



THIN CLAD CRA DOWNHOLE CORROSION PROTECTION



Pierre Kriesels, Stefan Hartman, & Ernesto Fonseca

DEFINITIONS & CAUTIONARY NOTE

Reserves: Our use of the term “reserves” in this presentation means SEC proved oil and gas reserves.

Resources: Our use of the term “resources” in this presentation includes quantities of oil and gas not yet classified as SEC proved oil and gas reserves. Resources are consistent with the Society of Petroleum Engineers 2P and 2C definitions.

Organic: Our use of the term Organic includes SEC proved oil and gas reserves excluding changes resulting from acquisitions, divestments and year-average pricing impact.

Resources plays: Our use of the term ‘resources plays’ refers to tight, shale and coal bed methane oil and gas acreage.

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this presentation “Shell”, “Shell group” and “Royal Dutch Shell” are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. Likewise, the words “we”, “us” and “our” are also used to refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. “Subsidiaries”, “Shell subsidiaries” and “Shell companies” as used in this presentation refer to companies in which Royal Dutch Shell either directly or indirectly has control. Companies over which Shell has joint control are generally referred to as “joint ventures” and companies over which Shell has significant influence but neither control nor joint control are referred to as “associates”. The term “Shell interest” is used for convenience to indicate the direct and/or indirect ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest.

This presentation contains forward-looking statements concerning the financial condition, results of operations and businesses of Royal Dutch Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management’s current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Royal Dutch Shell to market risks and statements expressing management’s expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as “anticipate”, “believe”, “could”, “estimate”, “expect”, “intend”, “may”, “plan”, “objectives”, “outlook”, “probably”, “project”, “will”, “seek”, “target”, “risks”, “goals”, “should” and similar terms and phrases. There are a number of factors that could affect the future operations of Royal Dutch Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this presentation, including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Shell’s products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share and industry competition; (g) environmental and physical risks; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, fiscal and regulatory developments including potential litigation and regulatory measures as a result of climate changes; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; and (m) changes in trading conditions. All forward-looking statements contained in this presentation are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward-looking statements. Additional factors that may affect future results are contained in Royal Dutch Shell’s 20-F for the year ended 31 December, 2014 (available at www.shell.com/investor and www.sec.gov). These factors also should be considered by the reader. Each forward-looking statement speaks only as of the date of this presentation, 12 September, 2016. Neither Royal Dutch Shell nor any of its subsidiaries undertake any obligation to publicly update or revise any forward-looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward-looking statements contained in this presentation. There can be no assurance that dividend payments will match or exceed those set out in this presentation in the future, or that they will be made at all.

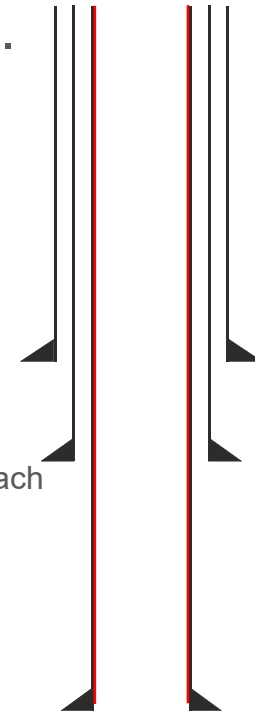
We use certain terms in this presentation, such as discovery potential, that the United States Securities and Exchange Commission (SEC) guidelines strictly prohibit us from including in filings with the SEC. U.S. Investors are urged to consider closely the disclosure in our Form 20-F, File No 1-32575, available on the SEC website www.sec.gov. You can also obtain this form from the SEC by calling 1-800-SEC-0330.

WHAT IS IT?

