


Deploying SET[®] and *ESeal*[™] Technology Using Coiled Tubing

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ENVENTURE.
EXPAND YOUR POSSIBILITIES

Challenge

- **Seal squeeze perforations to withstand high pressure frac operations.**
 - **Regulatory Agency had suspended operations due to poor cement behind the production casing.**
 - **Sidetracking or a replacement well not an economic option.**
- 

Proven Results

Value added

- Restored wellbore integrity; preventing re-drill

Benefits

- Deployed on coiled-tubing, eliminating need to mobilize additional equipment
- Met regulatory requirements for restoring casing integrity
- High-performance patch to withstand high frac pressures



CTU Deployable Patch Update

Two more patches
run on CT in Eagle
Ford last Month!

Both patches
were installed on
the same well in
seven hours!




Live Well: 3000 psi.
5-1/2" 20 lb/ft

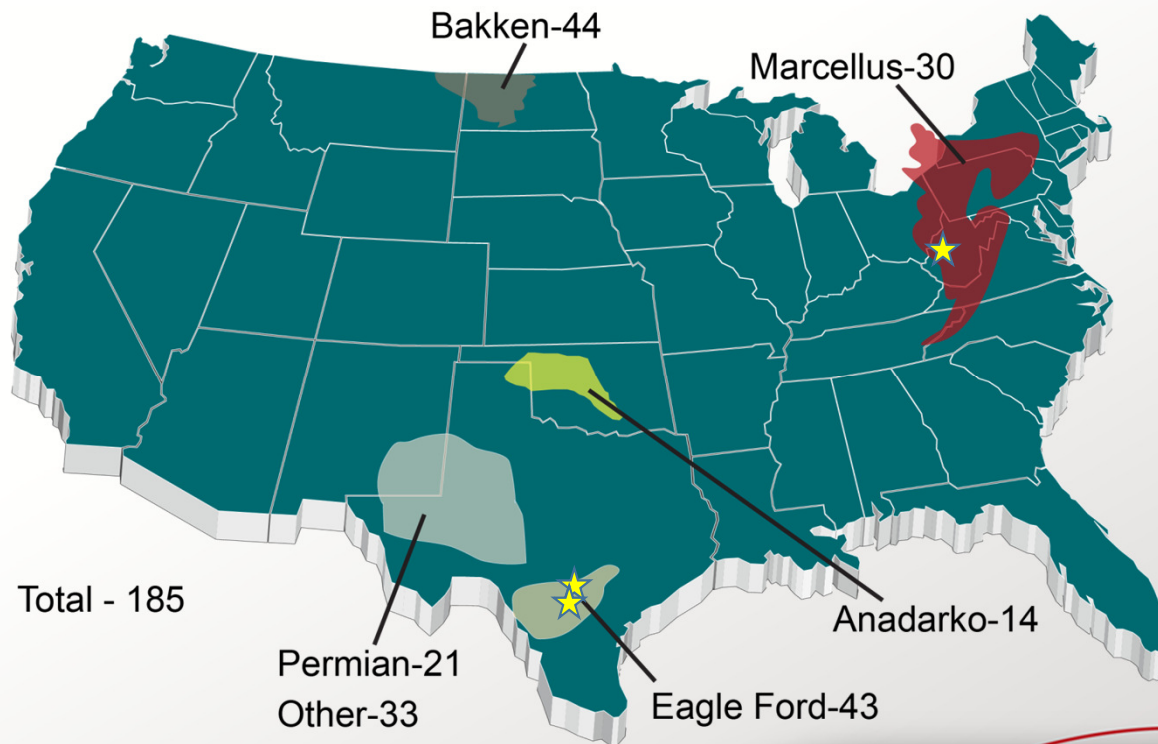
Solution:
4-1/4" Patch(s)
Length ~34 ft each

Intervention and Solid Expandables

Repairing leaks due to:

- Corroded casing
 - Parted / split casing
 - Failed connections
 - Accidental firing of perforating guns
 - Damaged frac sleeves
 - Leaking DV tools
 - Production / Water control
 - Injection control
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Patch Run History and Area



