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NOTE BY THE SECRETARY-GENERAL

The Secretary-General has the honour to transmit to the members of the Security Council the attached communication which he has received from the Director-General of the International Atomic Energy Agency (IAEA).

Annex

Letter dated 10 June 1993 from the Director-General of  
the International Atomic Energy Agency addressed to the  
Secretary-General

Please find attached the report of the nineteenth IAEA inspection in Iraq under Security Council resolution 687 (1991). You may deem it appropriate to transmit the report to the members of the Security Council. I remain, of course, available with the Chief Inspector, Mr. Richard Hooper, for any consultations you or the Council may wish to have.

(Signed) Hans BLIX

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REPORT ON THE NINETEENTH IAEA ON-SITE INSPECTION IN IRAQ  
UNDER SECURITY COUNCIL RESOLUTION 687 (1991)  
30 April - 7 May 1993

**SALIENT POINTS**

- The nineteenth IAEA inspection in Iraq was devoted to the spring collection of surface water samples, to follow-up activities related to the verification of the Iraqi January 1993 Annex 3 equipment declarations and to various monitoring activities. A total of 33 sites or establishments were visited in the course of this inspection.
- Part of the long term monitoring effort in Iraq involves the periodic radiometric survey of the main water bodies in Iraq. This requires the collection of surface water, sediment and biota samples. Fifteen locations along the Tigris-Euphrates watershed were sampled.
- Activities aimed at verifying new information provided by the Iraqi side in their January 1993 Annex 3 declarations were carried out at a number of sites. The work is a continuation of the effort begun during IAEA-18. A number of establishments, visited for the first time by a nuclear team, were inspected for the specific purpose of verifying the completeness of the Annex 3 declarations. No UNSC 687 proscribed activities or undeclared Annex 3 relevant equipment were discovered.
- During an IAEA-18 inspection of workshops at the Al Hatteen Establishment, a large number (242) of CNC machine tools were seen for the first time. None of the machines had been identified in the Iraqi Annex 3 declaration. The opinion of the inspection team was that more than a third of the machines (94 series-3 or -4 CNC turning machines manufactured by Matrix Churchill), according to reporting requirements previously communicated to the Iraqi side, should have been declared pending a more detailed technical evaluation. The Iraqi position was that the machines did not meet the technical specifications of Annex 3 and therefore they felt no obligation to declare them. This disagreement is not limited to the Matrix Churchill

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machine tools discovered at Al Hatteen. Inspection teams have seen and, over objections from the Iraqi side, sealed for identification an additional 54 CNC Matrix Churchill turning machines located at other State Establishments. Only a few of these additional machine tools were included in the Annex 3 declarations.

Machine tool experts, bolstered with specific technical information obtained prior to IAEA-19, carried out a detailed technical evaluation of a number of Matrix Churchill machine tools located at Al Hatteen and other establishments. The conclusion of this work is that, of the 148 Matrix Churchill machine tools so far inventoried by inspection teams in Iraq, 144 do not meet the specifications of Annex 3. Judgement is withheld on 4 specific machines pending accuracy measurements planned for a future inspection.

This conclusion applies only to those Matrix Churchill machine tools that have actually been seen by inspection teams. It does not apply to any Matrix Churchill machines that may exist in Iraq which have not yet been declared or inspected. There are, in fact, indications suggesting that more than 148 CNC Matrix Churchill turning machines have been exported to Iraq and some of them may meet the specifications of Annex 3. Until this procurement issue is settled, the monitoring of the Matrix Churchill machine tools will continue to be part of the IAEA inspection efforts.

## INTRODUCTION

1. This report summarizes the results of the nineteenth inspection mission carried out in Iraq by the IAEA under the United Nations Security Council resolution 687 (1991), with the assistance and co-operation of the Special Commission of the United Nations. The mission took place from 30 April to 7 May 1993 and was headed by Mr. Richard Hooper of the IAEA as Chief Inspector. The team consisted of 14 inspectors (comprising 8 nationalities) and support staff.
2. The objectives of the mission were:
  - the collection of surface water, sediment and biota samples at selected locations along the Tigris-Euphrates watersheds in the context of the periodic radiometric survey of the main water bodies of Iraq. This work is a continuing part of the monitoring effort in Iraq;
  - to continue the process, begun during IAEA-18, of verifying information provided by the Iraqi side in their January 1993 Annex 3 equipment and materials declaration;
  - to carry out inspections at selected sites not previously visited by a nuclear team for the purpose of verifying the completeness of the Iraqi Annex 3 declarations;
  - to carry out monitoring inspections at sites previously visited.
3. Inspection activities were carried out at 33 sites or establishments. These are listed in Table 1.

