

# Board of Governors

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

*Report by the Director General*

### **A. Introduction**

1. On 6 June 2003, the Director General submitted to the Board of Governors for its consideration a report (GOV/2003/40) on a number of safeguards issues that needed to be clarified and actions that needed to be taken in connection with the implementation of the Agreement between the Islamic Republic of Iran (hereinafter referred to as Iran) and the IAEA for the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/214) (the Safeguards Agreement).
2. In that report, the Director General stated that Iran had failed to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material imported into Iran and the subsequent processing and use of the material, and the declaration of facilities and other locations where the material was stored and processed. He described these failures and the actions being taken by Iran to correct them. In his report, the Director General also referred to the Agency's ongoing activities to verify the correctness and completeness of Iran's declarations and the safeguards measures the Secretariat intended to take in order to pursue questions that remained open.
3. At the conclusion of the Board's consideration of the Director General's report, the Chairperson summarized the Board's discussion. In the summary, the Chairperson stated that the Board shared the concern expressed by the Director General at the number of past failures by Iran to report material, facilities and activities as required by its safeguards obligations, and noted the actions taken by Iran thus far to correct these failures. The Board urged Iran promptly to rectify all safeguards problems identified in the Director General's report and to resolve questions that remained open. The Board welcomed Iran's reaffirmed commitment to full transparency and expressed its expectation that Iran would grant the Agency all necessary access. The Board encouraged Iran, as a confidence-building measure, not to introduce nuclear material at the Pilot Fuel Enrichment Plant (PFEP) located at Natanz

pending the resolution of related outstanding issues. The Board called on Iran to co-operate fully with the Agency in its on-going work, and took note of the introductory statement of the Director General, in which he called on Iran to permit the Agency to take environmental samples at the workshop of the Kalaye Electric Company in Tehran. The Board welcomed Iran's readiness to look positively at signing and ratifying an Additional Protocol, and urged Iran promptly and unconditionally to conclude and implement such a protocol, in order to enhance the Agency's ability to provide credible assurances regarding the peaceful nature of Iran's nuclear activities, particularly the absence of undeclared material and activities. Finally, the Board of Governors requested the Director General to provide a further report on the situation whenever appropriate.

## **B. Chronology since June 2003**

4. As foreseen in GOV/2003/40, an Agency team of centrifuge technology experts visited Iran from 7 to 11 June 2003 to discuss Iran's centrifuge enrichment research and development (R&D) programme. On 24 June 2003, the Agency submitted to Iran for comments a summary report reflecting the results of those discussions and the findings of the Agency's centrifuge technology experts, and proposed a follow-up meeting with the Agency experts in July. That meeting ultimately took place from 9 to 12 August 2003 as indicated below.

5. On 11 June 2003, the Agency provided to the Permanent Mission of Iran in Vienna "talking points" on the results of environmental samples taken from the chemical traps of PFEP at Natanz indicating the presence of high enriched uranium particles, which was not consistent with the nuclear material declarations made by Iran. The Agency emphasized the need to clarify this issue promptly, and suggested that it be addressed during the proposed centrifuge technology expert meeting.

6. On 9 July 2003, the Director General, accompanied by the Deputy Director General for Safeguards and the Director of the Division of Safeguards Operations (B), visited Iran to discuss safeguards implementation issues. He met with the President, H.E. Mr. M. Khatami; the Foreign Minister, H.E. Mr. K. Kharrazi; and Vice President of Iran and President of the Atomic Energy Organization of Iran (AEOI), H.E. Mr. R. Aghazadeh. During these meetings, the Director General emphasized the importance of the urgent resolution of outstanding safeguards issues, such as those raised by the results of environmental sampling at PFEP and the findings by the Agency's centrifuge technology experts, and in that connection, the need for full transparency by Iran. He also stressed the importance of the conclusion of an Additional Protocol by Iran to enable the Agency to provide comprehensive and credible assurances about the peaceful nature of Iran's nuclear programme. The President of Iran assured the Director General of the readiness of Iran to co-operate fully with the Agency and reiterated Iran's positive attitude towards the conclusion of an Additional Protocol, but indicated that some technical and legal aspects needed to be clarified. It was agreed that technical discussions should follow the Director General's visit, and that the Agency should dispatch a team to clarify technical and legal aspects related to the Model Additional Protocol (INFCIRC/540 (Corr.)).

