



IDF ENGINEERING & CONSULTANCY SERVICES

Drilling Fluids Engineering & Services

Completion & Packer Fluids Design

Drill-in-Fluids & Reservoir Fluids

Well Clean Up Services

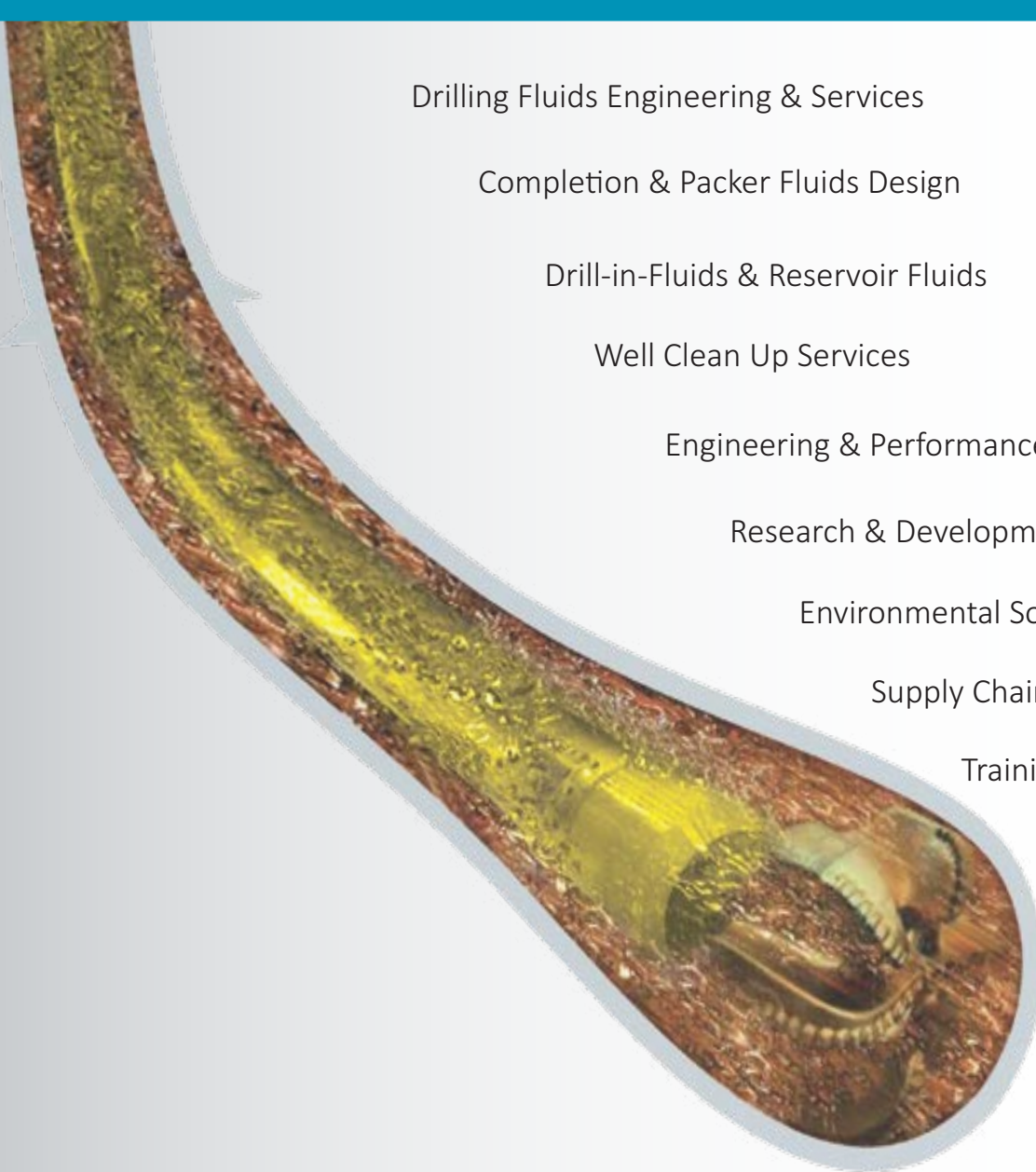
Engineering & Performance Monitoring

Research & Development

Environmental Solutions

Supply Chain Management

Training & Consultancy



OVERVIEW

Who Are We

IDF aims to serve the oil & gas industry as a technical and engineering based company. We position ourselves as an engineering consultancy and service company with years of insight in drilling, completion and production services. We do this by providing high quality specialist engineering support services to the industry. This is mainly due to our practical research activities to overcome drilling problems during the past years.

