GULF INTERVENTION SERVICES
WELL SERVICES

PROCEDURE MANUAL FOR

THRU TUBING OPERATIONS

GULF
INTERVENTION
SERVICES

INDEX

SECTION – 1 INTRODUCTION

1.0 This manual contains the operating procedures designed to assure and control the quality of the processes of Thru tubing operations that take place in GIS Engineering and Oil Field Services Facility.

2.0 The procedures in this manual apply to all GIS employees that implement or control the processes or receive the results of the processes described in this manual.

3.0 GIS offers the following services to the oilfield industry:

- THRU TUBING GENERAL MILLING
- THRU TUBING GENERAL FISHING
- THRU TUBING CASING EXIT
- THRU TUBING HYDRA- MECHANICAL CUTTING
- THRU TUBING UNDER-REAMING
- THRU TUBING SCALE CLEAN –OUT
- THRU TUBING HAMMERING & PUSHING
- THRU TUBING BRIDGE PLUGS & INFLATABLES
- THRU TUBING JUNK RETRIEVAL

4.0 The purpose of this manual is to describe the quality operating procedures of GIS for the Thru tubing operations

5.0 No deviations from what has been established in this manual or associated document shall be allowed without previous agreement between the Quality Representative and the Management

6.0 All employees associated with shall be familiar with the content of the Operating Procedure Manual, especially with the subjects that affect their job responsibilities directly

SECTION 2 : COMPANY ORGANIZATION

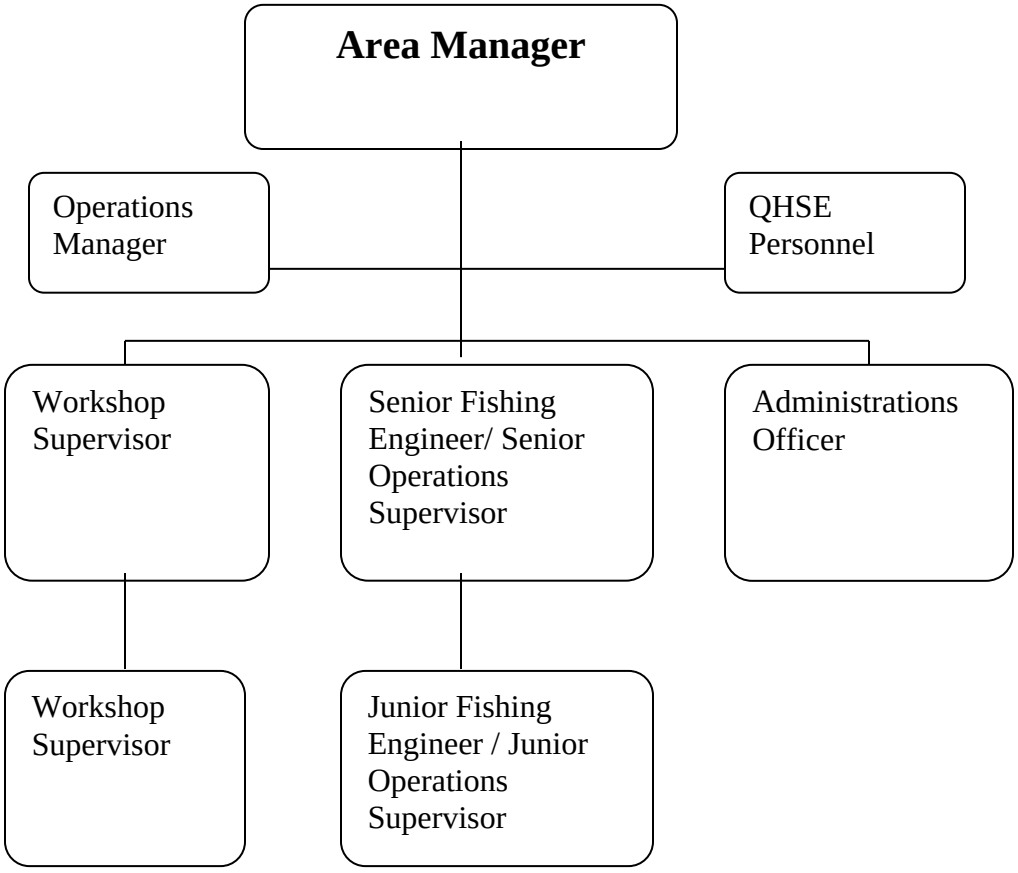
1.0 PURPOSE

1.1 To Show the organizational structure in the Unit Arab Engineering and Oil Field Services and to describe the basic responsibilities of each designation and department

1.2 Responsibilities under each work function are the minimum duties and are not limited to those listed herein. The employees direct reporting officer or higher may request the employee to take additional duties. Which may include coverage of another post in the event of employees being absent from their duties.

