GIS - Portfolio of Thru-Tubing Tools and Services.

Coiled tubing is increasingly used to service highly deviated, extended reach and horizontal wells which have become the typical well design in today's field development. Services performed with coiled tubing are typical but by no means limited to: logging, perforating, setting and retrieving plugs, opening and closing sliding sleeves, fishing, removing scale and debris, re-entry drilling, matrix acidizing and acid washing.

➢ Thru-Tubing Standard Bottom Hole Assemblies.

- **Coiled Tubing Connectors.**
  The connector provides a way for attaching tools to the Coiled Tubing (CT). GULF INTERVENTION SERVICES can offer a range of proprietary and 3rd party supplied connectors for any operation. These are typically attached either by Slip Mechanism, Internal or External "Dimpling" procedure, Roll-on or Quad Pin.

- **Standard Bottom Hole Assembly (BHA).**
  A standard BHA would consist of the Connector, Dual Flapper Check Valve, Emergency Disconnect & a Dual Circulation Sub, which gives you the basic well control components, as well as the ability to get out of a stuck situation.

- **Motor Head Assembly (MHA).**
  Originally the MHA was developed for Coiled Tubing Drilling Operations, so that the components of the Standard MHA could be fitted into one tool, shortening the toolstring considerably. Today the MHA is the preferred tool in any CT operation, over individual components, as they are too cumbersome and take up too much of a deployment length.

- **Dual Flapper Check Valve (DFCV).**
  DFCV is the industry preferred well control means, but there are other types such as ball, dart and a combination of the two.

- **Drop Ball Hydraulic Disconnect.**
  The standard disconnect tool of the industry, whereby pins are sheared when applying pressure to a ball pumped through the CT and landing on a seat in the BHA/MHA, shear pressure is adjustable. This allows a safe means of disconnecting from a stuck toolstring below the Disconnect, and leaves a standard Internal GS Fishneck in place for later fishing operations.

- **Emergency Pull Disconnect.**
  A tool that can be released just by applying a predetermined Overpull to the CT, thus shearing a set of pins in the tool. This could be used in operations where inserting a ball in CT is impossible, as when Wireline is used in the CT.

- **Flow Release Disconnect.**
  Another tool developed to disconnect without the use of a drop ball. The tool is fully pressure balanced and activated by flow, not pressure. A secondary set of pins also has to be sheared by Overpull, to avoid premature release.

- **Heavy Duty Disconnect.**
  A heavy-duty drop ball disconnect developed for CT Drilling, Jarring and other high load operations.

- **Dual Activated Circulation Sub.**
  A sub that incorporates two sets of circulation ports. Dropping a ball activates one, and shearing pins by applying pressure to the ball on seat. Applying pressure to the CT to burst a preset disc activates the other port. This allows circulation even though the toolstring might be plugged up below the sub. It can also be used to increase annular velocity or reducing wear on a PDM upon completion of an operation.

➢ Fishing Tools.

- **Hydraulic Release Overshot.**
  This is a heavy-duty flow release tool for CT or Jointed Pipe (JP) operations. It is specially designed to catch a variety of standard external fishnecks, and by changing out the bowl & grapple it can easily be converted to a slick OD catch tool.

- **Hydraulic Release Spear.**
  This is a heavy-duty flow release tool for CT or JP operations. It is specially designed to catch a variety of standard internal fishnecks, and by changing out the bowl & grapple it can easily be converted to a slick ID catch tool.

- **Snipper Cutting Overshot.**
  Snipper is a tool by Thru-Tubing Technology specially designed to wash over and catch stuck CT in the well. By applying Overpull to the tool, the “grapples” lodge & cut the CT at the desired depth. The Snipper Overshot can be run with a High Pressure Pack-Off, described later.

- **Continuous CT Overshot.**
  Basically the same as a Snipper, although equipped with regular gripping grapples that will not necessarily cut the CT, and can also be run with a Pack-Off.

- **High Pressure Pack-Off.**
  This is designed to be run either with the Snipper or Continuous CT Overshot, to provide a pressure tight seal around the CT to be brought out of the well.

