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IRAQ OIL SECTOR RAPID ASSESSMENT

31 AUGUST 2015

This publication was produced for review by the United States Agency for International Development. It was prepared by the USAID-Tarabot Oil Sector Assessment Team.



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Contracted under AID-267-C-11-0005

USAID-Iraq Administrative Reform Project "Tarabot"

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ACRONYMS

ABOT	Al Basrah Oil Terminal
API	American Petroleum Institute
CCR	Catalytic Reforming Unit
CMMP	Central Metering and Monitoring System
CLDP	Commercial Law Development Program
CPA	Coalition Provisional Authority
FEED	Front End Engineering Feed
GoI	Government of Iraq
GPS	Global Positioning System
GPRS	General Packet Radio Services
HLV	Heavy Lift Vessel
ICOEE	Iraq Crude Oil Export Expansions Project
IG	Inspector General
INES	Iraq National Energy Strategy
IOC	International Oil Company
ISIL	Islamic State of Iraq and the Levant
ISIS	Islamic State of Iraq and Ash-Sham
ISRAR	Iraq Solutions for Administrative and Regulatory Reform
JICA	Japanese International Cooperation Agency
JOE	Japan Oil Engineering Company
KAAOT	Khor Al Amiriyah Oil Terminal
LC	Letter of Credit
LPG	Liquefied Petroleum Gas
Mbpd	Million Barrels per Day
MoD	Ministry of Defense
MoF	Ministry of Finance
MoO	Ministry of Oil
MoP	Ministry of Planning
MoTR	Ministry of Transportation
MRC	Midland Refinery Company
NGL	Natural Gas Liquids
O&M	Operations and Maintenance
OECD	Organization for Economic Co-Operation and Development
OPDC	Oil Products Distribution Company
PPR	Plateau Production Rate
PM	Project Management
PMI	Project Management Institute
PSC	Production Sharing Contract
Psia	Pounds per square inch absolute
RFB	Remuneration Fee per Barrel
RFP	Request for Proposals
SBD	Standard Bidding Document
SCADA	Supervisory Control and Data Acquisition
SCOP	State Company for Oil Projects
SOC	South Oil Company
SOE	State Owned Enterprises
SOP	Standard Operating Procedures
SOW	Scope of Work

SPM	Single Point Mooring
SRC	South Refining Company
TBI	Trade Bank of Iraq
TSC	Technical Services Contract
USAID	United States Agency for International Development
USG	United States Government
UXO	Unexploded Ordinances
VLCC	Very Large Crude Carrier

EXECUTIVE SUMMARY AND RECOMMENDATIONS

Problem Statement

Iraq's oil sector, following recent "good years" of rising oil prices and increased oil production, is now facing its most daunting challenge in the decade since the nation regained its sovereignty in 2004. The 2014 ISIS/ISIL/DAESH insurgency in the north, plus the precipitous fall of the international price of oil, and key, long-neglected managerial, organizational, and political problems within the oil sector, have created a crisis for Iraq, most notably revenue shortages due to ISIL-caused damage to northern oil installations and the falling oil prices, and a number of on-going critical refinery and export projects stalled due to procurement and management inertia. As a medium income country, Iraq will be able to pay for the security and development assistance it needs. However, the GoI immediately needs expert assistance to address existing inertia while rapidly closing gaps and overcoming a range of obstacles that inhibit heightened oil revenue. The decrease in oil revenues impedes oil sector intervention investments, while also impacting negatively on the financial health of the entire government.

USAID Approach

Into this challenging situation, USAID has proposed a special type of review—a Rapid Assessment of the Oil Sector that must consider the problems (1) across a **wide swath of issues**, including technical, economic, organizational, and political in order to (2) identify **specific targeted interventions** that can assist Iraq to (3) **improve oil revenues** in a (4) **short space of time**. The Assessment was directed to recommend specific practical actions, investments, and interventions that will begin to show results within 10 months.

Prioritization of Recommendations

This assessment presents 19 specific recommendations for actions, investments, and decisions that meet the above listed four criteria. In every case the cost of addressing the problem is very small in relation to the estimated financial gains from solving the problem.

Export Projects. Based on potential rapidity and size of estimated cash flow impact, we propose that the four export-related projects have a first priority. These projects are: Expedite Completion of Single Point Mooring #5, Expedite Completion of JICA SEALINE, Improve Maintenance of Export Facilities, and Reduce Weather Outages at SPMs. The costs of further delay in addressing these are very large, and since these projects have been in process for a number of years the causes of delay are known. Also, with recent increases in oil production and even in refining, the problems of exporting oil to international markets are arguably the most important bottleneck to increased revenues.

Refinery Projects. The three recommended projects for Doura Refinery are: Install Isomerization Unit, Install Catalytic Reforming Unit, and Re-bid Tender for Heavy Boilers Project. The four recommended projects for Basrah Refinery are: Fix Contract problem with Refinery Boiler System, Adjust operations to reduce salt content in Crude Oil, and Fix Spare Parts Procurement for Reforming Unit. These projects are pressing especially because of the current closure of the Baiji refinery due to the ISIL insurgency. These are existing facilities that greatly need the proposed improvements to update their technology and improve their efficiency. These recommended projects will quickly improve revenues (partly by reducing the amounts of refined fuel currently imported by Iraq) while at the same time avoiding more serious problems in the very near future. Once the Export facilities are no longer the bottleneck for increased revenues, refining capacity and quality will become the bottleneck if not addressed during the next 10 months.

Improved Oil Products Distribution. The plans to automate three elements of **distribution** address an embarrassing and widespread corruption and theft of the nation's most important commodity. These three

projects are: GPS Tracking System for Tanker Trucks, Expand Metering to all Points of Transit, and Improve Service Delivery to Citizens. The proposed automation of the distribution network is long overdue, in comparison to other countries. Most important, although the recommended projects for the distribution system do not provide as high a level of revenue improvement as some of the projects in export and refining, they will have a widely-felt impact on the daily life of citizens. And the costs of these projects' implementation are small in comparison to the cost savings.

Capacity Building and Organizational Reforms in Procurement, Project Management, and Legal Reform. In addition to the specific 15 short-term projects recommended in the areas export, refineries, and distribution, we propose 4 recommendations regarding rapid improvements in the oil sector's capacity and systems in procurement, project management, and legal and regulatory reform. These 4 recommendations are needed to rapidly reduce the repetition of the types of procurement, contractor and project management problems, and outdated regulations and laws that currently plague the stalled projects in export and refining. Nine out of the eleven problem projects in export and refining, costing Iraq billions of dollars in lost revenue, relate primarily to problems stemming from poor procurement, poor project management oversight of contractors, or of a lack of management systems or legal instruments to quickly deal with non-performing contractors. The projects recommended by this Capacity Building and Organizational Development, and Legal Reform sections will provide closely targeted rapid training, technical assistance, and mentoring to minimize the repeat of the same failures over and over. The costs of addressing these issues are modest, even miniscule, in comparison to the avoidance of even one long over-delayed project due to the lack of systems and skills in these areas. The revenue gains from this capacity development work this year will positively impact the situation within one year, and for the years to follow.

Recommended Export (Ex) Projects

1 (Ex) Expedite the Commission of Single Point Mooring (SPM) #5

Problem Statement – Completion of SPM-5 is way behind schedule due to project management problems.

Revenue/Opportunity Costs – \$18 million per day.

Main Problem: Contracting dispute and technical challenges.

Key Findings – Removal of the shipwreck close to SPM#5 is required before operating the SPM. This issue was initially identified in 2011, but delays to the shipwreck removal project largely because SOC did not at first subcontract this complex task to an international company with specialized expertise.

Recommendation – The IG should review the current delays to strategic projects that result in significant opportunity costs. In this case, the shipwreck removal was identified as a critical path item back in 2011. Executing a project for such a wreck removal would take a qualified international company a maximum of 18 months to complete. The additional time required by SOC (2 ½ years) amounts to about \$15 billion in opportunity costs. These are real costs to the country of Iraq that should be getting the attention of the Inspector General. This project has first priority due to its large amount of lost revenue to date combined with, at this time, the relative ease of fixing the problem.

2 (Ex) Expedite Completion of JICA SEALINE:

Problem Statement – Delays to the commissioning of JICA SEALINE project have dragged on due to problems with the international contractor.

Revenue/Opportunity Costs—\$30 million per day of delay

Main Problem: Contracting dispute.

Key Findings – SOC lost confidence and trust in the ability of JOE and Leighton Offshore to properly execute their engineering design responsibilities. A 3rd party international consultant, Offshore Independents is currently reviewing the project design.

Recommendation – Assist the JICA-SEALINE project on the assumption that Offshore Associates approves of the valve station design in August.

- Encourage the MoO and higher-level executive GoI agencies to remediate storage fees with the firm to resolve the monthly storage costs pertaining to the completed station and SPM. Issues concerning contract penalties of several million US dollars places future decision-making above the authority of the South Oil Company. Active involvement by senior leadership in the Ministry of Oil and GoI overall will be required to resolve the contractual issues necessary for this project to be completed.
- Additionally, assist SOC with project scheduling functions to ensure that losses due to shutting down two berths on ABOT for installation of the valve station are minimized to the maximum extent possible.
- In the event that the design is rejected by Offshore Associates, the government should access project management technical assistance to ensure that a retrofit is planned and executed along the most expedient schedule possible.

This project has priority because of the very high costs of delay.

3 (Ex) **Improve Procurement Planning and Performance for Export Facilities' Upkeep:**

Problem Statement – Failure to maintain spare hoses and hawsers along with not paying the SPM operations and maintenance contractor risks the loss of current export levels.

Revenue/Opportunity Costs: Up to \$18 million day of non-functioning or under functioning

Main Problem: Contracting dispute.

Key Findings – SOC depends on their O&M contractor, Petrofac, to provide spare hoses and hawsers. Petrofac provided such equipment last summer to maintain SPM export operations. Even though the invoices were properly approved last summer, actual cash payment of the invoice of \$15 million was just recently received by Petrofac. Improper maintenance puts each SPM at risk of losing up to \$18 million per day, plus additional repair costs.

Recommendation – SOC must keep contracts and payments with the SPM operator and consultants up-to-date and provide them with enough spare hoses, hawsers and other spare parts to maintain their current SPM export levels. This project is prioritized because of the high cost of each day of service lost due to procurement/supply chain management problems.

4 (Ex) **Reduce Number of Days of Weather Outages**

Problem Statement – Weather outages of 50 – 60 days a year significantly reduce levels of exports through southern export facilities.

Revenue/Opportunity Costs: \$156 million per day of lost service

Main Problem: Technical issue.

Key Findings – SOC experiences higher weather outages to their export facilities than other Arab Gulf countries. Comments from industry sources indicate that the vessel pilots in the Iraqi waters need training and the tugboats are under sized for performing in rough seas. Also, the wind speed for suspending SPM loading operations in Iraq is not as high as guidelines used countries using similar technology, such as Pakistan. Our intention is not to copy Pakistan or other countries' operations or standards, but to point out the range of specifications that are common. Each situation is unique.

Recommendations – A marine consulting firm should be retained to conduct a “best practices” review of SOC loading operations. This review would address the sizing of tugboats, training of pilots and how Iraq can best implement industry best practices for SPM operations in poor weather. A periodic review of the operating guidelines and weather parameters for optimal use of SPM operations in poor weather would contribute to more effective utilization and a safer environment. The consultant should work across the MoO and MoTR to identify solutions to improve tugboat capacity and pilot performance. This could include reaching out to the IOCs for direct training support. These are solutions that aligns with both IOCs and MoO priorities, and do not require any significant capital investments. Finally, the MoTR recently awarded US\$380m in contracts to a South Korean shipbuilder for tugs and cargo vessels. While those tugs are intended for use with cargo ships

destined for Al Fao, The MoTR should work on subsequent tenders for renting or purchasing Very Large Crude Carriers (VLCC)-grade tug vessels. Time is of the essence, as Iraq's winter season and poor weather starts in November. This project has priority due to the extremely high costs for each day of service due to weather. It is well worth a full study of these delays and developing a careful policy for weather closures that minimize such losses.

Recommended Refinery (Rf) Projects

Basrah Refinery

5 (RfB) Basrah Refinery Boiler System

Problem Statement – Delays in project to install new boilers at Basrah Refinery.

Revenue/Opportunity Costs: \$80 million per year.

Main Problem: Contracting dispute.

Key Findings – Frequent outages of boilers over the last four years have hurt the refinery reliability and decreased the production of benzene. The most current reason for the delay in the new boiler project is because the refinery management wants to use an Iranian contractor and the US manufacturer cannot engage in a financial transaction with an Iranian company due to the current financial sanctions.

Recommendation – In consultation with the Minister of Oil, a contracting solution is possible. The Basrah refinery should select an acceptable installation contractor that will make it possible for Iraq to purchase the US-made boilers that meet the technical requirements.

6 (RfB) Excess Salt Content in Crude Oil

Problem Statement – Crude oil received from South Oil Company's Rumaila oilfield has been out of specification – containing salt in excess of 500 ppm. The refinery was originally designed to accept crude oil with no more than 3 ppm.

Revenue/Opportunity Costs: The capacity of the main crude units in the refinery is reduced due to the scale formation and narrowing the tubes diameter of the main heater and pre-heating chain of exchangers. This will reduce the production of the white products by 10-20% (1.5 million liter per day as minimum) which means losses of \$750,000 per day in the lowest prediction. Besides the investment losses in procurement of new equipment to replace the corroded ones, there is also the additional operational cost to clean up the scales, plus the cost of the stoppage time needed for cleaning or replacement of equipment. These costs can total over \$2 million per year.

Main Problem: Technical issue.

Key Findings – The excess salt content in the crude oil cannot be removed and is causing excess scaling and corrosion in the units and the power plants burning the this subgrade fuel oil.

Recommendation - South Oil Company should adjust operations to ensure that the refinery receives crude oil that meets the quality specifications over the medium and long terms. SRC and MoO leadership should explore procuring and installing additional de-hydration and de-salting equipment on an executive-priority basis.

7 (RfB) Spare Parts for Reforming Unit

Problem Statement – Lack of spare parts is causing excess downtime of reformer unit and decreasing the production of benzene.

Revenue/Opportunity Costs: This project was ready for operation from the beginning of 2015, until now the unit operates only 50% of the time due to the lack of spare parts. The estimation of losses so far this year (6 months) is about \$150 million.

Main Problem: Contracting dispute.

Key Findings – The refinery canceled the original recommended spare parts from the manufacturer in order to decrease the initial construction costs. Inadequate spare parts has hurt the reliability of the unit ever since.

Recommendation - SRC management should take action and adequately plan and execute procurements for spare parts for the new reformer unit.

8 (RfB) Isomerization Unit Project Stalled

Problem Statement – The project to install an 11,000-barrel per day isomerization unit is stalled due to non-performance of the sub-contractor.

Revenue/Opportunity Costs: The job of this project is to improve the quality of gasoline, this improvement will help in reduction of imported amount of gasoline required to raise the octane number of SRC production to the acceptable number in the Iraqi market, this quantity could be 2 million liter per day which means reduction of about \$1.4 million per day.

Main Problem: Contracting dispute.

Key Findings – SCOP sub-contracted this work with a Jordanian based contractor who has failed to perform. It is currently stopped by the IG and is only 20% complete.

Recommendation - MoO senior leadership needs to engage on the isomerization unit issue. The contract disputes have elevated beyond SCOP and South Refinery Company's (SRC) mandate. If the MoO decides against contract remediation, the MoO and SRC should develop a SOW for a new firm to resume work on the unit.

Doura Refinery

9 (RfD) Isomerization Unit Project

Problem Statement – The project to install an isomerization unit is almost complete, but contract dispute risks delaying its completion

Revenue/Opportunity Costs: \$100 million per year

Main Problem: Contracting dispute.

Key Findings – This project has overcome many delays over the last few years, but the contractor has surfaced contract issues that need resolution before commissioning.

Recommendation The isomerization project is more than 95% complete and simply awaiting final pre-commissioning and commissioning. MRC and MoO leadership should resolve the remaining problems with this contractor and commission the unit.

10 (RfD) Catalytic Reforming Unit Project Stalled

Problem Statement – The project to install a reformer unit has stalled at the 20% completion level due to problems with an international contractor.

Revenue/Opportunity Costs: \$300 million

Main Problem: Contracting dispute.

Key Findings – The project delays are due to contractor non-performance.

Recommendation - Instead of leaving the Continuous-generation Catalytic Reforming (CCR) unit lingering, MRC and MoO leadership should consider canceling the contract with the Jordanian registered company for non-performance.

