Specialized Performance Audit on the policy of Ministry of Oil for development and enlargement the production facilities of crude oil and gas at Midland oil Company (National Efforts) for the period (2011-2016)
The specialized audit team has performed specialized performance audit on the policy of Ministry of Oil for development and enlargement the production facilities of crude oil and gas at Midland oil Company (National Efforts) for the period (2011- 2016) and in accordance to the adopted standards, indicators and based on the information and indicators submitted by Ministry of Oil and its formations in addition to the information derived from the field visits and the statistical charts and tables, we have the following:

1- Background:

a- Work scope

The specialized audit team has performed the application sample of Ministry of Oil and its formations as following: -

- office of Minister
- Office of inspector general
- Office of senior deputy for extraction affairs
- Technical office
- Office of studies and planning
- Office of reservoirs and fields development
- Formations of ministry
- Oil projects company
- Midland oil company

The work scope includes verifying the data, and information for the period (2011- 2016).

B- Tasks of Midland oil company

- The Central Oil Company supervises and manages the extraction of crude oil and gas in eight provinces (Baghdad - Babel - Diyala - Wasit - Karbala - Anbar - Najaf - Qadisiya) as the company performs the tasks of producing crude oil and natural gas from the oil and gas fields within its areas of operations The company has a lot of facilities which consist of pumping stations, reservoirs, gas isolation and compressor stations.
- The oil wells are all linked to the various networks of pipelines and main pipelines distributed to the company's area, through which the company provides Iraqi crude oil in the center and power plants in Baghdad and Wasit and gas associated with oil to power plants and exports of crude oil abroad through export lines South of the ports of Basra.

  - **Future vision of the company**

- The company has future projects that have significant investment opportunities for both foreign and Iraqi companies in the fields of Mansouriya and Akaz.

C- The problem of the subject of the calendar and its impact on society

The problem of the subject was reached based on the national development plan, statistical groups, and technical reports and through risk matrices, resulting in waste of public funds due to the failure to implement clear policies to expand and improve production facilities for crude oil and associated gas. Increasing the drilling and reclamion of wells and the development of reservoir studies of the fields subject to the company's activity as a national effort and thus increasing the productivity of crude oil and associated gas in particular to supply stations of the electric power, which is covered by the need for gas through the import in addition to increasing the economic return of the country due to export operations.

D- Policy approved by the Ministry of Oil for midland oil company in treating the problem

The policy of the Ministry of Oil to take measures to benefit and improve the performance of production facilities for crude oil and gas in the operations center east of Baghdad / Rashidiya area and the oil field and the gas isolation area in the Nahrawan for the period 2011-2019.

- Rehabilitation of gas isolation units at the Naft Khan station

- Reconstruction and erection of the Nahrawan gas isolation station

- Rehabilitation of the fire extinguishing system at the oil station

- Replacement of fire extinguishing system

- Rehabilitation of engineering inspection workshop

3
- Rehabilitation of civil engineering workshop
- Construction of fuel tanks
- Construction of flow pipes
- Setting up a system of filtering and pumping of pure water
- Construction of a 16-node pipeline from Al-Ahdab field to Zubaidiyah power station
- Construction of a new production line in the field east of Baghdad.

There has been an expansion in the performance of the Central Oil Company through the increase of production of crude oil and gas as a result of companies licensing rounds within the general area of the company and not the activity of the national effort.

2- Methodology of the evaluation process

In order to identify the causes of the main problem, the team, through the detailed planning stage, took the following measures:

A- Risks Analysis

The study of the data obtained and the preliminary meetings with the general managers in the formations of the ministry and the future study was identified the main problem, which will be the subject of auditing (not to exploit the production capacity of crude oil and not to take advantage of associated gas and burning it in the field of eastern Baghdad and Khana oil to the oil company Which represent the company's national effort.

The problem (not to exploit the production capacity of crude oil and not to take advantage of associated gas and burning it) was identified as a social problem as in the matrix (1) Appendix (1). The topic (development and enlargement the production facilities of crude oil and gas at Midland oil Company) was selected and the reasons for the problem were discussed in matrix 2, appendix 2 to indicate the priority of the sub-problems that lead to it:

First: the lack of drilling of new wells and the lack of reclamation of old wells.
Second: The delay of the companies executing the projects of drilling wells and maintenance of the compressors and the erection and construction of the production line.