Our focus is on quality assurance, technical advice and providing viable solutions that ultimately leads to the best possible service for our clients.

We understand the significance of various drilling services, which can make a huge difference in the production process that drives the bottom line for our clients. It is of our core belief that one of the key components in the drilling services cycle is Drilling Fluids. For this particular reason, we have paid special attention to Drilling Fluids and its interface with other services.

What We Do

Our role is to review and analyze drilling and production performance, which is mainly driven by drilling and completion fluids. By doing so, we can design, re-design and customize a tailor made solution which is best suitable for the challenges ahead of us. The design process is a combination of R&D, Engineering Analysis, QHSE and Finance to come up with optimum solutions that are viable and in compliance with the required standards.

Cost of drilling fluids is known to be around 5-10% of the total drilling cost whereas the impact it can have on drilling problems is known to be more than 70%

Drilling Fluids Engineering & Services

We can design and customize drilling fluids based on the well design and the drilling program in order to improve drilling efficiency. This is initially done by preparing a comprehensive operational drilling fluids program to meet both normal and contingency plans. In addition, we can offer our advanced Hi-Tech Drilling Fluids for special applications such as those in high reactive shales/clays, depleted zones and HPHT wells. Our fluids systems can be customized based on our client's requirements whether it be OBM, WBM or Synthetic Based Muds.

We offer a wide range of drilling fluids engineering solutions to cover our client's engineering and operational requirements in drilling activities.

Our Expertise Can Provide the Following Value for Your Projects:

-  Drilling Fluids Engineering Program
-  Completion and workover Fluids Design
-  Hydraulic and Hole Cleaning Design
-  Wellbore Stability Study
-  Drilling Problem Investigation
-  Final Well Report and Recap
-  Advance Technologies and Applications
-  Total Fluids Management
-  Project Operational Management
-  Project Benchmarking and Performance Evaluation

Advanced Solutions for Drilling Problems

IDF's experience and technical acumen makes us capable to provide advanced solutions for drilling problems such as; lost circulation, reactive shales, high torque in deviated wells, bit balling, low ROP, salt water influx and other drilling troubleshooting issues.

Completion & Packer Fluids Design

Completion and Packer fluids design has direct influence on well integrity and well life. The result of a good fluid will minimize workover operations, reduce corrosion rates and prevent downhole tools damage. In addition, we evaluate the compatibility of completion and packer fluids with the formation of water properties to minimize damage invasion into the formation.

Drill-in-Fluids & Reservoir Fluids

Drilling the reservoir section is the most sensitive and important phase of the well. We take a proactive approach to make sure the negative impacts of drilling fluids, such as formation damage are minimized, and by doing so we can enhance the well productivity. We design compatible drill-in-fluids and reservoir fluids based on the reservoir characteristics to make sure production enhancement is optimized.

Reservoir Drill-in-Fluids service is a special service to provide specific fluids designed exclusively for drilling through the reservoir section of a wellbore.

Given that each reservoir is unique and optimizing its performance requires a unique approach, we select a fluid to match the reservoir to mitigate and prevent formation damage, minimize the skin factor and help improve well productivity.

Well Clean Up

The productivity performance of wells is a crucial endeavor which is directly related to the wellbore damage by drilling fluids. We evaluate the formation damage type and provide well clean up practices, proactive well clean up systems and specialty chemicals to obtain the maximum formation on recovery. Effective removal of drilling damage before putting wells on production maximizes well performance, cash flow and profitability. Well Clean Up services uniformly remove formation damage to optimize well productivity. Furthermore, it enables operators to retain and improve permeability in horizontal open hole completions and increase production in mature wells without the need for rig intervention. Well Clean up services ensures the cleanest wells and maximizes production to deliver significant financial benefits.

Well Clean up services optimizes zonal coverage and achieves uniform radial and longitudinal fluid placement throughout the wellbore. It consequently improves production from the entire horizontal section, maintaining and improving permeability all along the pay zone.

Our clean-up systems and mud breakers are customized according to the formation type, blockage degree and targeted productivity.

