

MISSION IRAQ

(Film Script)

1. **Film:** Multiple shots of destroyed buildings in Al-Atheer. Inspectors at the site.

Narration: Summer 1992. This is what remains of the secret weapons research centre at Al-Atheer in Iraq. It had to be dismantled as part of a clandestine nuclear programme uncovered by inspection teams from the International Atomic Energy Agency.

Freeze of previous shots to the title

Title: MISSION IRAQ

2. **Film:** (CNN archive footage) Jets taxiing along the airstrip. Jets taking off from the air field. Aerial view of Ash-Sharqat. Meeting of UN Security Council. Outside view of IAEA building.

Narration: After the Gulf War the Iraqi nuclear capability was believed to have been largely destroyed. The destruction was real but the programme turned out to be bigger and more complex than anticipated. The UN Security Council decided in April 1991 to give the IAEA far-reaching powers to map, neutralize and prevent the restart of Iraq's military nuclear programme. The IAEA, assisted by the UN Special Commission on Iraq, started the inspections.

3. **Film:** Dr. Hans Blix, Director General IAEA, in his office.

Dr. Hans Blix: "The International Atomic Energy Agency has a vast experience in verifying nuclear activities. This experience has been accumulated over the years by its own safeguards inspectors, its laboratories and through its links with Member States. The case of Iraq presented new challenges. The Security Council asked the IAEA to uncover, map and neutralize an extensive secret nuclear programme aimed at the development of weapons. This programme was largely unknown even to the intelligence community. The task was accomplished by IAEA teams which made use of exceptionally far-reaching inspection powers granted in connection with the cease-fire resolutions and accepted by Iraq."

4. **Film:** Briefing room for the Action Team. A team sits around the table, Prof. Zifferero in the centre. Close-up, he says "in a location which is a few miles south of Baghdad..."

Narration: In order to carry out the mandate of the Security Council an Iraq Action Team was swiftly set up at the Agency, headed by Professor Maurizio Zifferero.

5. **Film:** Inspectors boarding a UN plane in Bahrain. In the cockpit. Team seated in the cabin/cargo bay. Close-ups of team members. A shot through the porthole.

Narration: Iraq was at that time an uncharted territory and inspections went via uncharted routes, flying UN cargo planes from Bahrain. Inspection teams were mostly drawn from the experienced staff of the IAEA Department of Safeguards. Experts were also seconded by Member States.

6. **Film:** Shots of Baghdad streets. Map of Iraq.

Narration: All teams finally landed in Baghdad. This capital was quite a lively city even though international sanctions were in force. It turned out in the course of the inspections that a vast portion of national wealth had been drained into a military nuclear programme. This clandestine programme cost billions of dollars and was spread all over the country.

7. **Film:** Dissolve of the previous shot into the map of Iraq with major facilities of nuclear weapons programme. Tuwaitha blinks on the map. Driving through a tunnel into the inner area. General view from the earth wall. Zoom-in into destroyed reactor.

Narration: The initial destination was Tuwaitha, the national nuclear research centre south of Baghdad. It was at the heart of a well-guarded military complex. The research centre itself was surrounded by an earth wall 30m high. Tuwaitha was a military target in the Gulf War.

8. **Film:** Installing the IMMARSAT, inspectors inside, D. Perricos on the telephone.

Narration: One of the remaining administrative buildings was used as a field office for the teams. A permanent satellite link provided instant communication with headquarters in New York and Vienna. The field office was an assembly point for the inspection team to go out and come back with their findings.

9. **Film:** A view of the solitary front wall of Tammuz-2 reactor.

Narration: Two reactors were at the heart of Tuwaitha. This is the skeleton of the Tammuz-2.

10. **Film:** A view of IRT-5000 reactor.

Narration: This is what remains of IRT-5000 research reactor.

11. **Film:** Inspectors in white overalls taking measurements atop the destroyed reactor.

Narration: The core of the reactor and the storage of the irradiated fuel survived the bombing. Fuel assemblies were checked, measured and accounted for as part of preparations for future transportation out of the country.

12. **Film:** Outside view of the bombed radiochemistry laboratory. Group of inspectors walks in. Shots of hot cells with cables and mechanical arms cut off.