11 (RfD) Heavy Boilers Project Contract Breach

Problem Statement – The contractor will be in breach of contract if they manufacture the boilers at their Chinese facilities. No activity is currently progressing under this contract.

Revenue/Opportunity Costs: The lack in the rate and required pressure and temperature of the steam causes many problems in production and specification of products, more than 3% of the production is the losses due to steam failures and bad operation due to the low quality of steam. These losses can exceed \$70 million per year.

Main Problem: Contracting dispute.

Key Findings – The bid instructions specifically required that all materials and infrastructure must be manufactured in specific countries, excluding China. The contractor was not in compliance with

these original bid instructions. While the refinery company wisely disengaged from an out-of-compliance contract, the impetus to restart or resume work has not taken hold.

Recommendation: Issue a new tender for this work.

Recommended Distribution (Ds) Projects

12 (Ds) Introduce GPS Tracking System on government fuel tankers

Problem Statement –Piped fuel is closely metered and controlled, however it is estimated that as much as 30% of the fuel transported by tanker truck goes missing. This situation fosters a widespread culture of corruption and theft.

Revenue/Opportunity Costs – \$70 million per year.

Main Problem: Not utilizing modern information technology.

Key Findings – Ministry of Oil officials, including the Oil Products Distribution Company (OPDC) have already begun a pilot demonstration of this technology, and are in favor of scaling up.

Recommendation – OPDC should expand and complete its introduction of GPS tracking to its fleet of oil tanker trucks.

13 (Ds) Introduce electronic citizens' ration cards for subsidized oil products

Problem Statement –Although these subsidies on kerosene, butagas, and gasoline will eventually need to be removed, in the meantime the automation of this system would improve the transparent management of the distribution of these items. The subsidies are expensive, and should be managed to minimize losses.

Revenue/Opportunity Costs – Cannot be estimated at this point

Main Problem: Not utilizing modern information technology, allowing considerable corruption of the outdated paper-based system.

Key Findings – Ministry of Oil officials, including the Oil Products Distribution Company (OPDC) have already begun a pilot demonstration of this technology, and are in favor of scaling up.

Recommendation – OPDC should perform a study for the introduction of electronic ration cards for rationed commodities.

14 (Ds) Improve Supply Chain Management with metering of supplies

Problem Statement – Without metering at government facilities, amounts of fuel are estimated by drivers and others, providing opportunities for corruption and stealing of commodities.

Revenue/Opportunity Costs – Cannot be estimated at this point

Main Problem: Lack of up to date technology to control supplies

Key Findings – The current controls are very lax.

Recommendation – OPDC should make plans to expand metering to all points of transit, and to train drivers and other staff in meter reading and reporting.

15 (Ds) Improve Key Service Delivery Functions of OPDC

Problem Statement – OPDC provides citizens with a total of 22 services that involve close interface with large numbers of citizens.

Revenue/Opportunity Costs – Cannot be estimated at this point

Main Problem: Lack of properly developed standard operation procedures.

Key Findings – Interviews revealed the extent to which there are either faulty or absent standard operating procedures in all

Recommendation – OPDC should contract for a “surgical” Business Process Re-Engineering to improve the efficiency and honesty of the delivery of services to its citizen clients.

I6 (Pr) Procurement “Crash” Program in Capacity Building and Organizational Development

- Reorganize Procurement Departments.
- Unify Procurement Planning.
- Promote and Improve Outsourcing.
- Develop Oil Sector Standard Bidding Documents (SBDs).
- Adopt MoP-Authorized SBDs for General Works, Goods, and Services.
- Standardize Bid Evaluation Criteria and Shorten Evaluation Duration.
- Improve Cost Estimation Capacity.
- Streamline Import and Visa Regulations.
- Develop Standard Pre-Qualification Process.
- Develop a Longer-Term Procurement Capacity Development Plan.

I7 (Pm) Recommended Project Management “Crash Program in Capacity Building and Organizational Development

- Establish MoO Senior Projects Management Committee.
- Establish an MOO Senior Committee on Projects’ Follow-up.
- Improve Projects’ Risk Management.
- Improve Projects Progress Reporting Formats.
- Introduce Earned Value Management. Increase Delegation of Authority to Project Managers.
- Engage Inspector Generals’ Staff in Project Management Capacity Building.
- Increase Delegation of Authorities to Director Generals.
- Develop a Longer-Term Project Management Capacity Development Plan.

I8 (Pm) Recommendation for Project Management Master Plan

Establish a committee from all departments of planning, studies and follow up directorate of MoO to collect all data and information of MoO existed, ongoing and future projects. This committee will:

- a. Assess the volume of projects that shall be covered by the master plan and which have to encompass all oil sectors’ projects with the coordination plans among the MoO prospective master plan, the gas master plan undertaken by Shell Co, the plans of the Ministry of Electricity, the Ministry of Industry and Minerals.
- b. Based on projects, sectors and the ministries involved in the prospective master plan; the MoO is to specify the scope of work and allocate the estimated budget for each proposed investment project; and Reflect the scope of work to an invitation to bid addressed to international engineering and consultant companies for their bids.
- c. Shortly following the signing of the Master Plan agreement, the steering committee should hold a kick-off meeting to evaluate the overall status with specified current major issues in order to reorganize projects’ priorities to have a scenarios for short term solutions and then to commence with the mid and long terms master plan assessment in a way compatible with the short term solutions.

I9 (RL) Recommended Regulatory and Legal Actions Pertaining to the Oil Sector

The Ministry of Oil should consider utilizing the services of The Iraq Solutions for Regulatory and Administrative Reform (ISRAR) program under the Prime Minister’s Office, to focus its full attention over the next 10 months on reducing the number of harmful regulations still thwarting progress in the oil sector.

The MoO, should, working with ISRAR if possible, focus its efforts on regulatory reforms that require only the Minister's action. If it is not feasible or expeditious to work through the ISRAR program, the Ministry of Oil should and can move forward on its own to address selected regulatory reforms that can be corrected at the ministry level. The oil sector has the greatest fiscal and economic impact on Iraq, and therefore clearing away even some of this sector's worst of the outdated and harmful regulations at the ministry level will be of the great impact during this time of special crisis. The Ministry of Oil should immediately engage in preparing reform packages that can be implemented on the short run while at the same time engaging stakeholders with possible solution that might require legislative change.

Through discussion with ministry officials as well as our analysis, we are recommending the following reform packages:

- **Customs Regulations and Procedures**
Problem Statement – Long delays in clearing imported products through Basra and unclear procedures.
Main Problem – Regulations and Coordination
Key Findings – Complicated procedures and regulations in customs and clearance are causing inconsistencies in the applying these regulations are affecting imported procedure for oil needs including chemicals and spare parts.
Recommendation – Ministry of Oil is recommended to establish a task force together with Ministry of Finance to study the current regulations governing importing products and to recommend simplifications of procedures and regulatory reforms that can be implemented immediately.

- **Letters of Credit**
Problem Statement – Long delays in opening letter of credits.
Main Problem – Regulations and Coordination
Key Findings – The Trade Bank of Iraq (TBI) has an effective system to process opening letters of credit (LCs) within a few days, however for LCs of less than \$10 million the TBI refers these LCs other banks, which are less effective. Sometimes these LCs are taking months before they are opened for different reasons.
Recommendation – Ministry of Oil is recommended to establish a task force together with the Ministry of Finance to study the current regulations governing opening the LCs and to recommend simplifications of procedures and regulatory reforms that can be implemented immediately.

- **Decentralization of Authorities**
Problem Statement – Concentration of Power at the Ministry's HQ
Main Problem – Regulations and Procedures
Key Findings – Some state owned companies are lacking enough authorizes to make decisions on a timely manner, which affect their operation. This is more apparent at the South Oil Company.
Recommendation – Ministry of Oil is recommended to study the authority matrix and to give more administrative authorities to their companies in different areas such as supervision of projects.

INTRODUCTION

Problem Statement

Iraq's oil sector is facing its most daunting challenge in the decade since the nation regained its sovereignty in 2004, following the American/CPA administration of the country during first year following the US invasion.

Ten years later, Iraq had experienced considerable success in rebuilding the Iraqi oil industry, but suddenly found itself hit with the double whammy of resumed war and falling oil prices, and at the same time still had many organizational, managerial, and political issues to resolve.

- **Resumed Insurgency.** Iraq now faces the rapid incursion of the ISIL/ISIS/Da'ash insurgency throughout northern and western Iraq, shutting down Iraq's largest refinery and blocking critical oil export routes from Iraq's northern oil fields. This opens a new chapter in the Iraq's struggles, forcing a newly-seated government to rebuild an army overnight while facing serious impediments to refining and exporting its oil.
- **Falling Oil Prices.** The current collapse of world oil prices provides an immediate need to actually increase oil refining and exports. Prices have dropped by more than 35% since ISIL entered Iraq. Prices per barrel in April averaged about US\$56, notably below the then-conservative \$60 per barrel estimate that was used to calculate Iraq's 2015 budget. Government operational costs alone hover around \$63 billion per year, and expected revenue for 2015 is only about \$76 billion. With the drop in oil prices, Iraq is losing around \$80 billion per year in projected revenue. Additionally, Iraq bears an expensive repayment plan to international oil companies (IOCs), clocking in at \$20 billion per year. Without robust oil revenues the government cannot effectively confront the ISIL incursion, continue its progress energy investments, development reconstruction, improved social service delivery, or solve the major political problem of the distribution of oil revenues among political, geographical, and sectarian divisions.
- **Unresolved Political, Organizational, and Human Resources Problems.** During the recent good years, with revenues pouring in, Iraq left many needed organizational reforms on the back burner. Iraq must now face the immediate crises as well as address a list of technical, investment, and organizational, and political unfinished business if it is to rapidly increase oil revenues required for the continued and needed growth of its oil infrastructure development and modernization. Many Iraqi ministries in recent years faced the challenges of improving human capacity in the public sector, modernizing their administrative systems, improving their handling of public procurement and budgeting, and addressing corruption. But the challenge is greater for the oil ministry and companies, since they earn the government's revenue, rather than just spend it. In many respects, MoO lags behind other ministries regarding merit based hiring, developing modern administrative systems, reducing redundancies in employment, and closing the many loopholes of corruption at various levels. Especially it has failed to sort out an inefficient combination of decentralized public sector oil companies, and an increasingly powerful central oil ministry, as well as higher level political disagreements regarding the distribution of oil revenues among the religious, sectarian, and the geographical divisions. Wealth brings its own problems, and there are few middle-income countries with large petroleum resources that have managed to easily turn the largesse into successful and politically fair national development.

Iraq in recent years made plans to increase its oil exports to 6 million barrels per day (mpbd) by 2017, in addition to upping oil and natural gas production in order to generate significant additional national revenue. The Government of Iraq (GoI) and Ministry of Oil (MoO) in particular have aligned a broad political constituency, and have already begun to mobilize resources. However, the obstacles in the way of reaching

these goals are complex, and include infrastructure deficiencies, financial complications, and a shortage of sector expertise. Iraq today is working to leverage its resources and assume the responsibility for the struggle against ISIL.

USAID Approach

Into this challenging situation, USAID has proposed a special type of review—a Rapid Assessment of the Oil Sector that must consider the (1) problems across a **wide swath of issues**, including technical, economic, organizational, and political (2) in order to identify **specific interventions** that will assist Iraq to (3) **improve oil revenues** within a (4) very **short space of time** (10-12 months).

- **Wide Ranging Inquiry.** We stress the “wide swath” of concerns because it is clear that, as focused as the resulting proposed interventions must be, they will require rapid political and organizational improvements as well as technical accomplishments. A narrow, uni-disciplined approach will not succeed to fix the problems holding Iraq oil revenues back during this time. Procurement and contracting problems, uncertain or overly competitive bureaucratic responsibilities and authorities, and other political and economic problems have held many of the most promising projects back.
- **Small number of highly focused interventions.** Recommended projects must realistically be able to contribute the solutions needed in this time of crisis. This means they must already have a proof of concept, perhaps already of started but just need to be pushed to completions, have the needed political support within the government, and be able and willing to bring in the necessary technical assistance from within Iraq or from international experts.
- **Improve Iraq’s Short Term Cash Flow Position.** The selected projects must be shown to be able to generate significant oil revenues, contribute significantly to expenditure reductions, or solve certain current blockages and delays that incur extremely high opportunity costs.
- **Short Implementation Time Frame.** USAID knows that recent long term upstream investment in increased production in recent years raised production and increased revenues. But this type of upstream investment is too slow to meet the current crisis. Besides, the already increased production levels exceed the limitations of the lagging refinery and, especially, the export infrastructure. Therefore, this Assessment is focused on fixing stalled projects the export infrastructure, improving distribution capabilities, and addressing pressing organizational, procurement and managerial roadblocks. It is of particular importance to provide assistance now, as the Iraq faces a host of immediate challenges with major implications for the future of the nation, and for the middle-east region.

As a medium income country, Iraq will be able to pay for the security and development assistance it needs. However, the GoI immediately needs expert assistance to address existing inertia while rapidly closing gaps, overcoming a range of obstacles, and facing other challenges that currently inhibit heightened oil revenue.

I EXPORT PROJECTS

Summary

Iraq's main oil export lines in the south are obsolete and dilapidated, reflecting a legacy of conflict, sanctions, and underinvestment, and constitute a severe bottleneck, limiting the capacity of exports to keep pace with the increasing production levels of oil fields in the area. Absent adequate storage capacity, the export bottleneck currently results in rotating production curtailments. Halting production and transportation is an expensive, complex, and time consuming process that incurs tremendous amounts of lost revenue. While efforts to improve the capacity of Iraq's Southern export infrastructure are advancing, they continue to be plagued by a variety of technical, financial and political constraints that slow the pace of project implementation. Together, the failure to address these issues results in a massive opportunity cost to Iraq in terms of dollars lost on a daily basis. Today, select improvements to Iraq's Southern export infrastructure, specifically the installation of Al Fao gas turbine pumps, would result in some US\$50B in additional revenue per year.

The MoO has called revitalizing and improving Al Fao's export facilities a top priority and ministers past and present have echoed positive sentiments. The US Army Corps of Engineers as well as several high-end engineering and project management firms have designed phased technical solutions to improving the oil terminal's capacity for export, addressing some very technical issues like building on the thick silt or removing unexploded ordnance (UXO). While there has been distinct progress in some areas, it has not been consistent.

Given present political and security conditions and the fact that Southern Iraq accounts for a vast majority of Iraqi petroleum exports, improvements in the South are most critical to short-term revenue generation. Accordingly, this assessment has adopted a strategic focus on increasing exports out of Southern Iraq. The southern Iraq offshore export infrastructure consists of four separate segments: Khor al Amaya Oil Terminal (KAAOT), Al Basrah Oil Terminal (ABOT), the ICOEE project and the JICA SEALINE project. There are projects underway that would have a marked impact on Iraq's oil export capacity, however implementation has been impeded by a number of technical, financial, and political factors. Another major contributor to lost opportunity costs relates to weather-related outages of Iraq's already strapped export infrastructure.

Export Infrastructure

Khor Al Amiriyah Oil Terminal (KAAOT)

KAAOT was constructed in 1965 close to the border with Iran and in a shallow channel that prohibits safe navigation by Very Large Crude Carriers (VLCC). KAAOT was heavily damaged during the Iran War and from an accidental explosion in 2006. It currently loads about 300,000 barrels a day, receiving crude from shore through an old 42-inch pipeline in poor condition. Any future increase in capacity for this terminal is a function of the completion of the JICA SEALINE Project by Leighton Offshore.

Al Basrah Oil Terminal (ABOT)

ABOT was constructed in 1975 with four berths and an initial capacity of about 3 million barrels a day, currently operating at about 1.6 million barrels a day. It is located in the deepest channel in Iraqi waters, allowing the safe passage of VLCC's. ABOT receives crude oil from shore through two 48-inch pipelines, also in poor condition. These pipes were last inspected via an ultrasonic inspection pig in 1989 and found to have severe internal corrosion. The pipe maximum operating pressure was de-rated from 680 psia to 180 psia after this inspection.

SOC management has stated, and industry pipeline consultants concur, that these pipes should have started failing in the late 1990s. No one knows why these pipes have not yet had catastrophic failure. Oil Ministry

leadership previously considered an inspection in 2008, but felt that introducing an inspection pig would be too risky. SOC currently operates the pipeline at very low pressures of less than 10 bar. The high risk to the southern export infrastructure in 2007 prompted the MoO leadership to approve two projects: ICOEE and JICA SEALINE projects. These two projects would install 5 Single Point Moorings (SPMs) with exporting capacity of 900,000 barrels a day at high pressure of 90 bar, or 4.5 million barrels a day in total. Only three SPMs are currently operating at low pressures of about 45 bar and about half of throughput capacity for each SPM.

