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UNITED NATIONS MONITORING, VERIFICATION AND INSPECTION COMMISSION
(UNMOVIC)

Compendium of Iraq's Proscribed Weapons Programmes in the Chemical, Biological and Missile areas

June 2007

FOREWORD

The Compendium presents an account of Iraq's weapons of mass destruction (WMD) programmes, with the exception of the nuclear programme, as known to UN inspectors. A summary of the Compendium was published as a Security Council document in June 2006 (S/2006/420 of 21 June 2006). Iraq's WMD programmes contain many specific aspects, which are proliferation sensitive. As a result many technical details regarding individual programmes have either been removed or generalized in order to avoid such proliferation concerns. Throughout the Compendium text there are many references to documents, inspection reports or interview testimonies. Information in these references was used, in part, to develop an understanding of Iraq's past WMD programmes. Most of these references are not available in the public domain: they are internal documents supplied by Iraq such as various declarations and the documents from the Haidar Farm in 1995, as well as information contained in inspection reports.

The document contains both what Iraq declared as well as many assessments, comments and judgments made by UN inspectors and these are italicized in the comment boxes. Some considerable effort has been made to address issues that have been regarded as controversial and to include judgments and comments on these areas. The Compendium also contains instances where the thought processes of inspectors have been highlighted or the methodology employed for a certain activity has been detailed. This has been deliberately included for the benefit of readers and to allow for more transparency in the way the Compendium has been compiled.

References to the Currently Accurate, Full and Complete Declaration (CAFCD) of December 2002 throughout the Compendium does not mean that it was the most important of the documents that Iraq declared to the UN. It is rather cited more frequently than other documents since it was the last major declaration supplied by Iraq to UNMOVIC on its proscribed weapons programmes. In addition, information cited to a specific UN inspection report does not mean that it was the first time to be reported by the UN or declared by Iraq. Therefore, references are not intended to be comprehensive and are not cited based on the time-order of declaration or findings.

The Compendium is a long document structured with individual chapters in a manner that makes it as readable as possible. The three large chapters relating to Iraq's chemical, missile and biological weapons programmes are not structured in an identical manner. For example, Iraq's chemical weapons programme is more easily understood when examining the programme agent by agent; Iraq's missile programmes are best understood by examining the liquid propulsion and solid propulsion engine programmes separately and Iraq's biological weapons programme is most easily followed through time-lines as it moved from facility to facility. This approach also allows those who have a specific interest, for example, in Iraq's missile programmes, to follow the developments through time rather than describing all of the programmes as they developed simultaneously over time. However, for consistency, in all of the three weapons disciplines covered, events are described before and after the year 1991, which is used as a watershed.

There are many aspects of Iraq's WMD programmes, which may be unclear to a reader unfamiliar with Iraq. For example, the same facilities are referred to by several different names and this generally represents the evolution of the facility over time. For instance, Iraq's main chemical warfare agent production facility is referred to as the Samarra site, Project 922, the State Establishment for Pesticide Production (SEPP), the Muthanna State Establishment (MSE) and Muthanna. To some degree all of these terms are interchangeable. Besides the names of facilities changing over time, in Iraq there are sometimes several facilities with the same name and therefore this can be a source of confusion. For example, there is one Al Kindi facility dealing with missile research located near Mosul in the country's north; and another Al Kindi establishment for the production of veterinary vaccines located in western Baghdad. In addition, when the Arabic language is translated into English, there is no common spelling as the translations are often phonetically based.

The Lessons Learned chapter of this Compendium represents the views of the inspectors themselves and is deliberately presented in a bold and honest way highlighting at times the difficulties faced by inspectors and many of the strengths and weaknesses of the inspection system. No attempt has been made to shy away from the mistakes and difficulties encountered: in this way by highlighting these issues, it seems the best chance that this document will prove beneficial should another UN verification system become operational in the future.

Thanks go to the College of Commissioners for encouraging, advising and supporting UNMOVIC on the compilation of this Compendium.

The work on the Compendium has been a long and arduous process that started in late 2004. The Compendium represents very much a team effort by UNMOVIC staff in the Analysis and Assessment Division and the Planning and Operations Division supported by UNMOVIC staff from the Public Information, Data Processing and Information Technology sections. The staff searched through enormous data bases, examined imagery from all sources including overhead, digital imagery and video recordings, examined inspections reports, Iraqi declarations and other documents provided by Iraq including interviews and correspondence. Special thanks are due to each one of the staff, past and present, for their dedication and efforts in finalizing this document. The coordinators of this project have been successful in putting all information together and finishing on time and deserve congratulations.

Finally I want to thank all the inspectors and support staff of UNMOVIC and its predecessor UNSCOM for the work they performed and their devotion to the mission serving the Security Council and using their expertise in unraveling successfully a very complicated picture related to Iraq's WMD programmes.

Demetrius Perricos
Acting Executive Chairman
27 June 2007

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Glossary of Terms

Spelling of Names, Places and Items used in the Compendium

FACILITIES/ORGANIZATIONS

Abdul Wahab Al-Niami - Iraqi Chemical Engineering Company
Abu Ghraib – area 20km west of Baghdad
Al Farez Plant – the weapon filling plant at SEPP/MSE
Al Fao General Establishment – construction company for Military Industrial Commission (MIC)
Al Hazen Ibn Al Haitham – facility near the town of Salman Pak
Al Rashad – chemical corps facility in northeastern Baghdad.
Al Saad - a construction Company later known as Al Fao
Al Qaa Qaa State Establishment – munitions and explosives complex
BMVC - Baghdad Monitoring and Verification Centre
BOMVIC - Baghdad Ongoing Monitoring, Verification and Inspection Centre
CDG - Chemical Destruction Group
DAP - Destruction Advisory Panel
Fallujah 1 – CW associated facilities
Fallujah 2– CW associated facilities
Fallujah 3– CW associated facilities
Haidar (chicken) farm – General Hussein Kamel's farm which was a storage site for documents relating to the proscribed programmes
Hutteen State Establishment – produced missile parts
Iskandariyah – location of the State Establishment for Mechanical Industries (SEMI)
MIC - Military Industrialization Commission of Iraq a division in the Ministry of Defense
MIMI - Ministry of Industry and Military Industrialization
MIM - Ministry of Industry and Minerals
MSE - Muthanna State Establishment (also refers to Project 922 and SEPP)
NSE - Nasr State Establishment, or Nasser Factory produced aerial bombs for MSE
NMD - National Monitoring Directorate, a division of MIC formed in 1991 to interact and facilitate the UN inspection operation and the implementation of Security Council resolutions.
Project 922 – The fist given name to the CW complex, also known as State Establishment for Pesticide Production (SEPP) and later called Al Muthanna State Establishment (MSE)
Salah al Din –missile related facility; also name used for R&D complex at Muthanna
Samarra – city northwest of Baghdad, close to CW production areas.
SEHEE - State Establishment for Heavy Engineering Equipment
SEPP - State Establishment for Pesticide Production, a name used for CW complex that was later called Al Muthanna State Establishment (MSE)
SEMI - State Establishment for Mechanical Industries
SOTI - State Organization for Technical Industries

SORGI - State Organization for Oil Refineries and Gas Industry
STRC - Scientific and Technical Research Centre
TRC - Technical Research Centre involved in CBW research
TSMID - Technical and Scientific Materials Importation Division

