagery showed that the regime had completely razed the Lavisan-Shian site and destroyed its buildings in March 2004. As a result, IAEA inspectors sought to visit the site to ascertain the reason for the destruction.

The revelation and destruction marked the beginning of major changes to the organization in charge of weaponization of the Iranian nuclear program.

Changing Location of Lavisan-Shian to Mojdeh under the name of "New Defense Technology and Preparation Center"

On November 19, 2004, the NCRI reported that the center for weaponization of Iran's nuclear program had been transferred to a new site, with an area of around 60 hectares. This new site had three gates on Mojdeh Avenue and thus came to be identified as the Mojdeh site, as well as Lavisan 2 site. According to Iranian opposition information, all Shian activities were transferred to this new center.

IRGC Brigadier General Dr. Seyed Ali Hosseini Tosh, the Deputy Minister of Defense, followed up on the nuclear activities with IRGC staff Mohsen Fakhrizadeh, while biological weapons activities were followed up by another IRGC staff member, Nader Maghsoudi. Due to the top secret nature of this work, Ali Hosseini Tosh followed up on his activities directly with then Defense Minister Ali Shamkhani. Mohsen Fakhrizadeh, a renowned Ministry of Defense expert, was in charge of the Center of New Advanced Defense Technology and Preparedness. This center was formerly the location providing logistics and backup for the Ministry of Defense's ammunition production. This included three sections related to the Beheshti Battalion, Bus Battalion and the Truck Battalion. Upon an order by Defense Minister Ali Shamkhani, the evacuation of Shian Lavisian had begun 18 months earlier (i.e. May 2003, when the Shian site was revealed).

Upgrading Stature of the Nuclear Weapon Production Organ of the Ministry of Defense

In February 2008 the NCRI reported new changes in the organizational structure of the Mojdeh site. According to the Iranian opposition, Tehran entered its nuclear projects into a new phase and established for the first time a command and control center to complete the bomb-making project. This new entity, Advanced Technology Application Development Center, was established and expanded in the same location, the Mojdeh site. This was an independent organ of the Ministry of Defense, with its own departments and sub-divisions.

New Changes in Mojdeh to Cover Up its Activities

In September 2009, the NCRI again reported changes in the Mojdeh structure. Tehran suspended the Advanced Technology Application Development Center in order to provide an official and legal cover for its activities at the Mojdeh site. Subsequently, Tehran named the Mojdeh site and Malek Ashtar University as the Pardis of Malek Ashtar University. "Pardis," is referred to as 'Technology Park,' and with permission from the Ministry of Sciences, one was established in every university to produce and present their own research. However, the Pardis at Malek Ashtar went on with its activities without following legal procedures in other Iranian universities, meaning it never sought to be officially registered under the Ministry of Sciences and was merely intended to function as a cover-up.

As a result, Mojdeh became a branch of Malek Ashtar University, which is itself affiliated with the Defense Ministry. A sign at the gate read: Malek Ashtar University, New Technology Complex. Inside, nuclear activities continued in secret and unabated, while the structures and personnel of the nuclear organization were spread throughout the university.

Mohsen Fakhrizadeh Mahabadi became the head of Pardis in Tehran, i.e. the entity consisting of Mojdeh and this section of Malek Ashtar University.

Organization of Defensive Innovation and Research: New Name for Nuclear Weapon Production Organization

The Pardis of Malek Ashtar University went through structural changes again in 2011. The NCRI revealed in July of that year that the Iranian regime had reorganized the entity in charge of building a nuclear bomb in order to accelerate its activities.

In March 2011, the Defense Ministry reorganized this independent organization as the Organization of Defensive Innovation and Research, known by its Farsi acronym SPND. Under the new structure and hierarchy, SPND reported independently to the Deputy Minister of Defense.

According to reports from inside the regime, obtained by the opposition, in light of the policy that the regime had adopted vis-a vis the international community, and since it had no intention of responding to IAEA questions or allowing inspection of suspicious military centers, it saw no need for maintaining the previous structural organization and once again consolidated and restructured nuclear activities within an independent entity.

This reorganization was based on a review of the entity's new activities in 2010, and it had been restructured with the objective of accelerating its work and providing more focus and concentration. Under the new organization, the capabilities and offices of some sections of Malek Ashtar University were placed at the service of the new organization to carry out research and production requested by it.

Mohsen Fakhrizadeh Mahabadi continued to head this organization. He relinquished his previous positions and was no longer the "President of Pardis of Malek Ashtar University in Tehran" or the deputy dean of this university. The headquarters of SPND remained at the Mojdeh site, adjacent to Malek Ashtar University. The office of Mohsen Fakhrizadeh was transferred from Malek Ashtar University to the Mojdeh site.

Tight security and counter-intelligence regulations and measures are imposed on SPND personnel.

Relocation of SPND Command Center

In October 2013, and again in October 2014, the NCRI revealed the new address of the SPND command center to be Tehran, Pasdaran Avenue, No-Bonyad Square, Sanay-e (Lakpour) Avenue, south side, #6 (across from Chamran Hospital).

In order to remove all traces and deceive IAEA inspectors in the course of possible inspections, SPND's activities have been divided into two sections. Each division has its own separate location.

The sensitive and covert portion, the existence of which demonstrates the military dimensions of the regime's nuclear program, has been relocated to the new address.

The non-sensitive section has been deliberately kept at the former site so that in the event of inspections, the agency is not greeted with vacant premises that would lead them to conclude that a relocation has taken place.

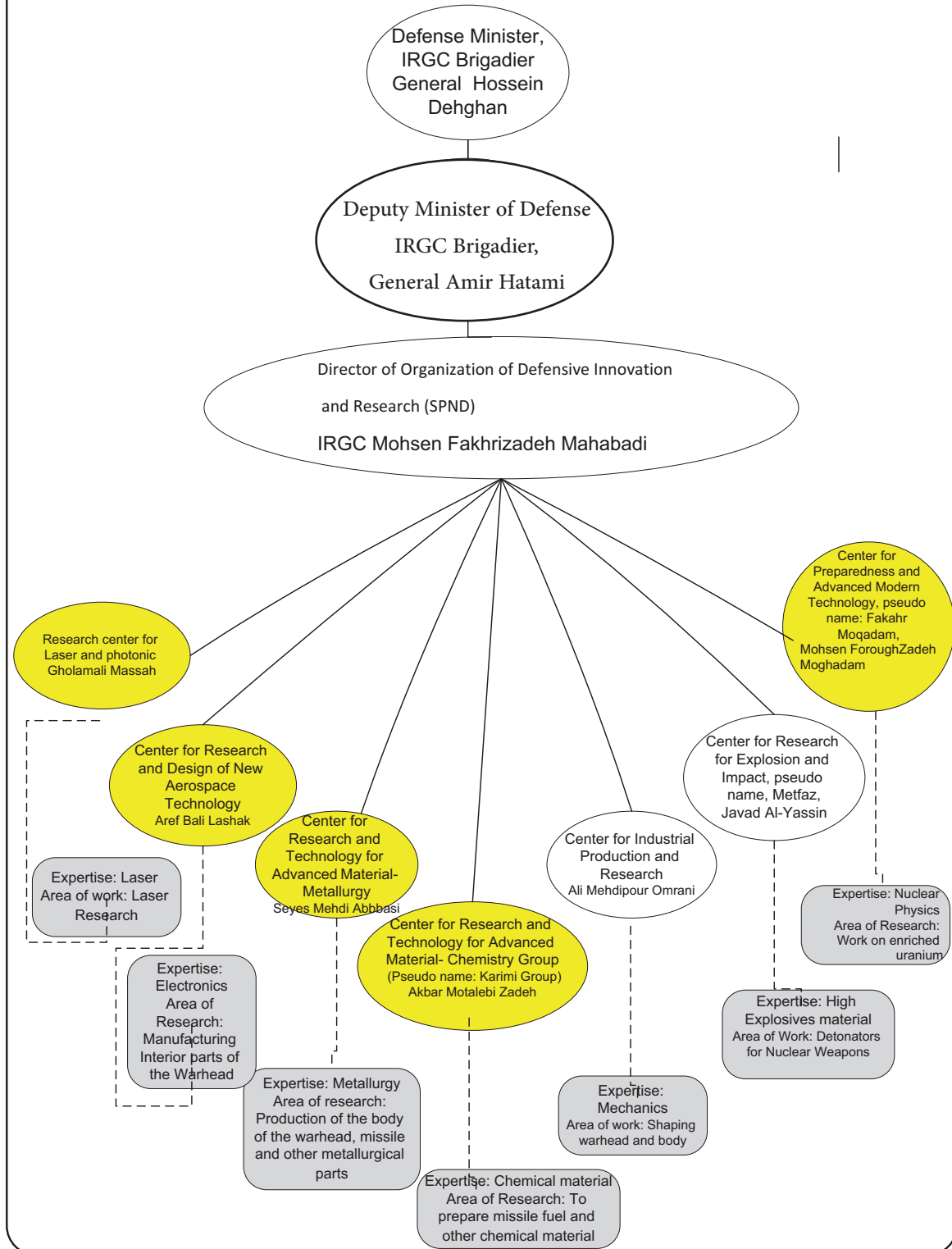
The transfer of SPND that started in late 2013 was completed in 2014. The offices of Dr. Mohsen Foroughizadeh, head of the SPND New Technologies Division, which is focused on nuclear physics, were among those transferred to the new location.

Mohsen Fakhrizadeh, a Brigadier General of the Islamic Revolutionary Guard Corps (IRGC), is still the director of SPND. He is the key person in the military dimensions of the Iranian nuclear program. The IAEA has sought to interview him for years.

The latest report provided by the opposition in October 2014 points out that Fakhrizadeh's office is located at the Beheshti complex at Iran Electronics Industries (Farsi acronym: SAIRAN). SAIRAN is the electronic department of the Defense Ministry and is located at Pasdaran Avenue and Moghan Street.

Due to the fact that the information maintained at Fakhrizadeh's office is highly sensitive, the whereabouts of the office have even been hidden from the heads of the various departments of SAIRAN.

Organizational chart of the organ in charge of manufacturing nuclear bomb (SPND)



Reports from Other Sources on Organ of the Nuclear Bomb Project

In a detailed report titled “The Physics Research Center and Iran’s Parallel Military Nuclear Program, dated February 23, 2012, the Institute for Science and International Security (ISIS) stated:

“A key issue for the International Atomic Energy Agency (IAEA) is whether Iran has a parallel military nuclear program that can provide nuclear weapons if the regime decides to build them. Understanding that issue depends critically on what Iran’s military nuclear entities have achieved already. Newly acquired information sheds light on one of Iran’s most important and least understood military nuclear organizations, the Physics Research Center, which operated in the 1990s and was consolidated into successive military nuclear organizations. The new information also demonstrates the incompleteness and inadequacy of Iran’s declarations to the IAEA about its past and possibly on-going military nuclear efforts.”

According to the ISIS analysts:

“Evidence obtained by the IAEA indicates that the Iranian revolutionary regime made its first decision to research and develop nuclear weapons in the mid-to-late 1980s, and it ordered the development of a parallel military nuclear fuel cycle. According to information received by the IAEA and included in its November 2011 report, the Physics Research Center (PHRC) appears to have been created in 1989 as part of an effort to create an undeclared nuclear program, likely aimed at the development of a nuclear weapon. PHRC in turn may have evolved from a project at Shahid Hemmat Industrial Group (SHIG) in the late 1980s that may have sought to research a nuclear warhead for a ballistic missile. In 2003, under intense international pressure, Iran agreed to suspend its uranium enrichment programs. Based on the IAEA’s findings, Iran sought to keep its nuclear weaponization programs secret from the inspectors and took steps to better hide this program’s existence. The razing of the Lavisan Shian in 2004 site that formerly housed the PHRC was likely an attempt to prevent the IAEA from carrying out environmental sampling, a technique that had uncovered other secret Iranian nuclear activities in 2003.”

The authors of the ISIS report pointed out that while Iran admitted that the Physics Research Center was related to its military programs and was focused on creating defensive preparedness to detect nuclear radiation, it appears that its role in Iran’s nuclear activities is much more expansive and elaborate.

The Institute of Science and International Studies was able to obtain some 1,600 of the telexes that were exchanged between the “Physics Research Center,” Shahid Beheshti University, and other parties outside of Iran. In light of this data and other information made public by Western governments, the IAEA, and international media, it is quite evident that the scope of the Physics

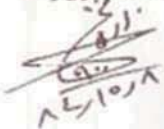
Research Center's activities from the early 1990s was quite vast. The information in these telexes was analyzed by numerous experts and ISIS published about 50 of these telexes in its report.

On December 14, 2009 the London Times published a document unveiling the structure of the Physics Research Center as of 2005. The document, with the signature of Mohsen Fakhrizadeh, the key individual in weaponizing the regime's nuclear project, is shown below.

Original segment of a letter, dated December 29th 2005, from the chairman of FEDAT Mohsen Fakhri-Zadeh to his centers.

رئیس حوزه توسعه کاربرد فناوریهای پیشرفته

محسن فخری زاده


۸۴/۱۰/۲۹

گیرندگان:

- ۱- ریاست محترم مرکز آمادگی و فناوریهای نوین دفاعی
- ۲- ریاست محترم مرکز تحقیقات و توسعه فناوری انفجار و ضربه
- ۳- ریاست محترم مرکز ساخت و تحقیقات صنعتی
- ۴- ریاست محترم مرکز تحقیقات و فناوری مواد پیشرفته - گروه شیمیایی
- ۵- ریاست محترم مرکز تحقیقات و فناوری مواد پیشرفته - گروه فلزی
- ۶- ریاست محترم مرکز تحقیقات و طراحی فناوریهای نوین هوافضا
- ۷- ریاست محترم حفاظت اطلاعات حوزه
- ۸- معاون محترم مالی و بودجه حوزه
- ۹- معاون محترم طرح و برنامه حوزه
- ۱۰- معاون محترم علمی حوزه
- ۱۱- معاون محترم اداری و نیروی انسانی حوزه
- ۱۲- مدیریت محترم بازرسی و حقوقی حوزه

Source: Times of London

Chairman of the Field for Expansion of Deployment of Advanced Technologies
Mohsen Fakhri-Zadeh
(Signature and date: December 29th 2005)

Addressees:

1. Chairman of the Center for Readiness and Modern Defense Technologies
2. Chairman of the Center for Research of Explosive and Shock Technologies
3. Chairman of the Industrial Production Research Center
4. Chairman of the Center for Advanced Material Research and Technologies – The Chemistry Group
5. Chairman of the Center for Advanced Material Research and Technologies – The Metallurgy Group
6. Chairman of the Center of R&D of Advanced Aeronautical Technologies
7. Head of the Information Security division of the Field
8. Head of Finance and Budget division of the Field
9. Head of Planning division of the Field
10. Head of Science division of the Field
11. Head of Administration and Personnel division of the Field
12. Director of Law and Inspection division of the Field

FEDAT centers embodies all the relevant disciplines for nuclear weapon research

Source: Times of London

Chapter 2 – Purchasing Nuclear Equipment by Physics Research Center (PHRC) (Lavisian-Shian)

Background:

After the existence of the Lavisian-Shian site was revealed by the NCRI in May 2003, satellite images provided by the Institute of Science and International Security (ISIS) on May 2004 showed that the Iranian regime had completely razed the site, and that in addition to the buildings, the roads and sidewalks were also destroyed or covered with dirt.

Ultimately, this site was inspected by the IAEA in June 2004. In their testing, IAEA inspectors established that there were more than 11 nuclear related activities ongoing there. Subsequently it was revealed that the Iranian regime had purchased a great deal of dual-purpose equipment with nuclear applications. IAEA has repeatedly requested to inspect this equipment. In January and early February 2006, after two years of requests, the regime was finally compelled to give permission to the IAEA for the inspection of some of the equipment. During the inspection of a vacuum machine it became apparent that there were traces of highly enriched uranium on it. From then on, the purchase of nuclear equipment and its relocation from the Shian site has been one of the topics of interest for IAEA inquiries.

Latest status, Unanswered Issues, Outstanding Subjects:

In 2008 the Iranian regime attempted to convince inspectors that it had already responded to questions about equipment purchases and that they were no longer a relevant topic of discussion. But as was later proven, the responses provided by the regime had been very specific deceptions.

As a case in point, the regime had not indicated the name of the tech university that the inspectors were taken to, which in reality was a university affiliated to the IRGC. Future IAEA reports – including the November 2011 report – showed that many unanswered questions remained. One key outstanding issue involved the failure of inspectors to interview Mohsen Fakhrizadeh Mahabadi, a top official in the PHRC, and subsequently SPND, and the key figure in the military dimensions of the Iranian nuclear program.

Excerpts from the IAEA September 2004 Report on Shian site:

42. The Lavisian-Shian site in Tehran was referred to in the June 2004 meeting of the Board of Governors in connection with alleged nuclear related activities and the possibility of a concealment effort through the removal of the buildings from that site.

43. As indicated above, in response to an Agency request, Iran provided access to that site. Iran also provided access to two whole body counters, and to a trailer declared to have been previously located on that site and to have contained one of the whole body counters. The Agency took environmental samples at these locations. Iran also gave the Agency a description and chronology of activities carried out at the Lavisian-Shian site. According to Iran, a Physics Research Centre had been established at that site in 1989, the purpose of which had been

“preparedness to combat and neutralization of casualties due to nuclear attacks and accidents (nuclear defence) and also support and provide scientific advice and services to the Ministry of Defence.” Iran provided a list of the eleven activities conducted at the Centre, but, referring to security concerns, declined to provide a list of the equipment used at the Centre. Iran stated further that “no nuclear material declarable in accordance with the Agency’s safeguard[s] was present” and that “no nuclear material and nuclear activities related to fuel cycle [were] carried out in Lavisian-Shian.”

44. According to Iran, the site had been razed in response to a decision ordering the return of the site to the Municipality of Tehran in connection with a dispute between the Municipality and the Ministry of Defence. Iran recently provided documentation to support this explanation.

Excerpts from the IAEA April 2006 report on dual-purpose equipment:

A.7. Transparency Visits and Discussions

24. Since 2004, the Agency has repeatedly requested additional information and clarifications related to efforts made by the Physics Research Centre (PHRC), which had been established at Lavisian-Shian, to acquire dual use materials and equipment that could also be used in uranium enrichment and conversion activities.¹⁰ The Agency also requested interviews with the individuals involved in the acquisition of those items, including two former Heads of the PHRC.

25. As previously reported, the Agency met in February 2006 with one of the former Heads of the PHRC, who had been a university professor at a technical university while he was Head of the PHRC.¹¹ The Agency took environmental samples from some of the equipment said to have been procured for use by the university, the results of which are currently being assessed and discussed with Iran. Although Iran agreed to provide further clarifications in relation to efforts to procure balancing machines, mass spectrometers, magnets and fluorine handling equipment, the Agency has yet to receive such clarifications. Further access to the procured equipment is necessary for environmental sampling. Iran has continued to decline requests by the Agency to interview the other former Head of the PHRC.

From the IAEA April 2006 report:

Footnote 10 According to Iran, the PHRC was established at Lavisian-Shian in 1989, inter alia, to “support and provide scientific advice and services to the Ministry of Defence” (GOV/2004/60, para. 43).

Footnote 11 Iran informed the Agency that the PHRC had attempted to acquire the electric drive equipment, the power supply equipment and the laser equipment, and had successfully purchased vacuum equipment for R&D in various departments of the university. The professor explained that his expertise and connections, as well as resources available at his office in the PHRC, had been used for the procurement of equipment for the technical university.

Excerpts from the IAEA February 2008 report:

A.1.1. Use of Equipment and Source of Contamination

8. According to Iran, vacuum equipment was procured in 1990 on behalf of the technical university by the former Head of PHRC because of his expertise in procurement and PHRC's business connections. The equipment was intended to be used at the Physics Department of the technical university for the coating of items such as optical mirrors, optical lasers, laser mirrors, resistive layers for solar cells and mirrors for use in medical operating theatres.

9. Iran stated that, upon receipt of the equipment in 1991, it was noticed that the delivery was incomplete and that some incorrect parts had been supplied. The equipment was therefore put into storage at the university.

Iran further stated that a number of letters of complaint were written to the supplier company at intervals until 1994, but to no avail.

10. According to Iran, some individual pieces of equipment were used both inside and outside the university during the period 1994–2003 in research, operation and maintenance activities involving vacuum conditions, but other parts of the consignment were never used. As its explanation of how the contamination had come about, Iran said that, in 1998, an individual who was testing used centrifuge components from Pakistan at the laboratory at Vanak Square for the AEOI (GOV/2004/34, para. 31) had asked the vacuum service of the university to come and repair a pump. Iran stated that some items of the vacuum equipment mentioned above were used for this repair activity and that, when these items were eventually brought back to the university, they spread uranium particle contamination.