➢ Extended Reach Tools

VibraReach™ Tools
The VibraReach tool is mainly aimed at reducing contact friction between coiled tubing and well bore in order to increase reach in a horizontal well. The VibraReach tool reduces as much as 70% of contact friction forces between the work-string and the casing/open hole.
Operated by flow rate and accepts most fluids.
Interacts easy with other tools in the BHA.
Effective and easy to use.
Cost effective.
Simple design - no wires or pulses required.
Does not rely on grip from wellbore.
The tool comes in sizes from 1-11/16" to 4-3/4"

➢ Thru-Tubing Motors & Rotational Tools.

- **Tubing Cutting BHA.**
  This BHA combines Hydro-Mechanical anchor, PDM motor and a Hydro-Mechanical Tubing Cutter.

- **Coiled Tubing Drilling Motors.**
  Extended Reach's PDMs are considered to be some of the most powerful PDMs in the industry, and just as important, most reliable. They come in sizes from 1-$^{11}/_{16}$"OD to 3- ½"OD with 2-⅛", 2-⅜" & "2-⅞" OD completing the line-up. The PDMs has been run successfully in a variety of heavy duty milling operations, extensively in CT Drilling operations including all window milling aspects, tubing cutting, underreaming and plug removal operations.

- **FB-1 Bear Claw Mill.**
  Full Body Bear Claw Bits are ideal for drilling cement & Strontium Sulfate scale.
  Not recommended for drilling iron.
  Carbide Buttons range in size from $^{5}/_{16}$" to ½".
  Bit Size Range: 1-¾" to 6-¾" in ⅛" increments.
  Circulation ports available from $^{5}/_{16}$" for downhole motors to 1" for reverse circulation.

Custom sizes also available.

- **FB Chomp Mill.**
  Full Body Chomp Bits are ideal for drilling cement, iron, cast iron, bridge plugs, etc.
  Carbide Buttons range in size from 5/16" to 1/2".
  Bit Size Range: 1-¾" to 6-¾" in ⅛" increments.
  Circulation ports available from $^{5}/_{16}$" for downhole motors to 1" for reverse circulation.
  Custom sizes also available.

- **FB CT & PDC Mill.**
  Full Body Tiger Claw Mill was designed for milling composite plugs and scale. The Full Body PDC Mills are ideal for drilling cement & hard scale as Strontium & Barium Sulfate.
  Carbide Buttons range in size from 5/16" to 1/2".
  Bit Size Range: 1-¾" to 6-¾" in ⅛" increments.
  Circulation ports available from $^{5}/_{16}$" for downhole motors to 1" for reverse circulation.
  Custom sizes also available.

- **Insert Step Mill.**
  This mill was primarily designed for the removal of nipple profiles in tubulars. It has been used successfully on scale removal and opening up the ID of tubulars blocked by scale etc. Can be custom made to any size wanted.

- **Junk Mill.**
  Typical Tungsten Carbide impregnated Junk Mill. Can be Convex, Flat, Concave or tapered to suit any eventuality.

- **Bladed Junk Mill.**
  Tree or four bladed Junk Mill, very aggressive and with Tungsten Carbide inserts to ensure removal of virtually any obstruction in the well.

- **Two-Step Underreamer w/Pilot Mill.**
  This multi-faceted tool has the ability of cleaning tubing, casing, drill pipe, liners or even open hole. Hydraulically actuated blades allow the capability of running through small diameter restrictions and cleaning out larger inside diameters. Tools range in size from 1.7"OD with a capability of full wall cleaning to 3.5"ID, to the 5.25"OD tool capable of a full wall clean out up to an 11"ID. Self-centralizing by 90° offset blades in two stages eliminates the need for a centralizer. A mill or a bit is run as a pilot on the tool, and circulation is established completely through the bit, effectively cleaning and cooling both the bit and the blades.

- **Internal Hydro-Mechanical Tubing Cutter.**
  The GULF INTERVENTION SERVICES Internal Hydraulic Tubing Cutter is a pressure activated internal cutting tool designed to cut pipe and tubing. The tool comes in various sizes with a range of blade materials and inserts technologies to meet the most demanding of applications. Will cut from 2-⅜"-5-½"OD Drill-pipe, Tubing, Casing or Liner.
  It is a result of an extensive testing program, which optimized the blade geometry and cutter configuration.

