

# Board of Governors

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(GOV/2004/27)

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

*Report by the Director General*

1. At its meeting in March 2004, the Board of Governors considered the report submitted by the Director General on 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 (the Safeguards Agreement)<sup>1</sup>. That report, published as GOV/2004/11 (24 February 2004), provided a chronology from November 2003, a summary of the Agency's verification activities and its current assessment, and next steps.<sup>2</sup>
2. On 13 March 2004, the Board of Governors adopted resolution GOV/2004/21, in which it:
  - Recognized that the Director General reported Iran to have been actively cooperating with the Agency in providing access to locations requested by the Agency, but, as Iran's cooperation so far had fallen short of what was required, called upon Iran to continue and intensify its cooperation, in particular through the prompt and proactive provision of detailed and accurate information on every aspect of Iran's past and present nuclear activities;
  - Welcomed Iran's signature of an Additional Protocol to its Safeguards Agreement; urged its prompt ratification; underlined the Board's understanding that, in its communication to the Director General of 10 November 2003, Iran had voluntarily committed itself to acting in accordance with the provisions of the Protocol with effect from that date; and stressed the importance of Iran complying with the deadline for declarations envisaged in Article 3 of the Protocol;

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

<sup>2</sup> The initial report to the Board of Governors on this specific matter was provided by the Director General orally at the Board's meeting on 17 March 2003. The Director General subsequently submitted four 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; and GOV/2004/11, dated 24 February 2004.

- Recalled that in its resolutions of 12 September 2003<sup>3</sup> and 26 November 2003 the Board had called on Iran to suspend all enrichment-related and reprocessing activities; noted that Iran's voluntary decisions of 29 December 2003 and 24 February 2004 constituted useful steps in this respect; called on Iran to extend the application of this commitment to all such activities throughout Iran; and requested the Director General to verify the full implementation of these steps;
- Deplored that Iran, as detailed in the report by the Director General, had omitted any reference, in its letter of 21 October 2003 which was to have provided the "full scope of Iranian nuclear activities" and a "complete centrifuge R&D chronology", to its possession of P-2 centrifuge design drawings and to associated research, manufacturing, and mechanical testing activities, which the Director General had described as "a matter of serious concern, particularly in view of the importance and sensitivity of those activities";
- Echoed the concern expressed by the Director General over the issue of the purpose of Iran's activities related to experiments on the production and intended use of polonium-210, in the absence of information to support Iran's statements in this regard;
- Called on Iran to be proactive in taking all necessary steps on an urgent basis to resolve all outstanding issues, including the issue of low enriched uranium (LEU) and high enriched uranium (HEU) contamination at the Kalaye Electric Company workshop and Natanz, the issue of the nature and scope of Iran's laser isotope enrichment research and the issue of the experiments on the production of polonium-210;
- Noted with appreciation that the Agency was investigating the supply routes and sources of technology and related equipment and nuclear and non-nuclear materials found in Iran; reiterated that the urgent, full and close cooperation with the Agency of all third countries was essential in the clarification of outstanding questions concerning Iran's nuclear programme, including the acquisition of nuclear technology from foreign sources; and appreciated any cooperation in this regard as may already have been extended to the Agency;
- Decided to defer until its June meeting, and after receipt of the next report of the Director General, consideration of progress in verifying Iran's declarations, and of how to respond to the above-mentioned omissions; and
- Decided to remain seized of the matter.

3. In resolution GOV/2004/21, the Board also requested the Director General to report on the above issues before the end of May, as well as on the implementation of this and prior resolutions on Iran, for consideration by the June Board of Governors, or to report earlier if appropriate. This report, which presents a chronology from March 2004, outstanding issues and next steps and a summary of the Agency's current assessment, along with an Annex on the Agency's verification activities, is being submitted in response to that request.

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<sup>3</sup> GOV/2003/69; GOV/2003/81.

## A. Chronology from March 2004

4. On 3 March 2004, the Agency notified Iran of its intention to carry out an inspection at the Pilot Fuel Enrichment Plant (PFEP) at Natanz, visits to other locations in Iran and discussions on Iran's nuclear programme between 13 and 18 March 2004. On 12 March 2004, Iran replied to the Agency's notification, stating that, "due to the practical reasons such as unavailability of personnel needed to be available for the inspection during the proposed schedule, which is the last week prior to Iranian New Year, the inspection had to be postponed until the second half of April 2004". The Agency replied on that day asking Iran urgently to reconsider the postponement of the inspection and visits.

5. On 5 March 2004, the Agency received a Note Verbale from Iran attaching "Comments and Explanatory Notes by [Iran] on the Report of the IAEA Director General (GOV/2004/11)" which, at the request of Iran, was circulated by the Secretariat as INFCIRC/628 (5 March 2004). On 30 March 2004, the Secretariat issued a response to those comments and explanatory notes in document 2004/Note 17.

6. On 15 March 2004, the Agency received from Iran a Note Verbale stating that "instruction has been issued to implement the voluntary decisions adopted by [Iran] on 24 February 2004<sup>4</sup> and planning for the implementation of that instruction has been started", but that, due to fact that "we are approaching the Iranian New Year holidays, ... verification of the suspension of those measures can begin on 10 April 2004". Iran also informed the Agency that the inspection at PFEP could be conducted on 29 March 2004. The inspection was carried out on that date.

7. On 6 April 2004, the Director General and senior Agency officials met in Tehran with H.E. Mr. M. Khatami, the President of Iran; H.E. Mr. R. Aghazadeh, Vice President of Iran and President of the Atomic Energy Organization of Iran (AEOD); H.E. Dr. H. Rohani, Secretary of the Supreme National Security Council of Iran; and H.E. Mr. K. Kharrazi, Minister of Foreign Affairs of Iran, to discuss safeguards implementation issues. During these discussions, the Iranian authorities agreed to accelerate cooperation with the Agency on a number of outstanding matters identified by the Director General with a view to achieving progress on the resolution of such issues prior to the June 2004 meeting of the Board of Governors.

8. The visits originally scheduled for mid-March 2004, including the discussions related to Iran's nuclear programme, were eventually held between 12 and 23 April 2004. The mission also included a visit by Agency centrifuge technology experts to a number of locations involved in Iran's P-2 centrifuge enrichment activities. They also visited a number of privately owned workshops in order to verify the suspension of centrifuge assembly and domestic production of centrifuge components at those locations. Since, at the time, no agreement could be reached on the modalities for access to the centrifuge component production workshops on sites belonging to the Defence Industries Organization (DIO), the Agency did not to carry out any verification activities at those locations.

9. On 15 April 2004, the Deputy Director General for Safeguards (DDG-SG) met in Vienna with Mr. Zamaninia, Director General of the Foreign Ministry of Iran, to further discuss modalities of Agency access to the sites owned by DIO. However, no agreement was reached at that time.