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**Table 1**

**List of Sites/Establishments inspected**

1. Tuwaittha, including Locations B and C
2. Ash Shakyli storage
3. Al Nafad storage
- 4-8 Baghdad Military Installation at Taji and four separate establishments
9. Nassr State Establishment
10. Al Hatteen Establishment
11. Iskandariya car and tractor factories
12. Al Nidaa (used to be Al Rabiya)
13. Um Al Maarik (used to be Auqba bin Nafi State Establishment)
14. Badr State Establishment
15. Al Furat project site
16. Al Nassariya (Ur State Establishment)
17. Schuala (subsidiary of Nassr State Establishment)
18. Al Qaim fertilizer plant
- 19-33 Fifteen sites indicated in Figure 1 and Table 2, where water, sediment and biota samples were taken

## **ACTIVITIES RELATED TO THE RADIOMETRIC HYDROLOGIC SURVEY**

4. During IAEA-14 (September 1992) and IAEA-15 (November 1992), a radiometric survey of the surface waters of Iraq was carried out. Water, sediment and biota samples were collected at 52 locations along the Tigris and Euphrates rivers, their major tributaries and selected lake basins. The objectives of the survey were the detection of undeclared nuclear activities and the establishment of a baseline for the longer term monitoring programme.
5. The IAEA's monitoring programme for Iraq includes the periodic radiometric survey of surface waters. Current plans are to monitor water bodies twice a year. The first of these periodic samplings was carried out during IAEA-19. A total of fifteen sites were sampled. The sample collection sites are indicated in Figure 1. Sample collection procedures were described in the IAEA-15 inspection report. The results from each sample analysis will be compared to the previously established base line.

## **ACTIVITIES RELATED TO EQUIPMENT AND MATERIALS**

6. The evaluation of machine tools in Iraq vis a vis the reporting requirements contained in Annex 3 of the IAEA's long term monitoring plan has proven to be a difficult problem. Some machine tools clearly fall within the Annex 3 specifications, while others, just as clearly, do not. However, there is a large number of machine tools in Iraq where the judgement requires a detailed technical assessment of drive and feedback control mechanisms, information from the manufacturer and possibly accuracy measurements.

The performance of many machine tools in Iraq has been degraded by war damage, multiple movements in an attempt to prevent further war damage and poor working conditions and maintenance. However, the performance of individual machines can be improved through refurbishment and compensations for systematic errors by appropriate programming of the computer numerical controller (CNC). Information from the manufacturer regarding the performance capabilities of the machines, as delivered, is most important since the assessment of a machine tool must be mostly based on the capability it had when it was exported to Iraq.