- **Internal Rotational Hydro-Mechanical Anchor.**
  The Tubing Anchor is used to fix the tubing cutter assembly in a position in the well bore so that no axial movement can take place and provides a platform to isolate axial forces and vibrations caused by the PDM from the tubing cutter..
  The grip for the anchor is provided initially by a collet expanding when forced with a hydraulic piston against a cone. When additional forces are applied these add to the setting force and grip of the anchor. The anchor is reversible so that it can take forces from above as well as below.

➢ Thru-Tubing Impact & Fishing Tools

- **Up & Down stroke Hydraulic Accelerator.**
  The accelerator is an energy accumulator used in conjunction with the Up or Down stroke Hydraulic Jars to maximize the impact delivered to the stuck point.

- **Up & Down stroke Hydraulic Jars.**
  The Dual-Acting Coiled Tubing Jar meets the needs of the CT industry; with it's small outside diameter CT Drillers get the quality and performance of a conventional drilling jar. Comes in sizes from 1-¾" -2-¼"OD.

- **Bi-Directional VibraHammer™ with Accelerator.**
  The VibraHammer is a unique fishing tool used to remove stuck objects in the well bore. The tool delivers up to 900 impacts on the fish per minute and combines oscillations and high impact peaks. The tool is operated by flowrate and has no operating "sweetspot". It can be used in conjunction with jars for increased impact.
  The tool produces higher impact force compared to jars and impact tools with same OD size and increases over-pull and set down weight in horizontal wells. It also eliminates any excessive cycling of the CT.

Thru-Tubing Clean-out tools

- **VibraBlaster™**

The GULF INTERVENTION SERVICES's proprietary tool VibraBlaster is a high-pressure downhole scale removal tool of all-metal construction. It is run in conjunction with the Blaster Head and amplifies inlet pressure, which will be expended onto the wellbore through a constant 360 degree nozzle. The Blaster Head can be configured in a number of ways, with or without hard facing of Tungsten Carbide for dispensing of bridges. The VibraBlaster tool also induces vibrations to the CT string and reduces friction in the wellbore as well as applies impact onto the scale.

- **BlasterHead™**
  The Blaster Head is a unique clean out nozzle with a constant 360 degree jetting circumference for complete coverage of the wellbore. The jetting direction can be preset to either down stream or up stream jetting tailor making the nozzle to a specific well need. The Blaster Head can be configured in a number of different ways for maximum efficiency.

- **Sand Catcher Venturi Bailer.**
  The GULF INTERVENTION SERVICES's Sand Catcher bailer is a flow operated tool that creates a strong vacuum that draws fluid and debris into the bailer. A high performance filter allows the fluid to pass through to the annulus but traps the debris between the flapper valves at the bottom of the bailer section and the filter at the top of the bailer section. Can be run on coiled tubing or jointed pipe and with or without a PDM. The patent-pending nozzle design and proprietary sand filter allow the GULF INTERVENTION SERVICES's Blaster Sand bailer to outperform conventional sand removal systems.

- **Debris Catcher.**
  The Debris Catcher is run above the PDM to help catch any debris from the well during a milling operation.

➢ Thru-Tubing Accessories.

- **Manual Torque Wrench.**
  For easy and accurate make-up of smaller connections, where hydraulic supply is not available, a pipe wrench where you "dial in" your required torque.
  Two different sizes;
  2 ⅛"OD up to 550 ft/lbs
  4"OD up to 1,000 ft/lbs

- **Hydro mechanical Make & Break Unit.**
  This unit is designed for a safe and efficient make-up and breakout of critical toolstrings. The make and brake tong is perfect for the Middle East region with a grip range of 1-½" to 3- ½"OD & 5,000 ft/lbs make-up & 7,500 ft/lbs breakout torque. The tong part of the unit only weighs 96 kg (220 lbs) and is equipped with a lifting point.
  Assemblies can be made up either vertically or horizontally.

- **In-Line Filter Sub.**
  This unit is designed to fit in the treating iron string between a fluid pump and the CT reel to keep debris from the pump or associated equipment from entering the CT. It will filter particles down to 200 microns, and can help improve equipment life and operations dependability, as well as reduce downtime.

- **Hippo Turbines.**
  These small Kevlar bladed "pigs" cleans and polishes the ID of the CT and further helps keeping debris away from the wellbore& downhole tools.

- **Down Hole Filter Sub.**
  This unit further helps avoid debris in the BHA and; improves PDM life, and unlike the In-Line Filter, captures contaminants from the CT itself.