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<sup>4</sup> As indicated in paragraph 62 of GOV/2004/11, on 24 February 2004, Iran informed the Agency that instructions would be issued by the first week of March to implement the further decisions voluntarily taken by Iran to (i) suspend the assembly and testing of centrifuges, and (ii) suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible.

10. On 20–21 April 2004 the Agency met with an Iranian delegation, led by H.E. Mr. C. Nasseri, a special adviser to the Government of Iran, to discuss issues referred to in the Director General's 6 April 2004 meeting in Iran, including modalities for access to the DIO sites.
11. Between 24 April and 5 May 2004, the Agency carried out inspections at the Tehran Research Reactor (TRR), the Jabr Ibn Hayan Multipurpose Laboratories (JHL), the Uranium Conversion Facility (UCF) and the Fuel Fabrication Laboratory (FFL). In addition to the inspections, discussions were held on Iran's earlier uranium conversion experiments.
12. On 26 April 2004, the Agency informed Iran of the Agency's requirements for its independent verification of Iran's voluntary suspension of the domestic production of centrifuge enrichment components at the DIO sites, noting that, before such verification could take place, the Agency needed to receive confirmation that Iran would agree to the actions identified by the Agency.
13. On 27 April 2004, the Agency provided Iran with the results of analyses of environmental samples taken previously at the Tehran Nuclear Research Centre (TNRC) and the Esfahan Nuclear Technology Centre (ENTC), as well as the results of environmental samples taken in January 2004 in some of the workshops involved in the production of P-1 centrifuge components. The Agency also provided comments on the information provided by Iran on its plutonium separation experiments.
14. In a letter dated 29 April 2004, Iran informed the Agency that it intended to conduct hot tests of the UF<sub>6</sub> production line at UCF. On 7 May 2004, the Agency wrote to Iran, informing it that, given the amounts of nuclear material involved, the hot testing of UCF with UF<sub>6</sub> gas would technically amount to the production of feed material for enrichment processes. In a letter dated 18 May 2004, Iran informed the Agency that "the decision taken for voluntary and temporary suspension is based on clearly defined scope which does not include suspension of production of UF<sub>6</sub>."
15. From 8 to 12 May 2004, Agency laser enrichment experts visited Iran with the main objective of reviewing the chronology of the laser enrichment programme and assessing the correctness and completeness of Iran's declarations with regard to this programme.
16. Between 14 and 23 May, Agency inspectors: carried out verification and sealing activities with respect to centrifuge components at Natanz in connection with the suspension; took samples associated with imported UF<sub>6</sub>; and visited the Heavy Water Production Plant (HWPP) at Arak.
17. From 15 to 17 May 2004, pursuant to a request by Iran, the Agency sent two technical staff from the Department of Safeguards to Iran to provide clarifications on the Guidelines and Format for Preparation and Submission of Declarations pursuant to Articles 2 and 3 of the Model Protocol Additional to Safeguards Agreements.
18. On 21 May 2004, an Iranian delegation led by Mr. Nasseri met with the Agency in Vienna to discuss the status of the issues discussed with the Director General during his 6 April 2004 meeting in Tehran. As a result of this meeting, Iran and the Agency were able to reach agreement the following day on the Agency's proposal regarding the frequency of visits during the next twelve months for verifying the suspension of the production of gas centrifuge enrichment components at the nine sites declared by Iran as having been engaged in such activities.
19. On 21 May 2004, Iran submitted the initial declarations pursuant to its Additional Protocol. In the Note Verbale forwarding the declarations, Iran informed the Agency that, as Iran had signed the Additional Protocol on 18 December 2003 and had decided voluntarily to apply the Protocol "as a confidence building measure in the context of Article 17 [of the Protocol]", the declarations were being submitted "prior to the due date of 18 June 2004", following the Director General's request during this visit to Iran in April 2004. The Note Verbale also states that, in the preparation of these declarations, "within this limited time, every reasonable effort has been made to provide the Agency

with the information to the extent that [it is] relevant to and compatible with the provisions of the Protocol” and that the declarations were “open to further clarification and amplification if needed.”

20. On 28 May 2004, the Director General met again with an Iranian delegation headed by Mr. Nasserri to discuss significant issues that remained outstanding.

21. On 29 May 2004, at the beginning of a five-day visit to Iran, Agency inspectors held discussions with Iranian authorities on the P-2 centrifuge programme and conducted activities related to the verification of suspension at DIO workshops and at Natanz.

## **B. Outstanding Issues and Next Steps**

### **Import and fabrication of P-2 centrifuge components**

22. As noted in the Director General’s last report to the Board (GOV/2004/11, paras 44–45), Iranian authorities had previously stated that Iran had not obtained any P-2 centrifuges, or components thereof, from abroad, but had manufactured all components, including composite rotors, in a workshop on the premises of a private company in Tehran. Iran has now acknowledged that, contrary to these earlier statements, it had imported some magnets relevant to P-2 centrifuges from Asian suppliers, and that the composite rotors that had been manufactured in Iran had in fact been fabricated in another workshop situated on a DIO site. On 30 May 2004, Iran provided information to the Agency on the quantities and sources of imported magnets, raw materials and some related equipment. This information is currently being assessed by the Agency.

23. In response to further questions by the Agency, Iran has also stated that the private company had also made enquiries with a European intermediary about the procurement of 4000 magnets with specifications suitable for use in P-2 centrifuges, but that no magnets had actually been delivered by the intermediary to Iran. In addition, during discussions held with the Agency on 30 May 2004, the owner of the private company acknowledged that he had mentioned to the intermediary the possibility of future procurement of higher numbers of P-2 centrifuge magnets beyond the 4000. He stated that the higher numbers of magnets had been mentioned to attract the intermediary by indicating that larger orders would follow.

24. The Agency has asked for further detailed information on imports by Iran of items for P-2 centrifuges, and an explanation regarding how the procurement efforts referred to in paragraph 23 above fit with the declared small scale of Iran’s P-2 centrifuge research and development (R&D) programme.

25. Environmental samples have been collected at the workshop of the private company at which the P-2 centrifuge components were said to have been manufactured and tested, the results of which are pending. The workshop where the composite rotors were manufactured was visited on 30 May 2004.

26. In light of the investment made in obtaining the design drawings of the P-2 centrifuge and the technical capabilities that existed in Iran at the time, the Agency centrifuge enrichment experts have some questions regarding Iran’s statement that, although the design drawings had been acquired in 1995, no work on P-2 centrifuges was begun until 2001, and mechanical testing of the P-2 composite rotors began only in 2002. The experts also expressed doubt about the feasibility of carrying out centrifuge tests based on the P-2 designs — which required the procurement of parts from abroad and the manufacture of casings and centrifuge components — within the stated period of less than a year.