11. To assess the information provided by Iran, the Agency spoke with the individual from the Vanak Square laboratory and the vacuum technician from the university who had carried out the repairs. The Agency was also shown the pump that had been repaired using the equipment concerned. The Agency made a detailed analysis of the signatures of the contamination of the equipment and compared them with those of the swipe samples taken from the centrifuge components in Iran which had originated in Pakistan. The Agency concluded that the explanation and supporting documentation provided by Iran regarding the possible source of contamination by uranium particles at the university were not inconsistent with the data currently available to the Agency. The Agency considers this question no longer outstanding at this stage. However, the Agency continues, in accordance with its procedures and practices, to seek corroboration of its findings and to verify this issue as part of its verification of the completeness of Iran's declarations.

A.1.2. Procurement activities by the former Head of PHRC

12. According to Iran, none of the equipment purchased or enquired about by the former Head of PHRC (see para. 4 above) was intended for use in uranium enrichment or conversion related activities, whether for research and development (R&D) or for educational activities in these fields. Procurements and procurement attempts by the former Head of PHRC were said by Iran to have also been made on behalf of other entities of Iran, as described below.

13. Iran stated that the vacuum equipment purchased by the Head of PHRC had been intended for educational purposes in the Vacuum Technique Laboratory of the university, specifically for use in experiments by students on thin layer production using evaporation and vacuum techniques, coating using vacuum systems and leak detection in vacuum systems. To support its statements, Iran presented instruction manuals related to the various experiments, internal communications on the procurement of the equipment and shipping documents. Agency inspectors visited the Vacuum Technique Laboratory and confirmed the presence of the equipment there.

14. Iran stated that some magnets had also been purchased by the Head of the PHRC on behalf of the Physics Department of the university for educational purposes in "Lenz-Faraday experiments". To support this statement, Iran presented a number of documents: instruction manuals related to the experiments; requests for funding which indicated that a decision had been made to approach the Head of PHRC to order and purchase the parts; and an invoice for cash sales from the supplier. Iran stated that the magnets were discarded after being used.

15. According to Iran, the Head of PHRC attempted twice — once successfully — to buy a balancing machine for the Mechanical Engineering Department of the university for educational purposes, such as in the measurement of vibrations and forces in rotating components due to unbalancing. To support Iran's statement, the Agency was shown laboratory experiment procedures, requests about procurement and a letter confirming the completion of the purchase. Agency inspectors visited the Mechanical Engineering Department and confirmed the presence of the balancing machine there.

16. According to Iran, the Head of PHRC also attempted to purchase 45 gas cylinders, each containing 2.2 kg of fluorine, on behalf of the Office of Industrial Interrelations of the university. Iran stated that the intended purpose of the fluorine had been to enhance the chemical stability of polymeric vessels. To support its statements, Iran presented a request to buy fluorine and a communication between the Head of PHRC and the President of the university about the proposed supplier's refusal to deliver the goods.

17. Iran stated that the AEOI had encountered difficulties with procurement because of international sanctions imposed on the country, and that that was why the AEOI had requested the Dean of the university to assist in the procurement of a UF₆ mass spectrometer. According to Iran, in 1988, the Dean of the university approached the Head of the Mechanics Workshop of the Shahid Hemmat Industrial Group (SHIG), which belonged to the Ministry of Sepah, and asked him to handle the procurement. According to Iran, the mass spectrometer was never delivered. The Head of the Mechanics Workshop, who was later appointed Head of PHRC when it was established in 1989, is the same person involved in the other procurement attempts mentioned above.

Explanation: The above-mentioned Head of PHRC is Seyed Abbas Shahmoradi. His background will be explained below.

18. The Agency took note of the information and supporting documents provided by Iran as well as the statements made by the former Head of PHRC to the Agency and concluded that the replies were not inconsistent with the stated use of the equipment. The role and activities of PHRC will be further addressed in connection with the alleged studies as discussed below.

Comparing IAEA Information with other available information

Reports by the Iranian opposition, and specifically information obtained in the years following the above-referenced reports, unveiled many aspects of the nuclear program that the regime had been attempting to cover up or to keep concealed.

Technical University or University affiliated with the IRGC

According to NCRI investigations, IAEA inspectors were taken to the IRGC's Imam Hossein University in January 2007 to inspect various equipment including vacuum pumps.

Mr. Rouhi, responsible for the university's international relations, accompanied the IAEA inspectors. IRGC Brigadier General Fazaeli was the chair of the university at the time. Mr. Soleymani and Dr. Amin, two university officials, were tasked with coordinating the IAEA visit.

In order to mislead IAEA inspectors, the Faculty of Science at the Imam Hossein University was introduced to them as the faculty of the technical university and it appears as such in the IAEA's reports. The university's Faculty of Science has a large section allocated to nuclear physics and is a military department managed by the regime's military hierarchy.

Following the IAEA inspectors' visit, as part of the scheme to erase the role of the Imam Hossein University, Fereydoon Abbasi was completely transferred from this university to Beheshti University.

Imam Hossein University was founded by the IRGC in 1986 during the Iran-Iraq War. This is the main university involved in educating IRGC rank-and-file and commanders, as well as the regime's counter-intelligence elements. The students of this university are all IRGC members and military discipline is imposed on the campus.

This university is a center of research and logistics to build nuclear weapons. It has an expansive nuclear physics department and the number of its science personnel equals that of Iran's largest universities that provide nuclear physics education.

Following the consolidation of research organs across the country in 1993, many of the IRGC research center's missions in nuclear affairs were consolidated under the Ministry of Defense, and were transferred to the Shian site and Imam Hossein University.

Imam Hossein University has regular and systematic connections with other military centers involved in building nuclear weapons and missiles, including the Mojdeh site (subsequently restructured as SPND), Malek Ashtar University, the Hemmat site in the Khojir region, and Parchin.

False Evidence Regarding Lavisan- Shian Destruction

In the Shian site two whole-body counters, which the Iranian regime had procured in the 1990s from the West under the pretext of peaceful purposes, were being used in clandestine research and a program related to nuclear fuel production activities.

The Nuclear Committee of the Supreme Security Council is the entity charged with implementing the regime's strategy on the nuclear issue. At the time when whole-body counters were being utilized at the Shian site, the Nuclear Committee was chaired by Hassan Rouhani and its members included Ali Shamkhani, the former defense minister and current Secretary of the Supreme National Security Council; Gholamreza Aghazadeh, then head of the Atomic Energy Organization; Ali Younesi, then Minister of Intelligence; Kamal Kharrazi, then Minister of Foreign Affairs; and Ali Akbar Velayati, former Minister of Foreign Affairs and currently Khamenei's senior advisor in international affairs. The committee came to the conclusion that the IAEA would definitely seek to inspect the site, and would follow up on the whole-body counters and the reason for the site's destruction. The following measures were carried out to justify these activities and deceive international organizations:

1. Following the razing and destruction of Shian, Tehran transferred the whole-body counters to different locations in order to lead IAEA inspectors to new locations and to mislead them regarding the true objectives of these devices. One of these counters was taken to the Isfahan Campus of the Malek Ashtar University, and the second was transferred to Tehran's Chamran Hospital, both of which are linked to the Ministry of Defense.

2. On June 27, 2004, Hassan Rouhani made the following remarks to justify the destruction of this site: “They say why they destroyed a building. But fortunately in recent months there have been good relations between the municipality and the armed forces, and you know that many of Tehran’s area that were previously military bases and garrisons have reached agreements with the municipality. Lavan was also one of these areas that was in dispute for years between the municipality and the Ministry of Defense. The municipality claimed the site was supposed to be a park according to the municipality plans and the grounds belong to the municipality. Recently they have come to an agreement to destroy the grounds and place it at the municipality’s disposal to build that park that they had given the plans for, and the municipality will give other grounds in return.”

Subsequent to the explanations provided by Rouhani, the NCRI obtained reports from the municipality in section 3 of district 4 of Tehran, where Lavan is located. They stated in part:

“The Tehran Municipality, in section 3 of district 4, noticed the destruction and razing of a military center in Lavan-Shan. This site belongs to the Ministry of Defense. Considering the fact that the municipality cannot enter military areas, the razing was reported to senior officials.”

This report indicated that the location had nothing to do with the municipality, as evidenced by the fact that there were no conflicts between it and the IRGC and Defense Ministry, despite the fact that the latter two entities had numerous buildings in this area. The only rift between the municipality and Defense Ministry was on a road opened by one of its centers in Shan between residential areas, where approximately 100 locals complained to the municipality, forcing it to stop construction until the matter was resolved.

The Ministry of Intelligence (one of the members of the Nuclear Committee of the Supreme National Security Council) ordered the destruction of the report prepared by section 3 of district 4, and even demanded that personnel informed of this matter be relocated to other posts. Furthermore, the Defense Ministry placed articles in newspapers to mislead inspectors about the actual rationale for the destruction by claiming that locals and the municipality had raised objections about the building concerned.

Information from other sources

A report published by French daily Le Figaro¹ on February 23, 2008 is very telling. Chris Charlier, an IAEA inspector, said that in 2004, after much insistence, the team under his supervision was finally able to inspect the Lavan nuclear center near southern Tehran. Despite the insistence of the inspecting team, for two months the gates of this center remained closed and finally, after they were

1. <http://www.lefigaro.fr/international/2008/02/22/01003-20080222ARTFIG00007-comment-l-iran-caches-secrets-nucleaires-a-l-iaea.php?pagination=3>

granted permission to enter, the inspectors were astonished to see that the building had been completely demolished and the ground had been razed at a depth of four meters, then refilled.

According to Le Figaro, the inspectors took samples to gain knowledge of these changes and developments, and in the recently returned dirt they found traces of uranium enriched up to 20%. Of course, at that time there were no signs of very advanced centrifuges that would be able to enrich uranium to such a level. However, in 2006 after the Iranian regime had time and again denied their existence, then-President Ahmadinejad finally admitted to their being in use.

Who is the Former Physics Research Center Chief?

The Institute for Science and International Security (ISIS) published an in-depth report on May 16, 2012 regarding documents related to the purchases made by the PHRC, naming Seyed Abbas Shahmoradi as the man in charge of this center. Shahmoradi was an IRGC officer and a professor of Malek Ashtar University in 2004.

From 1981 to 1983 he was a professor of Sharif Technical University and a member of the Academic Jihad. In 1983, three centers – IRGC Research, Construction Jihad's Combat Research Unit, and Academic Jihad Research – began working in nuclear, biological, chemistry and missile fields. After the Iran-Iraq war they merged into one entity under the control of the Ministry of Defense.

According to the ISIS investigation, Ali Akbar Salehi, then Foreign Minister of the Islamic Republic of Iran and the current head of the Atomic Energy Organization, had previously purchased goods for Iran's nuclear activities.

ISIS indicated that it has in its possession 1,600 telexes and other documents, all addressed to Mr. Salehi as the Dean of Sharif Tech University.

These communications include information on purchasing two radiation measurement devices, which the IAEA learned about in 2003. At least one of these devices was installed in the military facilities near Lavisan. For ten years, the PHRC was stationed at this location. The Iranian regime's razing of the site compounded the IAEA's suspicions, since the items are dual-use equipment.

These documents were addressed to Mr. Salehi as the Dean of Sharif Tech University. However, the name of Abbas Shahmoradi Zavare, then PHRC chief, is repeatedly mentioned in these documents. This evidence indicates that Salehi was fully cognizant of these purchases and may have been actively involved in them. Thus, he was using the University as the end-user in order to procure equipment for PHRC.

As stated in the telexes, some of the items originated from the US and their export required export permission from relevant authorities. Moreover, Iran knew that the US would not issue permits for a military organization to purchase these items. The telexes mention a European middleman in Vienna, and the receiver of the equipment was specified as Sharif Tech University.

The telexes were sent from the university number, but the numbers are very similar to the numbers of the PHRC. After a year, they were using the PHRC's number.

Another telex message shows the weight of the purchased equipment was 6 tons and an individual, whose name has been redacted, was eager to talk with Mr. Shahmoradi. All the telexes were addressed to Sharif Tech University.

Another telex included the names of both Mr. Salehi and Mr. Shahmoradi, adding that the equipment must be delivered to Dr. Salehi at Sharif Tech University. The name of Shahmoradi is copied, while the European middleman informed Tehran that two packages were sent for Shahmoradi by DHL. These were the export permission documents that Shahmoradi had to sign.

The telexes mentioned that face-to-face meetings were also conducted between the two parties to the deal. One message indicated that the representative of a European company met with Shahmoradi in Tehran regarding the installation of the devices and other issues.

Another telex showed Sharif Tech University informed the European company that Shahmoradi, as the chief of a delegation in Vienna, had complete authority to negotiate on how to conduct the deal, and explained where he could be reached again in Germany.

Subsequent to delivery, the equipment was installed by the seller in two flat-bed trucks at the Nuclear Research Center in Karaj, ostensibly to be used for medical and agricultural purposes. At that time construction of this center had not been completed and there were no activities at this site. Subsequently, Iran itself informed the IAEA that the equipment had been purchased for the Atomic Energy Organization and were installed in Karaj. Iran permitted the IAEA to inspect the flat-bed trucks, and it is said one of them was in Lavisán. By installing the devices in the trucks, Iran was able to easily relocate them and cover up their final destination.

Reminder of the Role of PHRC and its Chief

The PHRC was the same Lavisán-Shián site that the regime razed following its exposure in May 2003.

The other chief of this center, whom the regime has not permitted to be interviewed for the past 10 years, is Mohsen Fakhrizadeh Mahabadi, another key individual in Iran's nuclear program. He is currently chief of SPND.



Satellite Image of Imam Hossein University –Tehran



Lavisian-Shian site Prior and after May 2004

Chapter 3 – Procuring Necessities of Parallel & Secret Path, including Uranium Enrichment

Introduction:

One of the main issues constantly raised between the IAEA and the Iranian regime has been the production of highly enriched uranium carried out in secret and outside of IAEA control.

IAEA reports show the Physics Research Center (main research organ seeking to obtain nuclear weapons technology and its necessities) was seeking to extract and enrich uranium, and allocate a specific section to this objective. The remaining issues in relation to IAEA documents are the subject of the Gchine mine, the Kimia Maadan Company and the production of green salt. Systematic, long-lasting and widespread communications between the Atomic Energy Organization and the organ in charge of pursuing bomb production (Physics Research Center at the early stage, and presently SPND) included various aspects of production such as supplies, personnel and research, amongst others.

Latest status

Obtained Information points out that Iran's Atomic Energy Organization, whose objective ostensibly was obtaining nuclear technology for peaceful purposes, has actually been at the disposal of the nuclear bomb production organ (SPND). This organization utilized companies, supplies, and centers of the Atomic Energy Organization to obtain enriched uranium. Moreover, the Iranian regime began building a set of underground complexes to keep its nuclear activities secret. The trend continues and many unanswered questions and ambiguities remain on the issue.

IAEA Report on Extracting & Enriching Uranium by Physics Research Center

Excerpt from IAEA April 2006 Report:

28. As indicated in GOV/2006/15, Iran stated that the allegations with regard to the Green Salt Project “are based on false and fabricated documents so they were baseless,” and that neither such a project nor such studies exist or had existed. Iran stated that all national efforts had been devoted to the UCF project, and that it would not make sense to develop indigenous capabilities to produce UF₄ when such technology had already been acquired from abroad. However, according to information provided earlier by Iran, the company alleged to have been associated with the Green Salt Project had been involved in procurement for UCF and in the design and construction of the Gchine uranium ore processing plant.

Explanation: The above-mentioned Green Salt Project is a method of uranium enrichment using chemical means, transforming uranium dioxide to UF₄.

Excerpts from IAEA February 2008 Report:

A.4. Gchine Mine

25. On 22 and 23 January 2008, a meeting took place in Tehran between the Agency and Iranian officials during which Iran provided answers to the questions raised by the Agency in its letter dated 15 September 2007 (GOV/2007/58, para. 27) with a view to achieving a better understanding of the complex arrangements governing the past and current administration of the Gchine uranium mine and mill (GOV/2005/67, paras 26–31).

26. According to Iran, the exploitation of uranium at the Gchine mine, as well as the ore processing activities at the Gchine uranium ore concentration (UOC) plant, have always been and remain the responsibility of the AEOI.

27. Iran stated that, by 1989, the extent of uranium reserves at Saghand in central Iran had been established in cooperation with Chinese experts. Considering the promising output of this region, a contract for equipping the Saghand mine and designing a uranium ore processing plant was concluded with Russian companies in 1995. Insufficient funding was allocated in the Government's 1994–1998 five-year plan for the AEOI to pursue activities at both Gchine and Saghand. Since there was more uranium (estimated 1000 tonnes) at Saghand than at Gchine (estimated 40 tonnes), it was decided to spend the available funds on Saghand.

28. According to Iran, in the period 1993–1998, tasks such as the preparation of technical reports and studies, and some chemical testing of ores, were performed at the AEOI Ore Processing Center (OPC) at TNRC. The focus of some of the documentation work had been to justify funding of Gchine in the 1999–2003 five-year plan. These efforts were successful and funding for further exploration and exploitation at Gchine was approved in the plan. A decision to construct a UOC plant at Gchine, known as "Project 5/15", was made on 25 August 1999.

29. During the 22–23 January 2008 meetings, Iran also provided the Agency with supporting documentation regarding the budget, the five-year plans, contracts with foreign entities and the preparation of studies and reports. The Agency concluded that the documentation was sufficient to confirm the AEOI's continuing interest in and activity at Gchine in the 1993–1999 period.

30. Regarding the origin and role of the Kimia Maadan (KM) Company, Iran stated that the OPC, in addition to its own staff, had hired consultants and experts for various projects, including for work relating to Gchine. When budget approval was given in 1999 for exploration and exploitation at Gchine, some experts and consultants had formed a company (KM) to take on a contract from the AEOI for the Gchine plant. Supporting documentation was provided to the Agency showing that KM was registered as a company on 4 May 2000. Iran stated that KM's core staff of about half a dozen people consisted of experts who had previously worked for the OPC. At the peak of activity, the company employed over 100 people. In addition to its own staff, KM made use of experts from universities and subcontractors to work on the project.

31. According to Iran, KM was given conceptual design information by the AEOI consisting of drawings and technical reports. KM's task was to do the detailed design, to procure and install equipment and to put the Gchine UOC plant into operation. The contract imposed time constraints and the time pressure led to some mistakes being made. After the detailed design was completed, changes had to be made which led to financial problems for KM.

32. Iran stated that KM had had only one project — the one with the AEOI for construction of the Gchine UOC plant on a turnkey basis. However, the company had also helped with procurement for the AEOI because of the AEOI's procurement constraints due to sanctions (GOV/2006/15, para. 39). A document listing items procured for the Uranium Conversion Facility (UCF) was provided by Iran. According to Iran, because of KM's financial problems, the company ceased work on the Gchine project in June 2003, when the three-year contract

with the AEOI came to an end. Iran stated that KM was officially deregistered on 8 June 2003 and provided a document supporting this statement. After KM stopped work, the OPC again took over work on the Gchine UOC plant.

33. Iran stated that KM had been able to progress quickly from its creation in May 2000 and to install foundations for the UOC plant by late December 2000 because the conceptual design for the plant had been done by the OPC. This conceptual design and other “know-how” had been supplied to KM, which used the information for the detailed design of processing equipment. KM was therefore quickly able to prepare drawings and issue purchase orders. Documents supporting the conceptual work done by the AEOI were presented to the Agency by Iran.

34. Much of the supporting information provided by Iran had not been presented to the Agency during past discussions about Gchine. The Agency concluded that the information and explanations provided by Iran were supported by the documentation, the content of which is consistent with the information already available to the Agency. The Agency considers this question no longer outstanding at this stage. However, the Agency continues, in accordance with its procedures and practices, to seek corroboration of its findings and continues to verify this issue as part of verification of the completeness of Iran’s declarations

Annex of IAEA November 2011 Report:

C2 C.2. Procurement activities

25. Under the AMAD Plan, Iran’s efforts to procure goods and services allegedly involved a number of ostensibly private companies which were able to provide cover for the real purpose of the procurements. The Agency has been informed by several Member States that, for instance, Kimia Maadan was a cover company for chemical engineering operations under the AMAD Plan while also being used to help with procurement for the Atomic Energy Organization of Iran (AEOI).³¹

Unanswered Question on Production of Highly Enriched Uranium (HEU)

A key, lingering, and unanswered question raised regarding the Iranian regime’s plan to make nuclear weapons: Was Tehran seeking to produce HEU in a known site, and if so, what entities and which officials were involved?

As indicated in IAEA reports, the Iranian regime has denied any type of activities in the Physics Research Center on uranium enrichment, and it has stated all such activities are under the control of the Atomic Energy Organization and are completely peaceful. Furthermore, it denied the documents pertaining to the Green Salt Project 5 (extraction and uranium enrichment) and described them as forged.

However, extensive intelligence reports and the facts on the ground have challenged this claim and shown a specific plan with the necessary parts to procure HEU outside of the defined cycle for the IAEA. These facts were not limited to HEU. In fact, it shows a concerted effort to establish a parallel system in direct and close contact with military organs, specifically the IRGC and Defense Ministry. In this context, the regime’s civil and known organs played a logistics and procuring role (equipment and experts) for the secret section.