CHEMICAL TERMS

Chemical precursors
Dicyclohexylcarbodiimide (DCC)
Diethylethylphosphonate (DEEP) [$C_2H_5P(O)(OC_2H_5)_2$]
Diisopropylaminoethanol (Iraqi choline)
Diisopropylfluorophosphonate (DFP)
Dimethylamine hydrochloride (DMA.HCl)
Dimethylmethylphosphonate (DMMP)
Dimethylphosphite (DMPH) [$(MeO)_2POH$]
Dimethylphosphoramidic dichloride (D4) [$(CH_3)_2NP(O)(Cl_2)$]
Ethyl alcohol EtOH (C_2H_5OH)
Ethylmethylphosphonylchlorothionate
Methylphosphonyldichloride (MPC) [$CH_3P(O)Cl_2$]
Methylphosphonyldichlorothionite (MPS)
Methylphosphonyldifluoride (MPF) [$CH_3P(O)F_2$]
Monofluoromethylphosphonic acid – by product in MPF production
Methylphosphonylchlorofluoride (MPCF)
Phosphorus Oxychloride – ($POCl_3$)
Phosphorus pentasulfide (P_2S_5)
Phosphorus trichloride – (PCl_3)
Pyrophosphate
RTF = a mixture of MPF + MPC + small quantities of MPCF
Sodium Cyanide - (NaCN)
Sulphur chloride (S_2Cl_2)
Sulphur trioxide (SO_3)
Thiodiglycol (TDG)
Thionylchloride - $SOCl_2$
Trimethylphosphite (TMP).

Chemical Agents
Adamsite
BZ - 3-quinuclidinyl benzilate
CN - Chloracetophenone $C_8H_{13}ClO$
CS - O-chlorobenzyl-malononitrile
Cyclosarin (GF) - O-cyclohexyl methylphosphonofluoridate
Nitrogen mustard - (tris(2-chloroethyl)amine)
Sarin (GB) - O-isopropyl methylphosphonofluoridate
Sulphur mustard - bis(2-chloroethyl)sulfide
Tabun (GA) - O-ethyl N, N-dimethylphosphoramidocyanidate
VX - O-ethyl S-(2-diisopropylamino) ethyl methylphosphonothiolate

Chemical Associated Facilities

A plus B plant – plant to produce PCL_3 and $POCl_3$
Al Mamun plant – located at Fallujah 2 to produce $SOCl_2$
Al Tahadi plant – designed for the production of pyrophosphate
Bin Hayan 1 after 1987 - Mustard plant (P-8 plant)
Bin Hayan 2 after 1987 - Malik multipurpose plant
Bin Hayan 3 after 1987 - Dhia plant
DMPH plant – Added to Ahmed 3 to produce DMPH from PCl_3
Mutassim 1 after 1987 - Heberger 1, Heberger 2 and Heberger 3 pilot plants
Mutassim 2 after 1987 - Multipurpose precursor plants (Ahmed 1; Ahmed 2; Ahmed 3)
Mutassim 3 after 1987 - Mohammed plant - D4, MPC, MPF and final CW agents
Mutassim 4 after 1987 - P7 plant (Tabun/Sarin production plant)
Project 1-75 - civil construction of the CW plant at SEPP
TMP plant – plant to produce trimethylphosphite

MISSILE TERMS

Ababil-50 – 50km range, multiple tube surface-to-surface rocket system
Ababil-100 – Liquid – Iraqi programme to develop a 150 km range liquid propellant missile
Ababil-100 – Solid – Iraqi programme to develop a 150 km range, composite-solid propellant missile
Al Abbas - liquid propellant missile (SCUD derivative) with a range of 950kms
Al Abid – three stage missile designed as a space launch vehicle
Al Fatah - Iraqi programme to develop a 150 km range, composite-solid propellant missile in fact a continuation of Ababil 100 Solid programme. It was operational in 2003.
Al Hussein – liquid propellant missile (SCUD-B derivative) with a range of 650km
Al Rafidain – Iraqi programme for reverse engineering the SA-2 liquid propellant engine
Al Samoud – Iraqi programme to develop a 150 km range, 500 mm diameter, liquid propellant missile - in fact a continuation of Ababil 100 Liquid programme
Al Samoud-2 - Iraqi programme to develop a 150 km range, 760mm diameter, liquid propellant missile - in fact a continuation of Al Samoud 500mm programme. It was operational in 2003.
Al Tamooz – (Al Tamouz) Project for a two stage missile (SCUD plus SA-2) with a range goal of 2000kms (not developed)
APC- Ammonium perchlorate
BADR-2000 – Iraqi programme to develop a two stage, solid / liquid propellant ballistic missile
CEP – Circular Error Probable, the radius of a circle into which a missile will impact at least half of the time.
C-601– airborne, cruise anti ship missile derivation of the P15 Styx (NATO name)
C-611 – airborne, cruise anti ship missile derivation of the P15 Styx (NATO name)

Fahad 300/500 – Attempts of converting the SA-2 missile to a surface-to-surface purpose.
FROG-7 (NATO name)- 9K52 or Luna-M
G-1 – Iraqi programme for a ballistic liquid propellant missile based on SA-2 components
HTPB- Hydroxyl terminated polybutadiene
HY-2 – cruise anti ship missile, derivation of the P 15 - Styx (NATO name)
IRFNA - Inhibited Red Fuming Nitric Acid
P-15 –Styx (NATO name) cruise anti ship missile
Project 144- Name of industrial and scientific organization established for the modification of SCUD into Al Hussein, Al Abbas, and other Iraqi SCUD missiles derivatives)
Project 1728 – Name of industrial and scientific organization established for the production of SCUD, SA-2, HY-2 liquid propellant engines
SA-2 - "Guideline" (NATO)- S-75M or Volhov (Former Soviet Union) air defense missile system
SCUD-B (NATO name) –8K14 (Former Soviet Union) 300km range - ballistic missile
UDMH – Unsymmetrical dimethyl hydrazine

BIOLOGICAL TERMS

Aflatoxin – (Agent C) A toxin produced by fungi of the genus Aspergillus, which can cause lung and liver damage
Al Dora FMD Vaccine plant– Foot and Mouth Disease Vaccine plant, used for BW agent production
Al Fudaliyah – Agricultural and Water Resources Research facility
Al Hakam – Al Hakam factory - main production facility for biological warfare agents
Al Kindi - Company for the Production of Veterinary Vaccines and Drugs, before 1990 was called the Veterinary Research Laboratory (VRL).
Al Manal – another name for Al Dora FMD Vaccine plant when it was used for BW agent production
Al Taji – area north of Baghdad containing large Defence and petro-chemical complex
Al Safa'a – (Al Safah) another name for the Agricultural and Water Resources Research facility when it was used for BW agent production
Baby Milk Factory – located in Abu Ghraib west of Baghdad and targeted during the 1991 Gulf War
Bacillus anthracis – (Agent B) Causative agent of anthrax
Bacillus subtilis – a simulant for *Bacillus anthracis* used in weapons tests
Bacillus thuringiensis – bacteria used for bio-pesticide production (also can be used as a simulant for *Bacillus anthracis* in spray drying)
Clostridium botulinum – (Agent A) Causative agent of botulism
Clostridium perfringens – (Agent G) A causative agent of gas gangrene
FMD – Foot and Mouth Disease virus
Forensic Research Laboratory – the T-3 Department of the Technical Research Centre
Ibn Sina Centre – second Centre of the Al Hazen Ibn Al Haitham Institute
Project 324 – The name given to the Al Hakam site by MIC.