Narration: Within walking distance from the reactor are the ruins of the radiochemical laboratory. Here separation experiments took place to produce a few grams of plutonium. Even though the quantity was minute it was in violation of their non-proliferation commitments.

13. **Film:** Prof. Zifferero in his office.

Prof. Zifferero: "The obvious violation was that they were working to the development of a nuclear weapon. This is the violation of the NPT pledges. But there have been also violations to the safeguards agreement they had with the Agency. According to the safeguards agreement, they should have reported first of all their activities on enrichment and second, some of the laboratory experiments for plutonium preparation which involved also the manufacturing of fuel elements to be irradiated in the reactor.

14. **Film:** Out in the field where fuel elements are kept in makeshift pits. Location B activities.

Narration: Highly enriched uranium like that contained in fuel from their research reactors is a potential nuclear weapon material. Part of the fuel from the destroyed reactors was moved at the height of the bombing to makeshift storage in a farmland nearby. The location of the material was communicated to the team by the Iraqi authorities, the amount was verified and placed under the Agency's custody. Later on, in preparation for future transportation out of the country the fuel was transferred to a safer and cleaner storage. Working conditions at Location B, as this place is called, provided a tough challenge for radiation protection people but there was no over-exposure. As attractive as this material might have been to divert for weapons purposes as a short-cut it remained under the IAEA safeguards before and indeed after the war.

15. **Film:** A map of Iraq. Tarmiya blinks. Dissolve to views of calutron hall in Tarmiya.

Narration: Tarmiya, a site about 60km north of Baghdad. Early in 1991 IAEA inspectors, aided by intelligence tips, found clues to Iraq's hidden programme. In Tarmiya they found high-voltage power lines. Ventilation equipment but no machinery. The electrical cables had been cut off and it was clear that some huge machines had recently been removed.

16. **Film:** Prof. Zifferero in his office. As he speaks scenes of 2nd inspection are edited in (inspector's' footage).

Prof. Zifferero: "It is possible that the Iraqis thought that they were able to hide this clandestine programme from us. At the beginning they, for instance, had moved from their original location large quantities of equipment which had been hidden in remote locations in the desert in the hope that if this equipment was not found and identified the chances to hide the programme were very high."

17. **Film:** Inspectors, footage of 2nd inspection. David Kay talking to a group of Iraqi officers at Faluja. Still photos.

David Kay: "We arrived on time at this site, delivered the designation and requested that there be no equipment moved from this site. We put two people up onto the tower with photographic equipment and still photography; 15 minutes after they reached the tower vehicles exited the camp through the rear entrance."

18. **Film:** Different views of calutron parts in the junk yard. Inspectors studying the machinery.
- Narration:** Under pressure Iraq had to reveal this part of their nuclear programme. It came to surface during the 2nd inspection in June 1991. The contents of these crates are now stored in a field near Tuwaitha and belong to technology called EMIS, or electromagnetic isotope separation, a technique used to enrich uranium to weapons grade. These machines called calutrons were first developed in the early 40s and this technology was used in the US Manhattan Project. Their resurrection by Iraq came as a surprise to nuclear experts.
19. **Film:** Prof. Zifferero against the background of calutron building in Tarmiya.
- Prof. Zifferero:** "It was certainly a totally obsolete method, that had been abandoned in the late 40s in the Western world. I think that it was chosen because it was rather simple, was described in open literature, it didn't call for high sophistication in technology, it was in other words, compatible with the Iraqi industry."
20. **Film:** A shot of a large electromagnet is dissolved into animated sequence of calutron operation.
- Narration:** The power-hungry calutrons are considered to be a very inefficient method for uranium enrichment.
- Animation begins:** To enrich uranium the calutron uses magnetic fields produced by giant magnets. A beam of ionized uranium molecules shoots through a uniform magnetic field in a vacuum chamber. The ions follow curved trajectories. Ideally, molecules containing the lighter U-235 isotope would arrive at a different point from the heavier U-238 isotope. The separated U-235 isotope can be used as fissile material in a nuclear bomb.
21. **Film:** Archive Iraqi video shots of calutrons being installed in Tarmiya.
- Narration:** This is an Iraqi archive video of a calutron production line in Tarmiya. Iraq was test-operating calutrons and working towards installing a total of 70 machines. A typical machine might weigh several tens of tons, cost a million dollars and separate several hundred miligram of U-235 each day.
22. **Film:** Previous archive shots are dissolved into calutron parts in the junk-yard. A die for casting being cut by electric welding. Mechanical destruction of infrastructure in Tarmiya, followed by an explosion.
- Narration:** None of this EMIS equipment remains in operation today. It was either destroyed or rendered harmless under the supervision of the inspection teams. Other activities in Tarmiya were the destruction of the power distribution system and the demolition of all process buildings.