7. During the follow-up technical discussions, which were held from 10 to 13 July 2003 in Iran, the Agency team raised again the issue of the results of the environmental sampling at PFEP, and reiterated the Agency's request that, in fulfilment of Iran's stated commitment to full transparency, Iran permit the Agency to take environmental samples at the workshop of the Kalaye Electric Company in Tehran. The team also inquired as to whether, in accordance with that policy, Iran would permit the Agency to visit two locations near Hashtgerd (Lashkar Ab'ad and Ramandeh) at which it had been alleged, according to recent reports in open sources, that nuclear related activities were being

or had been conducted. The Iranian authorities indicated that they were not yet ready to discuss the findings of the Agency's centrifuge technology experts, nor were they willing at this stage to permit the Agency to take environmental samples at the workshop of the Kalaye Electric Company or to accede to the Agency's request to visit the two locations near Hashtgerd. The Iranian authorities indicated that they would like to propose a comprehensive solution to all of the enrichment related issues, but that it would take some time on their side. During the discussions, the specific issues that needed to be resolved were identified, and the Iranian side agreed to propose at an early date a timetable for resolving those issues.

8. In response to Iran's request for the clarification of aspects of the Additional Protocol, a team of Agency legal and technical experts participated in a meeting held in Tehran on 5 and 6 August 2003 with officials from a number of ministries of the Iranian Government. During the meeting, the Agency provided clarification of the Model Additional Protocol, and responded to detailed questions raised by the Iranian officials.

9. On 23 July 2003, the Agency received from the AEOI Vice President of Nuclear Safety and Safeguards a letter proposing a timetable for actions to be taken by 15 August 2003 in relation to urgent outstanding issues. In its reply of 25 July 2003, the Agency agreed to send to Iran a team of technical experts, with the understanding that the team would: (a) discuss the results of the environmental samples taken at Natanz; (b) take environmental samples at the workshop of the Kalaye Electric Company; (c) discuss the findings of the Agency centrifuge technology experts; and (d) visit the sites near Hashtgerd. This mission took place from 9 through 12 August 2003.

10. In a letter dated 19 August 2003, the AEOI provided additional information on the issues identified in the timetable, including Iran's heavy water reactor programme, Iran's use of previously imported  $UO_2$  in experiments to produce  $UF_4$ , "bench scale" conversion experiments and Iran's past interest in laser fusion and spectroscopy.

11. In a letter dated 24 August 2003, the Resident Representative of Iran to the Agency informed the Director General that Iran was "prepared to begin negotiation with the [IAEA] on the Additional Protocol" and expressed the hope that, "in this negotiation the concerns of [Iran] and the ambiguities on the Additional Protocol are removed".

## **C. Implementation of Safeguards**

### **C.1. Uranium Conversion**

12. In GOV/2003/40, the Director General identified a number of corrective actions by Iran which were necessary to enable the Agency to verify the previously unreported nuclear material declared to have been imported by Iran in 1991. These actions included:

- (a) The submission of inventory change reports (ICRs) on the transfer of the imported  $UO_2$ ,  $UF_4$  and  $UF_6$  for further processing and use.
- (b) The submission of ICRs on the production of uranium metal, uranyl nitrate, ammonium uranyl carbonate,  $UO_2$  pellets and uranium wastes from the imported material.