Project 85 – Also called PC-2 or Petro Chemical 2 in Latifiyah near Al Hakam.
Radwaniyah – Suspected dumpsite for BW bulk agents
Ricin – A toxin found in the bean of the castor plant, *Ricinus communis*.
Salman Pak – town south of Baghdad close to CBW research institute
SCP pilot plant– Single Cell Protein pilot plant at Al Taji used for botulinum toxin Production
Tilletia – (Agent D) A plant fungus, which causes wheat cover smut

MUNITIONS RELATED

AALD-250, aerial bomb 250 kg
AALD-500 aerial bomb 500 kg
Al Borak – indigenous 122mm artillery rocket
Al Muthanna-3 bomb - a modified AALD-250 aerial bomb
BM-21, Type of MLRS
BR-250 aerial bomb 250 kg
BR-500 aerial bomb 500 kg
BRIP-400 aerial bomb 400kg
CB-470 - cluster bomb 470 kg
CB-250 – cluster bomb 250 kg
CB-500 – cluster bomb 500 kg
C-24 – type of rocket
D-6000 – type of rocket
D-3000 – type of rocket
DB-0 – type of aerial bomb
DB-1 – type of aerial bomb
DB-2 – type of aerial bomb
ERFB-BT- Extended Range Full Bore Boat Tail – 155mm munition
Firos-25 rocket – 122mm artillery rocket
Firos-60 – artillery rocket
GHN-45 – artillery gun
G-5 - artillery gun
Jupiter 6 –munitions fuse
L-29 – jet trainer aircraft used as RPV (NATO name: Maya)
Luna S – is FROG-7 with cluster warhead
M110- smoke projectiles
MF-1000 – munitions fuse
MiG-21 – used for trials as an RPV
MiG-23 – aircraft's autopilot used in RPV experiment
Mirage F-1 – Fighter and attack aircraft used in drop tank experiment
MONICA – Munitions Opening and Neutralization and Identification of Chemical Agent
MLRS - Multiple launched rocket systems
Nasr-7 - aerial bomb
Nasr-250 - aerial bomb 250 kg
RPG-7- Rocket Propelled Grenade
R-400 - aerial bomb 400 kg

SAKR-18 - a 122mm artillery rocket 18 km range
SAKR-30 - a 122mm artillery rocket 30 km range
SAKR-80 - a modified artillery rocket
SAKR-100 - artillery rocket
SAKR-200 - artillery rocket
SDN-750 - aerial bomb 750 kg
SDN-500 - aerial bomb 500kg
SKS-360 - aerial bomb 360kg
SU-22 – Sukhoi-22 fighter-bomber used in R-400 bomb trials
82mm - mortar
120mm- mortar
122mm - mortar
107mm - rockets
130mm - artillery shells
155mm - artillery shells
UXO- Unexploded Ordnance

MUNITIONS TESTING SITES, STORAGE OR DESTRUCTION AREAS

Abu Obeydi Air base – site used for testing of BW related spray tank
Airfield 37 – storage area for R-400 bombs
Al Azzizziyah firing range – storage and destruction site for CBW munitions
Al Habaniyah – storage and testing area for CW munitions
Al Mansuriyah – storage site for Al Hussein warheads
Al Muhammadiyat – test site for CBW munitions
Al Nibai desert – destruction area north of Baghdad for SCUD missiles and munitions
Al Nihrawan – test site for first BW related weapons test
Al Rasheed Air base – used for testing of MiG-21 RPV.
Al Razaza – test site for chemical munitions
Al Ukhaider – storage for CW munitions
Al Walid Air base – storage site for R-400 bombs
Bahr Al Najaf – test site for CW munitions
Hader test site - test site for CW munitions
Jerf Al Sakhar – testing area for CBW munitions
Khan Bani Saad Air field – used for experiments with BW related spray device

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Compendium

Building a UN Verification Regime

CHAPTER I

BUILDING A UN VERIFICATION REGIME

Forming UNSCOM in 1991

The United Nations Special Commission (UNSCOM) was formed by the Secretary-General, in consultation with Council members, pursuant to Security Council resolution 687 (1991) adopted on 3 April 1991. Section C of that resolution adopted on 3 April 1991, called for the establishment of UNSCOM as a subsidiary body of the Council to carry out, inter alia, immediate on-site inspection of Iraq's biological, chemical and missile capabilities and to oversee their destruction. The Director General of the IAEA was tasked to conduct nuclear inspections with the assistance and cooperation of UNSCOM.

It was an unprecedented and challenging task since no international verification regimes comprising on-site inspection existed in 1991 in the areas of UNSCOM's mandate. The 1975 Biological Weapons Convention (Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction) does not provide for any system of inspection or verification. The text of the Chemical Weapons Convention (Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction) was still under negotiation at the Conference on Disarmament in Geneva, and even now, no international verification system exists in the missile area.

Thus, the mission given to UNSCOM by the Security Council included not only the organizational task of establishing a verification body in the chemical, biological and missile areas, but also the development of an inspection system capable of verifying Iraq's compliance with its obligations, as mandated by the Council. While there were no developed procedures for the conduct of international inspections in these areas, recourse was made to the limited but evolving experience in disarmament and arms control verification that existed at the national and international levels such as:

(a) Fact-finding missions initiated by the Secretary-General during the period 1984 to 1988 pursuant to the 1925 Geneva Protocol (Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare) to investigate the alleged use of chemical weapons in the Iran-Iraq war;

(b) On-site inspections under safeguards agreements pursuant to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) conducted by the IAEA in various countries, including Iraq. Although these were not disarmament verification inspections, they accumulated significant experience of on-site activities and led to the development of many inspection procedures;

(c) Agreements in the areas of chemical, biological and nuclear weapons and missiles related to confidence building, information exchange, arms reduction and comprising on-site visits and inspections. These resulted in the development of national procedures for inspections and visits to various types of facilities; and

(d) Mock challenge inspections and other inspection exercises conducted by some governments in preparation for the establishment of a chemical weapons convention.

The new organization was developed on the basis of what could be learned from the sources mentioned above and on what new capabilities would be necessary to meet the specific requirements of Security Council resolution 687 (1991). In its resolution 687, the Security Council defined prohibited items as not only chemical and biological weapons in a limited sense, but as stocks of agents, all related subsystems and components and all research, development, support and manufacturing facilities. As regards prohibited missiles, the definition covered all ballistic missiles with ranges over 150 km, all related major parts as well as repair and production facilities. The inspection authorities provided to UNSCOM were unprecedented as it came to address not only declared but also undeclared capabilities and locations in the field of biological and chemical weapons and missiles. Furthermore, UNSCOM had the obligation to designate additional locations for inspection by the IAEA (other than those declared by Iraq).

To assist in the formation of the Special Commission, the first cell of UNSCOM, consisting of a few staff from the UN secretariat (mainly from the Department for Disarmament Affairs), was set up immediately after the adoption of resolution 687, in April 1991. By May 1991, the Secretary-General appointed members of the Special Commission: appointments included Rolf Ekeus (Sweden) as the Executive Chairman and Robert L Gallucci (United States) as Deputy Executive Chairman and 19 members which included representatives from the other permanent members of the Security Council. The members of the Special Commission included diplomats and experts in the areas of arms control, disarmament and non-proliferation, some of whom later participated in inspections.

The report of the Secretary-General (S/22508) provided that under the Executive Chairman and Deputy Executive Chairman, the planning and operational direction of the functions should be carried out by a number of groups: biological and chemical weapons; ballistic missiles; nuclear weapons capabilities; future compliance; and operational support. The members of the Special Commission were so divided with responsibilities for the above groups.

