

# Board of Governors

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(GOV/2005/57)

## Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran

*Report by the Director General*

1. A meeting of the Board of Governors was held from 9 to 11 August 2005 to discuss the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the Agency for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (the Safeguards Agreement<sup>1</sup>).
2. On 11 August 2005, the Board of Governors adopted a resolution (GOV/2005/64) in which it, inter alia:
  - Expressed serious concern at the 1 August 2005 notification to the IAEA that Iran had decided to resume the uranium conversion activities at the Uranium Conversion Facility (UCF) in Esfahan, at the Director General's report that on 8 August Iran had started to feed uranium ore concentrate into the first part of the process line at UCF and at the Director General's report that on 10 August Iran had removed the seals on the process lines and the UF<sub>4</sub> at that facility;
  - Underlined the importance of rectifying the situation resulting from the developments reported by the Director General and also of allowing for further discussions in relation to that situation;
  - Urged Iran to re-establish full suspension of all enrichment related activities including the production of feed material, including through tests or production at UCF, on the same voluntary, non-legally binding basis as requested in previous Board resolutions, and to permit the Director General to re-instate the seals that had been removed at that facility;
  - Requested the Director General to continue to monitor closely the situation and to inform the Board of any further developments as appropriate; and
  - Requested the Director General to provide a comprehensive report on the implementation of Iran's NPT Safeguards Agreement and this resolution by 3 September 2005.

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<sup>1</sup> INFCIRC/214.

3. Since March 2003, the Director General has been reporting to the Board of Governors on issues related to the implementation of Iran's Safeguards Agreement.<sup>2</sup> The present report builds upon the previous reports.

## **A. Findings as of November 2004**

4. In the comprehensive report of the Director General to the Board of Governors dated 15 November 2004 (GOV/2004/83), it was concluded, on the basis of all information available to the Agency as of that date, that Iran had failed in a number of instances over an extended period of time to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material, its processing and its use, as well as the declaration of facilities where such material had been processed and stored. In that report, these failures, as assessed in the light of the available information, were 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 UF<sub>6</sub> for the testing of centrifuges at the Kalaye Electric Company workshop in 1999 and 2002, and the consequent production of enriched and depleted uranium (DU);
- (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 UO<sub>2</sub>, UO<sub>3</sub>, UF<sub>4</sub>, UF<sub>6</sub> and ammonium uranyl carbonate (AUC) from imported depleted UO<sub>2</sub>, depleted U<sub>3</sub>O<sub>8</sub> and natural U<sub>3</sub>O<sub>8</sub>, and the production and transfer of resulting wastes; and
- (vi) the production of natural and depleted UO<sub>2</sub> targets at the Esfahan Nuclear Technology Centre (ENTC) and their irradiation in the Tehran Research Reactor (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 the Tehran Nuclear Research Centre (TNRC).

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<sup>2</sup> The initial report to the Board of Governors on this matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General has since then submitted ten written reports to the Board: GOV/2003/40, dated 6 June 2003; GOV/2003/63, dated 26 August 2003; GOV/2003/75, dated 10 November 2003; GOV/2004/11, dated 24 February 2004; GOV/2004/34, dated 1 June 2004, and Corr.1, dated 18 June 2004; GOV/2004/60, dated 1 September 2004; GOV/2004/83, dated 15 November 2004; INFCIRC/648, dated 1 August 2005; GOV/2005/61, dated 8 August 2005; and GOV/2005/62, dated 10 August 2005. In addition, the Deputy Director General for Safeguards made oral statements to the Board on 1 March 2005 (GOV/OR.1119) and on 16 June 2005 (GOV/OR.1130).

- 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 (the Jabr Ibn Hayan Multipurpose Laboratories at TNRC (JHL); TRR; ENTC; waste storage facility at Esfahan and Anarak);
  - (ii) the facilities at ENTC and TNRC where  $UO_2$ ,  $UO_3$ ,  $UF_4$ ,  $UF_6$  and AUC from imported depleted  $UO_2$ , depleted  $U_3O_8$  and natural  $U_3O_8$  had been produced;
  - (iii) the waste storages 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 had been 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 had taken 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.

5. As corrective actions, Iran:

- a. Submitted inventory change reports relevant to imports, transfers, domestic receipts and shipments, losses and discards of nuclear material;
- b. Provided physical inventory listings and material balance reports with respect to all declared nuclear material, and presented the available material for Agency verification;
- c. Submitted declarations with respect to the pilot enrichment facility at the Kalaye Electric Company workshop, the laser enrichment plants at TNRC and Lashkar Ab'ad and the waste storages at Esfahan and Anarak; and
- d. Provided design information with respect to the facilities identified above (the facilities located at TNRC and ENTC).