- (c) The provision of design information on the waste storage facility at Esfahan, and the granting of access to that facility as well as to Anarak and Qom, where waste resulting from the processing of the imported material is stored or has been disposed of.
- (d) The submission of updated design information for the Molybdenum, Iodine and Xenon Radioisotope Production (MIX) Facility and for the Tehran Research Reactor (TRR) to reflect activities involving the imported nuclear material.

13. Since the June report of the Director General, Iran has provided ICRs on the transfer of the imported natural uranium for its further processing and use, as well as physical inventory lists (PILs) and material balance reports (MBRs) reflecting its use in the production of uranium metal, uranyl nitrate,  $UO_2$  pellets and wastes (Iran has stated that no ammonium uranyl carbonate was produced from that material). In addition, Iran provided updated design information for MIX and TRR on the use of the imported material in experiments at those facilities. Iran has also provided information on the storage of waste at Esfahan, and has granted Agency inspectors access to that location and to the waste sites at Anarak and Qom.

14. Iran stated on a number of occasions between February and July 2003 that no R&D using nuclear material, even on a laboratory scale, had been conducted on the conversion and production of any other nuclear material at the Uranium Conversion Facility (UCF) (specifically,  $UO_2$ ,  $UF_4$  and  $UF_6$ ). The Agency was told that the basic design of the UCF processes, and test reports for those processes, had been obtained from abroad. According to the AEOI, this information was sufficient to permit Iran to complete indigenously the detailed design and manufacturing of the equipment for UCF.

15. In a letter dated 19 August 2003, however, the Iranian authorities acknowledged that, in the early 1990s, there had been "bench scale" uranium conversion experiments. Iran has indicated that more time will be needed to find the people involved in these experiments and to trace any other closed down facilities. The Iranian authorities have indicated that they are currently preparing a response to the Agency questionnaires on closed down and decommissioned facilities in Iran and on Iran's nuclear fuel cycle, and that further information on the conversion experiments will be included in that response.

16. Drawing on this information, the Agency will continue with the verification of the imported nuclear material and its subsequent processing. In addition to physical verification activities and the evaluation of the ICRs, PILs and MBRs, this task involves the auditing of source documents on the shipment and subsequent processing of the nuclear material at various installations. Since some of the experiments took place a number of years ago and some of the imported material has been mixed with other nuclear material, the auditing and verification process is expected to be difficult and time consuming.

### **C.1.1. Processing of Imported $UF_6$**

17. In March 2003, the Agency took environmental samples from the surfaces of all three of the cylinders said to have contained the imported  $UF_6$  (two small S-type cylinders and a large 30B-type cylinder). The results of the analysis of those samples are now available and are consistent with the declaration by Iran that the material contained in them was natural uranium.

18. As previously reported to the Board of Governors (GOV/2003/40, para. 19), the Iranian authorities have stated that none of the imported  $UF_6$  had been processed, and, specifically, that it had not been used in any centrifuge tests. It was observed during Agency verification in March 2003, however, that some of the  $UF_6$  (1.9 kg) was missing from the two small cylinders. The Iranian authorities have stated that this might be due to leakage from the cylinders resulting from mechanical failure of the valves and possible evaporation due to their storage in a place where temperatures reach

55° C during the summer. On 18 August 2003, the Agency took environmental samples at the locations where Iran indicated that the small cylinders had been stored; these samples will need to be analysed and the results assessed. Investigation of this issue is continuing.

19. Verification of the contents of the large cylinder entail the weighing of the cylinder, non-destructive analysis (NDA), and destructive analysis of samples taken from the contents of the cylinder. While the weighing and NDA have been carried out, the taking of samples for destructive analysis can only be carried out when the equipment necessary for UF<sub>6</sub> transfer and sample taking has been installed at Natanz.

### **C.1.2. Processing of Imported UF<sub>4</sub>**

20. As described in the previous report (GOV/2003/40, para. 20), most of the imported natural UF<sub>4</sub> had been converted to uranium metal. As further noted therein, the Secretariat was seeking more information about the role of uranium metal in Iran's nuclear fuel cycle.

