

مفتاح العظم

الكيمياء

**National Monitoring Directorate**

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***Iraq's Biological  
Programme***

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## **Forward**

1. The present impasse between Iraq and UNSCOM regarding the biological programme stems from Iraq's initial decision to obliterate all traces of the part of the programme regarding the production including destruction of all records and traces of production and weaponization. Unlike other unilateral destruction carried out by Iraq in the areas of missiles and chemical programmes which were revealed in March 1992 the biological production was not revealed. However, the munitions filled with biological agents namely (157) R-400 bombs and (25) Al Hussain warheads were passed as CW munitions within the total amounts declared as unilaterally destroyed and verified by UNSCOM teams as CW munitions in 1992 and their accounting subsequently appeared in the March 1995 chemical FFCD.

In 1995 and prior to the defection of Hussain Kamil in August 1995 Iraq began to reveal the details of the scope of the biological programme on the understanding that the missile and chemical files would be closed in June that year .

However, the defection of Hussain Kamil and the discovery by Iraq of the Haider farm documents and their handover to UNSCOM created a new situation which could have been of great significance in expediting the work and finalizing their task in implementing UNSCOM's mandate as the executive chairman himself said in his report of Oct. 1995 in which he stated that the farm documents will "generally expedite the work of the Commission in accomplishing its tasks under resolution 687 (1991)" (see paras 4 & 5 of security council document S/1995/1038 of 17 Dec. 1995).

In fact the way UNSCOM decided to use the farm document has been anything but expediting the work and enhancing openness and building mutual confidence.

We are now in 1998 and no end is seen in UNSCOM's task as it rejected Iraq's BW FFCD as an unverifiable declaration. This we see as totally unjustified as the disclosures are full and true as the personnel who actually carried out the work have recounted to the best of their recollections in the absence of the records.

Some highly significant documents have been found and handed over to UNSCOM in addition to the farm documents which the programme director Dr. Rihab Taha had collected in a single box and handed over to one of Hussain Kamil's personnel late in 1991 and later turned up with Haider farm documents.



Recently some documents relevant to the programme were found with Dr. Nassir Al Hindawi the senior microbiologist who worked in the programme from 1986. The circumstances of their discovery is subject of an investigation and will be revealed when completed.

However, we believe that all these documents with the exception of the one in Dr. Hindawi's handwriting should be part of the farm documents. We hope that those papers will help in clearing up some of the issues and illustrate Iraq's desire to cooperate fully with UNSCOM in an open and transparent manner. It is also hoped that UNSCOM on its part will be open and transparent in the forthcoming technical evaluation meetings so that progress is achieved in moving forward from this impasse. We put our trust in God and in the impartiality and integrity of UNSCOM's professional team of experts to carry out its duty .

The way to proceed forward in our view is to identify the areas which UNSCOM's judge inadequate and to present the basis for those judgments in order to give Iraq the opportunity to respond. Without that the grave injustice and harm will continue towards Iraq and its people .

2. This report consists of a summary of Iraq's September 1997 FFCD which was itself a revised version of the June 1996 FFCD in the biological area. The summary reviews the programmes history from 1974 onwards including the research and development activities which are supported by original documents handed over to UNSCOM at various times. The production and weaponization activities are given; followed after that by other miscellaneous activities. Other accounts such as personnel, financial allocations, procurement activities relations with other organizations, concepts and role in Iraq's defence policy are given in answer to specific questions asked by UNSCOM at various times during the elaboration of Iraq's declaration.

Full details on any of these activities are referred to the FFCD accompanying the Summary .

3. abbreviations and glossary are given on the first page of volume I of the FFCD.
4. Since the submission of the September 1997 FFCD some typing, and editing errors have been discovered as well as some corrections and further clarifications were deemed necessary . These are given separately within this summary volume without changing the original version in the FFCD.

## Errata

Editing and typing errors in the FFCD 1997 are corrected herebelow .