23. **Film:** Map of Iraq. Ash-Sharqat highlighted. Dissolve to aerial view of the facility. Shots of bombed building. Team leaving the helicopter. Rich addressing the team.

Narration: Ash-Sharqat, 200 km northwest of Baghdad. Deep in the desert Iraq was building a duplicate of the Tarmiya facility. It was still under construction when it was bombed.

Rich Hooper addresses the team: "These buildings, as you can see, were badly damaged during the war and had been further damaged by Iraqis through salvage operations. So the place is dangerous."

24. **Film:** Rich Hooper in his office, explains about Ash-Sharqat, its place in overall programme, clarifies why the buildings there were dismantled.

Rich Hooper: "The Ash-Sharqat EMIS site was first visited by an IAEA inspection team in July 1991. At the time of that visit the site had not yet been declared but it was soon thereafter. This site and the other facilities built there is an exact duplicate of EMIS facilities at Tarmiya. The actions taken at Tarmiya to destroy process buildings, to dismantle infrastructure and reduce the electric power supply, those same actions were taken in Ash-Sharqat even though the facility was not as far along, but the actions were intended to render this site harmless for that use."

25. **Film:** Power lines. Switchboxes in desert at Ash-Sharqat. Centrifuge parts in "exhibition area" near Tuwaitha.

Narration: The calutrons required a huge amount of electric power, that's why they have been called the dinosaurs of the nuclear age. However, Iraq's secret enrichment programme had other options. They were also interested in more efficient ways of enrichment - centrifuges. A gas centrifuge is a high technology, compact machine. These component parts of gas centrifuges manufactured outside of Iraq belong to the anatomy of the nuclear weapons programme arrested in mid-course.

26. **Film:** Animated sequence of centrifuge operation.

Narration (animation begins): A gas centrifuge is composed of a casing that contains the rotating part or rotor. Uranium input in the form of gaseous compound is fed into the rotor where it is separated by centrifugal forces into two streams. One is slightly depleted and another is slightly enriched in the U-235 isotope. The desired enrichment is achieved by connecting a large number of centrifuges in a series.

27. **Film:** Rich Hooper in his office.

Rich Hooper: "Well, the Iraqi experimental centrifuge programme was developing very rapidly at the time of the Gulf war. They had not yet developed and deployed the capability to manufacture centrifuge components themselves. The piece that I have in front of me is a centrifuge rotor made from carbon fibre with maraging steel end caps. This piece was part of one of two experimental units that Iraqis were working with: one for mechanical test, one for separation test involving UF6 gas."

28. **Film:** A casing is crashed under press. Centrifuge components put into a box.

Narration: In the inspection process all of the centrifuge components were physically destroyed. Some samples were taken out of the country for further analysis.

29. **Film:** Rows of barrels in a depot. One is opened and sample is being taken by an IAEA inspector.

Narration: In addition to its own production Iraq imported hundreds of tons of yellow-cake. Yellow-cake is a uranium concentrate which can be purified and converted into feed material for enrichment. Inspection teams took samples of yellow-cake for analysis to determine its chemical composition. These stocks were inventoried and kept under control.

30. **Film:** Barrels with chemicals, destroyed building, unexploded bomb, a thirsty inspector drinking water, thermometer showing 55 degrees Celcius, a meeting.

Narration: When in the field inspection teams had to work under extreme conditions. Ability to handle radiation risks in makeshift conditions was an essential requirement. They faced the dangers from buildings that were reduced to ruins and had to beware of unexploded ordnance. Summer temperatures reached 55 degrees Celcius. They also had to watch their step in the field and be experienced diplomats at the negotiating table.

Prof. Zifferero: "I hope that I conveyed through the Iraqi mission how important it is to remove this stumbling block for the Agency..."

