



**esg**

energy  
services  
group

Tel: +971 4 332 5392 • Fax: +971 4 332 5394 • PO Box 72784, Dubai, UAE • [info@esgdubai.com](mailto:info@esgdubai.com) • [www.esgdubai.com](http://www.esgdubai.com)

**Capability Statement**  
**On**  
**Consultancy Services**  
**for**  
**Full Field Review and**  
**Field Development Planning**

## Contents

---

Introduction .....	3
Company's Capability .....	5
Project Management.....	9
Training.....	11
Organization.....	12
Experience .....	14
Contact Information.....	15

## Introduction

---

Energy Services Group Ltd. (ESG) provide management and advisory services spanning the upstream oil and gas business cycle, including exploration sub-surface analysis, field development planning, drilling, production, project management, facilities engineering and support services including late life asset management and decommissioning. ESG staff are seasoned, highly trained and motivated professionals, each with many years experience with international operating companies. ESG are independent, and specialize in the delivery of objective solutions to meet client needs, safely and efficiently. Consequently, the client is assured of receiving the highest quality, most cost effective solutions to meet its program objectives.

### ***Integrated Service***

ESG specialize in providing an integrated service and we work closely with our clients to ensure their objectives are clearly understood and our interests are aligned. We consider our clients to be our partners. Our strength is in providing expertise in technical and commercial disciplines to the oil and gas industry at reasonable cost. We believe innovation and best industry practice are the keys to unlocking value throughout the life of the asset, from exploration and appraisal, through development and production, to decommissioning.

### ***Philosophy***

ESG's philosophy is to utilize people with exceptional talents and skills, working together to provide exceptional results. ESG's pool of expertise includes world-class geoscientists, engineers and commercial analysts. ESG's staff assigned to a client's project can draw on the collective backing of the full expertise and knowledge base of the company.

The combination of knowledge, skills and experience within ESG spans the entire spectrum of the upstream energy industry. Our strength is in taking on the most challenging problems and providing innovative solutions, using all the disciplines we have in house or third party.

One of our unique strengths is in risk and reliability-based technologies, where we apply rigorous quantitative risk assessment techniques to design, evaluation and analysis. Combining this with our expertise in optimization, we provide optimal, pragmatic, and cost-effective design solutions to enhance performance and maximize productivity.

ESG can offer all the major aspects of **Field Development Planning** throughout the life of the asset either as green field projects, as brown field re-developments or as incremental oil recovery projects implemented during the life of the field to maximize asset value, including the following:

- **Full Field Review:** principally subsurface reservoir and surface assessment.
- **Field Development Plan:** includes all aspects of the life of asset development, including reservoir assessment, pressure maintenance and secondary recovery (excluding EOR), well and completion design and Artificial Lift; surface facilities: offshore jackets and topsides (if relevant), gathering system, process and pipelines, oil/gas storage and export facilities; Cost Estimation, Capex and Opex budget, economic evaluation and risk assessment; operating philosophy, abandonment and decommissioning, HSE philosophy and requirements, HR field organisation.
- **EOR:** the evaluation, design, planning and implementation of the Enhanced Oil Recovery processes, i.e. gas, thermal and chemical; such as Water Alternating Gas Injection (WAG), Steam Injection and CO<sub>2</sub> Injection. This service is described in EOR Capability Statement.

- **Enhanced Field Development Plan:** this combines the standard Field Development Plan with Enhanced Oil Recovery (as described above; this service is described in EOR Capability Statement.).

ESG staff have experience in all aspects of planning and operations management and supervision, integrity inspections, documentation and training. Each of the company's personnel has over 25 years experience with international operating oil companies in both offshore and onshore situations in over 40 countries worldwide.

## **Company's Capability**

---

### **Knowledge Base**

ESG's staff and associates have very extensive knowledge of the Field Development Planning process, most of it gained through many years experience with major oil companies. This knowledge base encompasses all the technical and commercial aspects of field development planning and implementation. We understand the full field life cycle and have experienced staff in-house to provide subsurface analysis, reserves assessment, production analysis and economic evaluation; engineering concepts and well design. We are also experienced with petroleum agreements of all types and their impact on economics. We are comfortable with uncertainty and risk and we use key decision-making tools to assess the value of reducing uncertainty and mitigating risk. We recognize the need for trade-offs in order to provide an optimized field development. Most importantly we understand the need to underpin all the technical and commercial disciplines with an unwavering commitment to health, safety and the environment

### **Services**

ESG has an extensive knowledge base and experience which enables us to offer complete integrated field review services. These services encompass the initial field development plan and updates to the initial plan, as well as a review of current field performance to optimize production and reserves. We can manage the complete review in-house or at the client's offices.