Item	Page No.	Paragraph	Incorrect	Correct
1.	22	Annex 1,2 Ser.N. 11	July 1988	July 1989
2.	22	Annex 1,2 Ser.N. 11	July 1990	<del>delete</del> Remove
3.	23	Annex 1,2 Ser.N. 16	Jan. 1989 to Aug. 1990	Jan. 1989 to the end of July. 1990
4.	23	Annex 1,2 Ser.N. 16	Jan. 1989 to Aug. 1989	Jan. 1989 to the end of July. 1989
5.	23	Annex 1,2 Ser.N. 16	Feb. 1989 to Aug. 1990	Feb. 1989 to the end of July. 1990
6.	23	Annex 1,2 Ser.N. 16	Jan. 1990 to Dec. 1990 <sup>(1)</sup>	May 1990 to the end of Dec.1990
7.	23	Annex 1,2 Ser.N. 16	Jun. 1990 to July 1990 <sup>(1)</sup>	May 1990 to the end of Jun.1990
8.	110	4.2.1 List of contracts fot the procurment (SEPP).	85/3/269 85/3/504 85/3/505 85/3/506 85/3/600 86/3/223	86/3/269 86/3/504 86/3/505 86/3/506 87/3/600 87/3/223
9.	113	4.2.2 List of letters of credit (SEPP)	85/3/269 85/3/504 85/3/505 85/3/506 85/3/600 86/3/223	86/3/269 86/3/504 86/3/505 86/3/506 87/3/600 87/3/223
10	119	4.3.3.1 Detailed information with indication of items and quantities (SEPP)	85/3/269 85/3/504 85/3/505 85/3/506 85/3/600	86/3/269 86/3/504 86/3/505 86/3/506 87/3/600
11.	126	Private foreign companies (SEPP)	85/3/269 85/3/504 85/3/505 85/3/506 85/3/600	86/3/269 86/3/504 86/3/505 86/3/506 87/3/600



<b>Item</b>	<b>Page No.</b>	<b>Paragraph</b>	<b>Incorrect</b>	<b>Correct</b>
12.	165	Annex IV.5 Procurements order through SEPP	85/3/269 85/3/504 85/3/505 85/3/506 85/3/600	86/3/269 86/3/504 86/3/505 86/3/506 87/3/600
13.	270	6.1.1	July 1987 to Jan 1991	Nov. 1987 to the end of Dec. 1990
14.	273	6.1.1.3	Aug. 1990	July 1990
15.	273	6.1.1.3	Aug. 1990	July 1990
16.	279	Table	Aug. 1990	July 1990
17.	280	6.1.2	2069	1597
18.	280	6.1.2	Jun - July 1990	May 1990 to the end of June 1990
19.	282	6.1.2.2	Jun - July 1990	May 1990 to the end of June 1990
20.	282	6.1.2 Table	6-7 / 1990	5-6 / 1990
21.	295	6.2.1 Table	Jan. - Aug. 1989	Jan. to the end of July 1989
22.	295	6.2.1 Table	Feb. - Aug. 1990	Feb. to the end of July 1990
23.	295	6.2.2 Table	Jun - July 1990	May to the end of Jun 1990
24.	295	6.2.2 Table	112 kg	89 kg
25.	298	6.3.2	Jan - Jun. 1990	May to the end of Jun 1990
26.	299	6.4.1 Table	Jan. - Aug. 1989	Jan. to the end of July 1989
27.	299	6.4.1 Table	Jan. - Aug. 1990	Jan. to the end of July 1990
28.	300	6.4.2 Table	Jun - July 1990	May to the end of Jun 1990
29.	308	6.6	Jun 1991	July 1991
30.	316	Table 16 d	Jan. - Aug. 1989	Jan. to the end of July 1989
31.	316	Table 16 d	Jun. - July 1990	May to the end of Jun 1990
32.	318	Table 16 e	Jan. - Aug. 1990	Jan. to the end of July 1990
33.	323	Table 17 a	Jan. - Aug. 1989	Jan. to the end of July 1989