2.0 ORGANIZATION

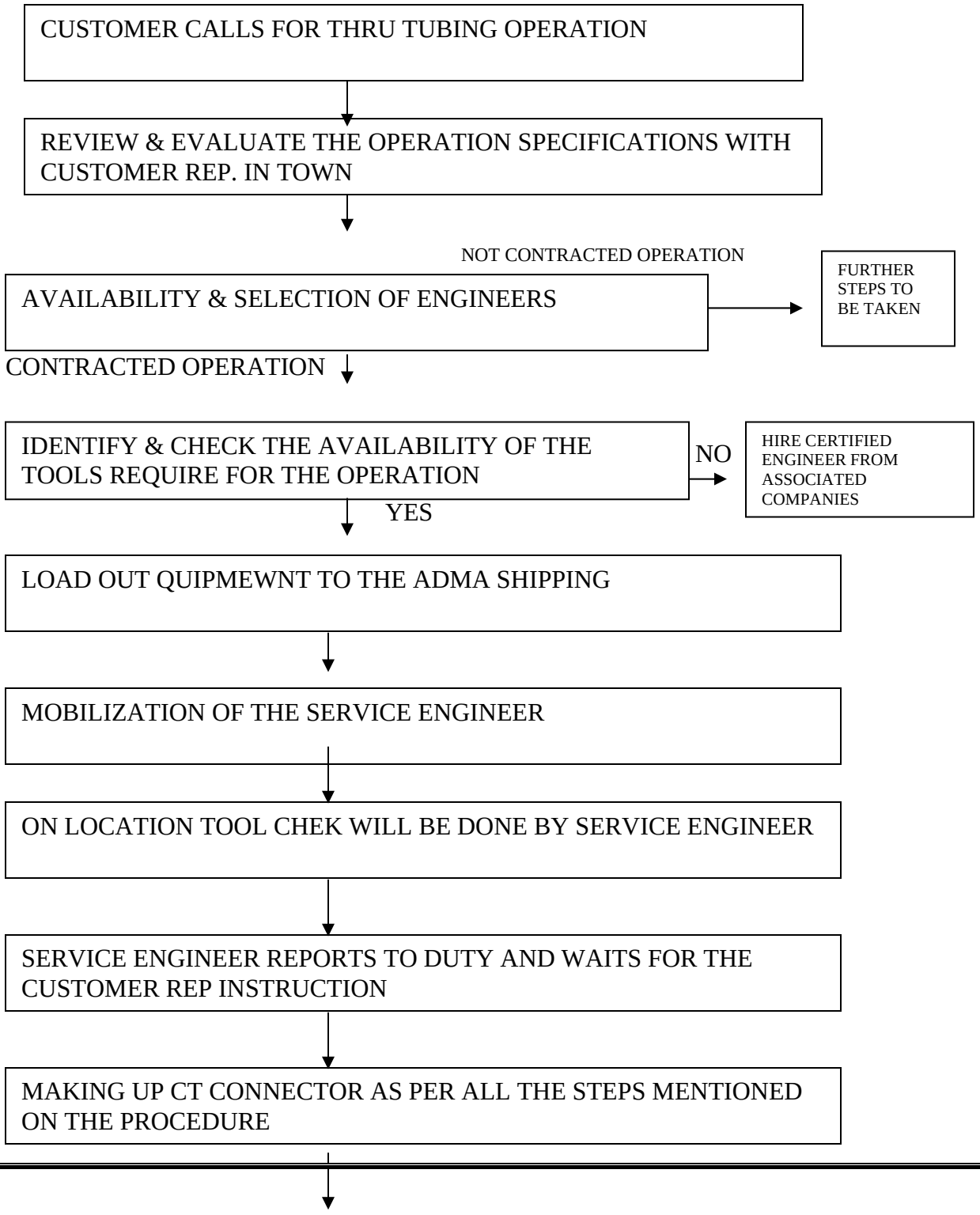
The Unit Arab's Thru Tubing organization is as follows

