

Shearforce Nigeria Ltd

Shearforce Application Process & Products for Treatment of Hydro Contaminated Ground Water, Soil, Drill Cuttings, Sludge, Hardened Crude

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INTRODUCTION

- **SHEARFORCE LLC IS A USA ENGINEERING & CONSULTING COMPANY FOCUSING ON GREEN PRODUCTS AND SERVICES TO HELP PRESERVE THE BEAUTY OF THIS PLANET.**
- Shearforce LLC has been operating since 1980 in the Oil & Gas Market. Shearforce LLC are partners in Shearforce Nigeria Ltd. which has been operating in Nigeria since 2001 in Lagos and Port Harcourt.
- Shearforce has successfully completed several Engineering and Design projects in Nigeria as listed below. The primary market served is the Bio Remediation of Hydro Carbon contaminated Soil, Drill Cuttings (OBM & WBM) and Water.
- Our Bio-Remediation projects utilize the Shearforce Application Process (SAP) Methodology. The SAP encompass the SF1000 surfactant, the SF-ACL solvent and the Patented Shearforce Rotor for Ozone nano bubble technology.
- Shearforce bio remediation uses bio stimulation by Nutrient Enhancement of Microbial Organic Waste Break Down. Specifically, the SF1000 provided a food source for the indigenous microbes which consume the hydro carbons. See Q&A slides.
- The SAP has been fully tested with DPR representatives and approved for use in Nigeria. The SF1000 and SFACL are NAFAC approved

INTRODUCTION

- There are several options of the SAP Bio Remediation, the best of which utilize Wash Tanks to provide the perfect amount of wash time, solution temperature, agitation and oxygen.
- The Wash Tank Process use products which are readily available in Nigeria such as back hoes, pumps and Nigerian Manufactured tractors, tanks, mixers, carts and tools.
- Shearforce will provide a transfer of the SAP Intellectual Property and totally train the endogenous personnel.
- Major projects include:
 - SPDC Bio remediation using SF1000 (several containers utilized)
 - ENI/AGIP Drill Cutting Remediation (11,000 m³)
 - Hyprep Ogoni Testing at Aabue Koro Koro in Tai LGA
 - SPDC Scada Upgrade (fifty five flow stations)
 - SPDC Jones Creek ESD system (Six Shipping Pumps)
 - XOM Offshore Well Head Monitoring System (44 offshore non manned platforms)

I: Treatment of Contaminated Ground Water

- 1: Treat Contaminated Ground Water to Pure Drinkable Water.
- 2: Train and Utilize 100% indigenous manpower and equipment as the core of the Shearforce Application Process
- 3: Utilize the proven and DPR approved Shearforce Application Process and SF-1000 , a totally green 100% biodegradable nutrient.
- 4: Utilize the Shearforce Nano-Ozone Water Purification System