Third: Not using modern technology in drilling operations.

Fourth: the occurrence of large parts of the field east of Baghdad within populated residential areas.

Fifthly: the company will slow down the exploitation of exploitable oil blocks.

B- The purpose of the evaluation process

The main objective of the process of evaluating performance is to contribute to address the problem of non-exploitation of the production capacity of crude oil and not to benefit from the associated gas and burning it because of its impact in filling the need of crude oil to Iraqi refineries in the center and power plants in Baghdad and Wasit and gas associated with oil to stations generating electricity and exporting quantities of crude oil abroad to support the national economy.

C- Audit questions

I- what is the policy of the Ministry of Oil to expand and improve the production facilities of crude oil and gas for the Central Oil Company?

II. Are there technical publications for the project?

III-What are the contracts for the project? A disclosure includes all the information and data related to it?

IV-What are the plans for the development, expansion and rehabilitation of the company's crude oil and gas production facilities?

V: What are the total costs spent on development projects to date?

VI: What are the priorities of the contract (rehabilitation of Company's compressors) and what technical feasibility study if any and all technical reports and minutes of the meeting related to the contract?

VII- What are the contract documents for the work of the compressor to work on nitrogen?
VIII- What items are to be supplied within the contractor's obligations?

**D-audit standards**

- National Development Plan.
- Technical and annual reports issued by the company.
- Minutes of meetings of the Board of Directors of the company.
- Reservoir study of the field east of Baghdad.
- Standard of ABI.
- The company's investment budget for the years 2011-2016.
- Instructions for executing government contracts.
- All decisions and instructions.

**E- Results of the evaluation process**

The policy of the Ministry of Oil to expand and improve the performance of the production facilities for crude oil and gas to the Central Oil Company, which includes mainly the development and rehabilitation and increase the capacity of the units of eastern Baghdad and oil fields, which represent the fields of the national effort of the Midland Oil Company through the drilling of new wells and add a second production line in the field of eastern Baghdad, as well as increasing the capacities of the reservoir and the investment of associated gas, below clarification from the above fields:-

**First- Field east of Baghdad**

The length of the field east of Baghdad is more than 120 km and a width of 5-7 km and extends to the north-west-south-east and extends from the east of the city of Essaouira in the south-east to the Nabai area in the north-west, cutting the center east of Baghdad and can be divided geographical areas of the field as follows:-

1- The northern extensions and the Nabai area.
2- The northern part of the field includes the residential, third and taji areas, which are located between the Diyala River and the Nabai area.

The field of Rashidiya was selected as the first experimental area for the purpose of studying the development of the field of eastern Baghdad from the geological and reservoir aspects and gaining experience with the experience of the drilling in the production communities as well as the experiment of dual completion and industrial lift with gas and reservoir behavior in relation to the effect of water injection.

(3) The southern part of the field is located south of the Diyala River

The field of eastern Baghdad is a convex fold affected by long and transverse faults and saturated and contributed to the division of the field into separate sections, each containing the vents and levels of contact of fluids vary according to the locations of the reservoirs for the structural situation in it

The main reservoirs in this field are the reservoirs of the formation of Altnma and Fertility of the Cretaceous and the upper composition of Zubair of the Cretaceous era, the lowest oil concentrations in the field distributed throughout the field can be divided into several areas according to the geological study of the Cretaceous reservoirs of the field east of Baghdad, strict from the North Oil Company in 1990 As follows:

- Essaouira area
- The 7th of April Region
- Residential area
- Al Rashidiya Area
- Taji area
- Al Nabai area

The original oil reserves of all the fields of eastern Baghdad, including Haritha, Saadi, Al-Kafil, Rumaila, and River Umr, as well as the producing reservoirs (Al-Tanumah, Al-Khayeb and Zubayr), are known to the audit
team and have been blocked for its confidentiality. According to the French study, the number of wells dug in the field of eastern Baghdad until 2017 are 97 wells.

