



POLYCORE

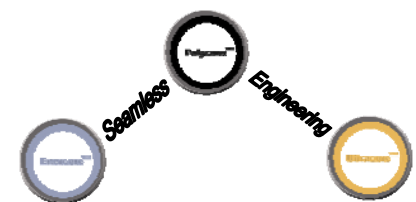
TUBULAR LININGS





Polycore Has History

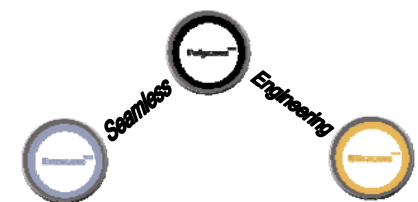
- Unfamiliar does not mean 'new'.
 - Over 18 years
 - 10,000 + wells
 - 10 Million Meters
- Visualize the productive use of our technology and solutions.
 - Tubing for extending the life of your well





Polycore's Team

- Dennis Carmichael
 - Managing Director
- Mat Davis
 - Account Manager
- Mike Sandbeck
 - Account Manager
- Eric Alles
 - Account Manager
- Blair Taylor
 - Account Manager
- Don Cottrell
 - Southern Field Sales and Service
- Lyle Tippe
 - Northern Field Sales and Service
- John Jenkins
 - Plant Manager
- Rob Davis
 - VP Engineering





Polycore's Purpose

Help You Maximize Production Revenue and Minimize Cost of Operations

- By providing a solution to rod on tubing wear and down hole corrosion problems
- By enhancing current production recovery practices
- By creating opportunities: More directional drilling





Polycore's Purpose

- How do we help you identify solutions to your problems?
 - Discussing real issues today!





Polycore's Technology





Our Technology

- Thermoplastic liners specifically formulated to be inserted inside new or used tubing.
- A unique procedure is followed to protect the pin ends.
- Seamless mechanically-bonded liner (no adhesive required)
- Couplings are coated with a high performance polymer to protect against corrosion in the J-area.





Our Technology



Polycore™ is a High Density Polyethylene (HDPE) liner extruded to the Plastic Pipe Institute's Specification PE 3408. This patented product is highly abrasion resistant which accounts for its success in the elimination of rod on tubing wear. Wire line, mechanical, and handling damage are minimized when compared to internal plastic coatings. Polycore™ is chemically inert to corrosive materials enhancing its use as a corrosion barrier. The mechanically bonded seamless tube is tolerant to minor surface imperfections and eliminates holidays unlike adhesive or thermally bonded liners and coatings.

Maximum Temperature 65°C (Oil) 75°C (Water)



Enercore™ is manufactured from a specially formulated blend of Polyolefin's, and has similar mechanical properties to our field proven Polycore™ liner with a moderate increase in tensile strength and temperature resistance. This second generation liner is specifically designed to limit permeability of acid gas such as CO₂ and H₂S. Enercore™ is a seamless mechanically bonded liner providing a smooth tubing ID surface.

Maximum Temperature 100°C



Our Technology



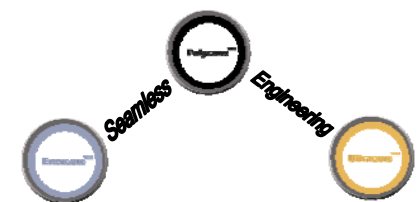
Ultracore™ is a patent pending liner manufactured from a proprietary blend of PolyPhenylene Sulfide thermoplastic resins; specially formulated for use in aggressive downhole oil and gas production environments. This third generation liner has a significant increase in temperature stability, tensile strength, abrasion, and chemical resistance. The innovative polymers in this liner offer the broadest range of resistance to solvents, steam, strong bases, fuel and acids. Ultracore™ is specifically designed to limit permeability of acid gas such as CO₂ and H₂S.

