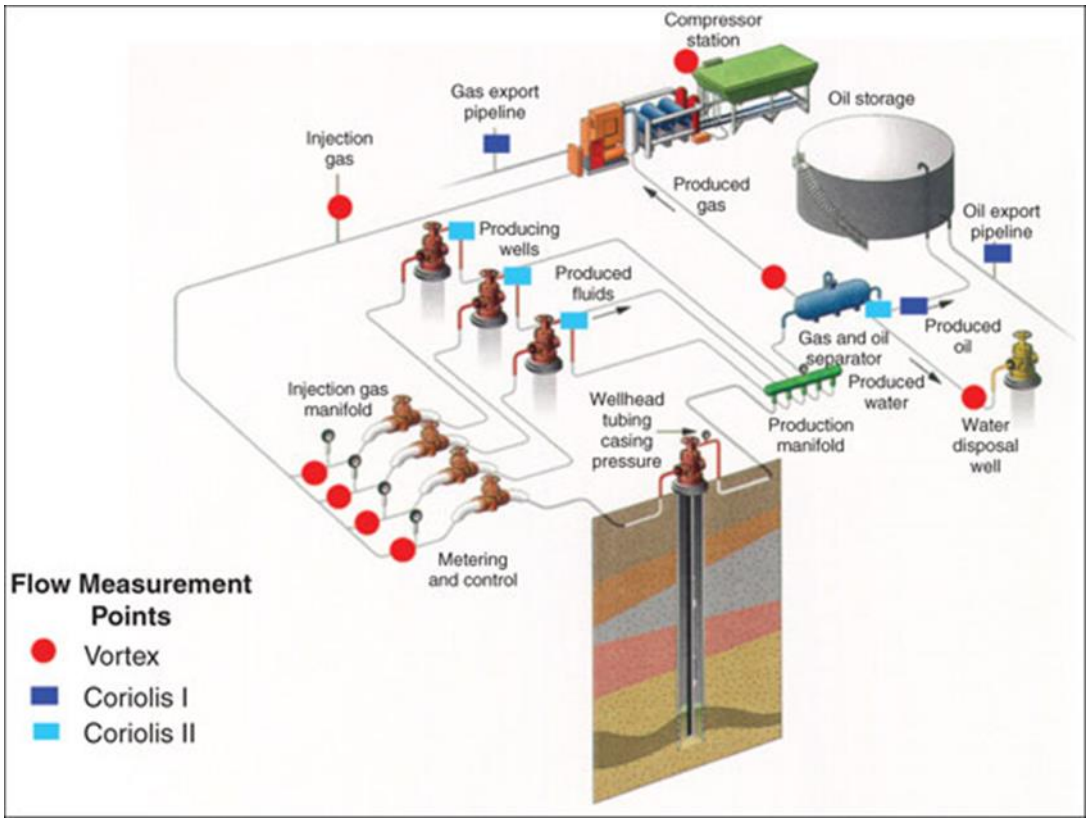
Get-Oil Integrated Services Limited

Integrated Profile



VISION

To become a premium and "highly sought after" Oilfield service company offering the best solutions and innovations to Oil and Gas companies in Africa.

MISSION

Our mission is to be the best and respected Oilfield service company, with a focus of providing unique and excellent services to Oil and Gas companies operating within the Africa Continent, to deliver optimum returns on investment to our Clients and Investors, whilst ensuring a safe working environment, opportunities to thrive, job security and satisfaction to all our employees.

OFFICES LOCATIONS

Registered Office	**Permanent Operations Base**
No 1, Napoleon Road, Dan Etete Layout Benin City, Edo State Nigeria	Off KM 19 Benin-Sapele Road Obaretin Community, Rubber Research Benin City, Edo State Nigeria
Telephone nos: +2348033562388; +2348184439469, web page: www.getoil.com.ng	

EXECUTIVE SUMMARY

Get-Oil Integrated Services - Nigeria

Committed to Customer Satisfaction.

Get-Oil is a fast growing well services company. Company started as an enterprise in 2005 supplying laboratory equipment and chemical and lubricants. It became registered as a limited company of Nigeria in 2014 as a well services company and have since then successfully carried out several production enhancement activities for several Oil and Gas Company within Nigeria. For Get-Oil to be successful in her mission, the company is committed to provide is client with a first class Well head maintenance activities, Civil Engineering Design and constructions, Intrusive and Non-Intrusive meters supply, Gaslift Design, Calibration and Optimisation and supply, Asset Integrity and Instrumentation, Oil and Gas formation damage evaluation and removal, professional training, logistic support and man power supply, through Enhanced Customer Relationship scheme as a method to fill Client's business needs and achieve Client's strategic goals. In order to provide all our clients with this level of service in Nigeria and other Africa company, Get-Oil is committed to providing safe, efficient, high quality operations by using advanced and reliable equipment and chemicals operated and used by first class People. Technological excellence will be provided whilst maintaining a flexible approach. Get-Oil operates a comprehensive service center in Nigeria, with base in Benin City, and a Liaison office in Lagos.

The range of services provided from these bases is in conformance with all the scopes of supply required by our clients are;

- **Wellheads – WIT/SIT/SLM**
- **Total GasLift Design**
- **Asset Integrity/Certifications**
- **Logistic and Warehousing**
- **Training and Manpower Supply**
- **Production Chemicals**
- **Intrusive/Non-Intrusive Meters**
- **Lab testing and Corrosion Control**