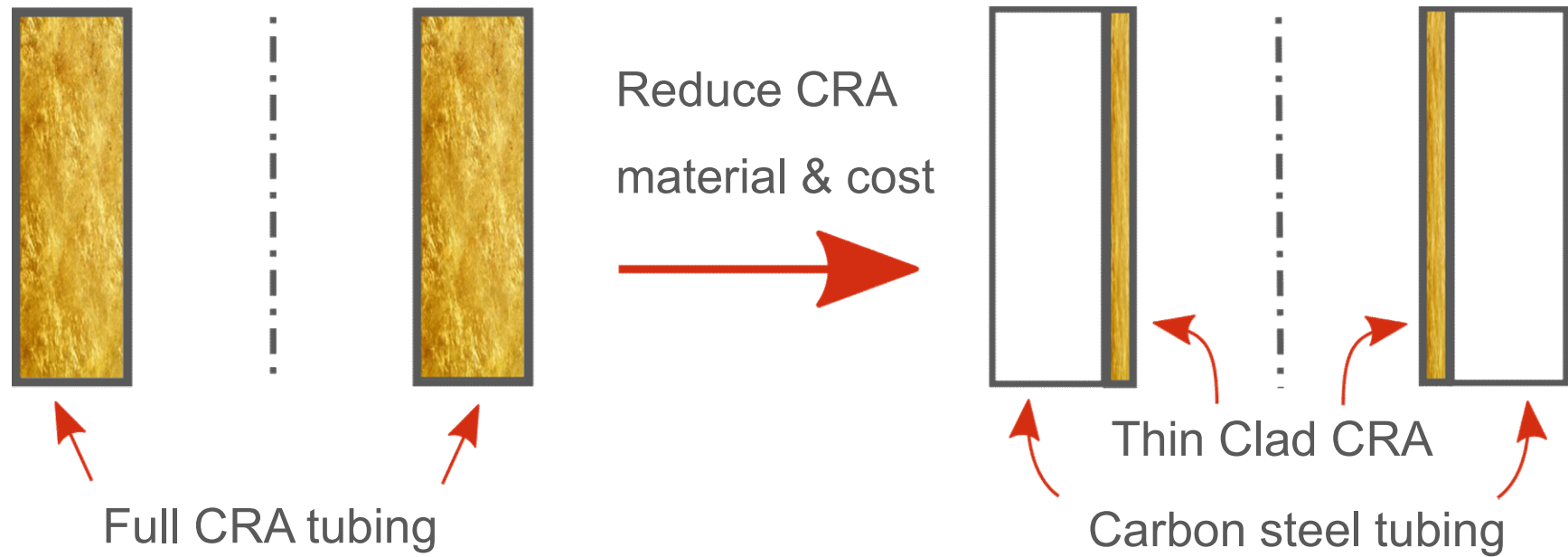
- A method to protect existing or new wells or pipe lines from corrosive gases and chemicals by obtaining a continuous gas tight layer inside a production tubing or pipe line.
- A system whereby a continuous thin sheet/foil of corrosion resistant material can be installed in downhole production tubing.
 - Thickness: 0.5 mm
 - Length: Same as production tubing
 - No diffusion
 - Resistant to high temperatures

(Note: jewelry like SSV, SPM and SSD cannot be clad. Longer length of tubing between each piece of hardware can be clad, shorter length need CRA tubing)

(Note 2: Thin Clad CRA was initially developed for Wells, but is equally applicable for pipe lines)