31. **Film:** A meeting in Tuwaitha. A meeting in Al-Qa-Qaa.

Narration: Through investigation and analysis the Agency accumulated a considerable body of evidence about the intended purpose of Iraq's nuclear programme. This information was confirmed during the 6th inspection in Summer 1991.

32. **Film:** (inspectors' footage) Inspection team in Design Centre, taking the documents. Documents in boxes. Activities around "Design Centre". Cars blocking the exit.

Narration: On September 23, the 6th inspection team seized documents related to a programme code-named Petrochemical-3 or PC-3 for short. The team obtained conclusive evidence that Iraq was developing a nuclear weapon. The documents were loaded onto vehicles but then in the middle of the day Iraqi officials blocked the inspection process. In violation of inspection team rights they prevented the vehicles with the documents from leaving the premises. In the evening they started to carry the documents away.

Voice: "Flash Vienna: Iraqis are forcibly removing the documents.

Narration: However, by that time inspectors had already managed to spirit away the most important papers. After about seven hours the documents were returned. There were very strong doubts as to whether all of them were handed back.

33. **Film:** Three multi-storey buildings as seen from the Sheraton. Zoom-in on PC-3 buildings. Activities in PC-3 area.

Narration: The next day this building set the scene for another confrontation. This location was identified as the headquarters for the secret PC-3 project. The team obtained documents that showed the real size and depth of Iraq's weapons programmes, in particular budget and personnel records. They also photographed many documents but were again prevented from leaving the location:

Dr. Jaffar: "Well, I'm afraid in that case you have to stay until you turn over your films".

David Kay: "A group of inspectors that turns over as films are seized from it will be another body blow at it. No, we'll stand here, we will sit here, we will stay here until we have the right to leave".

34. **Film:** Scenes of inspectors in the parking lot. Birthday party.

Voices: "Happy birthday, Samy".

Narration: And the team stood their ground in what went down into the history of inspections as the parking lot detention. The group was under siege but the morale was high.

Samir Morsy: (recollecting this episode) "Yes, I remember that day very well actually. The team had to choose between leaving the parking lot without the documents or staying in the parking lot with the documents. We also realized that it will take a few days to solve that problem since this would involve discussions at the Security Council and discussions among the parties concerned. In order to keep the morale of the team high we organized a camp. Everybody was busy doing some kind of activities, for example, jogging, playing chess, playing football, we even created a library and we conducted some Arabic lessons. By the end of the fourth day everybody left in top psychological and physical condition."

35. **Film:** The inside of the room. Rows of metal boxes. Bob walks into the room. He pulls a drawer.

Narration: The documents found during the 6th inspection were taken to the IAEA headquarters in Vienna and stored in a special room in the Department of Safeguards. The room has a separate locking and surveillance system. The large cache of documents containing more than 50,000 pages is held in repositories along with photographs and other evidence.

36. **Film:** Bob Kelley in the documents' room. He opens a document.

Bob Kelley: "This is an example of a top secret Iraqi document. This is a progress report covering progress in the nuclear weapons programme in the 1990 time frame. This was recognized immediately as one of the most important documents. It was translated immediately and has proven to be invaluable in documenting the state of the nuclear weapons programme at the Al-Atheer project."

37. **Film:** Map of Iraq. Al-Atheer highlighted. Dissolve to a view of Al-Atheer.

Narration: Al-Atheer, located about 70 km south-west of Baghdad. The documents confiscated during the sixth inspection cast new light on this facility, leaving no doubt about the direction of Iraq's clandestine programme.

38. **Film:** Bob Kelley in his Office. As he speaks views of Al-Atheer are edited in. Inside the bunker.

Bob Kelley: "Out there was a partially completed nuclear weapons laboratory. It was quite clear from the buildings and the way they were arranged. There were several large buildings that were configured to handle large amounts of radioactive materials - hundreds of kilograms. That was quite clear from the way that the buildings were designed and laid out. In addition, on the same site, in the same area, a few hundred metres away, were some extensive high explosive capabilities. In particular a large bunker which was designed to contain people and instruments as part of weapons development. The juxtaposition of those radioactive material handling facilities next to the high-explosive facilities was very very clearly for a nuclear weapons programme."