Our services include the following components:

#### **Pre-project Planning**

- Preparation of an overall project strategy, objectives, policies and procedures
- Cost-time-resource (CTR) preparation
- Preparation of a project schedule for the Field Development Plan (FDP) project

#### **Data Base Compilation**

- Compilation of the available technical and economic data from diverse sources
- Preparation of a comprehensive database
- Recognition of data gaps and recommendations on further data collection
- Preparation of an outline plan based on the available data

#### **Field Development Plan Studies**

- Review of client's existing subsurface data and studies, including site visit if required.
- Geological and reservoir engineering review of analogues
- Geological reservoir assessment
- 2D and 3D seismic interpretation and reservoir mapping
- Petrophysical evaluation of open hole and cased hole logs
- Construction of static reservoir geomodel
- Reservoir engineering studies to define input parameters for reservoir simulation
- Well performance modelling
- Gathering system analysis and network modelling
- Production technology assessment of critical factors impacting production assurance
- Well engineering to define best design case for development wells and completions
- Extended reach drilling concepts for infrastructure-led exploration
- Subsea concepts and systems

- Engineering systems definition assessment of any existing facilities and bottlenecks
- Concept level facilities engineering design of offshore structures, topsides, process, pipelines, storage and export
- Preparation of a Base Case plan which maximizes field value
- Preparation of alternative plans and contingencies
- Assessment of appropriate EOR technologies
- Dynamic reservoir simulation of the field
- Assessment Reserves and Contingent Resources
- Cost estimation of all drilling and facilities
- Assessment and modeling of decommissioning liabilities
- Economic evaluation, including optimization and sensitivity analysis
- Assessment of risk and uncertainty, including technical and commercial factors
- Delivery of the field development plan document
- Regular updates as required by the license holder

#### Field Development Plan Execution

- Execution of the Field Development Plan is covered under other Capability Statements, for example EOR, drilling project management, production assurance, project engineering and construction management.