Engineering Performance Monitoring & Optimization

Performance monitoring is one of our engineering services in order to optimize and improve efficiency of the drilling operation. Based on international benchmarked drilling standards, KPIs and drilling fluids parameters, we will identify the impediments and provide the best possible solution for optimization. We will track and monitor all records relevant to drilling and drilling fluid parameter in order to benchmark and compare performance during and after drilling.

We analyze the following information for monitoring and benchmarking drilling performance:

- 🌐 Wellbore Geometry Parameters
- 🌐 Bit and BHA Information
- 🌐 Hydraulic and Hole Cleaning Parameter
- 🌐 Drilling Fluids Properties
- 🌐 Drilling Parameters

Environmental Solutions

Solids build up is one of the main concerns that affects drilling parameters and performance. Monitoring and controlling solids will improve mud properties and drilling performance. This will enable our clients to achieve the best results from their drilling fluid systems (such as good rheological properties and system stability).

IDF offers a wide range of waste management services to minimize generated waste and contaminated discharged cuttings during drilling operations. This helps keep our environment clean and ensures that our operations are in compliance with DOE (Department of Environment) legislations.

We provide cost-effective and optimum solutions from environmentally acceptable procedures to achieve zero-discharge plans and improve fluids recovery. The outcome reduces operational costs and enables recycling.

Wastes are analyzed for various parameters such as chloride, nitrate, phosphate, BOD (Biological Oxygen Demand), COD (Chemical Oxygen Demand) and oil content. Other analysis are carried out to monitor the treatment process on a regular basis during waste generation. Our waste management personnel are fully trained and experienced having the competencies in place to provide the best reliable services with concentrated support and the least liabilities.

Our Environmental services Includes the Following:

- 🌐 Solids Control
 - Shale Shakers
 - Decanter Centrifuge
 - Screens
- 🌐 Solids Control Performance
 - Performance Monitoring
 - Optimization
- 🌐 Completion Fluids Filtration Services
- 🌐 Waste Water Treatment
- 🌐 Cutting Treatment
- 🌐 Environmental Impact Assessment

Training

We are able to offer a wide range of training courses to our clients from a variety of industrial backgrounds. Specific courses can be designed to meet our clients requirements where necessary and if facilities and equipment permit, training programs can be conducted on client premises to suit their own individual needs.

Our current training programs covers well engineering, drilling fluids, HPHT operation and design in both basic and advance levels:

Training Courses	Duration
🌐 Basic Drilling Fluids	5 Days
🌐 Advance Drilling Fluids Course	5 Days
🌐 Basic Drilling Practices	5 Days
🌐 Advance Drilling Practices	5 Days
🌐 Drilling Problems & Remedial Action	5 Days
🌐 HPHT Drilling Design & Operation	5 Days