### **Origin of contamination**

27. As mentioned in the Director General's previous reports, Iran has maintained that the LEU and HEU particles found at Natanz, the Kalaye Electric Company and Farayand Technique are due to contamination originating from imported P-1 centrifuge components. Iran has recently provided additional information on the locations in Iran to which the P-1 centrifuge equipment and components had been moved, as well as information on some associated timescales. Given the complexity of the information provided by Iran regarding domestic movements of the components, Agency experts do not anticipate that this information will contribute further to the resolution of the contamination issue, unless more information becomes available about the origin of the components. The Agency first requested in August 2003 information on the origin of the components. While Iran maintains that it does not know the origin of the equipment, it has, however, identified some of the intermediaries involved.

28. The Agency has continued discussions with the State from which it believes most of the centrifuge enrichment components originated, and with some of the intermediaries. Information obtained in these discussions may be helpful in resolving some of the contamination issues. However, although additional information has been requested and sampling will be needed to verify that information, it is unlikely, based on the information currently available, that the Agency will be able to conclude that the 36% uranium-235 (U-235) contamination found at Kalaye and Farayand was due to components originating from the State in question. Other possible explanations for this contamination remain under study by the Agency, including through contacts with other States.

29. The Agency is also analysing the recently available results of additional swipe samples in an effort to resolve the questions as to why the contamination is different on domestic and imported centrifuges, and why the contamination at PFEP at Natanz is different from that found at the Kalaye Electric Company workshop and Farayand Technique.

30. The Agency has also requested further information from Iran regarding the UF<sub>6</sub> contamination in the building at TRR at TNRC.

### **Design of UCF**

31. As noted in the GOV/2004/11 (para. 14), Iran had stated that UCF was built on the basis of a detailed set of drawings and other design documentation obtained from a foreign source in the early 1990s. To assess the validity of this statement, Agency experts compared these documents with the as-built components of UCF. The experts have concluded that the documents presented in general constitute the basis for the UCF design, with two exceptions: the uranium ore concentrate purification process and the uranium metal production process. The AEOI had not in these instances used the design documentation, but rather had used processes developed and tested at TNRC.

### **Uranium conversion experiments**

32. Agency experts continued efforts to confirm Iran's declaration that there had not been, in addition to laboratory experiments, any pilot scale uranium conversion experiments. In support of this declaration, Iran has completed characterization of all nuclear material at JHL and submitted revised nuclear material accountancy reports to the Agency. However, the Agency has requested additional supporting information from contemporaneous records of experiments, which would help to corroborate Iran's statements regarding the amounts of nuclear material produced and disposed of as waste. Final assessment of this issue is also pending additional sample analysis.

### **AVLIS capabilities**

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.

34. Agency experts have concluded that the capacity of the AVLIS installation at Lashkar Ab'ad was about 1 gram per hour, but that it was not able to operate continuously. With the cooperation of Iran, the Agency was able to remove from Iran some internal parts of equipment, which will be analysed with a view to assessing the AVLIS-related statements made by Iran in its 21 October 2003 declaration.

### **Designs for hot cells at IR-40**

35. As discussed in the Director General's previous reports (GOV/2004/11, para. 57; GOV/2003/75, paras 73–75), the Agency has raised questions regarding the absence of hot cell designs in drawings submitted for the Iran Nuclear Research Reactor (IR-40). In its 13 May 2004 submission of updated design information for the IR-40, Iran stated that, due to difficulties associated with obtaining technical information and subsequent purchase of manipulators and shielding windows, the construction of hot cells for "long lived" radioisotopes was no longer under consideration.

### **Plutonium separation experiments**

36. With regard to the plutonium separation experiments, the Agency has concluded that Iran understated the plutonium produced. However, the amounts produced were only in the milligram range. The Agency also found that the age of the plutonium in solutions was less than the 12–16 years declared. The Iranian officials maintain the earlier statements regarding age, but have agreed to repeat their analysis. The Agency also found some irradiated natural uranium in some samples, which the facility operator has attributed to iodine-131 (I-131) production experiments which had been declared to the Agency in 2003. The final assessment of this issue is pending.

### **Provision of requested corrections and revised design information**

37. As requested by the Agency, Iran has submitted revised design information with respect to certain facilities. Iran has also provided corrections with respect to inventory change reports, material balance reports and physical inventory listings, as requested by the Agency. However, as mentioned in the Director General's report to the March meeting of the Board (GOV/2004/11, para. 71), some corrections are still pending due in part to the need to establish the amount of nuclear material in dismantled equipment at Natanz.

### **Additional Protocol**

38. The Agency is reviewing the initial Additional Protocol declarations submitted by Iran on 21 May 2004.

## **Investigation of supply routes and sources**

39. As requested by the Board in resolution GOV/2004/21, the Agency is continuing to pursue its investigation of the supply routes and sources of conversion and enrichment technology and related equipment and nuclear and non-nuclear materials, and has received cooperation in that regard from a number of Member States. The Director General will provide more information to the Board about the results of this investigation as appropriate.

## **Suspension**

40. The Agency has continued to carry out verification activities with respect to the suspension of enrichment and reprocessing related activities at TNRC, Lashkar Ab'ad, Arak, Kalaye Electric Company workshop, Natanz and UCF, and has not observed to date any activities at those locations inconsistent with Iran's voluntary undertaking. Iran has also stated that it suspended the production of centrifuge components as from 9 April 2004. The Agency has been able to confirm this at three workshops, but three workshops belonging to private companies have continued production, claiming that they have not received adequate compensation from the AEOI for the suspension or termination of contracts. In addition, as of 21 May 2004, the Agency had not visited three DIO workshops, because the modalities of access to those locations had yet to be agreed by Iran. Agreement has now been reached with Iran on these modalities, and the three DIO workshops are to be visited during the week of 31 May 2004. As of the date of this report, two of the three sites have been visited.

41. It should be noted that some of the activities subject to suspension, such as component production, are inherently difficult to verify, and the assurances that the Agency can provide for the purpose of confidence building are of a different nature from those achievable with respect to the detection of nuclear material diversion. Therefore, while more intensive verification of the declared locations is possible, a balance should be struck between the cost and benefit of such verification.

42. Iran has informed the Agency that it is currently conducting hot tests at the UCF that will generate UF<sub>6</sub> product in the near future. Iran has stated that its voluntary suspension of enrichment activities does not include the suspension of UF<sub>6</sub> production.

## **C. Assessments**

43. There has been good progress on the actions agreed during the Director General's visit to Tehran in early April 2004. The Agency welcomes Iran's recent provision of the initial declarations pursuant to its Additional Protocol. Iran has been cooperating with the Agency in providing access to locations in response to Agency requests, including workshops situated at military sites. This is welcome, as is Iran's agreement to provide one-year multiple-entry visas to designated Agency inspectors.