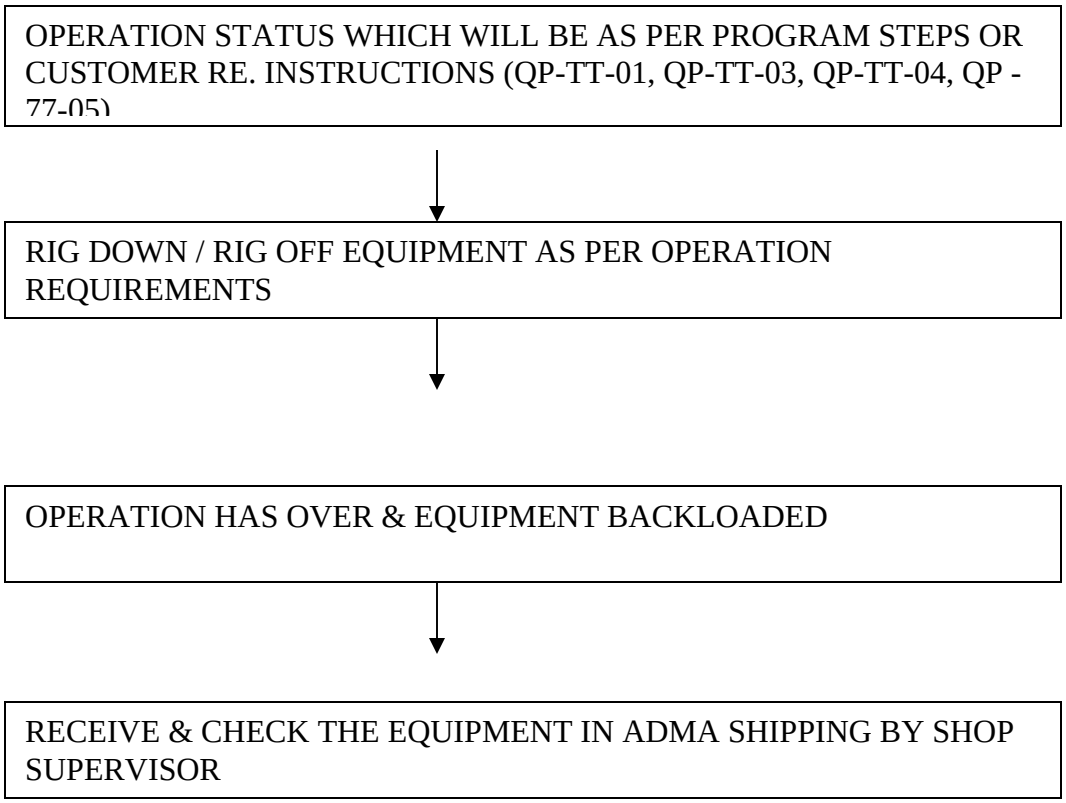


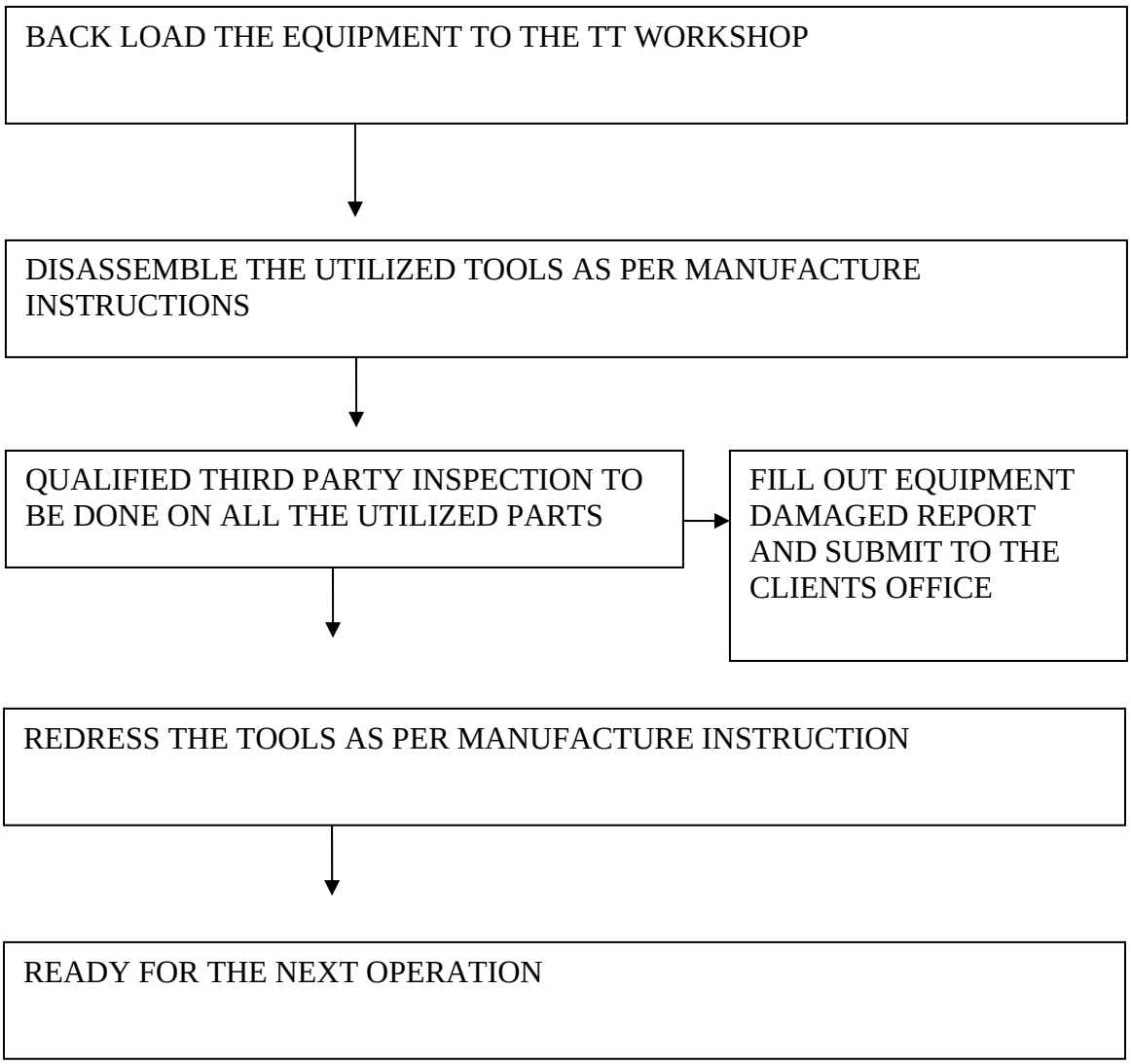
SECTION – 3 Operational Procedure for Thru Tubing Activity

3.1 Purpose

The purpose of this procedure is to demonstrate how the operation has been carried out once receive the call from the client




OPERATION STATUS WHICH WILL BE AS PER PROGRAM STEPS OR CUSTOMER RE. INSTRUCTIONS (QP-TT-01, QP-TT-03, QP-TT-04, QP - 77-05)
RIG DOWN / RIG OFF EQUIPMENT AS PER OPERATION REQUIREMENTS
OPERATION HAS OVER & EQUIPMENT BACKLOADED
RECEIVE & CHECK THE EQUIPMENT IN ADMA SHIPPING BY SHOP SUPERVISOR



3.2 Associated Documents :

- Job Call Sheet
- Equipment delivery ticket
- Equipment damage report
- Rig program
- Equipment return ticket
- Third party inspection certificates
- Daily service ticket

SECTION 4 : OPERATIONAL PROCEDURE FOR THRU TUBING ACTIVITY RECEIVING INSPECTION OF NEW TOOLS AND SPARES

4.1 PURPOSES

The purpose of this procedure is to verify that all incoming products that are to be incorporated into the company scope of supply shall meet specified purchase requirements. This procedure applies to goofs inward inspection of new tools and spares, and the responsibility for acceptance of tools, which have undergone final inspection and test.

4.2 RESPONSIBILITY

Applies to all personnel responsible for receiving and inspection of new material/ tools.

4.3 GOODS INWARD INSPECTION (NEW TOOLS)

All goods received in ware the house shall be fully inspected against the minimum the following criteria

Purchase order copy

Current revision of the applicable drawings /specifications before being accepted into the stock system as being available for use, unless the goods are released under the conditions of 6,8 below.