Kimia Maadan Company & its Relation with the Atomic Energy Organization and Physics Research Center

As stated in the annex of IAEA November 2011 report, “The Agency has been informed by several Member States that, for instance, Kimia Maadan was a cover company for chemical engineering operations under the AMAD Plan while also being used to help with procurement for the Atomic Energy Organization of Iran (AEOI).”

According to a report by the NCRI, all documents related to the Kimia Maadan Company in the Atomic Energy Organization were collected by the intelligence officials and the personnel were ordered to not provide any information about this company. Moreover, odd and inexplicable orders were issued in 2003 to close down this company after its name was revealed.

Close Relations between Officials of Physics Research Center Officials & Atomic Energy Organization

Senior officials of the Physics Research Center and the Atomic Energy Organization had close cooperation and Atomic Energy Organization assets have been at the disposal of the Physics Research Center:

As specified in the documents published by the Institute of Science and International Security, equipment purchases for the Physics Research Center – led by Abbas Shahmoradi from 1989 to 1999 – were carried out with the signature of the then Sharif Tech University Dean Ali Akbar Salehi. This fact clearly shows that Salehi, in charge of the Atomic Energy Organization for years, was fully informed of the plans and objectives pursued by the Physics Research Center from early on, and that the purchases were made bearing his signatures.

Fereydoon Abbasi is an IRGC member and the key man after Mohsen Fakhrizadeh in the Physics Research Center; he has worked on the secret activities of neutron initiators and laser enrichment, and he was in charge of the Atomic Energy Organization during the tenure of Ahmadinejad. In this position he used the assets and property of the Atomic Energy Organization at the disposal of SPND (the new name for Physics Research Center).

Beheshti University is where the joint research and scientific cooperation takes place between the most senior officials and nuclear experts of the Atomic Energy Organization and SPND. Test labs, equipment and professors of this university are used to advance secret projects. For example, Gholamreza Aghazadeh, who was in charge of the Atomic Energy Organization for years, and Fereydoon Abbasi, were among the most important and key individuals of the nuclear weapon project. Other experts of both organs are professors at Beheshti University and they use campus labs

and equipment. After the role of the IRGC's Imam Hossein University in relation to military nuclear research was revealed, part of the research by this university was transferred to Beheshti University.

The key actor in laser research is Jamshid Sabbaghzadeh, a close associate of Fakhrizadeh. In 1998 he and Fakhrizadeh were professors of physics in the IRGC's Imam Hossein University and they carried out joint research in relation to laser technology. He is currently working at the Lashkar-Abad Laser Center under the Atomic Energy Organization. This reveals the fact that laser activities and research currently pursued at the Lashkar-Abad site are all related to the SPND activities.

Kala Electric Company & its Relations with Lavan-Shan

The Kala Electric Company that functioned affiliated to the Atomic Energy Organization was the main entity manufacturing centrifuges and enrichment prior to 2002. Its main office was in the Lavan area and it worked in cooperation with the New Defense Technologies and Preparedness Center in Lavan-Shan on a project to produce enriched uranium, the main element for a nuclear weapon.

From 2002 to 2003 this company was transferred from the Lavan area to a black-colored 8-story building in Tehran's Vali Asr Avenue near Tajrish Square. This property was purchased by the Atomic Energy Organization and preliminary measures to prepare the building were carried out. However, since the regime was facing the threat of this site being exposed once again, Tehran had this building closed down and dispersed its companies.

Role of Physics Research Center & its Production of Uranium

The Institute for Science and International Security (ISIS) said in February 2012 it has been able to obtain around 1,600 telexes exchanged between the Physics Research Center and Beheshti University, and their counterparts outside of Iran. Based on this data and other information provided by Western governments, the IAEA and international media, it is rather evident that the scope of the Physics Research Center's activities from the early 1990s has been very widespread.

According to this information it appears the Physics Research Center was involved in various activities related to nuclear technology, including manufacturing gas centrifuges, laser enrichment, radiation protection, chemical changes in uranium, discoveries and most probably issues related to uranium mines, and the production of heavy water. These findings confirm the fact that Iran's Ministry of Defense has been involved in many areas, related to the full nuclear fuel cycle and research on building nuclear weapons.

Connection between Fordow & SPND

In May 2012, the NCRI put out a report in which, among other things, it stated that the construction of the Fordow site in Qom was initiated under the supervision of Mohsen Fakhrizadeh. During the

entire construction period of this site he personally followed and supervised the project. The specialists of the SPND are in direct contact with the Fordow site in Qom and monitor the activities at this site. It was a clear indication of the objectives of the construction of the Fordow site.

This site has a 3000-centrifuge capacity. This is very low capacity for enrichment on an industrial scale. This fact alone strengthens the probability that the site's construction had a military purpose. It is also telling that the road to the site entrance passes through an IRGC military base.

It is also worth considering the fact that the construction of Fordow began after 2002, when Natanz and Arak were revealed and the regime's biggest political and international crisis began.

Constructing a new secret site entailed a high risk for the regime given that the government was cognizant that the site might be exposed. This indicates that the regime concluded that the construction of such a site was necessary and vital, and that they accept all risks.

Building Underground Tunnels & Centers in Connection to SPND

Since 2010 the NCRI has revealed several clandestine sites in connection with the SPND.

There has been no inspection of these sites and their activities to this date.

On September 9, 2010, the NCRI revealed that a new clandestine nuclear site 120 kilometers west of Tehran in Behjatabad in the Abyek Township of Qazvin Province had been identified. This project was initiated during the former defense minister Mostafa Mohammad Najari's term. For domestic use within the ministry of defense and IRGC, this plan has been named as "Project #311".

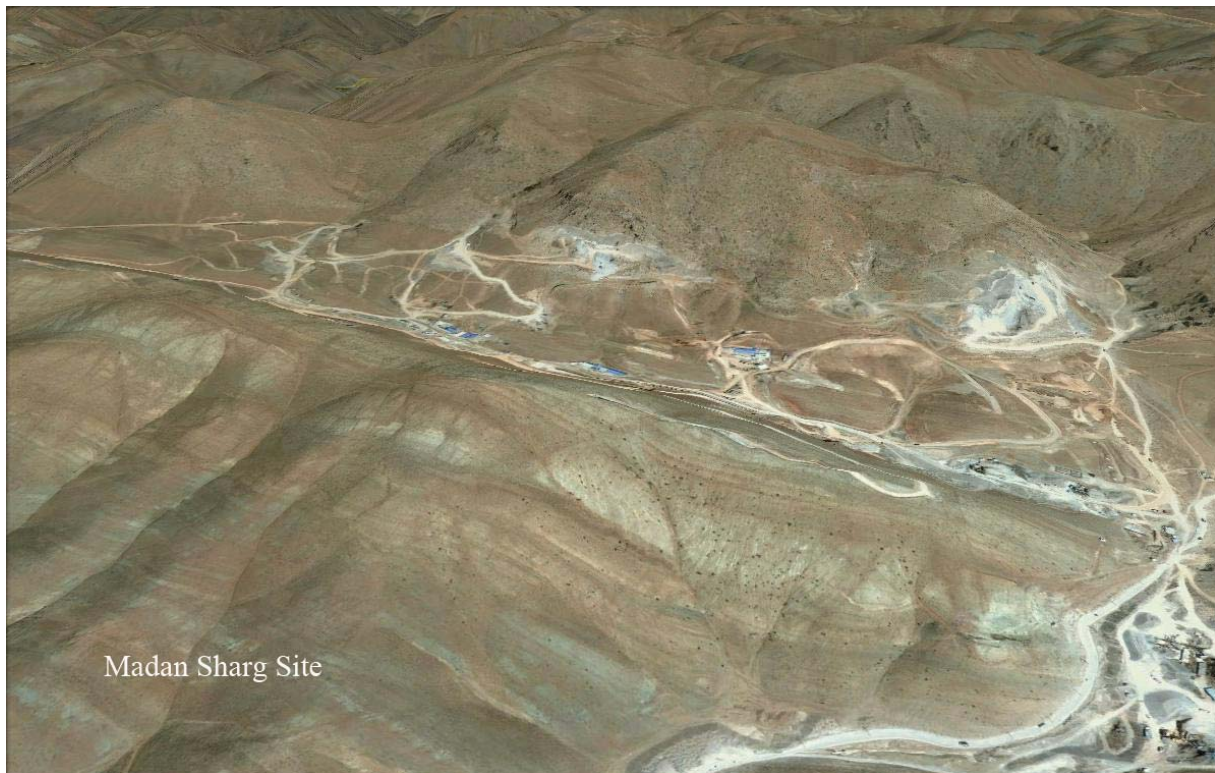
On 11 July 2013, the NCRI revealed a site with the code name Ma'adan Sharq (literally meaning the Eastern Mine) or "Kothar Project." This site, with a completely secret budget that is part of the regime's national security budget, is a new and completely clandestine site and has been allocated to the nuclear project. This site is located 10 kilometers east of the town of Damavand, in an area known as Asb-Cheran. This site, which has been jointly built by a number of Ministry of Defense and IRGC engineering companies, has four tunnels. Two of its tunnels are 550 meters long and 6 galleries have been built within them.

On September 18, 2013, the NCRI revealed the 012 site in the Haft-e Tir Military complex. This site is located in the regime's military industrial area in Isfahan. It is adjacent to the Isfahan-Shiraz highway, close to the town of Mobarakeh. The distance between this military area and Mobarakeh is about 10 kilometers. This site is a tunnel within a mountainous area south of this military zone. There is no other way of entering this site other than from within the military industrial complex.

In analyzing the above facts it is clear that creating a parallel system to the AEOI has been on the agenda for a long time. Public and civil organs have been at the service of this parallel system. This parallel system includes:

- Close and intimate relations that have existed since the beginning between the SPND Organization and the regime's AEOI, which the latter serving the interests of the SPND and formerly the Physics Research Center
- Sharif Technical University's purchases of necessary equipment for the PHRC, and the related close ties between Shahmoradi and Salehi.
- The relations of Kimia Maadan with the PHRC and the AEOI.
- The relations of Kala Electric with Lavisan- Shian.
- The cooperation of Fereydoon Abbasi and Gholamreza Aghazadeh at Beheshti University
- The relations of Mohsen Fakhrizadeh and Jamshid Sabaqzadeh on laser researching
- The relations of the SPND Organization with the Fordow site

All point to the fact that in order to acquire HEU the regime has used various methods, i.e. centrifuge, chemical (green salt), and laser, and has systematically used facilities, good offices and staff of the AEOI. These actions suggest a close relationship between AEOI and the organization tasked with weaponization of the nuclear project.



Satellite image of Madan Sharg site



Madan Sharg site- picture 2



Haft-tir site Photo 1



Haft-tir site- photo 2



Hafte-tir site- photo 3

Chapter 4 – Laser Enrichment

Introduction

Enrichment using lasers, the extent of the Iranian regime's involvement in this project, its advances in this method of enrichment, and the sites allocated to this project have all been matters of constant discussion between the IAEA and the Iranian regime for a decade now. Questions regarding the total halt or resumption of this project have been repeatedly discussed and pursued.

Latest status

The Iranian regime initiated specific work to enrich uranium using lasers in the 1990s. The Physics Research Center and the SPND organization have conducted detailed activities for enrichment by laser. According to nuclear experts, laser enrichment is the best method for clandestinely obtaining highly enriched uranium since it does not need a large facility as is the case when centrifuge cascades are used.

Although the subject has been under scrutiny by the IAEA since 2003, there remains much ambiguity regarding the regime's laser enrichment, particularly the developments in Lashkar-Abad and information regarding the regime's experts, such as Jamshid Sabbaghzadeh and Mohammad Amin Bassam. It was in February 2010 that former President Mahmoud Ahmadinejad announced that Iran has mastered the technology necessary for laser enrichment. However, the Iranian regime has left IAEA questions about this enrichment unanswered.

Investigations by IAEA on laser enrichment of uranium

Excerpts from IAEA August 2003 report:

C.2.2. Laser Programme

40. Iran has a substantial R&D programme on lasers. Iran has stated that it currently has no programme for laser isotope separation.

41. In May 2003, the Agency requested additional information about two sites near Hashtgerd owned by the AEOI which had been referred to in open source reports as locations allegedly engaged in laser and centrifuge uranium enrichment activities. The Agency was permitted to visit those locations on 12 August 2003.

42. One of the locations was Ramandeh, which belongs to the AEOI and is part of the Karaj Agricultural and Medical Centre. This location is primarily involved with agricultural studies said to be unrelated to nuclear fuel cycle activities. The other location visited was a laser laboratory at Lashkar Ab'ad belonging to the Research and Development Division of the AEOI. During that visit, Iranian officials stated that the laboratory had originally been devoted to laser fusion research and laser spectroscopy, but that the focus of the laboratory had been changed, and the

equipment not related to current projects, such as a large imported vacuum vessel, had been moved. Among other activities observed by the Agency were the production and testing of copper vapour lasers of up to 100 watts. However, there appeared to be no activities directly related to laser spectroscopy or enrichment being carried out at the laboratory. The Iranian authorities were asked to confirm that there had not been in the past any activities related to uranium laser enrichment at this location or at any other location in Iran. The Agency has requested permission to take environmental samples at the laboratory, which the Iranian authorities have undertaken to consider.

43. In the letter from Iran dated 19 August 2003, the Agency was informed that, in the past, apart from planned co-operation in laser fusion and laser spectroscopy which never materialized, there had been a research thesis on laser spectroscopy of SF₆ prepared by a university student in co-operation with the laser division of AEOL. While such a study could be seen as relevant to laser enrichment, the underlying experiments appear not to have involved nuclear material.

Excerpts from IAEA November 2003 report:

C.3.2. Laser Enrichment

36. As reflected in GOV/2003/63 (para. 41), Iran permitted the Agency to visit in August 2003 a laboratory located at Lashkar Ab'ad, which was described by Iran as originally having been devoted to laser fusion research and laser spectroscopy, but whose focus had been changed to research and development and the manufacture of copper vapour lasers (CVLs). In its 19 August 2003 letter to the Agency, Iran stated that it had had a substantial research and development programme on lasers, but that it currently had no programme for laser isotope separation.

37. During discussions which took place in Iran from 2 to 3 October 2003, in response to Agency questioning, the Iranian authorities acknowledged that Iran had imported and installed at TNRC laser related equipment from two countries: in 1992, a laser spectroscopy laboratory intended for the study of laser induced fusion, optogalvanic phenomena and photoionization spectroscopy; and in 2000, a large vacuum vessel, now stored at Karaj, for use in the spectroscopic studies referred to in the previous paragraph.

38. On 6 October 2003, Agency inspectors were permitted to take at Lashkar Ab'ad the environmental samples requested by the Agency in August 2003. The inspectors also visited a warehouse in the Karaj Agricultural and Medical Centre of the AEOL, where a large imported vacuum vessel and associated hardware were stored. The Iranian authorities stated that the equipment had been imported in 2000, that it had never been used, and that it had now been packed for shipment back to the manufacturer, since the contract related to its supply had been terminated by the foreign partner in 2000. The inspectors were informed that later during their visit to Tehran the equipment related to the laboratory imported in 1992 would be made available for examination and environmental sampling and the individuals involved in the projects would be available for interviews. However, these interviews and the presentation of the equipment were deferred by Iran.

39. In its letter dated 21 October 2003, Iran acknowledged that, starting in the 1970s, it had had contracts related to laser enrichment with foreign sources from four countries. These contracts are discussed in detail in Annex 1 to this report.

40. During the inspectors' follow-up visit to Iran between 27 October and 1 November 2003, Iran provided more information on Lashkar Ab'ad and acknowledged that a pilot plant for laser enrichment had been established there in 2000. The project for the establishment of the plant consisted of several contracts covering not only the supply of information, as indicated in Iran's letter of 21 October 2003 to the Agency, but also the delivery of additional equipment. Iran also stated that uranium laser enrichment experiments had been conducted between October 2002 and January 2003 using previously undeclared natural uranium metal imported from one of the other suppliers. According to Iranian authorities, all of the equipment was dismantled in May 2003 and transferred to Karaj for storage together with the uranium metal. The equipment and material were presented to Agency inspectors at Karaj on 28 October 2003.

41. In the meeting of 1 November 2003, Iran agreed to submit all of the relevant ICRs and design information, and to present the nuclear material for Agency verification during the inspection scheduled for 8–15 November 2003.

Laser enrichment of up to 15%

Excerpt from IAEA June 2004 report:

33. Iran had previously stated that the production capability of the atomic vapour laser isotope separation (AVLIS) equipment used at the Comprehensive Separation Laboratory (CSL) in the 1990s was on the order of a few milligrams per day, and that the equipment was able to enrich uranium up to the contracted level of 3% U-235, and even slightly beyond (GOV/2003/75, para. 59). With Iran's cooperation, the Agency's laser enrichment experts have been able to confirm Iran's statement regarding production capability. However, during the Agency experts' visit in May 2004, Iran presented laboratory reports indicating that the average laser enrichment levels achieved in these small quantities had been 8% to 9%, with some samples of up to approximately 15%. These laboratory reports are currently being assessed in more detail.

Laser enrichment activities and sites not declared to IAEA

Excerpts from IAEA November 2004 report:

86. As assessed in light of all information available to date, these failures can now be summarized as follows:

a. Failure to report:

(i) the import of natural uranium in 1991, and its subsequent transfer for further processing;

(ii) the activities involving the subsequent processing and use of the imported natural uranium, including the production and loss of nuclear material where appropriate, and the production and transfer of waste resulting therefrom;

(iii) the use of imported natural UF₆ for the testing of centrifuges at the Kalaye Electric Company workshop in 1999 and 2002, and the consequent production of enriched and depleted uranium;

(iv) the import of natural uranium metal in 1993 and its subsequent transfer for use in laser enrichment experiments, including the production of enriched uranium, the loss of nuclear material during these operations and the production and transfer of resulting waste;

(v) the production of UO₂, UO₃, UF₄, UF₆ and ammonium uranyl carbonate (AUC) from imported depleted UO₂, depleted U₃O₈ and natural U₃O₈, and the production and transfer of resulting wastes; and

(vi) the production of natural and depleted UO₂ targets at ENTC and their irradiation in TRR, the subsequent processing of those targets, including the separation of plutonium, the production and transfer of resulting waste, and the storage of unprocessed irradiated targets at TNRC.

b. Failure to declare:

(i) the pilot enrichment facility at the Kalaye Electric Company workshop; and

(ii) the laser enrichment plants at TNRC and the pilot uranium laser enrichment plant at Lashkar Ab'ad.

c. Failure to provide design information, or updated design information, for:

(i) the facilities where the natural uranium imported in 1991 (including wastes generated) was received, stored and processed (JHL, TRR, ENTC, waste storage facility at Esfahan and Anarak);

(ii) the facilities at ENTC and TNRC where UO₂, UO₃, UF₄, UF₆ and AUC from imported depleted UO₂, depleted U₃O₈ and natural U₃O₈ were produced;

(iii) the waste storage at Esfahan and at Anarak, in a timely manner;

(iv) the pilot enrichment facility at the Kalaye Electric Company workshop;

(v) the laser enrichment plants at TNRC and Lashkar Ab'ad, and locations where resulting wastes were processed and stored, including the waste storage facility at Karaj; and

(vi) TRR, with respect to the irradiation of uranium targets, and the facility at TNRC where plutonium separation took place, as well as the waste handling facility at TNRC.

d. Failure on many occasions to cooperate to facilitate the implementation of safeguards, as evidenced by extensive concealment activities.

87. As corrective actions, Iran has submitted inventory change reports (ICRs) relevant to all of these activities, provided design information with respect to the facilities where those activities took place, and presented all declared nuclear material for Agency verification, and it undertook in October 2003 to implement a policy of cooperation and full transparency.

88. Further corrective actions may be identified by the Agency as a consequence of assessments that are still ongoing.

Attempts by Physics Research Center (the first organ to design and control bomb-making in the nuclear project) to purchase laser equipment

Footnotes from IAEA April 2006 report:

10: According to Iran, the PHRC was established at Lavisan-Shian in 1989, inter alia, to “support and provide scientific advice and services to the Ministry of Defence” (GOV/2004/60, para. 43).

11: Iran informed the Agency that the PHRC had attempted to acquire the electric drive equipment, the power supply equipment and the laser equipment, and had successfully purchased vacuum equipment for R&D in various departments of the university. The professor explained that his expertise and connections, as well as resources available at his office in the PHRC, had been used for the procurement of equipment for the technical university.

Excerpt from IAEA February 2008 report:

A.5. Alleged Studies

41. During the same meetings, the Agency requested clarification of the roles of certain officials and institutes and their relation to nuclear activities. Iran was also asked to clarify projects such as the so-called “Project 4” (possibly uranium enrichment) and laser related R&D activities. Iran denied the existence of some of the organizations and project offices referred to in the documentation and denied that other organizations named were involved in nuclear related activities. Iran also denied the existence of some of the people named in the documentation and said allegations about the roles of other people named were baseless. Iran’s response to the Agency’s request regarding “Project 4” and laser related R&D activities is still awaited.