- **Quick Connector.**
  This tool facilitates safe, quick and efficient rig up and change out of BHAs on location. It is self-aligning with an anti-rotating locking system and incorporates a swivel system for easy make-up. Incorporates a large bore for dropping of balls.

- **Hydraulic Bowspring Centralizer.**
  The tool was developed for heavy duty fishing operations, where high impacts are delivered, with a high yield, torque & bending strength. Incorporates large bore, large piston area and high expansion ratio. No set screws, pins or other small components that can fall of downhole.

- **Sleeve Type Non-Rotating Centralizer.**
  This is a sub-type tool that can be incorporated anywhere in the BHA, and the Sleeve will remain still in a rotating situation. Can be manufactured to any size and specification.

- **Mechanical Bowspring Centralizer.**
  This tool is designed to go through restrictions and then open back up into the specific tubular.

- **Single & Double Knuckle Joint.**
  Knuckle joints were designed to make the Fishing string less rigid to gain access to the wellbore/fish and sometimes centralize the CT/BHA in the wellbore.

- **Tubing End/Nipple Profile Locator.**
  There are different types of this tool, mechanical and hydro-mechanical, designed to locate and give a surface indication, by way of over-pull of nipple-profiles and end of tubing/muleshoe.

- **Selective Shifting Tool.**
  This tool has been designed to selectively shift PCE, Otis, Camco and Baker Sliding Sleeves (SSD). It can selectively open or close multiple SSDs in a single CT trip.

It comes in sizes from 2.160”-4.250”OD tools.

- **Sequence Valve.**
  This tool changes the flow path from the annulus to your toolstring by change in the flowrate. It is easily adjustable by the tension of a spring inside the tool.

- **Hydraulic Deployment System.**
  This system is designed to safely deploy long CT downhole assemblies in or out of the wellbore under pressure. It consists of two deployment rams and two hydraulic cylinders together with a stripper bowl and uses the coiled tubing units BOP. This incorporates a double barrier, and there is no need to rotate toolstring for tool make-up, allows torque transmission and offers a full bore flow through.

  Benefits with the GULF INTERVENTION SERVICES’s Hydraulic Deployment System:
  - No need for dedicated crane and scaffolding crew.
  - No limitation on BHA lengths to be deployed.
  - BHA can be optimized with regards to specific well need rather than rig-up height restraints.
  - It will save time and reduce cost for our clients.
  - Safety is improved.

- **Lateral Seeker System.**
  This system was developed to be able to find and enter lateral junctions in both open and cased hole applications. It is not one specific tool or even toolstring, but a combination of both standard and dedicated CT tools.

- **Multi Shot Hydraulic Tubing Punch.**
  This system is purpose designed to punch a single or series of multiple holes in the production tubing during one CT run, eliminating the need for explosives. It is available as standard for 2-⅜”-4-½”OD Tubing.

Thru-Tubing Packers & Plugs.

Packers & Plugs.

- **Retrievable Packer.**
  Ideal for use on CT or conventional tubing, in straight or deviated well applications, where tubing rotation for activation is not available.
  Applications;
  Tubing testing, Acidizing, Cement Squeeze Jobs, Polymer Treatments, Velocity String Hang-off, Tail-pipe extensions etc.
  Available as standard from 2-3/8”-7”OD tubing & casing.

- **Retrievable Bridge Plug.**
  Set & Retrieved on Slickline, CT or conventional tubing, and ideal for operations such as; Acidizing, Fracturing, Cementing, Casing Pressure Tests, Well Head Replacement and Zonal Isolation.
  Available as standard from 3-½"-5-½"OD tubing & casing.

- **Selective Stimulation Packer (SSP).**
  The SSP is designed to go through all common nipple profile sizes to set in the tubing. The packer elements are activated by pressure, and released by flow manipulation. It is ideal for Selective Stimulation, Treating of Perforations/Sand-screens, Tubing Testing and Selective Polymer Treatment for water shut-off/zonal isolation.
  Available as standard from 2-3/8"-7"OD tubing & casing.

- **Cement Retainer.**
  This Cement Retainer can be set by E-line, Slickline, CT or Jointed Pipe, constructed from tempered cast iron it is easily drillable. Combined with the Hydraulic Setting Tool it can be run, set and squeezed through in one operation.
  Available as standard from 2-⅜"-13-⅜"OD tubing & casing.