Maximum Temperature 175°C



Our Technology

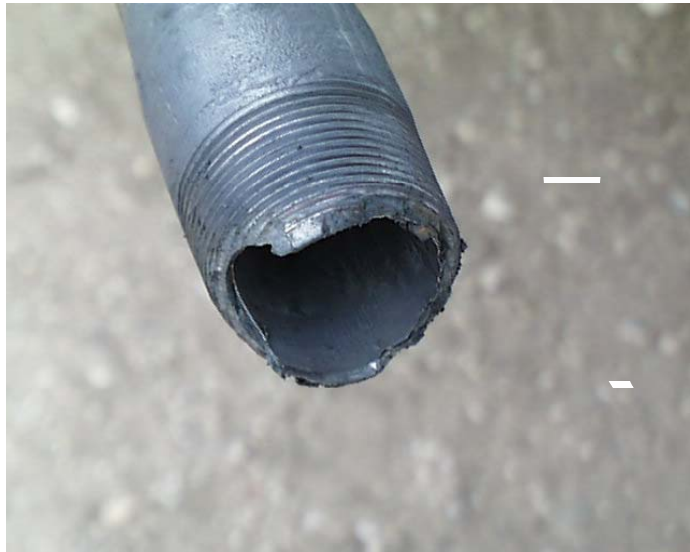
- Thermoplastic lined tubing mitigates rod on tubing wear:
 - Beam pumped, PCP, and other artificial lift wells
 - Deviated and dog-legged holes
 - Minimize use of other standard solutions
- Thermoplastic lined tubing maximizes rod string life by:
 - Reducing rod on tubing friction means reduced peak polished rod load
 - Reducing peak polished rod load means reduced stress on the rod string
 - Reducing stress on the rod string means **“increased rod string life”**
- Thermoplastic lined tubing mitigates corrosion:
 - “Holiday Free” corrosion barrier
 - Water Injection and disposal wells
 - Flowing / Pumping oil wells





Salvaged Used Tubing

- Chipped ends on IPC tubing
- Upsets long enough to rechase
- Lined over damaged IPC
- Salvaged 180 of 186 joints





POLYCORE
TUBULAR LININGS 





POLYCORE
TUBULAR LININGS 





Benefits

Utilize used tubing – **Greenband** too.





Benefits

Reduced Work-Overs.

- Objective to “keep service rigs off your well”
- Eliminate constant tubing inspection
- Eliminate tubing replacement
- Make low volume producers economical.





Benefits

Lower cost to complete a well

- Used tubing
- Other technologies not required
 - Corrod
 - Tubing rotators
 - Centralizers
 - Boronized tubing





Benefit Summary

- Used tubing
- Reduced Work-Overs
- Reduced Operational Costs
- Less load on surface pumps
- Increased tubing life
- Increased production
- Less energy required
- Chemically inert
- Field friendly

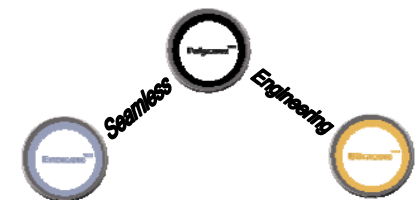




Lined Tubing Drift Specifications							
Tubing		Liner Drift		Liner Thickness		Liner Weight	
in.	mm	in.	mm	in.	mm	lb/ft	kg/m
2 3/8	60.3	1.60	40.64	0.120	3.048	0.40	0.60
2 7/8	73.0	2.00	50.80	0.140	3.556	0.47	0.70
3 1/2	88.9	2.50	63.50	0.160	4.064	0.64	0.95
4 1/2	114.3	3.40	88.90	0.180	4.572	0.95	1.14

Notes:

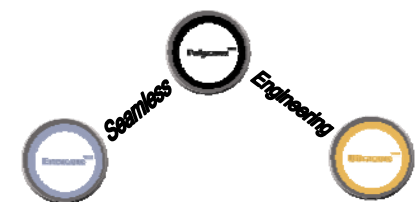
- Hydraulic benefit of reduced surface roughness in liner typically exceeds pressure loss due to ID restriction.
- Work with you on a well by well basis to evaluate the appropriate thermoplastic liner for your application.





Considerations

- ID Restriction
 - Coiled tubing size
 - Rod size
 - Pump size
- Know your,
 - Temperature
 - Depth
 - Volume
 - Pressure
 - Sweet or sour





Versatube

- 100% poly line pipe
- Spoolable
- Temperature ratings as high as 149°C (300°F)
- Burst pressure rating over 6,000 psi
- Working pressure rating over 3,000 psi
- Currently 2" maximum ID





Versatube

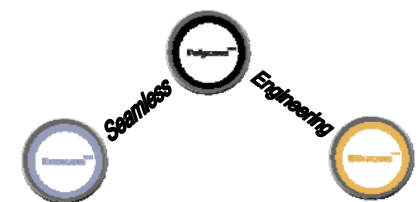
- No welding required
- Minimal amount of connections required
- Connections quickly applied to custom lengths in the field
- Swivel style connections for maximum flexibility