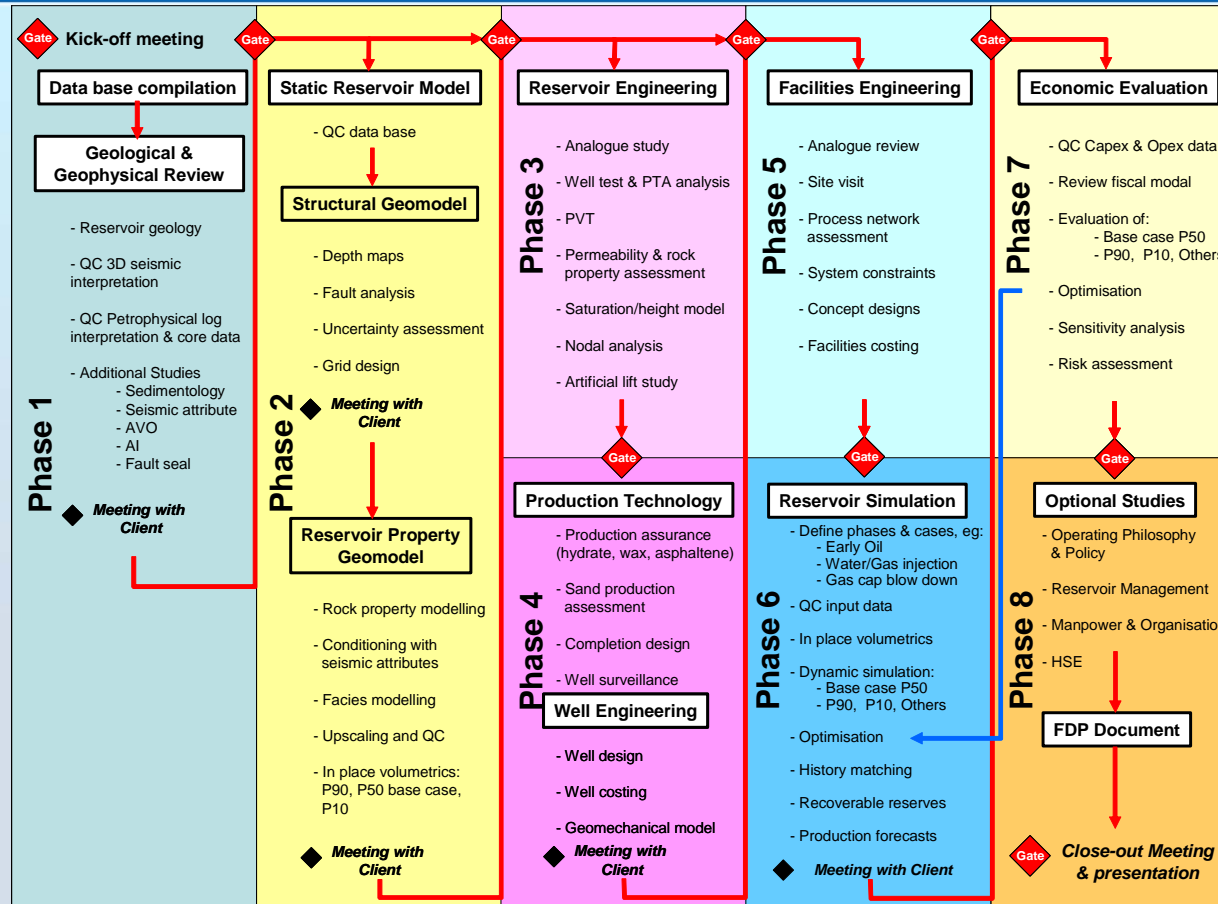
#### ***Capability & Methodology***

ESG can provide Field Development Planning services for any size of oil or gas development, onshore or offshore, in any geographical location. The standard methodology for preparation of a field development plan is outlined above. However as each project is distinct and different we first determine the client's specific needs through project initiation meetings at which the key objectives and deliverables for the project are defined. Finally, the Cost, Time and Resource components are discussed and defined for each phase of the project.

ESG's overall workflow for Field Development Plan is shown in the following diagram. This generic workflow is a starting point and will be tailored to the requirements of the client and the specific field under consideration.



# FDP Work Flow



6 – 12 months

Generic Work Flow for Field Development Plan projects

ESG use a gated project management method, whereby entry to each phase of the project is dependent on completion of all deliverables for the preceding phase and the client's approval, which is normally obtained at a technical review meeting.

### **Software**

ESG has licenses for or, is experienced in using, a range of workstation- and PC-based software applications which can be used for field review and development projects. These include:

- Geological well log correlation      Kingdom suite (SMT)
- Seismic interpretation and mapping      Kingdom suite (SMT)
- Seismic stratigraphic interpretation      OpendTect SSIS (DGB Earth Sciences)
- Material balance      MBAL (Petroleum Experts)
- Well modelling      PROSPER (Petroleum Experts)
- Lift curve generation      PROSPER (Petroleum Experts)
- System modelling      GAP (Petroleum Experts)
- PVT analysis      PVTp (Petroleum Experts)
- Pressure transient analysis      Saphir (KAPPA Engineering)
- Numerical well modelling      Saphir (KAPPA Engineering)
- Rate transient analysis      Topaze (KAPPA Engineering)
- Rapid numerical simulation      Rubis (KAPPA Engineering)
- Reservoir simulation      Eclipse (Schlumberger)
- Well planning      WELLPLAN (Landmark)
- Casing Design      STRESSCHECK (Landmark)
- Tubular Design      WELLCAT (Landmark)

Other software can be rented on an as-required basis.

## ***Project Management***

---

ESG operate a rigorous and comprehensive project management procedure for all its Field Development Plan projects. Our goal is to bring projects on time and under budget. ESG has a proven track record and its approach to effective project management includes the following:

- Chairing regular project team meetings and monitoring progress against agreed timelines
  - Maintaining action list and verifying follow through
  - Developing and maintaining timelines and gantt charts
  - Maintaining critical issues and roadblock list and assuring timely resolution of issues
- Providing full range of technical support from other ESG departments throughout the project, including drilling, facilities engineering and HSE.
- Coordinating with the client's existing contractors and suppliers for cost information
- Assuring adherence to client's approved procedures
- Assuring optimum reporting and communication between Project Team Members and Project Manager and Client.

### ***Project Schedule***

The project schedule, together with milestones and deliverables are agreed with the client prior to the start of the study. The project schedule is then updated on a weekly basis so that any critical issues can be identified and discussed with the client.