Quality, Health, Safety & Environment Policy

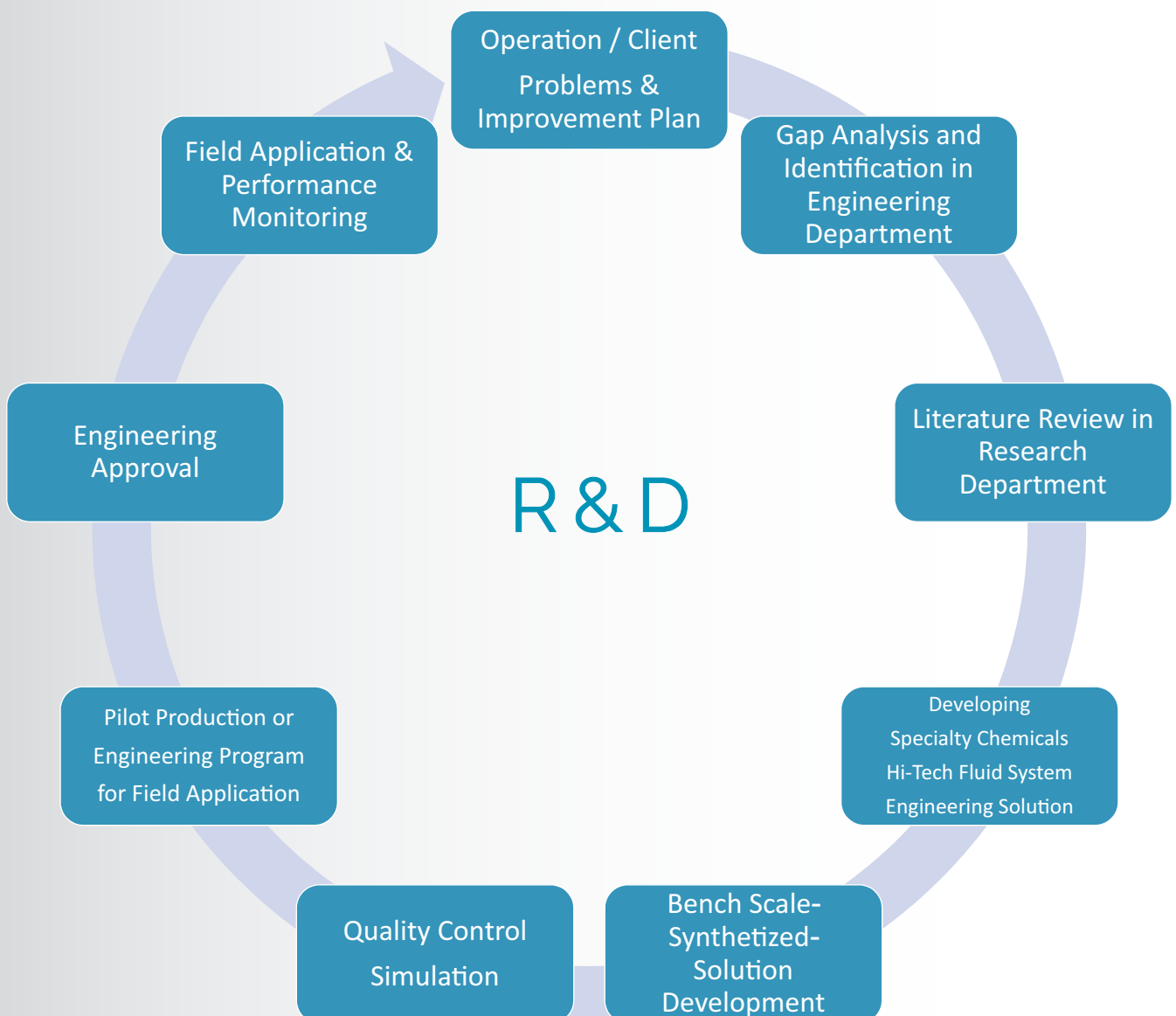
IDF has established certain basic QHSE policies to outline broad standards of conduct in specific areas with high risk. Seniors and managers are responsible for implementing the more detailed procedures to ensure compliance of all personnel with these policies, however, all employees are responsible and trained.

Research & Development

We strongly believe that research and development is a key element to continuous improvement. It has been the main driver behind the development of an integrated value chain to develop a wide range of , Hi-Tech Specialty Chemicals, Fluid Systems and Waste Management Solutions based on our clients operational troubleshooting problems.

We have strategic alliances with several academic research institutions to extend the depth of our R&D.

The following steps are implemented to analyze the gaps and find the proper customized solutions for drilling problems:



IDF has experience in the following R&D projects:

- ④ HPHT Wells in Exploration and Development Projects
- ④ High Pressure Geological Layer with Influx Contamination
- ④ Troublesome Shale Zones and Associated Problems
- ④ Reservoir Protection and Formation Damage Reduction by using Non-Solids Drill-in-Fluids
- ④ Environmentally Friendly Fluids in Replacement of Oil Based Mud
- ④ Complete and Moderate Losses in High Permeable or Fracture Zones
- ④ Bit Balling and Clay Stickiness
- ④ Environmentally Friendly Synthetic Based Mud for Hard Drilling
- ④ ROP Enhancer and Performance Improving
- ④ Cost Effective Solutions for Workover and Completion Fluids



PRODUCTS

Overview

Drilling operations requires vast amount of chemicals, which our procurement department has been supplying. We have therefore gained valuable experience in supply chain management and we are able to support our customers with a wide range of chemicals.

Managing our supply chain is one of the most important issues to sustain an efficient drilling operation. Failure to manage the supply chain has severe ramifications for us and our operators making all the difference in efficiency and profits. We have created strong ethical ties with our suppliers and logistic companies making sure they meet compliance requirements.

Many of the chemicals used in drilling operations can be applied to numerous industries and we have adequate knowledge of chemistry through our R&D department.