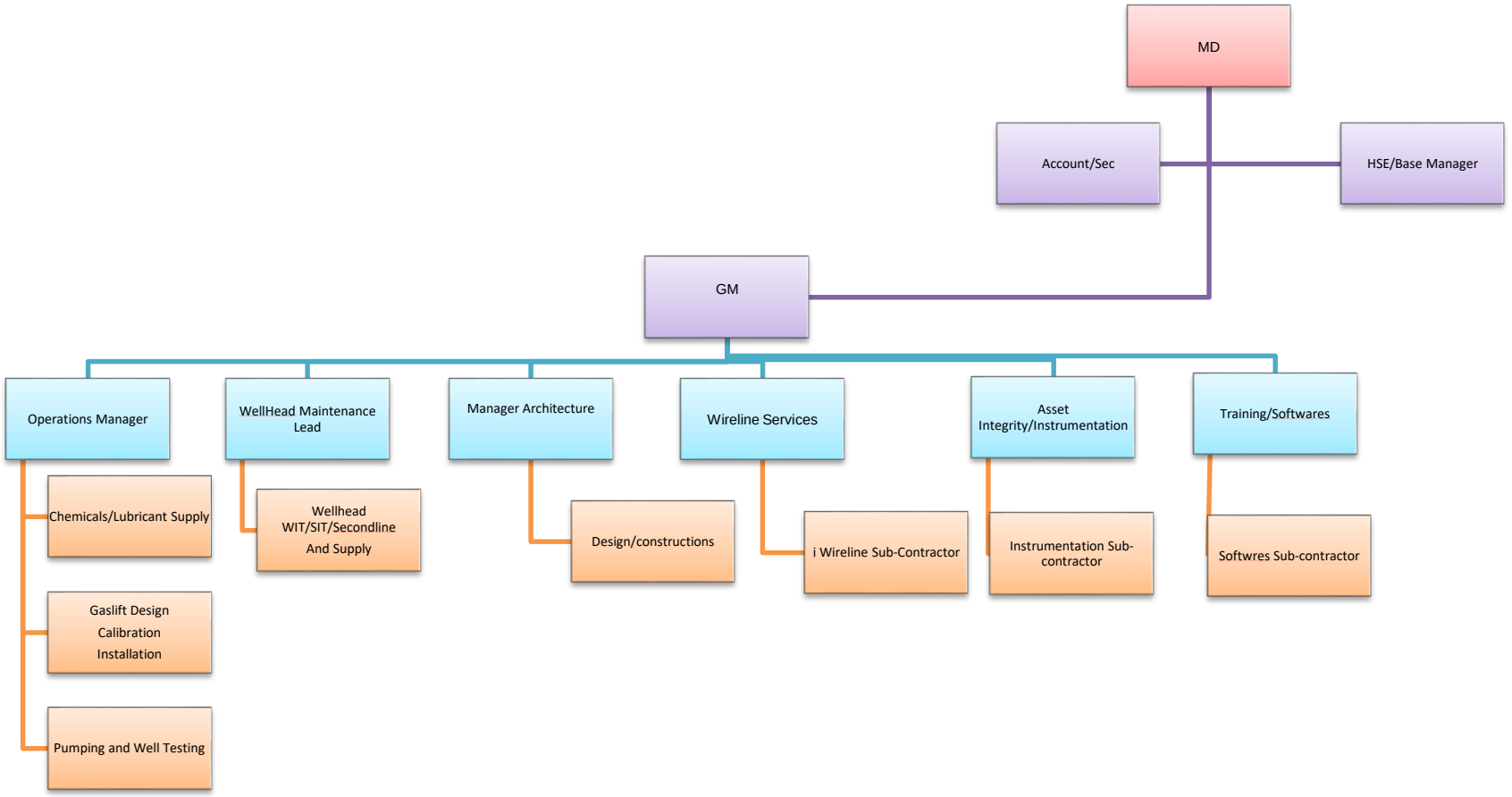
Recent value added innovations:

- **Well Securing of Non-integral wells**
- **Non-Intrusive Meter Supply and usage**
- **Our Case specific gaslift design and optimisation**
- **Chemical Supply**
- **Our Case Specific Training Plan**
- **Our Downhole Wellbore Clean-up support**
- **Vessel inspections and certifications**
- **Our non-fugitive emission detection**

Get-Oil - HS&E Standards

Get-Oil provides' proven technology, industry leading personnel, innovative approach and efficient operations will give her clients confidence in meeting all pre-determined targets and milestones. Get-Oil commitment to training, quality and pro-active safety program will ensure that her clients' safety standards are met and exceeded. Get-Oil maintains a standard HSE procedure throughout its locations ensuring that safety is not compromised at any level. Monitoring, reporting and review systems are also in place and designed to prevent any accident ensuring a zero downtime and 100% operational success. Safety is seen to be a major part of performance indicator.

Get-Oil Integrated Services Key Personnel Positions and Services



HSE POLICIES

INTRODUCTION

The objectives of this document are:

1. To show that Get-Oil Integrated Services has structured HSE-MS in place for the scope of work to ensure compliance with all applicable legislation and relevant policies and to achieve continuous improvement in HSE performance. Our HSE plan is generic and project case specific structured into the HSE MS.

2. To demonstrate that we have system to identify all hazards & effects at all levels of risks of our scope of work and that it will also be assessed and suitably controlled and that measures will be taken to reduce the risks to levels as low as reasonably practicable (ALARP) and that appropriate recovery preparedness measures will be in place in the event that control is lost

1.1 LEADERSHIP AND COMMITMENT

1.2 MANAGEMENT COMMITMENT TO COMMUNITY AFFAIRS, SAFETY, HEALTH, ENVIRONMENT, SECURITY (CASHES) ISSUES

Management of GET-OIL INTEGRATED SERVICE Shall:

- Comply with relevant legislation, identify non-compliance and endeavor immediate remedy
- Participate and champion all CASHES activities as demonstrated in attached HSE schedules.
- Ensure all engaged workers are committed to CASHES and implementation strategies through various programmes of diligence awards and consequence management.
- Ensure security of lives and property.
- Set milestone for improvement; measure and appraise performance against these milestones.
- Put measures in place to protect the environment.
- Always abide by agreed and endorsed memoranda of understanding with host communities.
- Ensure sub-contractors comply with client and our CASHES policies and programmes.