As for the southern region, the number of dug wells in the southern region is 17 wells (8 wells) within the southern region and (9) wells within the southern region. In its 2016 study, China's Xinhau Company proposed drilling of 134 wells to develop the area, (77) wells for the production of oil reservoirs (Altnuma and Fertility and Hareth) and 57 wells to inject water and produce at the rate of 40 thousand barrels per day and 33 thousand barrels per day of Altnum and Fertility and 5,000 barrels per day of Zubair reservoir and 2000 barrels of two days of the reservoir and the value of the API reaches to the oils of southern region is between 15-38. The images below are illustrative of the nature of the reservoir field.
Second: Khana oil field

The oil field is located on the Iraqi-Iranian border and the length of the field is 20 km and the width is 4 and 5 km. The average elevation of this field is 590 feet above sea level and about 140 km northeast of Baghdad. The main reservoir is the reservoir. The first well was dug in the field in 1923. In 1927 to feed the Lund refinery
to cover domestic demand. In 1976, the oil was exported to the refinery of the cycle. Two years later, production from this field reached 23 thousand barrels per day. The current production rate is 2,000 thousand barrels per day. Where the cumulative production of this field (182,906) million barrels and the remaining oil reserves known to the audit team for confidentiality. The total number of wells in this field is 41 wells, 32 of which are in the Iraqi side. The wells currently produced in this field are only 4 wells and the rest of the wells are either controlled or closed or abandoned and the original oil reserves to the original reserve of this field in the Iraqi side is known to the audit team has been blocked for confidentiality. The images below are illustrative of the nature of the reservoir field.
E- Production rate

Through the study of the annual technical reports of the company's oil center for the production of the national effort and production through the companies licensing rounds operating within the fields of the oil company to the middle show the following:-

First:- crude oil

The two tables and chart below show the crude oil production rates of the company through the fields of national effort and licensing rounds.

From the above tables we note the following

1-The lack of real development in the productivity of crude oil field east of Baghdad, where we note the rise in production ceiling since the establishment of the company in 2011 to date, while the decline in production rates for the field of oil box decreased by estimated at -77.9 which represent the activity of the national effort of Midland Oil Company despite the disbursement of amounts amounted to (35792813000) in order to expand, develop and improve the production facilities for crude oil and associated gas within the company's facilities and according to the progress report for work in September 2017 issued by Midland Oil Company in 2017.
2- We noticed there is a significant increase in the production rates of the fields invested by the companies licensing rounds (Badra and Alhaddab) and managed by the Russian company Kazprom and Chinese Waha.

**Second: Associated gas**

There is no exploitation of the quantities of associated gas produced in the fields of eastern Baghdad and the oil box where about 99% of the quantities produced are burned.

Through the field visit to the work team it was noted that the exploitation of gas associated with investment in the field of Badra / Kazprom Russian company about 50% of the gas produced, noting that the investment field of the field of Badra is in the initial stage and the card production line only one of the two lines planned to be launched and pilot for the month of December 2017 by the secondary contractor (Samsung) executing the associated gas exploitation lines in the field.

In the field of (Ahdab / China Waha) the rate of exploitation of gas associated with the amount of more than 80% of gas produced.

- The nature of the gas (field of Badra) is acidic gas, where the team found during the field visit through the examination of the reports of laboratory testing of gas that contains H2S In quantities ranging from 3000-70000 PPM in some wells note the conditions of the API for oil industries as follows:-

1- Non-hazardous does not require protective devices.

2- Low risk of less than 10 ppm.

3- The average risk ranges from 10-15 ppm.

4- High risk greater than 30 ppm.

Exposure to levels above 500ppm leads to immediate loss of consciousness, immediate self-inhibition, and death. The laboratory results of the gas showed that the sulfur content of the gas became a sweet gas within acceptable limits (1. 250 ppm). This refers to the
efficiency of the work of gas-related desalination units, although these units are within the initial pilot operation prior to receipt.

**Drilling and reclamation of wells**

First: The wells produced in eastern Baghdad (41) wells only, while the wells produced in 2011 base year is (27) wells, that is, only (41) wells were introduced into service within 6 years.