★ CTU Deployed Eseal HP Patch

Required Equipment



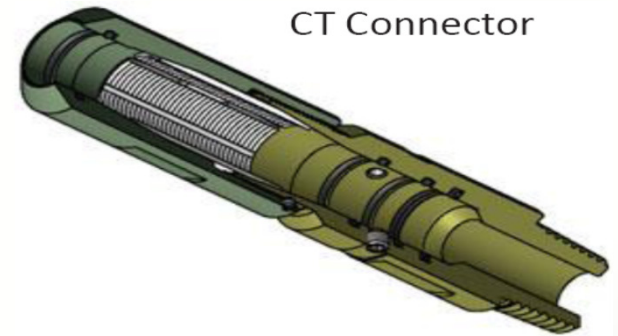
Operator

- **Coil Tubing Unit:**
 - 8,500 psi minimum working pressure
 - 60,000 lb minimum overpull (at setting depth)
- **Pump Unit:**
 - 8,500 psi minimum working pressure
 - 0.1 bpm minimum pump rate
- **Lubricator (if required)**



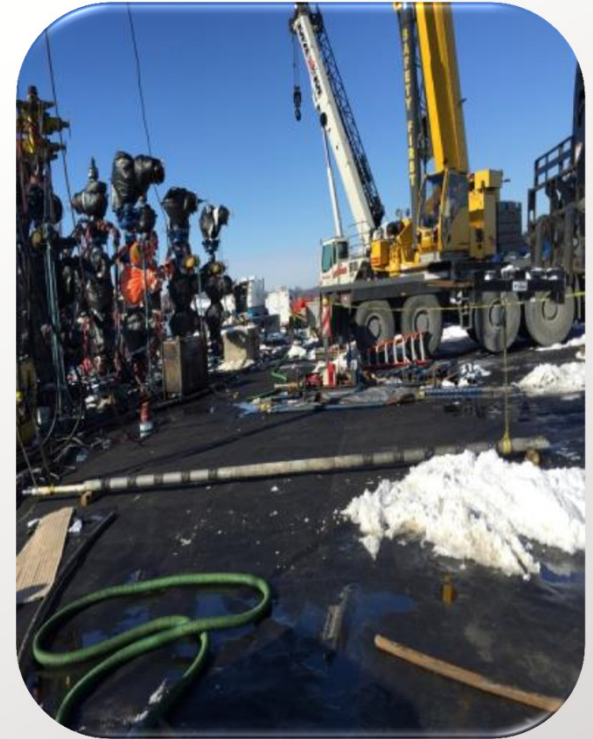
Operator

- Coil Tubing Connector
- Hydraulic Disconnect for emergency release (to allow 15/16 in. ball pass through)
- Crossover to connect with ESeal Patch
- Crane (120 ft minimum lifting height)



Enventure

- ESeal Patch:
 - Assembly (inner-string included) is made up in shop ready to RIH
 - Up to 64 ft long
 - 2-7/8 in. PH6, 2-3/8 in. PH6, or 1-1/2 in. Hydril CS box looking up



Enventure

- ESeal Patch:
 - Two each 13/16 in. brass/aluminum balls
 - Two each 15/16 in. brass/aluminum balls
 - Two each 3 in. foam balls

Wellbore Preparations

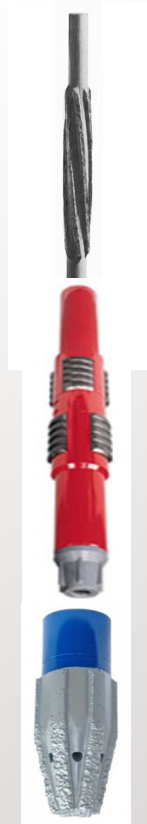


Wellbore Preparations

- Set Composite Bridge Plug (best practice):
 - 30 ft below the mid-point of leak for 30 ft long patches
 - 45 ft below the mid-point of leak for 60 ft long patches
- Used for:
 - Depth correlation
 - Pressure test Expanded ESeal Patch after shoe is drilled out

Wellbore Preparations

- RIH with dummy/cleanout BHA:
 - Tapered/junk mill
 - Casing scraper
 - 12 ft pony collar
 - String mill



Wellbore Preparations

- If milling took place (cement retainers, damaged pipe/connections), RIH with:
 - Tapered mill
 - String mill
 - String Magnet
 - Junk Basket
- **NOTE:** Pump sweeps. If setting depth is in the curve or lateral lay out a lubricant polymer pill on horizontal up to the kick-off point before POOH to run ESeal Patch.