2.1 POLICY STATEMENTS & STRATEGIC OBJECTIVES

2.2 GET-OIL COMMUNITY AFFAIRS, SAFETY, HEALTH, ENVIRONMENT, SECURITY (CASHES) POLICY STATEMENT

It is the policy of GET-OIL INTEGRATED SERVICES to carryout all its business activities in such a way as to:

- Preserve the health and safety of its employees, sub-contractors and members of the public at all times.
- Ensure the good integrity of the natural environment
- Maintain continued cordial relationship with host communities

Therefore all employees of GET-OIL INTEGRATED SERVICES and sub-contractors are required to comply with this CASHES policy statement when any work is being planned or executed. Any task which cannot be done in compliance with this CASHES policy statement shall not be started or continued.

Signed:_____

Ayodele Ajayi
Managing Director

Date:_____

1.1 GET-OIL CASHES POLICY OBJECTIVES

GET-OIL CASHES Policy objectives are as follows:

Community Affairs

- Create mutual beneficial relationship with the host communities
- Achieve zero community disturbances

Safety

- Achieve zero fatalities
- Achieve zero lost time incident (LTI)
- Achieve zero preventable road or marine accidents
- Achieve zero non-adherence to rules and regulations
- Achieve zero non-adherences to the "Permit-To-Work" and other agreed procedures

Health

- To avoid occupational illness/injuries to personnel
- Ensure personnel free from communicable diseases
- Maintain safe and healthy working environment

Environment

- Avoid damage to the environment
- Leave the environment at the end of our operation in a state suitable for future use

Security

- To ensure zero or minimal security incidents through adequate and effective procedures in place.
- To safeguard lives and property on every site.

1.2 WAYS TO ACHIEVE THESE OBJECTIVES

We will:

- Have competent staff to co-ordinate and implement the CASHES Programmes
- Ensure jobs are executed in accordance with work procedures/statements
- Ensure all employees participate in CASHES seminars and courses
- Carry out quarterly review of programmes and targets

- Implement all follow-up actions resulting from audits
- Display emergency procedures at strategic places in offices and sites
- Apply the hazard register in the execution of any job

1.3 IMPLEMENTATION AND DISSEMINATION OF POLICIES AND OBJECTIVES

Awareness and understanding of these policies and objectives is being fostered in the following ways:

- By displaying these policies & objectives on conspicuous location at project sites/offices
- Making copies available to all employees and visitors
- Induction of employees on the content of these policies and objectives in relation to their responsibilities/tasks
- Attendance by employees

1.4 POLICY STATEMENTS

1.4.1 SAFETY POLICY

It is GET-OIL's policy to:

- Identify, reduce or eliminate all HSE risks and provide necessary resources, programs and procedures to manage these HSE risks
- Develop and maintain HSE awareness and competence of our workforce
- Communicate to our workforce safe work procedures and ensure compliance
- Display warning signs and notices at worksites and all employees to obey such instructions
- Ensure work area free of flammable or harmful gases
- Identify and assess non-compliance to safe practices and endeavour immediate remedy

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.2 HEALTH POLICY

It is GET-OILs policy to:

- Carry out pre-employment medical examinations on personnel and only medically fit personnel shall be engaged.
- Engage in health surveillance of employees periodically.
- Ensure good sanitary and hygienic conditions exist at work place.
- Strictly prohibit the smoking of cigarettes, cigars or pipes in all hydrocarbon processing facilities and other designated no smoking areas.
- Strictly prohibit intake of alcohol & drug at work site and no employee should be under the influence of alcohol or drug during working hours.
- Develop and maintain programmes and systems to ensure healthy and safe working environment

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.3 ENVIRONMENTAL POLICY

It is GET-OIL's policy to:

- Comply with and follow up on the requirements of all applicable environmental legislations, laws and standards.
- Apply the principle of pollution prevention on all our activities and services
- Adopt necessary measures to prevent and reduce environmental impacts due to emergencies
- Use natural resources wisely and efficiently
- Effect timely and responsible clean up and mitigation of all unavoidable negative impacts on the environment
- Continuously improve its environmental performance through regular review of its objectives, targets and programmes.

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.4 COMMUNITY AFFAIRS POLICY

It is GET-OIL ENGINEERING's policy to:

- Suspend any activity that is identified hazardous, poses potential risk, unsafe, unhealthy or has adverse environmental implication to the community until better solutions are found.
- Be sensitive to the needs and concerns of host communities to forestall community related work disturbances.
- Maintain and operate under the guidelines laid down by client in dealing with host communities
- Recognize and maintain constant dialogue with all segments in the host communities in order to foster cordial relationship

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.5 SECURITY POLICY

It is GET-OIL's policy to:

- Give utmost priority to security of lives and asset and regard security as an integral part of good business in all its operations
- Identify, assess, manage and safeguard all security risks to personnel, assets and facilities in all business operations
- Educate and sensitize all employees to regard security of personnel, document, assets and materials as good business

This policy will be pursued in compliance with client's guidelines on use of external security agent and force. In pursuing this policy, GET-OIL INTEGRATED SERVICES will do all it can to ensure that human rights are respected.

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.6 TRANSPORT POLICY

It is GET-OIL's policy:

- That all transport equipment used for operations comply with regulatory standards and requirements
- That prior to being used for operations, all transport equipment are registered, inspected and certified for use by relevant regulatory bodies and thereafter on a periodic basis
- To engage only qualified, certified and authorized personnel to operate the transport equipment
- To encourage and support programmes designed to raise transportation safety awareness among personnel in order to further enhance performance.
- That all drivers apply the "No GSM Rules" during official business hours

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.7 SUBSTANCE ABUSE POLICY

It is GET-OIL's policy to:

- Ensure and maintain smoke, alcohol and drug free workforce and work place
- Ensure that only prescribed drugs are permitted within the workplace and work hours
- Strictly prohibit intake of alcohol and drug at work sites and no employee should be under the influence of alcohol or drug during working hours

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.8 EMERGENCY RESPONSE POLICY

GET-OIL INTEGRATED SERVICES shall:

- Promptly and effectively respond to any emergency which endangers the health and safety of staff, the environment, company assets or operations
- Provide organisation, facilities, procedures and training in order to ensure effective response at all times
- Liaise with relevant government and industrial organisations and with host communities
- Carry out regular exercise/drill in order to ascertain effectiveness of the response procedure

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.9 STAFF EMPOWERMENT TO STOP WORK WHEN FOUND UNSAFE

Any of the entire employees of this company is empowered to stop any work found unsafe.