6. As a result of these corrective actions and other activities, the Agency was able by November 2004 to confirm certain aspects of Iran's declarations (related to conversion activities and laser enrichment), which, as indicated to the Board, would be followed up as matters of routine safeguards implementation under the Safeguards Agreement and Additional Protocol.

7. As reported to the Board of Governors in March 2005, Iran failed to report to the Agency in a timely manner certain underground excavation activities that were already underway in December 2004 at the UCF at Esfahan. Although Iran submitted the necessary design information in December 2004, Iran should have provided such information to the Agency at the time the decision

was taken to authorize or carry out such construction, in accordance with the Safeguards Agreement Subsidiary Arrangements.

8. No additional failures have been identified. Iran has, however, provided some new information with respect to the dates of the plutonium research activities that is at variance with some of the dates provided earlier (see discussion below). As in November 2004, while there are a number of other matters requiring follow-up, the two important outstanding issues relevant to the Agency's efforts to provide assurance that there is no undeclared nuclear material and that there are no undeclared enrichment activities in Iran are: the origin of LEU and HEU<sup>3</sup> particle contamination found at various locations in Iran; and the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and P-2 designs.

## **B. Developments since November 2004**

### **B.1. Contamination**

9. As a vital part of its investigation into Iran's enrichment programme, the Agency has conducted extensive environmental sampling at locations where Iran has declared that centrifuge components were manufactured, used and/or stored, with a view to assessing the correctness and completeness of Iran's declarations concerning its enrichment activities.<sup>4</sup>

10. Analysis of these samples has revealed particles of LEU and HEU indicative of types of nuclear material that are not included in Iran's inventory of declared nuclear material, and has thus called into question the completeness of Iran's declarations about its centrifuge enrichment activities. The Iranian authorities have attributed the presence of these particles to contamination originating from imported centrifuge components. In that context, Iran has stated that it has not enriched uranium beyond 1.2% U-235 using centrifuges.

11. In January 2005, an Agency team re-visited locations in a Member State where, according to Iran, the centrifuge components imported by Iran had been stored by the supply network prior to their shipment to Iran. Additional samples were taken in March 2005 at one of the locations. The analysis of the environmental samples collected at these locations is still in progress.

12. On 21 May 2005, the Agency received from another Member State a number of centrifuge components, environmental sampling of which was thought might provide information on the origin of the LEU and HEU particle contamination found at various locations in Iran. The analysis of swipe samples taken from those components, which was carried out at the Agency's Safeguards Analytical Laboratory (SAL), was completed in early August 2005. Based on the information currently available to the Agency, the results of that analysis tend, on balance, to support Iran's statement about the foreign origin of most of the observed HEU contamination.

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<sup>3</sup> High enriched uranium (HEU) is uranium enriched to 20% or above in the isotope U-235; low enriched uranium (LEU) is uranium enriched to between 0.72% and less than 20% U-235.

<sup>4</sup>The most important observations with respect to the analytical results from the environmental sampling, as of 15 November 2004, were summarized in paras 36–41 of the Director General's November 2004 report to the Board.

## **B.2. Enrichment Programme**

13. As explained by the Deputy Director General for Safeguards (DDG-SG) in March 2005, there have been developments since November 2004 in four areas related to the Agency's verification of Iran's P-1 centrifuge enrichment programme, specifically in connection with: (a) a 1987 offer for centrifuge related design, technology and sample components; (b) the genesis of the mid-1990s offer for P-1 centrifuge documentation and components for 500 centrifuges; (c) shipping documents and other documentation related to the delivery of items in connection with the mid-1990s offer; and (d) technical discussions held between Iran and the intermediaries concerning centrifuge enrichment. These developments, as well as the status of the Agency's inquiries about Iran's P-2 programme, are addressed below.

### **B.2.1. The 1987 offer**

14. During a meeting on 12 January 2005 in Tehran, Iran showed the Agency a handwritten one-page document reflecting an offer said to have been made to Iran in 1987 by a foreign intermediary. The document suggests that the offer was for the delivery of: a sample machine (disassembled), including drawings, descriptions and specifications for production; drawings, specifications and calculations for a "complete plant"; and materials for 2000 centrifuge machines. The document also reflects an offer to provide auxiliary vacuum and electric drive equipment and uranium re-conversion and casting capabilities. Iran stated that only some of these items had been delivered, and that all of those items had been declared to the Agency. Iran further stated that the intermediaries had offered the re-conversion unit with casting equipment on their own initiative and that, as the Atomic Energy Organization of Iran (AEOI) had not requested it, the AEOI had not received it.