Iraq Crude Oil Export Expansion (ICOEE) Project

ICOEE is a two-phase export increasing initiative that the MoO and GoI leadership have publically hailed as “the most important project for all of Iraq’s future.” Phase 1, completed in 2012, included the installation of two 48” pipelines (20km onshore and 120km offshore), installation of four Single Point Moorings (SPMs) capable of receiving and loading VLCC tankers, activation of two of those SPMs, installation of a 600MT subsea valve manifold. Phase 2 was completed in 2014 and includes the design and installation of a Central Metering and Monitoring Platform (CMMP) and activation of an additional SPM.

JICA Sealine Project

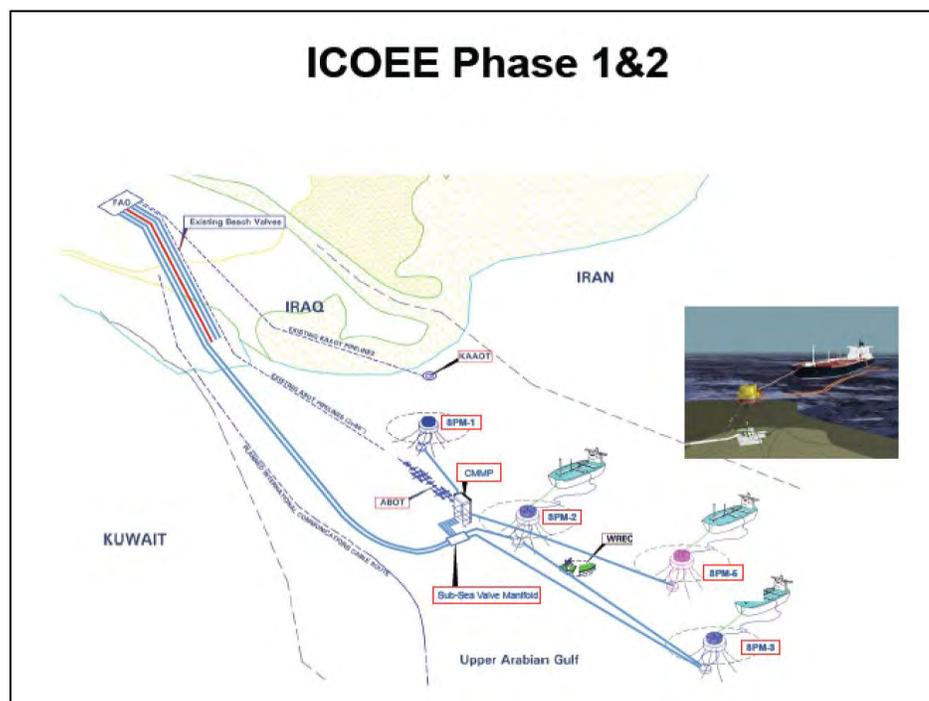
The JICA SEALINE project consists of one 48-inch pipeline from Al Fao to ABOT/KAOT, two valve stations and one SPM. The valve stations will direct oil flow to ABOT, KAOT or an additional SPM, now known as SPM #4 in addition to ICOEE’s SPMs 1-3 and 5.

Technical, Management and Political Challenges

Iraq Crude Oil Export Expansion (ICOEE) Project

The 4th SPM in the ICOEE project (labeled SPM #5) is currently awaiting the removal of a shipwreck before final commissioning. Note the red SPM in the following diagram. (*SEALINE diagrams courtesy of Foster Wheeler Energy Ltd*)

The VLCC Amuriyah is a Very Large Crude Carrier (VLCC) tanker ship that was damaged by US forces and later intentionally wrecked in the northern Gulf by Iraq during the 1991 war. One SPM installed under the ICOEE project is not yet operational due to this shipwreck. The need for removal of this wreck was identified in 2011 and a contract was awarded to Mammoet Salvage BV of the Netherlands in 2013. The current schedule is for removal by year-end 2015. Removal of the wreck and commissioning of SPM #5 would add up

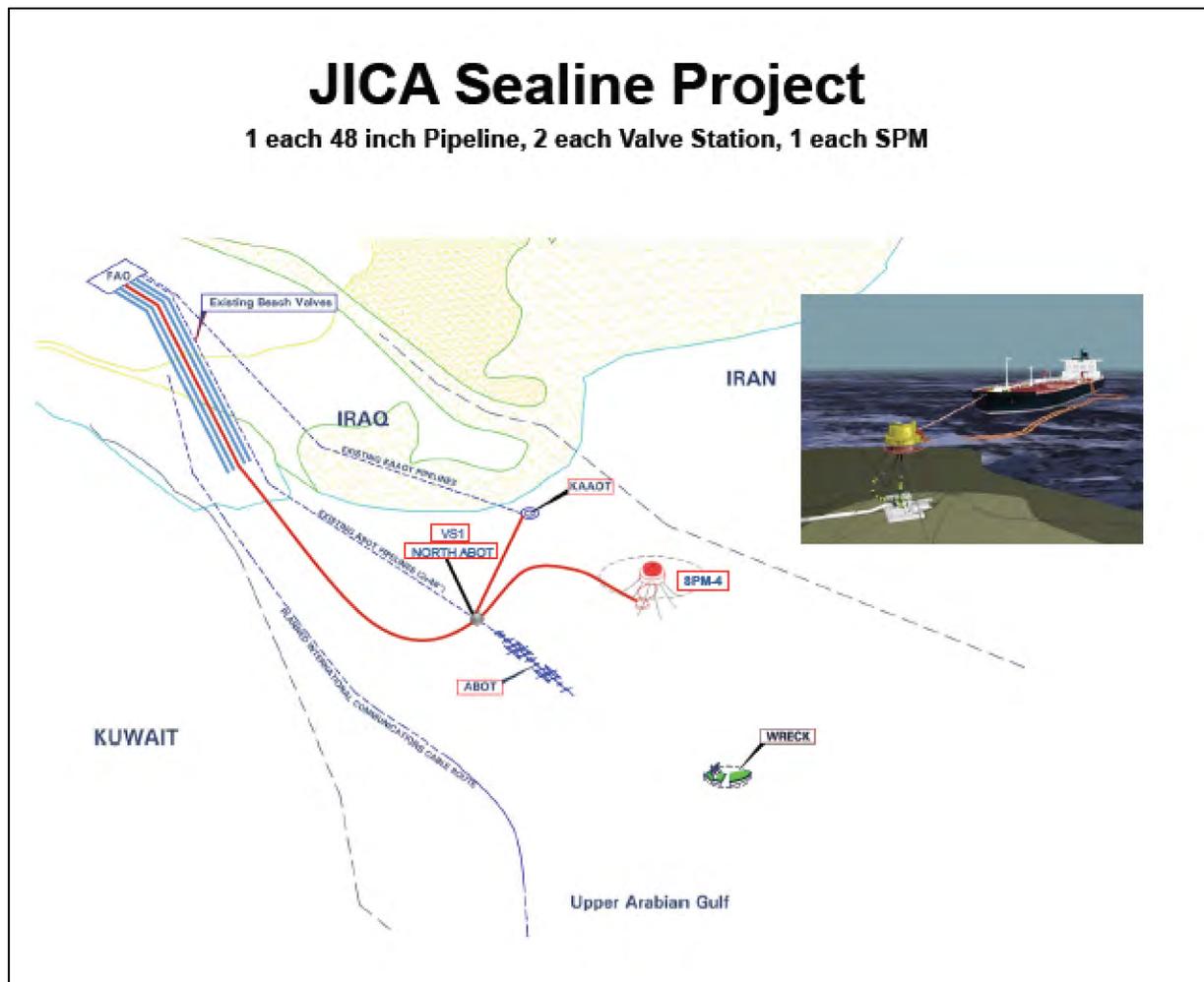


to 300,000 barrels per day of offshore export capacity, increasing export revenues by as much as \$18 million per day at \$60 per barrel.

The ICOEE project construction company, Leighton Offshore, needs to prepare SPM#5 for immediate commissioning upon removal of the wreck. The SPM has been sitting in the water for over a year without any maintenance. An immediate inspection should take place to understand what maintenance is required for commissioning. This work can be accomplished before wreck removal.

JICA SEALINE Project

The SEALINE project includes a 48" pipeline, a pair of valve stations, and an additional SPM. The sub-sea pipe joints have been installed, but there is an issue concerning the design of the valve stations that has prompted SOC to contract with a 3rd party engineering consultant, Offshore Independents. This consultant has been requested to review the design of the valve stations before installation. The Japan Oil Engineering Company (JOE) and Leighton Offshore have both certified that the valve stations meet American Petroleum Institute (API) standards. Leighton subcontracted a 3rd party consulting firm, Det Norske Veritas (DNV), who also verified that the design meets API standards.



The SEALINE project cost is about \$600 million. The engineering consulting company that performed the original feasibility study, Japan Oil Engineering (JOE) did not perform a Front End Engineering Design (FEED). JOE did not think that a FEED was required for their project. However, the current design controversy would have been resolved during a FEED process.

For a variety of official and unofficial reasons, SOC lost confidence in Leighton and JOE's ability to properly manage this project.

JICA and JOE consistently ignored SOC requests for design changes as far back as 2010 by stating in an early meeting that they considered their customer to be the senior leadership at the Oil Ministry and not SOC. In addition, Leighton Offshore's business practices scandal involving bribery payments to Iraqi officials has hurt this project. This lack of confidence and trust, along with knowledge of an 1,300 ton natural gas platform in January 2013 experience with a sunken Iranian valve station in the Gulf, prompted a review of the current design. This review is currently being undertaken by Offshore Independents, and final recommendations on whether to revise or proceed with the design are expected in August 2015. Leighton Offshore has gone through a significant management change due to the business practices scandal and new management under the Habtoor Leighton Group will be handling this contract. None of the original management team is currently handling this contract.

The installation of the valve station at ABOT may require shutting down export operations from two berths on ABOT for a short period. Lost revenues during this outage will be about 800,000 barrels a day at about \$60 per barrel, or about \$50 million per day. Proper planning to minimize this downtime and mitigate the revenue loss is essential. Proper selection of the crane and detailed planning can eliminate much of the downtime. Additionally, the valve stations and SPM are completed and in storage in the UAE. Monthly costs for storage and maintenance are \$4-5 million per month, and will require high-level remediation between the Iraqi government and the firm.

If given the green light in August, there are additional technical and scheduling hurdles to overcome. For example, planning for installation will require the scheduling of a proper Heavy Lift Vessel (HLV) capable of lifting 5,000 tons. These vessels are scarce and will not be easy to schedule. If one is not scheduled before winter storm season then it may have to be delayed until spring. JOE states that exports will increase by 500,000 barrels per day upon installation of their SEALINE project. This equates to about \$30 million per day of increased revenues at crude prices of \$60 per barrel.

Weather Outages

Iraq's southern oil exports are halted for an average of 50-60 days each year due to weather-related outages. Because of the lack of redundant storage and transport capacity, any outage at the export level correspondingly requires production and transport halts as well. Halting production and transportation is an expensive, complex, and time consuming process that incurs tremendous amounts of lost revenue. Iraq incurs a negative financial impact every time a decision is made in the south to shut down operations due to poor weather. The opportunity costs associated with the loss of export operations for 2.6 million barrels a day at current prices of \$60 is \$156 million per day. Estimated losses in export revenue alone attached to 50-60 outage days stand at approximately US\$8B per year.

Some reasons given for the outages from poor weather are related to pilot skills and tugboat sizing in relation to the type of terminal or mooring, tanker size, water depth, and more. The potential for operations during rough weather in the northern Arabic Gulf was taken into account by both the ICOEE and JICA SEALINE projects. The ICOEE feasibility study recommended installing SPM's instead of a fixed offshore terminal due to the following reasons:

- Less expensive up-front capital.
- Easier to replace after severe damage or destruction.
- Greater reliability in poor weather versus ABOT.

While some weather-related outages are inevitable, current SPM management practices should be monitored and reviewed with the objective of optimizing SPM operations in poor weather. The procedures and guidelines followed for any SPM operation are unique to each location and are the function of many variables – to include sea depths, size of tugboats, skill level of operators, etc. The guidelines can change as any of these variables change.

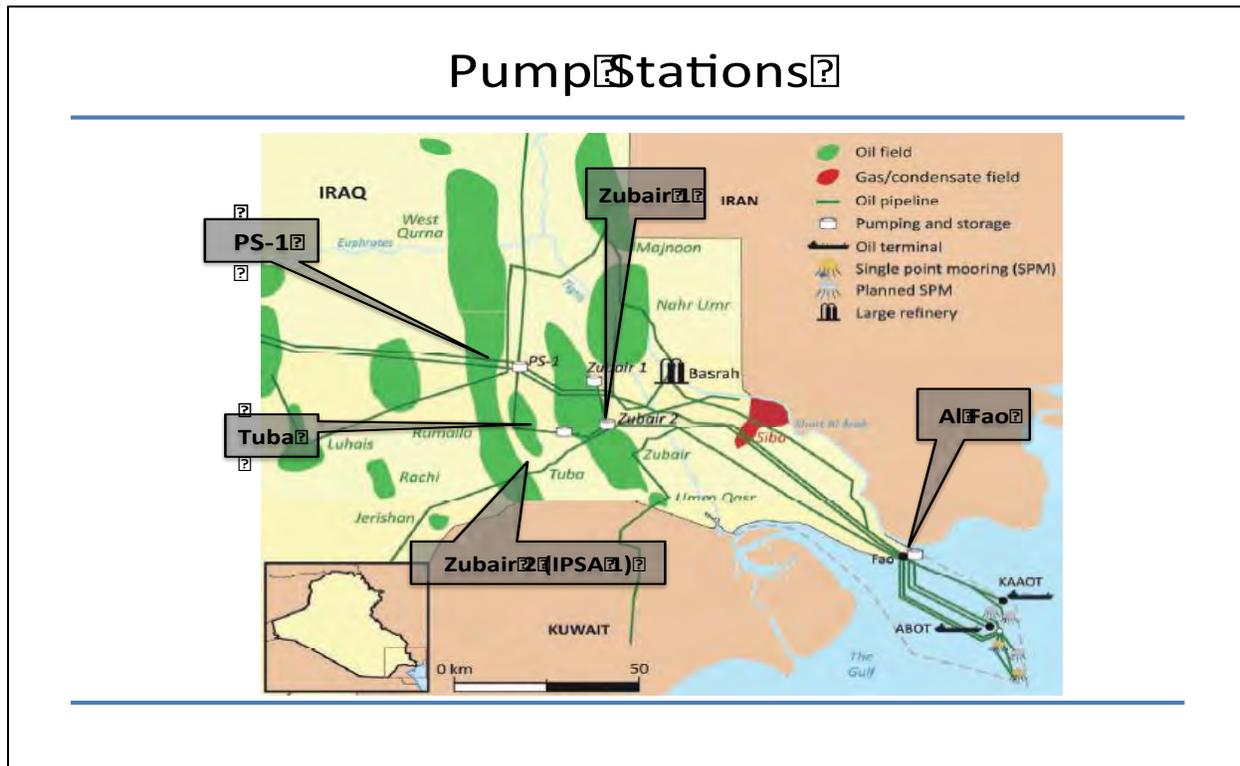
Wind Speed (in Knots): Guidelines for Suspending SPM Operations		
	Iraq	Pakistan
Berthing/Mooring	20	20
Suspend Cargo Ops	>25 Knots steady wind	31-34 Knots steady wind
Unmoor from SPM	35 knots	35
Wave Height (in meters) Guidelines for Suspending SPM Operations		
	Iraq	Pakistan
Berthing/Mooring	2.0 - 2.5	3.0
Suspend Cargo Ops	3.0	>3.0
Unmoor from SPM	2.0-2.5	3.5

However, the over-riding objective is to maintain effective operations in a safe environment.

The tables above compare the guidelines for tugboats for safe SPM operation followed by the Iraqi Ministry of Transportation and operator Petrofac against the guidelines presented by the Pakistani Port Information and Regulations booklet. Note that the Iraqi guidelines suspend loading operations at lower wind speed and wave heights than Pakistan. Comparing guidelines to an industry location identifies a difference in the way Iraq is operating versus Pakistan. Iraq SPM operations may be being conducted under conservative guidelines, driving up the number of weather outage days. This is not to suggest that Pakistan or any other country’s SPM operations should be a model for Iraq. Every situation is different. This highlights the need for a “best practices” review. Iraq should compare its operations to the best in the world, examine its special weather circumstances, and understand the gaps.

