PROFILE
WASTE MANAGEMENT IN-SITU CLEANING SERVICES
of
HYDROCARBONS CONTAMINATED MEDIA/FLUIDS
including
Produced Water
OBM, WBM, Drill Cuttings,
Storage Tanks, Bilge Water Tanks,
Sludge Pits, Oil Contaminated Soil/ Water
utilizing
Shearforce Patented Technologies

Shearforce Nigeria Ltd. RC-473016

A division of Shearforce Ltd. Co. USA,
Forth Worth, Texas 76119
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Section I: Mission Statement

Shearforce Nigeria Ltd. Mission statement is to offer the best available state of the art Waste Management Cleaning Services in the area of:
Produced Water
OBM, WBM, Drill Cuttings,
Storage Tanks, Bilge Water Tanks,
Sludge Pits, Oil Contaminated Soil/ Water

We believe we are the first and only company offering “GREEN” solutions to the extensive oil pollution problems in Nigeria.

Regarding the “DISPOSAL OF OILFIELD SLUDGE, DRILL CUTTINGS AND ASSOCIATED HYDROCARBON WASTE” In recent times, and at various sites, the attention of the Governments of Oil Producing States have been drawn to the issue of the safe, permanent and environmentally friendly disposal of oilfield sludge and other hydrocarbon wastes associated with the production and storage of crude oil in the Oil Producing States.

The Governments of Oil Producing States have noted that for a long time now, such waste materials have been stored mainly in sludge or drill cutting pits at various locations from which they are eventually disposed of primarily by incineration. Recent investigations have revealed that the incineration of oilfield sludge, drill cuttings and wastes continues to release toxic fumes into the atmosphere, thereby pollution the environment. The harmful effect to the health of the people has become immeasurable.

Further the risk that the wastes never arrive at the incineration site, question the validity of the “EX-SITU” method of cleaning.

In addition to the toxic emissions to which reference has been made, it is also known that the storage of oilfield sludge in earthen pits has resulted in the contamination of water sources through overflow and percolation of effluents into the surrounding soil. This has also had harmful effects on the aquatic life, birds and farmlands.
Under the provisions of Section 3 (1) of the Oil in Navigable Waters Act, Cap. 337 of the Laws of the Federation of Nigeria, 1990, it is an offense to discharge oil or any mixture containing oil into the waters of Nigeria. By the provisions of Regulations 25, 39 and 40 of the Petroleum (Drilling and Production) Regulations, made pursuant to Section 9 (1) (b) (iii) of the Petroleum Act, Cap. 350 of the Laws of the Federation of Nigeria, 1990, it is the duty of all oil licensees to:

(a) Take all practical steps to prevent or abate any oil pollution to the waters and environment of Nigeria.
(b) Use methods approved by the Director of Petroleum Resources for confining Petroleum and its derivatives and ensure that such products are not stored in earthen reservoirs; and
(c) Ensure that all waste oil, brine and sludge is safely stored and disposed of in a safe manner as approved by the Director of Petroleum Resources.

As earlier stated, the present mode of disposal of oilfield sludge and associated hydrocarbons waste by incineration has proved to be gravely harmful to the environment and injurious to the health of the inhabitants of the Oil Producing States.

Information available to these Oil Producing State Governments is to the effect that there is now in existence an environmentally friendly and safe process for the disposal of oilfield sludge, drill cuttings and associated waste. The process developed by Shearforce Company Limited of Dallas, Texas has received an approval to install by DPR. The process is an “IN SITU” process which utilizes patented Shearforce Technology brought into Nigeria through Shearforce Nigeria Ltd, a subsidiary of the American Company. The process also utilizes a chemical called SF-1000 which has received DPR approval.

This “IN SITU” process is cheaper than incineration and is inherently safer since the wastes are not transported from the site until they are safe. Further, this method employs a large number of local people from the site location, satisfying a critical current issue of the people.

It is the strong recommendation of these Oil Producing State governments, that all oil producers should within the shortest time possible, adopt this new process for the disposal of all oilfield wastes contaminated with hydrocarbons.