Item	Page No.	Paragraph	Incorrect	Correct
34.	324	Table 17 a	Jan. - Aug. 1990	Jan. to the end of July 1990
35.	324	Table 17 a	6 (1480 L ) sed. fer.	6 (1480 L ) fer.
36.	327	Table 17 c	Jun. - July 1990	May to the end of Jun 1990
37.	481	Table IX.2 Ser.N.1 <b>Thioglycollate broth</b> Qty. of media damaged/Kg	22	58
Added 36 Kg Thioglycollate broth from Al-Taji project to the acquired quantity				
38.	481	Table IX.2 Ser.N.2 <b>Yeast extract</b> Qty. of media damaged/Kg	28	15
39.	481	Table IX.2 Ser. N.3 <b>Casein</b> Qty. of media damaged/Kg	91	145
Added 54 Kg Casein from Al-Taji project to the acquired quantity				
40.	482	Table IX.2 Ser. N.4 <b>Glucose</b> Qty. of media damaged/Kg	66	67
41.	483	Table IX.2 Ser.N.18 <b>Cacl<sub>2</sub> (Local)</b> used/Kg for BW	559	551
42.	485	Table IX.2.1 <b>Thioglycollate broth</b> Acquired/Kg Lost/Kg Total/Kg <b>Casein</b> Acquired/Kg Lost/Kg Total/Kg Remaining /Kg	6000 22 4152  17500 91 7065 10435	6036 58 4188  17554 145 7219 10335

Item	Page No.	Paragraph	Incorrect	Correct
43.	486	Table IX.2.2 <b>K<sub>2</sub>HPO<sub>4</sub></b> Lost/Kg Remaining /Kg	128 126	126 128

<sup>(1)</sup> In the report of 1990 , it was mentioned that the amount of B. anthracis produced from 1 Jan.. to 1 July 1990 is equal to 150 L conc. .In fact the production of this agent started from May 1990 to the end of June 1990 then from Aug. 1990 to Dec. 1990 .



## **Part I**

# **History of Iraq's Past Biological weapons programme**

## **History of Iraq's Past Biological Weapons Program**

### **1.1 Early Attempts and Program Evolution:**

- 1.1.1. The first efforts to initiate a BW program was made in 1974 when a new organ called Al-Hassan Ibn Al-Haithem was created by governmental decree to conduct research and development in the field of physics (solid state & electronics), chemistry for CW objectives and biology for BW objectives. The new set up was ostensibly attached to the Ministry of Higher Education and Scientific Research but in fact enjoyed a considerable measure of independence and was supervised by individuals affiliated to a State Security Organ.

The BW efforts during the period from 1974 until the liquidation of the Organization in 1978 is given in subsequent chapters of Iraq's Sept. 1997 FFCD. The preliminary work did not amount to any significant results and the demise of the BW program was largely due to mismanagement and exaggeration of achievements in addition to the inexperience and lack of appreciation of the complexities in that kind of scientific undertaking by the individuals supervising the Organization. Thus the first attempt to organize a BW research & development program was terminated when in 1979 the Chairman of the Al-Hassan Ibn Al-Haitham Organization and a few of his colleagues were tried and sentenced to jail. (see chapter-V).

- 1.1.2. After the liquidation of Ibn Al-Haitham the CW part of the old program was considered for reactivation by the Chemical Corps of MOD and a proposal was submitted by the Director of the Chemical Corps was approved in 1981 and the unfinished structures at the Samara site were taken over and a new project was formed by the code name project/922 later to be known as (MSE) Al-Muthana State Establishment. Although the objective of project/922 was the creation of a CW facility the director of the project sought and obtained approval to add another objective namely the creation of an R&D section in the BW area. However, no practical steps to implement the BW objective were taken until 1985.

- 1.1.3. In Feb. 1985 Dr. Rehab R. Taha a specialist in the field of bacterial toxins joined the staff of MSE. Her task was to initiate work on BW agents starting with literature survey and to submit initial requirements for the R&D work in that area. She was joined later by other biologists drawn from the toxicological evaluation department at MSE and supplemented late in 1985 and early 1986 with biologists making a total of 9 members. The task of the biology group was defined as to carry out necessary R&D work which would



lead to the production on laboratory scale of BW agents and to evaluate their properties and characteristics as suitable BW agents. No plans were elaborated regarding large scale production, weaponization and storing of the BW agents. However, the D.G. of MSE informed his superior in 1985 about the measures taken to create a biology group as a nucleus for a BW project which would in his estimate take about 5 years to complete.