Project milestones are agreed at the outset to identify gates in the project work flow which cannot be passed without the client's approval. These are often associated with deliverables which are presented to the client as reports and/or presentations at technical review meetings. This process ensures that the client is kept fully informed of project progress and remains in full control of the project.

### ***Meetings***

Two types of meetings are normally held:

- Regular Update Meetings are held, usually either weekly or monthly depending on the location of the project team. Technical issues of the work are presented and discussed, administrative and any critical issues are identified and resolved with the client.
- Technical Review Meetings are held at key points during the project to present substantive pieces of work to the client, often as a prerequisite for proceeding to the next phase of work. The project schedule is reviewed at each meeting and any recommendations for additional studies and optional work are made. The final meeting is the Close-Out Meeting where final project deliverables are submitted to the client.

Any key decisions and action points made during the meetings are recorded and followed up for review at subsequent meetings.

### ***Progress Reports***

A report is submitted to the client on a weekly basis in order to monitor project progress. This highlights the work done in the past week, the work to be done in the coming week, any changes to the schedule and any highlights any critical issues.

## ***Training***

---

A key element of the Field Development Plan project, and the technical studies that underlie it, is the provision of training for the client's staff. This is particularly important to enable technology transfer and the build up of experience and capability within the client's organization. Effective training includes technical fundamentals, problem solving and operational practice. Training can be provided either as formal courses or as on-the-job, where the client's staff actively participate in the project.

ESG can provide customized training programs in the following main technical areas that underlie the field development plan:

- Geocellular modelling
- Reserves evaluation
- Well Test Analysis
- Artificial Lift and Nodal Analysis
- Reservoir simulation
- Economic evaluation of petroleum properties

ESG's courses are customized to suit client requirements and address client gaps in the most effective manner. Blending theory, practice and discussion in the right proportions, our courses succeed in elevating the understanding and competence of a wide cross-section of participants. In keeping with our philosophy, our courses go beyond the traditional approaches, and several special problems, current trends and research activities are discussed.

Classroom multimedia training is used along with practice sessions with relevant software and problem-solving tools. Several examples are also used in the class to illustrate and disseminate key concepts and problem solving skills. Detailed manuals and software products (where appropriate) are a standard part of an ESG training program. Continuing training programs are also available.

## **Organization**

---

ESG will use its own vastly experienced (in-house) resources to support a dedicated Project Team consisting of in-house and ESG associate personnel. ESG's experienced staff include the following:

<b>Name</b>	<b>Discipline</b>	<b>Overall Years Experience</b>
Jon Rodd	General Manager Exploration & Production/Project Manager	25
Paul Baron	General Manager Petroleum Engineering /Project Manager	28
Aavo Taal	Production Geology	27
Ge Hoogeworst	Geophysics	32
Serdar Kaya	Geomodelling	17
Andrew Stocks	Petrophysics	37
Faisal bin Anwar	Mapping Geology	13
Paula Pedler	Reservoir Engineering	20
Howard Wigg	Production Technology	34
Wayne Longstreet	Well Engineering	45
Paul Rhodes	Facilities Engineering	20