15. The Agency has repeatedly asked to have access to, and copies of, original documentation related to the 1987 offer. Iran has maintained that the only document that exists reflecting the 1987 offer is the handwritten one-page document. Iran has also reiterated its previous statement that it had not received the re-conversion unit, but has agreed to continue its search for additional supporting documentation on this and other items included in the offer.

### **B.2.2. Genesis of the mid-1990s offer**

16. Iran has informed the Agency that there is no written document reflecting the mid-1990s offer, made initially to an Iranian company unrelated to AEOI, for the delivery of P-1 centrifuge documentation and components for 500 centrifuges. According to Iran, an employee of that company (said by Iran to have been set up to purchase computer software and hardware for the State Organization for Management and Planning (OMP) was approached with an oral offer from the network. This information was conveyed to the head of the OMP, who, according to Iran, realized that the OMP did not have a mandate for the transaction, and reported it to higher authorities. The President of the AEOI was made aware of the offer, which resulted in renewed contacts in 1993 between the AEOI and the network intermediaries.

### **B.2.3. Shipping documents and other documentation**

17. The Agency has sought from Iran access to documentation which supports Iran's declarations concerning the number of shipments of enrichment related equipment received by Iran, and the specific contents of those shipments. In January 2005, Iran provided the Agency with copies of a number of shipping documents indicating four shipments between 1994 and 1995. In a letter dated 14 April 2005, the Agency asked Iran for permission to review the original folder containing the 1994 shipping documents and to be provided with supporting documents reflecting the content of the shipments made in the 1994 consignments. In August 2005, Iran showed the Agency the originals of

the shipping documents, as well as customs clearance sheets relevant to the 1994/1995 shipments. However, these documents did not provide additional details about the actual contents of the shipments. The Agency has reiterated its request for more information about the contents, and in particular for access to unpacking and storage documents. While Iran has stated that very few such records had been kept in those days, it has agreed to search further for such information.

18. From the shipping documents presented to the Agency in January 2005, it appeared that the first deliveries of the P-1 components started in January 1994, i.e. before what had previously been declared as the first meeting, in October 1994, of the two AEOI representatives with the network intermediaries. In its letter of 6 April 2005, Iran stated that, having checked the service passport of one of the AEOI representatives, "it is clear that he had made two trips relating to the matter in August and December 1993." Since this was not consistent with the earlier information provided by that individual during his discussions with the Agency, the Agency asked to see original supporting documentation (e.g. passports) of the two Iranian representatives who had participated in the meetings with the intermediaries. In August 2005, Iran allowed the Agency to review the service passport of one of the Iranian representatives, which contained stamps appearing to corroborate Iran's statement regarding the two trips in 1993. Iran promised to provide further clarification about the trips said by that individual to have taken place in 1994, and to provide supporting documentation for such clarification.

#### **B.2.4. Technical discussions between Iran and the intermediaries**

19. The Agency still needs to understand what contacts took place during the period 1987 through 1993 between Iran and the intermediaries and why P-1 centrifuge design documents similar to those that had been provided in 1987 were delivered again in connection with the offer made around 1994. This is important for establishing the chronology and sequence of events associated with the development of Iran's enrichment programme, in particular with a view to ensuring that there has been no other development or acquisition of enrichment design, technology or components by Iran. The Agency also has inquired about other subsequent contacts between Iran and the intermediaries (from 1994 to the present). In its communication received on 8 June 2005, Iran stated that, apart from the meetings and discussions about which Iran had already informed the Agency, no other discussions on centrifuge enrichment had taken place.

#### **B.2.5. The P-2 programme**

20. Another aspect of the Agency's investigation is related to Iran's statement that it did not pursue any work on the P-2 design between 1995 and 2002. As reported in November 2004, Iran has stated that no work was carried out on the P-2 design (or any centrifuge design other than the P-1 design) prior to 2002. Iran has said that, due a shortage in professional resources and changes in the management of the AEOI, priority had been placed at that time on resolving difficulties being encountered by Iran in connection with the P-1 centrifuge. The reasons given by Iran for the apparent gap between 1994/1995 (when the P-2 design was said to have been received) and 2002, and the evidence provided to date in support thereof, do not yet provide sufficient assurance that no related activities were carried out during that period, particularly given that the individual contracted to work with the P-2 design was able to make modifications necessary for composite rotors within a short period after early 2002 when, according to Iran, he had seen the drawings for the first time.<sup>5</sup> Iran has been requested to provide more information, along with any supporting documentation, relevant to the P-2 programme, in particular with regard to the scope of the original offer related to the P-2 design and Iran's acquisition of items in connection with that programme.