This indicates the slowdown of the company in the process of exploitation of this field in real, which requires speeding up the pace of work and planning to exploit this field for the purpose of ensuring that the rapid urban expansion of the city of Baghdad is not covered for large areas of it and therefore reflected negatively on the utilization of the resources of this field. In particular the southern and southern regions of Diyala (Basmayeh and Nahrawan) as well as the northern regions, which extend from the Rashidiya and Al Nabai area, which contain large areas suitable for exploitation and are adjacent and in direct contact with areas of urban expansion and offer to be within the areas affected or exceeded Making it difficult to exploit.

Second: No drilling and reclamation work was observed in the oil field of Khana, where no one well was drilled during the calendar years in the field, although this field contains oils with good quality and high APIs reaches to (41-44) as well as it is a joint oil field with the Iranian side, which in turn works to exploit this field regularly in the section next to the border, which led to shortening the oil column within the reservoir of this field, which ranges from 7 to 13 meters after it was about 300 In the early years of production.

- The nature of the geological field and the structure allows the oil to migrate to the Iraqi territories. The increase in the migration pattern is the decrease in the reservoir pressure which will result in the production of gas from the gas dome in the field which has not been exploited to date. Therefore, one of the studies previously prepared by the Department of Oil Reservoirs around the field Proposed the production of gas from the field through the gas dome and the suggested rate of the proposed at the time is 25 cubic meter per day as this study showed that it can take advantage of the field
equipment (Kurmur) which allocated to the Mansouriyeh field that stopped production and conversion of use of oil field. According to the letter of the Ministry of Oil / Department of Studies, Planning and Follow-up number (2792) in 2010, which also suggested that the difference of quantity of gas to access the energy of design equipment through the production of gas from the field of Tal Ghazal near the oil field and reach the rate of production 100 cubic meter per day.

**F- Projects development plans**

An operations center was established in the field of eastern Baghdad in the eighties of the last century and was a pilot project called the pilot project based on the recommendations and study of the Total French company to develop the field east of Baghdad in order to ascertain the conclusions of the study and the acquisition of additional reservoir information to promote the study and develop a plan to develop the field through production Continuous for one or two years. Therefore, it was established with one production line (SINGLE TRAIN) entered the service in the late eighties of the last century or at the present time was the establishment of a series of projects to expand and develop production facilities in the field and we have the following concerning this matter :-

**FIRST:** The project of establishing a crude oil production line in the East Baghdad field

The development plan included the construction of a crude oil production line for a field in eastern Baghdad with a production capacity of 3000 barrels per day. The contract was signed with the Italian company PEG for the purpose of constructing this line at a total cost of 63000000 dollars in EPCC style and with an executive period of 20 months, in order to provide the possibility of maintenance work for the first production line Non-stop production field, as well as to accommodate the future increases resulting from the drilling of new wells and we have the following:-

1- we didn't know what are the reasons for direct invitation to some companies to set up the second production line without announcing it as a tender, where the invitation was made to 10 companies,
noting that the contract is non-monopolistic and that the companies that submitted their bids are four companies, one of which was excluded because the technical offer is not identical either. The remaining three of them do not have similar works, as stated in the external tender analysis form for the project.

2- The offer of the Italian technical company BEG was considered 97%, which is the highest among the companies submitted on the project, but at the implementation of several technical problems are still existing and identified in the report of the Committee of the initial receipt was not resolved to date and remember them according to the sequence of departments and sections.

**Technical notes concerning the implementation of BEG Production Line**

- 1- the irregularity of the work of the oven normally until now, despite some adjustments by the PEG, where it gets continuous stops, which adversely affect the operational conditions for processing oil.

2- The irregularity of the work of the local dehydrator in addition to the instability of the work of the electric transformer affiliated to it, which is an important equipment in the treatment of crude oil.

3- The emergency closing valve of by-pass line between the second and third gas insulators does not function normally.

4- Non-activation of the corrosion protection system on the gas line outside of the third buffer to the emergence of H2S- CO2 gas with water in the results of test.