- 1.1.4. On 31st Dec. 1986 Dr. Naser Al-Hindawi a prominent microbiologist was released from Al-Mustansyria University/ College of Science to MSE to work with the group on part-time basis of two working days a week. The research group specified for procurement lab. appliances and devices, culture media and bacterial isolates to start their activity. Most of the appliances and devices were made available at the outset of 1986, and the supplies continued according to the needs of the work in progress.
- 1.1.5. The R&D work began, on the basis of the literature survey, after receiving the bacterial isolates in April 1986 from ATCC and Pasteur Instituts. Two agents were considered, *Clostridium botulinum* (agent A) and *Bacillus anthracis* (agent B). Testing of the two agents selected was conducted in accordance with published literature. Because of the confidential nature of the work the only consultations received by the group were from MSE personnel due to the fact that most of them were from the chemical corps, who were acquainted through their studies and training with elements of the BW.
- 1.1.6. In the second quarter of 1986, three labs were chosen from the toxicological evaluation department for carrying out biological research. One of those labs designated for agent (A), the second for agent (B) and the third for installing and operating lab. fermenters in addition to other services including sterilization and wash room and cold room. The animals house and the inhalation chamber of MSE were used for the purpose of biological experiments. Those facilities were utilized to conduct research on the two agents A & B. At this stage about the end of 1986 a report was submitted by MSE about the results achieved with a proposal to affiliate Al-Taji fermenter to MSE for future requirement of scaling up production, also, that any further development meant that extensive investments in production and test facilities were needed. Al-Taji fermenter was part of the gas refinery belonging to the Ministry of Oil. The purpose of the fermenter was for pilot production of single cell protein from gas. The unit was redundant since several years after the commissioning and trial runs. However, early in 1987 a change in the leadership of MSE took place. Gen. Faiz A. Al-Shaheen replaced Gen. Nizar Al-Attar. The new DG was of the opinion that BW expansion of



activities was incompatible with CW at MSE because of the large-investments needed and the expected interference with CW activities as the Establishment was till that time concerned with the CW activities only, in addition to that MSE site was not suitable for advanced biological activities because of possible contamination and the presence of accommodation centers near the site. He pushed for the BW group transfer. Al-Taji fermenter site was considered for possible utilization. The equipment were out of order requiring extensive overhaul and many spare parts . Several meetings took place between representatives of the Ministry of Oil and MSE to find the best solution for taking over the equipment either in its place or to transfer it to MSE. As MSE was pushing the BW group transfer outside MSE the matter remained without a decision until TRC took responsibility for the BW programme. TRC at first took measures to repair and operate the equipment at Al-Taji (see doc. Nos. 172-180). This continued till the end of 1988 when the equipment was moved to Al-Hakam site.

In May 1987 the translocation of the Research group to Al-Salman site/TRC was approved the group started its work at Al-Salman in July 1987 (Doc. No. 4) .

- 1.1.7. The Technical Research Centre TRC which was supervised by Hussain Kamil, directly, annexed the biological research activity to the Forensic Research Department as a separate section connected administratively to the a.m. department and technically to TRC's D.G. (Dr. Ahmed Murtada) who supported the biological activity according to his superior's directions at MIC (HK at the time).
- 1.1.8. After the translocation of the research group to Al-Salman site, four labs within the building of Forensic Department were designated in addition to a sterilization and washing room and an isolation room for conducting experiments on animals. The lab. devices, appliances, the 150 liters fermenter and the culture media were transferred from MSE to Al-Salman site during the period May-July 1987. Other rooms were added behind the Forensic Research Dept. Those rooms were dogs yard, isolation room for experiments, room for animal feed, store for cages and a hall to instal the 150 L. fermenter. In addition the inhalation chamber of Al-Salman was also used for experimental purposes.
- 1.1.9. Some of the experiments from those conducted at MSE, were reconducted to make sure of their results once again, in addition to expansion in doing other research experiments like studying pathogenicity, scaling up experiment using lab fermenters, and conducting experiments on maintenance of biological



agents. As a result of that work in the 1st quarter of 1988 another agent was selected which was designated agent (G) known as *Clostridium perfringens*.

