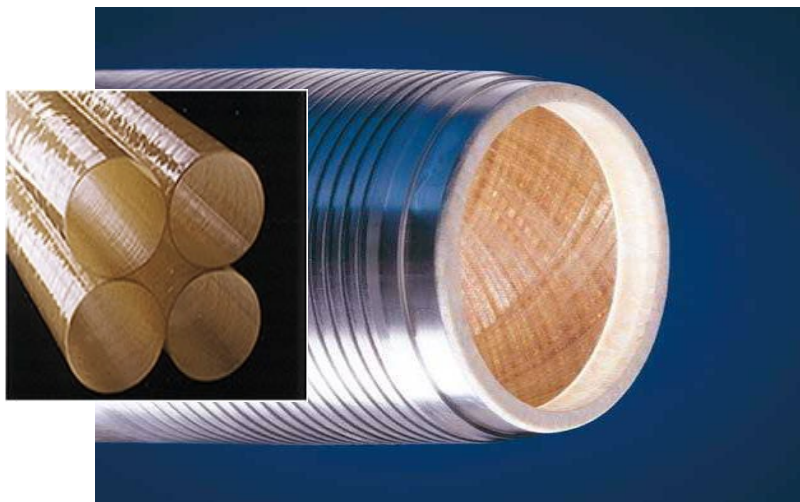


FIBERGLASS (GRE) LINED **TUBING** IN CO₂ INJECTION WELLS

Presented by Alwyn Fernandes, Business Development Manager – Energy Transition

Design Philosophy

Internal Lining

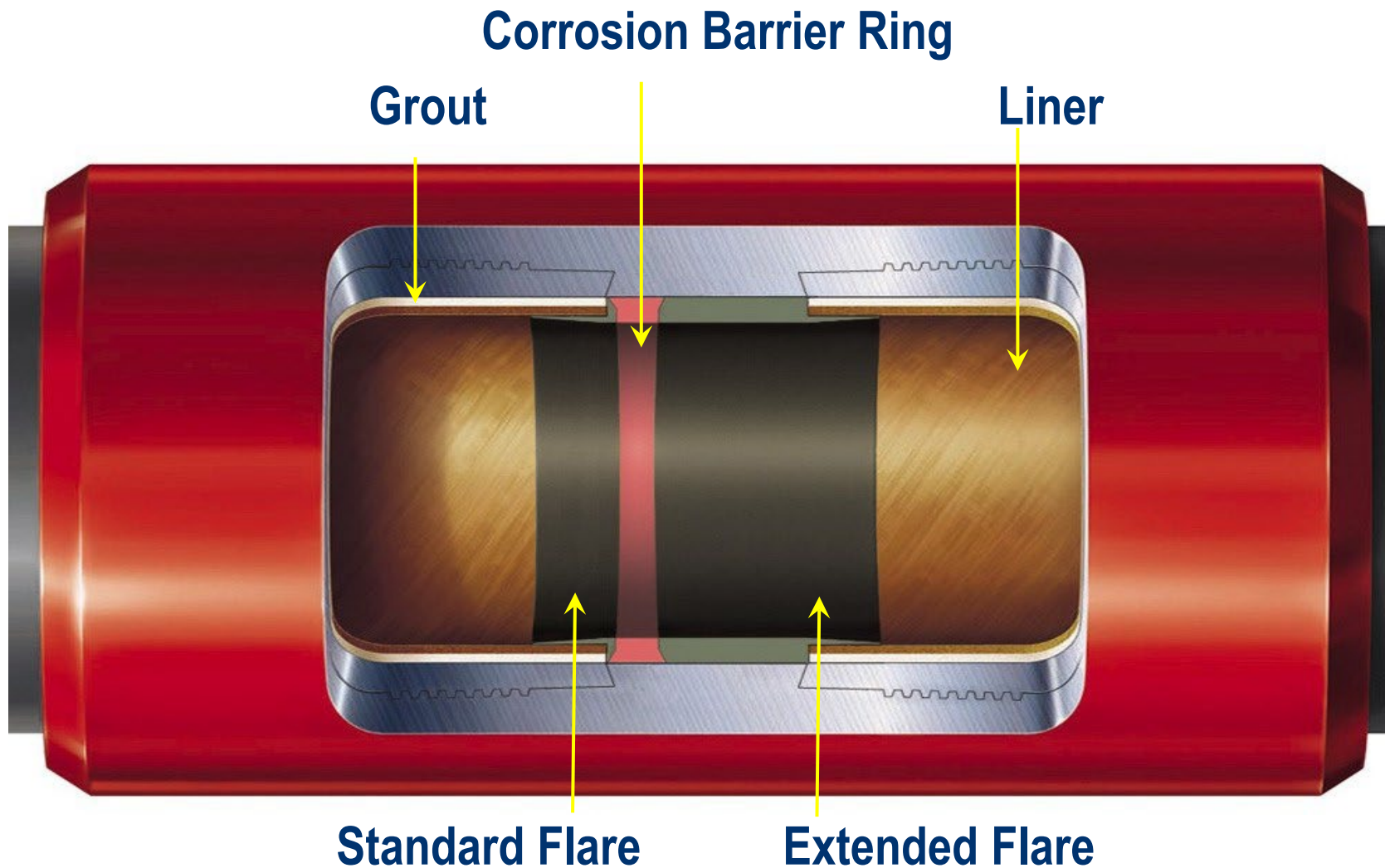


External Wrapping



Prevents tubular corrosion by **isolating** corrosive fluids from the steel

Premium Connection Lining System



Premium Connection Lining System



- ✓ Recognised in the **US EPA** Well Construction Guidance for Class VI wells as an alternative to CRA
- ✓ **No Modification** to pipe connection ensures **Metal-to-Metal (Gas Tight) Seal** and Full Connection Performance
- ✓ **Couplings are not removed**