21. This matter was discussed further in the technical meetings held on 10–13 July in Iran. In a letter to the Agency dated 23 July 2003, the Iranian authorities stated that 113 experiments had been carried out at the Jabr Ibn Hayan Multipurpose Laboratories (JHL) using the imported UF<sub>4</sub> with a view to optimizing reaction conditions and parameters for producing uranium metal. In that same letter, Iran stated further that, "In the early [90's] when the country decided to reconsider its nuclear program, we were not sure whether it will consist of CANDU reactors, Magnox reactors<sup>1</sup> or light water reactors. Therefore it was decided to include a U-metal production line in the Uranium Conversion Facility (UCF) which could also be used to produce shielding material. However, as the picture is now more clear, uranium metal experiments could be considered as a process to gain know-how in nuclear material production". The Secretariat is pursuing this matter further with the Iranian authorities in light of the construction at JHL of a uranium metal purification and casting laboratory.

22. Recent results from the destructive analysis referred to in the previous report (GOV/2003/40, para. 20) indicated the presence of depleted uranium in a UF<sub>4</sub> sample taken from JHL. The Agency requested Iran to explain the source of that material, since no such material is reflected in the declared inventory of Iran. The Agency also reiterated its request that Iran investigate further whether any experiments on the conversion processes had been conducted using nuclear material.

23. In its letter of 19 August 2003, Iran stated that, after intensive investigations, it had been found that, "around the 1990's", some laboratory scale experiments had been carried out in the radiochemistry section of the NRC (the Tehran Nuclear Research Centre) to produce UF<sub>4</sub> using depleted UO<sub>2</sub> imported by Iran in 1977, but that neither the laboratory nor the radiochemistry section still existed.

### **C.1.3. Processing of Imported UO<sub>2</sub>**

24. The report in GOV/2003/40 described (paras 21–24) experiments said by Iran to have been carried out using the imported natural UO<sub>2</sub>. These involved the testing of processes envisioned for UCF, isotope production experiments at TRR, and the use of pellets for testing chemical processes for the MIX Facility. Waste from these experiments was said to have been transferred to Esfahan, Anarak and Qom.

25. During the 9–12 August 2003 meeting with Iranian authorities, the Agency referred to earlier discussions which had taken place with Iran on samples taken at the hot cells of TRR and at the MIX

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<sup>1</sup> A reactor type that uses uranium metal.

Facility which indicated the presence of depleted uranium, material which is not included in Iran's declared nuclear material inventory. Iran was provided with a summary of these sampling results. It was suggested by Iran that the presence of depleted uranium could, in some cases, have originated from shielded containers received from other countries (identified by Iran during that meeting). The Agency has investigated the matter further through a comparison of the recent sample analysis results with analytical results of environmental samples taken in those other countries, and it has concluded that the depleted uranium particles could have originated from the imported containers.

26. As anticipated in the Director General's June report, Agency inspectors have now visited the waste disposal site at Qom and the waste storage location at Anarak where uranium bearing wastes from some of the experiments have been stored. Iran has informed the Agency that the waste currently located at Anarak will be transferred to JHL. Based on explanations provided by Iran, the nuclear material in the waste transferred to and disposed of at Qom is considered to be measured discard.

## **C.2. Uranium Enrichment**

### **C.2.1. Gas Centrifuge Enrichment Programme**

27. The Agency is continuing its analysis of Iran's enrichment R&D programme. This process has included thus far a visit by Agency centrifuge technology experts to Iran in June 2003 and subsequent technical discussions with the Iranian authorities. The primary focus of these discussions has been to seek clarification of the statement made by the Iranian authorities in February 2003 that the design and development work, which had been started in 1997, had been based on information from open sources and extensive modelling and simulation, including tests of centrifuge rotors both with and without inert gas, and that the tests of the rotors, carried out on the premises of the Amir Khabir University and the premises of the AEOI in Tehran, had been conducted without nuclear material.