4.4 PROCEDURE

1 Products shall be purchased in accordance with purchasing procedure.

2 The minimum designation for receiving tools shall be workshop/ welding shop charge hand.

3 The workshop charge hand or their designee shall check for conformity to the delivery ticket.

4 On receipt all critical equipments goods shall pass through quality control inspection and shall accompanied with a copy of purchase order/

5 The quality control inspector shall inspect critical goods against company or suppliers, drawings or specifications.

6 While doing the inspection if in case engineering drawing not available or if some critical areas of inspection cannot be measured, of if requested by the management, the trial assembly of component parts shall determine the acceptability of the goods. Also if drawings are not available the following check shall be made:

7 Dimensional checks on outside and inside diameters when specified on the Purchase Requisition.

8 All applicable third party certifications as mentioned in the PO.

9 Cross matching of serial numbers and part numbers marked on the goods against the purchase Requisition.

10 When goods have pressed a serial number will be given for the identification of the equipments for the operational purpose.

11 Copies of the following shall be placed in to the tools unique tool history file

- Material Certificate.
- Serial Number Log.
- P.O.
- Quality Inspection report. (Original to be kept on file)

12 If for any reason the goods are rejected at quality control inspection, the inspector shall identify the rejected goods by making them rejected.

13 The quality personal will raise a non conformances found, and pass these findings on to PO originator.

14 The PO originator will then complete a report and submit to the supplier for their corrective and

15 preventive action and if necessary replace the supplied materials along with necessary

16 compensations (if any)

17 GIS Quality division will make an investigation internally to determine the basic and root

18 cause for the non conformance and the supplier is re assessed accordingly.

4.5 Associated Documents.

- Non Conformance report.
- Corrective and preventive action report.

- Approved supplier list.
- Vendor assessment and re assessment records.
- Purchase Order.
- Delivery ticket.

SECTION-5 Operational Procedure for Thru Tubing Activity In process and final Inspection

5.1 PURPOSE

This procedure describes the methods for the mentioning and control the quality of equipment undergoing in process repair or maintenance and their final inspection. (This process is applicable even after each job). Applies to all through tubing process equipment in GIS.

5.2 RESPONSIBILITY

It is the responsibility of the relevant department head or his designee to ensure compliance with the following procedure

5.3 PROCEEDURE IN-PROCES INSPECTION

5.3.1 Tools are received from customer location after the job will be inspected as per the operation procedure above section-3 (page 5). All applicable third party inspection and reports will be maintained after the inspection.

If required tools are disassembled as per the relevant procedure.

- Tools Service Manual. Viz:
- Product Line Tool Maintenance Manuals,
- Workshop procedures Manual,
- Welding / Machining procedures manual.
- Procedures and policy's for field Operations Manual

5.3.2 All used tools shall receive a full inspection as per AP1 RP7G and company procedures and their condition identified by marking or colour coding

5.3.3 All inspections on tools shall be documented as per the relevant procedure.

5.4 PROCEDURE FINAL INSPECTION

5.4.1 The workshop welding shop supervisor shall continually monitor the progress of each piece of equipment and sign the work order as conforming to specifications.

5.4.2 All tools that have under gone a welding process shall be inspected as per RP7G

5.4.3 All other tools shall be inspected as per the relevant manufactures procedure.

6.4 Associated Documents.

- Operation job process
- Receiving inspection of new tools
- Tool Service manual
- Product line tool maintenance manuals
- Workshop procedures manual
- Procedure and Policy's for Field Operations Manual
- Product traceability and status markers

Hydro-Mechanical Cutter Generic Procedure
(Thru Tubing Division)

Successful application of a cutting procedure is achieved by matching the following basic assembly and a selection from the list of devices to stabilize and accure the bottom hole assembly (BHA) to eliminate work string movement, hence ensuring the correct BHA to meet each specific operational scenario. These are considered essential for coiled tubing operations but less critical to threaded pipe operations. The anchor/ stabilizer / swivel devices have been listed in their normal sequence in the BHA and in most circumstances are run in isolation if each other. Please note that a vast variety of scenarios exist and each operation BHA is specifically designed with care to ensure that the BHA is suitable for the hydraulic available.