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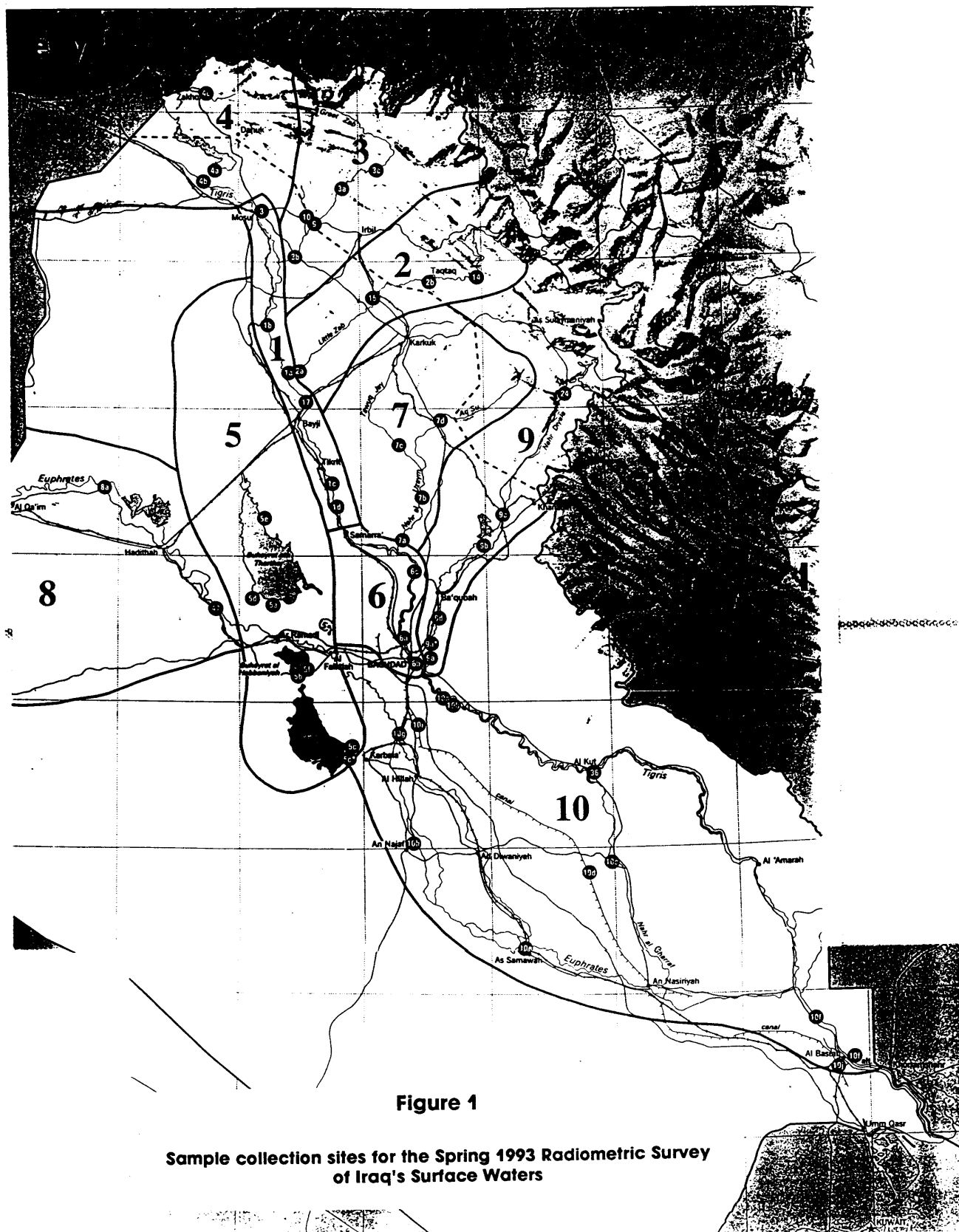
**Table 2**

**Sample collection sites for the Spring 1993 Radiometric Survey  
of Iraq's Surface Waters**

<b>Name of the location</b>	<b>Region No.</b>	<b>Corresponding number on the map</b>
Dora Expressway bridge	6	6b
Euphrates - Al Musayyib	10	10g
Route 6 Highway bridge	9	9a
Al Hadar	8	8a
Intersection Tigris canal/Tartar lake canal	5	5g
Diyala weyr	9	9b
North of Kuwayr	3	3b
Sharqat	1	1b
Tigris	2	2a
North of Samarra	1	1d
Confluence Nahr al Uzaym-Tigris	7	7a
Pontoon bridge	6	6c
Third river	10	10d
Shatt Nahr Al Gharraf	10	10c
Al Kut	10	36