South Oil Company management was recently asked why their weather outages are much higher than other Arab Gulf countries. They commented that the weather patterns in the Arab Gulf focus all the poor weather in the north – in Iraqi waters. If weather experts agree with these comments, then Iraq should consider alternative export routes in the south through neighboring countries for future export expansion. Alternative routes through neighboring countries are also advisable from a security standpoint.

Al Fao Terminal



The schedule for installation of large gas turbine pumps has slipped many times from an original target of December 2012 to the current target of December 2018. These pumps would pump oil from shore to the offshore loading terminals and SPMs. Commissioned SPMs will only operate at about 50% of capacity until the Al Fao pump installation becomes fully operational. A conservative estimate of the opportunity costs associated with the delays in these export projects is \$135 million a day or about \$50 billion per year (at a crude price of \$60 per barrel). Until recently, the MoO has insisted on keeping the management of this project in-house in spite of all the delays. It has now changed its position and is currently in the process of issuing a tender for a project management contract. This position change is due to heavy political and fiscal pressures driving a broad realignment of priorities.

Issuing a tender rather than awarding a single-source contract will further delay the project by at least six months. The retired deputy Oil Minister who pushed for a single-source award of the FEED and Project Management contract in 2008 for the ICOEE project recently commented – his decision received resistance within the Oil Ministry by the Inspector General and others, but he pushed hard and it was supported by the Oil Minister. The consulting/engineering contract for a strategic national project should not be primarily awarded based on “low bid”.

On-Shore Pumping System

The Al Fao Terminal currently operates as a transfer point - receiving crude oil from four pumping stations close to the oilfields: PS-1, Tuba, Zubair-1 and Zubair-2. The oil flows through Al Fao out to the offshore loading platforms and SPM's. The critical export storage and pumping is currently at these four pump stations. South Oil Company installed additional pipelines and pump capacity at the four pump stations over the last three years to mitigate the economic loss from the delays to Al Fao Terminal. The following throughputs table represents the maximum pumping levels and not current pumping operations.

Maximum Operating Throughput - B/D Export Route to:

Pump Station	ABOT/KAAOT	SPM's	Total
PS-1	1,100,000	-	1,100,000
Zubair 1	1,000,000	-	1,000,000
Zubair 2	-	700,000	700,000
Tuba *	-	850,000	850,000
Total	2,100,000	1,550,000	3,650,000

* Pumps only heavy crude oil through SPMs 2 & 3.

Pump Station 1 (PS-1)

PS-1 Oil Depot consists of a tank farm, an export pump station, a booster pump system, receiving and export manifolds, and a control building. The depot was constructed in 1975 with the designed capacity of 10 x 500,000 bbl storage tanks, 3 export pumps and 5 booster pumps. At present, PS1 carries the main export load for the Iraq export system and pumps approximately 1.1 MBPD with drag reducing agent (DRA) directly to offshore loading terminals via FAO, and the remaining oil northwest to refineries, power plants and K3 Oil Depot. The PS1 pump station impels not only the produced crudes from the fields connected to the PS1 Depot, but also the crudes transferred from other depots.

The 3 export turbine pumps, manufactured in 1975, are still operational and each is capable of discharging 60 bar pressure at a rate of 34,000 bbl/hour. However, the three turbine pumps are currently operated at 40 bar because the downstream export pipelines are de-rated in pressure containment capabilities. Although operating beyond the design life, these export pumps appear adequate for the current crude transfer loads.

PS1 was built with five electric booster pumps manufactured in 1974. Only three out of the five are operational today to move oil among tanks and provide the first stage compression to feed to export pumps. Each booster pump has design capacity of 7100 m³/hour and is currently operated at ~9 bar. PS1 Depot was initially constructed to have ten 82,000 m³ storage tanks (500,000 barrels) and dyke rings.

The Central Control System at PS1 is not fully functional. There is no Supervisory Control & Data Acquisition (SCADA) system that integrates PS1 with the rest of the southern Iraq export system. Operators communicate to other oil depots and producing fields primarily using telephone and record incoming and outgoing oil volumes on a log book. Operations are essentially manual. No leak detection system for pipelines is connected to PS1.

The fuel gas used by PS1 for driving the turbine pumps comes from the Rumaila NGL plant. The power for PS1 comes from the national grid.

Zubair 1

ZB-1 Oil Depot was constructed in 1973 and contains a tank farm, a pump station and a booster pump system. The ZB-1 Depot is inter-connected to Tuba, PS-1 and ZB-2 oil depots and capable of transferring crudes in both directions to balance the export load.

The ZB-1 tank farm consists of 20 crude storage tanks (10x145,000 bbl and 10x210,000 bbl) and two surge tanks. More than half of the crude storage tanks are operational.

The ZB-1 pump station contains three turbine pumps manufactured by Rolls-Royce in 1973. Each working turbine pump is capable of discharging 60 bar pressure at 45,000 bbl/hour. However, the ZB-1 pump station

is pumping approximately 700 tbd of crude at only 25 to 30 bar pressure for the Gulf export via FAO. The present export pumping pressure is limited by the pressure containment capability of the corroded sub-sea export pipeline. A designated control building controls the turbine pumps.

The ZB-1 Depot contains 10 electric booster pumps. One booster pump is designed to support two storage tanks. The original booster pumps installed in 1973 were later replaced in two groups. The first group was replaced in 1983 with 45,000 bbl/hour pumps and the second group in 1985 with 38,000 bbl/hour pumps. Both groups of pumps are capable of discharging 10 barg pressure.

The central control room is integrated with the main office building. Operations are controlled manually. No leak detection, metering station and SCADA systems are installed and connected to the central control.

Zubair 2

ZB-2 Oil Depot was originally built in 1983 to export Iraqi crude oil to the Red Sea via Saudi Arabia. The depot contains a pump station, a tank farm, a booster system and bunkered control buildings. The ZB-2 Depot was designed to pump 1.65 MBPD of produced oil from the Rumaila field and the transferred crudes from PS1, Tuba and ZB-1 oil depots to the Red Sea through a 1570-km pipeline. Just prior to the first Gulf War, the Saudi Arabia government shut down the pipeline in 1991 and later utilized a portion of the pipeline within Saudi Arabia to transport another hydrocarbon product. Since then, the ZB-2 Oil Depot was highly underutilized and only used to transfer the South Rumaila production to the ZB-1 and PS1 (via Tuba) depots.

The ZB-2 tank farm has the largest storage capacity by design among the southern oil depots and comprises of 16 x 58,000 m³ oil storage tanks and 2 surge tanks. Each oil storage tank is approximately 76m in diameter and 12.5m in height.

The ZB-2 pump station holds the most horsepower by design. It contains four turbine pumps capable of pumping 70 bar pressure at a rate of 33,000 bbl/hour. Nuovo Pignone manufactured the four turbine pumps in 1983. Since the shutdown of the Iraq-Saudi Arabia pipeline, some of the turbine pumps have been mothballed.

The turbine pump used to transfer crude oil from ZB-2 to PS1 and ZB-1 are operating at very low pressure discharging at ~12 bar. The fuel gas used to drive the turbine pumps comes from the Zubair oil field.

The booster pumping system at ZB-2 consists of eight electric pumps manufactured by Tayssen. The booster pumps are capable of discharging 10 barg pressure at 35,000 bbl/hour. The power used by ZB-2 currently comes from the national grid.

The control buildings at the ZB-2 Depot are underground and bunkered.

Tuba Pump Station

Tuba Oil Depot was built in 1985 with a tank farm, a pump station, a booster pump system, manifolds and control buildings. The design of Tuba tank farm consists of 8x415,000 bbl storage tanks and one 400 bbl relief tank.

Tuba was designated as the heavy crude oil exporting pump station in May 2015. It is currently pumping through al Fao to SPM's #2 and #3 at a rate of about 850,000 barrels a day. This segregation of crude export between heavy and light was important since SOC does not currently have the facilities to adequately blend the higher volumes of heavy crude oil with Basra Light. The customers were complaining about the quality and refusing to lift.

Tuba export pump station contains four turbine export pumps that were manufactured in 1985. These pumps have the capability of discharging 60 bar pressure at a rate of 47,000 bbl/hour.

The Tuba Depot was designed to have six electric booster pumps with the discharge capability of 12 bar at 23,000 bbl/hour. Three booster pumps are still operational (at ~10 bar) today and the other three were destroyed during the first Gulf War in 1991. The power used at Tuba comes from the national grid.

The Tuba Depot contains a central control building that was designed to be integrated with other oil depots connected to Tuba. Operators rely on telephone and log books to interface with other oil depots and fields, and for record keeping. The export pump station and booster pumps have their individual control buildings apart from the Tuba central control building to monitor and control the operations of turbine and booster pumps. No leak detection and SCADA systems have been installed to date.

Export Recommendations

Ex-1 Expedite the Commission of Single Point Mooring (SPM) #5

Problem Statement – Completion of SPM-5 is way behind schedule due to project management problems.

Revenue/Opportunity Costs – \$18 million per day.

Main Problem: Contracting dispute and technical challenges.

Key Findings – Removal of the shipwreck close to SPM#5 is required before operating the SPM. This issue was initially identified in 2011, but delays to the shipwreck removal project largely because SOC did not at first subcontract this complex task to an international company with specialized expertise.

Recommendation – The IG should review the current delays to strategic projects that result in significant opportunity costs. In this case, the shipwreck removal was identified as a critical path item back in 2011. Executing a project for such a wreck removal would take a qualified international company a maximum of 18 months to complete. The additional time required by SOC (2 ½ years) amounts to about \$15 billion in opportunity costs. These are real costs to the country of Iraq that should be getting the attention of the Inspector General.

Ex-2 Expedite Completion of JICA SEALINE:

Problem Statement – Delays to the commissioning of JICA SEALINE project have dragged on due to problems with the international contractor.

Revenue/Opportunity Costs—\$30 million per day of delay

Main Problem: Contracting dispute.

Key Findings – SOC lost confidence and trust in the ability of JOE and Leighton Offshore to properly execute their engineering design responsibilities. A 3rd party international consultant, Offshore Independents is currently reviewing the project design.

Recommendation – Assist the JICA-SEALINE project on the assumption that Offshore Associates approves of the valve station design in August.

- Encourage the MoO and higher-level executive GoI agencies to remediate storage fees with the firm to resolve the monthly storage costs pertaining to the completed station and SPM. Issues concerning contract penalties of several million US dollars places future decision-making above the authority of the South Oil Company. Active involvement by senior leadership in the Ministry of Oil and GoI overall will be required to resolve the contractual issues necessary for this project to be completed.
- Additionally, assist SOC with project scheduling functions to ensure that losses due to shutting down two berths on ABOT for installation of the valve station are minimized to the maximum extent possible.
- In the event that the design is rejected by Offshore Associates, the government should access project management technical assistance to ensure that a retrofit is planned and executed along the most expedient schedule possible.

Ex-3 Improve Procurement Planning and Performance for Export Facilities' Upkeep:

Problem Statement – Failure to maintain spare hoses and hawsers along with not paying the SPM operations and maintenance contractor risks the loss of current export levels.

Revenue/Opportunity Costs: Up to \$18 million day of non-functioning or under functioning

Main Problem: Contracting dispute.

Key Findings – SOC depends on their O&M contractor, Petrofac, to provide spare hoses and hawsers. Petrofac provided such equipment last summer to maintain SPM export operations. Even though the invoices were properly approved last summer, cash payment of the invoice of \$15 million was just recently received by Petrofac. Improper maintenance puts each SPM at risk of losing up to \$18 million per day, plus additional repair costs.

Recommendation – SOC must keep contracts and payments with the SPM operator and consultants up-to-date and provide them with enough spare hoses, hawsers and other spare parts to maintain their current SPM export levels.

Ex-4 Reduce Number of Days of Weather Outages

Problem Statement – Weather outages of 50 – 60 days a year significantly reduce levels of exports through southern export facilities.

Revenue/Opportunity Costs: \$156 million per day of lost service

Main Problem: Technical issue.

Key Findings – SOC experiences higher weather outages to their export facilities than other Arab Gulf countries. Comments from industry sources indicate that the vessel pilots in the Iraqi waters need training and the tugboats are under sized for performing in rough seas. Also, the wind speed for suspending SPM loading operations in Iraq is not as high as guidelines used in Pakistan. Of course every situation is unique regarding weather and other variables.

Recommendations – A marine consulting firm should be retained to conduct a “best practices” review of SOC loading operations. This review would address the sizing of tugboats, training of pilots and how Iraq can best implement industry best practices for SPM operations in poor weather. A periodic review of the operating guidelines and weather parameters for optimal use of SPM operations in poor weather would contribute to more effective utilization and a safer environment. The consultant should work across the MoO and MoTR to identify solutions to improve tugboat capacity and pilot performance. This could include reaching out to the IOCs for direct training support. These are solutions that aligns with both IOCs and MoO priorities, and do not require any significant capital investments. Finally, the MoTR recently awarded US\$380m in contracts to a South Korean shipbuilder for tugs and cargo vessels. While those tugs are intended for use with cargo ships destined for Al Fao, The MoTR should work on subsequent tenders for renting or purchasing VLCC-grade tug vessels. Time is of the essence, as Iraq’s winter season and poor weather starts 1 November.

2 REFINERY PROJECTS

Summary

Iraq is a net importer of refined petroleum products, despite being the world’s third largest oil producer. Through numerous discussions with Iraqi oil sector officials, private sector experts, and economists, it is widely agreed that significant economic gains could result from even marginal increase in Iraq’s abilities to refine its own petroleum for internal final consumption. While this assessment examined refinery capacity across the nation, the focus was correspondingly drawn to Iraq’s central and southern refineries network due to ISIL’s incursion.

Iraq has a total of 15 refineries of different sizes, most are small Topping refineries (no gasoline production) and sizes are between 10,000 – 30,000 barrels per day. The other refineries are large hydroskimming refineries (with gasoline production and 50% fuel oil production). See Annex 2 for a flow diagram of the various refineries in Iraq. The largest refinery, Baiji in the north, was not directly assessed and is considered out of commission due to ISIL’s incursion. Other large refineries include Doura in Baghdad and the Basrah refinery, as well as smaller facilities in Diwaniyah and Samawa (and others). These facilities are not operating at peak output and cannot keep up with Iraq’s recent and projected production increases or domestic demand. There are estimates of significant savings if Iraq can replace imported refined oil with refined products for its own. The facilities are not operating at peak output due to a host of issues, including stalled contracting processes, lack of spare parts, lack of maintenance, lack of qualified technicians to operate the facilities, and lack of financial resources.

Iraq has three refinery companies: North Refineries Company (NRC), Midland Refineries Company (MRC) and South Refineries Company (SRC). Iraq’s corresponding three largest refineries located at Doura, Basrah and Baiji and all are old technology, hydro-skimming refineries with 50% of production yielding heavy fuel oil. The one exception is the north refinery at the Baiji complex, which was equipped with a crude vacuum unit and 38,000 B/D hydro-cracker designed to produce gasoil from heavy fuel oil.

Both Doura and Basrah have current crude processing capacity of 210,000 barrels per day. MRC and SRC also have small crude units in neighboring provinces capable of producing gasoil, naphtha and heavy fuel oil.

It is worth mentioning that NRC is located at Baiji and includes the large Baiji complex as well as several small crude units located throughout neighboring provinces. None of these refineries are currently operating with the exception of a 30,000 bpd refinery in Kirkuk.

Looking at the supply/demand posture, Iraq is currently short on all refined products. It makes up for the shortfall by importing costly benzene, gasoil and kerosene. Additional refining capacity through a range of interventions from simple spare parts procurement to the installation of complex hydrocracking units will be required to fill the current product shortfall in totality. This would require expensive investments over a 5 to 10 year period. In several areas, however, USAID-Tarabot has identified “low-hanging fruit” or rapid first steps that may help boost product production and incrementally decrease reliance on imported goods.