Basic BHA

Coil connector (Slip/ Grub Screw Type)

Dual Flapper Check Valve (DFCV)

Heavy Duty Hydraulic Disconnect

Dual actuated Circulating Valve (DACV)

Annular Circulating Valve (Optional)

Multiple Opening Circulating Valve (Optional)

Tubing End Locator (Optional)

Bleed off subs No=Go Sub

Hydraulic Anchor Sub Under Reamer with Anchor Blades

Hydraulic Centralizer

Positive Displacement Motor (PDM)

Non Rotating Stabilizer

Hydraulic Cutter

Set Down Swivel

Latch Swivel

Ensure knives are of the correct sweep for the tubing or drill pipe to be out and that the knife cutting structure is optimal for the material to be severed. It is paramount that motor performance is matched to the cutting matrix and to the correct application, ensuring optimal flow rate, torque and cutting speed. The overall BHA must be designed as an integrated, complimentary system.

Please note that this procedure is generic only and a job specific procedure must be agreed prior to conducting this type of operation.

1. Make up bottom hole assembly
2. Flow test the bottom hole assembly adding each component in the correct sequence. Initially test the motor head assembly and then add each major

component as required, eg. Test MHA pus Hydraulic anchor, then test MHA plus Hydraulic Anchor and PDM. As each component is added test at a variety of flow rates noting all pressures? If anchor sub is included in the BHA, it will be activated when the pressure reaches 800-850 psi and equivalent flow rate of 27 gpm with no load on the motor, the anchor buttons will only retract when the pressure on the work string has been completely bled off.

3. An Annular Circulating Valve of Multiple Opening Circulating Valve may be run to eliminate actuation of any BHA component when running in hole by diverting flow to the CT /Tubing annulus until the valve is activated to the in line position.
4. Some form of depth correlation is considered essential especial for CT operations utilizing either a tubing end locator to indicate nipples or a previous correlation run to flag the CT string.
5. Lightly tape the knives closed into the body prior to running the tool to ensure they do not hang up whilst running in the hole.
6. Run the assembly in hole following operating companies accepted procedures.
7. If possible depending on the BHA and / Or Scenario, Run 30 ft past cutting depth and slowly pull back to

cutting depth. If using a hang off or set down swivel then layoff approx. 1000 lbs, as pressure is applied this will increase.

8. As determined during pre-run testing commence actuation of the bottom hole assembly. Note all pressure and any variations. When applying pressure increase it extremely slowly to minimize risk of knife tip damages e.g. control on Y piece and valve, very slowly closing the valve.
9. Maintain and note all parameters for the duration of the cut. Fluctuation of the BHA pressure is common as the motor generates torque and blades bed in. the length of time to complete the cut will vary dependent upon conditions but may take up to +/- 1 hour especially if the blade tips break end knife material needs to be worn before a cutting face is represented.
10. When the cut is completed various indications may observed dependent on the scenario. Prior to cutting the tubular ensure that all parties are briefed on these indications. For example, PDM pressure may decrease if torque on motor decreases when the cut is completed or it may increase/stall f the tubing is in compression hence impeding the blades. A good indication can be tubing is in compression hence

impeding the blades. A good indication can be tubing can be tubing or annulus communication confirmed by an increase decrease in pressure.

11. One cut is complete slowly shut down pump and pull BHA out of hole. Do not make any excessive over pulls and if CT drags attempt to work the pipe and close blades.
12. For multiple cuts repeat above steps.

Running Procedure
Rotary – Wash Tool Assembly

1. Pig he coil tubing with .75” setting ball to ensure that there are no obstructions in the reel.
2. Install Coil Tubing End Connector and pull test to 10,000 lbs. using test sub.
3. Pressure test Coil Tubing and End Connector to 5,000 psi
4. Make up 2.13 Motor Head Assembly, Tubing End Locator, Pluted Rotating Stabilizer, and Rotary Wash Tool.
5. Function Test the Rotary Wash Tool by pumping thru the Coil Tubing
6. Deploy the BHA into the riser, open the CT BOP and run BHA past the THS
7. Commence pumping thru the CT and make an accurate record of the pump pressure required to obtain various pump rates (ie, ¼ bbl/min, ½ bbl/min, ¾ bbl/min etc.)
8. Establish a desired rate and commence RIH while washing down tubing use a RIH speed of not more than 50 feet per min. Monitor returns, if any, for scale or debris.
9. Continue to wash the tubing ID until the BHA has run out the end of the tubing. Run the BHA to +/- 15 ft. above the packer setting depth.
10. Increase the pump rate (double) and continue to RIH @ +/- 10 fpm until the BHA has gone +/- 15 ft. past the packet setting depth. Pull back and wash the area of the

9 5/8 perfs where the packer will be set to remove any possible scale or debris.