44. The Agency has been able to verify Iran's implementation of its decision to suspend enrichment related and reprocessing activities. However, this verification was delayed in some cases by the discussion of modalities for access to the DIO sites, and is not yet comprehensive because of the continued production of centrifuge equipment by some private companies. Iran's decision to proceed with the generation of UF<sub>6</sub> at UCF through the conduct of hot tests is at variance with the Agency's previous understanding as to the scope of Iran's decision regarding suspension.

45. The Agency continues to make progress in gaining a comprehensive understanding of Iran's nuclear programme, but a number of issues remain outstanding. Two issues, in particular, are key to understanding the extent and nature of Iran's previously undeclared enrichment programme.



46. The first such issue relates to the origin of HEU and LEU contamination found at various locations in Iran. As stated in paragraph 27 above, the information provided to date by Iran has not been adequate to resolve this complex matter and Iran should make every effort to provide any additional information about the origin of the components that could be useful in resolving outstanding questions. The Agency has received some information from other States that may be helpful in resolving some contamination questions, and will equally continue to request those States to make every effort to assist the Agency in resolving this matter.

47. The second issue is the extent of Iran's efforts to import, manufacture and use centrifuges of both the P-1 and the P-2 design. The Agency has gained a fuller understanding of the scale of the programme involving P-1 centrifuges, and the locations of their use. However, important information about the P-2 centrifuge programme has frequently required repeated requests, and in some cases continues to involve changing or contradictory information.

48. It is important that Iran work proactively to enable the Agency to gain a full understanding of Iran's enrichment programme by providing all relevant information, as well as by providing prompt access to all relevant sites. Iran's postponement until mid-April of the visits originally scheduled for mid-March — including visits of Agency centrifuge experts to a number of locations involved in Iran's P-2 centrifuge enrichment programme — resulted in a delay in the taking of environmental samples and their analysis. It is also important that all other States with relevant information promptly provide such information to the Agency. Bringing the two issues referred to in paragraphs 46 and 47 above to a close, after almost two years from when Iran's undeclared programme came to the Agency's knowledge, is of key importance to the Agency's ability to provide the international community with the required assurances about Iran's nuclear activities.

49. The Director General will report to the September 2004 meeting of the Board, or earlier, as appropriate.



# VERIFICATION ACTIVITIES

## A. Uranium Conversion

### A.1. The Uranium Conversion Facility

1. Since the issuance of the Director General's report in March 2004, the Agency has been able to carry out a complete design information verification (DIV) at UCF. In the course of this activity in April 2004, Iran informed the Agency that the UF<sub>6</sub> production line of UCF would be ready for hot testing within a few weeks.

2. As indicated in the Director General's previous report (GOV/2004/11, para. 14), based on a preliminary examination of the UCF drawings and technical reports, Agency experts on conversion had reached a preliminary conclusion that it appeared that UCF was being built essentially on the basis of those drawings and reports, as had previously been declared by Iran. However, as also indicated in GOV/2004/11, further comparison of the documents with the as-built components of UCF was necessary to confirm this conclusion.

3. Between 24 April and 5 May 2004, during the visit by the Agency's conversion experts, the Agency carried out a detailed review of a selection of the documents said to have been provided in the early 1990s to Iran by a foreign supplier. The purpose of this review was to further assess the validity of Iran's statement that the UCF plant had been built essentially on the basis of that documentation, and not on the basis of pilot scale testing. The Agency was able to compare directly what was found in the documents with the actual installation and operations.

4. Based on its examination of the documents and the installed units, the Agency experts concluded that the documents were the technical basis for the design of the UCF, with two exceptions: the uranium ore concentrate (UOC) purification process and the uranium metal production process.

5. The basis for the change to the purification process from mixer settlers to pulse columns was clarified during discussions with engineering staff and through the examination of small scale test equipment at TNRC. As described by Iranian officials, initial tests had been carried out using glass column equipment followed later by the use of a small metal column system. According to these officials, following these tests, a full scale pulse column was constructed and cold tested at TNRC. It was stated that this pulse column is now installed in UCF. As regards the uranium metal production process, the Agency experts have noted that the process described in the foreign documents was technically and mechanically complex and more difficult than the process that Iran had successfully tested at TNRC. In light of this, the experts considered as credible Iran's explanation that it had therefore opted to use its own techniques at UCF.

6. On 15 March 2004, Iran informed the Agency that hot tests of the UOC purification process at UCF had been started that day. This process involves the conversion of UOC into ammonium uranyl tricarbonate (AUTC) through purification and precipitation. On 29 March 2004, the Agency was informed by Iran that operational tests of the conversion of the AUTC first into UO<sub>2</sub> and then into UF<sub>4</sub> would begin within the next few days. The final product of that process is UF<sub>4</sub> suitable for fluorination to UF<sub>6</sub>. In a letter dated 29 April 2004, Iran informed the Agency that, following the successful hot tests mentioned above, hot tests of the UF<sub>6</sub> production line would begin on 6 May 2004.

7. On 1 May 2004, Iran confirmed to the Agency its intention to carry out the hot tests and stated that Iran considered such activities to be tests, and not as production of UF<sub>6</sub>. On 7 May 2004, the Agency wrote to Iran, informing it that, given the amounts of nuclear material involved (which, with the current inventory of UF<sub>4</sub>, would be in the order of 100 kg), the hot testing of UCF with UF<sub>6</sub> gas would technically amount to the production of feed material for enrichment processes (see also paragraphs 60–61 below on suspension). As of 21 May 2004, Iran had not yet started the UF<sub>6</sub> production hot tests.

8. The Agency has verified the inventory of uranium ore concentrate at UCF, the quantities of UF<sub>4</sub> and intermediate uranium compounds, and the waste that had been produced since the commissioning of the UOC to UF<sub>4</sub> conversion line. The Agency is currently assessing the results of its verification.

9. Iran has agreed to follow the Agency's revised policy for natural uranium conversion plants, which will permit more effective safeguards implementation at such facilities.

## **A.2. Experiments and testing**

10. During the April/May 2004 mission of the Agency uranium conversion experts, additional discussions were held on Iran's conversion experiments and tests, as previously described by Iran (see GOV/2004/11, para. 16), with a view to confirming Iran's declaration concerning these activities. The Agency considers that contemporaneous records of experiments (e.g. log books and note books) would help corroborate Iran's statements regarding the amounts of nuclear material that were produced and sent for disposal as waste.

11. The operator of JHL completed the characterization and declaration of all nuclear material at JHL so that the flow chart on nuclear material involved in the conversion experiments could be completed. All inventory change reports were corrected and have been submitted to the Agency. Apart from the impurities analysis, which is still under evaluation, the results of the Agency verification agree with the activity levels and quantities of nuclear material declared by Iran to the Agency.