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<sup>5</sup> See GOV/2004/83, paras 42–48, for a more complete detailing of this issue.

### **B.3. Plutonium Experiments**

21. As indicated in previous reports to the Board, the Agency has been pursuing with Iran the issue of the date of its plutonium separation experiments, which Iran initially said had begun in 1988 and were completed in 1993. Iran also stated that no plutonium had been separated since then.<sup>6</sup>

22. The result of the Agency's analysis of plutonium solutions sampled by it in September 2004 confirmed the Agency's earlier finding that the age of the plutonium solutions in the bottles appeared to be less than the declared 12–16 years, indicating that the plutonium could have been separated after 1993. During follow up discussions with Iran in April 2005, Iran told the Agency that, in 1995, the plutonium nitrate solution contained in one of the two bottles said to have been a result of the experiments had been purified and a plutonium disk had been produced as a result for alpha spectroscopy, and that, in 1998, the plutonium solution in the other bottle had been purified and another plutonium disk had been produced. Following these discussions, at the request of the Agency, the plutonium disks were shipped to SAL for further analysis to determine the exact isotopic composition of the plutonium.

23. In a letter to the Agency dated 17 June 2005 referring to the statement by the DDG-SG, Iran explained that there was a clear distinction between the date of termination of the research project on plutonium and the dates of the other activities, such as the ones related to purification and related waste management of the liquid, which it had not considered as part of the main research project. Iran reiterated that the "research project had been terminated in 1993" and added, "That is, no more samples were sent for irradiation to the research reactor for the purpose of [plutonium] production and subsequent [plutonium] separation."<sup>7</sup>

24. With the cooperation of Iran, the Agency was able, between 1 and 9 August 2005, to conduct detailed verification of the unprocessed irradiated UO<sub>2</sub> targets stored in four containers. A preliminary assessment of the data collected and the measurements performed during that verification seems to corroborate Iran's declaration with regard to the quantity of uranium present in the containers, although the total number of targets found in those containers was much higher than had been declared by Iran. In a letter dated 24 August 2005, Iran provided further detail about the numbers of targets.

25. A final assessment of Iran's plutonium research activities must await the results of the destructive analysis of the disks and targets.

### **B.4. Uranium Mining and Concentration**

26. As indicated by the DDG-SG in his statement to the Board on 16 June 2005, while there are no indications of undeclared mining or milling activities at Gchine, the Agency has been trying to achieve a better understanding of the complex arrangements governing the past and current administration of the Gchine mine and mill. In particular, the Agency wished to investigate further how a turn-key project for a uranium ore processing plant could have been implemented by a newly founded company, described as having had limited experience in uranium ore processing, in such a relatively short period of time. In particular, the Agency has focused on the period between 2000 and mid-2001,

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<sup>6</sup> As indicated in the November 2004 report to the Board, in November 2003, the Agency took samples from two bottles containing plutonium solutions resulting from the experiments, and placed under Agency seal a number of disks which had been produced from the solutions. In September 2004, the Agency took a second set of samples for further analysis using different analytical techniques at different laboratories.

<sup>7</sup> The Agency's current understanding of Iran's activities in connection with the plutonium separation experiments is set out in Annex 1 to this report.

during which time, according to Iran, the company had been able to design, procure, build and test the grinding process line for the mill.

27. In response to the Agency's request, Iran, in April 2005, showed the Agency, and provided an oral translation of, a copy of a contract dated 13 June 2000. The Agency was also shown a comprehensive set of "as built" drawings provided by the engineering company to the AEOI, as well as a number of other documents and drawings.

28. During a meeting in Iran from 13 to 18 August 2005, the Agency requested to speak with the individual who had previously been in charge of the Gchine project, as well as to the AEOI representative currently in charge of the project. The Agency was only able to meet with the current AEOI representative, who had assumed responsibility for the project in 2002. The AEOI representative provided a chronology of the construction of the uranium ore concentration plant, and in particular, of the design and construction of the grinding process line, stating that procurement of parts for that line had been started in September 2000, that the civil engineering construction had begun in February 2001 and that the equipment was first tested in April 2001.