11. Decrease pump rate to original rate and pull BHA back thru the WEG and POOH @ 50 fpm washing the tubing ID on the way out.
12. When at surface, shut down the pump and pull the BHA into the riser. Close CT BOP below BHA and secure the well.
13. Lay down Rotary Wash Tool BHA and stand down operations overnight to allow the well to stabilize after washing and circulating.

Venture Junk Basket Running Procedure

Equipment specifications and Requirements

1. Function Test & Operational Procedures

1.1 Make up the coiled Tubing Connector and pull test the connector as per connector pull test program.

1.2 Line up fluid pump coiled Tubing Reel and carry out flow rate test. The Coiled Tubing Reel can also be pigged with largest activation ball required for the BHA/

1.3 Pressure test connector to 500 psi

1.4 Make up the MHA or upper BHA as specified.

1.5 Once tool-string is made up and the Injector head / BOPs are made up to the Lubricator, pressure testing of the surface equipment to client/Operator parameters and procedures.

Note: If filling the Lubricator through the Reel, Circulate at the lowest possible rate

1.6 On completion of pressure testing and after confirmation that the well is open, RIH to operating depth at a running speed of around 40 to 50 ft/min. The running speed should be reduced down to – ft/min while passing down-hole restrictions and completion jewellery

1.7 100 feet above the debris, perform a pull test. Continue in hole slowly until the HUD is tagged. Flag the coiled Tubing,

and pick up 50ft, record pick up weight and hanging weight.

1.8 Start circulating at the maximum rate of 60 GPM if attainable. Allow circulating pressure to stabilize prior to running in hole. When circulating pressure has stabilized, record pressure and rate.

1.9 Start to RIH at +/- 5 ft/min, recording the running weight and vacuum up any debris

1.10 Continue circulating until no further progress can be made

1.11 Once the desired depth has been reached, stop circulating and POOH

1.12 When at surface, close in the well and break out he BHA and inspect the contents of the venture junk basket and extensions.

1.13 If the venturi junk basket and / or extensions are full of debris, it is recommended to return them

Milling and Under Reamer Procedures

Equipment specifications and requirements for under- reaming with the Unit Arab Services, two stages under reamer

Under-reamer T Series Mill O/D to be 2.5”

For the 3-1/8 O/D Under-reamer, Mill to have 2 3/8” reg Pin looking up

Two stages Under-Reamer (one piece body), opening OD of Arms to have a minimum clearance of 1/16 inch a side between the fully extended Arm and the Liner/ Casing

Motor OD and working parameters are governed by:

1. Drill pipe size
2. I/D of liner / Casing to be cleaned up.
3. Minimum restriction in hole.
4. Type of cement scale of fill to be reamed or milled
5. Mud type, weight and the mud soled contents

Function Test & Operational Procedures

1. Line up fluid pump to carry out flow rate test
2. Make up BHA as specified
3. Make up the Under-reamer / T Series function test and record the flow rate and pressure that the under reamer blades open

4. on completion of pressure testing and after confirmation that the well is open, RIH to operating depth
5. 100 feet above the HUD/ TOC or scale, perform a pull test continue in hole slowly until the HUD is tagged. Flag the drill pipe and pick up 25 ft, record pick p weight
6. Start circulating at the maximum rate. Allow circulating pressure to stabilize prior to running in hole. When circulating pressure has stabilized, record pressure and rate.
7. Start to RIH at +/- 5 ft/min. recording the running weight. When an increase in the circulating pressure is seen, slow down the running speed and monitor the pressure differential across the under reamer.
8. Slowly increase the running speed to find the optimum penetration rate for the Under-Reamer
9. Wiper trips should be performed at regular intervals during milling operations. This depends largely on the material being milled, ROP, AV, Devision and surface returns, but a maximum of 50ft of penetration is a good guideline.