12. At JHL, Agency inspectors also discussed in greater detail with the Iranian authorities Iran's production of uranium metal for its AVLIS experiments. The Agency was able to take samples from the uranium metal, the analysis results of which are pending.

## **B. Irradiation and Reprocessing Experiments**

### **B.1. Plutonium separation**

13. As described in the Director General's report to the March 2004 meeting of the Board (GOV/2004, para. 21), Iran had irradiated depleted UO<sub>2</sub> targets and reprocessed some of them in shielded glove boxes. According to Iran, 7 kg of UO<sub>2</sub> were irradiated, 3 kg of which were subsequently reprocessed for the separation of plutonium, and the remaining 4 kg buried in containers on the site of TNRC. Iran estimated that the original amount of plutonium in the solution was approximately 200 µg. Based on Agency calculations the amount of plutonium should have been higher.

14. As indicated in the previous report, the glove boxes and equipment, as well as the separated plutonium, were presented to the Agency for sample taking in November and December 2003. Since

the last report, the analytical results have become available, and Iran provided the Agency with additional information on the experiments along with detailed records of the successful experiments.

15. On the basis of the information available to it, the Agency has concluded that the amount of plutonium declared by Iran had been understated. However, the amounts produced were only in the milligram range. The Agency also concluded that the analytical results indicated sources of plutonium other than that identified in the solution bottles, specifically: some of the plutonium has a plutonium-240 (Pu-240) abundance different from that found in the plutonium solution bottles; the age of the plutonium in the solution bottles appears to be less than the declared 12–16 years; analyses revealed the possible presence of slightly irradiated natural uranium; and the presence of milligram quantities of plutonium appears to be inconsistent with the relatively large amounts of unexplained separated americium-241 (Am-241) found in the glove box. These findings were discussed with Iran.

16. The Iranian officials acknowledged that their theoretical estimations of the produced plutonium had been low. However, they maintained that the 200 µg of declared separated plutonium was the actual amount successfully separated, and that the extremely low yield was due to very low separation efficiency. The Iranian officials provided corrected data sheets on the irradiation and reprocessing experiments that addressed the presence of one of the plutonium sources. As regards the age of the plutonium, the Iranian officials reiterated their statement that the experiments had been completed in 1993, and agreed to repeat the analysis of the plutonium solution samples in an attempt to obtain more precise results. They also suggested that the slightly irradiated natural uranium may be present due to I-131 production experiments (declared to the Agency in 2003) in which such material had been used. Finally, in response to the Agency's observations, the Iranian officials described work that had been carried out in the glove box involving separated Am-241, which explains the existence of Am-241 in the glove box.

## **B.2. Polonium-210 production**

17. The Agency also continued to follow up on explanations by Iranian officials of the purposes of the irradiation of bismuth metal samples that took place in the TRR between 1989 and 1993 (GOV/2004/11, paras 28–31). As explained in GOV/2004/11, although bismuth is not a nuclear material requiring declaration under the Safeguards Agreement, its irradiation is of interest to the Agency as it produces polonium-210 (Po-210), an intensely radioactive alpha emitting radioisotope<sup>5</sup> that could be used not only for certain civilian applications (such as radioisotope thermoelectric generators (RTGs), in effect, nuclear batteries<sup>6</sup>), but also, in conjunction with beryllium, for military purposes (specifically, as a neutron initiator in some designs of nuclear weapons).

18. In response to Agency inquiries, Iran informed the Agency in November 2003 that the bismuth irradiation had been part of a feasibility study for the production and use of Po-210 in RTGs. During subsequent discussions in February 2004, Iranian officials said that the experiments were also a part of a study about neutron sources, but that, as there were few remaining records related to the project, Iran was not able to provide evidence to support its claims as to the stated purpose. However, Iran provided the Agency with a document reflecting the approval of the project in which reference is made to these applications. In the most recent meeting on 21 May 2004, Iranian authorities continued to maintain that the purpose of the bismuth irradiation had been to produce pure Po-210 on a laboratory scale, noting that, if the production and extraction of Po-210 were successful, it could be used in radioisotope thermoelectric batteries, as was the case in the SNAP-3 application (a US developed power source for

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<sup>5</sup> Po-210 has a half-life of 138 days.

<sup>6</sup> The reported applications of Po-210 based RTGs are limited in number.

use in space probes). In the view of Agency experts, the explanations provided by Iran thus far are not detailed enough and therefore not entirely adequate.

19. It is the Agency's understanding that the submission of a proposal with appropriate justifications is standard practice as part of the approval process for such projects at TNRC. In light of that, the Agency has asked Iran to renew its efforts with a view to locating any further more detailed proposals or reports in connection with the internal approval of the Po-210 project.

20. The Agency will continue to follow up on these matters as appropriate.

## **C. Uranium Enrichment**

### **C.1. Gas centrifuge enrichment**

21. As of the issuance of GOV/2004/11, there were a number of issues outstanding with respect to the use and disposition of 1.9 kg of UF<sub>6</sub> (in two small cylinders) that had been imported by Iran in 1991 and which Iran acknowledged had been used in centrifuge tests at the Kalaye Electric Company workshop. The matters that required more follow-up included:

- Explanations for the UF<sub>6</sub> contamination detected under the roof of the TRR building where the material had been stored.
- Analysis of the samples taken from the dismantled equipment stored at PFEP said to contain, as hold-up, the 1.9 kg of UF<sub>6</sub>.

22. As described in GOV/2004/11 (para. 33), Iran originally stated that the 1.9 kg of the UF<sub>6</sub> which appeared to be missing from the two small cylinders had not been used, but had leaked from the cylinders during their storage in the TRR building. Environmental samples taken from that storage area did indicate the presence of UF<sub>6</sub>. Subsequently, however, Iran acknowledged that, contrary to its previous declarations, Iran had used that material in P-1 centrifuge tests at the Kalaye Electric Company workshop. Accordingly, the Agency sought further clarification as to the source of the contaminant material and its current location, as well as the date on which the contamination had taken place.

23. In a letter dated 4 February 2004, Iran indicated, for the first time, that bottles containing UF<sub>6</sub> from domestic R&D conversion activities had been stored in the TRR building from 1997 to 1998, and that "it is most probably that the particles which have been found in the [environmental] samples [taken by the Agency] could be the result of leakage of [these] UF<sub>6</sub> bottles". For a number of technical reasons, the Agency experts did not consider this explanation credible and requested further explanations. During his visit to Iran in April 2004, the Director General reiterated the Agency's request for evidence of the source of contamination. On 21 May 2004, the Iranian officials reconfirmed that the source of the contamination had been the domestically produced UF<sub>6</sub> contained in the bottles, and agreed to provide to the Agency without delay the date that the contamination actually occurred and a precise description of the circumstances under which it took place. The Agency has still to receive the requested information.