- 1.1.10. A group of specialists in fungi activities was transferred from the General Committee for Agricultural Research /Ministry of Agriculture at Abu-Ghraib to TRC at Al-Salman site in 22nd May, 1988 (see document No. 11) where they started research on mycotoxins.

## **1.2. Production**

- 1.2.1. At the end of 1987 beginning of 1988 and after achieving good results in the research of A&B agents, HK gave orders to TRC's D.G. (Dr.Ahmed Murtada) to prepare the production requirements for those agents. For this, the group proposed three alternatives, using disused equipments available in the country, or manufacturing equipments locally or purchasing them from outside the country (See document No.5, report dated 20th April, 1988). Since it was difficult to manufacture those equipments locally efforts to procure the equipment from abroad were made. Orders were also placed to procure culture media from foreign suppliers.
- 1.2.2. As the Salman site was not suitable to conduct production activities, an order was issued by HK in 24th March, 1988 to construct an independent site for biological activities, R&D, production and storing. During construction the site was given the code 324 which represent the decision date to construct it, 24 March 1988. This site found at a desert location far away from population centres, but not too far from another site selected for an oil refinery thus providing the necessary services. The site was deliberately made large (3x6 km) to safeguard against accidental contamination. Sheds A1 & A2 were completed in Nov. 1988 and the project later on became known Al-Hakam.
- 1.2.3. In the first or second quarter of 1987 the (SCP) unit at Al-Taji site, was affiliated to MSE, then the affiliation was changed to be to TRC/the biological group in Aug.1987. Spare parts were ordered and work began to maintain, repair and operate the equipment. Those activities continued during 1988 when the site was designated for agent (A) production. The aim of production in 1988 was to produce enough material for a field trial. The 450 L. fermenter of this site was transferred to Al-Hakam site at the end of 1988 and installed there. This fermenter was used in the first half of 1989 in production of agent A then in the second half ( Aug. - Oct. ) of 1989 in production of agent B simulant *B.Subtilis*. In 1990 ( Jan. - Feb. ) the fermenter was used in production of *B.Subtilis* also.



- 1.2.4. The group also investigated the suitability of the local facilities such as some animal vaccine production units at Abu-Ghraib, currently Al-Kindi Company, the equipments ( Olsa equipment ) of those units were transferred to the newly constructed site (Al-Hakam site) at the end of 1988 (see document No.21). Spare parts were ordered to repair and maintain the equipment . Beacuse the design of these equipment was for anaerobic fermentation reaction so they were used mainly in production of agent A ( Clostridium botulinum toxin ) from the period 1989 to end of July 1990 . After Aug. 1990 these equipment were used in production of agent B after minor modification to them .
- 1.2.5. In the second half of 1988 the group was sent to Switzerland, Czechoslovakia and Germany to get offers, and it received a competitive offer from Chemap. The Swiss Company asked for some information relevant to the site and its geographical coordinates, insisting on the necessity of its direct supervision when installing and operating the equipment. This situation made it necessary to choose another site adjacent to other establishments, so, Site/85 of PC2 was selected, and the Company was given the information requested, but about this site, the idea was to instal and operate the equipment actually for a limited period for the production of some other harmless material and then it was to be translocated to Al-Hakam. Before completing the manufacturing of the equipment, the Swiss Company declined supplying under a pretext that the export permit was cancelled in the last quarter of 1989 by the Swiss authorities.
- 1.2.6. In Sept. 1988 the 150l. fermenter which was procured when the group was at MSE and never used was moved to TRC was installed at Al-Salman site by swiss expert and used for training and later in 1989 for production of B.subtilis simulant B agent . The 150l. fermenter was used 1989 ( March - June ) at Al-Salman site in production of agent B .
- 1.2.7. At the end of 1988 aflatoxin (agent C) produced in lab scale. After that, small scale production was started in 1989 using locally available equipment plus some imported small scale incubators which produced enough materials in Nov. 1989 for static test and in May 1990 for dynamic tests . However, larger quantities were produced when, the production started at Al-Fudhailiya site in Sept. 1990 and continued until Jan 1991, (see documents No. 12,13 & 167) when the activity was abandoned and the site was occupied by IPA (Centre of Agricultural Research). For more details see Chapters (V) and (VI) .
- 1.2.8. The development after Aug. 1990 and due to persistence and tough direction given by HK to increase production capacity of biological agents other production sites Foot and Mouth (FMD) & Al-Fudhailiya were affiliated to