Installation Execution



Conduct Safety Meeting



| JOB SAFETY ANALYSIS | | ENVENTURE | |
|--|--|--|---------------------------|
| JOB TITLE: | | APPLICATION: | |
| SUPERVISOR: | | Offshore – Deep Water | |
| DATE: | REGION / COUNTRY / OPERATION AREA: | LOCATION: | DEPARTMENT: Operations |
| Required Personal Protective Equipment: Steel-toed boots, hard hats, safety glasses, gloves, long sleeve fire retardant coveralls, and hearing protection. | | | REVIEWED BY: |
| APPROVED BY: | | | |
| SEQUENCE OF JOB STEPS | POTENTIAL HAZARDS | RECOMMENDED ACTION OR PROCEDURE | |
| Unloading bolsters and baskets from the work boat onto the rig. | Material big and heavy; Dropping material or having it roll onto your foot or leg; Overhead hazards. | <ul style="list-style-type: none">• Hold pre-job safety meeting with crane operator and roustabouts and review all possible risks and hazards.• Clear area of unnecessary personnel.• Use the proper lifting equipment and ensure it is in good condition and certified for the job.• Wear the proper PPE at all times.• Use tag lines and spotters.• Observe crane safety issues.• One signal man; proper crane signals. Use radios for communication.• Stay away from swinging loads and from suspended loads.• Always be aware of hand placement. | |

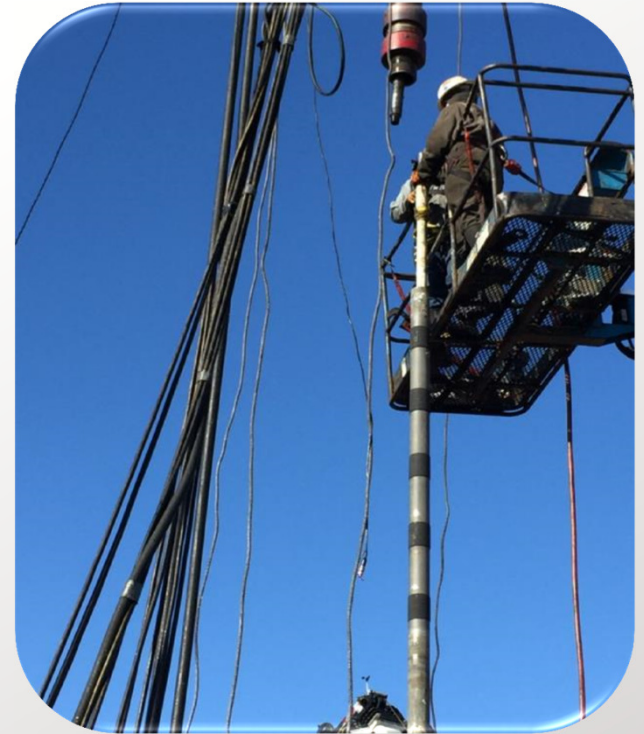
Execution

- Make up crossover
- Lift ESeal Patch in vertical position using straps and lift plug