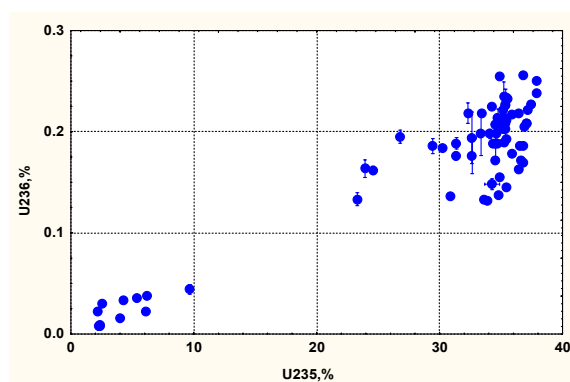
24. Samples still need to be taken of the nuclear material in the dismantled equipment at PFEP. However, on 17 and 18 May 2004, samples were taken from the larger cylinder containing UF<sub>6</sub> imported by Iran in 1991. The samples are currently being analysed and the results should be available soon.

25. As described in GOV/2004/11 (para. 39) and GOV/2003/75 (paras 34 and 35; Annex 1, paras 38–41, 45, 53), environmental samples taken by the Agency at Natanz and at the Kalaye Electric Company workshop revealed particles of natural uranium, LEU and HEU that called into question the completeness of Iran's declarations about its centrifuge enrichment activities. As of the issuance of GOV/2004/11, a number of discrepancies and unanswered questions remained to be resolved:

- Analysis of samples taken from domestically manufactured centrifuge components showed predominantly LEU contamination, while analysis of samples from imported components showed both LEU and HEU contamination. It is not clear why the components would have different types of contamination if, as Iran states, the presence of uranium on domestically manufactured components is due solely to contamination originating from imported components.
- The types of uranium contamination found at the Kalaye Electric Company workshop and at Farayand Technique differ from those at PFEP at Natanz, even though Iran has stated that the source of contamination in both cases is the imported P-1 centrifuge components.
- Environmental samples showing uranium enriched to 36% U-235 have come almost entirely from one room in the Kalaye Electric Company workshop and from a balancing machine at Farayand Technique that had been relocated from the Kalaye Electric Company workshop, both of which seem to be contaminated by more than trace quantities of that material.<sup>7</sup> Only negligible traces of 36% enriched uranium have been found on imported P-1 centrifuge components. The level of contamination suggests the presence of more than just trace quantities of such material.<sup>8</sup>

26. The Agency has taken additional swipe samples in an effort to resolve the first two questions, i.e. why the contamination is different on domestic and imported centrifuges, and why the contamination at Natanz is different from that found at the Kalaye Electric Company workshop and Farayand Technique. The results are now available, and the Agency is in the process of evaluating them.

27. As noted above, the presence of the 36% HEU is localized in a room of Building 3 at the Kalaye Electric Company workshop and on the vertical balancing machine at Farayand Technique. The presence of the HEU is indicated in the following graph by the large group of particles around 36% U-235. The fact that virtually no other particles similar to this group have been identified on imported centrifuge components suggests that those components are not the source of the 36% HEU, and that the 36% HEU was introduced in the room and the balancing machine in some other manner.



<sup>7</sup> On 28 May 2004, Iran stated that the balancing machine had also been at Natanz from February to November 2003.

<sup>8</sup> 36% enriched uranium is characteristic of nuclear material used in certain research reactors outside of Iran.

28. Since the issuance of the last report to the Board, the Agency and the State from which the imported P-1 centrifuges are believed to have originated have, in a cooperative effort, shared their respective analytical results. That State has reported to the Agency that it is not plausible that all of the contamination found in Iran could have originated from their country (e.g. the U-236 fraction found in Iran is significantly higher). Although the Agency has not yet been permitted to take its own samples from equipment or material in that State, the Secretariat and the State's authorities have discussed measures which would permit independent authentication of the State's results with a view to permitting the Agency to make progress on the issue of contamination. The Agency is also consulting with another State with a view to facilitating the resolution of the contamination questions.

29. As had been requested by the Agency since August 2003, Iran provided the Agency on 4 May 2004 with additional information about the movements of imported P-1 components. This information, combined with the results from environmental sampling, is currently being assessed. However, no information has been provided by Iran about the origin of these P-1 components, which Iran maintains it does not know. In addition, although Iran had previously identified some of the intermediaries who had secured the components on behalf of Iran, no additional intermediaries have been identified.

30. Given the results of the environmental sample analysis as indicated above, Iran has been asked to provide further information, particularly in light of its declaration that it has not enriched uranium to more than 1.2% U-235 using centrifuge technology.

31. The Agency was also invited in April 2004 to visit two locations in Tehran which Iran declared as having been involved in the centrifuge R&D programme and where mechanical testing of centrifuge rotors had been carried out. In the course of these visits, environmental samples were taken, the results of which are still pending. The Agency interviewed staff and contractors of AEOI who had been involved in Iran's centrifuge enrichment programme.

32. As reported in GOV/2004/11 (paras 44–48), in January 2004 Iran acknowledged that it had received P-2 centrifuge drawings from foreign sources in 1994 and that in 2002 it had conducted some mechanical tests, without nuclear material, using domestically manufactured rotors. The Iranian authorities stated that Iran had not obtained any P-2 centrifuges, or components thereof, from abroad, and that the components Iran did have, it had produced domestically in the workshop of a private company.

33. In subsequent clarification, Iran indicated that the P-2 drawings had been received around 1995, that no actual work commenced until 2001 and that the mechanical testing of the P-2 composite rotors had begun only in 2002. In light of the investment made in obtaining the design drawings of the P-2 centrifuge and the technical capabilities that existed in Iran at the time, the Agency centrifuge enrichment experts have some questions regarding Iran's statement that, after the design drawings around 1995, no actual work commenced until 2001, and that the mechanical testing of the P-2 composite rotors had begun only in 2002. The experts expressed doubt about the feasibility of carrying out such tests — which required the procurement of parts from abroad and the manufacture of casings and centrifuge components — all within a period of less than a year. On 30 May 2004, Iran provided additional information on the chronology of the P-2 experiments, which is currently being assessed.

34. At the request of the Agency, Iran allowed the Agency access to documents said to be the original P-2 technical drawings received from foreign intermediate sources. According to Iranian authorities, Iran received no electronic copies of the P-2 drawings. Having reviewed the drawings, the Agency centrifuge experts concluded that the origin of the drawings was the same as that of the drawings provided to the Socialist People's Libyan Arab Jamahiriya.



35. Iran informed the Agency in April 2004 that it had in fact imported some components relevant to its P-2 enrichment activities. The Agency has asked for details related to the import of those components and any additional information related to their procurement and the procurement of any other relevant components.