One of UNSCOM's first tasks was to draft the text of an Exchange of Letters between the United Nations and the Government of Iraq on facilities, privileges and immunities to be granted to the inspectors while in Iraq on official duties. The Exchange of Letters was finally agreed between the United Nations and the Government of Iraq on 14 May 1991, and finalized on 18 May. It provided extensive rights for no-notice inspections related to

declared as well as to undeclared facilities. The Exchange of Letters provided, inter alia. for unrestricted freedom of movement into, out of and within Iraq of inspectors, equipment and means of transport, of inspector's access to any location in Iraq, of their right to receive, examine and copy records, and to photograph any item. Furthermore, the rights of inspectors included the right to conduct interviews, the right to choose sites for storage, destruction and to construct facilities for those purposes, the right to take aerial photographs, the right to take and analyze samples of any kind and to remove and export them for analysis, the right to unrestricted communications by radio, satellite and other means. The Exchange of Letters obliged Iraq to facilitate the execution of these rights and to ensure the safety and security of all personnel involved in UN inspection activities.

On 17 May 1991, following consultation between the Executive Chairman of UNSCOM and the Director General of the IAEA and the Director-General of the World Health Organization (WHO), and with appropriate governments, the Secretary-General submitted to the Security Council a plan for the implementation of the disarmament provisions of resolution 687 (1991). The plan (document S/22614 of 17 May 1991) included a three-stage approach; collecting and assessing of information, disposal of weapons, components and facilities and monitoring and verification of future compliance by Iraq of its obligations.

In order to proceed rapidly with inspections, UNSCOM sited its executive office at the UN Secretariat Headquarters in New York. The office consisted of an operational unit, a small administrative branch and a few assistants to the Executive Chairman. The members of the Special Commission together with the staff of its executive office reviewed Iraq's initial declarations, which it was required to submit within 15 days of the adoption of resolution 687 (1991). They also prepared operational plans to conduct a series of initial missions in Iraq. UNSCOM dispatched its first inspection (related to chemical weapons) in June 1991. The IAEA had conducted its first nuclear inspection in May 1991 with support of the Special Commission.

After having investigated various options, UNSCOM in the summer of 1991, established a field office in Bahrain for assembly, training, briefing and de-briefing of inspections teams and for administrative and logistical support. The office was provided with secure facilities and two aircraft for the transport of inspectors, personnel, equipment and provisions in and out of Iraq. The Bahrain field office supported the UNSCOM Baghdad office, which was located in the Sheraton Hotel from 1991 to 1994. The task of the Baghdad office encompassed special support to the chemical destruction programme, including the construction of CW-destruction facilities, during the period 1992-94. When the UNSCOM monitoring centre was established in Baghdad in 1994, the role of the regional Bahrain field office evolved and it then provided the monitoring Centre with support for construction, refurbishment and supplies. With the subsequent implementation of the UNSCOM/IAEA monitoring and verification plans, the focus of the office became a centre of support for monitoring operations, including the continuous land-based camera surveillance of Iraqi weapons-potential production and storage facilities.

Support from Member States

During the initial phase, various UN departments, units and regional offices provided assets, expertise and support for UNSCOM activities. These included personnel, logistics, liaison with national governments and other international organizations, as well as sharing the experience of UN missions and peacekeeping operations. However, the magnitude of the task given to UNSCOM by the Security Council went far beyond the capabilities available at that time within the UN system. It required specific expertise in the areas of chemical and biological weapons and ballistic missiles, related verification technology and equipment and extensive mission support that included specialized medical treatment, explosive ordnance disposal (EOD) capabilities, field communications and transportation means. In addition, UNSCOM needed other assets required for credible verification, such as aerial surveillance, including satellite imagery, and laboratory capabilities which could only be provided by a limited number of Member States.

The Security Council, in its resolution 699 (1991), decided to encourage maximum assistance, in cash and in kind, from all Member States to ensure that verification and disarmament activities under resolution 687 (1991) could be undertaken effectively and expeditiously. UNSCOM requested a number of states to make available to it the services of qualified operational officers, experts and specialists to conduct inspections and provide technical support. These inspectors were recruited by UNSCOM primarily from among national expert advisers to the negotiations within the Conference on Disarmament in Geneva and from leading national defence laboratories. UNSCOM also asked several states to provide information support on substantive issues covered by its mandate. Member States provided the assistance requested, in most cases on a no cost basis.

Financing the Special Commission

The Security Council did not refer the financing of UNSCOM and IAEA activities in Iraq to the General Assembly and its organs. A proposal by the Secretary-General to ensure funding of the Special Commission through the assessment of Member States was not supported by all Member States. While encouraging maximum support in cash and kind from Member States, the Security Council decided that Iraq should be liable for the full costs of carrying out the tasks authorised by Section C of resolution 687 (1991). The Council requested the Secretary-General to report on the most effective means of financing the Special Commission. On the basis of this report (S/22792 of 15 July 1991), it was recommended that part of the proceeds from Iraqi sale of petroleum and petroleum products authorised under Security Council resolution 706 (1991), for the purchase of humanitarian supplies, be made available to meet the costs of the Special Commission and the IAEA. However from 1991 until its acceptance of resolution 986 (1995), in 1996, Iraq did not take up the offer to sell oil.

In the absence of such financing, Iraqi assets frozen in various international banks and financial institutions, were drawn upon for UNSCOM/IAEA early needs. However, by 1995, the resources made available under this procedure proved insufficient to cover all the costs. Therefore current expenses had to be met from voluntary contributions by Governments. The matter of financing became a question of great concern as the problem was exacerbated by the fact that UNSCOM, in accordance with resolution 687 (1991), also provided support to the IAEA operations under the Security Council's resolutions. UNSCOM was forced to devote considerable efforts to raise support in kind and in cash from supporting Governments. In his report of December 1993, the Executive Chairman wrote "In the absence of both Iraqi agreement to sell oil and of Iraq's acknowledgement of its obligations under resolution 699 (1991) to meet the full costs of the tasks authorised by section C of resolution 687 (1991), the problem of the financing of the Commission's operations remains a matter of great concern and further cash contributions by Governments are required." [1]

In 1995 the Security Council adopted resolution 986 (1995), permitting Iraq to export limited amounts of oil under UN control to pay for the import of foodstuffs and medicine. The resolution, inter alia, also set aside a proportion of the proceeds from the oil sales to fund the activities of UNSCOM and the IAEA in Iraq, later determined to be 0.8%. However, Iraq did not accept the resolution until the middle of 1996, and it was not implemented until the end of the year. In his October 1996 report to the Security Council, the Executive Chairman said that "the Special Commission's cash requirements have been met through funds released from the escrow account established under resolution 778 (1992) for the receipt of Iraqi frozen assets. In addition the Commission has received voluntary contributions from a number of States. To date the Commission has spent close to $120 million from these two main sources since its beginnings in 1991. Unless resolution 986 (1995) is implemented before the end of the year, the Commission will be unable to meet its operating costs starting January 1997 and will have to commence shutting down its activities in Iraq". [2]

Member States provided the following in-kind assistance prior to the adoption of resolution 986 (1995):

> (a) Expertise: While the administrative staff consisted mainly of UN staff members drawn from the Secretariat, the operational officers, experts and specialists in the executive office and on inspection teams were mainly recruited from governments under the UN's Special Service Agreement (SSA) whereby their salaries were covered by their government, while all other costs, such as travel and daily subsistence allowance, had to be funded by UNSCOM. This included different categories of inspection support staff, for example, medical