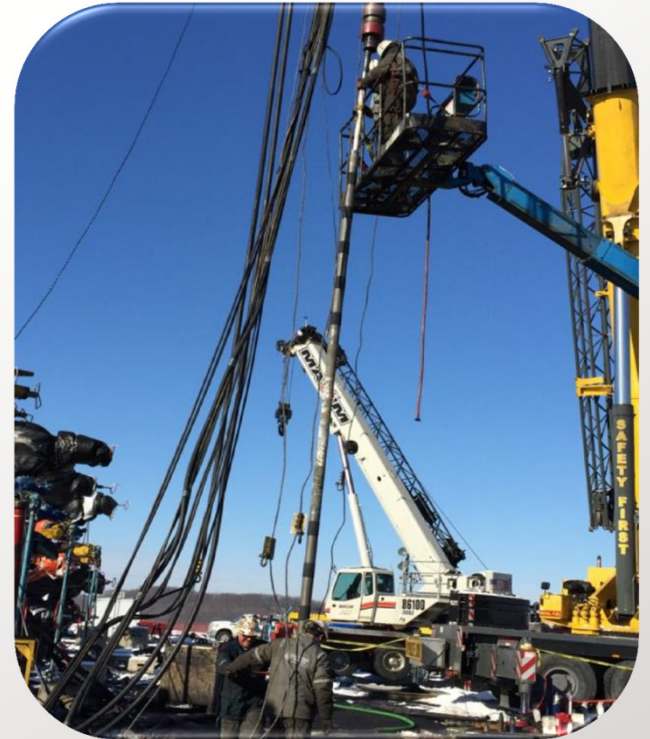
Execution

- Secure ESeal Patch to the basket of the bucket truck and remove lift plug



Execution

- Make up ESeal Patch to Hydraulic Disconnect of Coil Tubing under lubricator. Turn ESeal Patch counter-clockwise.
- Apply final makeup torque using two pipe wrenches and a come-a-long chain with a torque gauge.