36. On 28 May 2004, in response to this request, Iran stated that the private company in Tehran that had manufactured the P-2 components had made enquiries with a European intermediary about the procurement of 4000 magnets with specifications suitable for use in P-2 centrifuges. Iran stated that no magnets had actually been delivered by that foreign company to Iran, but that magnets relevant to P-2 centrifuges had been procured from Asian suppliers. The Agency asked for further detailed information, and an explanation regarding how such procurement efforts fit with the stated small scale of its P-2 centrifuge R&D programme. During discussions with the Agency on 30 May 2004, the owner of the private company acknowledged that he had mentioned to the intermediary the possibility of future procurement of higher numbers of P-2 centrifuge magnets beyond the 4000. He stated that the higher numbers of magnets had been mentioned to attract the intermediary by indicating that larger orders would follow. During those discussions, Iran also provided the Agency with other additional information on its procurement efforts, which is now being assessed.

37. The Agency has also reviewed the contract concluded by the AEOI with the private company referred to above for the carrying out of mechanical testing of a composite rotor for the P-2 derivative centrifuge. One of the terms of the contract was that a technical progress report was to be prepared by the contractor and submitted to the AEOI. In response to the Agency's request for access to that report, a report, written in Farsi, was shown to the Agency and an oral translation of the text provided. The document, however, was not a progress report on the achievements of the development programme, as had been requested by the Agency, but a technical report on the theory of centrifuges and the conclusions reached as a result of those theoretical studies. No details were given in that report concerning the number of centrifuges assembled and tested or the outcomes of such tests. The contractor claimed that he was still in dispute with the AEOI with respect to his payment and that he was therefore reluctant to produce the missing information.

38. This information has been discussed with Iranian officials, and further explanations have been requested.

## **C.2. Laser enrichment**

39. As reported in GOV/2004/11 (paras 49–55), the Agency has continued its evaluation of information and verification results in connection with Iran's AVLIS programme, which it had declared to the Agency in October 2003.

40. During the April/May 2004 visit of Agency laser enrichment experts, Iran cooperated with the Agency by providing relevant information, including documentation, and allowing interviews with scientists who had been involved in laser experiments at the CSL in the 1990s. The Agency experts have concluded that the production capacity of the AVLIS equipment used in these experiments is of the order of a few milligrams of uranium a day. Although Iran had previously indicated to the Agency that it had been able to produce enrichment levels of a little more than 3%, in discussions with the Agency in early May 2004, Iranian officials stated that they had been able to achieve average enrichment levels of 8% to 9%, with some samples of up to approximately 15%. At the meeting on 21 May 2004, Iran offered the explanation that the higher enrichments arose from initial tuning experiments of the AVLIS equipment and that it was not possible for the experimenters to know or control in advance the range of enrichment of all the material. Agency experts are studying this explanation.

41. The Agency was also informed that, as part of a contract with the supplier of the equipment, some samples from the AVLIS project had been sent for analysis to the supplier's laboratory. Final assessment of the CSL experiments is pending receipt of additional information from that analytical laboratory. Although the amounts of material involved were only on a milligram scale, Iran should have included in its 21 October 2003 declaration references to the higher enrichment levels and to the shipment of samples for analysis.

42. During the April and May missions, the inspectors and laser enrichment experts also interviewed personnel who had been involved in enrichment experiments and related research and development at Lashkar Ab'ad and at the Laser Research Centre (LRC) in Tehran. Based on information provided by Iran and examination of the equipment made available at Karaj, Agency experts concluded that the capacity of the larger scale AVLIS installation at Lashkar Ab'ad was about 1 gram of uranium per hour, but that continuous operation was not possible. With the cooperation of Iran, the Agency was able to sample some internal parts of the laser equipment, including the collector plates, which have been brought to the Agency's laboratory for analysis. Chemical analysis of those will be used to confirm the statements by Iran concerning AVLIS contained in its 21 October 2004 declaration.

43. On 3 March 2004, the Agency had written to Iran seeking clarification of information related to Iran's laser enrichment programme, in particular as regarded training in, and delivery of specific equipment (excimer lasers) by, another State. During the April/May 2004 mission, the laser enrichment experts were able to access the laser equipment, which Iran had declared as having been part of R&D on fusion. The Agency experts concluded that the lasers were not suitable for use in the enrichment of uranium.

44. Iran provided the Agency with a copy of extracts from the contract related to the training abroad of Iranian officials on lasers.

45. As indicated in GOV/2003/63 (para. 42), Iran is continuing with its R&D on copper vapour lasers. In May 2004, the Agency visited the LRC, which is developing pulsed (250 nanosecond) NdYAG lasers which could be useful in Iran's AVLIS programme if the pulse width is shortened.

## **D. Heavy Water Reactor Programme**

46. Following on the Agency's inquiry about efforts by Iran to import hot cells for use in connection with the Iran Nuclear Research Reactor (IR-40), construction of which is now scheduled to commence in June 2004, and requests for design information relevant to such hot cells, Iran stated in October 2003 that two hot cells had been foreseen for the project, but that neither the design nor detailed information about the dimensions or the actual layout of the hot cells was available. Iran later stated that it had tentative plans to construct at Arak an additional building with hot cells for the production of "long lived" radioisotopes.

47. Information provided to the Agency by another State on Iran's efforts to procure hot cell manipulators indicates that the specifications for the hot cells called for a wall thickness of approximately 1.4 metres, a dimension somewhat excessive for the stated radioisotope production and more indicative of that required for handling spent fuel.

48. In April 2004, the Agency requested updated design information for IR-40. It also reiterated its request for design information on the hot cells.

49. On 13 May 2004, the Agency received updated design information for the IR-40. Iran stated in its submission that, due to difficulties associated with obtaining technical information and subsequent purchase of manipulators and shielding windows, the construction of hot cells for “long lived” radioisotopes was no longer under consideration.

## **E. Suspension of Enrichment Related and Reprocessing Activities**

### **E.1. Scope of suspension**

50. As reported by the Director General to the November 2003 meeting of the Board, Iran informed him on 10 November 2003 of its decision to suspend enrichment related and reprocessing activities.

51. In its Note Verbale of 29 December 2003, Iran further informed the Agency, that, with immediate effect:

- it would suspend the operation and/or testing of any centrifuges, either with or without nuclear material, at PFEP at Natanz;
- it would suspend further introduction of nuclear material into any centrifuges;
- it would suspend installation of new centrifuges at PFEP and installation of centrifuges at the Fuel Enrichment Plant (FEP) at Natanz; and
- it would withdraw nuclear material from any centrifuge enrichment facility if and to the extent practicable.

52. In its 29 December 2003 communication, Iran also stated that: it did not currently have any type of gas centrifuge enrichment facility at any location in Iran other than the facility at Natanz that it was now constructing, nor did it have plans to construct, during the suspension period, new facilities capable of isotopic separation; it had dismantled its laser enrichment projects and removed all related equipment; and it was not constructing nor operating any plutonium separation facility.