29. During the meeting, files containing drawings and documents related to the Gchine mine ore processing activities were shown to the Agency. Most of the files were those which had been shown to the Agency in April 2005, and consisted of the final "as built" drawings. Only some of the files contained originals of drawings related to the first attempts to design and construct the grinding process line. In these latter documents, the names of the persons who had designed, drawn, checked or approved the drawings, and the name of the company that had prepared the drawings, along with project numbers and dates, were blacked out. Iran explained that "the coverage of names was done to protect the commercial secret."

30. During the August 2005 meeting, Iran also showed the Agency some of the delivery documents (receipts) for items purchased off the shelf, which matched the time line declared by Iran, as well as examples of purchase orders placed around 2002 with various subcontractors. According to Iran, however, no purchase orders or contracts existed for the procurement of equipment for the grinding process line. Iran explained that, since the company had just started in business in 2000, the company had not had a great deal of experience and had purchased most of the equipment for the grinding process off the shelf with the intention of assembling that part of the facility by itself on site, but that, after the first unsuccessful cold testing, the company had changed its operating practice and had subcontracted for the production of parts for the process lines. According to Iran, this explained the relative abundance of such documentation for the subsequent development of the process line as compared with the paucity of such documentation for the first efforts.

31. In addition to the above questions associated with the chronology, the Agency is still trying to acquire a better understanding about why no work was carried out at the Gchine site between 1993 and 2000. Iran has stated that, during that period, research and development experiments on Gchine ore were carried out at a TNRC laboratory.

## **B.5. Other Implementation Issues**

32. As described in the Director General's November 2004 report, Iran brought into operation in 1985 a Fuel Fabrication Laboratory (FFL) at Esfahan (which is still in operation), about which it informed the Agency in 1993 and for which design information was provided in 1998. Iran is also building a Zirconium Production Plant at Esfahan. Construction of the Fuel Manufacturing Plant at Esfahan, which is scheduled to be commissioned in 2007, was started in 2004. There are no other new developments to report with respect to Iran's fuel fabrication activities. Further follow up of these activities will be carried out as a routine safeguards implementation matter.

33. Iran is in the process of constructing a heavy water research reactor (IR-40) at Arak (planned to go into operation in 2014) and a heavy water production plant (HWPP) at Arak. As indicated in the November 2004 report, the Agency has requested additional information about Iran's efforts to acquire equipment for hot cells for the IR-40. However, no new information has been received concerning hot cell equipment since that time. In March 2005, Agency inspectors visited the Arak site to carry out design information verification (DIV), and noted that construction of the IR-40 building had been started. The March 2005 visit also included complementary access to HWPP, which is currently being commissioned. The Agency will continue to monitor Iran's heavy water reactor programme as a routine safeguards implementation matter.

34. Iran's activities involving polonium extraction, and the Agency's findings with respect thereto, were discussed in paragraphs 79–84 of the November 2004 report.<sup>8</sup> As indicated in that report, the issue is of interest to the Agency since polonium-210 can be used not only for certain civilian applications, but also, in conjunction with beryllium, for military purposes (specifically, as a neutron initiator in some designs of nuclear weapons). There are no new developments to report in connection with the polonium separation experiments. The Agency has, however, investigated evidence provided to it of attempts by Iran to acquire beryllium metal, and has been able to confirm that the attempts indicated in that evidence were not successful.

## **B.6. Cooperation in the Implementation of the Safeguards Agreement and Additional Protocol**

35. The Additional Protocol to Iran's Safeguards Agreement was signed on 18 December 2003. According to Iran, entry into force of the Additional Protocol will require ratification, which has not yet taken place. Notwithstanding, as undertaken in its letter to the Agency of 10 November 2003, Iran has continued to act as if its Additional Protocol is in force.

36. As noted in the Director General's November 2004 report, since December 2003, Iran has facilitated, in a timely manner, Agency access under its Safeguards Agreement and Additional Protocol to nuclear materials and facilities, as well as to other locations in the country, and has permitted the Agency to take environmental samples as requested by the Agency. Iran still maintains some restrictions on the issuance of multiple entry visas to designated inspectors. As of August 2005, Iran had agreed to provide fifteen designated inspectors with such visas.

## **B.7. Transparency Visits and Discussions**

37. Iran has, since October 2003, provided the Agency upon its request, and as a transparency measure, access to certain additional information and locations beyond that required under its Safeguards Agreement and Additional Protocol. A summary of the relevant developments through November 2004 is set out in paragraphs 96–105 of the 15 November 2004 report to the Board.

38. In connection with the Lavisian-Shian site and the two whole body counters (WBCs) that had been located there, as indicated in the November 2004 report to the Board, although Iran's description of events concerning the WBCs appeared to be plausible, the Agency still wished to take environmental samples from the remaining trailer said to have contained one of the WBCs.