Information by Iranian opposition

Disclosure of clandestine laser enrichment by the NCRI

In May 2003, the National Council of Resistance of Iran exposed two sites related to nuclear activities, which were 4-5 kilometers apart in the Hashtgerd region near the city of Karaj.

According to information provided by the Iranian opposition, in the year 2000, the Atomic Energy Organization purchased the Hashtgerd nuclear site, which was in a huge garden that was listed as being owned by Seyyed Jalal Amir Sadri. The Jihad Tose’a Silo Company built the buildings of the Hashtgerd nuclear site in Karaj. The construction work continued for two years. It is interesting to note that the very company that was responsible for building the infrastructure of this project was also working on the construction project in Natanz and its employees and specialists were former IRGC officers.

The Atomic Energy Organization created a company called Nourafzagostar to act as a front company for the activities of the nuclear site in Karaj. The director general of Nourafzagostar is Dr. Jamshid Sabbaghzadeh. The chair of the executive board is Reza Aqazadeh.

Following the opposition’s disclosure, IAEA inspectors referred to both sites in August 2003.

Work on laser enrichment in Parchin and Mojdeh sites

The National Council of Resistance of Iran revealed on 19 November 2004 that laser enrichment had been ongoing at two military centers prior to that time.

The opposition's information revealed that the Modern Defensive Readiness and Technology Center was located in Tehran, Lavisan, Mojdeh Street. It was this center that later evolved to SPND.

The second center that the Iranian opposition introduced as the center for laser enrichment was the Parchin military compound. NCRI declared that this center was headed by Mohammad Amin Bassam, the foremost laser expert in the Ministry of Defense.

It was in March 2005 that NCRI exposed further details about the site for laser enrichment in Parchin. According to the NCRI, the chemical industry is the largest industry in this complex. Every section (or plan) in this complex is engaged in one or more military projects. To hide the nuclear site, the area was placed in Plan 1 of the chemical industry.

The management of development plan (the engineering organ) has built a tunnel and a secure shelter for the nuclear site. The laser enrichment equipment of Dr. Mohammad Amin Bassam has been placed in this secure tunnel.

Disclosure of resumption of activities at Lashkar-Abad Site

In a press conference in New York on 14 September 2006, NCRI disclosed that the Lashkar Abad Site had resumed its operations. The opposition declared that according to reports recently obtained from inside the country on laser enrichment, one of the laser enrichment sites had resumed its operations. It was headed by Jamshid Sabbaghzadeh and had been practically placed under the supervision of the United Nations back in May 2003 due to the revelations of the activities there. Thus, the regime's enrichment activities were restricted there at the time.

The NCRI report stated that the front company for the laser activities in Lashkar-Abad was **Paya Partov Company for Distribution of Lab Equipment**. This company was registered in August 2003 with registration number 207096. According to the opposition, in order for this company to offer a plausible cover for the enrichment program, it became involved in the production of laser equipment for medical and industrial purposes. The Paya Partov Co. built new facilities in this large garden, including a 500 square meter warehouse. In addition, there is some model agriculture at the end of the garden to make things appear ordinary. The information on this site is top secret such that only four individual from Lashkar-Abad district work there, and even the laborers and peasants are brought from Tehran.

The Laser and Photon Section in SPND Organization

In July 2011 the NCRI exposed the SPND Organization as the central organ for the regime's nuclear weapons program. The opposition reported that laser research was a subdivision of this organization. According to this information, this section is currently headed by Dr. Gholamali Massah. This section works on lasers and research for laser enrichment, as well as additional and related laser experiments. Mohammad Amin Bassam is one of the directors of this section who worked at Parchin Industry on laser research. He worked in Parchin's Plan 1 program.

Information from other sources

Expansion of facilities in Lashkar-Abad Site in Karaj

In a report on July 29, 2013, the Institute for Science and International Security (ISIS) reported a great expansion of construction in Iran's laser enrichment factory in Lashkar-Abad.

According to this report, a study of satellite pictures revealed that construction in this site began in 2008 and continued until the beginning of 2013 despite the fact that previous reports indicated that the equipment in this uranium laser enrichment site had been removed following the disclosure of this center's activities back in 2003.

ISIS refers to papers by two scientists involved in laser technology by the names of Jamshid Sabbaghzadeh and Mohammad Javad Torkamani.

According to ISIS, the Paya Partov laser research that has Jamshid Sabbaghzadeh as its director general is most likely the same private company the activities of which IAEA reported on in its inspections of Lashkar-Abad in 2008.

Iranian regime denies laser enrichment of uranium

Excerpt from IAEA February 2008 report:

46. On 5 February 2008, the Deputy Director General for Safeguards and the Director of Safeguards Operations B visited laboratories at Lashkar Abad, where laser enrichment activities had taken place in 2003 and earlier. The laboratories are now run by a private company, which is producing and developing laser equipment for industrial purposes. All the former laser equipment has been dismantled and some of it is stored at the site. The management of the company provided detailed information on current and planned activities, including plans for extensive new construction work, and stated that they are not carrying out, and are not planning, any uranium enrichment activities.

Chapter 5 – Development of Explosive Detonator – EBW

The International Atomic Energy Agency has, in recent years, repeatedly demanded that the Iranian regime offer explanations for its research into high voltage explosive detonators.

On several occasions, Tehran has attempted to dodge the issue by offering evasive answers that have failed to persuade investigators and have in fact raised further questions.

Latest Status:

Many unanswered questions remain. Recently-acquiring information indicates that one of the subdivisions of the Organization of Defensive Innovation and Research (SPND), which is responsible for producing the nuclear weapon, is a division called Center for Explosion and Impact, which works on special detonators.

IAEA Reports and Regime's Answers

Excerpt from IAEA report, February 22, 2008:

39. During the meetings on 3–5 February 2008, the Agency made available documents for examination by Iran and provided additional technical information related to: the testing of high voltage detonator firing equipment; the development of an exploding bridgewire detonator (EBW); the simultaneous firing of multiple EBW detonators; and the identification of an explosive testing arrangement that involved the use of a 400 m shaft and a firing capability remote from the shaft by a distance of 10 km, all of which the Agency believes would be relevant to nuclear weapon R&D. Iran stated that the documents were fabricated and that the information contained in those documents could easily be found in open sources.

Document list from IAEA May 2008 report:

A.2. High Explosives Testing

Document 1: "Analysis and Review of Exploding Bridgewire (EBW) Detonator Test Results" dated January–February 2004, comprising 11 pages in Farsi reporting on work carried out by "Project 3.12" to design and construct an EBW detonator and a suitable detonator firing unit, including testing of about 500 EBW detonators.

Document 2: One page undated document in Farsi providing text and a schematic diagram for an underground testing arrangement. The diagram depicts a 400m deep shaft located 10km from a firing control point and shows the placement of various electronic systems such as a control unit and a high voltage power generator.

Document 3: Five page document in English describing experimentation undertaken with a complex multipoint initiation system to detonate a substantial amount of high explosive in

hemispherical geometry and to monitor the development of the detonation wave in that high explosive using a considerable number of diagnostic probes.

Regime's response to IAEA's question about explosive detonator

According to the May 2008 IAEA report, the Iranian regime responded by simply denying illicit activity:

20. Concerning the alleged work to design and build an EBW detonator and a suitable detonator firing unit, Iran acknowledged that it had conducted simultaneous testing with two to three EBW detonators with a time precision of about one microsecond. Iran said, however, that this was intended for civil and conventional military applications. Iran further stated, inter alia, that there was no evidence in the documents presented to it to link them to Iran.

The Iranian regime insisted to the IAEA that these researches were non-military in nature and denied the involvement of the Physics Research Center (or at some later stage called Applied Physics Institute). It declared that the purchases were for drilling oil fields.

In the first annex to the IAEA report of November 2011 about the "Possible Military Dimensions to Iran's Nuclear Programme," this subject was studied in detail.

Excerpts from IAEA November 2011 report:

C.5. Detonator development

38. The development of safe, fast-acting detonators, and equipment suitable for firing the detonators, is an integral part of a programme to develop an implosion type nuclear device. Included among the alleged studies documentation are a number of documents relating to the development by Iran, during the period 2002–2003, of fast functioning detonators, known as "exploding bridgewire detonators" or "EBWs" as safe alternatives to the type of detonator described for use in the nuclear device design referred to in paragraph 33 above.

39. In 2008, Iran told the Agency that it had developed EBWs for civil and conventional military applications and had achieved a simultaneity of about one microsecond when firing two to three detonators together,³⁷ and provided the Agency with a copy of a paper relating to EBW development work presented by two Iranian researchers at a conference held in Iran in 2005. A similar paper was published by the two researchers at an international conference later in 2005.³⁸ Both papers indicate that suitable high voltage firing equipment had been acquired or developed by Iran. Also in 2008, Iran told the Agency that, before the period 2002–2004, it had already achieved EBW technology. Iran also provided the Agency with a short undated document in Farsi, understood to be the specifications for a detonator development programme, and a document from a foreign source showing an example of a civilian application in which detonators are fired simultaneously. However, Iran has not explained to the Agency its own need or application for such detonators.

40. The Agency recognizes that there exist non-nuclear applications, albeit few, for detonators like EBWs, and of equipment suitable for firing multiple detonators with a high level of simultaneity. Notwithstanding, given their possible application in a nuclear explosive device, and the fact that there are limited civilian and conventional military applications for such technology, Iran's development of such detonators and equipment is a matter of concern, particularly in connection with the possible use of the multipoint initiation system referred to below.

C.6. Initiation of high explosives and associated experiments

41. Detonators provide point source initiation of explosives, generating a naturally diverging detonation wave. In an implosion type nuclear explosive device, an additional component, known as a multipoint initiation system, can be used to reshape the detonation wave into a converging smooth implosion to ensure uniform compression of the core fissile material to supercritical density.³⁹

42. The Agency has shared with Iran information provided by a Member State which indicates that Iran has had access to information on the design concept of a multipoint initiation system that can be used to initiate effectively and simultaneously a high explosive charge over its surface.⁴⁰ The Agency has been able to confirm independently that such a design concept exists and the country of origin of that design concept. Furthermore, the Agency has been informed by nuclear-weapon States that the specific multipoint initiation concept is used in some known nuclear explosive devices. In its 117 page submission to the Agency in May 2008, Iran stated that the subject was not understandable to Iran and that Iran had not conducted any activities of the type referred to in the document.

43. Information provided to the Agency by the same Member State referred to in the previous paragraph describes the multipoint initiation concept referred to above as being used by Iran in at least one large scale experiment in 2003 to initiate a high explosive charge in the form of a hemispherical shell. According to that information, during that experiment, the internal hemispherical curved surface of the high explosive charge was monitored using a large number of optical fibre cables, and the light output of the explosive upon detonation was recorded with a high speed streak camera. It should be noted that the dimensions of the initiation system and the explosives used with it were consistent with the dimensions for the new payload which, according to the alleged studies documentation, were given to the engineers who were studying how to integrate the new payload into the chamber of the Shahab 3 missile re-entry vehicle (Project 111) (see Section C.11 below). Further information provided to the Agency by the same Member State indicates that the large scale high explosive experiments were conducted by Iran in the region of Marivan.

44. The Agency has strong indications that the development by Iran of the high explosives initiation system, and its development of the high speed diagnostic configuration used to monitor related experiments, were assisted by the work of a foreign expert who was not only knowledgeable in these technologies, but who, a Member State has informed the Agency, worked for much of his career with this technology in the nuclear weapon programme of the country of his origin. The Agency has reviewed publications by this foreign expert and has met with him. The Agency has been able to verify through three separate routes, including the expert himself, that this person was in Iran from about 1996 to about 2002, ostensibly to assist Iran in the development of a facility and techniques for making ultra-dispersed diamonds ("UDDs" or "nanodiamonds"), where he also lectured on explosion physics and its applications.

45. Furthermore, the Agency has received information from two Member States that, after 2003, Iran engaged in experimental research involving a scaled down version of the hemispherical initiation system and high explosive charge referred to in paragraph 43 above, albeit in connection with non-nuclear applications. This work, together with other studies made known to the Agency in which the same Minitiation system is used in cylindrical geometry, could also be relevant to improving and optimizing the multipoint initiation design concept relevant to nuclear applications.

46. The Agency's concern about the activities described in this Section derives from the fact that a multipoint initiation system, such as that described above, can be used in a nuclear explosive device. However, Iran has not been willing to engage in discussion of this topic with the Agency.

Detonator development was one of the principal topics discussed within the framework of the "Joint Statement on Framework for Cooperation" between the IAEA and the Atomic Energy Organization of Iran. In August 2014 the regime replied to some questions on that topic; however, many other questions remained to be addressed, and still remain as of this writing.

Information by Iranian opposition

METFAZ ("Center for Explosion and Impact") a subdivision of SPND

In a press conference in Paris in September 2009, the National Council of Resistance of Iran disclosed an organ called METFAZ, the Centre for Explosion and Impact. METFAZ is one of the seven subdivisions of SPND.

According to the NCRI, the system for detonating a nuclear bomb is being developed at this center. The head of the research center for explosion and shock technology is IRGC Brigadier General Javad al-Yassin, an IRGC veteran. He reports to Mohsen Fakhrizadeh, who oversees the development of the nuclear bomb itself. METFAZ and its head Javad al-Yassin were put on the list of entities sanctioned by the EU in December 2011.

This center has a central headquarters and several subordinate centers in Tehran and the vicinity.

The Organization and Tasks of METFAZ

METFAZ has three principal sections:

- A. Research section
- B. Production section
- C. Testing section

A. The research site and the headquarters of MEFTAZ

The headquarters of this organ is in a five story building in Tehran- Pars District, east of Tehran – 180TH Western Avenue (aka Yazdan Doost), between Zarin Avenue (aka Avenue 117) and Adel Avenue (aka Avenue 119) – Number 44.

Academic research and computer simulations are carried out at this location. Research on supply and procurement, on design of systems for impact and penetration, and on high energy material are all carried out at this location.

This building has no plaque and was acquired under the name of one employee at the site, Massoud Sadighi Divani, in order to conceal the fact that the Defense Ministry is its true owner.

This site has a very strong counter-intelligence system which is under the supervision of an individual called Ajini. The person in charge of the administration of the site is Karimi.

Key specialists who work at this center are:

- Research section: Masoud Sadighi Divani, Alireza Molaii, Heydari and Khosravi
- Production section: Ali Mehdipoor Omrani and Ebrahimi
- Test section: Engineer Dadash Nejad

B. Disclosure of address and specifications of the new site, center for production

According to reports published by NCRI in 2009, METFAZ has a site for construction of designs prepared by its research section.

This site is located east of Tehran on the banks of Jajrood River and adjacent to Sanjarian village.

Sanjarian village is next to a military road at the end of Babaie Highway. The village is 10 kilometers south of the end of Babaie Highway.

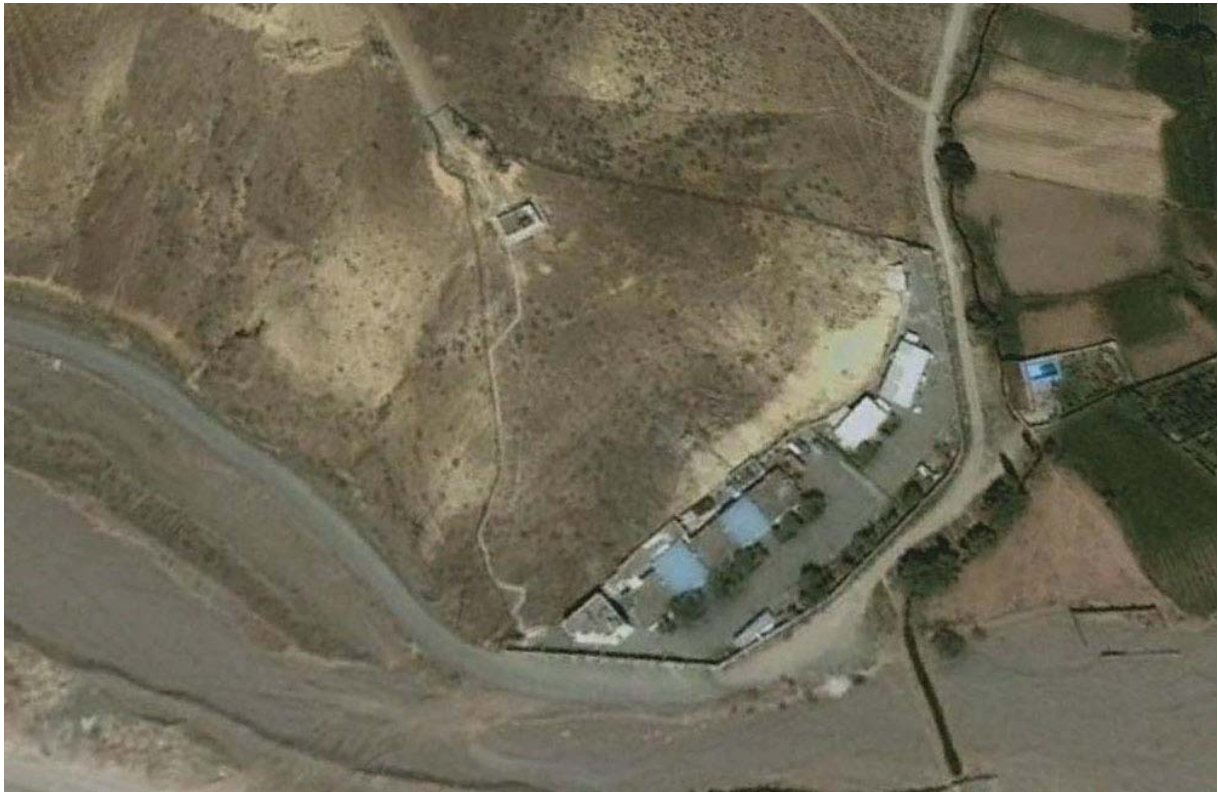
In order to conceal the activities inside the site it is completely surrounded by very high pre-fabricated concrete walls so there is no view into the site from outside. Tunnels have been built in order to supply the site and facilitate secret research.

C. Testing Section

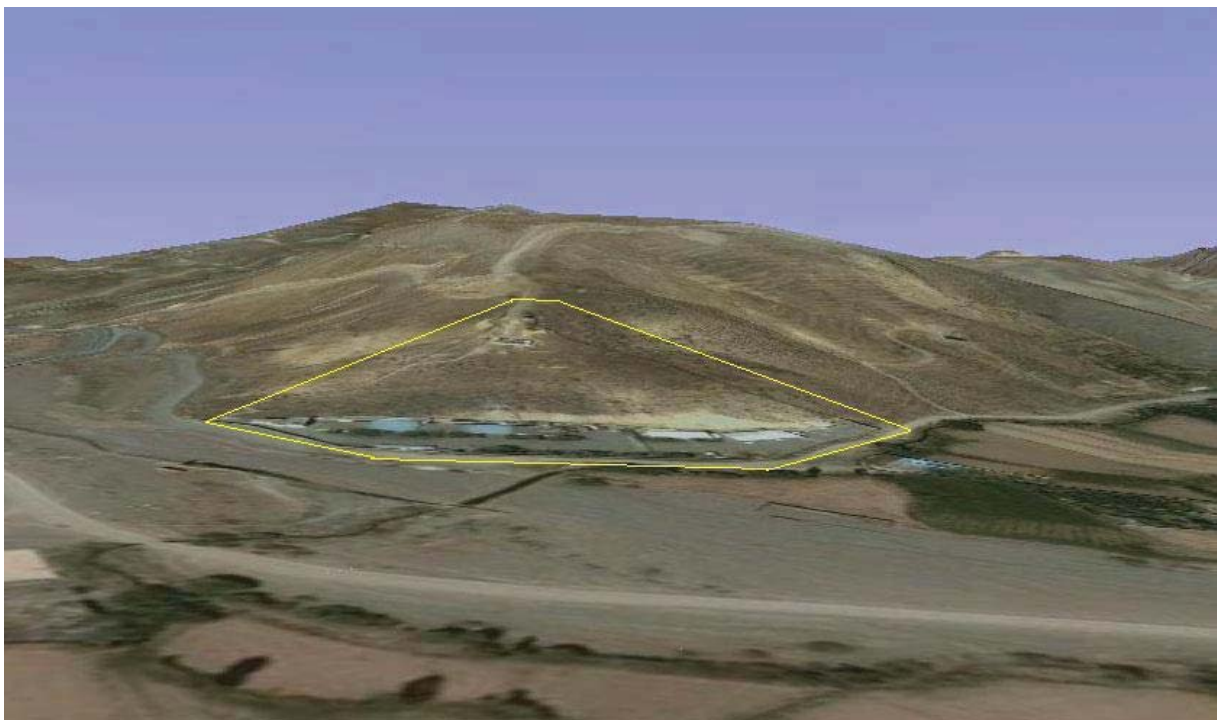
In the testing section the explosives that have been developed are tested; other tests are conducted at Parchin.