5- The analyzer PH METER needs to be calibrated to adjust its action.

6- The analyzer OXYGEN on the water line needs to be calibrated.

7- The steam boiler was run on a stage FUEL and was working well but was not run in the second stage DESAL, which is considered the most important stage in the boiler in cases of stop production line and maintenance work.
8- Gas counter for the third gas buffer has stopped despite the fact that BEG works on the meter.

9- The water pipes of the services were switched to drinking water with a new pipe of type BBR. However, the crossing areas were not changed by the type mentioned. After the samples were taken from the water before and after the pipe in order to know the percentage of iron oxides which showed negative results.

**Department of Control and Systems**

1- Interface level transmitters on the 1st stage doesn't work properly.

2- Interface level transmitters on the 2st stage doesn't work properly.

3- Interface level transmitters on the dehydrator doesn't work properly.

4- Interface level transmitters on the desalter doesn't work properly.

5- BS & W doesn't work properly.

6- The gas flow meter on the 3 stage doesn't work properly.

7- Existence of leakage in the control valve.

8- Temperature treatment in water doesn't work.

9- Operating work station in dcs system is freezing.

10- Existence of leakage in the control valve.

**Mechanical department**

1- Existence of leakage in the pumps:-

   - 01-P-101A
   - 01-P-102A
   - 01-P-103A
   - 01-P-1035
   - 01-P-105A
   - 01-P-105S

2- By matching the charts and the reality of the case, there are some differences according to the numbers of the plans.
A- In fact, the tube is 3/4, whereas in the diagram it is 1, the tube must be changed to be as in the diagram.

B- The presence of a 3/4 gauge valve instead of the blind flange in the oil line processor with a branch on the same line and not in the diagram.

C- Change Flange locations and Valve in the air line for control and systems.

**Electrical department**

1- The Commission did not obtain final readings authenticated by any party from the company and the work of the system cathodic protection is unstable.

2- The system protection of the fire extinguishing system that needs to be re-calibrated has not been activated. In addition to the need to regulate the running sequence of pumps fire system according to the manual operation.

3- The contractor' has not provided the final acceptance committee with the software and accessories related to the maintenance and diagnosis of malfunctions of the systems and has not yet been trained by specialized persons.

4- The fire system for the new power station for the second production line has not been activated.

**Department of Transfer of Ownership**

1- Gas meters have been set up in the direction of the flame by BEG. However, the commitment made by the executing company and the project management is not binding on the transfer department because it undertakes only normal operation and not the accuracy and validity of the readings. From the date of his appointment.

2- Maintenance was done on the first and third insulation counters, but the third buffer meters are still idle and out of work according to the PEG report.
3- The water meter was returned to the first local buffer and needed to be calibrated to work.

4- There is no written approval from the project management regarding the conversion of gas meters.

5- A crude oil meter in the direction of the export tanks began with faked readings during the general firefighting process, forcing PEG to open the meter and maintain it. However, the meter did not work correctly after the operation. There were large differences between it and the reservoirs.

**Civil works**

1- Existence in the concrete walls surrounding the KOD system at the joints of the mold, which requires the injection of these openings.

2- Non-screening of the joints of the extension of the material of the mastic or poly sulfide as required.

3- The presence of specific cracks concerning the system of water treatment.

4- The presence of specific cracks.

5- There is no buckle in the system of close drain unlike the charts.

6- Failure to complete the observations of the First Receiving Committee regarding the joints where all the observations have not been completed.

7- Do not assign pipe concerning the system of RO with concrete supports.

8- There was supposed to be a pump to drain the water collected in salier.

**Notes on the management of the project in the midland oil**

1- All drawings approved by the technical committee and the advisory office according to the administrative order NO (219) on 10/2/2014.

2- Certificate of origin for equipment, equipment, pumps and any importation material and calibration certificate for meters approved by the Iraqi Embassy and commercial attaché in the country of origin.

3- Form No. 13 approved by the Director General of the entire project.

4- Approvals for the design of the fire equipment container by the midland Oil Company.
5- Fundamental Approvals for Oven Modification of the Main Supply.