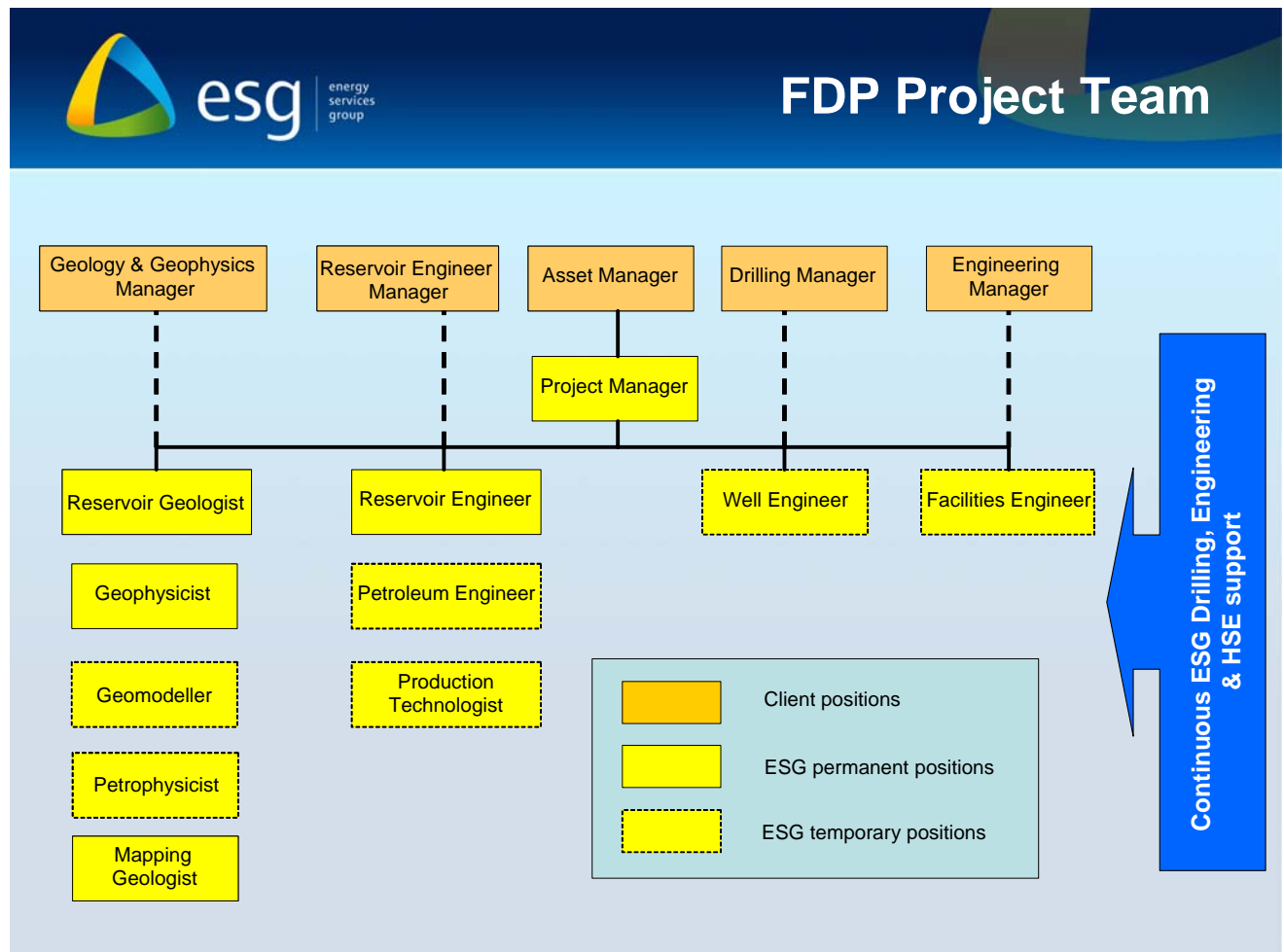
The dedicated Project Team normally consists of the following positions:

- Project Manager\*
- Reservoir Geologist\*
- Geophysicist (as required)
- Reservoir Geomodeller (as required)
- Petrophysicist (as required)
- Mapping Geologist\*
- Reservoir Engineer\*
- Petroleum Engineer (as required)
- Production Technologist (as required)
- Well Engineer (as required)
- Facilities Engineer (as required)

\*Members of the Core Team of permanent staff

ESG assign staff to a project as and when required. The staff varies according to the size and needs of each project and is agreed with the client prior to the start of the project. There is generally a core team of permanent staff and a number of temporary staff (marked "as required" in the list given above). It is only through the use of such expertise and assistance that a project

schedule, process and timely work-flow will be successfully applied and managed to meet each project's needs. The reporting structure of this FDP Project Team is outlined in the figure below:



ESG's Project Manager will be a senior General Manager of ESG and will report directly to the client's designated Asset Manager. All other ESG staff report to the ESG Project Manager. There is also a very important functional link between ESG staff and their counterparts in the client's organisation (shown as dashed lines in the above chart). This is essential for direct, open communication at all technical levels between the client's technical staff and the Project Team. ESG's Project Team is supported at all times by ESG's other departments, particularly Drilling, Facilities Engineering and HSE.

ESG's Project Team can be located either in the client's offices or in ESG's offices in Dubai.

## **Experience**

ESG's staff have conducted a wide range of full field review and field development projects for several clients. Following is a list of the most recent ESG projects, some of which are ongoing.