ExxonMobil



ارامكو السعودية
Saudi Aramco



ConocoPhillips

PIONEER
NATURAL RESOURCES

DUOLINE[®]
TECHNOLOGIES



110 million+ feet installed



PETRONAS

55,000+ wells

equinor

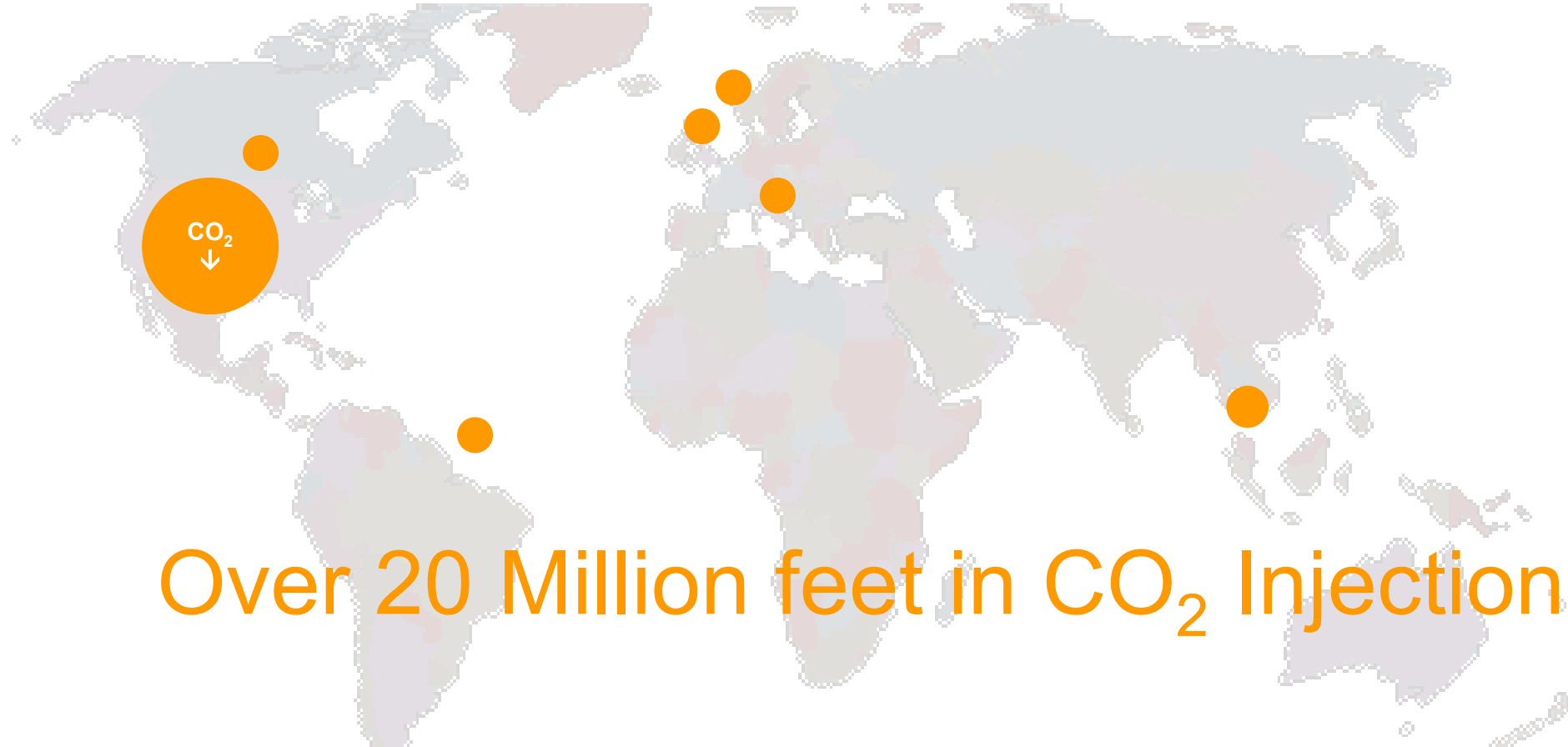
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www.maxtube.com