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<sup>8</sup> 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 continues to maintain that the purpose of the irradiation had been to produce pure Po-210 on a laboratory scale, noting that, if production and extraction of Po-210 were successful, it could be used in radioisotope thermoelectric batteries. The Agency does not have any concrete information that is contrary to the statements made by Iran, but still remains somewhat uncertain regarding the plausibility of the stated purpose of the experiments.

39. However, with regard to the razing of the Lavisian-Shian site, in August 2005, Iran provided further clarification and additional documentation in support of its statement that the site had been razed following the return of the site to the Municipality of Tehran in connection with a dispute between the Municipality and the Ministry of Defence. Iran explained further that the razing of the site had been carried out by the Municipality, and that it had begun in December 2003 and was completed within two or three months. The information provided by Iran appeared to be coherent and consistent with its explanation of the razing of the Lavisian-Shian area.

40. The Agency is still awaiting additional information and clarifications from Iran regarding, and interviews with the individuals involved in, efforts by the Physics Research Centre, which had been located at Lavisian-Shian, to acquire dual use materials and equipment that could be used in uranium enrichment or conversion activities.

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.

## **C. Current overall assessment**

42. The Director General provided in paragraphs 106–114 of GOV/2004/83 a detailed overall assessment of Iran's nuclear programme and the Agency's efforts to verify Iran's declarations with respect to that programme. As indicated in that report, Iran has made substantial efforts over the past two decades to master an independent nuclear fuel cycle, and, to that end, had conducted experiments to acquire the know-how for almost every aspect of the fuel cycle. Many aspects of Iran's fuel cycle activities and experiments, particularly in the areas of uranium enrichment, uranium conversion and plutonium research, had not been declared to the Agency in accordance with Iran's obligations under its Safeguards Agreement. Iran's policy of concealment continued until October 2003, and resulted in many breaches of its obligation to comply with that Agreement (summarized in paragraph 4 above).

43. Since October 2003, good progress has been made in Iran's correction of the breaches, and in the Agency's ability to confirm certain aspects of Iran's current declarations, which will be followed up as a routine safeguards implementation matter (particularly in connection with conversion activities, laser enrichment, fuel fabrication and the heavy water research reactor programme).

44. Two important issues were identified in the Director General's November 2004 report as relevant to the Agency's efforts to provide assurance that there are no undeclared enrichment activities in Iran, specifically: the origin of LEU and HEU particle contamination found at various locations in Iran; and the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and P-2 designs.

45. With respect to the first issue — contamination — as indicated above, based on the information currently available to the Agency, the results of the environmental sample analysis tend, on balance, to support Iran's statement about the foreign origin of most of the observed HEU contamination. It is still not possible at this time, however, to establish a definitive conclusion with respect to all of the contamination, particularly the LEU contamination. This underscores the importance of additional work on the scope and chronology of Iran's P-1 and P-2 centrifuge programmes, which could greatly contribute to the resolution of the remaining contamination issues.

46. With respect to the second issue — the P-1 and P-2 centrifuge programmes — although, as indicated above, some progress has been made since November 2004 in the verification of statements by Iran regarding the chronology of its centrifuge enrichment programme, the Agency has not yet been able to verify the correctness and completeness of Iran's statements concerning those programmes. While Iran has provided further clarifications, and access to additional documentation, concerning the 1987 and mid-1990s offers related to the P-1 design, the Agency's investigation of the supply network indicates that Iran should have additional supporting information that could be useful in this regard. Iran has agreed to endeavour to provide further supporting information and documentation. Iran has also been asked to provide additional details on the process that led to Iran's decision in 1985 to pursue gas centrifuge enrichment and on the steps leading to its acquisition of centrifuge enrichment technology in 1987.

47. No additional information or documentation has been provided with respect to Iran's statement that it did not pursue any work on the P-2 design between 1995 and 2002. As indicated above, Iran has been requested to provide more information, along with any supporting documentation, relevant to the P-2 programme, in particular with regard to the scope of the original offer related to the P-2 related design and Iran's acquisition of items in connection with that programme.

48. The Agency is still assessing other aspects of Iran's past nuclear programme, including: statements made by it about plutonium research, in particular with respect to the dates they were carried out; Iran's activities at Gchine; and Iran's activities involving polonium.

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 Kolehdoz, Lavisán and Parchin. While the Agency found no nuclear related activities at Kolehdoz, it is still assessing information (and awaiting some additional information) in relation to the Lavisán site. The Agency is also still waiting to be able to re-visit the Parchin site.