Parchin is an old site known for testing conventional explosives. The Iranian regime uses it as a cover for tests of explosives related to unconventional weapons as well.

Had MEFTAZ and its research been only for conventional military purposes, then there would have been no reason to organize it as a division of SPND with secret offices, sites, experts and researchers.



Satellite image of Metfaz- photo 1



Satellite image of Metfaz- photo 2

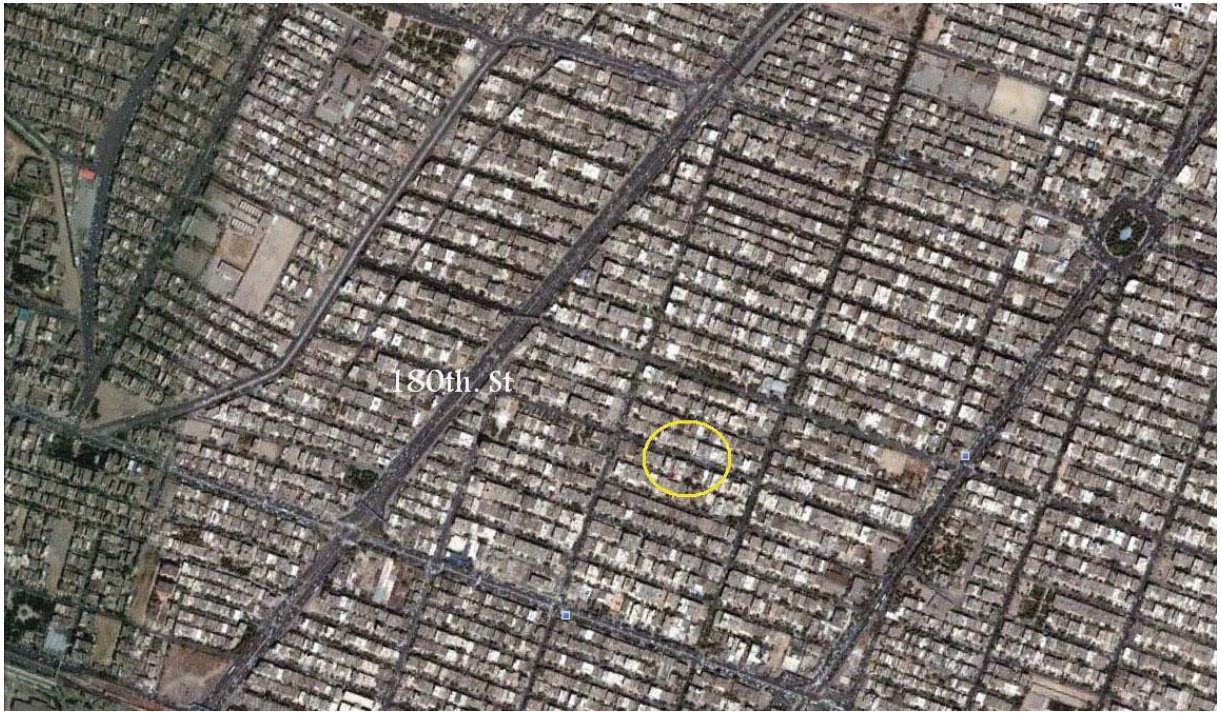


Image of Metfaz main office in Tehran

Chapter 6 – Neutron Initiator

Introduction

Since 2004 there have been a number of recurrent disputes about activities under the Iranian regime's nuclear program that could have had possible military dimensions. Among the topics of these disputes is Tehran's research into production of neutron initiators and the means of calculating their output.

This issue has been raised time and again in the IAEA's periodic reports. It is important to note that in the past 10 years, Tehran has never offered complete, transparent and persuasive answers to the various aspects of this topic.

Latest Status:

This issue was raised again in the IAEA September 2014 report as one of the unresolved topics of its ongoing probe into military dimensions of Iran's nuclear work.

Review of IAEA reports:

Excerpt from IAEA November 2004 report:

A.1.8. Polonium-210

Development

79. Between 1989 and 1993, Iran irradiated two bismuth targets, and attempted to extract polonium from one of them, at TRR as part of a feasibility study for the production of neutron sources. Iran has stated that it does not have a project either for the production of Po-210 or for the production of neutron sources using Po-210 and that "there [had] not been in the past any studies or projects on the production of neutron sources using Po-210".

In its February 2008 report, IAEA elucidated the importance of polonium production. Further details appeared in the annex of the agency's report in November of 2011.

Excerpts from IAEA February 2008 report:

A.3. Polonium-210

20. Polonium-210 is of interest to the Agency because it can be used not only for civilian applications (such as radioisotope batteries), but also — in conjunction with beryllium — for military purposes, such as neutron initiators in some designs of nuclear weapons.

...

40. During the meetings of 27–28 January and 3–5 February 2008, the Agency asked Iran to clarify a number of procurement actions by the ERI, PHRC and IAP which could relate to the abovementioned alleged studies. These included training courses on neutron calculations, the effect of shock waves on metal, enrichment/isotope separation and ballistic missiles. Efforts to procure spark gaps, shock wave software, neutron sources, special steel parts (GOV/2006/15, para. 37) and radiation measurement equipment, including borehole gamma spectrometers, were also made. In its written response on 5 February 2008, Iran stated that ‘PAM shock’ software was enquired about “in order to study aircraft, collision of cars, airbags and for the design of safety belts.” Iran also stated that the radiation monitors it had enquired about were meant to be used for radiation protection purposes. Iran’s response regarding the efforts to procure training courses on neutron calculations, and enrichment/isotope separation, spark gaps, shock wave software, neutron sources and radiation measurement equipment for borehole gamma spectrometers is still awaited.

Excerpts from annex of IAEA November 2011 report:

C.8. Modeling and calculations

52. Information provided to the Agency by two Member States relating to modeling studies alleged to have been conducted in 2008 and 2009 by Iran is of particular concern to the Agency. According to that information, the studies involved the modeling of spherical geometries, consisting of components of the core of an HEU nuclear device subjected to shock compression, for their neutronic behavior at high density, and a determination of the subsequent nuclear explosive yield. The information also identifies models said to have been used in those studies and the results of these calculations, which the Agency has seen. The application of such studies to anything other than a nuclear explosive is unclear to the Agency. It is therefore essential that Iran engage with the Agency and provide an explanation.

53. The Agency obtained information in 2005 from a Member State indicating that, in 1997, representatives from Iran had met with officials from an institute in a nuclear-weapon State to request training courses in the fields of neutron cross section calculations using computer codes employing Monte Carlo methodology, and shock wave interactions with metals. In a letter dated 14 May 2008, Iran advised the Agency that there was nothing to support this information. The Agency has also been provided with information by a Member State indicating that, in 2005, arrangements were made in Iran for setting up projects within SADAT centres (see Section C.1 and Attachment 1), inter alia, to establish a databank for “equation of state” information⁴² and a hydrodynamics calculation centre. The Agency has also been provided with information from a different Member State that, in 2005, a senior official in SADAT solicited assistance from Shahid

Behesti University in connection with complex calculations relating to the state of criticality of a solid sphere of uranium being compressed by high explosives.

54. Research by the Agency into scientific literature published over the past decade has revealed that Iranian workers, in particular groups of researchers at Shahid Behesti University and Amir Kabir University, have published papers relating to the generation, measurement and modeling of neutron transport.⁴³ The Agency has also found, through open source research, other Iranian publications which relate to the application of detonation shock dynamics to the modeling of detonation in high explosives, and the use of hydrodynamic codes in the modeling of jet formation with shaped (hollow) charges. Such studies are commonly used in reactor physics or conventional ordnance research⁴⁴, but also have applications in the development of nuclear explosives.

42 An "equation of state" is a thermodynamic equation describing the state of matter under a given set of physical conditions (such as temperature, pressure, volume or internal energy).

C.9. Neutron initiator

55. The Agency has information from a Member State that Iran has undertaken work to manufacture small capsules suitable for use as containers of a component containing nuclear material. The Agency was also informed by a different Member State that Iran may also have experimented with such components in order to assess their performance in generating neutrons. Such components, if placed in the centre of a nuclear core of an implosion type nuclear device and compressed, could produce a burst of neutrons suitable for initiating a fission chain reaction. The location where the experiments were conducted was said to have been cleaned of contamination after the experiments had taken place. The design of the capsule, and the material associated with it, are consistent with the device design information which the clandestine nuclear supply network allegedly provided to Iran.

56. The Agency also has information from a Member State that work in this technical area may have continued in Iran after 2004, and that Iran embarked on a four year programme, from around 2006 onwards, on the further validation of the design of this neutron source, including through the use of a nonnuclear material to avoid contamination.

57. Given the importance of neutron generation and transport, and their effect on geometries containing fissile materials in the context of an implosion device, Iran needs to explain to the Agency its objectives and capabilities in this field.

Information from Iranian Opposition

In a press conference in Paris on 3 February 2005, Mohammad Mohaddessin, Chair of the National Council of Resistance of Iran's Foreign Affairs Committee, exposed details of the production of polonium-210 and beryllium, institutions and experts involved in this project, and the identity of a key front company.

According to the opposition information, the regime has acquired the technical know-how to generate neutrons in the facilities of its Atomic Energy Organization (AEOI), as well as those of the Ministry of Defence. The Iranian opposition identified Dr. Javad Rahighi of the AEOI as an expert on

neutron generation who would be capable of building a generator with a seven to eight thousand hour life span if given an adequate budget.

The opposition also identified another individual as an expert in building neutron generators, who has also served as deputy to Iranian Revolutionary Guard Corps officer and nuclear weapon project leader Mohsen Fakhrizadeh. Working at the IRGC-affiliated Imam Hossein University, Dr. Fereydoon Abbasi was engaged in building a neutron generator for the Defence Ministry.

At the time that this information was revealed, both the Ministry of Defence and the AEOI were working to produce beryllium. Malek Ashtar University, which is affiliated with the Defence Ministry, has been working on beryllium oxide for many years and has succeeded in generating it in the lab and has already begun industrial production. The address of the chemistry laboratory of Malek-Ashtar University that is producing beryllium oxide is: Tehran, Tehran, Babai Expressway, Lavizan, Malek-Ashtar University, Chemical Labs Science Complex.

The NCRI identified Dr. Nasser Ehsani as the head of this top secret project, which was operating under the supervision of IRGC Brigadier General Dr. Seyyed Ali Hosseini Tash who was Deputy Defence Minister at the time. Dr. Teimourian, head of the chemical group of Malek-Ashtar University, and engineer Abbas Soliemani worked with Dr. Ehsani on mixing Beryllium with Polonium 210 for a nuclear neutron initiator.

The NCRI disclosed on September 1, 2005 that in one instance during the previous year the Ministry of Defence illicitly imported beryllium from China to be used in nuclear weapons. The order to make this purchase and smuggle it into Iran was issued by Mahmoud Tourni, Head of the Foreign Trade Department of the Defence Ministry.

The majority of orders for purchase of beryllium by the Defence Ministry came from a front company by the name of Majd Gostar. This ostensibly private company had been operating as the only company involved in copper-beryllium alloy importation in Iran since 2001, and it imported this material from Dubai.

The Applied Physics Institute constructed a building in the Iran University of Science and Technology (IUST) for its operations and it purchased nuclear equipment under the cover of this university. For example, in 2002, it attempted to buy beryllium from Britain but the purchase was exposed in the British parliament. Illicit purchases under the cover of IUST led to protests from the professors of this university and the case went to the court. In 2004, the Applied Physics Institute was forced to leave the university.

In another case, this university purchased a powerful laser from Ukraine.

The Times of London exposed production of the neutron detonator

On December 14, 2009, the *Times of London* published a document in Farsi with English translation detailing the design of a neutron detonator.

According to this document, Iran had been working on a neutron detonator program that can function as the trigger for a nuclear bomb.

The *Times* wrote that foreign intelligence organizations dated this document to 2007. According to this document, the neutron source would be uranium deuterid (UD3). Experts say that this compound has no civilian or military use other than in a nuclear bomb. The *Times* emphasized that this document has been given to the IAEA. This document alone showed that Iran was hiding a nuclear weapons program behind legitimate peaceful research.

Connection between Physics Research Center, and subsequently SPND) and Beheshti University on neutron research

The aforementioned document pointed to cooperation between Beheshti University and the Physics Institute, which later changed its name to SPND. The document said in part:

"Given the current cooperation between the Shahid Beheshti University and the Institute, in the first stage a memorandum of understanding will be signed between the Shahid Beheshti University and the Physics Institute so that at the first opportunity and as soon as things are ready in the Shahid Beheshti University, the N.G. systems would be transferred to the university to be used in the projects with cooperation from the center's experts in Shahid Beheshti University."

The March 11, 2008 issue of the *Washington Post* exposed the role of Beheshti University in the advancement of military nuclear research based on a report by the National Council of Resistance of Iran.

Beheshti University replaced Imam Hossein University:

Beheshti University in Tehran is located in Darake District, northwest of Tehran. Prior to the exposure of the role of Imam Hossein University in secret nuclear research, Beheshti University had no nuclear science college, only a small nuclear research lab. Afterwards the Iranian regime decided to establish a large nuclear science college at Beheshti.

Relying on the regime's internal reports, the NCRI discovered that the secret research going on at Imam Hossein University had been transferred to Beheshti University. At the same time, a special and out of the ordinary security system was established in the laboratories of this university.

Part of the secret budget for nuclear military research was diverted from Imam Hossein University to Beheshti University. This and other such budgets are kept top secret because of their relationship to national security.

A number of professors and individuals on the board of the Science Department at Imam Hossein University were also transferred to Beheshti University during this transition. Most prominent among them is Fereydoon Abbasi, who was also head of the Atomic Energy Organization during President Ahmadinejad's tenure. As stated above, Fereydoon Abbasi was working at Imam Hossein University on neutron detonators, and so his research was transferred to Beheshti University.

Iranian regime's reactions

Until 2008, Tehran denied that its reason for producing polonium-210 was for a neutron detonator. For example IAEA reported in May 2008:

5. In response to the Agency's requests, Iran denied that procurement attempts were made for neutron sources in 2003. Iran also denied that it had attempted in 1997 to obtain training courses on neutron calculations, enrichment/isotope separation, shock wave software, neutron sources and ballistic missiles (GOV/2008/4, para. 40).

Despite Tehran's denials, in later years, new information was obtained on the neutron detonator, which indicated that the regime's previous answers have been false and that Tehran had been working on production of just such a device all along.

Chapter 7 – Design and Manufacture of Uranium Hemisphere

Yet another of the important subjects pursued by the IAEA over the past decade is the design of the metal hemisphere, an essential section of the nuclear bomb. This design was given to the Iranian regime in 1987 by Abdul Qader Khan Network, but the regime claims that it acquired those designs only by accident.

The 15-page document on this subject reached the IAEA in 2005, and was subsequently published by the agency in August 2006. Nevertheless, Tehran was only prepared to give a copy of this document to the agency in November 2007, over two years later, and claimed that the designs had been accidentally found among the documents it had received from the Abdul Qadeer Khan Network.

According to the information obtained by the opposition, non-government organizations and media, in addition to the designs reported by the agency, the regime had tasked a specific institution to follow this matter and it created workshops and designed equipment for the explicit purpose of producing a uranium hemisphere.

Latest status:

Despite ample evidence pointing to one of the most dangerous developments in the programs history the regime has stonewalled inspectors. The issue remains unclear and many questions remain unanswered by Tehran.

Review of IAEA reports

Excerpt from IAEA November 2005 report:

A.2.1. The 1987 offer

5. As previously reported to the Board, in January 2005 Iran showed to the Agency a copy of a hand-written one-page document reflecting an offer said to have been made to Iran in 1987 by a foreign intermediary for certain components and equipment (see paras 14 and 15 of GOV/2005/67).³ Iran stated that only some components of one or two disassembled centrifuges, and supporting drawings and specifications, were delivered by the procurement network, and that a number of other items of equipment referred to in the document were purchased directly from other suppliers. Most of these components and items were included in the October 2003 declaration by Iran to the Agency.

6. The documents recently made available to the Agency related mainly to the 1987 offer; many of them dated from the late 1970s and early to mid-1980s. The documents included: detailed drawings of the P-1 centrifuge components and assemblies; technical specifications supporting component manufacture and centrifuge assembly; and technical documents relating to centrifuge operational performance. In addition, they included cascade schematic drawings for

various sizes of research and development (R&D) cascades, together with the equipment needed for cascade operation (e.g. cooling water circuit needs and special valve consoles). The documents also included a drawing showing a cascade layout for 6 cascades of 168 machines each and a small plant of 2000 centrifuges arranged in the same hall. Also among the documents was one related to the procedural requirements for the reduction of UF₆ to metal in small quantities, and on the casting and machining of enriched, natural and depleted uranium metal into hemispherical forms, with respect to which Iran stated that it had been provided on the initiative of the procurement network, and not at the request of the Atomic Energy Organization of Iran (AEOI).

7. The Agency is assessing all the documentation referred to above and comparing it with, inter alia, documentation from other sources.

This topic arose again in the report from the following year, and repeatedly after that.

Excerpt from IAEA November 2006 report:

D.2. Uranium Metal

12. Iran has still not provided a copy of the 15-page document describing the procedures for the reduction of UF₆ to uranium metal and the casting and machining of enriched and depleted uranium metal into hemispheres (GOV/2005/87, para. 6). The document was resealed by the Agency in August 2006.

From IAEA February 2007 report:

D.2. Uranium Metal

19. Iran has still not provided a copy of the 15-page document describing the procedures for the reduction of UF₆ to uranium metal and the casting and machining of enriched and depleted uranium metal into hemispheres (GOV/2006/53, para. 14). The document remains under Agency seal, however, and is accessible to Agency inspectors.

From IAEA February 2008 report:

A.2. Uranium Metal Document

19. On 8 November 2007, the Agency received a copy from Iran of the 15-page document describing the procedures for the reduction of UF₆ to uranium metal and the machining of enriched uranium metal into hemispheres, which are components of nuclear weapons. Iran reiterated that this document had been received along with the P-1 centrifuge documentation in 1987 and that it had not been requested by Iran. The Agency is still waiting for a response from Pakistan on the circumstances of the delivery of this document in order to understand the full scope and content of the offer made by the network in 1987 (GOV/2006/15, paras 20–22).

Excerpts from IAEA November 2011 report:

Between 2003 and early 2006, Iran submitted inventory change reports, provided design information with respect to facilities where the undeclared activities had taken place and made nuclear material available for Agency verification. Iran also acknowledged that it had utilized entities with links to the Ministry of Defence in some of its previously undeclared activities.⁷ Iran acknowledged that it had had contacts with intermediaries of a clandestine nuclear supply network in 1987 and the early 1990s, and that, in 1987, it had received a handwritten one page document offering assistance with the development of uranium centrifuge enrichment technology, in which reference was also made to a reconversion unit with casting equipment.⁸ Iran further acknowledged that it had received a package of information related to centrifuge enrichment technology that also included a 15 page document (hereafter referred to as the "uranium metal document") which Iran said it did not ask for and which describes, inter alia, processes for the conversion of uranium fluoride compounds into uranium metal and the production of hemispherical enriched uranium metallic components.⁹

9 GOV/2005/87, para. 6; GOV/2007/58, para. 25. Pakistan confirmed, in response to an Agency inquiry, that an identical document existed in Pakistan (GOV/2008/15, para. 24).

C.4. Nuclear components for an explosive device

31. For use in a nuclear device, HEU retrieved from the enrichment process is first converted to metal. The metal is then cast and machined into suitable components for a nuclear core.

32. As indicated in paragraph 5 above, Iran has acknowledged that, along with the handwritten one page document offering assistance with the development of uranium centrifuge enrichment technology, in which reference is also made to a reconversion unit with casting equipment, Iran also received the uranium metal document which describes, inter alia, processes for the conversion of uranium compounds into uranium metal and the production of hemispherical enriched uranium metallic components.

33. The uranium metal document is known to have been available to the clandestine nuclear supply network that provided Iran with assistance in developing its centrifuge enrichment capability, and is also known to be part of a larger package of information which includes elements of a nuclear explosive design. A similar package of information, which surfaced in 2003, was provided by the same network to Libya.³⁵ The information in the Libyan package, which was first reviewed by Agency experts in January 2004, included details on the design and construction of, and the manufacture of components for, a nuclear explosive device.³⁶

34. In addition, a Member State provided the Agency experts with access to a collection of electronic files from seized computers belonging to key members of the network at different locations. That collection included documents seen in Libya, along with more recent versions of those documents, including an up-dated electronic version of the uranium metal document.

35. In an interview in 2007 with a member of the clandestine nuclear supply network, the Agency was told that Iran had been provided with nuclear explosive design information. From information provided to the Agency during that interview, the Agency is concerned that Iran may have obtained more advanced design information than the information identified in 2004 as having been provided to Libya by the nuclear supply network.