[1] S/26910 of 21 December 1993
[2] S/1996/848 of 11 October 1996

officers, communications technicians, movement control officers, EOD experts, photo-interpreters, linguists and information technology professionals;

(b) Transportation: Included vehicles and fixed-wing aircraft to transport inspection teams together with equipment and supplies to and from Iraq, as well as for emergency and medical evacuation of personnel from Iraq. A helicopter unit, for the transportation of inspection teams within Iraq, aerial inspections and medical evacuation in emergency situations was also available;

(c) Verification and inspection equipment: Included a variety of equipment and materials, including sampling and detection equipment, EOD equipment and decontamination equipment. For operational reasons, this equipment was usually deployed together with personnel of the same contributing Member State;

(d) Communications: Included secure means of communications between the UNSCOM's office in New York, its office in Baghdad, the IAEA and national authorities of Member States that controlled the "no-fly zones" in Iraq, as well as field radio stations and mobile radios to provide communications within Iraq, between inspection teams and the UNSCOM office in Baghdad and between inspectors in the field. Member States also provided the services of technicians to operate this equipment;

(e) Laboratory support: Included analyses of various samples of chemical and biological materials taken by the inspectors in Iraq performed by national laboratories of Member States. Various national institutions of Member States also examined different types of Iraqi chemical and biological munitions and missile parts and components taken out of Iraq by inspectors for evaluation;

(f) Medical support: Included lifesaving equipment, medicines and other medical supplies provided by Member States together with the services of medical personnel, including physicians and paramedics. UNSCOM requested medical personnel to have specific experience in the treatment of possible casualties resulting from exposure to various types of unconventional weapons;

(g) Information support: Additional information from Member States on Iraq's chemical and biological weapons and ballistic missiles was provided. Member States also provided information on sites and locations in Iraq for inspection, including geographical coordinates, site diagrams and descriptions, and arranged for relevant briefings to be given to inspection teams;

(h) Aerial surveillance: Included the conduct by Member States of frequent missions by high and medium altitude surveillance aircraft to produce overhead imagery of sites, locations and facilities for inspection, in accordance with UNSCOM's mandate and on the basis of special arrangements with UNSCOM. They also provided the services of photo-interpreters to evaluate the imagery

collected. On a case-by-case basis, two Member States shared relevant satellite and aerial imagery with UNSCOM and the IAEA; which were proven helpful to identify movements at that time of weapons components and undeclared destruction activities, especially missile-related.

(i) Information technology: Member States provided computers, software, audio-, photo- and video-recording equipment and helped to establish secure computer networks both in UNSCOM's office in New York and in Baghdad; and

(j) Facilities: To provide information to inspection teams going into Iraq, a secure facility was established by some Member States in Bahrain. Member States also supported construction, refurbishment and security surveillance of the UNSCOM office in Baghdad, and provided stand-by medical facilities in the region for medical evacuation and emergency medical treatment.

Following the implementation of resolution 986 (1995) by the end of 1996, the Commissions financial status was put on a firmer footing.

The early availability of assets and services enabled UNSCOM to rapidly commence its inspection activities in Iraq, support the IAEA in its activities and establish its verification system during the period 1991 to 1998. By consolidating the best available expertise and technology provided by individual states, UNSCOM was also able to develop advanced verification methods, procedures and techniques that not only allowed it to verify Iraq's compliance, but also added to the experience of international verification.

Developing UN verification practices and procedures

Inspection procedures

Prior to the beginning of inspections in Iraq, the Commission had developed generic inspection plans. Detailed inspection procedures could not be developed in advance without knowing the specific situation in Iraq. The importance of the first inspections was that these inspection teams elaborated detailed operational procedures that were used as templates and further extended by subsequent teams of inspectors.

The first series of inspections carried out by UNSCOM in the summer of 1991 were focused mainly on sites and locations where relevant weapons and materials were declared by Iraq, in order to identify and to inventory them for destruction, removal or rendering harmless.

Special attention was paid to the safety of inspection operations, since the conditions of sites and facilities subject to inspections in post-war Iraq largely consisted of damaged structures, unexploded ordnance, chemical contamination and multiple other health

hazards. Procedures were also developed with regard to the destruction, removal and rendering harmless of specific prohibited items and materials in Iraq.

Many procedures, modalities and guidelines were developed and applied by the UN during the period from 1991 to 1998. Some of these were endorsed by the Security Council, such as procedures for inspections of presidential sites (February 1998), while others, such as the use of helicopters for aerial inspections and health and safety guidelines were approved internally. In addition, numerous other detailed internal guidelines were issued such as those relating to the use of aircraft and means of communication. Guidelines on technical matters were also issued by chief inspectors and senior officers, such as those for medical treatment and for chemical analyses at the Baghdad Monitoring and Verification Centre (BMVC) laboratory, while other procedures, mainly related to the conduct of inspections, existed as common practices rather than formal guidelines.

Following Iraq's admission of concealment activities after the defection of Lieutenant General Hussein Kamel (then the head of Iraq's Military Industrial Commission (MIC)) in 1995, additional emphasis was placed on investigation-type verification inspections including interviewing Iraqi scientists and officials and document searches. Specific procedures were developed regarding the conduct of interviews and the forensic evaluation of documents and computers.

Staffing and organization

During the first months of 1991, there were not more than a dozen executive officers, operational officers and experts in UNSCOM's Headquarters. In 1992-1993, when it became clear that a long and complex verification programme was required to determine Iraq's compliance with the requirements of the Security Council's resolutions, UNSCOM was expanded to include four or five experts organized within each weapons discipline group: chemical, biological and missile. In addition, some nuclear experts were attached to UNSCOM to facilitate the planning of joint inspections with the IAEA.

In the second half of 1991, a special unit, the Information Assessment Unit (IAU), was set up, staffed with personnel trained in dealing with and protecting sensitive information provided by Member States. The IAU synthesized such information as well as open source material to produce assessments of Iraq's compliance with its obligations and identified sites and activities that required further investigation. As Iraq failed to give full accounting of its holding of prohibited items, the IAU's assessment and data collection capability became UNSCOM's essential source of information. Over time the information residing in the IAU came to be more extensive than any other single collection.

UNSCOM personnel retained under UN SSA's served as advisers to the Executive Chairman of UNSCOM, and as such reported directly to him. The functions, positions and seniority within the various units and groups were generically defined.

There was a high degree of staff rotation in UNSCOM during the period 1991 to 1993 when the tour of duty of personnel whose services were provided directly by Member States ranged from a few months up to a year. By 1993, however, it was recognized that longer periods were necessary as solid institutional knowledge of Iraq's past proscribed programmes was a prerequisite for achieving and maintaining an efficient system of inspection and verification.

Following the adoption of Security Council resolution 1051 (1996), a joint UNSCOM/IAEA unit was established in the office of UNSCOM for the implementation of the export/import monitoring mechanism for dual-use items and materials being delivered to Iraq.

In 1998, UNSCOM's office had a total staff of over 60 personnel, including some 20 staff members under various types of UN contracts and over 40 experts and specialists whose services were made available by Member States. Due to this mixed composition of its staff, UNSCOM had to develop a flexible organizational structure for its office. Personnel operated under direct guidelines from the Executive Chairman. This system enabled rapid adjustments in the face of changing operational requirements and circumstances. On the other hand, it was sometimes difficult to demonstrate objectively that personnel whose services were made available were fully accountable for their activities only to the Commission.