TRC centre .

A suitable facility, the Foot & Mouth disease (FMD) was found belonging to the Ministry of Agriculture was duly taken over (See documents Nos. 6,7 & 167). This site was designated for the production of agent (A) during the period from Nov. 1990 to Jan. 1991.

Al-Fudhailiya site was designated for aflatoxin production from the period 1.10.1990 to 31.12.1990 and then from 1.1.1991 to 15.1.1991 .

1.2.9. Production of agent G ( *Cl. perfringens* ) was done in 150l. & 340l. Olsa fermenter from the period Aug. - Nov. 1990 at the Al-Hakam site .

1.2.10. The decision to produce BW agents in significant quantities was taken mainly in 1990. Before that the production was carried out in batches for the purpose of conducting laboratory studies and experiments on animals. For field trials and weaponization studies relatively larger quantities of Botulinum toxin were produced as necessary for the capacity of munitions tested. The production trend can be clearly seen from the table below and the relevant information given in this report which support this fact.

The quantities of agents produced from each type of agents A, B, & C did not follow a specific plan. However, the quantity produced was dictated by the availability of production equipment, the availability of trained operators at each stage, and the quantities needed to fill the empty munitions allocated for the BW program.

Year of prod.	Bot. Toxin	B. anthracis	Cl. perfringens	Aflatoxin
1987	10 l.*	----	----	----
1988	400 l.**	---	----	----
1989	8600 l.**	20 l. (Conc. 60 times)	-----	40 l.
1990*** (1st half)	4300 l. **	150 l.	-----	400 l.
1990 (2nd half)	5700 l. **	8275 l.	340 l.	1800 l.
1991(Two weeks)	----	---	---	150 l.

\* (Conc. 10 times).

\*\* (Conc. 20 times).

\*\*\* (See document No.13).

- 1.2.11. The quantities of biological agents A, B and G produced at Al-Hakam site were stored in buildings 35 and 23 in stainless containers 5 m<sup>3</sup> and 1 m<sup>3</sup> capacity.
- 1.2.12. In July 1991, the order was issued from H.K to destroy the stockpile of biological agent, the stored quantity of agent (A) was about 7.5 m<sup>3</sup>, agent (B) was about 3.4 m<sup>3</sup>, agent (C) was about 0.6 m<sup>3</sup> and agent (G) was about 0.34 m<sup>3</sup>. The process of destruction continued for about one month. The work was conducted in Al-Hakam Site. (see chapter VI para 6.5). A samples were taken from destruction site and the results of analysis were indicate the presence of traces of agents which coincide with Iraqi declaration .

### 1.3 Weaponization

#### 1.3.1 Weaponization field trials

- In anticipation of future requirement the D.G of TRC in 1988 gave instructions to conduct field experiments to specify delivery and dispersion means of biological agents. Owing to shortage of experience in this job, MSE was consulted to support this activity. So, field experiments were carried out by using similar types of munitions used by MSE for CW purposes ( expect for Nihrawan test ). The field tests, static and dynamic followed the same pattern of testing munitions in existence for filling CW agents. Although the tests were made intermittently over a period of two years they were conducted by the same small group from Al-Hakam and MSE without advice or consultation from the operational stand point. The trials results were finally submitted to MIC and no action was taken to pursue the weaponization suggested by the group.
- The very first field tests on BW agent simulant bacillus subtilis was conducted at Al-Nihrawan site in Feb. 1988 in order to investigate the effect of explosives and high pressures on the viability of spores and their dissemination. (See Chapter-VII).
- After the above test was conducted , the idea was first put forward, with the objective to choose real munition for field trials using simulants and test animals. Therefore all types of munitions in current production ( or imported ) were reviewed . TRC then obtained from MSE some empty munitions as samples for studies and familiarization . The samples included 155 mm shell , 122 mm rocket warhead & LD-250 , AALD 500 .



