

Guide to Successful Through-Tubing Intervention

Through-tubing intervention in live wells offers time, economic and risk-reduction advantages over intervention operations that require killing the well and removing the completion equipment. However, through-tubing intervention operations have their own set of challenges, many of which can be addressed by pre-job planning and knowledge sharing. Baker Oil Tools offers this guide as a service to help E&P companies optimize their intervention operations.

Devising a plan of approach

Many through-tubing intervention-associated problems can be avoided or alleviated by thorough, collaborative pre-job planning and consistent communication throughout the project cycle. The operator and service company representatives should meet as early as possible to:

- collect well data that will provide an accurate picture of the problem the intervention is to solve;
- chart the course for the intervention operation; and
- develop a structured plan for a detailed and auditable solution based on equipment selection, engineering considerations, job procedures and well programming.

Sharing knowledge

To expedite and improve project planning and execution, Baker Oil Tools developed proprietary software for through-tubing intervention design. Baker engineers and field technicians use the design software to gather pertinent data from the operator to accurately engineer and implement viable, customer-focused through-tubing intervention solutions. The information is auditable and quantifiable to help the operator evaluate product applications and perform risk analysis.

Reducing risk

Being aware of common problems and their possible causes and solutions can significantly reduce performance and economic risk in through-tubing intervention operations. A problem-solving matrix such as the one in the Baker Oil Tools Through-Tubing Intervention design program consolidates collective knowledge and best practices in a reference tool that is valuable for both planning and execution. The matrix augments the field engineer's personal knowledge

and experience with that of fellow engineers who have addressed similar challenges.

Executing the operation

By following planning guidelines, completing a pre-job information request, consulting a problem-solving matrix and working closely together, operator and service provider can execute viable, reliable and cost-effective through-tubing live-well intervention operations that yield significant reward for minimal outlay.



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Thru-Tubing Intervention

Pre-Job Information Request

(To be completed by Baker Oil Tools Sales/Operations Engineer during planning stage and checked on location by Baker Oil Tools Service Supervisor prior to execution.)



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1. General Information

Operator	
Contact Name	
Tel./Fax./ E-Mail	
District / Field / Well	
Well Type	
Anticipated Start Date	

2. Well Information

Tubing (OD (") and Weight (#/ft))	
Casing / Liner (OD (") and Weight (#/ft))	
ID at Working Depth (")	
Condition (Scale, Corrosion etc.)	
Min. Restriction (ID (") / Type / Depth (ft))	
Maximum Well Deviation (")	
Working Depth Deviation (")	

3. Well Data

Pressure at Working Depth (psi)	Static		Flowing		Inject	
Wellhead Pressure (psi)	Static		Flowing		Inject	
Temperature at Working Depth (°F)	Static		Flowing		Inject	
Perforation Intervals (ft)						
Crossflow (psi, bpd, direction)						

4. Fluids Information

Description	
Density (p.p.g.)	
Fluid Level (ft)	
Treatment Fluid (Type, Density (p.p.g.))	
CO ₂ / H ₂ S (%)	

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Baker Oil Tools – your best partner for through-tubing intervention success

Experience

The longest proven track record in the industry

Technology

Pioneers and innovators of numerous Thru-Tubing Intervention tools, systems, accessories and methodologies, from the first inflatable Thru-Tubing tools to patent-pending Z-Seal™ metal-to-metal expandable sealing technology

Quality

All products engineered and manufactured in-house, in ISO 9001-certified facilities, and subjected to rigorous Baker Performance Testing

Support

Digital information and knowledge sharing for effective pre-job planning, risk avoidance, post-job evaluation, data capture and archiving.

Thru-Tubing Intervention

Problem Solving Matrix



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Problem	Possible Cause	Solution
Inability to reach setting depth	Well restriction	Perform suitable drift &/or utilize smaller OD tools
	Scale	Perform suitable drift, utilize smaller OD tools or remove scale
Depth Correlation	Incorrect well-bore schematic	Check all restriction ID's & utilize suitable OD tools
	Coiled tubing in-accuracy	Use nipple profile/tubing end locator
		Employ electric wireline casing collar locator
No setting pressure build up	Setting ball not on seat	Make sure schematic depths correctly adjusted
		Surge pumps to transport ball to seat
	Tool pull released while correlating	Run BHA 50 feet in hole and pull back up to setting depth rapidly to surge ball onto seat.
		Pull out of hole
Element not anchoring during inflation process	Element ruptured	Pull out of hole
	Tool string leak	Pull out of hole
	Flow Actuated Inflation Valve not tripped	Increase pump rate in order to function utilizing 'operation enhancement' program
	Delayed opening valve not sheared	Check well pressures and increase initial setting pressure
Element rupture	Irregular profile scale deposition	Pull out of hole
		Caliper log prior to run in hole
	Perforation damage	Select full cover element
		Utilize a lower inflation pressure
Element limitations	Element limitations	Underream scale from setting ID
		Caliper log prior to run in hole
	Element limitations	Select full cover element
		Utilize a lower inflation pressure
		Clean up perforations
		Use correct element for setting ID
Electrical short	Various	Do not apply excessive differential pressure
		Do not draw down by more than allowable limit
		Perform pre-job PLT or memory gauge run for accurate BHT and BHP
		Do not cool well significantly after inflation
Electrical short	Various	If heat up anticipated after inflation, consider using pressure relief valve
		Do not utilize incompatible inflation / treatment fluid
		Perform step test as per INFLATEDESIGN™
		Run motors backwards for two minutes
Electrical short	Various	Vary voltage to attempt to clear.

Where to go for more on Baker Oil Tools Thru-Tubing Intervention Products and Services

Visit us at www.thrutubingintervention.com
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