50. In view of the fact that the Agency is not yet in a position to clarify some important outstanding issues after two and a half years of intensive inspections and investigation, Iran's full transparency is indispensable and overdue. Given Iran's past concealment efforts over many years, such transparency measures should extend beyond the formal requirements of the Safeguards Agreement and Additional Protocol and include access to individuals, documentation related to procurement, dual use equipment, certain military owned workshops and research and development locations. Without such transparency measures, the Agency's ability to reconstruct, in particular, the chronology of enrichment research and development, which is essential for the Agency to verify the correctness and completeness of the statements made by Iran, will be restricted.

51. As indicated to the Board in November 2004, all the declared nuclear material in Iran has been accounted for, and therefore such material is not diverted to prohibited activities. The Agency is, however, still not in a position to conclude that there are no undeclared nuclear materials or activities in Iran. The process of drawing such a conclusion, after an Additional Protocol is in force, under normal circumstances, is a time consuming process. In view of the past undeclared nature of significant aspects of Iran's nuclear programme, and its past pattern of concealment, this conclusion can be expected to take longer than in normal circumstances.

52. The Secretariat will continue its investigation of all remaining outstanding issues relevant to Iran's nuclear programme, and the Director General will continue to report to the Board as appropriate.

## **D. Suspension**

53. Pursuant to the Board's resolution on 29 November 2004 (GOV/2004/90), and previous resolutions, the Agency has continued its activities to verify and monitor all elements of Iran's voluntary suspension of all enrichment related and reprocessing activities.

54. Prior to 22 November 2004, the Agency had already established a baseline inventory of all UF<sub>6</sub>, essential centrifuge components, key raw materials and equipment, and the assembled centrifuge rotors at declared workshops said by Iran to have been involved in the manufacturing of centrifuge components, and had applied containment and surveillance measures to these items.

55. The Agency has continued its monthly monitoring activities at the Pilot Fuel Enrichment Plant (PFEP) at Natanz, most recently from 30 to 31 August 2005, to ensure that the suspension of enrichment activities at PFEP is fully implemented. The surveillance records from the cascade hall have been reviewed to ensure that no additional centrifuge machines were installed. The seals on the equipment and nuclear material have been replaced and verified. The inventory of centrifuge components has been verified periodically, and the seals on the essential components replaced and verified. The cascade hall, and the 20 sets of centrifuge components stored at the feed and withdrawal station, continue to be under Agency surveillance, and all the previously declared UF<sub>6</sub> feed material at PFEP, as well as product and tails, remain under Agency containment and surveillance.

56. The Agency has also continued to monitor the suspension by conducting:

- DIV activities at the Fuel Enrichment Plant (FEP) at Natanz and at the Molybdenum, Iodine and Xenon Facility at TNRC;
- monitoring of the decommissioned status of the Lashkar Ab'ad atomic vapour laser isotope separation pilot plant through complementary access at Lashkar Ab'ad and to laser enrichment equipment stored at TNRC and the Nuclear Research Centre for Agriculture and Medicine at Karaj;
- inspections and DIV at JHL; and
- visits to several declared workshops, randomly selected by the Agency, where centrifuge components had been manufactured and/or stored, including the Kalaye Electric Company workshop.

57. On 9 May 2005, during a DIV at FEP, Agency inspectors observed some construction work being carried out in the underground cascade hall of Building A and in the ventilation building above the

cascade hall foreseen in the design information for FEP submitted by Iran. Iran has described this work as civil construction, not covered by its voluntary suspension undertaking. In subsequent DIVs, the Agency has noted that this construction work is continuing.

58. The Agency also continued its verification of Iran's voluntary suspension of conversion activities at UCF. As reported previously, in August 2004, Iran introduced about 37 tonnes of uranium ore concentrate (UOC or yellowcake) into the process area of UCF as feed material for facility testing. As of 22 November 2004, all of the UOC had been dissolved and converted into intermediate products, principally AUC and  $UF_4$ , and part of the intermediate  $UF_4$  had been converted into  $UF_6$ . On 22 November 2004, the Agency installed seals and other tamper indicating devices to verify that no additional feed was introduced in the process and that there was no further production of  $UF_6$ . On 18 February 2005, Iran completed its conversion of the AUC into  $UF_4$ , and conducted clean-out operations. The Agency carried out a physical inventory verification at UCF between 21 and 25 April 2005, in the course of which the UOC, the  $UF_4$ , the  $UF_6$  and the scrap and waste generated by the conversion process were verified by the Agency, and the  $UF_4$  placed under Agency seal. The material unaccounted for (MUF) as a result of the conversion campaign was calculated to be less than 1% of the total quantity of material fed into the process, which is within an acceptable range for similar size conversion plants. The process lines and nuclear material remained under Agency seal until August 2005.