Our goal is to provide innovative products for oilfield chemicals with international standards at competitive prices.

Products

- Commodity Chemicals
- Drilling Specialty Chemicals
- Drilling Fluids Systems
- Loss Circulation Solutions
- Reservoir & Drill-in-Fluids Systems
- Completion Fluids & Well Clean Up
- Workover & Reservoir Fluids
- Production & Processing Chemicals
- Waste Water Treatment Chemicals



Commodity Chemicals

Category

Additives

Fluid-Loss-Control Agents	AMYLOSE B AMYLOSE HV-100 AMYLOSE LV-150	AMYLOSE ULV CMC LV-LP CMC LV-TG	PAC LV-LP PACLV-TG PAC ULV
Mineral Salts	CAUSTIC POTASH CAUSTIC SODA	CITRIC ACID SODA ASH SODIUM BICARB	
pH and Alkalinity Control	CALCIUM CHLORIDE DH-SXS CALCIUM CHLORIDE MH/AH-SXS KCL IG	KCL UPG SODIUM CHLORIDE AC	
Weighting Agents	BARA-WATE API BARA-WATE BULK BARA-WATE I	CARBO-WATE F HEMA-WATE API HEMA-WATE I	
Viscosifiers	BENTO-GEL API BENTO-GEL BULK BIO-XCD	CMC HV-LP CMC HV-TG GUAR GUM MG HEC P	NATURAL GUM PAC HV-LP PAC HV-TG SALT CLAY

Drilling Specialty Chemicals

Category

Additives

Shale Inhibition & Stabilizer	ASPHA-SHALE MP ASPHA-SHALE NHP CLAY BOND L	CLAY-BOND P EMO-BLOCK GILSON	GLYCO-DRILL GP GLYCO-DRILL HC GLYCO-DRILL MC
Hole Cleaning & Thixotropic	THIXO-DRILL	WELL-SWEEP	
Dispersants, Deflocculants & Rheology Control	RHEO-STAB SPERSEEN CFL SPERSEEN L (RHEO-REDO)		
Corrosion Inhibitors/Scavengers/Preservative	BIO-SAFE BRINE-COR HP BRINE-COR MP	H2S BLOCK H2S SCAV L H2S SCAV LP	OX-SCAV L OX-SCAV P OX-SCAV SSP PIPE-COR
Lubricants/ROP Enhancers/Torque & Drag Reducer	BIT-WASH ECO-LUB EP ECO-LUB HP	ECO-LUB MP ROP ENHANCER (HC) ROP ENHANCER (LC)	TORQUE-FREE GB M100 TORQUE-FREE GB M600 TORQUE-FREE GB M1000 TORQUE-LOW GR
Cleaning , Foaming, Defoaming & Emulsifier Agents	CLEAN SURF DEFOAM ALC DEFOAM SLC	FOAMER HP FOAMER MP WBM-EMULSIFIER	
Pipe Free Agent	PIPE-FREE HP	PIPE-FREE MP	
HPHT Specialty Chemicals	AMYLOSE HT BIO-XCD HT HT FLC MICRO-DENSE	MICRO-MAX TEMP-STAB L RHEO-STAB	
OBM/SBM Specialty Chemicals	OBM-COR OBM-FLC OBM-LUB OBM-EMULP OBM-EMULS	OBM-OMC OBM-RM OBM-TREAT OBM-VIS	SBM-BASE SBM-COR SBM-FLC SBM-LUB SBM-OMC SBM-RM SBM-TREAT SBM-VIS

Drilling Fluids Systems

Challenges	Category	Drilling Fluid System			
Moderate-Active Shales/Clay	High Performance Drilling Fluid Systems	CLAY-BOND	GLYCO-DRILL	SHALE DRILL	
High Pressure Zones	High Performance Drilling Fluid Systems	HEAVY-DRILL	ULTRA-WEIGHT		
High ROP, Deviated, Horizontal & Extended Reach Wells	High Performance Drilling Fluid Systems	LUB-DRILL			
Depleted & Low Pressure Formations & Reservoir	Hi-Tech Drilling Fluid Systems	LOW-WEIGHT	MICRO-DRILL	MICRO-FOAM DRILL	
HPHT	Hi-Tech Drilling Fluid Systems	ALL-STAB	HT/HPHT		
Sensitive & Reactive Shale/Clays	Hi-Tech Drilling Fluid Systems	N-INHIBIT ULTRA-INHIBIT	ULTRA-PERFORMANCE	LOW-SALT	
Reservoir Compatible	Reservoir & Drill-in Fluid Systems	CARBO-BRIDGE	ULTRA-CARB	MAX-DRILL	
Drill-in Fluid Systems	Reservoir & Drill-in Fluid Systems	CRYSTAL-SEAL	FREE/FORMA DRILL	CS-FORMA DRILL	