Our mission is to provide top quality modern and professional engineering services to our clients using the most efficient and responsive customer – oriented approach.
Section II: Structure

The structure of the company consists of extremely experienced management personnel from within Nigeria as well as ex-pat personnel whom have operated in Nigeria for over twenty five years.

In view of increasing awareness on information Technology development in Nigeria, the two primary principals of the company have formed a business for effective pioneering of our information technology business in the area of the Oil & Gas Business utilizing world reputable technical principal partners in United States. The purpose of the company is to provide technical services in our areas of business to our major clients in Nigeria.

Shearforce Nigeria Ltd. was incorporated in 2001 in Nigeria as a private limited indigenous company to provide Integrated System Engineering Services in the fields of Petroleum and Drilling engineering consultant services.

The directors of Shearforce consists of Mr. Frank Tybor who has over thirty years of experience operating in Nigeria and Mr. Femi Olufowobi who is the former chairman of Weatherford Nigeria Ltd. & a current director of Hot-Head Nigeria Ltd.

Shearforce has a team of experienced Engineers and well-trained technicians that have made their mark in the various fields of the Engineering services offered.

This organizational structure allows the Shearforce to offer Integrated System Services incorporating the in various principal partners with the basic concept of having the instrument of Management by Objectives for efficiency and growth within the line of staff managerial levels.
Section III: Services Offered: WASTE MANAGEMENT IN-SITU CLEANING SERVICES of HYDROCARBONS CONTAMINATED MEDIAS/FLUIDS including
- Produced Water
- OBM, WBM, Drill Cuttings,
- Storage Tanks, Bilge Water Tanks,
- Sludge Pits, Oil Contaminated Soil/ Water

3: Process Details

We have presented below one of the processes which have been developed by Shearforce LLC for the purpose of cleaning hydrocarbon contaminated medias. We believe that the Shearforce processes are truly “GREEN” which utilizes patented Shearforce technology with chemically enhanced bioremediation and ozone treatment. Shearforce has received an “approval to Install” from DPR. The Shearforce processes are totally safe and use 100% bio-degradable components which leave no potentially toxic by-products.

The primary purpose of this process is to provide “In-situ” or Clean in Place (CIP) alternatives for the various specific applications in order to provide a safer and cleaner environment.

We are addressing specifically the treating of OBM/Cuttings and Produced Water in the following section.

3.1: Shearforce Basic Process- Principal/Methodology

Shearforce LLC has engineered several processes which form well thought out Turnkey process packages for the purpose of In-Situ cleaning of hydrocarbon contaminated fluids including produced water, drilling mud’s, industrial waste water, sludge pits and oil contaminated soil from oil spills or any hydrocarbon contaminated site such as gas service stations, sites which have used oil fired furnaces etc.

The Shearforce packages are intended to be mobile in design which can be utilized by the drilling and/or oil/gas operating companies. There are also options for more permanent versions of the same design intended for long term installations.

The Shearforce packages are a solution to needs created by the Oil & Gas Industry in the areas of exploration and production. Both areas produce hydrocarbon contaminated fluids which require cleaning prior to discharge into the environment.
The Shearforce process packages are based on a multi-phase approach using components which have been proven individually with extensive field experience. Although several different processes have been developed, all on based on a basic three phase approach:

Phase 1: Bio-remediation using SF-1000 chemical
Phase 2: Ozone injection using Shearforce Pumps
Phase 3: Filtering of precipitates and other solids from the fluids

3.2: Chemically enhanced bioremediation

Bioremediation is the process of encouraging the natural process of biodegradation of hydrocarbon contaminated substances. There are three different types of bioremediation: nutrient enrichment, seeding with naturally occurring microorganisms, and seeding with genetically engineered microorganisms.

The growth of oil-degrading microorganisms is limited by the availability of nitrogen, phosphorus and oxygen. The SF1000 provide these nutrients which cause the stimulation of the indigenous microbial colonies to multiply at an expeditious rate. Oxygen is assured by the use the Shearforce Pumps which added millions of microscopic air bubbles by injecting air or ozone concentrated air into the suction or discharge of the pumps.