6- Lack of access to the project design capacities.

(3) The contract with PEG Italia and the midland Oil Company did not include the points of connection between the new production line and the old line, which would give flexibility in the production processes and also for the purpose of carrying out maintenance work on one of the facilities. This is one of the reasons for the construction of the second production line, the contract was signed, forcing the company to sign an extension contract with PEG to do the linking work and $850000 dollars. These additional costs could have been exceeded if there was a technical study integrated with the purpose of the project and the reality of the field. Note that the processing of pipes and valves are the duties of PEG.

(4) The construction of the second production line in the field of eastern Baghdad amounted to 63 million dollars, as was previously indicated, while the audit team during the visit to Al-Ahdab field found that the cost of constructing a production line with the same design capacity of 30 thousand barrels per day is (21237752) us dollars. Each with a capacity of 30 thousand barrels per day amounted to (42475504) US dollars in a period similar to the period that was contracted by the oil company with the center of the Italian company BEG. This represents a large difference in the amount of the contract up to $105.1 million, noting that the initial tender for the Italian PEG was €19350000 and $25,400,000, but that the call was re-directed for the second time for the purpose of adding some paragraphs and this does not mean that the offer rises to $63 million just for some Additions to be within the estimated cost range.

(5) The production capacity of the two crude oil processing lines in the East Baghdad field has reached 60,000 barrels per day (bpd) by 30,000 barrels per day per production line. There has been an increase in production since the establishment of the company in 2011 until where the annual reports of production in the company showed that the annual production rate is 10000 barrels per day and this is contrary to the objective for which the production line was created.

According to the technical opinion that this reflects negatively on the efficiency of this production line as a result of consumption and a rate of
less than one third of its design capacity as well as it will be economically inefficient.

**Second: Compressors**

The draft rehabilitation and development of the East Baghdad oil field of the midland Oil Company included the installation of gas Compressors for the purpose of exploiting the associated gas produced from the field and its use mainly as fuel to the Quds thermal station for the production of electrical energy of the Ministry of Electricity, in addition to using part of it for injection purposes Increase field production. Seven Compressors were built by the Italian company Dresser Rand, which has been in the field operations center since 1986 and was installed in 1989. These Compressors did not enter the service to date, as they were not operated even if experimental.

Due to the long period in which these cables were left without operation, the rehabilitation of these Compressors was directed and according to the field visit of the deputy of the Ministry to the headquarters of the North Oil Company / Department of Oil fields of the center through which the oil projects company in cooperation with the cadres of the Central Oil Field rehabilitated the system of Compressors according to the letter of North Oil Company number 565 on 9/6/2005 and according to a memo sent from the Department of Mechanical Engineering to the Engineering commission on 11/3/2007, Which showed the lack of clarity What is required to restore the rehabilitation of the Compressors and light of the source and to avoid any technical obstacles was proposed to send cables to the main factory or one of the companies authorized for the purpose of full rehabilitation and training cadres in the factories of the manufacturer on the work of rehabilitation of the cabins and the installation of control systems in addition to the maintenance and operation of special electrical panels to operate variable speed motors and to purchase a new integrated control system with control devices.

On 31/3/2009, the contract was signed between the Oil Projects Company and GTS company- UAE for the rehabilitation of the 7 stations in Jebel Ali, UAE, for a period of 6-7 months starting from the opening of the credit in the amount of 13695518 US dollars on 13/9/2009.
According to the technical opinion that the approval of the rehabilitation of these Compressors is a decision is not successful in terms of practical and economic because of the following:

1- These Compressors are old fashioned and have been stopped manufactured by the manufacturer as described in the letter of the midland Oil Company No. (20510) on 8/1/2012, where the company called for the provision of spare materials for ten years because of the availability of these materials in addition to the work of these Compressors will require many modifications and complex maintenance.