Loss Circulation Solutions

Category	Formations	Recommended LCM LPM Solution & System		
Wellbore Strengthening	Mini fractured formations Shales Depleted sands	WELL-STRENGTH M WELL-STRENGTH C		
Bridging Agents for Reservoir	Mini fractured formations Depleted sands	CARBO-BRIDGE UF CARBO-BRIDGE SF		
LPM & Seepage Loss Controller (Less than 25 bbl/hr)	Permeable formations Fractured carbonates	LPM-BRIDGE F/M KWICK SEAL F/M LPM-RES F/M/C		
Moderate Losses (25-100 bbl/hr)	Unconsolidated sand, Limestone Shale and coal wide range of fracture sizes & depleted	LCM-FLAKE LCM-FIBER M KWICK SEAL C		
Severe Losses (100-200 bbl/hr)	Unconsolidated sand, Limestone Shale and coal Cavernous zones	LCM-FLAKE LCM-FIBER M KWICK SEAL C		
Complete Losses (More than 200 bbl/hr)	Fractured Large vugular or cavernous zones	H-SEAL BCD-SEAL HARD-SEAL BARA-PLUG	RES-PLUG S-SEAL POLI-SEAL	HARD-SEAL WELL-PLUG STONE-SEAL

Reservoir & Drill-in-Fluids Systems

Category	Fluids Systems	
Drill-in Fluid Systems	FREE/FORMA DRILL CS-FORMA-DRILL	SIZED-SALT MAX-DRILL
Reservoir Compatible Fluid Systems	CARBO-BRIDGE	ULTRA-CARB

Completion Fluids & Well Clean Up

Category	Additives		
Completion Brines	CALCIUM BROMIDE L	CALCIUM CHLORIDE MH/AH-SXS	FORMA-DRILL II-P
	CALCIUM BROMIDE P	CALCIUM CHLORIDE MH/AH-BB	FORMA-DRILL III-L
	CALCIUM CHLORIDE DH-BB	FORMA-DRILL I-P	SODIUM BROMIDE L
	CALCIUM CHLORIDE DH-SXS	FORMA-DRILL II-L	SODIUM BROMIDE P
Well Clean UP	WELL-CLEAN WBM		
	WELL-CLEAN OBM		

Workover & Reservoir Fluids

Category	Fluid Systems	
Work over Fluid Systems	CRYSTAL-SEAL	
	MILL-DRILL	
	WATER SHUT OFF	
Reservoir Fluids & Services	TRACER INJECTION	WATER SHUT OFF
	FORMATION DAMAGE STUDY	ASP CHEMICAL EOR

Production & Processing Specialty Chemicals

Types	Trade Names	
Biocides, Corrosion Inhibitors H2S Scavengers	BIO-INHIBIT	FULE-SAFE
	ANTI-BIOCOR	COR-INHIBIT
	SULPH-SCAV TBO	H2S-SCAV FAZ
	OX-INHIBIT	
Wax, Asphaltene Inhibitors	ASPHA-SPERS	
	WAX-INHIBIT T	WAX-INHIBIT PI
Demulsifiers	DEMUL-20	DEMUL-2007
Scale Inhibitors	SCALE-INHIBIT PAP	SCALE-INHIBIT OPT
Hydrate Inhibitors	HYDRATE-INHIBIT	

Waste Water Treatment Chemicals

Category	Additives	
Coagulants	POLY ALUM	
Flocculants	FLOC HP	SILICA HR
	FLOC MP	SILICA MR
	CEMENT CLASS A	SILICA LR
pH and Alkalinity Control	ALKAN-CONTROL	HARDNESS-CONTROL
	ANTI-SEPT	QLIME
Corrosion Inhibitors/Scavengers/Preservative	BIOCIDE HP	
	BIO-CIDE WT	COR-INHIBIT WT
	OX-SCAV WT	



International Drilling Fluids



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