- When MSE experience was sought for munition consideration the task group selected only LD-250 aerial bomb and 122 mm rocket warhead . For ricin , 155 mm was selected for field trial . Those trials aimed to study the effect of explosives and munitions design on the dissemination and activity or viability of agents A, B-simulant, C and ricin filled in these munitions .
- Selection for final weaponization was made only for R-400 aerial bombs and Al-Hussain warheads . No other munition was filled for production purposes . For details of field trials (see chap VII & Annex 1.1 ) .

### 1.3.2. Weaponization adopted policy & implementation

After August 2/1990, HK ordered the production of 200 pieces of R-400 bomb bodies as well as 25 AL-Hussain warheads to be allocated for BW weaponization although very few static tests were made using the R-400 and not a single test was carried for Al-Hussain warhead, both tests were made for CW purposes prior to August 1990. The filling of the bombs and warheads started late December 1990 and completed on 11 January 1991. The filling activity was implemented at MSE because of CW work on similar munitions . (See Chapter-VII).

### 1.3.3 After the filling was completed for each of the two types , the filled munitions were transported from MSE and dispersed to the following sites :-

R-400 aerial bombs were divided into two lots, one lot was stored at Airstrip 37 west of Ramadi. The second lot stored at Al-Aziziya firing field in Kut..

Al-Hussein warheads were stored also in two lots, one lot at Tigris canal and the other lot at Al-Mansuriya tunnel. (For details see chap VII).

### 1.3.4. The munitions remained at those sites until the decision was taken to unilaterally destroy them late June/early July 1991. All the R-400 bombs were destroyed by demolition explosives at Al-Aziziya firing field (See doc 15 ), after a chemical destruction of the agents in the bomb was carried out. The Al-Hussain warheads were also destroyed by explosives after the chemical treatment. The destruction site was at Al-Nibae'e area (see Chapter VII ).

### 1.3.5

- The unfilled R-400 munition remained at MSE and was destroyed under UNSCOM 8 in 1991 and they were counted as CW empty munitions.

A few rejected empty R-400 bombs remaining at Al-Hakam site were thrown in the Euphrates river when the site was cleared during May/June



1991.

- The 25 filled Al-Hussain warheads destroyed at AL-Nibai'e were later declared as chemical warheads together with 20 CW warheads.
- The left over unused bulk agents were destroyed chemically & physically by autoclave at Al-Hakam site during the clearing of the site during June/1990. (For details see Chapter VI ).

#### 1.3.6. Other weponization activities

##### - Drop Tank

By the end of 1990 the F-1 drop tank was selected for modification for possible use for dissemination of BW agents from fighter planes. Accordingly, modification was made for the drop tank followed by serious test of dissemination using coloured water, mixture of water and glycerine and finally with simulant B. subtilis.

In conclusion, the drop tank modification was not completed and the result was not encouraging and needed further improvements on the system. In addition, the drop tank was never filled with any agent and never used.

#### 1.4. Other activities

- 1.4.1. At TRC in 1985 a study was undertaken by T<sub>3</sub> department to do some experiments on wheat cover smut disease and the work continue until 1990 ( see chapter V ).

Bunt (smut) of wheat disease, is considered to be one of the problems which occur in Iraq and its neighbouring countries.

At the end of 1984 a study was undertaken on bunt of wheat disease on finding suitable protective measures, and to investigate its possible use as economic weapon. Early in 1985 an area of 100 m<sup>2</sup> was planted with different ways of infested seeds with smut spores. The same experiment was repeated in 1986, the total quantity of 500 gm of smut spores was collected from these two experiments.

In Nov. 1987 an area of about 2025 donums was chosen and planted with infested seeds by different ways. The total quantity of the harvest was about 5 tons ( infected and un infected spikes ). No further work by the team was done and no attempts for weaponization were undertaken.