39. **Film:** Animated sequences against the background of a still photo representing explosion of a nuclear bomb.

Narration (animation begins): There are two types of nuclear fission bomb. The simplest is the gun-type device. The two sub-critical pieces of enriched uranium are placed at either end of a reinforced barrel. Explosives push together uranium pieces into super-critical mass and a nuclear reaction follows. A more complicated type is the implosion device. A single sub-critical mass of uranium (or plutonium) is placed inside the sphere of high-explosives. On detonation of the explosives the uranium (or plutonium) is compressed into a super-critical mass, triggering a nuclear reaction. Iraq never admitted that the goal was a nuclear bomb but there is convincing evidence that they were working on an implosion type weapon.

40. **Film:** A shot from the earth wall in Tuwaitha; camera zooms out of a burnt book into destroyed buildings.

Narration: The Gulf War stopped the Iraqi nuclear programme dead in its tracks. How close were they to their goal?

41. **Film:** Prof. Zifferero in his office.

Prof. Zifferero: "We have to distinguish - because there are two problems to be solved. One is the availability of sufficient quantities of uranium, of enriched uranium for the bomb. And the second is to master the technology of bomb-making, and these are two different things. They were active on both sides. The time needed was probably of the order of a few years - two or three years. They were still two or three years away from the target."

42. **Film:** A pan of Al-Atheer. D. Perricos walking, pointing towards a building, flanked by inspectors. He speaks to Iraqis.

Narration: Al-Atheer facility was identified as the focal point for the so-called weaponization activities which means manufacturing enriched uranium into weapons.

D. Perricos: "What we want is whatever effort on the ground you can co-ordinate. But it is to the advantage if we be able to go out and say that out of the 8 buildings that were designated one is out, the second, the very big one is out, the third one is out and the fourth is about to be destroyed."

43. **Film:** Different sequences representing preparations for destruction by explosives. Filling the bunker with concrete. Laying charges. Explosions.

Narration: Around a dozen of the one hundred or so buildings in Al-Atheer were earmarked for destruction.

Live sound: drilling holes for laying charges: The Iraqi side gave full co-operation in this difficult task and provided all the necessary equipment and manpower. However, they argued against detonating any part of Al-Atheer saying it was only a research facility. These claims were contradicted by the obvious direction of their programme and the destruction plan was carried out. The two test bunkers were rendered harmless: one by cutting to pieces and another by plugging it with concrete and scrap metal. More than 350 cubic metres of concrete were needed. Other process buildings and laboratories were demolished by explosives. More than 8 tons of explosives were used in Al-Atheer. Up to one thousand Iraqi workers participated in the operation carried out under the Agency's supervision. Countdown followed by explosions.

44. **Film:** Inspecting destroyed presses, furnaces. Olli Heinonen in his office. As he speaks, pictures of equipment are edited in.

Narration: Iraq's secret facilities had a varied and expensive stock of machines and equipment, which were subject to scrutiny by inspection teams. Thousands of pieces of equipment scattered all over Iraq were investigated and their true purpose revealed.

First part of Olli Heinonen's statement: "Some of the equipment is single use equipment which means that it has only nuclear applications. Examples of such equipment are hot cells with manipulators or gas centrifuges."

Narration: No single use equipment is left, it was all destroyed in the inspection process.

Second part of Olli's statement: "Dual use equipment has applications in other areas of industry. Examples of such equipment are high-temperature vacuum furnaces, high-precision CNC machine tools or high strength aluminium alloys. It is important for the Agency's long-term monitoring plan to have a full inventory of such equipment in Iraq."

45. **Film:** Prof. Zifferero with an inspection team in Tarmiya.

Narration: The IAEA mandate was to uncover Iraq's clandestine nuclear programme, render it harmless and prevent its restart. How successful was the Agency in achieving these goals?

46. **Film:** Prof. Zifferero in Sheraton Hotel overlooking Baghdad.

Prof. Zifferero: "I think that we have identified what had to be identified. We have destroyed what we were requested to destroy. Now we have to implement the prevention. The long-term monitoring plan is meant for that."

47. **Film:** Exhibition in Tuwaitha. Shot of a meeting.