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7. Prior to IAEA-18, 54 Matrix Churchill machine tools had been seen by IAEA inspection teams in Iraq. These machines, depending upon their condition (some are destroyed), were sealed for identification pending a detailed examination of their performance capabilities. The Iraqi side objected to this practice, arguing that the machines do not meet the specifications of Annex 3. Instructions to the Iraqi side were that they were to report all such machine tools existing in Iraq (as of 1 January 1989), together with their objections, in the Annex 3 declaration. The January 1993 Annex 3 declaration covered only a few of the 54 Matrix Churchill machines seen by inspection teams. The IAEA Action Team for Iraq had received indications that the numbers of Matrix Churchill machine tools delivered to Iraq were far in excess of the 54 units identified up until January 1993.
8. In the course of IAEA-18 in March 1993, an additional 94 CNC Matrix Churchill turning machines were discovered during an inspection of workshops at the Al Hatteen State Establishment. These machines had not been listed in the Iraqi Annex 3 declaration. This matter was reported in detail in the IAEA-18 inspection report. The Iraqi side again contended that they were under no obligation to declare these machines, because they did not meet the technical specifications of Annex 3.
9. An objective of the IAEA-19 inspection was to resolve the issue regarding the Matrix Churchill machine tools. Two machine tool experts, both with previous inspection experience in Iraq, were included in the inspection team. Inspection activities specific to this issue included:
  - a visit to the Al Hatteen Establishment where examples of the series 3, 4/15 and 7/48 machines were opened and examined in detail. Of particular interest was the fact that the design and location of the axis position feedback device (the "encoder") on many of these machines is not consistent with the type of precision machines covered in Annex 3.
  - A similar visit was carried out at the Nassr State establishment at Taji. Selected examples of the series 3 Matrix Churchill machines were examined. In

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addition the Iraqi side demonstrated a 2-axis displacement test using slip blocks and a dial indicator to measure linear accuracy which resulted to be outside the specifications of Annex 3. This method is not as precise as the one with a laser interferometer, but the experts judged the results to be acceptable.

- Three technical meetings on the Matrix Churchill machines were held during the inspection. Two of the meetings involved the Director Generals and senior technical personnel from the State establishments where Matrix Churchill machines were located. The Iraqi side described the circumstances under which they obtained the machines during a difficult time in the Iran-Iraq war, when high spindle capacity was badly needed for the manufacturing of artillery shells. As long as the machines were adequate, accuracy was a secondary consideration. The technical discussions were extensive.
10. The conclusion of the inspection team, discussed at length with the experts and the IAEA Iraq Action Team following the inspection, is that 144 of the 148 Matrix Churchill machines do not now meet the specifications of Annex 3. The remaining 4 machines, because of a particular controller and encoder configuration, require further evaluation. This conclusion pertains only to the Matrix Churchill machines seen by inspection teams. It does not include Matrix Churchill CNC machines which may exist in Iraq that have not been declared or seen. There are indications suggesting that more than 148 CNC Matrix Churchill turning machines have been exported to Iraq and some of them may meet the specifications of Annex 3. Until this procurement issue is settled, the monitoring of the Matrix Churchill machine tools will continue to be part of the IAEA inspection effort.
11. Facing the eastern boundaries of the Nassr State Establishment at Taji, on the right side of the Baghdad-Mosul highway, is a large military complex known as the Baghdad Military Installation at Taji. This site had been visited several times by UN Special Commission ballistic teams in view of its past connection with the missile programme (Project 144). Part of the complex was visited by Agency inspectors in the

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course of IAEA-2, IAEA-7 and IAEA-15. The area previously occupied by project 144 activities and the southern part of the site are completely destroyed and remain unchanged. The IAEA-19 team toured the whole complex and checked all major buildings. The installation is partitioned into a number of separate establishments mainly utilized for maintenance and repair of military equipment, heavy vehicles and earth moving equipment. The establishments have no manufacturing capability and repairs are made using salvaged parts. Several modest mechanical workshops equipped with machine tools were seen, but none of these were CNC type or capable of high precision. No other Annex 3 relevant equipment of interest was seen nor any special feature was noted in any of the buildings.

12. The large military-industrial complex at Iskandariya adjacent to the Al Hatteen ammunition plant, included two factories originally built for the production of tractors and buses/trucks respectively. The tractor production factory is in operation, while activity at the second factory is limited to repair work. IAEA-19 verified machine tools and other equipment of these two factories. With the exception of an horizontal flow forming machine (seen and reported in a previous inspection), no machine tools or other equipment relevant to Annex 3 was seen.
13. A detailed inspection was carried out at the Ur establishment in the vicinity of Nassariya, circa. 350 km south east of Baghdad. Ur is a large aluminium production factory where previous inspection teams had verified stocks of preformed high strength aluminium components procured for the Iraq centrifuge programme and melted in the foundry of this complex when the decision was taken to destroy evidence of this procurement. The IAEA-19 team completed a detailed inspection of this factory and verified the functions and the equipment of the main buildings. The following are currently the main production lines at Nassariya:
  - Production of aluminium window frames and aluminium foil by recycling aluminium scraps;
  - Production of copper and aluminium wire; and

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- Production of cables for power supplies and telecommunications.