Iraq Refineries		
Refineries	Design Capacity (TBD)	Available Capacity (TBD)
Baiji	310	0
Kirkuk	30	30
Al Suniyah	30	0
Al-Jazeera	20	0
Haditha	16	0
Quaiyarah	14	0
Kessak	10	0
NRC Total	430	30
Doura (Baghdad)	210	140
Najaf	30	20
Samawah	30	20
Diwania	10	7
MRC Total	280	187
Basra	210	190
Nassiryah	30	24
Missan	30	10
SRC Total	270	224
TOTAL	980	441

Production of Middle Refineries Company / 2013
(Al-Doura, Al-Samawa, Al-Najaf, Al-Diwaniya)

Product	Measuring Unit	Planned	Achieved	% Achieved of Planned	% Change from 2012
Gasoline	M3	988724	875716	88.5	5
Kerosene	M3	773928	512268	66	13-
Naphtha	M3	587452	532164	90.5	16
Jet fuel	M3	81506	96743	118.6	15
Gas Oil	M3	1763994	1289849	73	14
Diesel	M3	120898	211226	174.7	22
Fuel oil	M3	6550687	4458297	68	21
Liquid Gas	Tons	46470	54009.6	116	17
Ready Oils	M3	25650	25951	101	72
Base Oils	M3	50000	31649	63	31-
Grease	Tons	1521	1365.9	89.9	26
Asphalt	Tons	173700	204323.7	117.6	51
Wax	Tons	0	180.8	-	-
Crude Oil Refined	M ³	10432101	8308638	79.6	16

Technical, Management and Political Challenges

RfB-1 Incomplete Refinery Boiler System

The current refinery boiler system is unreliable for providing the necessary steam to keep all process units operational. A project to install three new boilers with about 450 tons of steam per hour has been 75% complete and sitting largely untouched for the last four years. This project is necessary to provide a reliable source of steam for the refinery. Technically, the original contract was canceled due to contractor non-performance. In practice, the reason for this standstill is political: the delay is due to the fact that the new contractor selected to complete the boiler installation is an Iranian company, while the supplier of the boilers is an American company. Sanctions against Iran prevent these two companies from engaging in financial transactions or directly working together. The supplier and installation contractor must work together or else warranties become invalid. Monthly outages of the old boiler system are responsible for decreased benzene production at the refinery.

Nevertheless, there remains a strong preference within SRC management that the work be contracted through the Iranian company. The choice of this contractor reflects a broader pattern of procurement system dysfunctions that spans the oil sector. While bidding processes are nominally competitive, the determination of which firms are eligible to bid appear subject to influence, resulting in the award of contracts on the basis of lowest proposed cost to firms (often intermediaries, who in turn, sub-contract to other firms) with uncertain or demonstrably poor performance records. While often difficult to document with any precision, there is a strong presumption that rents accruing to such distortions in the procurement process underpin both personal accumulation and political coalition building. In this case, a strong Iraqi Shi'ia identification with Iran, and efforts to ensure that oil sector revenues are locally retained are also likely at play. **The opportunity costs associated with these outages amounts to \$80 million a year to the Iraqi treasury, far outstripping the nominal political value of the boiler installation contract.** Given the political nature of this impediment, it is likely that a political intervention will be required for forward momentum to resume and that such an intervention will incur costs. At the same time, however, the cost of boiler installation is relatively insignificant in comparison to the opportunity costs associated with continuing delays to increased production.

RfB-2 Excess Salt Content Inhibiting Near and Long Term Production

Basrah refinery has been receiving crude oil that does not meet the water/salt specifications.

The refinery was designed to handle a crude oil salt content of 3 ppm. It has been receiving crude oil containing 500 ppm of salt. The refinery cannot remove this excess salt from the crude oil so it remains in

the product throughout the refining process. The refinery is sending heavy fuel oil with high salt content to the power plants. The salt is causing heavy scale formation and narrowing the tubes inside the heat exchangers and furnaces. This reduces the capacity of the refinery and causes excess corrosion to the equipment at the refinery as well as the equipment at the power plants.

The source of the crude oil is the Rumaila oilfield and it was confirmed that they are producing crude oil containing excess water/salt. Rumaila does not currently have the equipment to remove the excess salt and has not stopped producing from those wells supplying the excess water/salt.

The saline scale inside the equipment will require immediate and regular chemical cleaning. This challenge creates a host of risks and costs in the immediate, medium, and long-terms.

RfB-3 Spare Parts for Reforming Unit / Gasoline Production

The unit is short spare parts normally supplied during pre-commissioning and commissioning. They are necessary for start-up procedures.

SRC recently commissioned a new 10,000 barrels per day reforming unit for gasoline production. The original EPC contract included two-year supplies of spare parts. However, the SRC management reduced the budget for these items. The reduced level of spare parts was all consumed during the commissioning of the unit. The new unit suffers from excess downtime due to inadequate steam (the boiler project mentioned in the political challenges section below) as well as other utility problems such as nitrogen shortages. The unit is short spare parts normally supplied during pre-commissioning and commissioning. They are necessary for start-up procedures.

RfB-4 11,000 Barrel Per Day Isomerization Unit Project Stalled

This project was delayed due to non-performance of the contractor. The Inspector General and other higher authorities currently halt it.

SRC signed a contract with SCOP in 2014 to build an isomerization unit with a capacity of 11,000 barrel per day. Isomerization is a process that converts pentane and hexane into their respective isoparaffins of substantially higher octane number. Isomerization is important for creating gasoline primarily through the conversion of hexane into isohexane. SCOP sub-contracted this effort with a Jordanian registered company. The procurement process was not defined. It is a vitally needed component in one of Iraq's largest functional refineries, and currently stands about 20% complete.

Doura Refinery

RfD-1 Doura Isomerization Unit

The isomerization project at Doura refinery is currently scheduled to start up in early 2016, but that may slip due to some current contract issues. This project is projected to deliver 10,000 barrels a day of high quality benzene, reducing Iraq's needs for import. Originally awarded to an Italian company through a Jordanian intermediary in February 2009 and initially scheduled for completion in August 2012, the contract has incurred many delays since its inception. The Jordanian intermediary possesses a history of work that should have indicated a high risk to schedule. As with the case cited above, the choice of this contractor reflects a broader pattern of procurement system dysfunctions that spans the oil sector.

The delays are primarily related to poor performance of the contractor and have resulted in significant opportunity costs. The additional quality of benzene produced from this unit would have saved Iraq more than \$100 million per year by reducing benzene imports and eliminating the use of toxic and costly Octane Improver, Tetra Ethyl Lead (TEL) ingredients.

RfD-2 Catalytic Reforming Unit Project Stalled

The MRC signed a contract several years ago with a Jordanian company owned by an Iraqi contractor to build a new, Universal Oil Products (Honeywell-UOP)-licensed 10,000 barrel per day continuous-regeneration Catalytic Reforming Unit (CCR) for benzene production. The contractor sub-contracted with a Korean company for execution of the project. The project is about 20% complete. This project, when completed will deliver more than 1.5 million liters per day of good quality benzene. **Opportunity costs associated with current delays are about \$0.8 million a day and nearly US\$300m per year.** However, MRC is having difficulties resolving contractual problems with the contractor. Schedule delays are officially attributed to contractor non-performance. In the past, Jordanian-registered companies have been used to extract economic rents within the Iraqi political economy.

RfD-3 Heavy Boilers Project Contract Breach

A contract to install five 80-ton per hour boilers was signed in 2013 with a UK-registered company. The engineering design was completed, but the contractor later confirmed that their manufacturing facilities are only in China. MRC had specified in the contract bid instructions that all materials and infrastructure must be manufactured in the US, Western Europe or Japan. Contract execution was subsequently halted and no course of action has been charted. MRC needs the boilers to keep the process units operating and increase production of quality products.

Refineries Recommendations

Basrah Refinery

RFB-1 Basrah Refinery Boiler System

Problem Statement – Delays in project to install new boilers at Basrah Refinery.

Revenue/Opportunity Costs: \$80 million per year.

Main Problem: Contracting dispute.

Key Findings – Frequent outages of boilers over the last four years have hurt the refinery reliability and decreased the production of benzene. The most current reason for the delay in the new boiler project is because the refinery management wants to use an Iranian contractor and the US manufacturer cannot engage in a financial transaction with an Iranian company due to the current financial sanctions.

Recommendation – In consultation with the Minister of Oil, a contracting solution is possible. The Basrah refinery should select an acceptable installation contractor that will make it possible for Iraq to purchase the US-made boilers that meet the technical requirements.

RFB-2 Excess Salt Content in Crude Oil

Problem Statement – Crude oil received from South Oil Company's Rumaila oilfield has been out of specification – containing salt in excess of 500 ppm. The refinery was originally designed to accept crude oil with no more than 3 ppm.

Revenue/Opportunity Costs: As the capacity of the main crude units in the refinery reduce due to the scale formation and narrowing the tubes diameter of the main heater and pre-heating chain of exchangers, this will reduce the production of the white products by 10-20% (1.5 million liter per day as minimum) which means losses of \$750,000 per day in the lowest prediction, besides the investment losses in procurement of new equipment to replace the damaged ones due to corrosion and also the additional operational cost to clean up the scales in addition to the stoppage time needed for cleaning or replacement of equipment and this could be more than \$2 million per year.

Main Problem: Technical issue.

Key Findings – The excess salt content in the crude oil cannot be removed and is causing excess scaling and corrosion in the refinery units and the power plants burning the fuel oil received from the refinery.

Recommendation - South Oil Company should adjust operations to ensure that the refinery receives crude oil that meets the quality specifications over the medium and long terms. SRC and MoO leadership should explore procuring and installing additional de-hydration and de-salting equipment on an executive-priority basis.

RFB-3 Spare Parts for Reforming Unit

Problem Statement – Lack of spare parts is causing excess downtime of reformer unit and decreasing the production of benzene.

Revenue/Opportunity Costs: This project was ready for operation from the beginning of 2015, up to date the unit operates only 50% of the total period due to the lack of spare parts.

The estimation of losses in this year till now (almost 6 months) is about \$150 million.

Main Problem: Contracting dispute.

Key Findings – The refinery canceled the original recommended spare parts from the manufacturer in order to decrease the initial construction costs. Inadequate spare parts has hurt the reliability of the unit ever since.

Recommendation - SRC management should take action and adequately plan and execute procurements for spare parts for the new reformer unit.

RFB-4 Isomerization Unit Project Stalled

Problem Statement – The project to install an 11,000-barrel per day isomerization unit is stalled due to non-performance of the sub-contractor.

Revenue/Opportunity Costs: The job of this project is to improve the quality of gasoline, this improvement will help in reduction of imported amount of gasoline required to raise the octane number of SRC production to the acceptable number in the Iraqi market, this quantity could be 2 million liter per day which means reduction of about \$1.4 million per day.

Main Problem: Contracting dispute.

Key Findings – SCOP sub-contracted this work with a Jordanian based contractor who has failed to perform. It is currently stopped by the IG and is only 20% complete.

Recommendation - MoO senior leadership needs to engage on the isomerization unit issue. The contract disputes have elevated beyond SCOP and SRC's mandate. If the MoO decides against contract remediation, USAID-Tarabot specialists can engage the MoO and SRC to develop a SOW for a new firm to resume work on the unit.

Doura Refinery

RFD-1 Isomerization Unit Project

Problem Statement – The project to install an isomerization unit is almost complete, but contract dispute risks delaying its completion

Revenue/Opportunity Costs: \$100 million per year

Main Problem: Contracting dispute.

Key Findings – This project has overcome many delays over the last few years, but the contractor has surfaced contract issues that need resolution before commissioning.

Recommendation The isomerization project is more than 95% complete and simply awaiting final pre-commissioning and commissioning. MRC and MoO leadership should resolve the remaining problems with this contractor and commission the unit.

RFD-2 Catalytic Reforming Unit Project Stalled

Problem Statement – The project to install a reformer unit has stalled at the 20% completion level due to problems with an international contractor.

Revenue/Opportunity Costs – \$300 million

Main Problem – Contracting dispute.

Key Findings – The project delays are due to contractor non-performance.

Recommendation – Instead of leaving the Continuous-generation Catalytic Reforming (CCR) unit lingering, MRC and MoO leadership should consider canceling the contract with the Jordanian registered company for non-performance.

RFD-3 Heavy Boilers Project Contract Breach

Problem Statement – The contractor will be in breach of contract if they manufacture the boilers at their Chinese facilities. No activity is currently progressing under this contract.

Revenue/Opportunity Costs – The lack in the rate and required pressure and temperature of the steam causes many problems in production and specification of products, more than 3% of the production is the losses due to steam failures and bad operation due to the low quality of steam. The losses could be more than \$70 million per year.

Main Problem – Contracting dispute.

Key Findings – The bid instructions were specific - all materials and infrastructure must be manufactured in specific countries and China was excluded. The contractor was not in compliance with the original bid instructions. While the refinery company wisely disengaged from an out-of-compliance contract, the impetus to restart or resume work has not taken hold.

Recommendation – Issue a new tender for this work.

3 OIL PRODUCTS DISTRIBUTION

Summary

Iraq's refined oil products distribution system faces immense challenges throughout its transport, storage, metering and retail services. The oil product distribution system is subject to leakage, smuggling, black-market sales of refined oil products, and distortions in the fuel subsidy system, and other forms of corruption, including the solicitation of bribes from consumers at fuel distribution centers. The Oil Products Distribution Company (OPDC) is well known as a locus of corruption within MoO, with an estimated 30% of \$260 million per year of distribution of benzene going unaccounted for. Losses of a similar order of magnitude are likely for other refined oil products, although data are not readily available. Illicit trade in benzene is driven by the price differential between an effective market price of roughly 1000 fils/liter, and the government fixed price of roughly 450 fils/liter – a price differential which suggests that demand far exceeds supply, and that official prices are not well-aligned with demand, although in the short term it would likely be politically impractical to increase prices. This project is recommended because it meets the following criteria:

- **Short-term results:** Because the Ministry has already conducted a small trial of a similar monitoring system and has initiated a subsequent tender to install a fleet management system, there is a sound proof of concept that enables implementation to proceed relatively rapidly and with few unexpected surprises. Key high level and medium level MoO and OPDC officials are in favor of the reform.
- **Resistance:** The categories of resistors and the scale of the corruption are known. Based on previous Tarabot experience in automating large corrupt systems in Iraq (Social Safety Net), despite fears of project blockage, this type of corruption crumbles surprisingly quickly.
- **Political advantage:** The combination of the metering savings and the improvements in general service delivery will be experienced first-hand by large numbers of citizens and will provide evidence of governmental honesty regarding Iraq's most important resource.

Technological or management system solutions will not address these issues in their entirety, and any efforts to implement monitoring and control systems for products distribution will be strongly resisted by ministry, OPDC, and lower level actors whose incomes are based largely on rents derived from weaknesses of the current distribution system. However, the financial return associated with even a partial reduction in system leakage would be substantial.

Technical, Management, and Political Challenges

The OPDC's system of distribution of oil products and transportation is reliant on trucks instead of metered fixed pipelines. As largely unmonitored and unmetered vehicles move between warehouses and tank facilities to distribution stations, a segment of the process that is particularly vulnerable to mismanagement, products smuggling and administrative corruption emerges. At the lower end, citizens use an antiquated paper-based fuel card system. It is estimated that the introduction of the fuel-monitoring and tanker-tracking system will save an estimated 30% of the total \$260 million per year of benzene losses at current oil prices.

Domestic product demand is an extremely politically sensitive issue, as is domestic price. Price increases are likely to result in civil unrest, as they have before and in the rest of the region. Efforts to constrain leakages will also likely be met with strong opposition from within OPDC and elements of the MoO, as well as from those in the broader distribution network whose incomes are closely associated with the rents derived from illicit sales. This dynamic was highlighted by the attempted assassination of the Director General of OPDC in 2003, and the assassination of his successor in 2004. Because the Ministry has already conducted a small trial of a similar monitoring system and has initiated a subsequent tender to install a fleet management system, there is a sound proof of concept that enables implementation to proceed relatively rapidly and with few unexpected surprises. Key high level and medium level MoO and OPDC officials are in favor of the reform. The combination of the metering savings and the improvements in general service delivery will be experienced first-hand by large numbers of citizens and will provide evidence of governmental honesty regarding Iraq's most important resource. The OPDC provides some 22 key services, but processes are ill-defined, creating opportunities for corruption, mismanagement, and bureaucratic loops. The distribution system appears to provide the widest latitude for the extraction of rents. The OPDC owns and manages about a fleet of 1,300 vehicles used in the transport of oil products to industrial consumers and retail distribution outlets in the various governorates of Iraq. It is roughly estimated that around 30% of all products go unaccounted for; smuggled illegally to anonymous sources and sometimes sold at market rates twice the state's fixed official price.

Accounting for refined products is subject to ambiguity at all levels – from the estimation of aggregate refinery output, through the metering of individual truck loading, to discharge metering at the point of sale. At the point of sale, the distribution of oil products to the citizens also presents a broad set of opportunities for corruption and smuggling via the distribution stations. Corrupt employees can divert oil products outside the stations and sell them in markets at commercial rates. Citizen quotas for subsidized refined products are easily manipulated, and citizens and distributors can broker deals to transfer several times their allocated amounts of subsidized oil products and then selling them at market rates. While products marketed at higher than official rates do enter the market and serve to satisfy consumer demand, the revenue generated through such sales remains entirely outside the state budget.