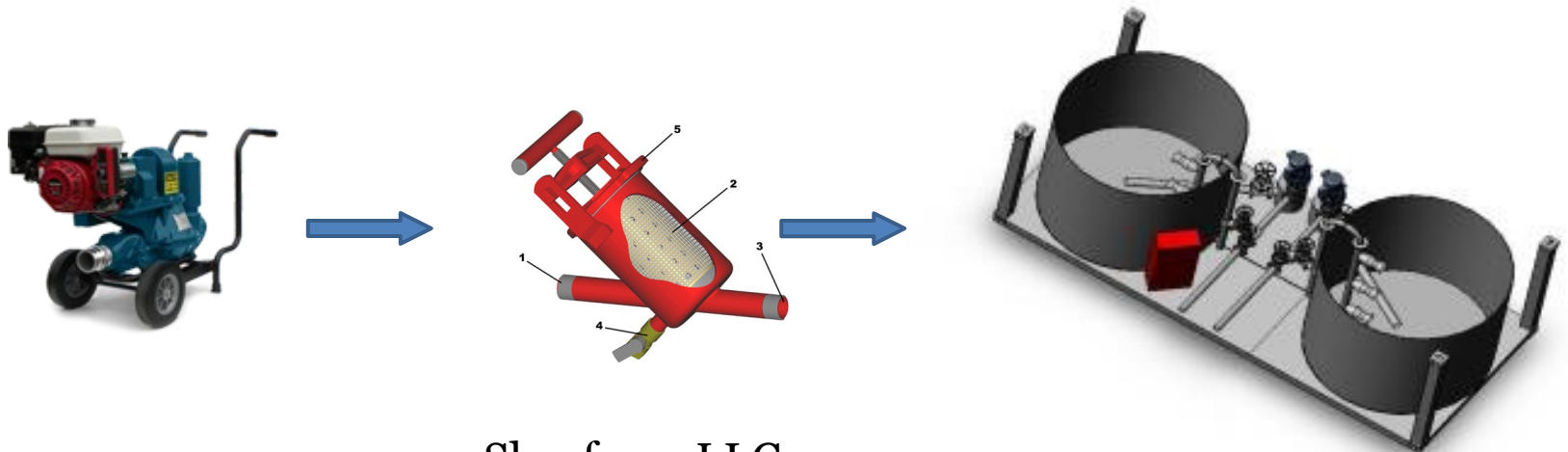
I: SAP DETAILS

- A complete survey must be completed to define the Scope of the Project and to agree upon the best solution.
- A bench mark back ground must be established to determine the TPH, PAH and BTEX of the water. A Dexsil Petro Flag Analyzer System Model PF-MTR-01 portable TPH test stand will be used to test the sample for TPH content. PAH & BTEX values will be obtained from a local testing laboratory.
- Mobilization to the site will include necessary equipment including the SF1000 and Shearforce Nano Ozone Machine.



I: SAP DETAILS

- The process will begin by pumping the water from the contaminated area through self cleaning filter into holding tanks for transport to the wash area.
- The contaminated water is pumped into the Wash Tanks shown below. The SF1000 is added to the water and mixed for a periods of 20 minutes to assure complete 100% dilution.
- After a wash cycle, the media is further treated by Shearforce Nano Ozone treatment to remove all bacteria from the water and to assure that any metals present are oxidized as well as remediate any PAH present in the water.
- Upon completion and verification, the now cleaned water can be sent to an area as specified.

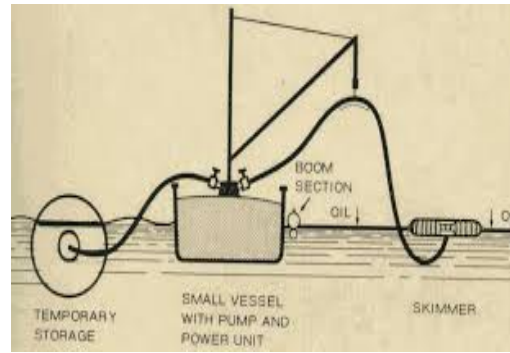


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I: SAP DETAILS

If necessary river boats with floating booms or Oil skimmers will be used to gather any floating oil.

If the surrounding ground is also contaminated, it will also be loaded in tanks for treatment at an agreed upon location. After treatment the cleaned media can be placed in an approved location.



- For certain areas a variation to the Soil Wash Tanks can be used with a simple method of spraying of the SF1000 and tilling with a back hoe. The decision of which Soil Washing system to be used is based on the location. The media is mixed with fresh soil during the tilling process.



I: SAP ADDITIONAL DETAILS

Shearforce Ozone Nano Bubble Process

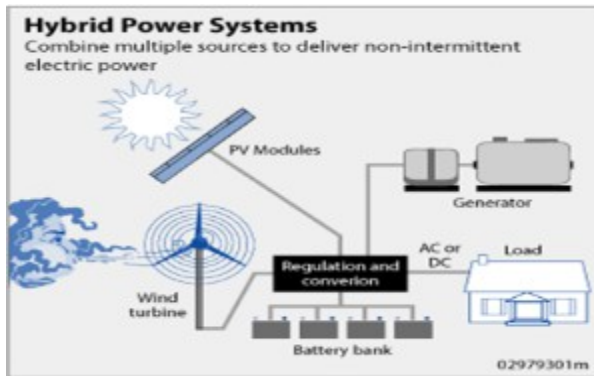
- Shearforce has developed the Ozone Nano Bubble Process for cleaning water contaminated by hydrocarbons, human wastes and natural bacteria.
- Shearforce Process is based on the U.S. patented Shearforce Pump which produces the Nano bubbles by pumping water diluted with Ozone.
- Ozone was first used to purify drinking water in Europe over 100 years ago. Ozone assures you of the cleanest and safest water possible by
 - Oxidizing iron, manganese and sulfur into insoluble compounds
 - Breaking down hydrocarbons into carbon dioxide and water
 - Eliminating up to 99.99% of bacteria and viruses including E-Coli.