Any job, which in the opinion of the worker is not safe should be suspended and communicated to the HSE Officer/Supervisor who will in turn report to management for immediate action.

Signed:_____

Ayodele Ajayi

Managing Director

Date:_____

1.4.10

2.0 ORGANISATION, RESPONSIBILITIES, RESOURCES & STANDARDS

2.1 HSE ORGANISATION

To enhance HSE in our operations, HSE department has been created with a competent HSE Co-ordinator/Focal Point who reports directly to the Managing Director to allow Management respond to HSE issues promptly.

2.1.1 HSE RESPONSIBILITIES OF PERSONNEL

2.1.1.1 MANAGERS

- Provide leadership and active support for HSE
- Assure that all employees are held accountable for these HSE responsibilities
- Consider the safety attitude of subordinates prior to promotion

2.1.1.2 HSE OFFICERS

- Advice Management on HSE matters
- Give pep talk to workers before the day's work begins
- Ensure all equipment in services must be in good working condition
- Ensure workers wear necessary PPE
- Obtain appropriate work permit from client and all precautions stipulated strictly observed
- Attend clients HSE meetings and implement all related action points
- Identify and correct all unsafe Acts and conditions on site daily
- Empowered to stop any activity which endangers personnel and immediately notify appropriate authority
- Display appropriate HSE notices and signs at work sites and offices
- Ensure functional First Aid Box is on site and all employees are made to obtain treatment
- Hold HSE meetings at least monthly and the minutes of such meetings sent to the client
- Investigate any accident that may occur at work site

2.1.1.3 SUPERVISOR

- Co-ordinates HSE activities and motivate employees to adopt safe work practices
- Empowered to stop or suspend any unsafe work until it is safe to continue
- Assures that safety devices and relevant PPE are used by persons under his supervision
- Assures the injured are treated promptly and reported properly
- Assists with investigation of accidents and initiates corrective actions when required
- Assures that no unsafe conditions exist in area of responsibility and informs HSE officer(s) on any corrective actions needed

2.1.1.4 ALL EMPLOYEES

- To be familiar and comply with the company HSE policies.
- Use all required safety devices and PPE
- Identify and know emergency procedures, exits, fire fighting equipment, life-saving and first aid equipment and mustering point
- Stop or suspend any work considered unsafe to do
- Report incidents, near-misses, theft, unsafe acts and conditions to supervisor or HSE Officer
- Attend all HSE meetings & training sessions
- Keep all assigned equipment in good condition

2.1.1.5 VISITORS RESPONSIBILITIES

- Always report in to security/supervisor, complete any logs or negotiation forms so that you can be accounted for in an emergency and always sign-out when you depart

- Be in the appropriate PPE (hard hat, safety shoes, etc)

- Follow the instructions of your host at all times. Listen carefully to safety briefings and orientations and know what to do in an emergency, if you have questions, ask your host.

SERVICES

Well Head Maintenance

Our well integrity program is a mechanism to ensure the sound quality and healthiness of all its completion components with the ultimate aims of safeguarding the life, environment and shareholder investment. Our Well Integrity Manual contained all the best practices and standard across the E&P.

Our unique standard surveillance mechanism and corrective methodologies for all well types (oil, water and gas) will help put our client in best class position on well integrity. The developed program not only ensures the identification of well problems at its infancy but also maintains the healthiness and upkeep of Clients assets. This Integrity plans focused on the following three (3) primary well integrity methods:

1. Surface Well Integrity Testing (WIT) – The WIT comprises the flow-wetted parts of the completion. An improved first-line maintenance.
2. Sub-Surface Integrity Testing (SIT) - The SIT comprises all the sub-surface fluid containment conferment of all flow-wetted parts of the completion.
   WIT and SIT are intended to be intervention less. However it has been recognized that, in order to acquire true knowledge of whether or not a valve can be considered a barrier, there may be a need to set plugs in the completion or the wellhead and pressure test against these to establish their integrity. Such a test would be called a Pressure Integrity Test, PIT.
3. General Routine and Corrective Maintenance – secondline maintenance

Our services include routine Wellhead Maintenance as well as Wellhead Completions. Our expertise covers various Wellheads, Chokes & Valves including Cameron, Vecto Gray, FMC & Kvaerner. Comprehensive valve refurbishment are carried out by skilled engineers and technicians at our dedicated workshops in Benin and Warri.

GetOil supplies quality Wellhead systems to suit all casing size requirements - to full API specifications. We provide conventional gaslift valves, mandrels, deployment tools and all mechanical and fluid system needed for well securing.

Oil Wells Frequencies

TYPE OF JOB	TYPE OF WELL	RECOMMENDED FREQUENCY
Wellhead Valves Integrity	Wells in populated area	2 times per year
	Non-residential – desert, forest etc	Once every 2 years
	All other wells	Annually
SSV/SSSV/ESD Test	All wells	2 tests per year
Annuli Surveys	Wells with ESP	2 times per year
	Wells in populated area	2 times per year
	All other wells	Annually (Note: wells equipped with pressure transmitters should be monitored online.
Landing Base Inspection	All Wells	After rig release
		Once every 10 years/once 5yrs for wells over 30
Temperature Survey	D/H Packer with known reservoirs	Base survey

Selected Wellheads Equipment

New back pressure valve lubricator and VR plug side door lubricator to support increasing wellhead demand within Nigeria market. Just concluded 50 strings WIT and secondline and just commencing 30 strings well second of non-integral wells using NRV, VR plugs and brine fluid where no top packer or high casing communication.	
Warehouse with new and newly repair manual and auto flow valves for client and those warehoused for future usage during secondline or adhoc repairs and sales. The warehouse house contain over 30 of both manual and auto manual and SCSSV actuators for various wellheads.	

Various surface and sub-surface valve control system for repairs for clients. And new once stored for client and for sales.	