The use of SF1000 will cause a breakdown of the hydrocarbon contamination into small minute particles so that the indigenous microbes in the soil and water will be able to consume the hydrocarbons as a food source.

The breakdown is liberation of the oil from the cuttings as a free phase layer, sans surfactant and sans solids. This technique was confirmed in the following article.

“Surfactant-enhanced washing of oil-based drill cuttings was evaluated as a technology of benefit to domestic oil producers. Laboratory studies showed the branched CM-C,15 alcohol propoxylate sulfate to be a promising surfactant for liberating oils from these drill cuttings. Low concentrations (similar to 0.1% by weight) of this surfactant produced ultra-low oil-water interfacial tensions (IFTs), thereby allowing the rollup/snap-off mechanisms to liberate drilling oil (C16, C18 alpha olefins) from the cuttings.” ref.5

The breakdown or liberation is further enhanced by the Shearforce pump which by it’s design creates “shear” within the fluid. This shearing action will assist in the dissolving of salts.

Shearforce SF-1000™ provides both the nutrients and the surfactant as discussed. SF-1000™ is a non-hazardous concentrated water based synergistic blend of synthetic biodegradable, non-toxic, non-flammable surfactants. The surfactant action of Shearforce SF-1000™ allows it to emulsify hydrocarbon contaminants into microscopic droplets suspended in solution. This emulsion remains stable in the rinse and/or treated media. SF-1000™ does not contain any enzymes or microbes.
3.3: Ozone

3.3.1: What is Ozone? How does Ozone Work?
Ozone is a naturally occurring colorless gas produced from oxygen. It has the ability to act as a disinfectant and eliminate various types of matter. Ozone treatment of water and other medias is a purification technique that uses this gas to kill certain impurities in water.

In nature, ozone can be created by lightning or by the sun. To make an ozone water treatment system work, a similar process must be created. First, there needs to be an oxygen source. This could be air or it could be a dry process gas. Second, there needs to be an energy source, which is typically electricity.

The oxygen source is fed into an ozone generator. There, it is charged to make ozone. The ozone created has a very high Oxidation Redox Potential (ORP) of over 2700 millivots and thus it becomes a powerful oxidizer. As such, it can kill organic impurities found in water and other medias such as bacteria, viruses, and mold which decreases the Chemical Oxygen Demand (COD) and the Biochemical Oxygen Demand (BOD) significantly. Test results show a decrease of over 60% BOD on oily waste water from values of 14,100 mg/l to 5190 mg/l.

At the end of its short lifespan, ozone completely converts back into oxygen. Ozone has no bioavailability or toxicity potential.

“Ozone reacts quickly with micro pollutants containing accessible amino groups, double bonds, or aromatic systems. Alongside these pollutant-specific attributes, the efficiency of the reactions also depends on the pH value and on dissolved organic carbon (DOC). The extent to which a pollutant can be eliminated can be estimated by looking at its reaction rate constants with ozone.” Ref. 10

3.3.2: Purpose of using Ozone:
Ozone is 3,000 times more efficient than chlorine when used as a disinfectant. It destroys bacteria, fungus, spores and parasites in water, especially chlorine-resistant microorganisms. Ozone also oxidizes organic contaminants and decomposes inorganic contaminants. Ozone is capable of decomposing most of the complex organic substances to the less harmful basic elements from which the complex substance is derived.

For example, BTEX is a common acronym used to describe benzene, toluene ethyl benzene, and xylenes. BTEX compounds are some of the most commonly VOC (volatile organic compounds) found in petroleum derivatives such as gasoline and are often found as a persistent contaminants in the areas prone to gasoline and gasoline derivative spills (old gas stations, gasoline storage yards, refineries, etc.).