I: SAP ADDITIONAL DETAILS

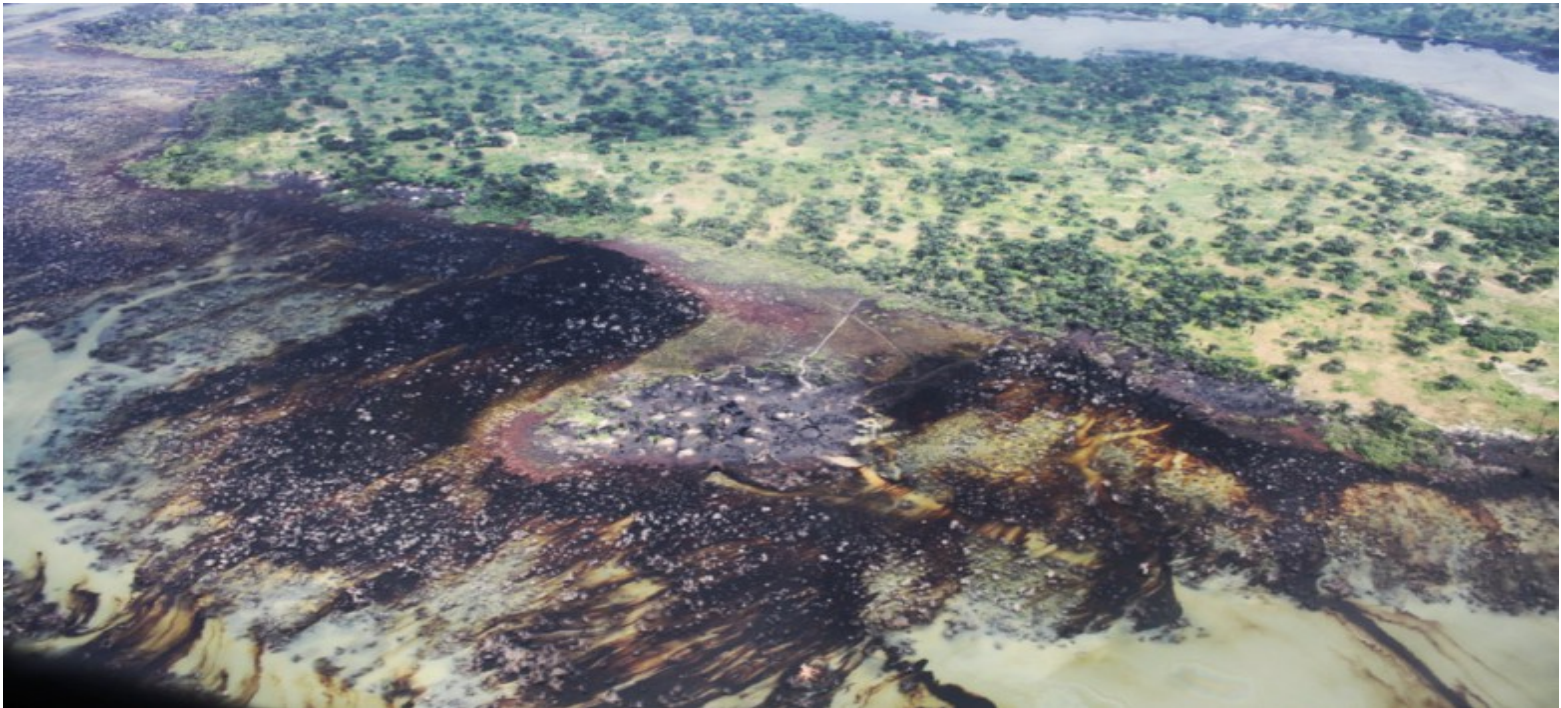
Shearforce Ozone Nano Bubble Process

- Shearforce has developed a Hybrid solar and wind power system provide 24 hour power with or without generators. The system will produce 1 M³/hr at 1025 Watt power requirement.
- The Shearforce hydraulic powered ozone generator can be connected to the faucet of a roof top water source producing 2.5 Liter/min.



II: Treatment of Contaminated Soil or Drill Cuttings

- Treat Contaminated Soil to Usable Pristine Land or Drill Cuttings to usable media.
- Train and Utilize 100% indigenous manpower and equipment as the core of the Shearforce Application Process
- Utilize the proven and DPR approved Shearforce Application Process and SF-1000 , a totally green 100% biodegradable nutrient.



II: SAP DETAILS

- The Area will be remediated using the SAP soil washing process with the SF-1000™ as shown below. The system is very simple, scalable and mobile which allows for maximum flexibility.
- The tanks are manufactured in Nigeria and use 100% readily available materials allowing for QUICK mobilization to the field and zero down time due to unavailable replacement parts.
- The Wash Tanks are mounted in dump trucks or skids which can be moved by tractors. The contaminated media is loaded using Back Hoes.
- Barges with mini swamp buggies will be used along the shoreline area which is not accessible by land. The contaminated media will be loaded into frac tanks for further treatment as discussed below.