36. Additionally, a Member State provided information indicating that, during the AMAD Plan, preparatory work, not involving nuclear material, for the fabrication of natural and high enriched uranium metal components for a nuclear explosive device was carried out.

37. As the conversion of HEU compounds into metal and the fabrication of HEU metal components suitable in size and quality are steps in the development of an HEU nuclear explosive device, clarification by Iran is needed in connection with the above.

Information by Iranian opposition

Contacts between Abdul Qader Khan and Revolutionary Guards commanders, including with the IRGC Research Center

In August 2005, the National Council of Resistance of Iran exposed information on a meeting of the Islamic Revolution Guards Corps (IRGC) that included the commander of IRGC Research Center with AQ Khan and his people.

According to this information in 1987, three IRGC commanders had met at least twice with Abdul Qader Khan in Tehran.

Mohammad Eslami, commander of the IRGC Research Center at the time, headed the IRGC delegation. The main task of IRGC Research Center was to conduct research on nuclear weapons, and this had been the case since 1983, when Tehran began the implementation of a strategic project by the IRGC for research on the military applications of nuclear technology. For this purpose, the bulk of the experts that the Nuclear Research Center of the Atomic Energy Organization had trained were hired by the IRGC at the end of their two year training course and they were employed at the IRGC Research Center.

These people, along with other experts and engineers that the IRGC had independently hired at high salaries for nuclear research initiated a special, clandestine research center in northern Tehran, around Vanak Square. In 1986, the IRGC opened nuclear research offices in several Iranian universities, prominently at Sharif Industrial, Tehran and Shiraz universities.

At present IRGC Brigadier Commander Mohammad Eslami is the head of the Institute for Education and Defensive Research at the Ministry of Defense. In 1993, all research centers working on the nuclear project were gathered from around the country and transferred to the Ministry of Defense. Similarly, the IRGC Research Center was also transferred to the Ministry of Defense and was named the Institute for Education and Defensive Research.

Reza Amrollahi, head of the Atomic Energy Organization at the time, had made the arrangements for the meeting of IRGC commanders with AQ Khan.

Following these meetings, connections between the IRGC and Pakistan became active and Pakistan became one of the principal countries for the IRGC to advance its objectives and nuclear research.

For example, in 1988, after senior commanders of the IRGC secretly made a proposal to the head of the physics group at Kerman University for the establishment of a nuclear research center in the

southeastern part of the country, an official letter was sent from Pakistan Atomic Energy Commission (PAEC) to Kerman University. The letter from PAEC stated that they had learned that Iran intended to set up a nuclear research center and they then expressed their readiness for scientific, technical and personnel cooperation. This letter from PAEC clearly demonstrates the close link between IRGC and Pakistan, and it raised eyebrows among the staff of Kerman University who were supposed to be engaged in that project.

According to the information provided by NCRI, in addition to meeting with the IRGC, AQ Khan also met with a delegation from Iran's Atomic Energy Organization. This delegation included Mohammadreza Ayatollahi, deputy head of the Atomic Energy Organization, Mohammad Kazem Rasouli Mahallati, head of the Nuclear Center of Esfahan, and Seyyed Mohammad Haj Saeid, head of the Research Department of the Atomic Energy Organization.

Contacts between AQ Khan and Pakistan with various governmental institutions and organs in Tehran (including the Atomic Energy Organization, the IRGC, and the Ministry of Defense) continued in later years, a matter that has also been confirmed by senior Pakistani officials.

Provision of equipment for building uranium metal hemisphere

On January 20, 2006, the NCRI published documents disclosing special press machines for shaping metals. According to this report, "Tehran had procured an Iso-static Hot Press machine and a Hot Press machine, which can be used to shape enriched uranium for use in a nuclear bomb."

These two machines that are forbidden, use pressure along with heat to build various parts of the nuclear weapon, including the hemisphere. Pressure, along with heat, causes the melt down of metals at lower temperatures.

Tehran attempted to purchase these machines from various Western countries including Belgium under the cover of research work at Tehran University, Malek Ashtar University (affiliated with the Ministry of Defense), and Imam Hossein University (affiliated with the IRGC), but the producing countries refused to sell them to the regime. Thus, the regime indirectly procured these machines through front companies and smuggled them to Iran.

In addition to smuggling these machines from foreign countries, the mullahs' regime also attempted to rebuild and produce these machines inside the country. According to a report published by the Iranian opposition, the Ministry of Defense and Malek Ashtar University requested the manufacture of these machines from Pajouheshgah Mavad and Energy (research center of material and energy) a scientific and industrial research center affiliated with the Ministry of Science.

In this research center the Hot Press machine was rebuilt and manufactured. Specifically, this research center rebuilt and put to use an American Hot Press machine that had been purchased in the 1970s. In the winter of 2005, Mohammad Reza Aref, the regime's vice-President at the time, made a visit to see the rebuilt machine.

Two subdivisions of SPND were involved in this project

According to the information of NCRI, two subdivisions of SPND and their experts are allocated to the metallurgical work and the manufacture of special parts such as the metal hemisphere:

1. Center for Manufacture and Industrial Research:

This center specializes in the mechanics and shaping of material, including shaping metals for the construction of a nuclear warhead. This center has advanced laser cutting machines that have been smuggled into Iran. This center also uses novel methods in shaping metals. According to the information provided by the opposition, the director of this center, Ali Mehdipour Omrani has also worked on explosion tests at Parchin, as will be discussed in the next chapter.

2. Center for Research and Technology for Advanced Material-Metallurgy:

This center works on production of metallic material needed for the manufacture of a nuclear warhead. One of the research areas concerns creating the aluminum-lithium alloy used in the casing of the warhead. Currently, this center is headed by Seyyed Mehdi Abbasi.

Some of the machinery used in the production facilities at this center are:

- Vacuum Induction Melting Furnace – (this equipment is used for super alloys which are sensitive to oxygen)
- A machine known as Hot Isostatic Press (HIP)
- Equipment for plating, casting, machining, grinding and restoring metals.

This center has secret workshops outside the SPND organization. One of these secret workshops is named Doroudi and is located in the Local Industrial Factories of the Defense Ministry's Aerospace Industry. This center has secret workshops at Chamran Industries and Baqeri Industries.

This center has a network of front organizations that are tasked with procuring the required materials from outside Iran in order to cover up the military nature of its purchases. One of these front companies affiliated with this organ, which acts as the mother front company on behalf of the Center for Research on Advanced Material, is Iman Taba Company. Its director is an individual named Seyyed Mohammad Mehdi Hadavi. Another company is called Pardis Medical Pioneers (*Pishgaman Pezeshki Pardis*), which started work in 2003. Its director is Ali Emadi Allahyari.

Chapter 8 – Explosion Chamber in Parchin

The Parchin site is one of the largest centers focusing on manufacturing ammunition and explosives for the Iranian regime's Ministry of Defense, and the regime carries out its tests on explosives at this site. At various times over the years there have been numerous questions about the tests in Parchin and their relation to the regime's nuclear program, especially about high-power explosions, high explosives, explosion fuses, and bridge wires that have specific nuclear weapons applications. During the past decade IAEA has repeatedly tried to gain access to Parchin and to conduct necessary tests there.

Latest status:

Despite the agency's repeated insistence, in particular since 2012, upon obtaining access to specific sections of Parchin, which according to numerous reports have been the site of high explosive tests; and despite various promises by regime officials to cooperate in this regard, the mullahs' regime has prevented the IAEA's access to these locations. However, there have been various credible reports on dramatic changes, face lifts, demolitions, and constructions at specific Parchin locations. The regime has also failed to provide information about foreign experts involved in tests carried out at Parchin. All of this has added to international suspicion that the site has been host to high explosive tests related to the trigger mechanism of nuclear bombs.

Getting to Know Parchin and Its Location

This site is built adjacent to Jajroud River, using the conditions of the regional grounds and adequate coverage in southeastern Tehran. Parchin is a sprawling site, covering over 60 square kilometers (over 10 kilometers in length and 6 kilometers in width). The Parchin compound includes dozens of complexes, hundreds of silos, warehouses, and other facilities. Additionally, it has numerous underground tunnels and facilities.

Parchin is divided into 11 sections, each being dubbed as 'Plan'. These plans are as follows:

Plan 1 Chemical Industries

Plan 2 Chemical Industries

Plan 3 Ammunition Manufacturing

Plan 4 – Cruise Missile Activities (there are numerous sub-sections in this plan, including Moslemi, San'i Khani, Fasihi, Rahimi, and Alam al-Hoda)

Plan 5 – Chemical Industries

Plan 6 – Chemical Industries

Plan 7 – Missile Industries (named Sattar Industries, subdivision of the Bakeri Industries Group)

Plan 8 – Chemical (linked to the cruise industries)

Plan 9 – Missile

Plan 10 – Air Defense Industries

Plan 11 – Cruise Industries

Work on Laser Enrichment at Parchin

On November 19, 2004, the NCRI revealed the existence of a laser enrichment facility at Parchin. According to Iranian opposition information, the official in charge of this center was Dr. Mohammad Amin Bassam, the senior laser expert in the Ministry of Defense, who was working under the supervision of Mohsen Fakhrizadeh.

NCRI presented additional information in March 2005 on the enrichment site at Parchin. According to the opposition, the Chemical Plan is the most expansive section of this complex and each of its sub-sections are engaged in one or several military projects at any given time. In order to conceal nuclear-related activities, they have been placed in Plan 1 (Chemical Industries). The construction management of Parchin has constructed a tunnel and safe underground facility for nuclear related activities. The equipment used in laser enrichment by Dr. Mohammad Amin Bassam is placed in this safe tunnel.

Limited Inspection of Parchin by IAEA Inspectors

IAEA inspectors on two occasions carried out limited inspections of specific locations at Parchin.

Excerpts of IAEA September 2005 report:

41. The Agency has discussed with the Iranian authorities open source information relating to dual use equipment and materials which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area. As described by the DDG-SG in his 1 March 2005 statement to the Board, in January 2005, Iran agreed, as a transparency measure, to permit the Agency to visit a site located at Parchin in order to provide assurance regarding the absence of undeclared nuclear material and activities at that site. Out of the four areas identified by the Agency to be of potential interest, the Agency was permitted to select any one area. The Agency was requested to minimize the number of buildings to be visited in that area, and selected five buildings. The Agency was given free access to those buildings and their surroundings and was allowed to take environmental samples, the results of which did not indicate the presence of nuclear material, nor did the Agency see any relevant dual use equipment or materials in the locations visited. In the course of the visit, the Agency requested to visit another area of the Parchin site. The Agency has been pursuing this matter with Iran since then with a view to being able to access the locations of interest at Parchin.

...49. The Agency continues to follow up on information pertaining to Iran's nuclear programme and activities that could be relevant to that programme. In this regard, it should be noted that, absent some nexus to nuclear material, the Agency's legal authority to pursue the verification of possible nuclear weapons related activity is limited. The Agency has, however, continued to seek Iran's cooperation in following up on reports relating to equipment, materials and activities which have applications in the conventional military area and in the civilian sphere as well as in the nuclear military area. Iran has permitted the Agency, as a measure of transparency, to visit defence related sites at Kolahdouz, Lavisian and Parchin. While the Agency found no nuclear related activities at Kolahdouz, it is still assessing information (and awaiting some additional information) in relation to the Lavisian site. The Agency is also still waiting to be able to re-visit the Parchin site.

IAEA Inspectors visit Parchin again

Excerpts of IAEA November 2005 report:

16. On 1 November 2005, following a meeting held on 30 October 2005 between Mr. Larijani, the Secretary of the Supreme National Security Council of Iran, and the Deputy Director General for Safeguards (DDG-SG), the Agency was given access to the buildings requested within the area of interest at Parchin (see para. 41 of GOV/2005/67), in the course of which environmental samples were taken. The Agency did not observe any unusual activities in the buildings visited. Its final assessment is pending the results of the environmental sample analysis. There have been no new developments with regard to questions and access related to the Lavisan-Shian site (see paras 37–40 of GOV/2005/67).

Details of IAEA Inspection and Facilities Accessed by Inspectors

The NCRI held a press conference on November 22, 2005 in Vienna revealing details of these inspections and the regime's plan in light of them.

According to the opposition, the regime allowed inspection of a very limited area of Parchin called Shahabadi Plan. This belongs to section 10 of Parchin, which is only a small portion of the entire site. The visited section belongs to the air-defense systems of the Iranian military. It was a facility where air-defense equipment, air-to-air and anti-submarine missiles were being built under the direction of Col. Vanak, who was the head of the section at the time.

Another official, Mirzai, who was in charge of security and counter-intelligence at section 10, arranged for the visit and accompanied the inspectors during their tour.

According to the information provided by the opposition, the IAEA was given access to a limited section of Parchin in the previous visit as well. During that visit, inspectors managed to visit Martyr Babai, a sub-section of Section 10, which also works on air-defense systems. Col. Biyadi was introduced as being in charge of Martyr Babai Industries. The January 2005 visit involved only five buildings in that section. IRGC Brig. Gen. Taghizadeh was in charge of the air-defense group that includes the two sub-sections.

According to the same report, once it became clear that the IAEA would visit the site, the regime put all sections in Parchin on full alert and demanded that they begin sanitizing their sites, which they did. The sanitizing of the various sections explains the delay in granting the IAEA access to parts of Parchin.

Relation of Explosion & Impact Technology Research Center with Parchin

The NCRI, in revealing the Center for Research for Explosion and Impact (METFAZ) (one of the sub-sections of SPND) in September 2009, said explosives are built and tested in the METFAZ section. Therefore, parts of the tests of this center were carried out at Parchin.

Information on High Explosives & Hydrodynamic Tests in Parchin

In early 2011, IAEA received new information on tests of high explosives and hydrodynamic tests that had been going on in a specific section north of Parchin between the years of 2000 and 2003. From early 2012 on, the agency repeatedly requested to inspect and take environmental samples from that section. This was met with serious opposition from the senior-most regime officials.

Excerpts from IAEA November 2011 report:

47. One necessary step in a nuclear weapon development programme is determining whether a theoretical design of an implosion device, the behaviour of which can be studied through computer simulations, will work in practice. To that end, high explosive tests referred to as “hydrodynamic experiments” are conducted in which fissile and nuclear components may be replaced with surrogate materials.⁴¹

48. Information which the Agency has been provided by Member States, some of which the Agency has been able to examine directly, indicates that Iran has manufactured simulated nuclear explosive components using high density materials such as tungsten. These components were said to have incorporated small central cavities suitable for the insertion of capsules such as those described in Section C.9 below. The end use of such components remains unclear, although they can be linked to other information received by the Agency concerning experiments involving the use of high speed diagnostic equipment, including flash X ray, to monitor the symmetry of the compressive shock of the simulated core of a nuclear device.

49. Other information which the Agency has been provided by Member States indicates that Iran constructed a large explosives containment vessel in which to conduct hydrodynamic experiments. The explosives vessel, or chamber, is said to have been put in place at Parchin in 2000. A building was constructed at that time around a large cylindrical object at a location at the Parchin military complex. A large earth berm was subsequently constructed between the building containing the cylinder and a neighbouring building, indicating the probable use of high explosives in the chamber. The Agency has obtained commercial satellite images that are consistent with this information. From independent evidence, including a publication by the foreign expert referred to in paragraph 44 above, the Agency has been able to confirm the date of construction of the cylinder and some of its design features (such as its dimensions), and that it was designed to contain the detonation of up to 70 kilograms of high explosives, which would be suitable for carrying out the type of experiments described in paragraph 43 above.

50. As a result of information the Agency obtained from a Member State in the early 2000s alleging that Iran was conducting high explosive testing, possibly in association with nuclear materials, at the Parchin military complex, the Agency was permitted by Iran to visit the site twice in 2005. From satellite imagery available at that time, the Agency identified a number of areas of interest, none of which, however, included the location now believed to contain the building which houses the explosives chamber mentioned above; consequently, the Agency’s visits did not uncover anything of relevance.

51. Hydrodynamic experiments such as those described above, which involve high explosives in conjunction with nuclear material or nuclear material surrogates, are strong indicators of possible weapon development. In addition, the use of surrogate material, and/or confinement provided by a

chamber of the type indicated above, could be used to prevent contamination of the site with nuclear material. It remains for Iran to explain the rationale behind these activities.

Another element that exacerbated sensitivities with regard to these tests was reports on foreign aid, especially that of Vyacheslav Danilenko, a Ukrainian expert in high explosive tests. He had knowledge and experience from the former Soviet Union's nuclear program and his presence in Iran was believed to be related to the suspicious chamber and tests carried out at Parchin.

Abnormal Activity at Parchin following IAEA's November 2011 Report

The Institute for Science and International Security (ISIS) has provided several reports on abnormal activity and concentrated activities focused on bringing about changes in Parchin, which continued up to the time this report was prepared.

Excerpt from 25 January 2013 ISIS report:

Tests Conducted?

The IAEA has not provided complete information on which tests it believes Iran could have conducted inside the Parchin chamber. It has provided partial information and the media have reported on additional types of possible tests. As best as can be determined, three types of tests could have been conducted, each with appropriate diagnostic equipment, although the IAEA has never confirmed such a list and still other types of tests are possible. The three most commonly discussed tests have been:

A test of the initiation components of a nuclear warhead, which could have involved up to 50 kg of high explosives. This test would not contain any uranium. The November 2011 safeguards report noted that the explosive chamber at Parchin would be suitable for carrying out this type of test.

A test to ascertain the symmetry of an imploding hemispherical shell of high explosives, surrounding a uranium metal hemisphere, in a scaled down experiment. A technical advisor to ISIS with decades of involvement in the experimental study of nuclear weapon mock-up explosions evaluated this case. He assessed that based on the constraints of this chamber and the use of powerful high explosives, the explosive shell would contain about 50 kilograms of high explosives, an amount within the constraints of the chamber.

A test of a uranium deuterium neutron initiator used in a nuclear weapon. The initiator is located at the center of a compression system involving a sphere of high explosives and possibly a non-nuclear surrogate material for the weapon-grade uranium core. The goal of the experiment is to compress the initiator, causing the fusion of the deuterium and a spurt of neutrons. This test would involve only a few grams of uranium and deuterium with variable amounts of explosives.

Update on Current Activities at Parchin

A reconstruction phase continues at a steady pace at the alleged Parchin high explosives test site, as shown by recent Digital Globe commercial satellite imagery acquired by ISIS. The site underwent a demolition phase from April to August 2012 and entered what appears to be a reconstruction phase in late September or early November. In satellite imagery from January 17, 2013, several activities at the site appear to be almost complete and there is also evidence of new construction work (figure 1).

In a May 30, 2012 report ISIS published satellite imagery showing the demolition of two buildings located near the building suspected to contain the high explosive test chamber (figure 2). ISIS was not able to establish the purpose for why the buildings were demolished. Debris from the larger of the two was completely cleared from the site but some debris from the smaller building was left. As seen in the January 17 satellite imagery, the smaller building has now been reconstructed (figure 1). The new imagery also shows what appears to be the foundation of a new building not far from where the second demolished building was located. The size and layout of the excavation, however, do not suggest that the same building is being reconstructed.

Construction of the new security perimeter also appears to be nearing completion. The new perimeter resembles the previous layout except its southern section has been visibly extended and it now runs much closer to the buildings on the western side of the site (figure 1). There is also new construction of what appears to be a small building located outside the northern side of the security perimeter. Earth piles initially visible in early November 2012 are still visible in the northern part of the site as are heavy machinery and materials indicating the likelihood of further construction. There is also earth displacement nearby the two support buildings located just south of the suspected chamber building although at this stage it is impossible to determine its origin.

Regime Not Permitting Inspection of Parchin from February 2012 until Present

Despite lengthy discussions and about a dozen negotiation sessions with the regime to gain access to this specific section of Parchin, Tehran has continuously stonewalled, IAEA inspectors from accessing this site and this particular section. It has used various pretexts in doing so, such as pointing out that Parchin has already been inspected twice while ignoring the obvious fact that the sections visited in 2005 are far from the area currently in dispute.