Wellhead crew working on client location during well securing with VR plugs and NRV installation. Two barrier well safeguarding principle.	
Auto system ready to usage on wellhead.	

Set of various sizes of NRV plugs for well securing and usage during temporary wellhead intervention. Over 30 were installed this year successfully in our client wells.	

Get-Oil setup during flow testing of weak well to confirm fluid content before completing Flowline for line-up to production. Same setup for high casing pressure bleed down during WIT/SIT.	
Currently ongoing wellhead repair and gaslift valves installation on client well. Over 2000bopd oil was gain from several of this gaslift valves change-out and optimization using four rate test method.	

GASLIFT

During the life cycle of a reservoir, changing reservoir conditions such as reduced pressure, increasing water production and/or decreasing gas-liquid ratio among others, could create situations in which a reservoir will no longer have sufficient natural energy to move produced liquids to the surface through the production tubing at desired rates. Under such condition, improvement in the reservoir performance could be effected by the application of appropriate options within the "Artificial Lift" program.

Fundamentally, it is good engineering practice to be proactive when dealing with well-bore hydraulic problems by introducing artificial lift mechanism(s) at the initial life of a reservoir. Such artificial lift method must be fit for purpose and be sufficiently flexible to respond to the exigencies of production operations and at the same time optimize production throughout the life of the reservoir.

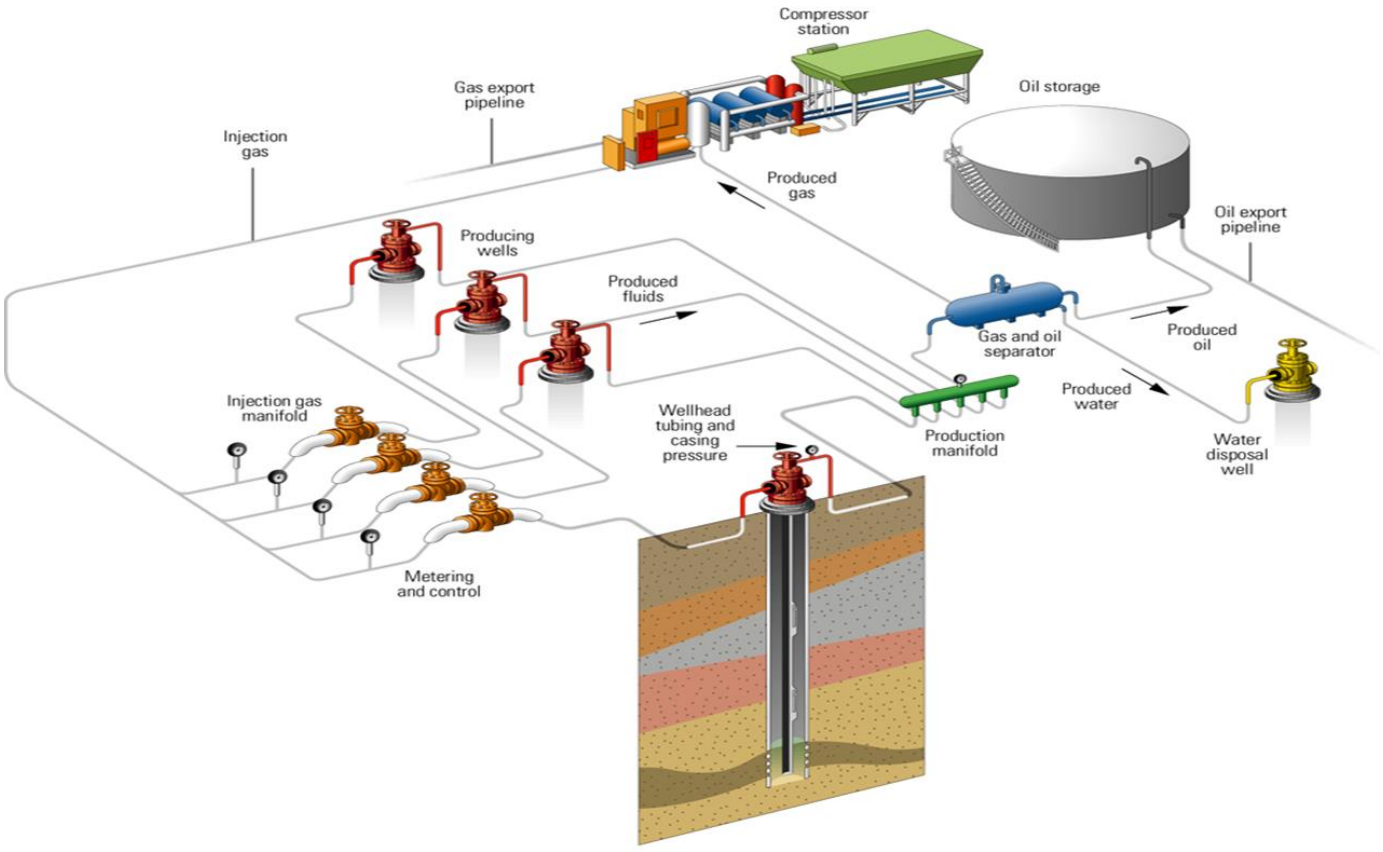


Figure-1: Gaslift Total System

Gas Lift Methods

Gas lift is perhaps the most widely used of all the Artificial Lift Methods. It is a lift method that

is known for its extreme flexibility in providing solutions to various well-bore hydraulic problems and in most cases, it is durable throughout the life span of the well. It is however not without its own operational problems; the most severe of which are:

(i) An initial design error in the placement of lift mandrels or a design which fails to account for current and future characteristics of the well-reservoir system. Accuracy and optimized gaslift design if required during initial well design.

(ii) Continuing availability of adequate volume of high-pressure-gas source for injection and the ability to maintain an optimum, stable gas injection rate into each of the wells in a multi-well reservoir.at the later stage of the reservoir life cycle. Compressor often required, where high gas pressure is available, it is practicable and economical to go best practice and take gas direct to well manifold without high capital investment on compressors.