59. On 1 August 2005, Iran informed the Agency of its decision to resume uranium activities at UCF.<sup>9</sup> The Agency installed additional surveillance equipment at UCF between 8 and 10 August 2005. On 8 August 2005, Iran started to feed UOC into the first part of the process line and on 10 August removed the Agency seals from the remaining parts of the process line. The  $UF_6$  remained under Agency seal.

60. As of 29 August 2005, approximately 4000 kg of uranium in the form of UOC had been fed into the process and approximately 600 kg of uranium in the form of AUC produced, from which approximately 110 kg of uranium in the form of AUC was fed into the next process line. As of 29 August, no  $UF_4$  had been produced as a result of that processing. From the 21 tonnes of uranium in the form of  $UF_4$  produced during the previous campaign, approximately 8500 kg of uranium in the form of  $UF_4$  was fed into the  $UF_4$  to  $UF_6$  process line; approximately 6800 kg of uranium in the form of  $UF_6$  was produced therefrom. In a letter dated 29 August 2005, Iran informed the Agency of its intention to start moving the remaining inventory of UOC to the new storage area, and that it would likely take two months.

61. The Director General will continue to report to the Board as appropriate.

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<sup>9</sup> INFCIRC/648.

## CHRONOLOGY OF PLUTONIUM SEPARATION EXPERIMENTS

The Agency's current understanding of the chronology of Iran's activities in connection with the plutonium research is as follows:

- 1987–1988 The separation process was simulated using imported unirradiated  $UO_2$  (DU); dissolution and purification took place in the Shariaty Building at TNRC; pressed and sintered pellets were manufactured using imported  $UO_2$  (DU) at FFL; the  $UO_2$  pellets were further manipulated into aluminium and stainless steel capsules at FFL
- 1988–1993 The capsules (containing a total of 7 kg of  $UO_2$  in the form of powder, pressed pellets and sintered pellets) were irradiated in TRR
- 1991–1993 Plutonium was separated from some of the irradiated  $UO_2$  targets in the capsules (about 3 kg of the 7 kg of  $UO_2$ ) and plutonium solutions produced; these activities were carried out at the Shariaty Building and, after the activities were transferred in October/November 1992, at the Chamaran Building at TNRC; the research and development related irradiation and separation of plutonium were terminated in 1993
- 1993–1994 The unprocessed irradiated  $UO_2$  was initially stored in capsules in the spent fuel pond of TRR, and later transferred into four containers and buried behind the Chamaran Building
- 1995 In July, purification of the plutonium solution from the 1988–1993 period was carried out in the Chamaran Building; a planchet (disk) was prepared from the solution for analysis
- 1998 In August, additional purification of plutonium from the 1988–1993 period was carried out in the Chamaran Building; another planchet (disk) was prepared from the solution for analysis
- 2000 The glove boxes from the Chamaran Building were dismantled and sent to ENTC for storage; one glove box was moved to the Molybdenum Iodine Xenon Facility
- 2003 Due to construction work being carried out behind the Chamaran building, two containers holding the unprocessed irradiated  $UO_2$  were dug up, moved and reburied

**ANNEX 2**

**ABBREVIATIONS AND TERMS**

AEOI	Atomic Energy Organization of Iran
AUC	ammonium uranyl carbonate
DIV	design information verification
DU	depleted uranium
ENTC	Esfahan Nuclear Technology Centre
FEP	Fuel Enrichment Plant, Natanz
FFL	Fuel Fabrication Laboratory, ENTC
HEU	high enriched uranium
HWPP	Heavy Water Production Plant, Arak
IR-40	Iran Nuclear Research Reactor, Arak
JHL	Jabr Ibn Hayan Multipurpose Laboratories, TNRC
LEU	low enriched uranium
PFEP	Pilot Fuel Enrichment Plant, Natanz
SAL	Safeguards Analytical Laboratory, Seibersdorf, Austria
TNRC	Tehran Nuclear Research Centre
TRR	Tehran Research Reactor, Tehran
UCF	Uranium Conversion Facility, ENTC
UF <sub>4</sub>	uranium tetrafluoride
UF <sub>6</sub>	uranium hexafluoride
UO <sub>2</sub>	uranium dioxide
UO <sub>3</sub>	uranium trioxide
U <sub>3</sub> O <sub>8</sub>	urano-uranic oxide
UOC	uranium ore concentrate
WBC	whole body counter