USAID-Tarabot has identified a set of tiered-priority, immediate-term solutions that will also raise the sector's trajectory towards meeting its longer-term needs. Those comprehensive, long-term needs include: metered injection and withdrawal points; expanded fuel oil, kerosene, and other oil product pipelines throughout the country; improved and geographically-balanced storage capacity; a revamped fleet of distribution vehicles with monitoring, tracking, and other controls; and systems measures for issues like transferring unsold fuel oil to power plants, asphalt, cement, and brick factories.

USAID-Tarabot recommends the following “quick-win” solutions that will simultaneously enable an immediate recovery of distributed products while contributing to the longer-term development trajectory of the sector. These include measures to reduce leakages and distortions (smuggling and trade in black-market fuel) in domestic distribution of refined oil products by assisting the MoO in its nascent efforts to introduce GPRS tracking of the tanker fleet, improved domestic metering, and Electronic Fuel Cards to monitor individual vehicles in distribution fleet. These measures will be most effective taken in tandem, since without accurate metering, GPRS tracking and Fuel Card systems will be ineffective.

GPRS Tanker Truck Fleet Tracking: A GPRS system can be included to monitor the tankers working on transferring oil products to and from depots and clients. This system can monitor the product during transportation, the routes taken and status of the cargo in terms of quantity and quality. These systems reduce complicated paper-based procedures, which are time consuming and easily manipulated. A related simple but functional pilot project known as the Electronic Control System (ECS) has already established a degree of proof-of-concept. According to interviewees, the ECS has reduced smugglers’ consumption in pilot stations by nearly 70%. The system tracks and monitors fuel transfer tankers, accurately locating each of them, measuring the amount of fuel in the shipping and engine tanks' compartments, transferring this information in real-time to the database of the OPDC Control & Monitoring room. Through this information, it is possible to track the movements of tankers, the quantities of fuel added or withdrawn and mark it on the map. The system sends an immediate warning to the Control & Monitoring center if any tanker went out of the specified path or unloaded in unallocated places.

USAID-Tarabot is working with its counterparts in the MoO and OPDC to complete the procurement of a GPRS-based fleet management system, scaling up the initial progress with the ECS. With dropping costs of technology, initial estimates are that the MoO would need to spend about US\$2m of its own funds on the system. USAID-Tarabot is currently providing technical support to the procurement process, as well as in developing the accompanying implementation plan and management system.

A more sophisticated, GPRS-based fleet management system would offer the following

- Live tracking of the tanker, determine its location, direction and speed and giving the real value to the fuel amount in the shipping tank and engine tank compartments in real time and display the data on the map. Give full information on the tanker's previous paths, mileage, stop places, times and periods, speeds and other warnings.
- A full report on the amount of fuel consumed during the trip, refuel amount, places and times or siphon from the engine tank and give the cost in Iraqi dinars. It is possible to dedicate specific regions and paths for each tanker with a warning sent in the event of leaving or entering those regions and paths.
- Give full information on the amount, locations and times of loading and unloading fuel in the tanker's compartments and in emptying them.

Distribution of Citizen Fuel Cards for Rationed Products: This rationing system suggestion is made with the assumption the GoI may need to continue to execute some form of rationing system.

Manipulation of citizens’ quotas for subsidized oil products such as kerosene, LPG, and gasoline is a major weakness in Iraq’s system for distribution of oil products to its citizens. Previously, the ration card was utilized in the distribution of kerosene and LPG, and given the difficulty to control product distribution management; a paper fuel card was issued to be distributed with the ration card in order to facilitate the distribution and ensure the delivery to the citizen by issuing numbered cards. Information Technology can be utilized as one of the tools through which the problem of oil products distribution can be solved as the process can be protected from smuggling and manipulation. The electronic fuel card is one of the optimal solutions by which all cars and their consumption can be tracked through a database that is connected to all fuel stations. The system is comprised of a main server linked to all fuel stations, with an electronic card reader in each station where all data are sent to the main server. This gives the company a complete picture through the reports provided by the electronic system.

An electronic fuel card for fuel distribution will decrease all manipulations during the process of oil products distribution. Such a system will provide the ministry and OPDC a comprehensive and detailed illumination of what is going on in specific fuel stations as well as the ability to print detailed statements for all consumers and clients for giving them an idea of what has been disbursed of fuel. This last measure may catalyze economization of consumption to a limited degree. It also facilitates the calculation procedures for OPDC. In addition, this card can contribute to the security process through coordination with the Ministry of the Interior to locate suspicious and wanted vehicles as the system can show the history of filling the vehicle with fuel, the name of the employee who filled the vehicle, and the location and name of the fuel station.

Metering:

Reliable information on Iraq's oil product distribution is complicated by the lack of metering. According to oil officials, meters are in place at some locations, but are far from comprehensively distributed and many in place are often not usable due to the difficulties in obtaining needed replacements and spare parts. Without comprehensive metering, products distribution must be estimated using less precise means, often relying on reports from drivers, onsite personnel and others rather than an automated system that could be verified.

This is an inherently technically complex and politically toxic subject that needs to be addressed in the long-term at both the technical and political levels.

“Surgical” Business Process Re-Engineering for Key Service Delivery:

OPDC through its corporations and branches throughout the country provides a range of 22 services to complete the administrative procedures and facilitate the distribution of oil products. Over the course of USAID-Tarabot's assessment interviews, administrative and bureaucratic challenges to the effective delivery of these services emerged. These challenges include the lack of clarity regarding the conditions to access services, and the lack of printed guidelines or documentation to clarify the procedures for accessing the service. There are a number of complex but routinely required procedures that do not have clear processes or timelines. OPDC staff mentioned that working hours are simply not sufficient to complete all proceedings of the clients expeditiously.

Additionally, service provision sites are not prepared well to receive the citizens and there is no guidance map indicating where to access services. OPDC's service delivery mechanisms are reliant on paper-based systems, aging infrastructure, and no standardized processes for the services or customer service overall.

Of the 22 citizen-level services provided by the OPDC, USAID-Tarabot has identified the following eight services as high-priority, determined through general criteria of OPDC interest to improve, MoO interest to improve, and broad citizen impact:

- Service contracts with the owners of local power generators.
- Service contracts with the operators of local power generators (Provincial Councils).
- Service contracts with gas retailers.
- Service contracts with the owners of bakeries and laundries.
- Service contracts with the owners of agricultural stations and construction machinery.
- Supply services to supply local power generators with fuel.
- Service of benefits disbursed to families of dead, detainees and kidnapped.
- Service of badge renewal for retailers of kerosene and LPG.

With ministerial buy-in and a solid understanding of the bureaucratic hurdles and bastions of resistance, business process re-engineering and the establishment of ministry-mandated standard operating procedures can make an immediate difference to service delivery in terms of timelines and customer experience. With selective interventions supported by a wide constituency within the ministry, new processes and SOPs can

decrease the time, cost and manpower of delivering the aforementioned services, even working within the constraints of existing paper-based

Distribution Recommendations

Ds-1 Introduce GPS Tracking System on government fuel tankers

Problem Statement – Piped fuel is closely metered and controlled, however it is estimated that as much as 30% of the fuel transported by tanker truck go missing. This situation fosters a widespread culture of corruption and theft.

Revenue/Opportunity Costs – \$70 million per year.

Main Problem – Not utilizing modern information technology.

Key Findings – Ministry of Oil officials, including the Oil Products Distribution Company (OPDC) have already begun a pilot demonstration of this technology, and are in favor of scaling up.

Recommendation – Carry out study to “up-Scale” the tracking technology to all government tanker trucks.

Ds-2 Introduce electronic citizens’ ration cards for subsidized oil products

Problem Statement – Although these subsidies on kerosene, butagas, and gasoline will eventually need to be removed, in the meantime the automation of this system would improve the transparent management of the distribution of these items. The subsidies are expensive, and should be managed to minimize losses.

Revenue/Opportunity Costs – Cannot be estimated at this point

Main Problem: Not utilizing modern information technology, allowing considerable corruption of the outdated paper-based system.

Key Findings – Ministry of Oil officials, including the Oil Products Distribution Company (OPDC) have already begun a pilot demonstration of this technology, and are in favor of scaling up.

Recommendation – OPDC study the introduction of electronic ration cards for its rationed commodities.

Ds-3 Improve Supply Chain Management with metering of supplies

Problem Statement – Without metering at government facilities, amounts of fuel are estimated by drivers and others, providing opportunities for corruption and stealing of commodities.

Revenue/Opportunity Costs – Cannot be estimated at this point

Main Problem: Lack of up to date technology to control supplies

Key Findings – The current controls are very lax.

Recommendation – OPDC should make plans to expand metering to all points of transit, and to train drivers and other staff in meter reading and reporting.

Ds-4 Improve Key Service Delivery Functions of OPDC

Problem Statement – OPDC provides citizens with a total of 22 services. Many of these services involve close interface with large numbers of citizens.

Revenue/Opportunity Costs – Cannot be estimated at this point

Main Problem – Lack of properly developed standard operation procedures.

Key Findings – Interviews revealed the extent to which there are either faulty or absent standard operating procedures in the delivery of all of the 22 services.

Recommendation – OPDC should contract for a “surgical” Business Process Re-Engineering to improve the efficiency and honesty of the delivery of services to its citizen clients.

4 PROCUREMENT

Summary

The MoO is Iraq's largest builder and spender, with capital investment budgets that exceeded US\$17B in 2014, which is 25% more than the rest of Iraq's 23 non-sovereign ministries combined. Despite its complex organizational structure and numerous SOEs, the majority of the MoO's procurements are conducted through SCOP. A smaller percentage of procurement activities (generally for smaller-scale activities) are carried out by SOC, SRC, MRC, and other state companies. It is telling that 9 out of the 11 stalled midstream and downstream projects that we have recommended to jump start to greatly improve the financial position suffer primarily from the results of poor procurement and resultant post-award contract disagreements.

Within the MoO, each State Owned enterprise (SOE) produces its own proposed project designs and budgets, which are transmitted to SCOP for procurement and implementation. SCOP prepares basic designs for each project, inviting tenders whether for the whole job or in parts. Once proposals have been received, evaluated, and approved, SCOP is tasked to carry out detailed design, including preparing bills of quantity for materials, equipment terms of reference, tender documents, and contracts. From there, SCOP is mandated to manage project execution right up until completion and handover. As one might expect SCOP's capacity is limited and the burden of these responsibilities is tremendous.

Technical, Management and Political Challenges

- While the MoO and its accompanying SOEs have some skills to carry out the basic technical design and specifications of their proposed projects, there is inconsistency that presents a major weakness and bottleneck when these designs move from one SOE to another and then to SCOP for bidding and implementation. For example, if MRC wants a new pipeline, they will send a 2-3 page simple document to SCOP. The initial designs submitted to SCOP are often rudimentary at best, and require a significant time and expertise investment to bring up to a level of quality suitable for procurement. SCOP does not have the in-house capacity to flesh out simple designs into complex, tender-ready designs, particularly for multiple concurrent projects.
- Ahead of submitting projects to SCOP, most SOEs follow ad hoc procurement activities and processes, driven primarily by emerging needs. This is done without proper planning and causes confusion and lack of efficiency, particularly in between departments.
- Furthermore, SCOP engineers (and those of the MoO overall) struggle frequently with complex change orders, scope creep and time deviation. These project-delaying and cost-increasing issues all stem from poorly assembled project designs.
- The MoO overall currently suffers from an overly lengthy process for bid evaluation and award, with seemingly simple bids stretching into several months of evaluation. This deters many qualified companies from pursuing business with the MoO.
- The MoO issues numerous contracts, and very few of them share common structures or terms. It is impossible to compare conditions and performance across contracts, much less manage them in a systematic way. Additionally, the wide variations between contracts deprives the MoO and its SOEs from learning what works as it is near impossible to ascertain common elements of successful or unsuccessful contracts.
- The MoO does not maintain unified a database or index of current and historical product costs. Individual entities manage their own supplies and needs with little inter-coordination, even between like "businesses" such as South Refinery Company and Midlands Refinery Company. These systems are ad hoc at best, and the MoO overall would benefit greatly from unified index of product costs.

- The lack of access to the international market or international expertise also hampers understanding and impedes on productivity.
- Prequalification: The MoO and its various bodies depend on the Department of Prequalification. This department is used to solicit direct invitations to international companies to bid on upcoming projects. This department does not follow the international standards for prequalification, which has resulted in them bringing in less qualified companies that outside of their areas of specialization.
- The MoO is still implementing the general procurement regulations as stipulated by the MoP instructions from 2014. However, some elements of these instructions are not tuned to the oil sector and causing some bottlenecks and delays. There is a need for the MoP and the MoO to work hand-in-hand to develop and issue new oil sector-specific bidding documents and procurement procedures. This would be similar to the SBDs created and adopted on a rapid, emergency basis by the MoP for the MoD to procure armaments and ammunition. There are comparable SBDs for specialized sectors such as Health (for pharmaceuticals) and Education (for textbooks).
- Furthermore, the MoO has a critical need to engage with the Ministry of Finance (MoF) to reform the procurement procedures) – specifically with the customs and letter of credit procedures. This will accelerate the procurement process and restore confidence in the procurement process.
- Basrah Seaport Authority as part of the Ministry of Transportation also represents a bottleneck in oil sector development because of lengthy and unclear procedures that are open to manipulation and inconsistencies. There is also a strong bureaucracy and a concentration of authority that makes agile development in the sector exceedingly difficult. Oil sector goods such as spare parts, critical chemicals and so on all come through Basrah.
- The number of international firms willing to compete in the Iraqi oil sector is limited, and the role of brokers and middlemen is clear within the MoO. They are needed to boost confidence in the sector. International companies dealing with the MoO are not in isolation with other companies dealing with Iraq. The facilities they are offered in terms of taxes, visa issuance, work permits, and other bureaucratic issues often impede on performance. International implementers are initially or subsequently deterred from pursuing business in Iraq due to these administrative hurdles.

Procurement Recommendation

Problem Statement – The Ministry of Oil and its accompanying SOEs do not meet international standards in procurement procedures in that their organization of procurement does not facilitate uniform procedures, thus leaving room for ad hoc and unjustifiably varied offers for similar services. They rarely produce annual procurement plans providing transparency on their procurement actions. They lack a standard bidding template for Oil Sector procurements, and many other standard policies and procedures. These problems are compounded by the varied practices among the different oil companies and departments associated with the MoO. Given the central importance of the oil sector to the Iraqi economy and public budget, the volume and critical nature of the MoO procurements, and so forth, this situation is a key element in many of the expensively stalled projects.

Revenue/Opportunity Costs – Cannot be reasonably estimated, but procurement problems, directly and indirectly, play a role in almost all of the projects recommended in the present Assessment. The opportunity costs from poor procurement systems clearly total tens of billions of dollars per year.

Main Problem – Lack of efficient, transparent, standard procedures and policies.

Key Findings – Interviews revealed the extent to which there are either faulty or absent standard procedures weakening the MoO's and oil companies' abilities to move rapidly and surely on many critical investments.