(iii) Inability to accurately measure all the fluid components (oil, water and gas) in the fluid flow stream using the two pen chart system; and particularly our inability to resolve the measurement nightmare traditionally associated with the common but irregular, turbulent multiphase flow regimes in pipes.

(iv) Where source of gaslift gas is high pressure gas well(s), the gas must be controlled to a specified, desired pressure. The gas must be conditioned (dried, where possible etc.) to a specified quality. The volume of gas must be sufficient to provide for gas-lift requirements, recognizing that these requirements will likely grow over time. Keep in mind that use of 4-rate optimisation test will be required because limited control system in this case.

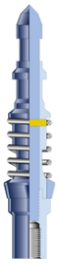
The mechanism of gas-lifting is fairly straightforward. It involves injecting high-pressure gas through the annulus into the tubing through the gas-lift integral mandrel valves located at prescribed depths downwards to the lowest point possible. As the gas flows upwards through the tubing to the surface, it expands, reducing the average fluid density and the weight of the fluid column inside the tubing. The reduction of the fluid column weight enables the low formation pressure to push up the low density fluid column for production through the tubing. Furthermore, the fluid column weight reduction also manifest itself as an equivalent reduction in the well-bore flowing bottom-hole tubing pressure, causing an increase in pressure differential across the sand face and a consequent increase

in oil production from the reservoir. In theory therefore, gas-lift performance is based on the balance
of forces between improved buoyancy in the tubing string and the corresponding increase in the
flowline back-pressure of the multi-phase flow stream.
Normally oil production increases as gas injection rate increases. However the gas injection rate has an optimum limit beyond which we enter the elusion phase during which a high rate of gas injection will cause slippage as the gas phase moves faster than the liquid phase.

Generally, three central issues are key to a successful gas lift injection optimization program. The
issues are:

- Inability to maintain constant gas injection rate at the gas-lift injection header as a result of inadequate availability of requisite compressed gas, and/or inadequate compressor capacity or frequent compressor down time or poor gas wells performance.
- Poor implementation of a purpose designed well-head surveillance program to ascertain real time performance of gas-lifted wells.
- Inadequate four rate gaslift optimisation to ensure optimum gaslift injection and
- Poor compliance to timely optimization well tests required to re-calibrate the production model needed to construct the performance profiles of wells under gas-lift.

Deployment and Valves



Wireline Retrievable Gas Lift Equipment

- Side Pocket Mandrels
- Gas Lift Valves
- Valve Latches
- Kick-over Tools
- Running Tools
- Pulling Tools

GASLIFT EQUIPMENT WITH PICTURES

Hih pressure Testing pump (HP-V10). Equiped with: 1. 10,000psi pump 2. stainless steell gauges 3. 25psi standard air compressor 4. Stainless 100mesh strainers	
Crude pump - capacity 10000barrel/day at min 500psi discharge pressure, diesel driven with lifting frames for offshore, with emergency shutdown and control panel/switches...lagged exhust, suitable for zone-2 usage	
Echometer – Fluid Level and BHPs Most common use of acoustic liquid level instrument is to measure the distance to the liquid level in the casing annulus of a producing or shut-in oil well. On gas wells an acoustic fluid level tests can provide the similar results as the static gradient surveys.	

S/N	DESCRIPTION D	PICTURE
1	**Calibration Chamber** This chamber is owned by GET-Oil but manufactured by ACT. It is made of stainless steel. Designed to test valves to API-11V1 standard. It comprises of: 1.Sleeve tester 2. Encapulated stem-seat leak tester 3.Ager - inbuilt pressure chamber Picture-1 is Gaslift test Bench Picture-2 is Water bath for valve conditining.	 
	Sleeve Tester/Vice The sleeve tester for valves pressure setting and sleeve movement test.	 
	Gaslift Cabin Complete view of the gaslift workshop dedicated cabins with Test bench, sleeve tester, nitrogen bottle, water bath and work table.	
	Gaslift Valves Selected view of our arrays of gaslift valves form America Completion Tools a subsidiary of Parveen Industires. 1.Venturi high volume, low energy loss orifice valve called Super- FlowTM 2. Standard orifice valve 3. standard offloading valve	

Sand Management

Background:

Sand production during the course of hydrocarbon production is a common phenomenon. However high sand production with its attendant damaging effects on both downhole and surface accessories have led to an increasing demand for both down hole and surface sand control in the oil and gas industry.

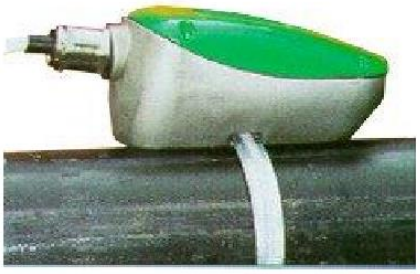
Sand production in Clientfield has led to loss of revenue due to reduction of well choke, increasing pigging rates, reduced pumps efficiency, maintenance cost and frequent de-sanding. Currently, the spot sampling technique for determining sand production is inadequate and adversely impacts decisions on field management.

The common approach to sand monitoring has been monthly surface sampling and laboratory analysis. Challenges surrounding monthly sampling are long interval between each sampling and testing, spot sampling not representative in a continuous flow fluids system with varying velocity and sand content, poor repeatability of test result and in many cases results could be highly optimistic – given false high sand alarm to operators.

Oil and gas well operators know how important it is to maintain production at optimum levels, and an important part of that optimisation is a clear and accurate measurement of solids production. The SandAlert range provides robust, dependable measurement of solids within the production stream, so you can be confident that you are operating as efficiently as possible. The SandAlert system consists of two parts: The PulsarGuard 2001 sensor, a small, robust clamp-on acoustic monitor, and the SandAlert controller. SandAlert is ideal wherever you need to keep wells producing efficiently at the highest rate possible. The unique PulsarGuard sensor is installed after a suitable pipe bend where the turbulent flow profile is fully developed. The sensor measures solids production directly, without the need for an external or additional flow measurement

Equipment

Acoustic Sensor



PulsarGuard 2001

Functional Description

The high frequency structure borne acoustic signal generated by a sand impact on the internal wall of a pipe, travels through the pipe wall and is detected by the acoustic sensor. The acoustic signal is then converted to an electrical signal by the sensor.