During April or May 1991 , an order was given to burn the stored quantity of spikes in a pit at Al-Fadhelia site .

- 1.4.2. In 1987 Dr. Al-Zubaidi on loan from the technical Medical Institute to TRC to pursue his proposals on some aerosol work for medical & protection purposes . The objectives of this were to work on design and prototype production of nebulizers for medical treatment purposes through reverse engineering of existing imported nebulizer & this continued without any significant success for about 3 months , so TRC directed the researcher to work on the dissemination of biological agents through aerosol technique , which was not successful also and so Dr. Al-Zubaidi was released from further work after August 1988 due to the failure in achieving any results & he returned to Technical Medical Institute on Sept. 1988 ( for details see chapter 5.2.5 ) .
- 1.4.3. Ricin was considered as CW agent . R&D on ricin was initiated outside TRC by a chemist Mr. Jasim M. represented the Ministry of Interior in a committee tasked with registration and control of dangerous and lethal materials . Ricin attracted his attention through studies connected with his task and he suggested that ricin could be extracted from the seed of the locally grown castor oil plants. The study was given to Dr. Shakir Al-Aqidi . After some preliminary work on extraction of ricin from castor oil seeds a small sample was prepared & submitted to TRC for evaluation . A research team was formed at TRC to follow up the investigation work for one year then the project was abandoned .

The objectives :

- To extract ricin from locally grown castor oil plants .
- To perform test on viability for use as a CW agent including field tests on experimental animals .

The work were done at Al Salman site including extraction , identification of protein and toxicity studies . In connection to field experiment MSE was relied upon to help in conducting the test . ( see chapter 5.2.7 ).

The protein ricin was confirmed to be present in the castor beans (seeds) of the plant Ricinus Communis which is widely spread in Iraq . Ricin was extracted from the seeds by crushing and water extraction and precipitation . The protein mixture - containing ricin was evaluated for toxicity using laboratory animals in 1989 , a short term project was formed in TRC to carry



out the extraction of the protein for further lab and field tests .

#### 1.4.4. Genetic Engineering :

In TRC a genetic engineering unit was suggested to be affiliated administratively to the BW group at Al-Hakam site but the working location was to remain within T<sub>3</sub> department at Al-Salman Site in March 1990. Preparatory work for establishing such unit was delayed due to several reasons such as security clearance, supplying equipments and materials.

Then it was decided to transfer the activity to Al-Hakam Site, but it was found unsuitable for such work. then a move to Al-Safa site was made .

In Al-Safa, a laboratory was allocated to be utilized for genetic engineering research by Nov. 1990 but with no actual work performed. After the war biological work at TRC ended, then the program was abolished and the staff were transferred to the university of Baghdad. (see chapter XI)

1.4.5. In July 1990 the viral activity at TRC was started by Dr. Hazim M. Ali (Ph.D in virology ) in forensic department (see document No. 14 , the letter of transferring Dr. Hazim M. Ali ) in order to conduct research on viral agents which can be used as a BW agents like intro. virus-70, Rota virus and camel Pox virus. Some attempts were made to obtain some equipment and devices. The work on all three viruses started on 01/12/1990, and terminated on 17/01/1991 (see document no. 144).

All specimen were destroyed at that time and no further work were conducted (see chapter V).

**1.5. The activities implemented for the BW program reviewed in the above are given in annexes to Chapter I in the form of tables for each type of activity and its time frame, Annex I.2 .**

#### 1.6. Objectives of the Program

##### 1.6.1 Objectives of the program for the period 1974 to 1978 .

An organization called Al-Hassan Ibn Al-Haitham was established where research and development in the fields of physics (solid state & electronics ), chemistry , and biology were to be conducted . Details of the founding of that organization and its accomplishments which came to nothing especially in the BW area are given in chapter-V. The objective of the BW part of the program was to conduct studies on viable BW agents as part of familiarization and building up the experience necessary for defensive measures . In 1978 Al-Hassan Ibn Al-Haitham was liquidated and its director with a few of the senior staff were