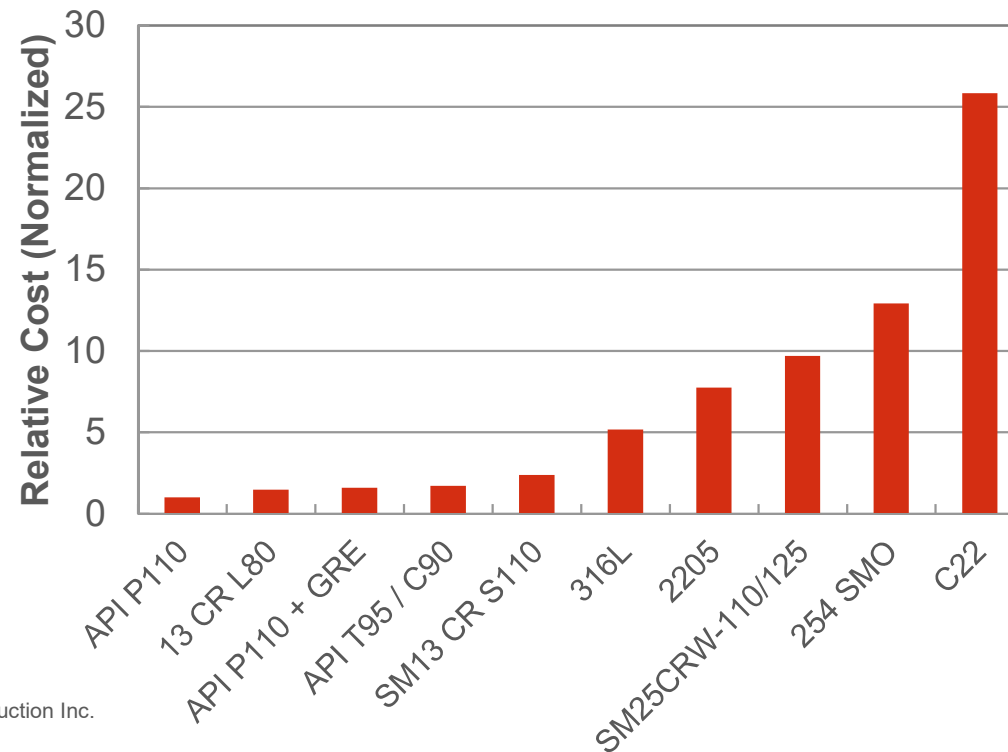


WHAT IS IT?

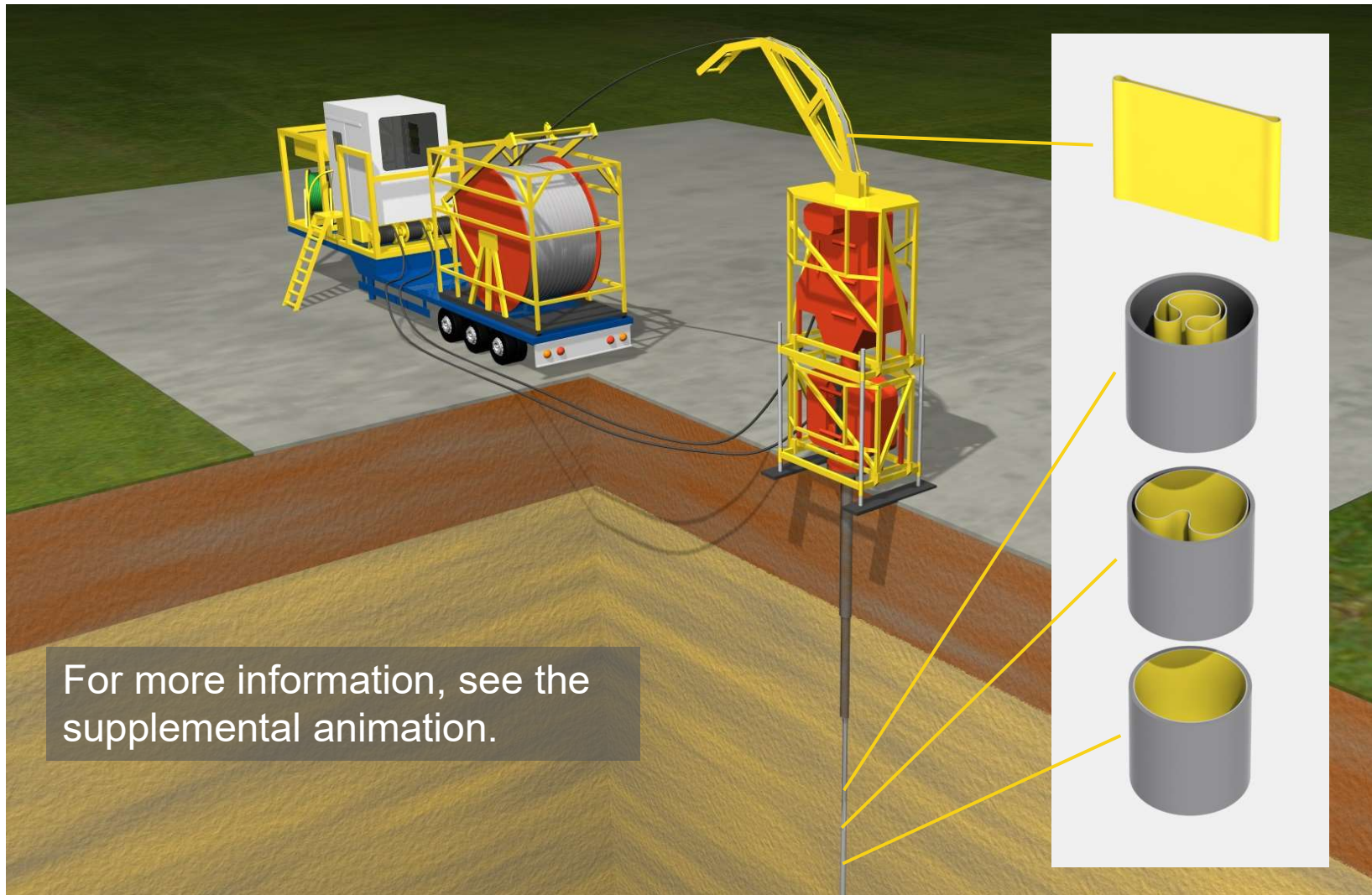


WHY?