Excerpts from IAEA November 2012 report:

43. Parchin:

As stated in the Annex to the Director General's November 2011 report,⁴⁴ information provided to the Agency by Member States indicates that Iran constructed a large explosives containment vessel in which to conduct hydrodynamic experiments;⁴⁵ such experiments would be strong indicators of possible nuclear weapon development. The information also indicates that the containment vessel was installed at the Parchin site in 2000. As previously reported, the location at the Parchin site of the vessel was only identified in March 2011, and the Agency notified Iran of that location in January 2012. Iran has stated that "the allegation of nuclear activities in Parchin site is baseless".⁴⁶

44. As previously reported, satellite imagery available to the Agency for the period from

February 2005 to January 2012 shows virtually no activity at or near the building housing the containment vessel. Since the Agency's first request for access to this location, however, satellite imagery shows that extensive activities and resultant changes have taken place at this location. Among the most significant developments observed by the Agency at this location since February 2012 are:

- *Frequent presence of, and activities involving, equipment, trucks and personnel;*
- *Run off of large amounts of liquid from the containment building over a prolonged period;*
- *Removal of external pipework from the containment vessel building;*
- *Razing and removal of five other buildings or structures and the site perimeter fence;*
- *Reconfiguration of electrical and water supply infrastructure;*
- *Shrouding of the containment vessel building and another building; and*
- *Initial scraping and removal of considerable quantities of earth at the location and its surrounding area, covering over 25 hectares, followed by further removal of earth to a greater depth at the location and the depositing of new earth in its place.*

45. In light of the extensive activities that have been, and continue to be, undertaken by Iran at the aforementioned location on the Parchin site, when the Agency gains access to the location, its ability to conduct effective verification will have been seriously undermined. While the Agency continues to assess that it is necessary to have access to this location without further delay, it is essential that Iran also provide without further delay substantive answers to the Agency's detailed questions regarding the Parchin site and the foreign expert, as requested by the Agency in February 2012.⁴⁷

Excerpt from IAEA November 2014 report:

59. Since the Director General's previous report, at a particular location at the Parchin site, the Agency has observed through satellite imagery that the construction activity that appeared to show the removal/replacement or refurbishment of the site's two main buildings' external wall structures appears to have ceased. This activity is likely to have further undermined the Agency's ability to conduct effective verification. It remains important for Iran to provide answers to the Agency's questions and access to the particular location in the question.

Experiments carried out by Ali Mehdipour, a key figure in the SPND organization in Parchin

Ali Mehdipour Omrani, who served for a time as director of Center for Manufacture and Industrial Research in SPND, has worked on explosive experiments at Parchin. Research for his PhD thesis at Khaje Nassir University in 2006 concerned using explosive effects to increase the density of tungsten. This test was conducted at Parchin. Omrani had been introduced to the Khaje Nassir University by the Ministry of Defense and concurrent with his work in SPND he was working on his PhD thesis and

the above test. His professor was Dr. Mehdi Zohouri from the Mechanical Engineering Department at this university.

Exposing the Parchin Mystery

In its latest report on November 7, 2014, titled "Exposing the Parchin Mystery," the National Council of Resistance of Iran exposed new details about the activities at Parchin and the explosion chamber that had been built there.

According to the opposition, there were two explosion chambers built by AzarAb industries, an affiliate of the IRGC company Khatam al-Anbia. This was part of a highly classified special project of which only two senior officials at the company had full knowledge. The chambers were to be used for special tests, particularly for high explosive impact tests as part of the nuclear weapons program. One of the two chambers was installed at Parchin Military Complex in southeast Tehran by the Defense Ministry between late 2000 and early 2001.

The explosion chamber(s) installed and used at Parchin Military Complex were part of a project that began under the supervision of the nuclear weapons structure. Mohsen Fakhrizadeh Mahabadi, the key figure for the Iranian regime's nuclear weapons program, headed the project. The cover story for this project was research in the field of nanodiamonds, or "ultra-dispersed diamonds."

The main individual responsible for the design and installation of the explosion chamber was an IRGC official, an engineer by trade, named Saeed Borji, a confidant of Mohsen Fakhrizadeh, who is also an explosives expert and a former official at the Center for Explosives, Blast Research and Technologies, which is known by its Persian acronym METFAZ and is one of the subdivisions of SPND.

The Ukrainian expert Vycheslav V. Danilenko was in Iran at the time to cooperate with the regime in the field of explosive impact and collaborated closely with Saeed Borji in the design and installation of the explosion chamber. In addition to Danilenko, his son-in-law, Vladimir Padalko, was also in Iran at the time and was involved in the explosion chamber project.

When installing the chamber at Parchin Military Complex, no one from AzarAb Industries was allowed into Parchin. Danilenko and Borji were present at Parchin and supervised the installation of the explosion chamber.

Iranian Presidential Center for Innovation and Technology Cooperation (CITC) (this 'center' was at the time referred to as 'office'), whose task is to circumvent international sanctions and to obtain illicit information on weapons of mass destruction including nuclear weapons, has been involved in the Ministry of Defense's nuclear activities in relation to recruiting and employing experts from Russia, Belarus and Ukraine. CITC was directly involved in recruiting Danilenko while also addressing his specific needs.

Saeed Borji had an intimate working relationship with Danilenko throughout the latter's stay in Iran, and together they designed the explosion chambers. Borji gained expertise and experience from Danilenko in the areas of nanodiamonds, explosives detonation and other aspects of nuclear warhead manufacturing.

According to the information provided by the opposition, contrary to Danilenko's claims, he was directly involved in the explosion chamber project, was in Parchin, and supervised its installation and operation. New intelligence indicates that Danilenko's contract for cooperation with the Iranian regime was signed by CITC under the direct supervision of the head of this office, Seyyed Mohammad-Reza Sajjadi.

According to this information, Morteza Amir Kanian, the deputy chair of the office, and Seyyed Hassan Emami, a consultant at the office (currently the deputy for energy at CITC), were both in direct contact with Saeed Borji and Mohsen Fakhrizadeh Mahabadi and were in charge of recruiting and accommodating the needs of foreign scientists. They personally made arrangements for Danilenko's stay in Iran, including providing him with a travel visa.

Chapter 9 – Nuclear Warhead

Introduction

The delivery system is an essential part of any nuclear weapons project. Therefore, questions about the design and development of the nuclear warhead have been among the questions constantly posed to the Iranian regime over the years. They have thus far remained mostly unanswered.

Has the regime indeed worked on the production of a nuclear warhead specifically for use with the Shahab 3 missile or similar missiles such as Qadr, Ashura and Sejil? Where have the research and tests been conducted and who are the experts involved in this project? This report has attempted to answer these questions in this chapter.

Latest status

From the outset, the Iranian regime has said that the documents that pointed to the development of a nuclear warhead were baseless and were simply electronic documents that could have been fabricated. However, recent IAEA reports have included new information supporting the claim that Iran had been working on the design of a nuclear warhead and its detonation system.

Moreover, the organization responsible for the building of such a weapon has been identified, as have the particular division heading the project, its front companies, and a number of experts who are working on the project. This subject remains among the most important questions posed to the Iranian regime by the IAEA.

Review of IAEA reports:

Excerpt from IAEA February 2006 report:

38. On 5 December 2005, the Secretariat repeated its request for a meeting to discuss information that had been made available to the Secretariat about alleged studies, known as the Green Salt Project, concerning the conversion of uranium dioxide into UF₄ (often referred to as “green salt”), as well as tests related to high explosives and the design of a missile re-entry vehicle, all of which could involve nuclear material and which appear to have administrative interconnections. On 16 December 2005, Iran replied that the “issues related to baseless allegations.” Iran agreed on 23 January 2006 to a meeting with the DDG-SG for the clarification of the alleged Green Salt Project, but declined to address the other topics during that meeting. In the course of the meeting, which took place on 27 January 2006, the Agency presented for Iran’s review a copy of a process flow diagram related to bench scale conversion and a number of communications related to the project. Iran reiterated that all national nuclear projects are

conducted by the AEOL, that the allegations were baseless and that it would provide further clarifications later.

Partial list of documents prepared by the IAEA on Missile Re-entry Vehicle

Documents list from annex to IAEA May 2008 report:

A.3. Missile Re-entry Vehicle

Document 1: One page piece of correspondence in Farsi, dated 3 March 2003, from M. Fakhrizadeh to Shahid Hemat Industrial Group (SHIG) management, referring to the “Amad Plan” and seeking assistance with the prompt transfer of data for “Project 111”.

Document 2: One page letter in Farsi, dated 14 March 2004, from a “Project 110” official to Dr Kamran advising him of the views of the project supervisors regarding the report relating to “Group E1” (part of “Project 111”).

Document 3: One page undated document in Farsi providing correspondence from the “Project 111 Office” to “Engineer Fakhrizadeh, Chief, Amad Plan,” referring to a meeting on 28 August 2002 and the provision of the “Project 111” progress report to a Ministry official.

Document 4: Fourteen page document in Farsi dated February–March 2003 entitled “Documentation Preliminary Training” which outlines, in both text and in copies of a presentation, the methodology to be adopted for the production and management of technical reports and documents.

Document 5: Three page document comprising a cover letter in Farsi, dated 11 June 2002, from M. Fakhrizadeh to “Project Executive” requesting that monthly reports are to be provided to him by the 25th of each month in a specified format.

Document 6: Undated, five page document in Farsi from “Orchid Office” to “Design Management” summarizing the scientific activities of the “Project 111 Groups E1 – E6” and the “Vice Chair E.”

Document 7: Comprised of four presentations in Farsi providing an overview of “Project 111” from some time before December 2002 to January 2004. The documents detail various aspects of an unidentified entity’s effort to develop and construct a Shahab-3 re-entry vehicle capable of housing a new payload for the Shahab-3 missile system. The material includes a short film clip on the assembly of a dummy re-entry vehicle payload chamber.

Document 8: “Instructions for Assembling the Chamber Parts, Assembling the Payload Inside the Chamber, and Assembling the Chamber to Shahab-3 Warhead”, 18 pages in Farsi, dated December 2003–January 2004, produced by Group E6 of Project 111.

Document 9: “Explosive Control System. Construction and Design Report”, 48 pages in Farsi, dated December 2003–January 2004, produced by Project 111.

Document 10: “Assembly and Operating Guidelines for Explosive Control System”, 17 pages in Farsi, dated December 2003–January 2004, produced by the Groups E2 and E3 of Project 111.

Document 11: “Design and Construction of Explosive Control System”, 29 pages in Farsi, dated December 2003–January 2004, produced by Groups E2 and E3 of Project 111.

Document 12: “Finite Element Simulation and Transient Dynamic Analysis of the Warhead Structure”, 39 pages in Farsi, dated February–March 2003, produced by Group E5 of Project 111.

Document 13: "Implementation of Mass Properties Requirements of Shahab-3 Missile Warhead with New Payload, with the Use of Nonlinear Optimization Method", 36 pages in Farsi, dated March–April 2003, produced by Group E4 of Project 111.

Excerpts from annex to the IAEA November 2011 report:

C.11. Integration into a missile delivery vehicle

59. *The alleged studies documentation contains extensive information regarding work which is alleged to have been conducted by Iran during the period 2002 to 2003 under what was known as Project 111. From that information, the project appears to have consisted of a structured and comprehensive programme of engineering studies to examine how to integrate a new spherical payload into the existing payload chamber which would be mounted in the re-entry vehicle of the Shahab 3 missile.*

60. *According to that documentation, using a number of commercially available computer codes, Iran conducted computer modelling studies of at least 14 progressive design iterations of the payload chamber and its contents to examine how they would stand up to the various stresses that would be encountered on being launched and travelling on a ballistic trajectory to a target. It should be noted that the masses and dimensions of components identified in information provided to the Agency by Member States that Iran is alleged to have been developing (see paragraphs 43 and 48 above) correspond to those assessed to have been used in Project 111 engineering studies on the new payload chamber.*

61. *During these studies, prototype components were allegedly manufactured at workshops known to exist in Iran but which Iran refused the Agency permission to visit. The six engineering groups said to have worked under Project 111 produced many technical reports, which comprise a substantial part of the alleged studies documentation. The Agency has studied these reports extensively and finds that they are both internally consistent and consistent with other supporting information related to Project 111.*

62. *The alleged studies documentation also shows that, as part of the activities undertaken within Project 111, consideration was being given to subjecting the prototype payload and its chamber to engineering stress tests to see how well they would stand up in practice to simulated launch and flight stresses (so-called "environmental testing"). This work would have complemented the engineering modelling simulation studies referred to in paragraph 60 above. According to the information reflected in the alleged studies documentation, within Project 111, some, albeit limited, preparations were also being undertaken to enable the assembly of manufactured components.*

63. *Iran has denied conducting the engineering studies, claiming that the documentation which the Agency has is in electronic format and so could have been manipulated, and that it would have been easy to fabricate.⁴⁵ However, the quantity of the documentation, and the scope and contents of the work covered in the documentation, are sufficiently comprehensive and complex that, in the Agency's view, it is not likely to have been the result of forgery or fabrication. While the activities described as those of Project 111 may be relevant to the development of a non-nuclear payload, they are highly relevant to a nuclear weapon programme.*

C.12. Fuzing, arming and firing system

64. The alleged studies documentation indicates that, as part of the studies carried out by the engineering groups under Project 111 to integrate the new payload into the re-entry vehicle of the Shahab 3 missile, additional work was conducted on the development of a prototype firing system that would enable the payload to explode both in the air above a target, or upon impact of the re-entry vehicle with the ground. Iran was shown this information, which, in its 117 page submission (referred to above in paragraph 8), it dismissed as being “an animation game”.

65. The Agency, in conjunction with experts from Member States other than those which had provided the information in question, carried out an assessment of the possible nature of the new payload. As a result of that assessment, it was concluded that any payload option other than nuclear which could also be expected to have an airburst option (such as chemical weapons) could be ruled out. Iran was asked to comment on this assessment and agreed in the course of a meeting with the Agency which took place in Tehran in May 2008 that, if the information upon which it was based were true, it would constitute a programme for the development of a nuclear weapon. Attachment 2 to this Annex reproduces the results of the Agency’s assessment as it was presented by the Secretariat to the Member States in the technical briefing which took place in February 2008.

Information by Iranian opposition

Shahab 3 missile, capable of carrying a nuclear warhead

The Shahab-3 missile is the most prominent missile manufactured by the Iranian regime so far. In later years, with limited modifications, other types of this missile were produced under the names Qadr, Ashura and Sejil. The preliminary range of this missile was 1300 km and according to the Iranian regime, the later models had a range of up to 2000 km. In 1993, the NCRI discovered that Tehran had allocated a \$500 million budget for the purchase of the North Korean No Dong 1. Subsequently, in July 1998, NCRI reported that this missile had been produced inside of Iran with cooperation from North Korea and China and it is capable of carrying a nuclear warhead.

Hemmat Industries, site of missile production and warhead research

In November 2005, NCRI revealed the structure, centers, and the tunnels of Hemmat Industries, one of the most important groups of the Aerospace Industries Organization (AIO), which is in turn a division of the Ministry of Defense.

According to NCRI information, this was part of a secret and strategic plan for production of missiles capable of carrying a nuclear warhead. For the purpose of that project, the Ministry of Defense had taken over a huge area in the east and southeast of Tehran with Supreme Leader Ali Khamenei’s personal approval. The general area is 120 square kilometers (an average width of 6 km and a length of around 20 km).

The Iranian regime initiated this strategic project in 1989 after the Iran-Iraq War and has constantly invested in it since that time.

North Korean experts participated in the design and construction of this complex, which is composed of dozens of huge tunnels and facilities under the mountains. Many of the construction plans were produced by North Korean experts. The central tunnel, which is used for the final mounting of the missiles, is 1000 meters long with six 500 meter long branches and is built like a town under the mountain.

The factories of Hemmat Industries, are located in this area and produce the Shahab 1, Shahab 2, Shahab3 and Qadr missiles.

The Iranian opposition reported in 2005 that the production of Shahab3 missiles had reached mass production levels and that 70% of the work for production of Qadr missile had also been completed. Production of the Qadr missile was completed and announced by the regime a few years later.

In February 2008, NCRI disclosed in a press conference that the project to produce a nuclear warhead was being carried out in Khojir region. They explained that this project was under the supervision of the organization tasked with producing nuclear weapons as part of the regime's nuclear program. This agency is currently known as SPND. The NCRI also brought the following facts to light:

1. The project to manufacture nuclear warheads is called Alireza Nori Industry. It is identified with the code 8500. In order to keep the project secret, communications and correspondence regarding it use this code.
2. Given the extreme sensitivity of the nuclear warhead project, Alireza Nori Industry has its own security and the individuals who have clearance to other parts of Khojir site are not allowed to go to 8500 section. The entrances to this section are closed and every coming and going is controlled.
3. This site is located on the northern side of 1720 height. The location is marked as B1 in maps of Khojir sections.
4. A key figure for the regime is Dr. Mehdi Naghian Fesharaki. He is in charge of designs for the construction of nuclear warheads. Dozens of other experts of the regime cooperate with him. He is an expert in computers and electronics. For years, he was the Director of the Center for Training and Research of AIO and for a long time was involved in the production of missiles. He was transferred to the 8500 section of Khojir in 2006.
5. Dozens of engineers are working on the nuclear warhead project, specializing in aerodynamics, metallurgy, and electronics.
6. The chief head of Nouri Industry is Mr. Naimi, who works with Dr. Fesharakei in building the warhead. The head of research for Nouri Industry is Mr. Aram, who is an engineer.

Cooperation of North Korean experts

7. North Korean experts work with the Iranian regime on this project and have contributed significantly to advancing it. The North Korean experts assist the regime's experts in the aerodynamic design of the warhead, as well as its superficial design.

8. The North Korean experts prepared the design of the Hemmat site and its secret tunnels and centers.

9. Among the sections that Koreans have access to is the Hemmat Industries center for production of electronic parts, which is located in Azmayesh Factory. They also have access to the Khojir area.

Front companies for warhead production

According to disclosures made by the Iranian opposition in September 2008, the Iranian regime had by then established several front companies to purchase the equipment and material needed for the project of mounting a nuclear warhead on long range ballistic missiles, as well as for keeping the project secret from IAEA inspections and saving the project from UN sanctions.

One of the main front companies involved in this project is Asri New Technology Engineering. Since April 2007, in order to cover up the real purpose of this company, the regime has changed its name to *Twose'eh Fanavaran Hava Payeh*, or, Company to Develop Aerospace-based Technology.

This company is active in designing nuclear warheads and other missile parts as well as in the purchase and smuggling of requisite material for the warhead project from other countries.

Dozens of experts in various fields are participating in this research and helping to obtain the equipment and material for the project, all under the cover of this front company. It has a hand in aerospace engineering, evaluation of flight dynamics for supersonic flights, electromagnetism, designing and producing space equipment and satellites, designing missile bodies, aerodynamics and mechanics.

Another company that is active in missile and warhead research under the supervision of Dr. Fesharakei is *Tose'a Fanavari*, or Expansion of Technology. Mr. Yadborouqi, an engineer, is the director of this company and Mr. Kiarostamim, who is also an engineer, is responsible for the mechanics division.

Roles played by the most senior regime officials

In the documents published by the IAEA on March 14, 2004, an individual by the name of Kamran was mentioned as one of those in charge of the nuclear warhead project.

This individual is Kamran Daneshjoo, the former Minister of Science, Research and Technology during the second term of Mahmoud Ahmadinejad. He was one of the people in the headquarters of Mohsen Fakhrizadeh who was pursuing the design of the nuclear warhead at that time.

In 2009, when the cabinet ministers were being introduced, Kamran Daneshjoo was introduced as: “Head of the Ministry of Defense Center for R&D of Advanced Aeronautical Technologies, from 2002 till 2005”

The *Times of London* on December 14, 2009 disclosed a secret letter signed by Mohsen Fakhrizadeh as “Head of Field of Expansion and Deployment of Advanced Technologies,” dated 29 December 2005. Among the recipients of copies of this letter is the “Respectable Head of Center for R&D of Advanced Aeronautical Technologies.” That entity is plainly one of the divisions of the agency headed by Mohsen Fakhrizadeh.

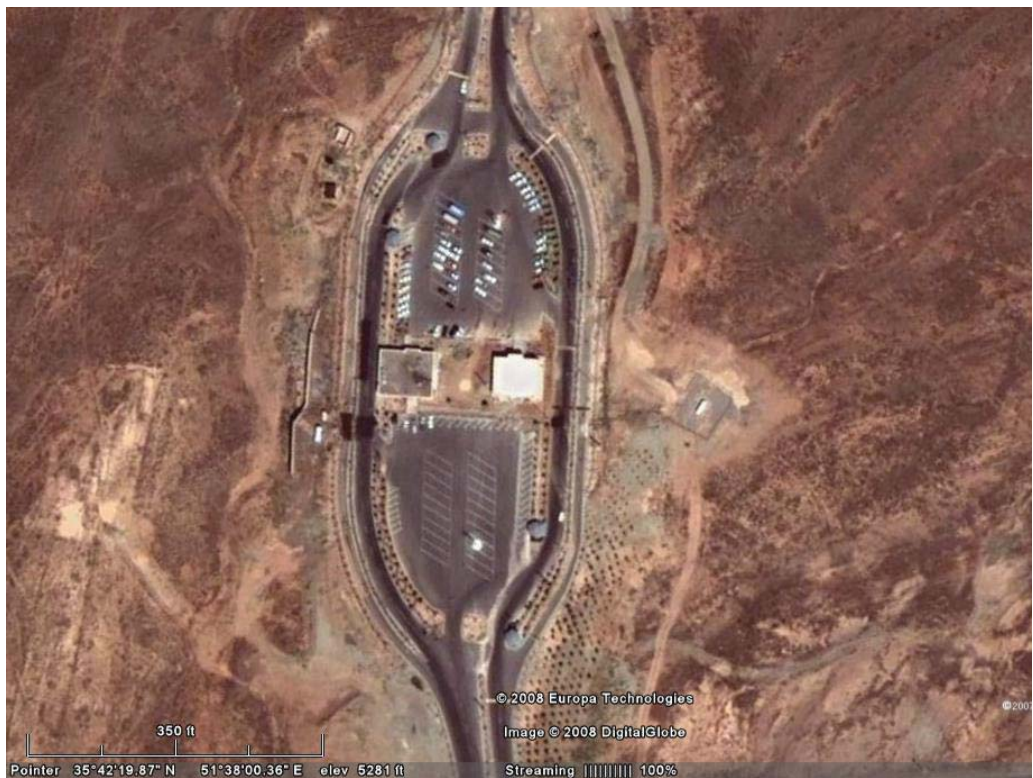
In the above documents, there are also exchanges with the same Hemmat Industry Group that the Iranian opposition had already identified as being at the head of the Iranian missile industry.