Note: Do not exceed 30 minutes of milling / Under reaming at any one point with no progress as damage /wear may occur in the Liner/Casing

10. Maintaining a constant W-O-B and differential pressures will optimize the ROP, assist in obtaining a clean and

smooth well bore and will also improve Motor performance and longevity

11. Carry out under reaming operations until the Cement / Scale or fill has been totally removed or required TD is reached. Carry out a wiper trip prior to opening the circulation sub.

Thru Tubing Milling Procedures

Equipment specifications and requirements for Scale Milling with the GIS Taper Mill

Motor OD and working parameters are governed by

1. Coil- Tubing OD
2. Coil –Tubing length
3. I/D of Liner/ Casing to be cleaned up
4. Minimum restriction in hole.
5. Type of Scale or Fill to be Reamed or milled

Function Test & Operational Procedures

1. Make up the coiler tubing connector and pull test the connector to 80% Yield of the Ct base on the CT Grade and wall thickness for more details refer to the CT Connector Manual Chart
2. Line up fluid pump to Coiled Tubing Reel and carry out flow rate test. The Coiled Tubing Reel cans also be pigged with the largest activation ball require for the BHA.
3. Pressure test connector to 5000 psi
4. Make up the MHA or upper BHA as specified
5. Make up the PDM to the MHA/BHA and flow test the PDM at 20, 30, 40 and 50 GPM of attainable, recording the circulating rates and pressures.

6. Make up the GIS type 'T' Mill to the Motor and flow test the PDM with the 'T' Mill at 20,30,40 and 50 GPM if attainable, recording the circulating and pressures. Record the flow rate and pressure that the under reamer blades open.
7. Break out PDM and 'T' mill if BHA length is to long for stabbing onto the lubricator.
8. Once tool-string is made up and the injector head/BOPs are made up to the Lubricator, pressure testing of the surface equipment to Client/ Operator parameters and procedures

Note: If filling the Lubricator through the Reel, circulate at the lowest possible rate.

9. On completion of pressure testing and after confirmation that the well is open, RIH to operating depth at a running speed of around 40 to 50 ft/min. The running speed should be reduced down to 10-15 ft/min while passing down- hole restrictions and completion jewellery.

NOTE: If circulation is required to be broken during the RIH, only circulate at the minimum rate, while continuing to RIH slowly at +/- 10 ft/min. Stop circulating prior to passing any down-hole restrictions and completion jewellery

10. 100 feet above the HUD/TOC or scale, perform a Pull Test. Continue in hole slowly until the HUD is tagged. Flag the

Coiled Tubing, and pick up 50ft, record pick up weight and hanging weight.

NOTE: Due to the build of scale in some wells it is usually prudent to pick up on the Coil-Tubing around 200 to 300 ft above the wire line HUD, this is so that the Milling operation commences in the "full gauge' section of the well bore

11. start circulating at the maximum rate of 50GPM for the PDM if attainable. Allow circulating pressure to stabilize prior to running in hole. When circulating pressure has stabilized, record pressure and rate.
12. Start to RIH at +/- 5 ft/min. recording the running weight. When an increase in the circulating pressure is seen, slow down the running speed and monitor the pressure differential across the motor.
13. Slowly increase the running speed t find the optimum penetration rate for the 'T' Mill and motor while keeping the motor differential around 250 to 350 psi.
14. If a motor stall in encountered, stop circulating and allow the pressure to drop, prior to picking up off bottom.
15. Pick up 10 ft or until the pressure is seen to drop of suddenly.
16. Start, circulating at the maximum rate of 50 GPOM for the PDM if attainable. Allow circulating pressure to stabilize prior to running in hole. When circulating pressure has stabilized record pressure and rate.

17. Wiper trips should be performed at regular intervals during Milling operations. This depends largely on the material being milled, ROP, AV, Deviation and surface returns, but a maximum of 50ft of penetration is a good guideline.

NOTE: Do not exceed 30 minutes of milling at any one point with no progress as damage /wear may occur in the Liner / Casing

18. Maintaining a constant W-O-B with the recommended Motor differential pressures will optimize the ROP, assist in obtaining a clean and smooth well bore and will also improve Motor performance and longevity
19. Carry out milling operations until the Cement / Scale or fill has been totally removed or required TD is reached. Carry out a wiper trip prior to opening the Circulation Sub.