Each building was exactly as explained and equipment and machine tools were of a common variety for the work being performed. Further inspections and monitoring is needed in connection with the melts and scraps of high strength aluminium existing at this site.

14. The Iraqi Annex 3 declarations contain a number of pieces of equipment in Tuwaittha - buildings 9, 82 and 90 - and at the Ash Shakyli warehouses. The IAEA-18 team had started verifying and tagging this equipment and had also initiated a systematic updating of the materials and equipment stored in the Ash Shakyli warehouse. The IAEA-19 team was mandated to complete the job at Tuwaittha and Ash Shakyli. All items declared under Annex 3 at Tuwaittha were identified and recorded with the exception of a pulse generator and a timer which were declared but not found. The Iraqi side will look for these two items and present them to the next inspection team. A complete inventory of the 25 warehouses at Ash Shakyli was drawn. At Tuwaittha, new samples of tree trunks were taken in different locations to complete a tritium survey aimed at identifying activities prohibited under resolution 687 (1991).
15. The Al Nidaa (formerly Al Rabiya) Establishment was visited on 27 January 1993 by the IAEA-17 inspection team, just ten days after the facility had been destroyed by a cruise missile attack. At that time, the Iraqi side was involved in a massive reconstruction effort. The reconstruction effort was reported as largely complete at the time of IAEA-18. Today the facility has been turned into a showcase - all destroyed buildings are nicely finished inside and out, the new administration building is occupied, the whole area is landscaped, monuments (including recovered scraps from cruise missiles) have been erected and an exhibition centre that documents the whole reconstruction is a required stop for all visitors. The purpose of the inspection was to update the equipment inventory for the facility.

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Most of the machine tools and equipment were reinstalled in the workshop buildings. The locations of the machine tools are changed from the previous inventory which had been taken last year. Many of the machine tools have been repaired. A detailed inventory of machine tools was taken during the visit and changes in the specific functions of some buildings have been noted.

A vacuum plasma spray system was declared under Annex 3 requirements at Al Nidaa. It could not be located at Al Nidaa in previous inspections because it had been removed prior to the 17 January 1993 cruise missile strike at Al Nidaa. It was agreed that this equipment would be returned to Al Nidaa to be shown to the IAEA-19 team. This visit took place on the last inspection day. The plasma spray system (PLASMA TECHNIK AG) was still dismantled in many sections and photographic records were taken of all components and ancillaries.

16. Short inspections with the objective of completing activities initiated in the course of previous inspections were conducted by the IAEA-19 team at the Badr State Establishment and at Auqba bin Nafi. At Badr the IAEA-19 team made a detailed review of the equipment and machine tools of the plant which manufactures tungsten carbide tooling bits and could confirm that this equipment and the machine tools are not Annex 3 relevant. While in Badr, a check was made on items sealed in the course of previous inspections. All seals were intact and the storage conditions remained unchanged.

At Auqba bin Nafi (new name: the Um Al Maarik Establishment), the objective of the visit was to check the possibility of using photo surveillance techniques to monitor the utilization of four large diameter milling and boring machines located in building 119. A detailed map of the building with indications of the individual machine location has been prepared for the future installation of surveillance devices.

## OTHER ACTIVITIES

17. Al Furat project site (see Figure 2) - This site was being developed by the Iraqi side as a centrifuge manufacturing and test facility when work stopped at the time of the Gulf War. According to an Iraqi statement, the site had originally been a training centre with dormitories, cafeteria and training hall to which three new buildings (B01, B02 and B03) were being added when the conversion to a centrifuge manufacturing and testing facility was decided. Building B03 - a raw materials store - was complete and buildings B01 and B02 were in the early stages of construction when work stopped. All other buildings go back to the training centre application, although building B00 (the main training hall) was being modified.