Status of Center for R&D of Advanced Aeronautical Technologies

According to information disclosed by the NCRI in January 2012, this section works on the designs and electronic calculations needed for building a nuclear warhead. This center is headed by Dr. Erfan Bali Lashak, formerly the head of Malek Ashtar University’s Electronic Complex.



Satellite image of Khojir- section working on nuclear warhead – photo 1



Satellite image of Khojir- section working on nuclear warhead – photo 2



Satellite image of Khojir- section working on nuclear warhead – photo 3

Chapter 10 – Key Experts in Building Nuclear Weapons

Introduction:

Alongside its pursuit of other issues, the IAEA has spent 12 years seeking interviews with and unhindered access to experts involved in advancing Iran's nuclear plans, especially those related to the possible military dimensions of the nuclear program. These interviews and access are necessary for completion of a complete probe into the nature of the regime's nuclear program. The IAEA clearly understands this on the basis of its experience with the nuclear weapons programs of other nations. Without direct, active, and repetitive interviews with key experts who lead the various aspects of the nuclear program, there is no possibility of dispelling obscurities or obtaining clarifying answers on many matters.

Latest status:

The Iranian regime's 12 years of limited cooperation have allowed only interviews with a number of handpicked experts, coming with many constraints. Tehran has fundamentally blocked the IAEA's access to key figures in possible military aspects of the nuclear program. It has left IAEA requests in this regard unanswered and has shown no inclination to respond.

Repeated IAEA requests for interviews regarding possible military aspect

Excerpt of IAEA February 2011 report:

Possible Military Dimension

39. The Agency has continued to request that Iran engage with the Agency on these issues, and that the Agency be permitted to visit all relevant sites, have access to all relevant equipment and documentation, and be allowed to interview all relevant persons, without further delay. The passage of time and the possible deterioration in the availability of some relevant information increase the urgency of this matter. Iran's substantive and proactive engagement is essential to enable the Agency to make progress in its verification of the correctness and completeness of Iran's declarations.

Excerpts from IAEA November 2011 report:

Possible Military Dimension

39. The Board of Governors has called on Iran on a number of occasions to engage with the Agency on the resolution of all outstanding issues in order to exclude the existence of possible military dimensions to Iran's nuclear programme. 34 In resolution 1929 (2010), the Security Council reaffirmed Iran's obligations to take the steps required by the Board of Governors in its resolutions GOV/2006/14 and GOV/2009/82, and to cooperate fully with the Agency on all outstanding issues, particularly those which give rise to concerns about the possible military dimensions to Iran's nuclear programme, including by providing access without delay to all sites, equipment, persons and documents requested by the Agency. 35 Since August 2008, Iran has not engaged with the Agency in any substantive way on this matter.

Denial of IAEA access to Mohsen Fakhrizadeh

24. Since 2004, the Agency has repeatedly requested additional information and clarifications related to efforts made by the Physics Research Centre (PHRC), which had been established at Lavisan-Shian, to acquire dual use materials and equipment that could also be used in uranium enrichment and conversion activities. The Agency also requested interviews with the individuals involved in the acquisition of those items, including two former Heads of the PHRC.

25. As previously reported, the Agency met in February 2006 with one of the former Heads of the PHRC, who had been a university professor at a technical university while he was Head of the PHRC. The Agency took environmental samples from some of the equipment said to have been procured for use by the university, the results of which are currently being assessed and discussed with Iran. Although Iran agreed to provide further clarifications in relation to efforts to procure balancing machines, mass spectrometers, magnets and fluorine handling equipment, the Agency has yet to receive such clarifications. Further access to the procured equipment is necessary for environmental sampling. Iran has continued to decline requests by the Agency to interview the other former Head of the PHRC.

Explanation: The above passage notes that the Iranian regime allowed the IAEA to interview Seyed Abbas Shahmoradi Zavarei, former chief of the Physics Research Center. However, it has not permitted any interviews with Mohsen Fakhrizadeh.

Identities of a Number of Regime Experts Identified in UNSC Resolutions

Excerpts from annex of UNSC resolution 1747, dated March 24, 2007:

Persons involved in nuclear or ballistic missile activities

1. Fereidoun Abbasi-Davani (Senior Ministry of Defence and Armed Forces Logistics (MODAFL) scientist with links to the Institute of Applied Physics, working closely with Mohsen Fakhrizadeh-Mahabadi, designated below)

2. Mohsen Fakhrizadeh-Mahabadi (Senior MODAFL scientist and former head of the Physics Research Centre (PHRC). The IAEA have asked to interview him about the activities of the PHRC over the period he was head but Iran has refused)

...6. Mehردادا Akhlaghi Ketabchi (Head of SBIG, which is designated under resolution 1737 (2006) for its role in the ballistic missile programme)

7. Naser Maleki (Head of SHIG, which is designated under resolution 1737 (2006) for its role in Iran's ballistic missile programme. Naser Maleki is also a MODAFL official overseeing work on the Shahab-3 ballistic missile programme. The Shahab-3 is Iran's long range ballistic missile currently in service)

“Fakhrizadeh Team”: Identification Code of Nuclear Weapons Experts in Regime

According to revelations made by the National Council of Resistance of Iran, “Fakhrizadeh team” is the code name used for nuclear weapons experts amongst the regime’s nuclear elite.

The members of this group work in secret while experts in nuclear physics and other fields are not informed of the results of their work.

It is common practice the world over for scientists and experts to place the results of their research at the disposal of colleagues in their country and make mutual use of it. However, Fakhrizadeh team’s work remains secret and the group maintains closed communications. Another characteristic of this group is that it continuously changes the name of its organization, which is unusual and in contrast with the norms of scientists and researchers.

This team has used the Shian-Lavisan site, Malek-Ashtar University in Isfahan, the IRGC’s Imam Hossein University and Mojdeh site to pursue their plans.

Some of the known members of this group are:

- Mohsen Fakhrizadeh Mahabadi
- Fereydoon Abbasi Davani

- Parviz Katani
- Saeed Borji
- Mohammad Hossein Keshavarz
- Majid Rezazadeh

Transfer of Atomic Energy Organization experts to military branch

The NCRI announced on April 28, 2004 that 400 Atomic Energy Organization experts had been transferred to the military section, including the Mojdeh site. The Iranian opposition at that time identified the names of a number of nuclear scientists and experts working in military facilities:

1. Dr. Ali Pazirande –cooperates with the MoD Special Military Industries Organization. He is a professor of nuclear physics at Tehran University and is considered one of Iran’s senior nuclear scientists.
2. Dr. Mohammadi – nuclear expert. His expertise was in building, assembling, and initializing Natanz centrifuges. He is a senior official in the Defense Industries Organization. However, he is currently stationed in Isfahan’s Nuclear Research Center.
3. Dr. Nosser Shariflu – head of the Bushehr power plant, who works in close cooperation with the MoD.
4. Dr. Mohammad Bagher Ghafrani – Sharif University professor, former official of Atomic Energy Organization, expert in uranium enrichment, and one of the nuclear scientists currently working with the IRGC on research to obtain nuclear weapons.
5. Dr. Hamidreza Moshfegh – Expert in theoretical nuclear physics and Tehran University professor; cooperating with Jihad & Military Industries.

Key experts involved in nuclear weapons projects

On 17 November 2004, the NCRI published the names of a number of nuclear experts working in the Center of New Advanced Defense Technology and Preparedness as follows:

1. Mohsen Fakhrizadeh – A member of the IRGC, he is a staff member in the Physics Department of Imam Hossein University. He teaches one day a week as a professor in this college. A member of the IRGC since the early days of the clerical regime, he began his nuclear research work with the MoD prior to 1991. He is currently in charge of nuclear-related activities at the MoD.
2. Fereydoon Abbasi is another nuclear expert of the Iranian regime. He was a member of the IRGC from the very beginning and participated in the Iran-Iraq War in the 1980s. Following the ceasefire, while he was an officer of the IRGC, he continued his studies in physics in Amir Kabir University and

the Mashhad College of Physics. He received his PhD in 1992. In 1993 he became a faculty member of the Imam Hossein Physics College and went on to become the dean of that college. At the same time, he began his work on nuclear research in the MoD. Fereydoon Abbasi is currently one of the senior experts of the Center for Organization of Defensive Innovation and Research.

3. Mansour Asgari, another Iranian regime nuclear expert, is a member of the IRGC and academic staff of the Physics College of Imam Hossein University. Currently he is a laser expert in the Center of New Advanced Defense Technology and Preparedness, working under the supervision of Fakhrizadeh.

4. Majid Rezazadeh is another Iranian regime nuclear expert who works closely with Mohsen Fakhrizadeh in the Center of New Advanced Defense Technology and Preparedness. He is a member of the academic staff of the MoD's Malek Ashtar University in Tehran and Isfahan and teaches at these two facilities. He also heads the Science Complex of Malek Ashtar University in Isfahan.

In May 2012 the NCRI unveiled the names of a number of key experts in the Organization of Defensive Innovation and Research (SPND):

1. Mohsen Feroozizadeh is the head of the Physics Group, dubbed "Fakhar Moghadam Group" as a cover name. The physics group has hidden centers outside of the site where this entity is located.

2. Parviz Katani is a veteran senior staff member of Center of New Advanced Defense Technology and Preparedness. He was the guiding professor of Shahram Amiri in Iran University of Science and Technology.

3. Alireza Agha Mohammadi is another senior staff member of Center of New Advanced Defense Technology and Preparedness who has led various sections of this institution.

4. Mohammad Sadegh Nasserian is the head of the Physics Research Institute, a subdivision of the Physics Group.

5. Javad Al Yassin is the director of Center for Research for Explosion and Impact.

6. Saeed Borji was formerly the director of Center for Research for Explosion and Impact.

7. Ali Mahdipour Omrani is director of the Center for Industrial Production and Research and has worked on shaping metals.

8. Akbar Motlabizadeh is the director of the Center for Research and Technology for Advanced Material – Chemistry Group, also known as the Karimi Group.

9. Seyed Mehdi Abbasi is head of the Center for Research and Technology on Advanced Materials-Metallurgy. Seyed Mohammad Mehdi Hadavi was the former chief of this center.

10. Dr. Erfan Bali Lashak leads the Center for Research and Design of New Aerospace Technologies. Kamran Daneshjoo, former President Ahmadinejad's Minister of Science, was formerly the chief of this center.

11. Dr. Gholam Ali Massah heads the Center for laser and Photonic Research. Mohammad Amin Bassam was a director of this center and he has worked on laser research in the Parchin site.

Identifying around 100 experts and scientists working in SPND

In 2013 and 2014 the NCRI released information on some 100 of the Iranian regime's experts and scientists working in various sections of SPND. The following is information on these experts:

Partial list of directors, experts, researchers at Organization of Defensive Innovation and Research- (SPND) -		
R	Name of expert	Function
1	Mohsen Fakhrizadeh Mahabadi	Director and head of SPND
2	Behzadi	Chief of staff Fakhrizadeh and coordinator of affairs for Fakhrizadeh
3	Parviz Katani	one of experts and managers of SPND
4	Alireza Agha Mohammadi	one of experts and managers of SPND
5	Mohsen Froughi Zadeh	Director of Center for preparedness and Advanced Modern Technology (Fakhar Moghadam Group)
6	Ashkevari	expert of Center for preparedness and Advanced Modern Technology (Fakhar Moghadam Group)
7	Tavakoli	expert of Center for preparedness and Advanced Modern Technology (Fakhar Moghadam Group)
8	Javadi	expert of Center for preparedness and Advanced Modern Technology (Fakhar Moghadam Group)
9	Yalan	expert of Center for preparedness and Advanced Modern Technology (Fakhar Moghadam Group)
10	Mohammad Sadeq Nasseri	Director of Physics research center
11	Khayatan	expert at physics research center
12	Mohammad Saber Saraf Zadeh	expert at physics research center
13	Seyed Mostafa Sadati	expert at physics research center
14	Abuzar Keshvarzian	expert at physics research center
15	Hossein Tar Gholizadeh	expert at physics research center
16	Ahmad Shahidi Delshad	expert at physics research center

17	Rouhollah Azimi Rad	expert at physics research center
18	Eskandar Assadi Amirabadi	expert at physics research center
19	Qassem Salehi	expert at physics research center
20	Gholamreza Taati	expert at physics research center
21	Hassan Taheri	expert at physics research center
22	Saeed Safa	expert at physics research center
23	Talebiaan	A manager of physics research center (logistics)
24	Javad Al- Yassin	Director of Center for Research for Explosion and Impact (METFAZ)
25	Massoud Sadighi Divani	expert at Center for Research for Explosion and Impact (METFAZ)
26	Alireza Moelaie	expert at Center for Research for Explosion and Impact (METFAZ)
27	Heydari	expert at Center for Research for Explosion and Impact (METFAZ)
28	Khosravi	expert at Center for Research for Explosion and Impact (METFAZ)
29	Ibrahimi	expert at Center for Research for Explosion and Impact (METFAZ)
30	Khosrow Keshan Zareh	expert at Center for Research for Explosion and Impact (METFAZ)
31	Dadashzadeh	expert at Center for Research for Explosion and Impact (METFAZ)
32	Ajini	expert at Center for Research for Explosion and Impact (METFAZ)
33	Sadeq Alem-zadeh	expert at Center for Research for Explosion and Impact (METFAZ)
34	Ali Mehdipour Omrani	Director of Center for Industrial Production and Research
35	Mehdi Tajdari	A manger of Center for Industrial Production and Research
36	Bahman Tootiaie	A manger of Center for Industrial Production and Research
37	Akabar Motalebi-zadeh	Director of Center for Research and Technology for Advanced Material - Chemistry Group
38	Mojtaba Alamshahi	expert at Center for Research and Technology for Advanced Material - Chemistry Group

39	Amir Heydar pour	expert at Center for Research and Technology for Advanced Material - Chemistry Group
40	Aliakbar Bassampour	expert at Center for Research and Technology for Advanced Material - Chemistry Group
41	Mehdi Shabani Arani	expert at Center for Research and Technology for Advanced Material - Chemistry Group
42	Engineer Nazzari	expert at Center for Research and Technology for Advanced Material - Chemistry Group
43	Engineer Fayaz	expert at Center for Research and Technology for Advanced Material - Chemistry Group
44	Engineer Mastour	expert at Center for Research and Technology for Advanced Material - Chemistry Group
45	Reza Ajami	expert at Center for Research and Technology for Advanced Material
46	Hossein Azimi	expert at Center for Research and Technology for Advanced Material
47	Parisa Nasiri	A manger of Center for Research and Technology for Advanced Material
48	Seyed Mehdi Abbasi	Director of Center for Research and Technology for Advanced Material- Metallurgy
49	Abdullah Sharafi	Director of Center for Research and Technology for Advanced Material- Metallurgy
50	Moslem Khazaie	Director of Center for Research and Technology for Advanced Material- Metallurgy
51	Mohsen Mohammadshahi	Director of Center for Research and Technology for Advanced Material- Metallurgy
52	Khodadad Mihammi	Director of Center for Research and Technology for Advanced Material- Metallurgy
53	Amir Hossein Fatollah Najarbashi	Director of Center for Research and Technology for Advanced Material- Metallurgy
54	Hossein Faghfour	Director of Center for Research and Technology for Advanced Material- Metallurgy
55	Reza Joulaie Sani	Director of Center for Research and Technology for Advanced Material- Metallurgy
56	Alireza Razaghi	Director of Center for Research and Technology for Advanced Material- Metallurgy
57	Mohamamd Reza Heydari	Director of Center for Research and Technology for Advanced Material- Metallurgy
58	Issa Pour-Moradi	Director of Center for Research and Technology for Advanced Material- Metallurgy
59	Hossein Choupanian	Director of Center for Research and Technology for Advanced Material- Metallurgy
60	Behzad Shakouri	Director of Center for Research and Technology for Advanced Material- Metallurgy

61	Ahmad Mohamamd zadeh	Director of Center for Research and Technology for Advanced Material- Metallurgy
62	Hamed Tavakoli	Director of Center for Research and Technology for Advanced Material- Metallurgy
63	Seyed Mehdi Hosseini	Director of Center for Research and Technology for Advanced Material- Metallurgy
64	Hamidreza Tayeri	Director of Center for Research and Technology for Advanced Material- Metallurgy
65	Iman Babainejad	Director of Center for Research and Technology for Advanced Material- Metallurgy
66	Mostafa Alizadeh	Director of Center for Research and Technology for Advanced Material- Metallurgy
67	Dr. Erfan Bali Lashak	Director of Center for Research and Design of New Aeospace Technology
68	Dr. Gholamali Massah	Director of Research center for Laser and Photonic
69	Mohammad Amin Bassam	Director of Research center for Laser and Photonic
70	Bagher Dibaie	Director of Research center for Laser and Photonic
71	Rasoul Rokni zadeh	Director of Research center for Laser and Photonic
72	Qassemi	Director of Directorate of Research
73	Nourelahi	expert at Directorate of Research
74	Seghtforoush	expert at Directorate of Research
75	Arezou Vajhi	expert at physics research center (research liasion)
76	Jalal Shahrizi	A manger of SPND Research Directorate
77	Namvar	A manger of SPND Research Directorate
78	Seyed Ibrahim Valizadeh	expert at physics research center
79	Saber Sadafzadeh	expert at physics research center
80	Sajad Maleki	expert at physics research center
81	Reza Mohamamdi	expert at physics research center
82	Saeed Borji	One of Managers of SPND and Director of research on Nano diamond

83	Mir Tajdini	expert of Nano diamond
84	Dr. Hashem Setareh	Director of Engineering Institue of safety of nuclear, hygine and enviornment
85	Dr. Shahram Akhlaghpour	Director of New medical adiation Institute
86	Ali Emadi Allahyari	Director General of Pardis medical company
87	Engineer Elyassi	A director at the Center for prepredness and Advanced Modern Technology (Fakhar Moghadam Group)
88	Kamali	one of the managaers and directors of SPND
89	Ahadi	an expert at SPND
90	Tavana	an expert at SPND
91	Katanbaf	an expert at SPND
92	Aboudi	an expert at SPND
93	Gholestani	an expert at SPND
94	Ghadiri	an expert at SPND
95	Ms. Hassani	an expert at SPND
96	Mohammad Davoodi	an expert at SPND
97	Seyed Mohammad Mehdi Hadavi	Direrctor of Iman Taba Company

Some of known IRGC commanders and personnel engaged in nuclear and Weapons of Mass Destruction program



Mohammad Eslami, Deputy Minister of Defense for Military Industries and Research. Met AQ Khan in Tehran in 1987.



IRGC Brigadier General Ali Hossein Tash, former Deputy Minister of Defense, senior official of Supreme National Security Council, former head of Imam Hossein University. Oversaw project on neutron initiator.



IRGC Brigadier General Ali Shamshiri, head of counter-intelligence of MoD (Nov 2005-2011), in charge of counter- intelligence on the regime's military nuclear project and other aspects of weapons of mass destruction development



IRGC Brigadier General, Hassan Zolfagharnia, head of counter-intelligence of MoD (until November 2005), in charge of counter- intelligence on the regime's military nuclear project, and other aspects of weapons of mass destruction development



Mullah Ghlomhossein Ramezani, head of counter-intelligence of MoD (2011-2013)



IRGC Brigadier General Ahmad Vahidi, formerly Deputy Minister of Defense 2005-2009) (oversaw the structure for weaponization of nuclear program) and subsequently Minister of Defense (2009-2013)



IRGC Brigadier General Mohammad Najar, Defense Minister (2005-2009)



Kamran Daneshjoo, Head of the Ministry of Defense Center for R&D of Advanced Aeronautical Technologies (from 2002 till 2005), Minister of Science (2009-2013)



Mohsen Fakhrizadeh, IRGC Brigadier General, head of SPND and PHRC



Fereydoon Abbasi, veteran IRGC officer, key figure in Iran's nuclear weapons program, head of AEOI (2011-2013)



Mohsen Reza'i, former Commander in Chief of IRGC (1981-1997), Secretary of the Exigency Council (1997-present)



Ali Shamkhani, former Defense Minister (1997-2005), Secretary of the Supreme National Security Council (2013-present)



Hossein Dehghan, Minister of Defense (2013-present)