2- As a result of the above mentioned, the rehabilitation process included the modification of high pressure compressors to operate the system of gas seal with the use of nitrogen gas as a modern and internationally approved system instead of Oil Seal as an old technique, according to the letter of the midland Oil Company No. 250 on 8/1/2012 where 60-m nitrogen production unit was imported by midland Oil Company in a contract with Eagle Bergman company At a cost of 1850000 US dollars for the purpose of providing nitrogen gas for the operation of Compressors and thus became the total cost of the paragraph rehabilitation cavities (15545518) US dollars, while the team and through the field visit to the field of Al Ahdab of the midland Oil Company, the Chinese Oasis Company installed a system of integrated treatment of gas accompanying, Part of it during one year only and began to supply the station Zubaidiyah to produce electric power in the province of Wasit dry gas and at a rate of 60 per day and according to the letter of the midland Oil Company No. 922 on 17/9/2014.

The cost of processing the modern cables used in the field of Ahdab (620000000) US States for one cup, including spare materials for two years and according to the letter of the Central Oil Company on 20/11/2014, indicating the absence of any technical and economic study for the rehabilitation project compressors field Baghdad.

3- The weakness of the procedures taken by the Ministry of Oil in the company of oil projects in the right of the UAE GTS to date, despite the passage of eight years of the contract with the company knowing that the contract period ranging from 6-8 months only did not enter any company to work and was given 3 months to the company for the purpose of completing the control systems and control systems and the prevailing
systems for the purpose of the formation of Compressors only that the remaining Compressors are run later and according to the minutes of the meeting held on 29/10/2017 between the contracting company and the Ministry of Oil represented by the oil projects company (the contracting authority) and the center oil company (the beneficiary) in addition to the departments of studies and economic and technical inspector general, the letter of the oil projects company No. 10947 on 5/11/2011 that the two Compressors will exploit 20% of burning gas.

(4) Development work

The plan for the development and expansion of crude oil and gas facilities in the fields of eastern Baghdad and Naft khana included a series of supporting works in order to contribute to the development of the productivity of the two fields through a series of contracts such as the contract for the establishment of additional tanks in the field of eastern Baghdad and the field of Naft khana, as well as many orders for the purpose of processing equipment such as pumps and valves and heat exchangers in addition to the maintenance and rehabilitation of systems such as fire and safety system.

In addition to the loading systems for crude oil in return, we did not notice any development in terms of production of crude oil or exploitation of associated gas. According to our technical opinion, the company had to focus on the development of actual production in the fields through the development of drilling and reclamation wells in order to increase production, available from the field of eastern Baghdad, as well as the development of oil production and gas exploitation of Naft khana field.

Support and development of production

First: the prevailing things

Through the study of the technical reports of the company and field visits, we note that the company does not maintain the pressure of the oil reservoir in the field of eastern Baghdad within the areas exploited the field and the oil field of either through the injection of gas or water by injection wells and lifting gas, which also increase the quantities of crude oil. The product and the preservation of wells from depletion. In return and through the field visit to the field of oil Ahdab observed that the Chinese Oasis company
using water injection for the purpose of maintaining the pressure of the reservoir and thus stability of production and maintain the reuse of water used in crude oil washing the product after the treatment of water in technical units in addition to the drilling of artesian wells for the purpose of providing sufficient water for injections.

I: Modern technology

-first :-Drilling techniques

To date, the Central Oil Company has not used modern drilling techniques such as slurry or horizontal drilling in the fields under its responsibility as a national effort. It relies on vertical wells that require land acquisition, which in turn costs the company huge amounts. Of these amounts, especially in the field of eastern Baghdad with large areas, where they can exploit the areas located within the area of the site of the field of eastern Baghdad within residential areas In addition to the agricultural land with private ownership. The use of this type of technology is not expensive compared to vertical drilling and the table shows the cost of drilling wells in the form of vertical and horizontal and according to layers of reservoir described in the production reports of the Ahdab field and provided to the team during the field visit.

2- Modern drilling equipment and techniques

This equipment is modern and advanced technology to give a more accurate evaluation of the wells than the old drilling machines and we have the following concerning this:-

A- Measuring while drilling equipment

It is used in directional drilling (diagonal drilling and horizontal drilling) where it gives readings to the surface to control its direction, speed and determinants and are linked behind the mud motor.