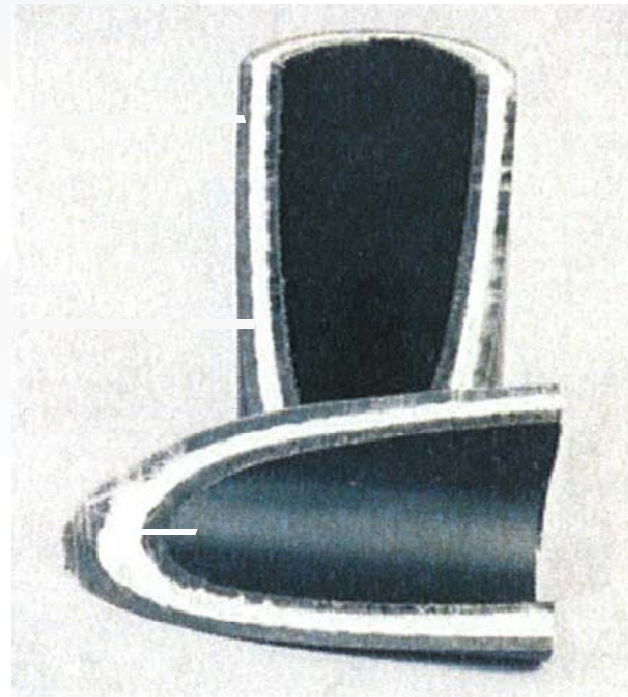
Versatube

- Primary Applications
 - High Pressure Water Injection Flowlines
 - Water Injection / Disposal Wells (downhole)
 - Production Flowlines
 - Oil and Low Pressure Gas Production Lines
 - ESP Production Wells
 - Velocity Strings





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More Solutions Coming

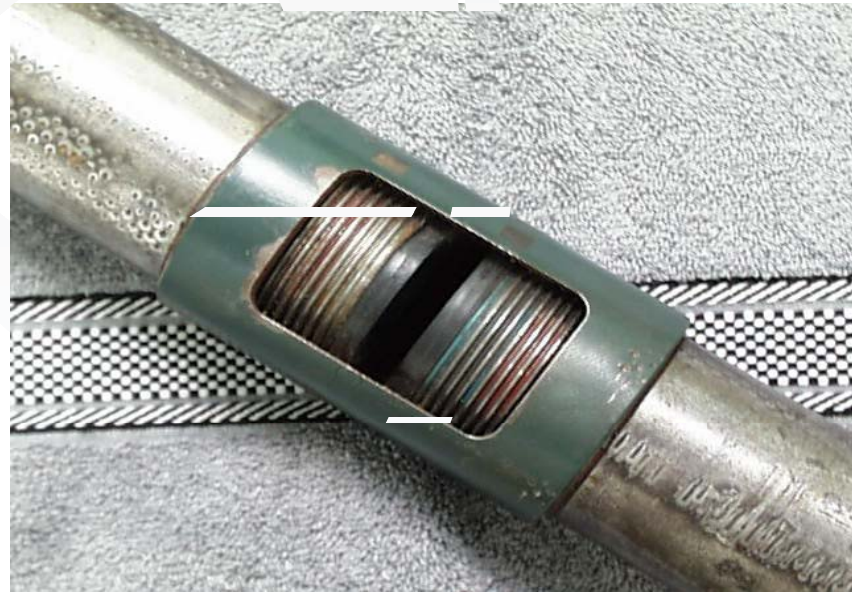
Coming Soon – 100% Impermeable CO₂
and H₂S liner





Summary

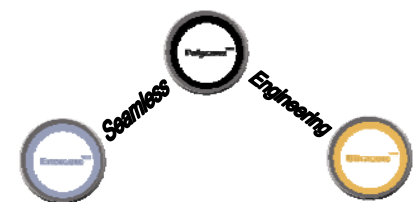
- Proven Technology
- Knowledgeable Support
- Value
- Another tool in the toolbox
- More Solutions Coming





Elk Hills, CA

- 2 wells averaging <100 day runtimes for tubing wear in deviated section of wells
- Polycore™ was installed in green band used tubing to control rod wear in deviated bottom section of wells
- Caliper logs showed no measurable signs of wear in Polycore™ lined tubing after 6 months of service
- Currently 60 months of service

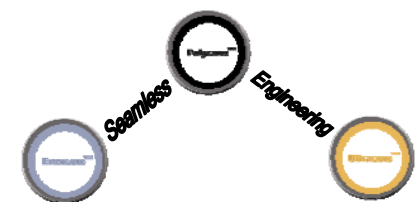




Fletcher Challenge Energy*

- Over 50 wells for Fletcher Challenge Energy in Provost, AB. 1999
- May 2000 Report:
 - Work-Over cost decreased \$1,262/month.
 - Additional revenue of \$1,172/month.
 - Total average benefit of \$2,434/month