II: SAP DETAILS

- A bench mark back ground must be established to determine the TPH, PAH and BTEX of the soil. A Dexsil Petro Flag Analyzer System Model PF-MTR-01 portable TPH test stand will be used to test the sample for TPH content. PAH & BTEX values will be obtained from a local testing laboratory.
- The contaminated soil is loaded into the Wash Tanks using front loaders as shown below. The media is then washed for periods of 20 minutes to assure complete 100% saturation.
- After a wash cycle, the media is further treated as necessary by an ozone treatment to assure that any metals present are oxidized and to remediate any PAH present in the media.
- Upon completion and verification, the now cleaned media can be returned to an area specified by SPDC and/or BCC.



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III: Treatment of Hardened Crude

- **Area 3: Illegal refineries and shoreline stranded asphalt and tar.**



Marshes and Mangroves

Tidal Contaminated Soil/Clay

Tidal Oily Water

III: SAP DETAILS

- The Oily Sludge/Asphaltic Tar-like Weathered Crude and Burnt Crude in sand matrix will be gathered from the areas of Illegal refineries and shoreline by use mini swamp buggies and/or back hoes. The equipment will be brought to the work area by barges unless the area is accessible by road.
- Along the shoreline, Mini swamp buggies will load the media into Shell approved frac tanks loaded on adjacent barges. If the contaminated area can be accessed by Road, back hoes will be used to load the media into adjacent dump trucks.
- River boats with floating booms will be used to gather any debris or floating oil that is present during the operation. If the surrounding ground is also contaminated, it will also loaded in tanks for treatment at an agreed upon location. After treatment the cleaned media can be placed in an approved location.



III: SAP DETAILS

- The Shearforce SF-ACL product is used to liquefying the Sun Hardened/Asphaltic Soil –Clay. The SF-ACL is a liquefying agent similar to turpentine. The result is a fluid with characteristics similar to Fuel Oil C.
- After mixing the media in a Frac Tank, the liquefied media is filtered to separate the sand from the liquid. The sand will be treated in a similar fashion as described in Section II.
- The HC can be treated at site, however it would be more efficient to excavate the HC into dump trucks and moved to a site in Ogoni or PH for further treatment.



Experience

5: WORK PROFILE LISTS

PARTIAL LIST EXPERIENCE of SHEARFORCE OIL & GAS APPLICATIONS

5.1: CLIENT/CUSTOMER: SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA

SCOPE OF WORK: SUPPLY OF SEVERAL HUNDRED DRUMS OF SF-1000 FOR THE BIOREMEDIATION TREATMENT OF OIL CONTAMINATED SOIL

YEARS: 2009 TO 2014

CONTACTS: AUGUSTINE IGBUKU EMAIL: Augustine.Igbuku@shell.com 0807-031-0185

5.2: CLIENT/CUSTOMER: NAOC/AGIP

SCOPE: EVACUATION, TREATMENT (INSITU) AND DISPOSAL OF 11,000 M³ OBM DRILL CUTTINGS AT SAMABRI BISENI FLOWSTATION

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

YEARS: 2007 to 2009

CONTACTS: ASHISH KAUL: email: ashish.kaul@naoc.agip.it

Experience

5.3: CLIENT/CUSTOMER: HYPREP

SCOPE: TECHNOLOGY DEMONSTRATION AT WELL 3, AABUE KOKO KOKO IN TAI LGA

WORK: PROOF OF CONCEPT SF1000 SHEARFORCE CHEMICAL SYSTEM FOR THE CLEANING OF OIL CONTAMINATE SOIL.

YEARS: 2017

CONTACTS: : Shekhar Ajmani email: shajmani@yahoo.com



EXPERIENCE

5.4: 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.

YEARS: 1996 TO 2000

5.5: CLIENT/CUSTOMER: EXXON-MOBIL QIT NIGERIA

SCOPE: SCADA/TELEMETRY SYSTEM FOR WELL HEAD MONITORING UN MANNED PLATFORMS

WORK: ENGINEERING, DESIGN, and SUPPLY, START-UP AND TRAINING OF TELEMETRY SYSTEM FOR WELL HEAD MONITORING OF UN-MANNED PLATFORMS.

YEARS: 1996 TO 2000

5.6: 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.

YEARS: 1995 TO 1997