The electrical signal or sensor output is processed by the electronics in the SandAlert Portable control unit to provide a sand impact rate (SIR) in impacts per second (IPS). (This figure is then used by the calibration algorithm to give sand mass).

To illustrate this the following figures (a,b,c & d) show the types of signals that you would expect under conditions of high and low flow rates, with and without sand impacts:

1. Equipment Installation Procedures

Site Visit

Sites visit involving Contractor's personnel and CLIENT focal point (s) on the operation and would be
Conducted prior to mobilization to ascertain the following:

- Accessibility to w/head or point of installation
- Availability of a suitable angle 90 degree bend for each installation
- Affirm availability of a safe area where the sand monitoring on the PC laptop would be ongoing
- Measure the distance from the point of sensor installation to the safe area to provide adequate length of cable
- Check and verify integrity of swab and w/head needle valves
- Availability of an ½" NPT male connection
- Identify source of portable water
- Community issues; negotiation and settlement

Installation Procedure of Sand Probes

Mounting of Sensor:

Sensor is mounted downstream of a bend point (bend, elbow, tee) in the line and located on the outside of the corner.

Attachment:

The sand detector sensing head is attached to the pipe by screwing it into a unit (skid) which has been clamped to the pipe using metal straps. Once installed, the base unit will not need to be removed except if the signal is noticed to be weak and unreliable. The most likely cause of an unusual decline in signal is poor contact between the pipe surface and the sensor head. Silicone grease is used to ensure good ultrasonic contact between the sensing head and the surface of the pipe.

Surface preparation:

Since the acoustic sensor picks up the energy from the particles impacting on the inside of the pipe, it is important to obtain the best possible acoustical contact between the sensor and the surface of the pipe. Therefore paint and other coating on the pipe surface must be removed. A circular spot should be smoothed, cleaned and treated with silicone compound to improve the contact between the sensor and the pipe surface. This is usually done via the following steps:
Remove paint and coating with a knife or file in a marked circular spot. The sensor probe head has a diameter of 8mm, but it is recommended to prepare a circle of minimum 2 cm in diameter.
Use a file to remove any roughness in the pipe surface.
Rub the spot with sand paper to achieve an effectively smooth area
Clean the spot with a smooth cloth –moisten with grease dissolving fluid.

Note; Silicone compound must be applied prior to sensor installation

Mounting Of Skid:

The stainless steel clamping bands for the skid are delivered in1 meter lengths each if not otherwise specified. This is sufficient for an outer pipe diameter of DN 640 (25"). If the particle monitor is going to be permanently, the bands should be cut to fit the actual installation.
Fit the band to the actual installation. Make sure you are using one band with a threaded part and one without a threaded part. You might be able to stretch the bands while tightening them.
Fasten the bands to the skid with the m6 screws through a hole in the band.
Hand tight the fastening screw.
Check that the skid is sufficient fastened, and that you are not able to move the skid by hand.

Mounting Unit

The particle monitor is easily installed in the skid by screwing the whole unit 4-5 rotations until there is metal to metal contact between sensor probe and the pipe.
Check that the particle monitor is free of fault and the sensor and the threads are clean
Check that the skid is securely fastened
Clean with smooth cloth and moisten with grease dissolving fluid

Apply silicone compound
Screw the unit into the skid and hand tight with both hands
Tighten the fastening screw on the clamping band ½ turns
Tighten the 2 screws on the skid

Verification of Installation

To make sure the particle monitor is correctly installed and securely fastened, the following checks are performed .If any errors found, the installation is incorrect and reinstallation should be done according to procedure.

Try to move the unit by hand –this should not be possible.
Try to screw the unit further into the skid - this should not be possible
Make sure that the particle monitor has metal-to-metal contact with the pipe structure for earthen purposes.

Power Requirements

The portable ClampOn particle monitoring system consists of the sensor, 100m twisted pair cables and the power supply unit (PSU). The PSU powers the sensor with 2 watts (15 watts at start up) and is itself powered by 110-230Vac. the sensor is EExia certified but the PSU is not and hence has to be kept in a safe area.

2. Reporting Format:

A daily report shall be submitted to the CLIENT representative at end of the 12-hr daylight operation. Sand measurement basically would be reported in two ways:

- Qualitatively: establishing the highest sand free-limit
- Quantitative: sand rate (density) in PPTB; grams/sec (g/s), Total sand in pounds (Lb)

4.Onsite procedures

1. Hold safety meeting with all the personnel involved and discuss objectives, procedures and exit routes.

2. Layout equipment as per figure-1.

3. Install the sensor at the identified suitable bend – figure2.

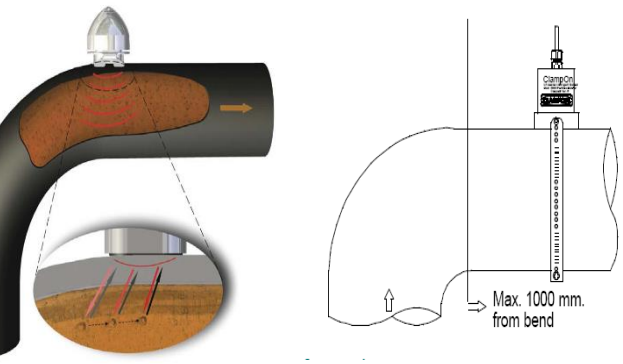


Figure-1,2 – elbow connection for effective particle detection

4. Start the Clamp-On sand monitoring by lining up interval to test separator (if no result test data)

5. Start-up monitoring software and monitor the signal for at least one hour to identify good or bad patterns.

6. When flow is observed stablised, collect surface sample for immediate laboratory analysis (if no recent lab sand data).

7. Produce wells with flowline less than 1KM for 4 hours and wells with flowline longer than 1Km or gas lifted for minimum of 6hours to ensure proper well stability and data repeatability.