Non-resident inspectors

Experts, specialists and technicians assigned by UNSCOM to participate in specific inspections were assembled in Bahrain before deployment to Iraq. All inspectors were retained by under SSAs and enjoyed the privileges and immunities commensurate with experts on mission for the UN. The Executive Chairman appointed chief inspectors. In Bahrain, the inspectors were briefed by UNSCOM and by representatives of some Member States with regard to specific information, inspection tasks and requirements. A short period of pre-inspection training, normally from a few days to a week, depending on the nature of the inspection, was also organized in Bahrain.

UNSCOM sought to maintain the participation of the most skilled inspectors in multiple sequential inspections in Iraq. Although this was an important factor in developing institutional knowledge and in follow-up action with successive inspections, it was not always possible. This depended on the availability of the individual inspectors and the readiness of their respective national authorities to make their services available to the UN. Thus, most of the inspectors involved in UNSCOM operations in Iraq only participated in one or two inspections, while a core group of inspectors were involved in multiple inspections.

With respect to the BMVC, its organizational structure was more formal and addressed multiple issues relevant to its functions, including chain of command and coordination

between various resident inspection teams and support units. In 1998, the BMVC was staffed with up to 100 personnel, including members of resident monitoring teams, operational, support and administrative staff. While its Director and administrative personnel were UN staff members, the services of most of its inspectors and operational and support staff were made available by Member States as consultants under UN SSA's.

Inspection activities

Within the field of verification of disarmament, the UN conducted a variety of inspections in Iraq. These included the initial evaluation of declared facilities, items and materials, follow-up inspections of declared facilities and sites designated by UNSCOM, and the supervision of the destruction, removal and rendering harmless of weapons, designated facilities, items and materials. In addition, there were search inspections, interviews, technical seminars and technical evaluation meetings with Iraqi officials and scientists.

Facilities and sites inspected included industrial facilities, research centres, military installations and ammunition depots, offices of ministries, agencies and companies, public health facilities, transportation companies, customs offices and trading companies, as well as geographic locations covering large areas. Depending on the specific verification objectives, most facilities and sites were identified to the Iraqi counterparts only upon arrival of inspection teams at their respective locations and were inspected without any advance notice. Some other facilities, where advance coordination was required such as for the installation of cameras and sensors, were inspected with short advance notice, while sites where Iraq had to provide extensive technical input, such as equipment and personnel for the destruction of proscribed items, were also identified in advance to the Iraqi authorities.

Activities carried out at inspection sites varied and included site exploitation, evaluation and accounting for relevant equipment, items and materials, securing sites to prevent removal of relevant items and materials, sampling, discussions, interviews, document searches and forensic computer evaluations. Samples taken in the course of inspections were sent for analysis to various national laboratories of Member States. In most cases, UNSCOM did not retain samples for reference purposes. In several cases, samples were analyzed by only one national laboratory. The samples taken were not shared with Iraq, which disputed several of the analytical results reported to UNSCOM by national laboratories.

In late 1993, after Iraq accepted the Plan for Ongoing Monitoring and Verification (OMV) approved under Security Council resolution 715 (1991), additional types of inspections were conducted. These included baseline inspections aimed at the identification of dual-use facilities, items and materials in Iraq, the verification of Iraq's declarations under the OMV Plan, as well as technical missions relating to the installation of monitoring equipment, cameras and other sensors. These resident inspection teams conducted monitoring inspections, which included aerial inspections, environmental

monitoring and the maintenance of verification equipment. The UNSCOM chemical laboratory established at the BMVC could conduct analysis of air, soil and other environmental samples and the biological room was capable of preparing biological samples for outside analysis. In 1996, an export/import monitoring team joined other resident inspection teams at the BMVC and conducted various inspections at points of entry to Iraq, customs offices, trading companies and distribution facilities, as well as verifying the end users in Iraq of items subject to notifications under the mechanism. A multidisciplinary resident team, which inspected sites and locations considered to be capable of hiding weapons or related activities, was established in 1998, at the BMVC.

UNSCOM conducted inspections relating to the verification of disarmament mainly through the deployment of non-resident inspection teams to Iraq, while resident teams at the BMVC were mainly involved in monitoring activities within the scope of the OMV Plan. Although resident teams and other units at the BMVC were sometimes tasked by Headquarters on a case-by-case basis for the verification of specific issues of proscribed programmes and provided technical support to non-resident inspection teams, in general the verification of disarmament was kept separate from monitoring inspections.

UNSCOM realized at an early stage the advantages of a multidisciplinary approach to the verification process, and conducted several multidisciplinary inspections in Iraq with non-resident and resident inspection teams. Joint chemical, biological, missile and export/import inspections were also conducted. Inspection teams that included a multidisciplinary mix of expertise enhanced the team's ability to recognize and properly assess the relevance of dual-use equipment and capabilities in the chemical, biological and missile fields. A number of inspections were also conducted jointly with the IAEA.

A balance was maintained between the need for operational security and the efficient preparation of inspections. These security precautions were deemed sensible since Iraq was presumed to be collecting information on UNSCOM's inspection plans, and it was necessary to protect the integrity of the inspection process as much as possible. UNSCOM's archives and databases were compartmentalized between and sometimes within operational disciplines. Only some senior staff and experts from UNSCOM's office were authorized by the Executive Chairman to interact with national authorities of Member States to receive additional information on issues relevant to the Commission's mandate.

Cooperation by Iraq

Despite the various Security Council resolutions in 1991, which established the UN inspection agency and Iraq's obligations following the cease-fire arrangements, cooperation by Iraq was uneven at best. Rather than accepting the UN resolutions, Iraq sought to claw back concessions at every opportunity and tried to negotiate terms for site access and inspection procedures, which it clearly had no basis to do. Iraq continually challenged the UN authority and engaged in a programme of concealment and denial particularly prior to 1995, in contravention of the Security Council resolutions.

In the Executive Chairman's first report to the Security Council, [3] he stated that in June 1991 (not long after the first UN inspection), a nuclear team was denied access to certain facilities, and on one occasion shots were fired to deter the team from photographing trucks transporting materials previously removed from Iraqi nuclear weapons programme sites. In addition, during the first year of inspections, an IAEA nuclear team was detained in a parking lot for four days in September 1991. Also in that year, Iraq refused for three months to allow the Special Commission to introduce its own helicopter support unit.