In documented research studies and reviews of the data from projects where the ozone sparging has been successfully used for the soil and water remediation, the contamination of BTEX in the soil and surrounding ground water has been successfully reduced by as much as 90% within the first five weeks of the treatment and as much as 98% + reduced by the week seven or eight of the treatment. In case of the BTEX, the decomposing of the complex organic substances result in hydrogen and carbon.
Through further reaction the hydrogen is used to create water and the carbon is either left in its pure state or further synthesized in carbon dioxide.

Ozone can destroy BTEX, MTBE, TCE, Hydrocarbons, Diesel Fuel and other contaminants.

3.3.3: Ozone Treatment

Ozone Treatment consists of injecting Ozone into the system using a Ozone Generator. The Ozone is injected into the suction of the Shearforce Pump. The Shearforce patented design allows the pump to handle large volumes of gas (20% or greater). The result is an Ozone dissolution ratio which is more then 90% which is significantly higher then ratios obtained using venture ejector systems. Injecting the Ozone into the suction is the creation of microscopic bubbles which assist in the effectiveness of the Ozone. Further the pressure created by the pump will compensate for any elevated temperatures of the media assuring proper concentration.

Ozone, with a standard redox potential of 2.07 V is the current gold standard for disinfection of marine acquaria….In the words of Jacques Yves Cousteau, “No aquarium, no tank in a marine land, however spacious it may be, can begin to duplicate the conditions of the Sea.” Since ozone can be converted back to oxygen, it can be used in high concentration without residuals—making it a truly green solution.

3.3.4: Uses of Ozone

3.3.4.1: Removal of heavy metals from water using ozone

Ozone oxidizes the transition metals to their higher oxidation state in which the conversion of soluble heavy metal salts to insoluble salts occur which will then precipitate. The precipitates are then easy to separate by filtration.

“Metals precipitation from contaminated water involves the conversion of soluble heavy metal salts to insoluble salts that will precipitate. The precipitate can then be removed from the treated water by physical methods such as clarification (settling) and/or filtration.” Ref. 6

Iron, for example, is usually in the ferrous state when dissolved in water. With Ozone it yields ferric iron which is further oxidized in water to Ferric Hydroxide a molecule that is very insoluble and precipitates out.

Other metals such as Arsenic (in the presence of Iron), Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Nickel, and Zinc can be treated in a similar way. At Ozone levels above 4 ppm however, Manganese will form soluble permanganate, showing up as a pink color.
3.3.4.2: Removal of organics from water using ozone

Ozone reacts rapidly with most simple aromatic compounds and unsaturated aliphatics, such as Vinyl Chloride, 1,1-dichloroethylene, trichloroethylene, p-dichlorobenzene, Benzene, etc. But it reacts slowly with complex aromatics and saturated aliphatics. Ozone will degrade many organic compounds, such as sugars, phenols, alcohols, and as it degrades these materials it turns again into Oxygen.

Coupling Ozone with Hydrogen Peroxide will cause the formation of very active Hydroxyl ions which initiate a nucleophilic attack on organic compounds. This can result in the displacement of Halogens and other functional groups such as Amines, Sulfides.

3.3.4.3: Oxidation of dissolved Organic materials with Ozone

Oxidation of dissolved Organic materials with Ozone results in polar and charged molecules that can react with Polyvalent Aluminum or Calcium to form precipitates. Treatment of surface water with up to 0.4 ppm of Ozone results in a decrease in turbidity, improved settle ability, and a reduction in the number of particles. This treatment, referred to as pre-ozonation, destabilizes the colloid with a resulting reduction in the amount of coagulant needed to produce a clear filtrate.

3.3.4.4: Decreasing turbidity in water with ozone

Oxidation of dissolved Organic materials with Ozone results in polar and charged molecules that can react with Polyvalent Aluminum or Calcium to form precipitates. Treatment of surface water with up to 0.4 ppm of Ozone results in a decrease in turbidity, improved settle ability, and a reduction in the number of particles. This treatment, referred to as pre-ozonation, destabilizes the colloid with a resulting reduction in the amount of coagulant needed to produce a clear filtrate.