Narration: Under Security Council resolutions Iraq may continue peaceful applications of nuclear science in agriculture, industry and medicine. An exhibition in Tuwaitha with some insights into legitimate applications. However, people who now carry out peaceful activities may be recognized as the ones behind the old nuclear programme. The knowledge and experience gained in the military programme cannot be erased. That's why the activities are to be monitored over a long period.

48. **Film:** Sequence of shots during water sampling.

Narration: Long-term monitoring is a package of many measures. One such measure is a waterway survey programme. Selected spots on all main rivers are monitored through water sampling. This technique is sensitive enough to detect very small quantities of radioactive isotopes and other chemicals used in the nuclear industry. The waterway survey programme includes periodic visits to sample water bodies of Iraq - lakes and rivers. The baseline results show no evidence of an unknown nuclear facility operating in Iraq in the recent past.

49. **Film:** Outside view of Seibersdorf laboratories. Inside a laboratory.

Narration: IAEA Laboratories at Seibersdorf near Vienna. Samples from Iraq were analyzed and evaluated here.

50. **Film:** P. Danesi explains the role of Seibersdorf. As he speaks laboratory scenes are edited in.

P. Danesi: "Well, this has been actually a unique experience for us because for the first time in the history of the laboratory two components of the Seibersdorf labs - the safeguards analytical laboratory and the chemistry unit which was involved in the environmental analysis - they were together for a common purpose on a single specific problem."

"More than 1000 samples were analysed here: some were environmental samples, some - nuclear material - in a co-ordinated effort."

51. **Film:** IAEA exterior. Shots of the General Conference.

Narration: In eliminating Iraq's secret nuclear weapons programme the international teams faced up to many challenges. The support of Member States was essential in conducting the inspections. The IAEA has gained new experience and knowledge.

52. **Film:** Dr Hans Blix, Director General, IAEA, in his office.

Dr. Hans Blix: "The major lesson we learnt from the case of Iraq was that the safeguards verification system, though basically sound, would have to be further strengthened in order to detect possible non-declared nuclear installations or material. An important step taken by the Board of Governors of the IAEA was to reaffirm the right of the Agency to conduct special inspections at undeclared sites. I am convinced that a strengthened safeguards system will increase confidence in non-proliferation commitments."

53. **Film:** A crane hoists a fuel assembly from a storage pool in IRT-5000. A view of the reactor. Zoom-in onto container. A convoy starts to move, views of convoy on the road. Scenes of loading into the cargo bay of the plane. Plane taxis on the runway. The last frame frozen at the point of take-off.

Narration: Highly enriched fuel in a reactor storage pool in Tuwaitha. This material could be diverted to weapons purposes. To end Iraq's possession of weapon grade material, the Agency adopted a plan to have it removed. Iraq bought part of that fuel several years ago from the former Soviet union and now it is going back to the country of its origin. Russia's MINATOM won the contract to have it transported and reprocessed. An American subcontractor provided the equipment. In the first leg of the long journey to Russia containers loaded with fuel had to be trucked down to Habaniya airport about 90 km from Tuwaitha. This was not the only shipment of fuel. In a relatively simple operation completed two years before the fresh fuel had been removed from Iraq to a storage in Russia. Habaniya airport near Baghdad. The second largest cargo plane in the world, Antonov-124, was used to transport the irradiated fuel. The containers were designed and constructed to make sure that even in the event of a crash there would be no radiation leakage. About 40 kg of weapon grade uranium were removed from Iraq. The irradiated fuel was encased in almost 200 tons of protection structures. This cargo was transported in two shipments during the operation that lasted several months.

The first phase of the mission in Iraq has been accomplished. Lessons have been learnt. The challenge for the future is to establish a comprehensive, credible, and sustainable monitoring regime.

FILM ENDS

List of Captions

Dr. Hans Blix, Director General, IAEA

Prof. Maurizio Zifferero, Leader, Action Team

Richard Hooper, Chief Inspector, Action Team

Jaffar Dhia Jaffar, Iraqi Atomic Energy Commission

David Kay, Chief Inspector, 6th Inspection

Samir Morsy, Department of Safeguards, IAEA

Robert Kelley, Deputy Leader, Action Team

Demetrius Perricos, Deputy Leader, Action Team

Olli Heinonen, Department of Safeguards, IAEA

Pier R. Danesi, Director, IAEA Seibersdorf Laboratory