8. Download data to analyze using the ClampOn software for the period logged.

9. Extract logged data and calculate sand impact and rate for the period logged.

10. After the baseline ultrasonic sand monitoring, if sand production is less the 10ppt, the well will be ramped-up and re-tested. Otherwise, the well will be choked back and re-tested at CLIENT instruction.

11. Process of optimisation will continue until an optimum oil rate with sand rate less than 10pptb is obtained.

Case History New Oil and Gas Well– Ramp-up

ACOUSTIC FLUID DEPTH METER

Acoustic liquid level tests are performed successfully on different types of wells throughout the world. Most common use of acoustic liquid level instrument is to measure the distance to the liquid level in the casing annulus of a producing or shut-in oil well. On gas wells an acoustic fluid level tests can provide the similar results as the static gradient surveys. Information can be collected quickly and at low cost. The beneifts of acoustic fluid meter over conventional slickline methods are: access to Well Not Restricted by Road Bans or Rough Terrain, Safer Because of Using Less Manpower and Heavy Equipment, Inexpensive to use Fluid Level Instruments and Wire Line Methods Are More Intrusive and Costly.

Figure 1: Acoustic Depth Meter Installation in Casing Valve Outlet

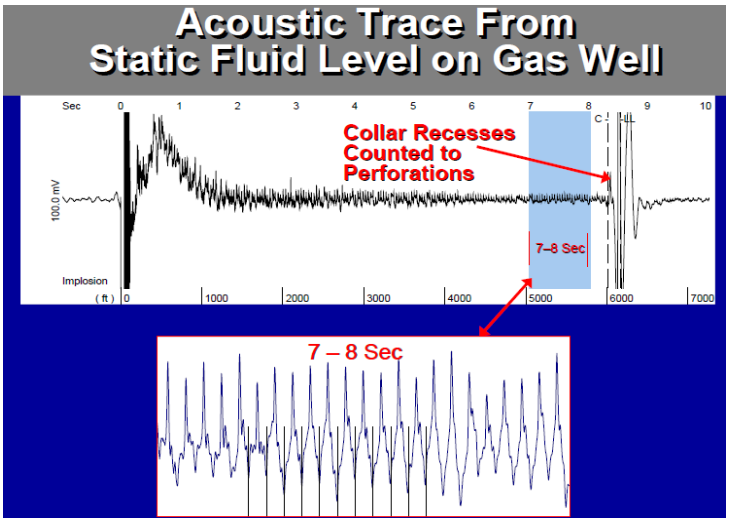


Figure 2: Signature interpretation

Chemicals and Lubricants Supply

Supplying of various Oil and Gas chemicals and lubricants listed but not limited to the list below

- Demulsifies – case specifics; Anti sludge agents – acid jobs; Corrosion inhibitors – for acid jobs and flowlines; Mutual solvents – acid jobs; Bactericides – water wells; Defoamers – foaming crude Oxygen scavanger – waterline; Paraffin control agents – waxing wells; Surfactants – as required in wells; Scale inhibitors – water wells and high water cut oil/gas wells; Completion Salt – KCL, NaCl,CaCL2; Glycols family – mono; dial; tri EthylAlchohol – dehydrator; Coolants.
- Oil pump lubricants; Gas Compressors and Generators Lubricants, Heating Oil

Laboratory Services

Basic lab testing – SG, Salinity, bottle testing of chemicals, emulsion testing, lubricant acidity, viscosity, compatibility test, Sand sieve analysis and BSW Testing

CASE HIASTORIES

Years	Jobs Desc	Values
2019	Wellhead WIT/SIT/Adhoc	40 Strings campaign to carryout WIT/Adhoc ongoing. Secondline will kick-off using information from WIT operations.
2019	Gaslift Valves Changeout/Optimisation	Planning for gaslift installation on news well and optimisation of old wells.
2019	Sand Management in a client fields	Flow tested 5 gas wells and monitoring sand with Clamp-On Acoustic meter to ensure no sand influx to gas plant.
2018	Gaslift Valves Changeout/Optimisation	Changeout (non-functioning/old/obsolete/poorly calibrated) 42 Offloading valves and 10 orifice from 10 wells to new valves and did 4-rates test and gain +1200bopd for client.
2018	Gaslift Valves Changeout	Installed orifice valves in two new wells and kicked-off on gaslift. Each string delivering over 1000bopd.
2018	Wellhead WIT/SIT/Firstline	35 Strings campaign to carryout firstline and testing of all flow Wetted areas of wellhead with well pressure or pressure pump and mark out materials for repairs.
2018	Wellhead WIT/SIT/Firstline	Sub-surface wellhead accessories testing done on five gas wells and six high GOR wells. 20 Strings campaign to repairs/replace/re-set wellhead accessories.
2017	Gaslift Valves Change out and optimization	Well making over 1000bopd. Gain plus 400bopd from gas optimisation.
2017	Sand Management in a client fields	Gain +300bopd via choke optimisation, safe pumps life
2016	Condensate/crude/water evacuation	Evacuated plus 50000bbls to crude to refinery
2016	Sand Management in a client fields	Gain +1000bopd via choke optimisation
2016	Wellhead Firstline	25 Strings campaign to carryout Firstline and mark out materials for repairs
2016	Wellhead Secondline	12 Strings campaign to carryout repairs and replacement of malfunctioning valves and damage wellhead accessories
2015	Gaslift Optimisation in a client field	Gain plus 800bopd via optimum gas injection
2015	Oil and Gas wells acid stimulation chemicals – in client wells	New well meet expected potentials- well-30/29 etc
2015	Gas well acid stimulation in client wells	Expected gains

2015	Crude/Condensate Trucking	Crude trucking for marginal field producers
2015	Manpower supply	ESP/Gaslift Engineer
2014	Wellhead Firstline	21 Strings campaign to carryout Firstline and mark out materials for repairs
2014	Wellhead SecondLine	15 Strings campaign to carryout repairs - AVA changeout, Swab valve changeout, O ring replacements, Pilot-resetting etc