3.3.5: Summary Benefits of Ozone:

Ozone will:

- Increase the oxygen level in soil/groundwater
- Destroy TBA (Tetrabutylammonium), Aliphatic & Polyaromatic, VOC’S (volatile organic compounds), Hydrocarbons, Chlorinated
- Kill contaminants and reduces BOD (Biological Oxygen Demand)/COD (Chemical Oxygen Demand) levels
- Kill virus, bacterium, germs
3.4: Water Dispersion Method

Another key element in the proposed process is the dispersion method of WBM which assures that the WBM and drill cuttings are dispersed over a large area. This method will avoid a Mud/Cuttings pile which occur when the media is discharge through a single pipe located on the rig.

The effects of WBM cuttings piles on bottom living biological communities are caused mainly by burial. The Shearforce process will spray the processed WBM & DC over a large area, thus reducing the possibilities of damages caused by burial.

3.5: Filtration

The third phase of the system is to filter out any precipitates and solids from the media prior to discharge. There are several methods available such as centrifuges, filters and Lamella separators.

“Metals precipitation from contaminated water involves the conversion of soluble heavy metal salts to insoluble salts that will precipitate. The precipitate can then be removed from the treated water by physical methods such as clarification (settling) and/or filtration.

In the precipitation process, chemical precipitants, coagulants, and flocculantation are used to increase particle size through aggregation. The precipitation process can generate very fine particles that are held in suspension by electrostatic surface charges. These charges cause clouds of counter-ions to form around the particles, giving rise to repulsive forces that prevent aggregation and reduce the effectiveness of subsequent solid-liquid separation processes. Therefore, chemical coagulants are often added to overcome the repulsive forces of the particles. The three main types of coagulants are inorganic electrolytes (such as alum, lime, ferric chloride, and ferrous sulfate), organic polymers, and synthetic polyelectrolytes with anionic or cationic functional groups.
The addition of coagulants is followed by low-shear mixing in a flocculator to promote contact between the particles, allowing particle growth through the sedimentation phenomenon called flocculant settling.

Flocculant settling refers to a rather dilute suspension of particles that coalesce, or flocculate, during the sedimentation operation. As coalescence or flocculation occurs, the particles increase in mass and settle at a faster rate. The amount of flocculation that occurs depends on the opportunity for contact, which varies with the overflow rate, the depth of the basin, the velocity gradients in the system, the concentration of particles, and the range of particles sizes. The effects of these variables can only be accomplished by sedimentation tests.”ref.6

The Lamella separator is supplied as a complete easy-to-install unit, reducing installation costs to a minimum. Wear and tear is practically negligible since the unit contains only a few moving parts which minimizing operating and maintenance costs.

3.5.1: Principal of Operation

The liquid containing the solids to be separated enters the unit through the inlet pipe and flows downward through the inlet chamber in the centre of the unit entering the plates through openings in the sides.

As the liquid flows upward, the solids settle on the inclined parallel plates and slide into the sludge hopper at the bottom of the unit. In the hopper, the sludge is thickened prior to discharge through the sludge outlet.

The clarified liquid leaves the plate assembly through openings at the top and is discharged into collection channels leading to the clarified water outlet.

The openings at the top of the plate assembly are designed to create a pressure drop across the collection channels, ensuring that the flow is distributed uniformly between the plates and that the full area is utilized.
3.6: Secondary Uses for by-products - making of Bricks

Once the hydrocarbon contamination and/or other contaminates have been removed from the OBM and WBM, there are by-products which can be useful.

We have contacted the NNDC regarding the use of several brick making machines which they have imported into River State. Once the hydrocarbon has been removed from the OBM or NAF through the Shearforce process, then the mud and cuttings can be used to make bricks.

Below is an example of a labor intensive design. This machine can produce 3,500 3” X 3” X 9” concrete bricks in only 60 minutes. This straightforward apparatus which spewed out all those construction blocks has no motors, no gears, no hydraulic systems, and no other complex hardware. In fact, it's entirely manually operated. Also shown is a diesel driven design of a very simple machine.
4 Technical Explanation of SF-1000 & MSDS

4.1 Technical Explanation of SF-1000™

The formulation is based upon compounds which are totally bio-degradable. They will never be shipped as raw chemicals, only as completed concentrates which are water based and non-hazardous.