Execution

- Lift ESeal Patch inside Lubricator



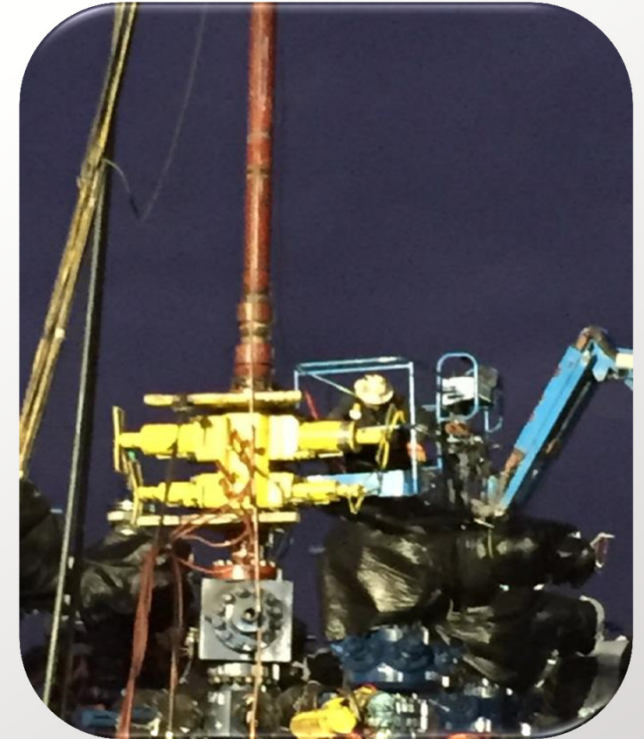
Execution

- Make up Lubricator to the BOP stack
- Zero in Coil Tubing Gauge, open BOPs



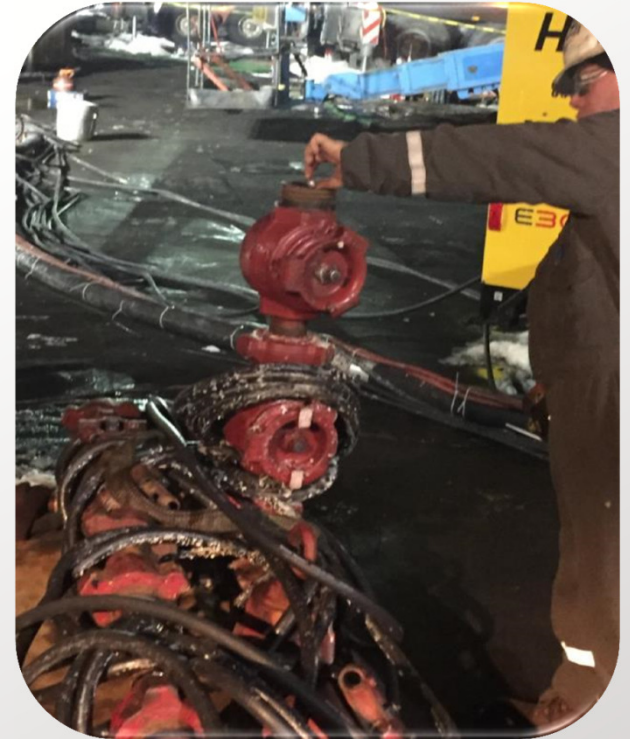
Execution

- RIH with ESeal Patch at ~100 ft/min in vertical and ~60 ft/min through curve and horizontal (can be circulated on backside to assist running through curve and lateral).
- Tag Composite Bridge Plug. Space out for expansion.



Execution

- Drop and pump the 13/16 in. aluminum ball at 1.5 bpm.
- Land Ball with 2,500 psi
- Continue Pumping at .25 bpm to 6,000 psi.
- Take overpull test to 10,000 lb
- Continue expansion with 10,000 overpull and 6,000 psi



Expansion Operations

- When cone exits the top of ESeal Patch, pressure will bleed off to zero
- POOH with expansion assembly, close BOPs, low pressure test



Shoe Drillout

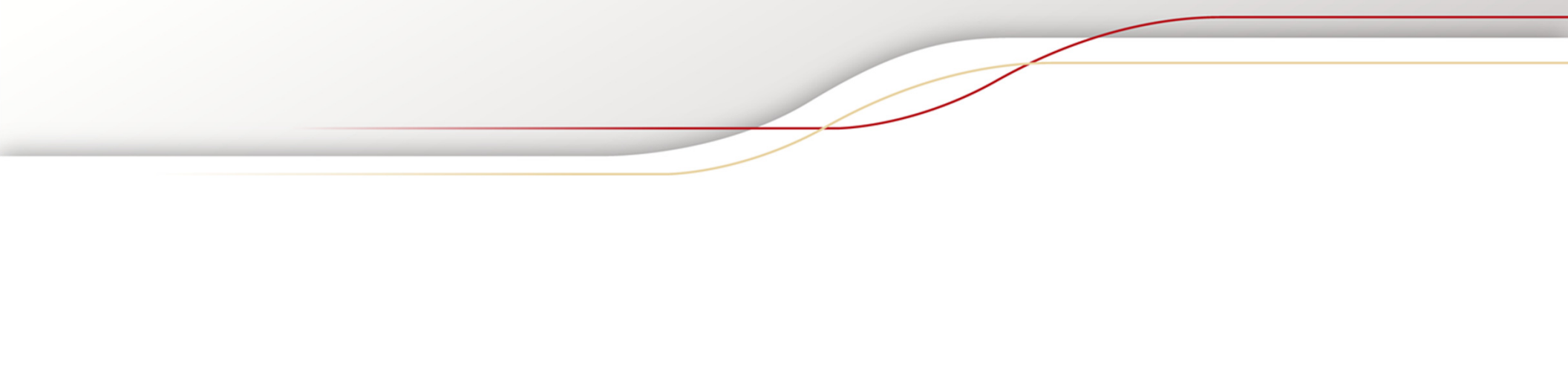


Shoe Drillout

- RIH with drillout or millout BHA (mill or bit OD the same as drift of expanded ESeal Patch)
- Drill out (mill out) shoe as per Enventure's best practices
 - Do not drill out Composite Bridge Plug. Composite Bridge Plug will be used to pressure test expanded ESeal Patch against




Shoe Drillout

- Pressure test expanded ESeal Patch as per Operator's specifications
 - Drill out (mill out) Composite Bridge Plug
 - Circulate hole clean, POOH with drillout BHA
 - Resume operations as per Operator's Program
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Conclusion – Solid Expandables

Intervention:

- Patches and liners
 - Permanent Mechanical Casing Repairs
 - Adaptable
 - Deployable on
 - **Coil Tubing**
 - Drilling or Work Over Rig
 - Snubbing Unit
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2015 ICOTA Roundtable

**Thanks for your
time!**



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EXPAND YOUR POSSIBILITIES