Furthermore, in March 1992, Iraq admitted that it had failed to declare over 24,000 chemical munitions and 92 proscribed missiles and associated equipment including mobile launchers that it had destroyed unilaterally in contravention of resolution 687 (1991). Unilateral destruction occurred in all areas of its WMD programme and was thus a major factor in delaying the pace and progress of UN inspections. Problems associated with denying aerial surveillance flights on occasions and denying or delaying access to sites, such as the stand off which occurred over access to the Ministry of Agriculture in 1992, typified the uneven cooperation of Iraq. At high level talks in March 1994, the Deputy Prime Minister Tariq Aziz threatened to withdraw Iraqi cooperation with the UN Commission citing his loss of confidence in it and his disappointment that there was no date set for the lifting of economic sanctions.[4]

In his December 1994 report the Executive Chairman said that despite a generally more cooperative attitude by Iraq in relation to the past programme, Iraq has not volunteered information and has shown a marked lack of transparency, disclosing only when confronted with evidence by the Commission. He also said that important documentation exists and that the Iraqi authorities had taken a conscious decision not to release it freely to the Commission. In this report, the Commissions' concern about Iraq having had an offensive biological warfare programme was also raised and this was well before the defection of General Hussein Kamel. [5]

The Commission's doubts about all documentation being destroyed were realised when the Executive Chairman was taken to Haidar Farm following General Hussein Kamel's departure for Jordan in August 1995. In addition, Iraq admitted other information previously concealed from the Commission including the extent of indigenous production of liquid propellant missile engines, the extent of VX production the scope of the biological warfare programme and details of experiments involving radiological weapons. In August 1995, Iraq admitted in an official letter that it had been engaged in a dedicated concealment effort to hide proscribed items and documents from the Commission. [6]

[3] United Nations Doc No S/23165 of 25 October 1991
[4] United Nations Doc No S/1994/750 of 24 June 1994
[5] United Nations Doc No S/1994/1422 of 15 December 1994
[6] United Nations Doc No S/1996/258 of 11 April 1996

In response to Iraq's admission of deliberate concealment, the Commission undertook a major investigation of the "concealment mechanism". In March 1997, a specially established UN team inspected 17 sites, mainly Special Republican Guards and intelligence and security facilities. The activities of the concealment investigation team caused Iraq to react over the course of the following years: these reactions included withdrawing cooperation, refusing to allow US inspectors to participate in inspections and requiring US inspectors to leave Iraq in November 1997 and on 31 October 1998 Iraq ceased cooperation with the Commission and its activities in Iraq.

Through its concealment and denial activities, Iraq forced the UN Special Commission to change its modus operandi from one of verifying Iraq's declarations to one of investigative inspections and, sometimes, forensic work. Over the course of more than seven years of inspection activity, considerable distrust had built up on both sides. By its own admission, Iraq did not act in good faith following the 1991 ceasefire in the Gulf War and abide by the demands of the Security Council resolutions. It begrudgingly gave only what it thought was the bare minimum to satisfy the inspectors and the international community.

Because of Iraqi false statements, incorrect declarations and concealment activities, UN inspectors not only were wary of accepting Iraqi testimony without solid evidence but also were forced to re-evaluate their assessments of Iraq's programmes after each new revelation by Iraq. From Iraq's perspective, it would seem they had assessed that, regardless of the degree of cooperation, neither economic sanctions would be lifted nor the oil embargo removed. Iraq's suspicions and allegations of the Special Commission being diverted for other tasks led to a break down in relations between the Commission and Iraq in late 1998. On 16 December 1998 UNSCOM ceased inspections and the Executive Chairman (at that time Ambassador Richard Butler of Australia who served from July 1997 to June 1999) withdrew inspectors from Iraq although some assets were maintained at the Canal Hotel.

The Establishment of UNMOVIC

As was recommended by the panel, known as the Amorim panel, on disarmament and current and future ongoing monitoring and verification issues, established pursuant to the note by the President of the Security Council of 30 January 1999, various lessons learned from UNSCOM's experience were taken into account in the drafting of Security Council resolution 1284 (1999). The resolution established the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) as a subsidiary organ of the Security Council to replace UNSCOM, undertake the responsibilities mandated to UNSCOM in the verification of Iraq's compliance, and take over its assets, liabilities and archives. Following consultations with the members of the Security Council, the Secretary-General appointed Dr. Hans Blix (Sweden) to serve as Executive Chairman of UNMOVIC.

The Executive Chairman of UNMOVIC is assisted in his tasks by the creation of an advisory College of 16 Commissioners. The College operates as a body and schedules its meetings to discuss UNMOVIC's work, assessments and results of inspections and as required by resolution 1284 (1999), provides input into and comments on the Executive Chairman's quarterly report to the Security Council and discusses policy issues raised by the Executive Chairman.

The organizational plan for UNMOVIC prepared by the Executive Chairman, in consultation with the Secretary-General and approved by the Security Council, incorporated specific provisions drawn from practical lessons learned by UNSCOM. These comprised the following:

(a) While recognizing that the different parts of the organization should complement and closely cooperate with each other, the functions of operations were deliberately kept separate from analysis within the organizational structure of UNMOVIC. While UNSCOM core staff were responsible for both verification activities and assessment of their results, UNMOVIC established two separate units, the Division of Planning and Operations that was responsible for planning, directing and performing all monitoring, verification and inspection activities, and the Division of Analysis and Assessment responsible for the analysis and assessment of information resulting from the organization's own activities in the field, as well as data from other sources, such as information on export/import activities, overhead imagery and outside information. The Baghdad Ongoing Monitoring, Verification and Inspection Centre (BOMVIC) was directly subordinated to the Director of Planning and Operations;

(b) UNMOVIC expanded upon UNSCOM's experience of multidisciplinary verification and established dedicated multidisciplinary sections in the Division of Analysis and Assessment and in the Division of Planning and Operations that included multidisciplinary inspection teams in Iraq;

(c) From the beginning, UNMOVIC established an office for outside information sources that, apart from the Executive Chairman, was the sole entrance point for intelligence provided by governments. Although recognizing that dialogue with providers may be necessary in order to seek clarification and to indicate what may be of particular interest to the organization in discharging its tasks, it was established that the flow of intelligence must be one-way only to UNMOVIC and have regard only to matters relevant to the mandate of UNMOVIC;

(d) The system of cooperative management established by UNMOVIC ensured the unity of purpose, mutual assistance and the sharing of as much information as possible and, at the same time, recognized the need for strict confidentiality of information regarding sites, objects and timing of inspections

and about data underlying the inspections, which was shared strictly on a "need-to-know" basis;

(e) While UNSCOM's databases and archives were compartmentalized and maintained by individual disciplines, UNMOVIC formed a Data-Processing and Archives Unit that established, operated and maintained a central, integrated database. This included the organization's archive, which consists of information from a variety of sources, including data taken over from UNSCOM and the results of UNMOVIC's inspection and monitoring activities. These were also accessible on a need-to-know basis;

(f) UNMOVIC established an imagery evaluation unit, like UNSCOM, that not only processed the specialized non-commercial imagery provided by governments, but also acquired and processed commercial overhead imagery to support the Division of Planning and Operations and the Division of Analysis and Assessment. In a manner similar to that of UNSCOM, Member States supported the Commission through the provision of high-altitude and medium-altitude surveillance aircraft, at no cost to the UN. In addition, one of the helicopters contracted by UNMOVIC was equipped for the acquisition of aerial imagery during day and night and was used for surveillance;

(g) While UNSCOM used verification technology, equipment, transportation, logistics and mission support provided mainly directly by Member States, UNMOVIC acquired most of these assets and services through the established UN procurement procedures. This enabled the acquisition of the most advanced technology, development of coherent and unified verification procedures and provision of a high degree of operational readiness in the planning and conduct of inspections. At the same time, as was the case with UNSCOM, Member States provided a limited number of unique instruments and materials such as ground penetrating radar technology and life-saving equipment;

(h) The acquisition by UNMOVIC of its own verification technology and equipment allowed it to train its inspectors in advance on the use of specific instruments and items of equipment;

(i) Contrary to UNSCOM, the vast majority of UNMOVIC staff has been recruited as UN staff members. To supplement UNMOVIC staff on inspection teams, a roster of trained inspectors from more that 50 states was established by UNMOVIC. When called upon to serve as inspectors in Iraq, members of the roster were recruited as UN staff members with short-term contracts. Under both types of contracts, staff members are subject in particular to Articles 100 and 101 of the UN Charter concerning their status as international civil servants responsible only to the Organization, meeting the highest standards of efficiency, competence and integrity and representing as wide a geographical base as possible. Only a very limited number of selected specialists whose services were

made available by Member States were engaged by UNMOVIC for its verification activities in Iraq, such as medical and communications personnel; and

(j) UNSCOM inspectors were mainly trained on-the-job. With UNMOVIC, all those selected for employment or to be included on the Roster were required to go through UNMOVIC training. This training includes proscribed weapons and programmes, monitoring and verification methods and procedures, dual-use technology, sampling and analysis, health and safety and cultural training. The personnel are experts with special skills and expertise not only of WMD but also to specific fields of technology relevant to Iraq's declarations.