4.1.2: Chemical Composition: SF-1000™

Shearforce SF-1000™ is based on a nonionic surfactant, composed of:

Polycxyethylene Ethers:- Sodium bis (2-ethyhexyl) sulfosuccinate - CAS # 577-11-7
Alkoxylated Alcohols: C10-12 ethoxylated propoxylated - CAS # 68154-97-2.

D.O.T. classification is non-regulated. The freight classification is a cleaning compound.

4.1.3: Purpose:

Shearforce SF-1000™ is a nonhazardous concentrated water based synergistic blend of synthetic biodegradable, non-toxic, non-flammable surfactants. The surfactant action of Shearforce SF-1000™ allows it to emulsify hydrocarbon contaminants into microscopic droplets suspended in solution. This emulsion remains stable in the rinse and/or treated media. It does not contain any enzymes or microbes.

Shearforce SF-1000™ plays an important role in biodegrading hydrocarbon contaminants and converting them to an emulsion that is easily biodegradable by naturally occurring microorganisms. Shearforce SF-1000™ is used for bioremediation of hydrocarbons. Shearforce SF-1000™ functions not only as an emulsifier of hydrocarbon contaminants but also represents a food source that promotes the growth and metabolic activity of the micro-flora present. The net effect is an increase in the rate of hydrocarbon biodegradation.

This methodology provides a multitude of benefits when using Shearforce SF-1000™ for spill response, in-situ bioremediation of drill cuttings, water treatment and cleaning applications.

5.1.4: Benefits:

Because Shearforce SF-1000™ is a non-hazardous, non-flammable, water-soluble liquid, it can be used for removing oil and grease on surfaces while providing the following benefits:

- Will not diminish the integrity of surfaces
- Very fast working (TCEQ-1005 TPH testing)
- Contains no ozone depleting solvents
- Non-toxic (EPA LC50 testing)
• Non-chlorinated
• Does not leave volatile or semi-volatile organics (EPA 8260B & 8070C tests)
• 100% biodegradable
• Provides odor control
• Promotes vegetation growth
1. PRODUCT IDENTIFICATION: Shearforce SF-1000™
   Shearforce Ltd. Co.,
   4624 Martin Luther King Fwy-Ste 100,
   Ft. Worth Texas 76119

2. PRODUCT INFORMATION: Shearforce SF-1000™
   Polycyethylene Ethers: Sodium bis (2-ethylhexyl) sulfosuccinate - CAS # 577-11-7 , 70%
   Alkoxylated Alcohols: C10-12 ethoxylated propoxylated - CAS # 68154-97-2., 30%
   All chemical ingredients appear on the EPA TSCA inventory

3. HAZARDS IDENTIFICATION
   May irritate eyes, respiratory tract, skin through normal contact.
   No known adverse health effects through hazardous components or ingredients. No known effects on other illnesses. No known carcinogens. HMIS classification is Non hazardous.

4. FIRST AID MEASURES
   EYE CONTACT: Wash eye thoroughly for 15 minutes: including upper and lower lids. Seek medical assistance.
   SKIN CONTACT: Irritation possible, wash with soap and water for 15 minutes. If irritation persists, call physician.
   INHALATION: Move to well ventilated area: if breathing difficulties persist after 15 minutes, seek medical assistance.
   INGESTION: If conscious, administer 2 glasses of water. Seek medical assistance. Do not induce vomiting unless directed.
   ACUTE: May irritate eyes, respiratory tract, skin.
   CHRONIC: Prolonged contact with skin may result in dryness due to removal of skin oil.

5. FIRE FIGHTING MEASURES
   FLASH POINT: >200° F
   pH: 7.2
   EXTINGUISHING MEDIA: Non-Flammable
   FIRE FIGHTING PROCEDURES: None
   UNUSUAL FIRE HAZARDS: None

6. ACCIDENTAL SPILL PROCEDURES: Absorb in inert material & place in DOT approved containers for disposal in accordance with local, state, and federal regulations. Larger spills may be collected and repackaged.