<b>Company/Operator</b>	<b>Date</b>	<b>Project</b>
KOC	2008-09	Heavy oil network modelling and steam supply project, part of the integrated field development plan of the Lower Fars Heavy Oil Field, Kuwait.
ZADCO	2009	Umm al Dalkh seismic sequence stratigraphy study to support full field review, Abu Dhabi
KOC	2008	Evaluation of EOR options for North Kuwait fields.
KOC	2008	Assessment of waterflood options and corrosion assessment for Umm Gudair onshore oil field, Kuwait.
Sonatrach	2008	Reservoir geomodeling as part of Full Field Review of North Hassi-Messaoud Field, Algeria.
Sky Petroleum	2008	Garachukhur Field project, Azerbaijan
QP	2007-08	Uwainat reservoir integrated field development plan for the Dukhan field, Qatar.
KOC	2007	Sedimentological study of Ratawi reservoir as part of full field review of Ratawi Field, Kuwait.
KOC	2007	Reservoir sedimentology study of the Burgan reservoir as part of full field review of SE Burgan field, Kuwait.
Sky Petroleum	2008	Technical and commercial evaluation for full field review of Peschanoozerskoye field, Timan Pechora, Russia.
ADNOC	2007	Technical review of gas injection and recycling projects of all major fields in Abu Dhabi.
Sky Petroleum	2007	Technical and commercial evaluation for full field review of Luzskoye field, Timan Pechora, Russia.
Sky Petroleum	2006	Subsurface evaluation, facilities design, field audit and screening economics for full field review of Sedigi oil field, Chad
Sky Petroleum	2006	Full field review and re-development plan of the Ilam and Mishrif reservoirs of Mubarek Field, Sharjah, UAE.
KJO (Al Khafji Joint Operations)	2005	Subsurface contribution to the full field review of the Eocene Rus gas reservoir and Paleocene Radhuma oil reservoir of Khafji Field, Neutral Zone.
DNO	2004-2006	Full field development project management for Tawqee oil field in North Iraq.
Dragon Oil	2003-2004	Revised full field review and integrated development plan of LAM and Zhdanov fields, offshore Turkmenistan.
Novus Petroleum	2003-2004	Subsurface and commercial components of the Zarghun South integrated field development plan, Pakistan
Premier	2001-2003	Integrated reservoir development plan for a large heavy oil re-development in Albania.
Dragon Oil	2000-2001	Full field review and integrated development plan of LAM and Zhdanov fields, offshore Turkmenistan.

## Contact Information

---

ESG operates from its Head Office in Dubai, UAE. It has also established country offices and representation in Turkmenistan and Malaysia.

### **Head Office**

ESG Dubai  
PO Box 72784, Suite 704, Al Moosa Tower 1, Sheikh Zayed Highway, Dubai,  
United Arab Emirates  
Tel +9714 332 5392, Fax +9714 332 5394  
Email: [info@esgdubai.com](mailto:info@esgdubai.com)  
[www.esgdubai.com](http://www.esgdubai.com)

### **Turkmenistan**

ESG Turkmenistan  
Ak Altyn Hotel, Magtum Guli Ave No 141, 141/1, 744000 Ashgabad  
Turkmenistan  
Tel +993 (66) 309757

### **Malaysia**

Agent: ILaunch Sdn. Bhd.  
58 Jalan Tg Ampuan Zabedah F9/F Seksyen 9, 40100 Shah Alam Selangor Darul Ehsan, Kuala Lumpur,  
Malaysia  
Tel +603 4256 6623, Fax +603 4251 9623

### **ESG Management Team**

Ian Baron, Managing Director	<a href="mailto:ian.baron@esgdubai.com">ian.baron@esgdubai.com</a>
Peter Bradley, Director Exploration & Production	<a href="mailto:pbradley@esgdubai.com">pbradley@esgdubai.com</a>
Hugh Kane, Director Facilities Engineering & Construction	<a href="mailto:hkane@esgdubai.com">hkane@esgdubai.com</a>
Jon Rodd, General Manager Exploration & Production	<a href="mailto:jon.rodd@esgdubai.com">jon.rodd@esgdubai.com</a>
Paul Baron, General Manager Petroleum Engineering	<a href="mailto:pbaron@esgdubai.com">pbaron@esgdubai.com</a>
Paul Rhodes, General Manager Facilities Engineering & Construction	<a href="mailto:paul.rhodes@esgdubai.com">paul.rhodes@esgdubai.com</a>
Wayne Longstreet, Regional Drilling Manager	<a href="mailto:pwl@esgdubai.com">pwl@esgdubai.com</a>
John Green, General Manager HSEQ	<a href="mailto:john.green@esgdubai.com">john.green@esgdubai.com</a>