Recommendation – The MoO and its SOEs should engage consultants to deliver a crash program to improve the skills and systems of prioritized appropriate departments during the next year to:

- a. **Reorganize Procurement Departments.** Assist the MoO and its accompanying SOEs to reorganize their procurement departments to follow a unified structure as well as a unified process. Complicated procedures – often justified as necessary to reduce corruption - introduce unnecessary delays and create multiple opportunities for the extraction of rents (both large and small). By working to simplify and streamline procedures, and improve system oversight and decision tracking, the GoI can begin to address both bureaucratic dysfunctions as well as reduce the level of corruption.
- b. **Improve Procurement Planning.** Work with target MoO SOEs to adopt a unified system for procurement planning that is based on localized planning specific to each SOE and also through a centralized procurement planning mechanism in the MoO HQ. The central function will ensure compatibility, complementarity, communication coordination and efficiency of the procurement process. This should be the backbone of any MoO procurements and the decision making process, and should be closely related to the proposed improvements in Project Management and Master Planning (see next section).
- c. **Promote Outsourcing.** Work with MoO leadership to promote and enable the outsourcing of key oil sector projects. Leaving the heavy lifting of design to SCOP is not a viable solution. Our intervention would include assisting SCOP to draft TORs for outsourcing project designs to known international design firms, while concurrently advocating MoO leadership to establish a threshold for procurements that require outsourced, professional designs.
- d. **Develop Oil Sector Standard Bidding Documents (SBDs).** Assist the MoO to work with the MoP to develop oil sector-specific Standard Bidding Documents, in-line with specialized sector documents developed for the Ministries of Defense, Education, and Health.
- e. **Adopt MoP-Authorized SBDs.** In addition to developing more agile and appropriate sector-specific SBDs, USAID-Tarabot also recommends that the MoO adopt the MoP's recently promulgated SBDs for more commonly procured elements such as goods, works, and services. This will help the MoO create a common language with international companies (based on INCOTERMS), formalizing terms and conditions for bid evaluation and award, and ultimately heightening confidence in this crucial aspect of the procurement process.
- f. **Standardize Bid Evaluation Criteria and Shorten Evaluation Duration.** Engage the MoO to standardize bid evaluation criteria and evaluation duration. The length of time from receipt of bids to the time of award and implementation needs to be truncated to encourage international bidders. This recommendation entails training for MoO procurement and contracts staff on procurement processes. Develop a guideline for the contracting conditions with local and international companies. By unifying contracts and their processes (how to negotiate, how to evaluate) this will simultaneously expedite procurement processes while also improving opportunities to learn and correct mistakes.
- g. **Improve Cost Estimation Capacity.** Assist MoO procurement and costing staff to improve strengthen their estimations. This intervention requires MoO leadership buy-in, and would necessarily stretch beyond individual capacity development and into organizational reform in a way that would fundamentally change how the MoO does this business. The MoO should add or assign dedicated staff within each entity and within the MoO HQ to unify cost estimation efforts, including maintaining product costs. This intervention would be cross-cutting, merging into the management of projects during implementation. (See Chapter 5: Project Management.)

- h. **Streamline Import and Visa Regulations.** Improve facilities provided to suppliers and relax regulations related to imports and visa issuance, and assist the MoO in the area of regulatory analysis and reform, through our experience with the ISRAR activity, to map out unnecessary regulations and requirements and submit a package to the executive offices for their reform. (See Chapter 6 Legal and Regulatory Reform.)
- i. **Develop Standard Pre-Qualification Process.** Assisting the MoO to adopt a standard prequalification process that is fair, open, transparent, and based on the precedent set by the MoP's existing standard prequalification document.
- j. **Develop a Longer-Term Capacity Development Plan.** The MoO and Oil SoEs should develop and initiate a plan for longer term, continuing staff education program for capacity development and systems improvement for the sector in the area of procurement.

5 PROJECT MANAGEMENT

Summary

Despite being Iraq's biggest builder and possessing capital budgets that exceeded US\$70B over the past five years, the implementation of major works projects with the MoO and its subsidiary SOEs has suffered from deficiencies in scheduling, budgeting, and monitoring and controlling. As such, oil production, transportation, export and refining is negatively affected as projects are delayed, run over budget, or sometimes canceled altogether. Despite its complex organizational structure and numerous SOEs, the majority of the MoO's projects are managed by SCOP, with other SOEs managing some projects of their own. SCOP's failure to complete projects has been a huge unrecognized subsidy. Opportunity costs associated with delays to SCOP projects are billions of dollars each year.

Technical, Management, and Political Challenges

- The MoO is currently implementing about 165 projects across Iraq. Some of these projects are funded through the federal budget, requiring MoP approval, and others are funded through the state companies' funds. These projects are contracted and managed by different companies, based on the type of project and level of complexity. This may include IOCs, Iraqi local companies, SCOP and other SOEs. There is no systemized management within the MoO designed to work with these disparate mechanisms. While these projects are all of high priority and have been identified as critical to crude oil production, exportation and refining; they have many delays. In some cases, those delays have stretched beyond weeks and months and into years, negatively affecting oil production and Iraqi revenue generation.
- The MoO has about 288 Purchase Orders totaling more than 6 billion USD, according to an MoO IG report in 2014. However, the funds have not moved easily, and represent an area that needs GoI attention.
- Because of the poor estimation techniques used by the MoO's subsidiary SOEs, requests for proposals are often developed with unrealistically low cost estimations. This flawed dynamic pushes qualified international companies to withdraw their interest, and often renders the bids submitted largely unrealistic. Because bidders are selected according to the lowest cost, contractors that are not cognizant of these issues or actively peddle unrealistic bids are frequently selected.
- Risk is not systematically considered or analyzed when the MoO companies prepare Requests for Proposals (RFP). This leads to unexpected delays in the project's schedule during the implementation phase and problems can escalate to levels where they cannot be controlled or rectified.
- Although the MoO SOEs are normally conducting regular project status reports, these reports usually lack important basic information and data. This includes timelines, plans, staff updates, quality

management records, forecasts, corrective and preventive actions, and so on, particularly when the contractor is a local Iraqi company.

- Although SOEs usually get reports from their contractors, they don't use any techniques for measuring project performance correctly and use the activity weighing system instead which is mostly subjected to individual judgment rather than a set of performance measures. SOEs sometimes employ rudimentary estimates on actual physical completion percentages of major projects, which are not necessarily accurate or indicative of schedule, cost, or other performance measures.
- Although the responsibilities are immense, MoO and SOE projects managers are not authorized to make decisions as they are constrained within GoI and MoO regulations and sometimes mismanagement (i.e. the project manager in SOC doesn't have the authority to rent machinery from outside the company and is committed to use their existing machinery, which are old, nonfunctional, or needing days or weeks' worth of maintenance.)
- Al-Fao Depot is one of the critical portions of the export system in Iraq, and it has currently many delays for different reasons which need to be emphasized by MoO with its contractor, PMC as well as SCOP, and other contractors involved in the development of this project. MoO, PMC, and SCOP can conduct several review meetings to discuss the issues and recommend the actions necessary to accelerate the progress.
- The Nahr Bin Omar field is being developed solely by SOC and if completed it will produce an estimated 500,000 bpd of crude oil for additional export.

Project Management Recommendations

Establish a MoO Senior Projects Management Committee. The MoO should establish taskforce (Senior Management Committee) preferably including management officials from MoO and all state companies, and coordinate the development of action plan for certain time limit to make a prioritized list of projects, shortlist the most critical projects, gather information and conduct focused meetings with relevant parties to negotiate and reach a consensus of the necessary actions to mitigate any bottlenecks. And establish **an MOO Senior Committee on Projects' Follow-up Committee** to assist MoO to establish a higher committee for PM follow up; the committee will be responsible to:

- a. **Establish an MOO Senior Committee on Projects' Follow-up.** The MoO should establish a higher committee for PM follow up; the committee will be responsible for:
 - Review the current critical on-going delayed projects in MRC, SRC and SOC, and conduct focused meetings bringing all the relevant parties together to negotiate and reach consensus for prompt solutions,
 - Review the other delayed projects, conduct meetings with oil companies to discuss their problems and agree upon the actions required to reduce the variance and bring the project in line with the project plan,
 - Conduct meetings with SCOP to understand the causes of delayed project and find solutions to accelerate the work especially in critical projects like Al-Fao Depot, and
 - Assist the MoO to conduct regular meetings (monthly, quarterly) to track the strategic and critical projects, understand their status and recommend corrective to preventive action control the variance,
- b. **Improved Projects' Risk Management.** Enhance projects risk management and planning within oil companies to reduce the occurrence of unnecessary delays. The MoO should secure consultancy services for state companies (SOC, SRC, MRC, and SCOP) about how to use risk management according to PMI knowledge base and add the necessary (cost and time) contingencies to the

project's estimation to make it even more accurate and acceptable, though distribute funds accordingly.

- c. **Improved Projects Progress Reporting Formats.** Increase projects reporting efficiency by adopting international forms/templates that provide clearer idea about the project progress. State companies (SOC, SRC, MRC, and SCOP) should secure technical expertise and consultancy services for adapting templates that contain such information and help them measure project performance based on this information to better control the project.
- d. **Introduce Earned Value Management.** Enhance project performance measurement and controlling costs throughout the use of modern project performance techniques like earned value management (EVM). EVM is a technique that is internationally used to measure the project performance using cost and time factors and provides forecasts for how critical the current delay is to the project's duration. The PMI EVM method should be used within the state companies' current system to enhance project performance measurement and controlling function. The technique can be used to selected projects to see the results to be reflected to the whole system.
- e. **Increase Delegation of Authority to Project Managers.** Review current regulations and make necessary amendments to give the project managers more authorities within their level of responsibilities especially in MRC, SRC and SOC. The MoO should secure consultancy services to review the current organizational structure and regulations for each state company to understand the situation and help in recommendation necessary action to amend them to best manage projects.
- f. **Role of Inspector Generals' Staff.** Engage Inspector Generals' staff in Improved Project Management Knowledge staff in the field of project management to understand the process and help departments reach better management performance levels,
- g. **Increase Authorities of Director Generals.** Support Director Generals to use their authorities especially in taking critical decisions related to projects to avoid wasting time in vertical communications,

Oil Projects Master Plan: Challenges

Years of sanctions and war saw Iraq's oil infrastructure deteriorate and production volume plunge to less than 2mbpd, down from 3.5 mbpd. Since 2006, the GoI with the support of IOCs has invested around \$20 billion to bring this infrastructure to the industry standard and to keep pace with the updated levels of technologies.

The task of this massive upgrade program has not been given to one specific entity inside MoO. The planning directorate at MoO is given part of that job; however each SOE also is trying its best to contribute to this effort, but with little coordination with sister companies or the MoO headquarters. Previously, the MoO had 5-10 master plans that coordinated all projects in upstream, midstream, downstream and gas sectors. In the absence of a coherent master plan and effective overall sector management capacity, multiple ongoing and planned service and construction contracts are not effectively prioritized, executed OR monitored. In order to achieve oil sector goals by increasing oil revenues in Iraq, an integrated and comprehensive projects plan should be introduced. As suggested by MoO leadership, recommendations in the Iraq National Energy Strategy (INES), and various other sources, new refineries should be built, storage capacity and pipelines expanded, and oil and gas production should increase. The problem is that oil sector capital investment project planning is decentralized to the point that there is not an overall new projects investment plan that allows the revelation of duplications or facilitates the process of prioritizing investment projects, especially now with decreased revenues and rapidly changing priorities to respond to changing market forces.

Oil Projects Master Plan Recommendations

Establish a committee from all departments of planning, studies and follow up directorate of MoO to collect all data and information of MoO existed, ongoing and future projects. Specifically, this committee will:

- a. Assess the volume of projects that shall be covered by the master plan and which have to encompass all oil sectors' projects with the coordination plans between the MoO prospective master plan and the gas master plan undertaken by Shell;
- b. The assessment has also to encompass coordination with other ministries i.e. Ministry of Electricity and Ministry of Industry and Minerals to have a wide vision about the Power Generation, Petrochemical and fertilizer Plants and thus to include their projects in MoO master plan in order to achieve better contribution to Iraqi GDP and Economy;
- c. Cooperation with the Ministry of Oil to have a better understanding of the current regional demand for oil products and agree basis of developing scenarios to meet the future growth in refined product demand over the next 20 years, transportation infrastructure and exportation system;
- d. Based on projects, sectors and the ministries involved in the prospective master plan; the MoO is to specify the scope of work and allocate the estimated budget;
- e. Reflect the scope of work to an invitation to bid addressed to international engineering and consultant companies for their bids;
- f. Evaluation of bids to focus on the man/hour rates in comparison to the options presented by the bidders with the alternative scenarios to cover contingencies; and the high rate in evaluation scoring table to be given to the companies that already have a successful existing projects in Iraq and that have the ability for a better on ground survey; and
- g. Shortly following the signing of the Master Plan agreement, the steering committee should hold a kick-off meeting to evaluate the overall status with specified current major issues in order to reorganize projects' priorities to have a scenarios for short term solutions and then to commence with the mid and long terms master plan assessment in a way compatible with the short term solutions.

6 LEGAL AND REGULATORY REFORM

Summary

Despite the progress the Oil Sector administration has achieved in Iraq and the enthusiasm of the new leadership of the sector, there remain regulatory obstacles disrupting the production increases. Besides the crisis of lower oil prices and cash liquidity problems, there is a huge backlog of outdated, contradictory, and harmful regulations, instructions, and laws on the books. These outdated and harmful interfere with the Ministry's efforts to address the specific stalled projects that are the focus of this Oil Sector Assessment, but which also block and delay many of the operations of the State Owned Oil Companies and the International Oil Companies in Iraq. The oil sector has the greatest fiscal and economic impact on Iraq, and therefore any clearing away even some of this sector's worst of the outdated and harmful regulations at the ministry level will be of the great impact during this time of special crisis.

Technical, Management, and Political Challenges

The problem is that Iraq lacks established mechanisms for addressing the required regulatory reform, and officials often do not understand which regulations can be changed or deleted simply by Ministerial order of a single ministry, which regulations pertaining to multiple ministries must be addressed by the Council of Ministers, and, which regulations, promulgated by parliament, can only be cancelled or changed through legislation. The Ministry of Oil recently finalized a study identifying the huge need for regulatory and legal reforms of the oil sector. The challenge is to adopt a practical mechanism for relatively quickly fixing a limited number of outdated regulations. The Prime Minister's Office, under support from USAID, established the Iraq Solutions for Regulatory and Administrative Reform (ISRAR) that provides a proven approach to moving such reforms forward, based on a system developed by the Organization for Economic Co-operation and Development (OECD) and utilized in many countries facing similar problems. The ISRAR program, however has focused with some success on business and private sector development regulations and has not addressed the regulatory problems in the oil sector, despite its primacy in the Iraqi economy.

Recommendations

The Ministry of Oil should: 1) Immediately engage in preparing reform packages that can be implemented in the short run solely by the Minister of Oil. 2) Engage stakeholders with possible solutions that might require Council of Ministers action since the regulation applies to more than one ministry; and 3) Explore whether the Prime Minister's Office's program for Iraq Solutions for Regulatory and Administrative Reform (ISRAR) is able and willing at this point to focus its efforts to support reform in the oil sector.

Our survey shows there are many laws and regulations currently inhibiting progress in the Oil Sector. Using the existing ISRAR database on all Iraqi laws and regulations, we have identified which regulations will require only an action of the Minister of Oil to be annulled, and which regulations require wider efforts. Through discussion with ministry's officials as well as our analysis, we are recommending the following priority reform packages:

Customs Regulations and Procedures

Problem Statement – Long delays in clearing imported products through Basrah and unclear procedures.

Main Problem – Regulations and Coordination

Key Findings – Complicated procedures and regulations in customs and clearance are causing inconsistencies in the applying these regulations are affecting imported procedure for oil needs including chemicals and spare parts.

Recommendation – Ministry of Oil is recommended to establish a task force together with Ministry of Finance to study the current regulations governing importing oil related products and to recommend simplifications of procedures and regulatory reforms that can be implemented immediately with the agreement of the two ministries, or through the Council of Ministers.

Letters of Credit

Problem Statement – Long delays in opening letter of credits.

Main Problem – Regulations and Coordination

Key Findings – The Trade Bank of Iraq (TBI) has an effective system to process opening letters of credit (LCs) within a few days, however for LCs of less than \$10 million the TBI refers these LCs to other banks, which are less effective. Sometimes these LCs are taking months before they are opened for different reasons.

Recommendation – Ministry of Oil is recommended to establish a task force together with the Ministry of Finance to study the current regulations governing opening the LCs and to recommend simplifications of procedures and regulatory reforms that can be implemented immediately.

Decentralization of Authorities

Problem Statement – Concentration of Power at the Ministry's HQ

Main Problem – Regulations and Procedures

Key Findings – Some state owned companies are lacking enough authority to make decisions on a timely manner, which affect their operation. This is more apparent at the South Oil Company.

Recommendation – Ministry of Oil is recommended to study the authority matrix and to give more administrative authorities to their companies in different areas such as supervision of projects.

7 TECHNICAL SERVICES CONTRACTS

Summary

In 2005, the GoI and the MoO began to plan to return Iraq to its place among the top oil-exporting countries in the world. In emerging from its decades-long international isolation, the government sought to capitalize on the advantages and advances in the sector brought by international business, importing new technologies, investments and to the extent of oil and gas industry with the international contribution to make use of the latest technologies around the world.

Technical Service Contracts (TSCs) represent an extraordinarily sensitive topic, both economically and politically, in Iraq. This chapter of the USAID-Tarabot Oil Sector Assessment intends to provide an overview of the current TSCs context, the comparative advantages and disadvantages for their promulgation in the Iraqi oil sector. We recommended that the USG not engage significantly in this area, due to the domestic Iraqi political sensitivity of the issue, and because such engagement would place the USG in the position of mediating between the interests of Iraq as a recipient of US development assistance and the interests of IOCs, many of which are US-based. Being perceived as engaged in such a role would carry risks from both Iraqi and US domestic political perspectives.