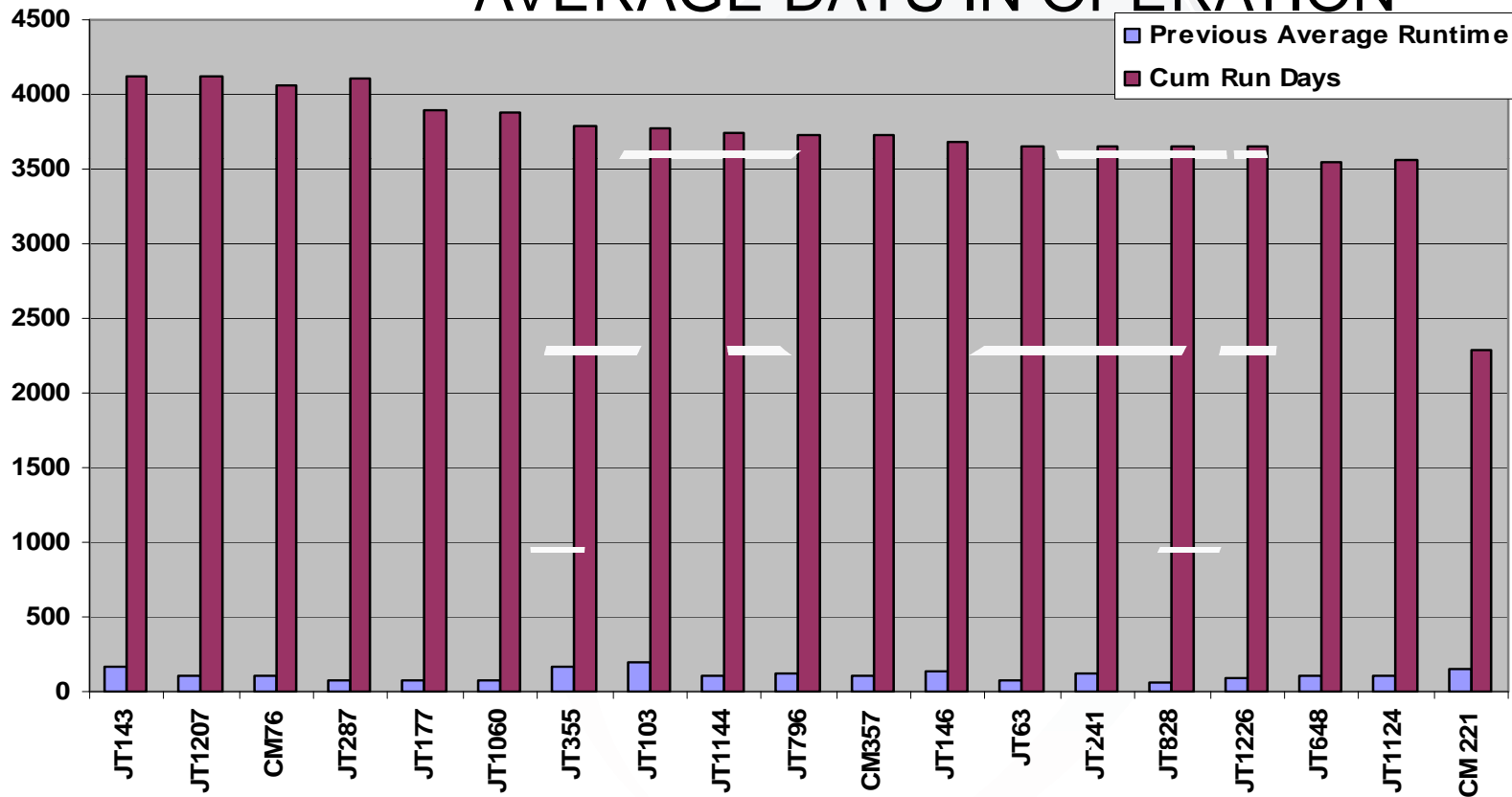
*Now Owned by Rife Resources Ltd.





SPE 39815 CHEVRON RUNLIFE

AVERAGE DAYS IN OPERATION

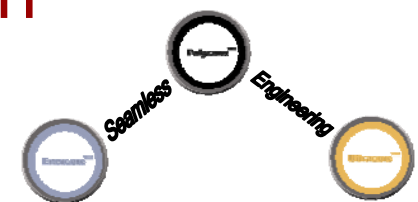


Updated Sept. 2003 – All 17 wells still in service expect one that was shut-in due to low production rates



CHEVRON Improvements with HDPE Liner

- No failures to date with liner in used tubing – **25X increase in service life** in many wells
- Average annual workover frequency (mainly rod parts, pump failures, casing leaks, etc.) reduced from 4.30 to 0.59
- Average annual workover **cost reduce from \$9,636 US to \$1,120 US per well**
- Average TOTAL liner cost \$ 4,294 per well
- Significant decline in polished rod load range, due to reduced coefficient of friction





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Thank You