- Fields are producing increasingly corrosive hydrocarbons requiring higher grade Corrosion Resistant Alloys (CRA's)
- Cost saving on Production tubing of >80% when compared to solid CRA
- Rehabilitation of older wells in case of souring, increase in water cut, etc.
- Minimal Reduction of borehole



WHAT IS IT?



TECHNOLOGY

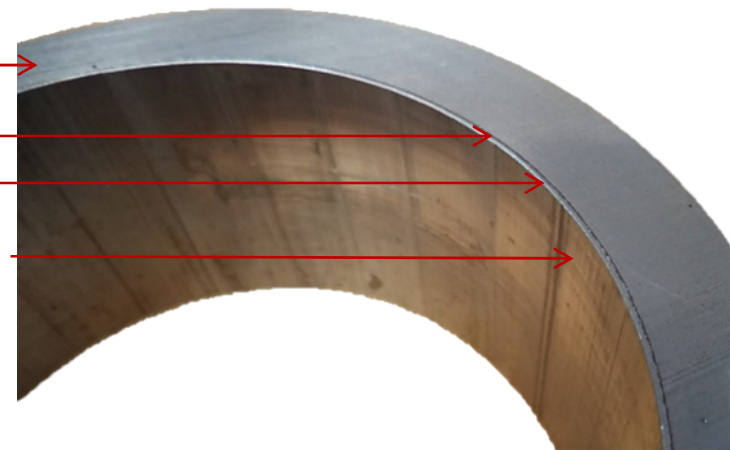
“Liner forming, running and expanding”

LINER

- Formed as flattened tube, then reeled, RIH, unfolded and expanded.
- Three Layers:

Swellable Coating	<ul style="list-style-type: none">• Absorbs free water in annulus• Seals annulus
CRA	<ul style="list-style-type: none">• Provides corrosion resistance required• 0.5mm thick
Abrasion Resistant Coating	<ul style="list-style-type: none">• Protects CRA against abrasion and erosion• Coated on strip prior to forming liner

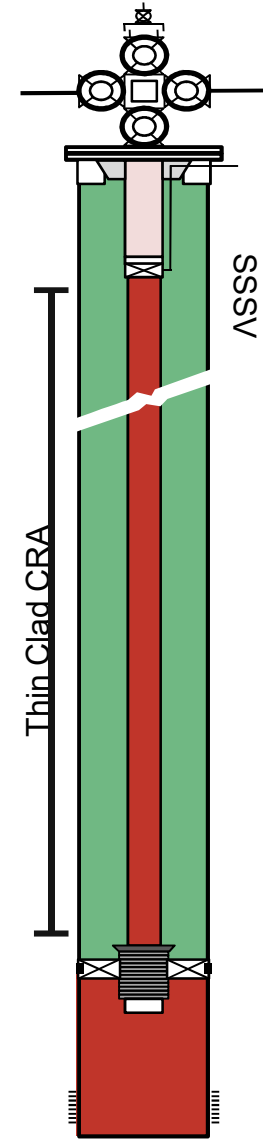
- Production Tubing
- Swellable Layer (Annulus)
- CRA Layer
- Abrasion Resistant Coating (inside)