28. During the Agency's June visit, AEOI officials stated that the enrichment factor used in Iran's calculations had been obtained from some original centrifuge drawings, not from experiments. The Agency requested to be shown the original drawings. In August 2003, the AEOI presented redrawn copies of those documents, which included a design of a 164-machine cascade. The Iranian authorities have yet to show the Agency the originals.

29. In their summary report prepared after that visit, the experts judged that:

- (a) Machines at PFEP at Natanz can be recognized as an early European design; and
- (b) It is not possible to develop enrichment technology, to the level seen at Natanz, based solely on open source information and computer simulations, without process testing with UF<sub>6</sub>.

30. These findings were provided to Iran, and were discussed with Iranian officials during the meetings that took place on 9-12 August 2003. In that discussion, in contrast to earlier information provided about the launch dates of the programme and its indigenous nature, AEOI officials stated that the decision to launch a centrifuge enrichment programme had actually been taken in 1985, and that Iran had received drawings of the centrifuge through a foreign intermediary around 1987. The officials described the programme as having consisted of three phases: activities during the first phase, from 1985 until 1997, had been located mainly at the AEOI premises in Tehran; during the second phase, between 1997 and 2002, the activities had been concentrated at the Kalaye Electric Company in Tehran; during the third phase, 2002 to the present, the R&D and assembly activities were moved to Natanz.

31. The Iranian authorities also explained that during the first phase, components had been obtained from abroad through foreign intermediaries or directly by Iranian entities, but that no help had been

received from abroad to assemble centrifuges or provide training. Efforts were concentrated on achieving an operating centrifuge, but many difficulties had been encountered as a result of machine crashes attributed to poor quality components. According to the AEOI officials, no experiments with inert or UF<sub>6</sub> gas were conducted. Iran indicated its willingness to make available for interview key scientists responsible for that phase of the enrichment programme. According to Iranian officials, from 1997 through 2002, the activities were concentrated at Kalaye Electric Company, and involved the assembly and testing of centrifuges, but again without inert or UF<sub>6</sub> gas.

32. During their 9–12 August 2003 visit to Iran, Agency inspectors were permitted to take environmental samples at the Kalaye Electric Company workshop, with a view to assessing the role of that company in Iran's enrichment R&D programme. The results of the analysis of these samples are not yet available. It was noted by inspectors that there had been considerable modification of the premises since their first visit in March 2003. Iranian authorities have informed the Agency that these modifications are attributable to the fact that the workshop is being transformed from use as a storage facility to its use as a laboratory for non-destructive analysis. This modification may impact on the accuracy of the environmental sampling and the Agency's ability to verify Iran's declarations about the types of activities previously carried out there.

33. On 25 June 2003, Iran introduced UF<sub>6</sub> into the first centrifuge for the purpose of single machine testing, and on 19 August 2003 began the testing of a small ten-machine cascade with UF<sub>6</sub>. Iran continues to co-operate with the Agency in implementing safeguards measures now in place at PFEP for monitoring single machine and small cascade testing.

34. In accordance with its standard practice, the Agency took baseline environmental samples at PFEP at Natanz before nuclear material was introduced in the facility. This baseline sampling campaign was conducted during inspections carried out between March and June 2003, and samples were taken at many locations within the facility. While the Agency has already received the results from some of the samples (see below), which have been provided to Iran, other samples are still being analysed by a number of laboratories that participate in the Agency's Network of Analytical Laboratories.

35. Iran has stated that it has not carried out any enrichment and that no nuclear material was introduced to the PFEP prior to the Agency's having taken its first baseline environmental samples there. However, the sampling results which were provided to Iran on 11 June 2003, revealed particles of high enriched uranium. During the 10–13 July and 9–12 August 2003 technical meetings, more complete environmental sampling results were provided to Iran and the matter was discussed further.