Increasing Tubular Life & Performance

GRE Lined Tubing in CO₂ Injection



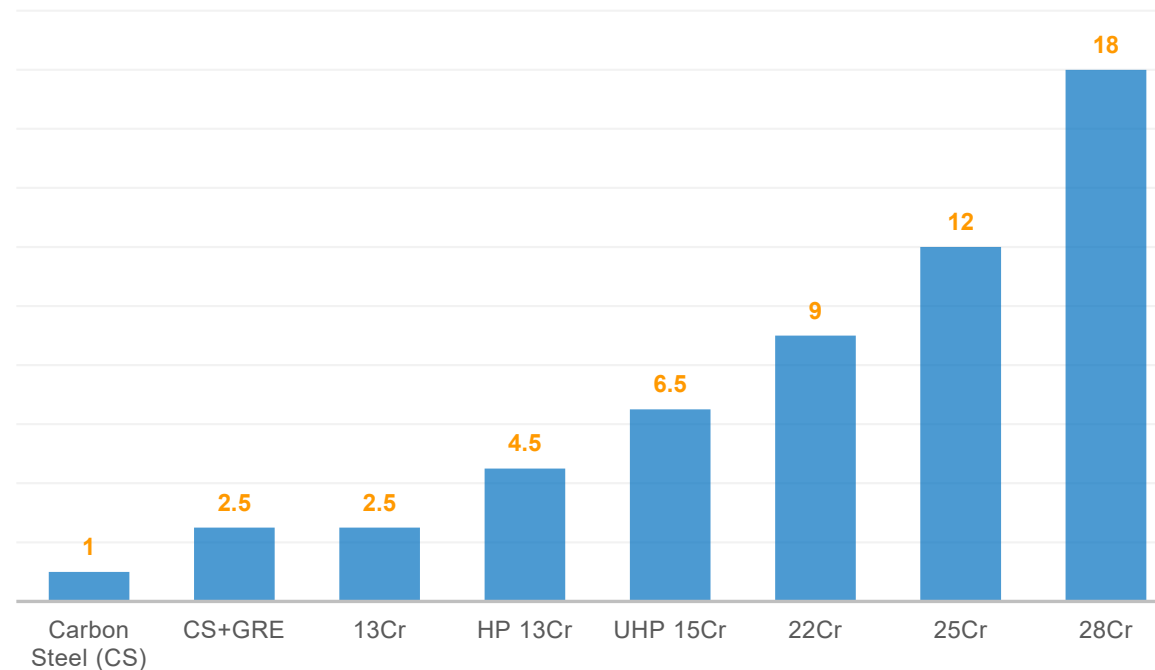
Over 20 Million feet in CO₂ Injection

GRE Lined Tubing in CO₂ Injection

Country	Operator	Description
USA	ExxonMobil	CO ₂ WAG wells (353,000 ft) in Means and Guymon
USA	ExxonMobil	CO ₂ WAG wells (16 wells) in Cornell and Cordona Lake
USA	Oxy	CO ₂ Injection (18 million feet)
USA	Pennzoil	CO ₂ WAG wells (191 wells)
USA	Shell	CO ₂ WAG wells (400 wells)
USA	Chevron	CO ₂ WAG wells (23 wells)
USA	ConocoPhillips	CO ₂ Injection 4 wells in Buckeye, New Mexico
Malaysia	ExxonMobil	CO ₂ WAG wells (480,000 ft) in Tapis
Croatia	INA	CO ₂ Injection (80 wells)
Canada	Whitecap	CO ₂ WAG wells (250+ wells)
Canada	Enhance	CO ₂ WAG wells (19 wells)
Canada	Husky	CO ₂ storage well
Malaysia	Petronas	CO ₂ WAG wells (30 wells)
Brazil	Petrobras	CO ₂ WAG wells (2 wells)

Savings Potential with GRE Lined Tubing

Tubing Materials Relative Costs



- At least 25 years tubing life
- Pipes re-useable
- Opex savings e.g. Workover, fishing, corrosion and scale inhibition, etc. are not included.

First Material of Choice for CO₂ Applications



CO₂

Tested and field proven to resist 100% CO₂ (**Wet and Dry**)

CO₂ Injection

O₂

Inert to Oxygen

Raw Seawater

Cl⁻

Inert to High Chlorides.

300,000 ppm

TEMPERATURE

Max temp: 292°F
Tested to -93°F

Field proven

Duoline Intervention Tests and Experience



OPERATOR	FIELD /TEST	INTERVENTION/TEST TYPE
Shell	Test	27 slickline and 8 braided line logging runs
Shell	Field	50 wireline runs, 5 hours of jarring. 7 perforating gun runs
Shell	Field	Hydraulic Frac using proppant
Shell	Test	Tractor Test
Statoil	Field	22 Wireline runs
BP	Test	40 Wireline runs
BP	Field	7 perforating gun runs
Saudi Aramco	Field	Multiple Wireline and CT jobs over 20 years
Chevron	Field	Logging every two years plus multiple CT jobs
Oxy	Field	CT jobs every 6 months since 1999
Petronas	Test	Tractor test to manipulate SSD
KJOC	Field	Setting inflatable packer using CT and Drill pipe
DONG	Field	Using Jetting tools for scale removal, Setting inflatable bridge plug
Confidential	Test	Setting TAM bridge plug
ADNOC	Field	At least two Gauge Cutter and CT acidizing jobs

Multiple Challenges – Single Solution

- ✓ Eliminate Corrosion
- ✓ Better flow dynamics than steel
- ✓ Dehydration not required
- ✓ Suitable under varying process conditions
- ✓ Pipe reuseability
- ✓ Reduced Carbon Footprint
- ✓ Unmatchable lifecycle economics
- ✓ Shorter lead time than CRA tubing
- ✓ MADE IN THE USA

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