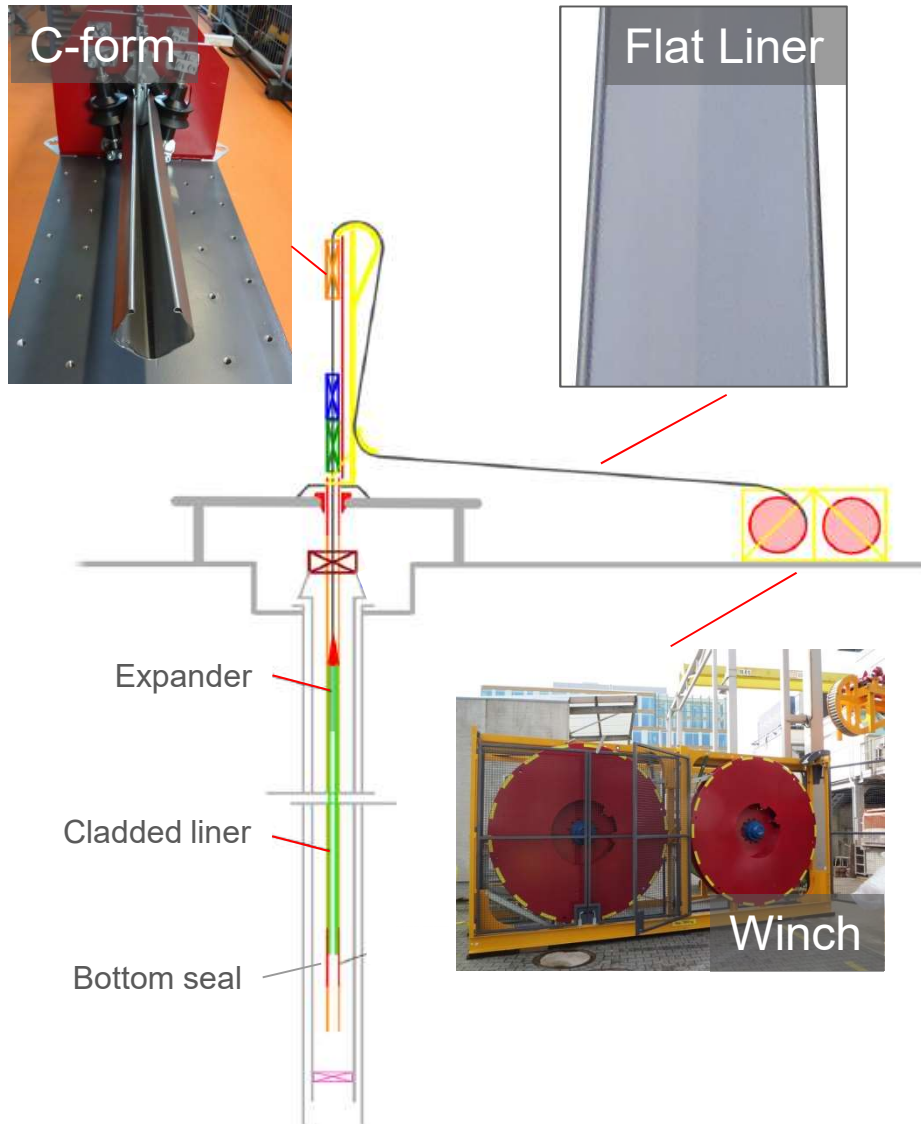
INSTALLATION

- Workover rig/ wireline (CT not required)
- CRA Liner between SSSV and SPM
- Custom Landing section in Tubing
- Expander and bottom seals lowered via CRA Liner
- Upwards expansion
- Top seal set at end of clad section

CT: Coiled Tubing
SSSV: Sub-surface Safety Valve
SPM: Side Pocket Mandrel
CRA: Corrosion Resistant Alloy



INSTALLATION



- A liner is delivered to the well site on a reel.
- Production tubing is run into the well, including:
 - CRA stinger and SSD/SPM
 - Seat of bottom seal (start of lined section)
 - Carbon steel tubing to just below SSSV
 - Joint for top seal
- On site, the liner is folded into a C-form and the bottom seal and expander are made up.
- The bottom liner assembly and liner are pumped into the well.
- Once the bottom liner assembly latches, the expander is pumped upwards, thereby expanding the liner.
- The top seal is set at surface, thereby ending the clad section.
- The SSSV and last CRA tubing section are run.

STATUS AND WAY FORWARD



CURRENT STATUS AND WAY FORWARD

100m Rig Test successfully completed in Rijswijk.

- 5.5", 26#, tubing using an HC340LA liner (carbon steel with mechanical properties approaching that of C22)

Currently seeking a field trial location ideally:

- Internal diameter of ~4.5"
- Ability to circulate via annulus
- Ability to install special joints (with max OD of 6.25") in tubing string
- Internally flush connections

Production of liner and modification of equipment for the field trial