The Ministry was faced with a choice of IOC contracting mechanisms, notably between Technical Service Contracts (TSCs) and Production Sharing Contracts (PSCs). While both types meet the requirements of bringing the latest technology, knowhow and include upfront capital investments, there are stark differences in structure of compensation. In addition to the compensation methods between the TSCs and PSCs, there are four major differences between the contracting mechanisms. These are:

- Field Ownership rights;
- Produced Crude Ownership rights;

- Field Operatorship; and
- The degree of risk that each side bears.

Iraq was interested in TSCs because they enabled them to give up less control over reserves and produced oils to the IOCs and giving them the privileges to have a full control over the production rate and operation process. Those reasons led to the Ministry of Oil to make the change to the Iraqi oil & gas industry and sign TSCs. Iraq's TSCs are each defined by six essential factors:

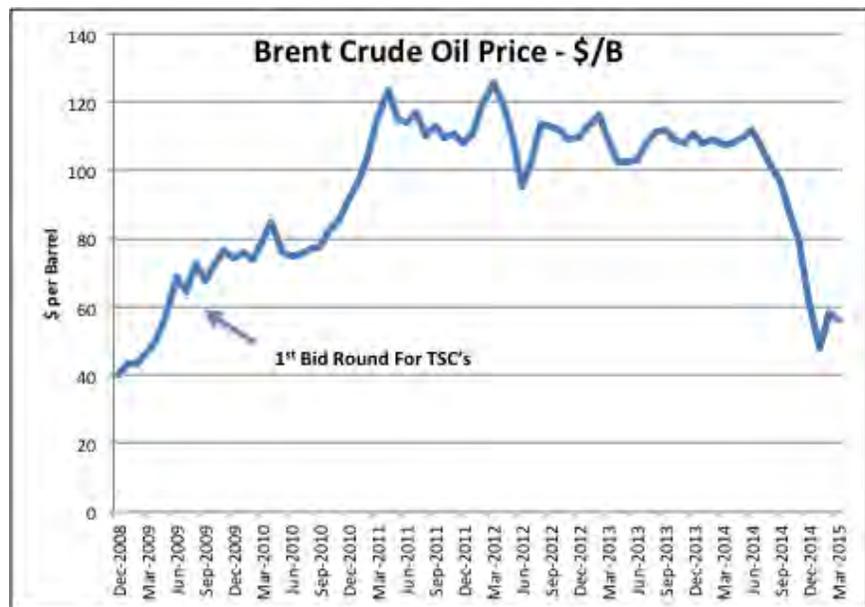
- Baseline Production Rate;
- Initial Production Rate;
- Incremental Production Rate;
- Improved Production;
- Plateau Production; and
- Performance Factor, which is the ratio of net production rate to the bid production target (not to exceed 1.0)

The above factors are having strong correlation to the:

- Contractor Investments Cost recovery;
- Contractor Operation Cost Recovery; and
- The Remuneration Fees.

A number of unforeseen challenges have emerged relating to the TSCs. Due to the complex legal and political nature of the agreements, it is exceedingly difficult to undertake what is otherwise urgently needed remediation to rectify and mitigate risks to smooth and productive performance of activities.

No consideration for the fluctuation of oil prices was taken into account, as remuneration fees are stated as fixed figures in the contracts even at event of oil prices dropdown to 50% or more. The TSCs don't include any indication of correlation between the proposed sector development plans / projects and the international oil prices, and the contracts were signed in a period of peak oil prices.



While the TSCs were designed to provide favorable economic conditions for Iraq, they do not account for a drop in oil prices, financial crisis, or big loss, any of which then leads to a conflict between the IOCs' rights vs. GOI responsibilities.

Crude Oil Prices and TSCs over Time

The first bid round took place at the end of June 2009. It is worthwhile to note that at that point the price of crude oil was less than \$60 per barrel, and had been during most of the preparation time and lead-up to the bid round. Some of the initial analyses published in the public domain on the economics of TSCs assumed an average price of \$60 to \$65 per barrel. The remuneration fee of \$2 per barrel represented about 3% of the crude price. Today, it represents about 3% of the crude price. Iraq was fortunate to experience high oil prices over the last five years that pushed the remuneration fee to less than 2% of the crude price.

For further information, see the below table showing the contracts of 1st & 2nd Licensing Rounds with the shares of each contractor, remuneration fees and the period specified for each field to achieve the first commercial production and up to the plateau.

	Contact Area	Consortium	Part. % without state Partner	Part. % with State Partner (25%)	State Partner (Part. =25%)	Client	RFB	MRF	Current Pro. rate	FCP	Min PPT (MoO)	PPT (Contractor)	Effective Date	Max Dur. to Reach PPT	PP	Contract Duration	Required operator Qualification for Lead Contractor	Signature Bonus	Min Exp. Obligation
							(US\$/B)	Barrels Per Day						Years	US\$ Million				
1	Rumaila	BP	51	38	SOM O	SOC	3.9	2	1,066,000	1,066,000	1,750,000	2,850,000	17 Dec. 2009	6	7	20	Unrestricted Operator	500	300
		Petro China	49	37														Recovered	
2	Zubair	Eni	43.75	32.81	MOC	SOC	4.8	2	182,775	182,775	400,000	1,200,000	18 Feb 2010	6	7	20	Unrestricted Operator	300	200
		Occidental	31.25	23.44														Recovered	
		KOGAS	25	18.75															
3	Wast Qurna (phase1)	ExxonMobil	80	60	OES	SOC	4.0	1.9	244,000	244,000	600,000	2,325,000	1 March 2010	6	7	20	Unrestricted Operator	400	250
		Shell	20	15														Recovered	
	Wast										1,800,000								

	Contact Area	Consortium	Part. % without state Partner	Part. % with State Partner (25%)	State Partner (Part. =25%)	Client	RFB	MRF	Current Pro. rate	FCP	Min PPT (MoO)	PPT (Contractor)	Effective Date	Max Dur. to Reach PPT	PP	Contract Duration	Required operator Qualification for Lead Contractor	Signature Bonus	Min Exp. Obligation	
							(US\$/B)	Barrels Per Day						Years				US\$ Million		
4	Qurna (phase2)	Lukoil	85	63.75	NOC	SOC	5			120,000	750,000		10 Feb 2010	7	13	20	Unrestricted Operator	150	250	
		Statoil	15	11.25							Non-Recovered									
5	Mainoon	Shell	60	45	MOC	SOC	1.39		45,900	175,000	700,000	1,800,000	1 March 2010	7	10	20	Unrestricted Operator	150	300	
		PETRO NAS	40	30																Non-Recovered
6	Halfya	Petro China	50	37.5	SOC	MOC	1.40		3,100	70,000	250,000	535,000	1 March 2010	7	13	20	Unrestricted Operator	150	200	
		PETRO NAS	25	18.75																Non-Recovered
		TOTAL	25	18.75																

	Contact Area	Consortium	Part. % without state Partner	Part. % with State Partner (25%)	State Partner (Part. =25%)	Client	RFB	MRF	Current Pro. rate	FCP	Min PPT (MoO)	PPT (Contractor)	Effective Date	Max Dur. to Reach PPT	PP	Contract Duration	Required operator Qualification for Lead Contractor	Signature Bonus	Min Exp. Obligation
							(US\$/B)	Barrels Per Day						Years				US\$ Million	
7	Garraf	PETRO NAS	60	45	NOC	SOC	1.49			35,000	150,000	230,000	10 Feb 2010	7	13	20	Restricted Operator	100 Non Recovered	150
		JAPEX	40	30															
8	Badra	Gazprom	40	30	OES	NOC	6.00	5.5		15,000	80,000	170,000	18 Feb 2010	7	7	20	Restricted Operator	100 Non Recovered	100
		KOGAS	30	22.5															
		PETRO NAS	20	15															
		TPAO	10	7.5															
9	Qaiyarah	Sonangol	100	75	SOC	NOC	12.50	5		30,000	120,000	120,000	18 Feb 2010	7	9	20	Restricted Operator	100 Non Recovered	150
1																		100	

	Contact Area	Consortium	Part. % without state Partner	Part. % with State Partner (25%)	State Partner (Part. =25%)	Client	RFB	MRF	Current Pro. rate	FCP	Min PPT (MoO)	PPT (Contractor)	Effective Date	Max Dur. to Reach PPT	PP	Contract Duration	Required operator Qualification for Lead Contractor	Signature Bonus	Min Exp. Obligation
							(US\$/B)	Barrels Per Day						Years				US\$ Million	
0	Najmah	Sonangol	100	75	IDS	NOC	8.50	6		20,000	110,000	110,000	18 Feb 2010	7	9	20	Restricted Operator	Non Recovered	100
11	Missan	CNOOC	100		IDS	MOC	18.9	2.3	100,000	170,000	220,000	450,000		7			Restricted Operator		100

Technical, Management and Political Challenges

The specific terms of TSCs vary considerably along a variety of dimensions including the scope of agreement, the Remuneration Fee per Barrel (RFB), the Plateau Production Rate (PPR), the term of the contract, assumptions about international market prices for oil, the payment schedule, and a variety of additional factors that together determine overall returns to both the GoI and individual IOCs.

Comparative analyses of the terms of at least one Iraqi Technical Services Contract (TSC) and the KRG PSA suggest that, “over the first five years... the contracts behave similarly with early cash flow to Iraq aided by royalty and the lower cost recovery ceiling in the KRG PSC. After seven years, the TSC yields a consistently higher revenue and value to Iraq than the KRG PSC. In revenue terms, the difference widens from around US\$1B after 10 years to more than \$8bn after 25 years.”[1] The same analysis concludes that, for all the economic criteria that matter to Iraq, the TSC either equals or is considerably superior to the KRG PSC. At base case conditions, Iraq’s revenues would be \$8B less over the life of the project with the KRG PSC compared to the TSC. This worsens considerably at higher oil prices: at \$100/B (Brent flat nominal) Iraq’s revenues would be \$14BN worse off with the KRG PSC Compared with the TSC.”

There is clearly a trade-off between the GoI’s need for IOC technical expertise and investment on one hand and the returns to the Iraqi economy over the short, medium and long term. There are indications that these GoI preferences for maximizing short-term returns, coupled with its desire to retain a high degree of control over mid-stream infrastructure, has resulted in constraints on short-medium term export revenue.

There has been some discontent on the part of the GoI relative to the terms it accepted with IOCs in the 1st and 2nd bidding rounds, in light of subsequent decline in world market prices. On the other side, there has been discontent on the part of the IOCs relative to the GoI’s perceived (and real) failure to fully implement essential midstream infrastructure, which has resulted in a need to periodically suspend production due to limitations of storage and export infrastructure (notably port and SPM facilities). The GoI takes the position, inter alia, that it should not be responsible for paying a fixed remuneration fee to the IOCs in light of marked declines in the price of oil on international markets, and that the agreed 25 year terms of existing TSCs should be shortened.

Transportation facilities and the discharge of oil production from the oil fields to delivery points is considered the most difficult part of the oil industry, and under TSCs that falls squarely under the responsibility of the MoO. The MoO so far has not undertaken the comprehensive, integration actions necessary to rehabilitate the existing storage and transportation systems nor enhance them by adding new facilities. These elements should be in place prior to or at least in concurrent implementation with IOC oil operations by the IOCs, in order to accommodate increasing production.

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Comparative analyses of the terms of at least one Iraqi TSC and the KRG PSC (Production Sharing Contract) suggest that, “over the first five years... the contracts behave similarly with early cash flow to Iraq aided by royalty and the lower cost recovery ceiling in the KRG PSC. After seven years, the TSC yields a consistently higher revenue and value to Iraq than the KRG PSC. In revenue terms, the difference widens from around US\$1B after 10 years to more than \$8bn after 25 years.”[1] The same analysis concludes that, for all the economic criteria that matter to Iraq, the TSC either equals or is considerably superior to the KRG PSC. At base case conditions, Iraq’s revenues would be \$8B less over the life of the project with the KRG PSC compared to the TSC. This worsens considerably at higher oil prices: at \$100/B (Brent flat nominal) Iraq’s revenues would be \$14BN worse off with the KRG PSC Compared with the TSC.”

There is clearly a trade-off between the GoI's need for IOC technical expertise and investment on one hand and the returns to the Iraqi economy over the short-medium and long term. There are indications that these GoI preferences for maximizing short-term returns, coupled with its desire to retain a high degree of control over mid-stream infrastructure, has resulted in constraints on short-medium term export revenue.

There has been some discontent on the part of the GoI relative to the terms it accepted with IOCs in the 1st and 2nd bidding rounds, in light of subsequent decline in world market prices. There has been discontent on the part of the IOCs relative to the GoI's perceived (and real) failure to fully implement essential midstream infrastructure, which has resulted in a need to periodically suspend production due to limitations of storage and export infrastructure (notably port and SPM facilities). The GoI takes the position, inter alia, that it should not be responsible for paying a fixed remuneration fee to the IOCs in light of marked declines in the price of oil on international markets, and that the agreed 25 year terms of existing TSCs should be shortened.

Transportation facilities and the discharge of oil production from the oil fields to delivery points is considered the most difficult part of the oil industry, and under TSCs that falls squarely under the responsibility of the MoO. The MoO so far has not undertaken the comprehensive, integration actions necessary to rehabilitate the existing storage and transportation systems nor enhance them by adding new facilities. These elements should be in place prior to or at least in concurrent implementation with IOC oil operations by the IOCs, in order to accommodate increasing production.

The issue of sovereignty over oil is and will likely remain a highly emotional issue in Iraq. At present, two distinct sovereignty issues are at stake. The first relates to the nature of contractual relationship between the Iraqi state and International Oil Companies (IOCs) upon which it remains dependent for the efficient extraction of its petroleum resources; the second to the evolving relationship between the central Iraqi state and the Kurdistan Regional Government (KRG), which seeks to assert a right to control and profit from the development of oil within the KRG and which has sought to ensure IOC interest in developing its resources (despite the risk of alienating the GoI) by offering highly favorable terms under Production Sharing Arrangements (PSAs). This is in clear opposition to GoI insistence on working with IOCs under more limited TSCs.

TSCs are desirable to the GoI from a variety of perspectives (although the terms of specific TSCs have been contentious and contested between the GoI and the IOCs), including retaining exclusive sovereign control of oil resources over the long term, vesting the GoI with the ability to retain virtually all profits accruing from oil price increases, ensuring the GoI a generally higher percentage of profits than would be the case under a PSA, and finally by retaining for the GoI greater control of the production-conveyance-export continuum than would likely be the case under a PSA. The latter is particularly relevant from a political economy perspective, since it means that the Ministry of Oil – rather than IOCs - is responsible for the provision of midstream infrastructure (pipes, pumping stations, storage facilities, export terminals, etc.), and therefore directly oversees procurement and project management functions relative to this infrastructure.

As stated above, TSCs are an extraordinarily sensitive and political topic and one in which this assessment's intervention may not be productive. The USG has other arms involved, including the Commercial Law Development Program (CLDP) among others.

TSCs are not likely to be replaced by PSAs, and remain a highly sensitive political issue. There are risks associated with engagement in this area that is closely linked debates on regional autonomy/federalism and sectarian balance, and to legitimate national concern to ensure long-term control of resources. There may be some need and opportunity to adjust terms of TSCs to simultaneously address the concerns of both the GoI and IOCs, but further USG involvement in this debate may create problems both with the GoI and the IOCs.

The GoI has a legitimate interest in seeking to retain control of resources and negotiate arrangements with IOCs that maximize returns; it needs to be sensible and strategic in evaluating opportunities and constraints

associated with its relationships with IOCs, and probably needs advisory services to do so effectively. On the other hand, the USG has nothing to gain by appearing to assist the GoI in negotiating with IOCs.

TSC Recommendations

Following this rapid assessment and keeping in mind the apparent sensitivities related to this subject that we stated at the beginning of this chapter, our general recommendations are limited to the following:

- GoI should explore negotiating for extending credit terms on existing TSC's to generate short-term cash flows.
- USG not engage significantly in this area, due to the domestic Iraqi political sensitivity of the issue.
- Pursue streamlining of existing export and midstream infrastructure projects to facilitate increased production/exports under existing TCSs. (This is an umbrella recommendation that encompasses virtually all of the other, more practical recommendations made throughout this paper, as they relate to relevant TSCs.)