36. The PFEP environmental sample results indicate the possible presence in Iran of high enriched uranium, material that is not on its inventory of declared nuclear material. During the August meeting, Iranian authorities indicated that they had carried out extensive investigation with a view to resolving this question, and had come to the conclusion that the high enriched uranium particles which had been detected must have resulted from contamination originating from centrifuge components which had been imported by Iran.

37. At that meeting, Agency inspectors explained that subsequent environmental sample analysis revealed the presence of two types of high enriched uranium, and noted that there had been differences among the samples taken from the surfaces of the centrifuge casings installed for the single machine tests. The Agency asked the Iranian authorities to investigate whether there were differences in the manufacturing history of those pieces of equipment. To investigate this matter further, the Agency took two additional samples from centrifuge components which were said to have been imported and those said to have been produced domestically. The results are not yet available.

38. Conceptually, it is possible to envisage a number of possible scenarios to explain the presence of high enriched uranium in environmental samples at Natanz. As part of the Agency's ongoing detailed plan of investigation each scenario will be considered carefully by Agency experts.

39. The Agency also intends to follow up with Iran information about other sites at which unreported nuclear activities allegedly are being or have been carried out.

### **C.2.2. Laser Programme**

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

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

42. One of the locations was Ramandeh, which belongs to the AEOI and is part of the Karaj Agricultural and Medical Centre. This location is primarily involved with agricultural studies said to be unrelated to nuclear fuel cycle activities. The other location visited was a laser laboratory at Lashkar Ab'ad belonging to the Research and Development Division of the AEOI. During that visit, Iranian officials stated that the laboratory had originally been devoted to laser fusion research and laser spectroscopy, but that the focus of the laboratory had been changed, and the equipment not related to current projects, such as a large imported vacuum vessel, had been moved. Among other activities observed by the Agency were the production and testing of copper vapour lasers of up to 100 watts. However, there appeared to be no activities directly related to laser spectroscopy or enrichment being carried out at the laboratory. The Iranian authorities were asked to confirm that there had not been in the past any activities related to uranium laser enrichment at this location or at any other location in Iran. The Agency has requested permission to take environmental samples at the laboratory, which the Iranian authorities have undertaken to consider.

43. In the letter from Iran dated 19 August 2003, the Agency was informed that, in the past, apart from planned co-operation in laser fusion and laser spectroscopy which never materialized, there had been a research thesis on laser spectroscopy of SF<sub>6</sub> prepared by a university student in co-operation with the laser division of AEOI. While such a study could be seen as relevant to laser enrichment, the underlying experiments appear not to have involved nuclear material.

### **C.3. Heavy Water Reactor Programme**

44. On 13 July 2003 the Iranian authorities made a presentation on some technical features of the 40 MW(th) heavy water reactor (the Iran Nuclear Research Reactor, IR-40), construction of which is planned to start in 2004. The reactor, which Iranian officials have stated is based on indigenous design, is currently moving from the basic design phase to the detailed design phase. Iranian officials have further stated that Iran had tried unsuccessfully on several occasions to acquire from abroad a research reactor suitable for medical and industrial isotope production and for R&D to replace the old research reactor in Tehran. Iranian officials had concluded, therefore, that the only alternative was a heavy water reactor, which could use the UO<sub>2</sub> produced in UCF and the Zirconium Production Plant in Esfahan. According to the Iranian authorities, to meet the isotope production requirements, such a reactor should have a neutron flux of 10<sup>13</sup> to 10<sup>14</sup> n/cm<sup>2</sup>/s, which would require power on the order of 30–40 MW(th) when using natural UO<sub>2</sub> fuel.

45. The Agency was provided on 4 August 2003 with an updated DIQ, which is currently being reviewed. The DIQ does not contain any references to hot cells, contrary to what would be expected



given the radioisotope production purposes of the facility. Iran has been asked to look into this matter further, particularly in light of recent open source accounts of alleged efforts by Iran to import remote manipulators and windows that would be suitable for use in hot cells.