When the IAEA-19 team arrived for the inspection, they found a large workforce busy reconfiguring and refurbishing the pre-existing buildings. The Iraqi counterpart indicated that the facility now belongs to the Military Industrial Committee (MIC) and that they were preparing it for some use, but he did not know what it was. The team proceeded to walk through every building on the site. Buildings B01, B02 and B03 (i.e. those buildings added for the centrifuge programme), with the exception of scavenging for building materials, are untouched. All other buildings are being modified and refurbished. By all appearances, the site is being converted into an office complex. Even the large halls in B00 are being partitioned into halls and office size cubicles. The same is true of the former barracks indicated as B05 and B06. The site has the possibility for a large power supply. Thirteen transformer bays were counted. Only one had a transformer installed (1000 kVA), but two additional 1000 kVA and one 630 kVA transformer are available for installation. Probably the potential power supply relates to the centrifuge manufacturing application, but those buildings were being refurbished along with the rest. The utilities, ventilation, etc., being installed in buildings B00, B05 and B06 are modest. The Iraqi counterpart was requested to provide the team with a written explanation of the planned use of the facility before the team's departure. A reply was received two days later, at the time the team was leaving Baghdad. This matter which needs further clarification (Attachm.1), will be pursued during the next inspection.

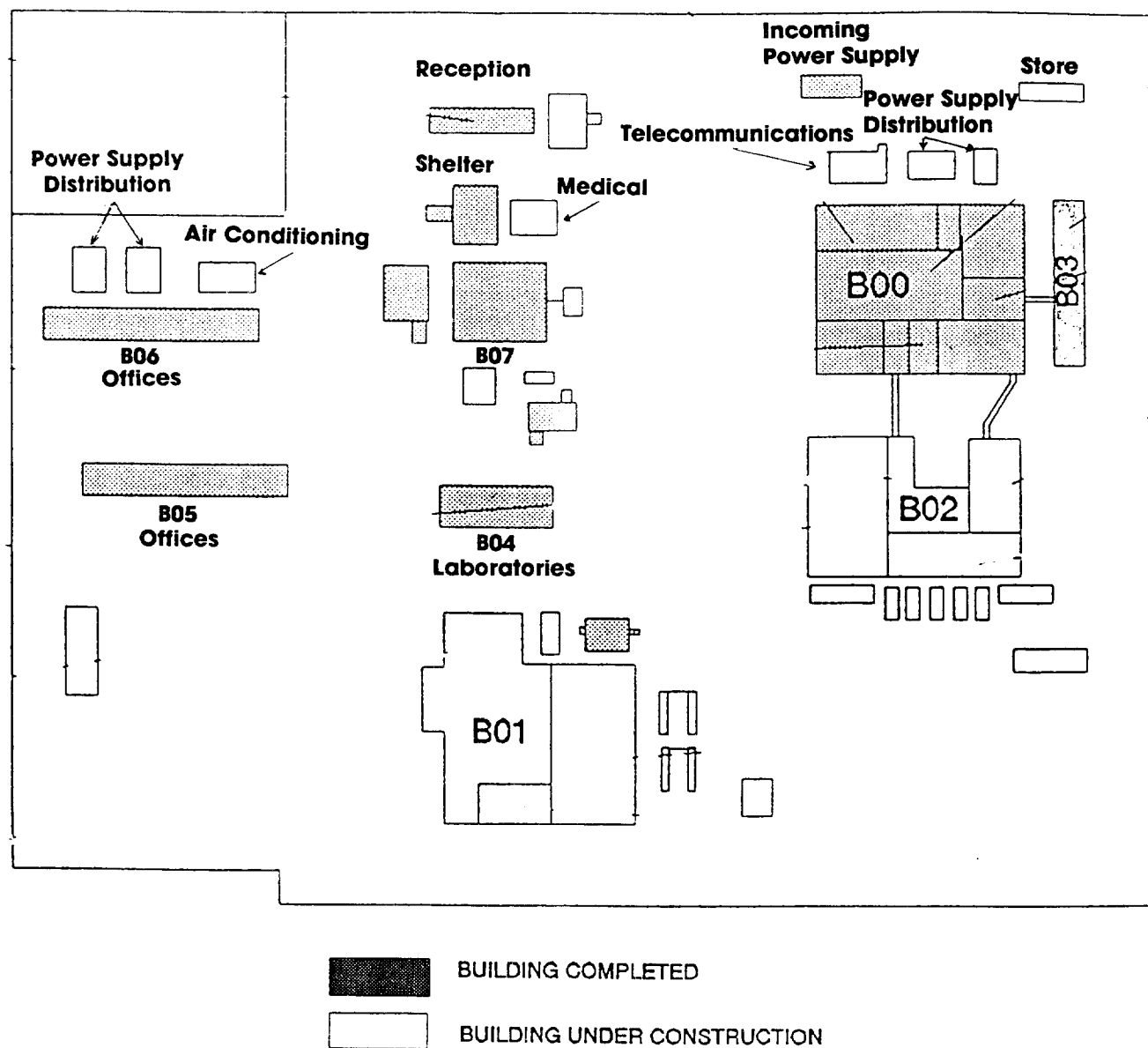
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18. Al Qaim phosphate plant - The purpose of the inspection at Al Qaim was to assure that the  $\text{UO}_4$  and associated equipment remain as it was and that no attempts are being made to recover uranium from the phosphate ore. The yellow cake ( $\text{UO}_4$ ) plant was destroyed during the Gulf War and it remains unchanged since the last inspection. The process for production of  $\text{UO}_4$  is a loop in the phosphoric acid production process. The chemical processing of the uranium bearing phosphate ore yields a dilute, uranium containing, phosphoric acid solution. After filtration and prior to concentration, this dilute solution was sent to a separate plant to recover the uranium. The raffinate was then sent back to the main plant where the dilute phosphoric acid solution, which did not contain any more uranium, was concentrated and converted into a phosphate fertilizer. The processing of the dilute phosphoric acid for recovery of