53. In addition, Iran also stated in its 29 December 2003 communication that: during the period of suspension, Iran did not intend to make new contracts for the manufacture of centrifuge machines and their components; the Agency could fully supervise storage of all centrifuge machines assembled during the suspension period; Iran did not intend to import centrifuge machines or their components, or feed material for enrichment processes, during the suspension period; and “[t]here is no production of feed material for enrichment processes in Iran”.

54. On 24 February 2004, Iran informed the Agency that instructions would be issued by the first week of March to implement the further decisions voluntarily taken by Iran to (i) suspend the assembly and testing of centrifuges, and (ii) suspend the domestic manufacture of centrifuge components, including those related to the existing contracts, to the furthest extent possible. Iran also informed the Agency that any components that were manufactured under existing contracts that could not be suspended would be stored and placed under Agency seal. Iran invited the Agency to verify these measures. Iran also confirmed that the suspension of enrichment activities applied to all facilities in Iran.

55. In its Note Verbale to the Agency of 15 March 2004, Iran stated that the Agency’s verification of the suspension of centrifuge component production could begin as of 10 April 2004. However, as

stated by Iran, due to disputes between the AEOI and some of its private contractors, three private companies continued production in April. The Agency has received no further information which would suggest that these private companies have suspended their centrifuge component production activities.

## **E.2. Verification activities**

56. The Agency's approach to verifying Iran's decision to suspend certain activities needs to be viewed in the context of a number of considerations, including the following:

- Verification is limited to those sites that have been identified by Iran. It may be of questionable value, therefore, for the Agency to invest significant time and resources in intensive verification at these sites, given that the Agency cannot provide any assurance about the possibility of component production elsewhere in the country. Therefore, the approach being adopted by the Agency for verifying the suspension of component production, as agreed with the Iranian authorities, is based primarily on visits at short notice to certain locations.
- Some of the activities subject to suspension, such as component production, are inherently difficult to verify. The assurances that the Agency can provide are of a different nature from those achievable with respect to the detection of nuclear material diversion.

57. The cascade hall of PFEP continues to be under Agency surveillance and all of the declared UF<sub>6</sub> feed material remains under Agency seal. All containment and surveillance devices have been checked during monthly inspections, most recently on 15 to 16 May 2004, confirming the non-operational status of the facility.

58. As a result of its verification activities, the Agency is able to confirm: that there has been no operation or testing of any centrifuges, either with or without nuclear material, at PFEP; that no new centrifuges have been installed at PFEP; that no centrifuges have been installed at FEP; and that no nuclear material has been introduced into any centrifuges which have been declared to the Agency.

59. The Agency has also, through inspections, design information verification visits and complementary access, continued to verify:

- The decommissioned status of the dismantled pilot enrichment facility at the Kalaye Electric Company workshop in Tehran. The workshop was last visited on 13 and 22 May 2004.
- The decommissioned status of the AVLIS pilot plant at Lashkar Ab'ad and of the decommissioned AVLIS and molecular laser isotope separation (MLIS) installations at TNRC, as well as the dismantled AVLIS and MLIS related equipment currently stored at Karaj. These locations were visited most recently on 10 and 11 May 2004.
- The non-production of UF<sub>6</sub> at UCF, and of uranium metal at UCF and TNRC. These locations were visited between 26 April and 5 May 2004.

60. As regards the last point, Iran has commenced hot tests of two units of UCF. As indicated above in paragraph 7 of this Annex, in its letter dated 7 May 2004, the Agency informed Iran that, given the amounts of nuclear material involved, the hot testing of a third UCF unit, the UF<sub>6</sub> production unit, with UF<sub>6</sub> gas would technically amount to the production of feed material for enrichment processes.

61. In a letter dated 18 May 2004, Iran stated that "the decision taken for voluntary and temporary suspension is based on clearly defined scope which does not include suspension of production of UF<sub>6</sub>." This is at variance with the Agency's previous understanding of Iran's decision, as stated in the Director General's report to the Board meeting in November 2003 (GOV/2003/75, para. 19) and

indicated in the Director General's report to the Board meeting in March 2004 (GOV/2004/11, para. 66), as well as in the Agency's letter to Iran dated 5 December 2003, in which the Agency sought Iran's confirmation that it would proceed on the basis of an attached plan prepared by the Agency, which, inter alia, contemplated the suspension of the production of feed material for enrichment processes.

62. Iran continued to assemble P-1 centrifuge rotors until April 2004, at which time Iran announced it would cease such assembly. The total number of P-1 rotors verified by the Agency during its visit in February 2004 was 855. Since then, the operator has declared that another 285 rotors had been assembled. During its April visit, the Agency verified the total of 1140 assembled P-1 rotors.

63. During the Agency's April 2004 visit, contracts for the production of P-1 centrifuge components in Iran were reviewed. Iran has been requested to declare to the Agency the total number of such components imported and manufactured in Iran so that an inventory of the components could be established by the Agency. Most of the P-1 components locally manufactured were transferred to Natanz.

64. Iran has provided the Agency with an inventory of imported and domestically produced centrifuge components. During their visits in May 2004, Agency inspectors took an inventory of the key components and sealed them inside containers. Of the 402 assembled rotors, 392 were sealed by the Agency. Iran has requested that a small number of key components, as well as 10 assembled rotors be left unsealed in order to allow ongoing R&D centrifuge work at Kalaye Electric Company and Natanz. Iran stated that R&D is not covered by its voluntary suspension undertakings, but these unsealed items would be made available to the Agency on request to permit it to ensure that they are not used in activities inconsistent with Iran's undertaking.

65. A number of mandrels and moulds used to manufacture some of the key components were also transferred to Natanz. These items, as well as maraging steel and high strength aluminium, were placed under Agency seal on 31 May and 1 June 2004. At Natanz and Farayand Technique, vertical and horizontal balancing machines were sealed by the Agency, along with the centrifuge test pits. Engineering jigs and gauges which had been used for quality control were also sealed by the Agency at Natanz.

66. Since February 2004, the Agency visited a number of workshops declared by Iran as having been involved in the production of P-1 centrifuge components. However, as noted above, at three of the private workshops, the centrifuge component production activities have not been suspended.

67. On 22 May 2004, Iran and the Agency reached agreement on the Agency's proposal regarding the frequency of visits during the next twelve months for verifying the suspension of the production of gas centrifuge enrichment components at nine sites declared by Iran as having been engaged in such activities. As a consequence of this agreement, visits are being carried out at the three DIO sites during the week of 31 May 2004.

68. In relation to reprocessing, the Agency has continued to verify the use and construction of declared hot cells, including equipment used earlier for plutonium separation experiments at TNRC, ENTC, Karaj and Arak. In addition, the Agency has carried out inspections and design information verification at JHL in support of its verification of the suspension of reprocessing.