- The device consists of a battery and sensors. These devices read the data and are sent to a part inside MWD of the so-called PULSER, which conducts the pulses in the drilling clay by opening and closing. These sound impulses are transferred to the surface and are sensed by
surface devices that interpret and read the impulses to digital data displayed on the screen.

- The MWD is providing drilling data as following:
  1 - The general direction of drilling as horizontal angle for the north and the vertical angle and angle of the mud motor from the two face angle.
  2- Depth, rotary speed, penetration rate of rop, torque, temperature, vibration, weight on BIT, and mud flowrate.

- The number of working hours of MWD depends on the life of the electric battery, with a life span of up to 200 continuous working hours.

- In the field of Ahdab, MUD is used in contract with two companies OIL DQE & ANTON according to the following specifications:
  - DQE equipment of 8 1/2 "12 1/4", 6 "working in a water-based or oil-based clay with a density of 1.02 to 1.5 g / cm3 and an operating life of 240 hours.
  - equipment of ANTONOIL company of 1/2 "8", 6 " size working in a water-based or oil-based clay with a density of 1.02 to 1.5 g / cm3 and an operational life of 260 hours.

**B- LWD:**

- LOGGING WHILE DRILLING is used in all types of drilling to take the LOGGING during the drilling to give more accurate readings than the traditional concrete operations for the non-affected layers drilling holes and others, and the working principle of the LWD is similar to the full MWD work principle above Except that they contain sensors instead of sensors.

- The LWD shall give the well data exactly as the data provided by any ordinary column, such as the GAMA RAY sensor, density sensor, salinity, stratification, permeability, permeability, etc.
Conclusions

1- The development of production in the fields of the national effort of the company since its establishment in the year / 2011 to date, which led to a significant reduction in production in the oil field and not to dig any productive well in the field above, while there is a clear imbalance in the work of drilling wells and reclamation. The field of eastern Baghdad where the number of wells produced in 2017 (41) wells while there were (27) wells in the field in 2011.

2- The Department directed invitations to companies regarding the establishment of the second production line for crude oil in the field of eastern Baghdad, noting that the contract material is not monopolistic.

3- Failure to liquidate the technical problems of the production line with the company PEG despite the existence of technical problems and diagnosed in the report of the initial receipt and confirmed by the final receipt committee by writing on 5/10/2017.

4 - There is a big difference between the amount of the company contract PEG for the construction of the second production line and the contract to establish a production line with the same capacity of the field of Ahdab oil, where the difference amounted to (10.51 million) dollars (ten million and five hundred and ten thousand dollars) as well as not include a contract PEG paragraph to link the new production line and the old production line, which cost the company an extra cost.

5- It is not clear to us that there is a clear policy for the company to exploit the associated gas produced from oil extraction operations in the fields of national effort.

6. The company's delay in the rehabilitation of the compressors equipped since 1986, which was installed in 1989 and did not enter the work until its date. This has an important effect in exploiting the gas wealth in terms of its use in power stations and injections to increase the pressure of the reservoir and thus increase the field
production In addition to the lack of economic feasibility to restore the rehabilitation of these compressors.

7- Failure to take the necessary measures to maintain the reservoir pressure in eastern Baghdad to sustain fields of Omar and thus increase the field production of these wells, such as the use of water injection.

8- Not to use the equipment of modern technology for exploration (MWD, LWD), which gives accurate detailed data about the oil reservoir as well as modern drilling techniques such as horizontal and oblique drilling.

**Recommendations**

1- Expediting the oil blocks available from the field east of Baghdad, especially in S1, S2 because they are uninhabited.

2- Investigate the direct invitation provided to the companies regarding the second production line contract, noting that the executed work is not monopolistic.

3- Speeding up the necessary measures against the Italian PEG company to solve technical problems.

4- Open an investigation about the contract of PEG Company to find out the causes of waste.

5- Accelerate the taking of measures that would exploit the associated burning gas resulting from extractive processes.

6- Take the necessary measures that will resolve the issue of the UAE GTS and conduct an investigation into the reasons for the delay in achievement.

7 - Develop a plan to maintain the hidden pressure for the permanence of work wells.

8- Adoption of modern technology in the exploration and drilling.