uranium, including additional purification, oxidation and selective precipitation, was, according to Iraqi authorities' statements, stopped when the  $\text{UO}_4$  plant was bombed. The pipe that runs from the phosphoric acid plant to the  $\text{UO}_4$  plant was destroyed. Inspectors took a sample of the dilute phosphoric acid after the filtration cycle and a second sample of the concentrated phosphoric acid product as it is sent to the fertilizer plant. A highly sensitive radiation detector was used to examine the contents of a number of storage tanks and pipe runs. In all cases the Iraqi side's description of the use of this equipment was consistent with the detector's readings. Samples will be analyzed in the Agency's laboratories to confirm that the uranium has not been separated and is now present as an impurity in the plant product.
19. Ash Sukhayr - This is the site of a carbonate ore mine that the Iraqi side was attempting to exploit as an indigenous source of uranium. The ore reportedly contained ~150ppm uranium and the Geologic Institute, Baghdad was working on a process for uranium recovery. According to a source at the mine, work stopped at this location in mid-1990. This site is now totally abandoned and the modest equipment is encrusted with a heavy layer of rust. The mine shaft, ~75m deep with a horizontal shaft extending ~100m is flooded. Several large piles of ore removed from the mine are situated close by. The Agency will recommend that the extracted ore be dumped back to fill and close the mine shaft.

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**FIGURE 2. THE AL FURAT PROJECT SITE**



**Note:** Captions describe buildings planned utilization as declared by the Iraqi authorities to the IAEA-19 team. No details are yet available on the intended future use of Buildings B00, B01, B02, B03 and B07.

ATTACHMENT 1

93-10724 (1214n/0084n)  
Translated from Arabic

REPUBLIC OF IRAQ  
Iraqi Atomic Energy Commission  
Baghdad

No.: N 16

6 May 1993

Subject: Furat site

Sir,

The Furat site was handed over to the Military Industry Committee, as indicated in the tables showing the sites which had belonged to and supported the nuclear programme. These tables were transmitted to the IAEA on 21 April 1993.

At present the Committee is modernizing the site and putting it back into operation for one of its organizational units. There is a preliminary proposal that this site should be occupied by the Research and Development Committee.

Yours, etc.,

(signed) Abdul Halim Ibrahim Al-Hajjaj  
Head, Iraqi Inspection Team

Head, Nineteenth Nuclear Inspection Team  
IAEA, Vienna

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