An UNMOVIC Inspectors Handbook was produced as a single source of guidance and regulations covering all aspects of UNMOVIC's operations and activities. The handbook included operating procedures for inspections, aerial surveillance, transportation, accommodation, UNMOVIC rights and responsibilities, relations with the media, Iraq's disarmament obligations, discipline-specific procedures, sampling and analysis, health and safety guidelines as well as the texts of relevant governing resolutions and related legal instruments.

In addition, an Administrative Manual was issued to guide UNMOVIC personnel in the discharge of their responsibilities. It serves as a compendium of administrative rules and procedures customized for UNMOVIC's activities and requirements, consistent with and complementing those of the UN covering, inter alia, communications and records, personnel matters and management of confidential information.

After November 2002, with the resumption of monitoring and verification activities in Iraq, UNMOVIC was able to deploy rapidly a large number of inspection teams to Iraq drawing on inspectors from its Headquarters and the roster. As of the end of February 2003, UNMOVIC core staff in the professional grades at Headquarters included 75 persons of 30 nationalities while the number of UNMOVIC personnel in Iraq reached a total of over 200 staff. As of March 2006, 381 persons were trained including 30 core professional staff members that are currently working at UNMOVIC Headquarters. Over 300 (non-staff) members of the roster have confirmed their availability to serve on UNMOVIC missions.

Further development of the verification system by UNMOVIC

UNMOVIC further developed the previous multidisciplinary approach to inspection operations. Inspection teams, consisting of experts with different scientific backgrounds, were set up, which enabled the proper conduct of inspections at sites with multiple activities. As a result, a more complete understanding of the sites was developed since it was possible to obtain, in addition to information ascertained under a specific weapons discipline, complementary information about procurement, contracts and relationships with other companies and national and foreign suppliers.

An additional regional office established by UNMOVIC in the north of Iraq, in Mosul, and operated by a multidisciplinary team of inspectors, provided several advantages. These included a greater number of and more efficient inspections due to the relatively short travel distances to a significant number of sites in northern Iraq and increased effectiveness of verification through the attainment of quicker unannounced access to sites. A planned regional office in the south of Iraq in Basra did not materialize before UN inspectors were withdrawn from Iraq in March 2003.

UNMOVIC established its own analytical chemical laboratory at BOMVIC expanding the UNSCOM facilities there. In addition, it also established a biological laboratory at the BOMVIC for screening of biological samples taken in the course of inspections.

A network of laboratories was established with eleven internationally recognized laboratories in various parts of the world. They are contracted to perform analyses of samples provided by UNMOVIC in accordance with strict procedures.

The following procedures for the analysis of samples to be performed outside of Iraq were introduced and followed by UNMOVIC in contrast to the UNSCOM experience:

(a) Chain-of-custody procedures were established to ensure the integrity of samples throughout the process of sampling, transport and analysis and reporting of results;

(b) One portion of each sample was to be given to Iraq and another retained by UNMOVIC as a reference;

(c) Samples were to be independently analyzed by at least two laboratories in the network;

(d) All samples, as well as raw data and analytical results generated in the course of analyses by the outside laboratories remained at all times the property of UNMOVIC and were to be kept confidential by the laboratories; and

(e) UNMOVIC was solely responsible for drawing any conclusions and assessments from the analytical results.

UNMOVIC's experience in both planning and operations and analysis and assessment also shows that there are still some areas where further improvement can be made. These include the following:

(a) Synchronization of formats of declarations and lists of relevant dual-use items and materials to be declared by Iraq under the auspices of the OMV Plan and the export/import monitoring mechanism to ensure coherence between those declarations and to avoid ambiguities during inspections;

(b) Optimization of formats of inspection reports to ensure that relevant data would be expeditiously reflected in the central integrated database and could be promptly made available for the assessment of inspection results and planning for follow-up inspections; and

(c) Augmentation of specific weaponry-related expertise both on the UNMOVIC staff and with respect to training programmes for inspectors to ensure that remnants and components of old proscribed weapons are more easily identifiable from the myriad of conventional arms remaining in Iraq.

Major achievements

From its inception, UNSCOM achieved remarkable success. Within two months of its establishment the first inspection team was in Iraq, an inspection regime was set up and various inspection procedures were in place. Inspectors had little prior training as international inspectors, almost no familiarity with working together and much was learnt on the job. By the time of its dissolution, a large number of chemical weapons and bulk warfare agents were destroyed under its supervision, missiles and related facilities were rendered harmless or destroyed and abundant evidence for illicit biological activities was uncovered to place sufficient pressure on Iraq for it to acknowledge that it had had an offensive biological weapons programme. In addition UNSCOM introduced an export/import monitoring mechanism, which enabled the monitoring of imported dual-use items and materials. Despite Iraqi efforts at concealment and denial, UNSCOM was able to develop a comprehensive understanding of the totality of Iraq's WMD programmes although some issues remained unresolved.

The international verification system developed by UNSCOM was further expanded and transformed by its successor, UNMOVIC, into a reinforced system of ongoing monitoring and verification in line with the Security Council's requirements.

It was possible to develop a comprehensive monitoring and verification system in Iraq that covered multiple areas of WMD and delivery means. Despite the remaining unresolved issues which are mainly from Iraq's past concealment efforts and unilateral destruction of WMD and related materials, the system of international verification was able to make significant progress in the identification and mapping out of Iraq's past proscribed weapons programmes. It also demonstrates that even concealed and heavily guarded proscribed programmes or their elements could not be hidden in their entirety from an effective and comprehensive system of UN inspection and verification.

The UN verification system was also able to deter the resumption of proscribed activities by Iraq after 1991. During the period 1992-1993, Iraq attempted to conceal some ongoing proscribed missile projects. These projects were halted once the monitoring system under the Plan for OMV was established and became fully operational. Only during the period 1999 to 2002, when UN inspectors were absent from Iraq, did Iraq engage in proscribed missile activities.

With respect to specific verification methods and procedures, UNSCOM introduced an inspection system of monitoring teams, resident in-country which were integrated with aerial inspections using helicopters and was thus able to undertake combined ground and aerial inspections. It also made innovations in developing techniques for on-site no-notice inspections, document exploitation and interviews. As UNSCOM's successor, UNMOVIC developed the experience it inherited from UNSCOM and, in some areas, acquired more resources and advanced specialized tools.

The UN's verification experience in Iraq also illustrates that in-country verification especially on-site inspections, generate more timely and accurate information than other outside sources such as national assessments. The experience also demonstrates that an effective and comprehensive verification system is based on two major elements: institutional knowledge, encompassing the detailed experience and expertise gained from inspections and technical capabilities, comprising verification technology and other necessary specialized assets. Clearly, both cannot be acquired instantly. This takes a significant amount of time, effort, resources and budgetary allocations.