46. In its 19 August 2003 letter, the AEOI provided information on the heavy water reactor programme, stating that a decision to start the R&D had been taken in the early 1980s. It further stated that, in the mid-1980s, laboratory scale experiments to produce heavy water had been conducted in the Esfahan Nuclear Technology Centre, and that a decision to construct a heavy water reactor had been taken in the mid-1990s. The letter provided additional information on the amount of heavy water initially needed for the IR-40, and on the design capacity of the heavy water production plant under construction at Khondab near Arak. According to the information provided in the letter, Iran plans to start the production of heavy water next year.

## **D. Findings, Assessments and Next Steps**

47. In connection with the nuclear material imported by Iran in 1991, Iran has submitted ICRs, PILs and MBRs, as well as relevant DIQs. The Agency has verified nuclear material presented to it and is currently auditing relevant source data. The issue of depleted uranium in the UF<sub>4</sub> remains to be resolved, and the environmental samples taken in connection with the UF<sub>6</sub> cylinders need to be analysed. To confirm that the pellet irradiation experiments have been solely for radioisotope production, the Agency has taken samples from the hot cells and lead shielded cells at the laboratories of the Tehran Nuclear Research Centre. The analytical results are not yet available.

48. In its letter of 19 August 2003, Iran acknowledged that it had carried out uranium conversion experiments in the early 1990s, experiments that Iran should have reported in accordance with its obligations under the Safeguards Agreement. Iran has stated, however, that it is taking corrective action in that regard. The Agency will continue its evaluation of the uranium conversion programme.

49. As regards enrichment, and as mentioned earlier, during the meeting of 9–12 August 2003, the Agency team received new information about the chronology and details of Iran's centrifuge enrichment programme. Agency evaluation of the new information will require, inter alia, an assessment of the various phases of the programme and analysis of environmental samples taken at the Kalaye Electric Company workshop.

50. Additional work is also required to enable the Agency to arrive at conclusions about Iran's statements that there have been no uranium enrichment activities in Iran involving nuclear material. The Agency intends to continue its assessment of the Iranian statement that the high enriched uranium particles identified in samples taken at Natanz could be attributable to contamination from imported components. As agreed to by Iran, this process will involve discussions in Iran with Iranian officials and staff involved in the R&D efforts and visits by Agency inspectors and enrichment technology experts to facilities and other relevant locations. In that connection, Iran has agreed to provide the Agency with all information about the centrifuge components and other contaminated equipment it obtained from abroad, including their origin and the locations where they have been stored and used in Iran, as well as access to those locations so that the Agency may take environmental samples. It is also essential that the Agency receive information from Member States either from which nuclear related equipment or other assistance relevant to the development of Iran's nuclear programme has been exported to Iran, or which have information on such assistance.

51. In connection with the Agency's investigation of Iran's heavy water reactor programme, the Agency is currently evaluating design information provided on the heavy water reactor.

52. Since the last report was issued, Iran has demonstrated an increased degree of co-operation in relation to the amount and detail of information provided to the Agency and in allowing access requested by the Agency to additional locations and the taking of associated environmental samples. The decision by Iran to start the negotiations with the Agency for the conclusion of an Additional Protocol is also a positive step. However, it should be noted that information and access were at times slow in coming and incremental, and that, as noted above, some of the information was in contrast to that previously provided by Iran. In addition, as also noted above, there remain a number of important outstanding issues, particularly with regard to Iran's enrichment programme, that require urgent resolution. Continued and accelerated co-operation and full transparency on the part of Iran are essential for the Agency to be in a position to provide at an early date the assurances required by Member States.

53. The Director General will inform the Board of additional developments for its further consideration at the November meeting of the Board, or earlier, as appropriate.