7. HANDLING AND STORAGE: Keep tightly closed, store in a cool, dry place.

8. PROTECTIVE EQUIPMENT TO BE USED:
   GLOVES: Rubber
   EYE PROTECTION: Goggles recommended
   VENTILATION: Recommended
   EXHAUST: Mechanical/local
   RESPIRATORY PROTECTION: Respirator in confined areas.
   OTHER PROTECTIVE EQUIPMENT: As required to avoid skin contact.

9. PHYSICAL AND CHEMICAL DATA:
   FORM: Liquid
   ODOR: Bland
   COLOR: Clear Blue
   FORMULA: Proprietary
   BOILING POINT: 212°
   FREEZING POINT: 23 F
   SPECIFIC GRAVITY: 0.999
   VAPOR PRESSURE (m HG): N/A
   VAPOR DENSITY: N/A
   SOLUBILITY IN H₂O: Soluble

10. STABILITY AND REACTIVITY:
    STABILITY: Stable
    INCOMPATIBILITY: Strong acids and bases
    DECOMPOSITION PRODUCTS: N/A
    HAZARDOUS POLYMERIZATION: N/A
11. Toxicological Information:
   ACUTE: May irritate eyes, respiratory tract, skin.
   No known oral toxicity.

12. Ecological Information:
   Product is 100% biodegradable and has been tested by DPR for toxicity testing.

13. DISPOSAL DATA: Place in DOT approved containers for disposal in accordance with local, state, and federal regulations. Larger spills may

14. TRANSPORT INFORMATION:
   The following may not apply to all shipping situations. Consult 49 CFR mode specific/quantity specific shipping data.
   DOT PROPER SHIPPING NAME: Not regulated
   DOT HAZARD CLASS/DIVISION: Not hazardous
   DOT IDENTIFICATION: N/A
   DOT PACKAGING GROUP: N/A
   TYPE LABEL REQUIRED: None

15. REGULATIONS:

   EC Risk Phrases:
   R36: Irritating to eyes
   R42: May cause sensitisation by inhalation
   R43: May cause sensitisation by skin contact

   EC Safety Phrases:
   S3: Keep in a cool place,
   S7/8: Keep container tightly closed and dry
   S25: Avoid contact with eyes
   S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
   S62: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label
   S63: In case of accident by inhalation: remove casualty to fresh air and keep at rest
   S64: If swallowed, rinse mouth with water (only if the person is conscious)

   SF-1000 is private labeled with permission and consent of Texas Envirochem, its agents and/or assignees.
Section V: DPR Approval

MINISTRY OF PETROLEUM RESOURCES

Petrolem Resources DEPARTMENT
7 KOFQ ABAYOMI STREET, VICTORIA ISLAND LAGOS

P.M.B. No. 12560
Telegram. PETRES
Telephone
Telex 2790000

Ref No. PI/SE/7132/Vol.39/105
Date 7th October 2008

The Managing Director
Shearforce Nigeria Limited
Suite 1B, Prince’s Court
PC 37, Ahmed Onibudo Street
Victoria Island
Lagos

Dear Sir,

APPROVAL TO USE SF-1000 FOR OPERATIONS IN THE OIL AND GAS INDUSTRY IN NIGERIA

I am pleased to inform you of the acceptance of the technical products data including the MSDS submitted on the chemical, SF-1000, as well as the result of the acute toxicity test carried out under Nigerian conditions.

2. Consequently, I am to convey to you, this Department’s PROVISIONAL APPROVAL for the use of SF-1000 in the oil and gas industry. This provisional approval is to afford you the opportunity to use the chemical for the purpose intended, as an oil cleaner. Also note that this approval is subject to periodic review, as deemed necessary by this Department.

3. Please note that the use of SF-1000 shall be governed by the relevant regulations as contained in the Environmental Acts/Laws of Nigeria, as well as the provisions of the Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN). This approval notwithstanding, the user of SF-1000 shall not be exonerated from any
damage done to the environment on account of the use of this chemical.

4. Furthermore, any change in the composition or reformation of the chemical, affecting the data submitted, should be promptly communicated to the Director of Petroleum Resources for the purpose of re-certification, as such changes automatically renders this provisional approval invalid.

Yours faithfully,

Ugo theukwumere

For: Director, Petroleum Resources
Section VI: Experience

PARTIAL LIST EXPERIENCE of SHEARFORCE

OIL & GAS APPLICATIONS

CLIENT/CUSTOMER: NAOC

SCOPE: EVACUATION, THREATMENT (INSITU) AND DISPOSAL OF WBM DRILL CUTTINGS AT SAMABRI BISENI FLOWSTATION

WORK: TURNKEY ENGINEERING, DESIGN, SUPPLY OF EQUIPMENT, MANPOWER AND SHEARFORCE CHEMICAL SYSTEM FOR THE CLEANING OF DRILL CUTTINGS.

CLIENT/CUSTOMER: SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA

SCOPE: REBUILD OF SULZER MULTI STAGE PUMPS

WORK: ENGINEERING, DESIGN AND REBUILD OF SULZER MULTI STAGE PUMPS WITH SHEARFORCE PATENTED SHEARFORCE ROTORS.

CLIENT/CUSTOMER: NAOC

SCOPE: SHEARFORCE SLUDGE PUMPS

WORK: TURNKEY ENGINEERING, DESIGN, SUPPLY, INSTALLATION OF SHEARFORCE SLUDGE PUMPS FOR THE PUMPING OF HEAVY SLUDGE.

CLIENT/CUSTOMER: SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA

SCOPE: SCADA/TELEMETRY SYSTEM FOR PRODUCTION STATION MONITORING

WORK: ENGINEERING, DESIGN, and SUPPLY OF TELEMETRY SYSTEM FOR PRODUCTION STATION MONITORING.

CLIENT/CUSTOMER: SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA

SCOPE: CONTROL SHUTDOWN SYSTEM FOR JONES CREEK PUMPING STATION (30,000 BBL/DAY.)
WORK: ENGINEERING, DESIGN, and SUPPLY OF CONTROL SYSTEM FOR SIX MAIN CRUDE OIL SHIPPING PUMPS.

CLIENT/CUSTOMER: CHEVRON FOR GULF OIL NIGERIA

SCOPE: FIREWATER PUMPS WITH ENGINE, FITTINGS AND CONTROL PANEL

WORK: ENGINEERING, DESIGN, FABRICATION, and SUPERVISION OF INSTALLATION FOR FIREWATER PUMP SYSTEM FOR OFFSHORE PRODUCTION PLATFORMS.

CLIENT/CUSTOMER: BARRIVEN/LAGOVEN, VENEZUELA

SCOPE: LOCAL CONTROL PANELS FOR OIL PUMPING STATION FOR VARIABLE SPEED GEAR/PUMP/MOTOR WITH LUBE OIL/COOLER SYSTEM.

WORK: ENGINEERING, DESIGN, INSTALLATION OF CONTROL EQUIPMENT FOR INTERFACE TO MAIN CONTROL SCADA SYSTEM.

CLIENT/CUSTOMER: CHINESE NATIONAL PETROLEUM

SCOPE: MAIN PIPELINE PUMPING STATIONS WITH CAT 399 ENGINES

WORK: ENGINEERING, DESIGN, and INSTALLATION OF CONTROL EQUIPMENT FOR INTERFACE TO MAIN CONTROL SCADA SYSTEM.

CLIENT/CUSTOMER: ECOPETROL, COLUMBIA

SCOPE: 5 KV SWITCHGEAR

WORK: ENGINEERING AND EQUIPMENT SUPPLY.

CLIENT/CUSTOMER: BROWN & ROOT FOR EXXON

SCOPE: SURGE ARRESTER NEMA 6 PACKAGE FOR 5 KV MOTORS

WORK: ENGINEERING, DESIGN, and SUPPLY OF EQUIPMENT.