AXESS

Solutions Designed by Experts

Purpose

- To innovate safety and develop end user confidence and trust

Value

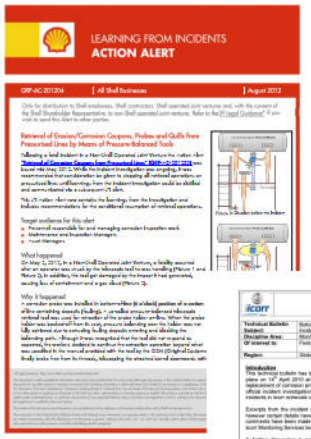
- Uniquely positioned to supply products and services that can complement, integrate and support projects from the design stage, through to maintenance and data retrieval services and analysis

Experience

- A team comprised of experts in monitoring hardware and systems

Global Incidents

- High pressure retrieval tools and portable isolations are required for device changeouts under pressure (online)
- Incidents reported globally range from loss of containment, severe injury and fatalities
- Life extension of assets, diluting field experience, and growing concerns around intrusive monitoring techniques called for innovation to solve several problems
- Axess release the Janus™ Guard having consulted with Shell on the design and piloting it successfully


LEARNING FROM INCIDENTS
ACTION ALERT


Offshore - Gulf of Mexico

Incident Investigation
&
Root Cause Analysis Report

Name of Incident: Thunderhorse Corrosion Coupon Plug Ejection
Business Unit: Thunderhorse Performance Unit
Location of Incident: Thunderhorse Mezzanine Deck
Date of Incident: May 28, 2008

Draft Report
Issued: June 2,2008

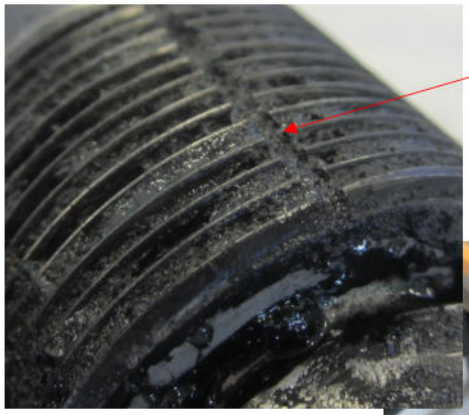

TECHNICAL BULLETIN

Impact of Incidents Across our Industry

- Fatality in May 2012 lead to many operators suspending online retrieval of intrusive devices
- The fatality occurred during the retrieval of an ER probe installed at the 6 o'clock position on a slug catcher line
- The access fitting had not been serviced in over four years
- Scaffolding was built to accommodate a technician, located directly below the retriever to help support the weight

The challenge

- High pressure mechanical access systems
- Technique requires pressure balance for safe operation
- Equalization channels on carrier plugs can become blocked
- Back pressure pumps can be used to ensure balance but are not always available or practical



Blocked equalization channel on a hollow carrier plug

Blocked equalization ports on a solid carrier plug

How the Janus™ Guard Works

- Remove the line of fire
- **Retrofittable**, auto deploying and built into the retrievers, replacing original components
- Axess retrievers with the guard are lighter than other brands without the guard
- Low cost, low maintenance and do not require re-certification of technicians

Click for Animation

Janus Fittings

- Seals the external threads from the environment with the O-ring positioned on the access fitting
- Radial sealing surface provides an additional seal for the service valve and the pressure retaining cover
- The only access fitting with a double seal and double isolation between process and environment
- Applies to both **mechanical** and **hydraulic** systems

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Horizon Fittings

- Access Fittings for intrusive monitoring systems remain unchanged in over 70 Years.
- The preferred monitoring location in most installations is the 6 o'clock position and this poses multiple technical challenges that can also introduce risk.

HORIZON

AN AXXESS INNOVATION

Clearance for retrieval

- The required clearance is often not identified prior to design and fabrication
- This can lead to fittings welded to the pipe that may never be serviced
- In onshore applications access pits may need to be designed and they can accumulate toxic gases and are not always practical or possible

Performance of 6 o'clock Access Fittings

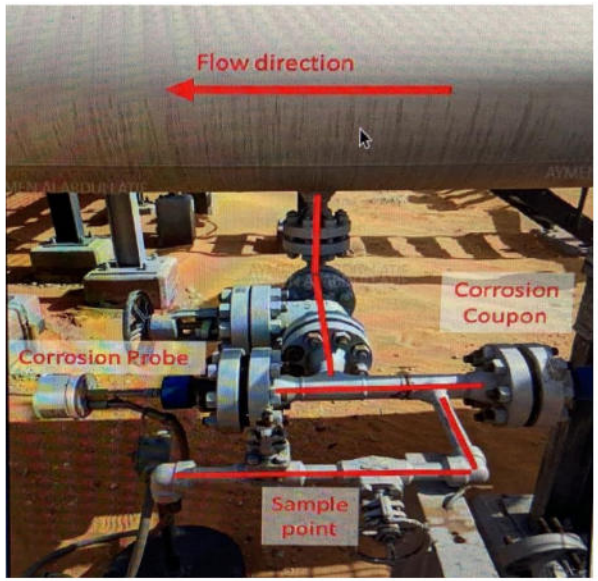
- Accumulation of debris in the 6 o'clock access fitting "trap"
- Risk of retrieval tools not equalizing as per their design due to blockages
- Create a problem with pigging operations
- Majority of reported incidents ranging in severity from loss of containment to fatality, occur at 6 o'clock

Alternative monitoring points

- 3/9 o'clock positioning often leads to monitoring the oil wetted surface and not the water wetted surface
- 12 o'clock positioning leads to longer devices reaching to the bottom of the pipe
- This creates wake frequency concerns and requires longer and heavier retrieval equipment and often the need for scaffolding

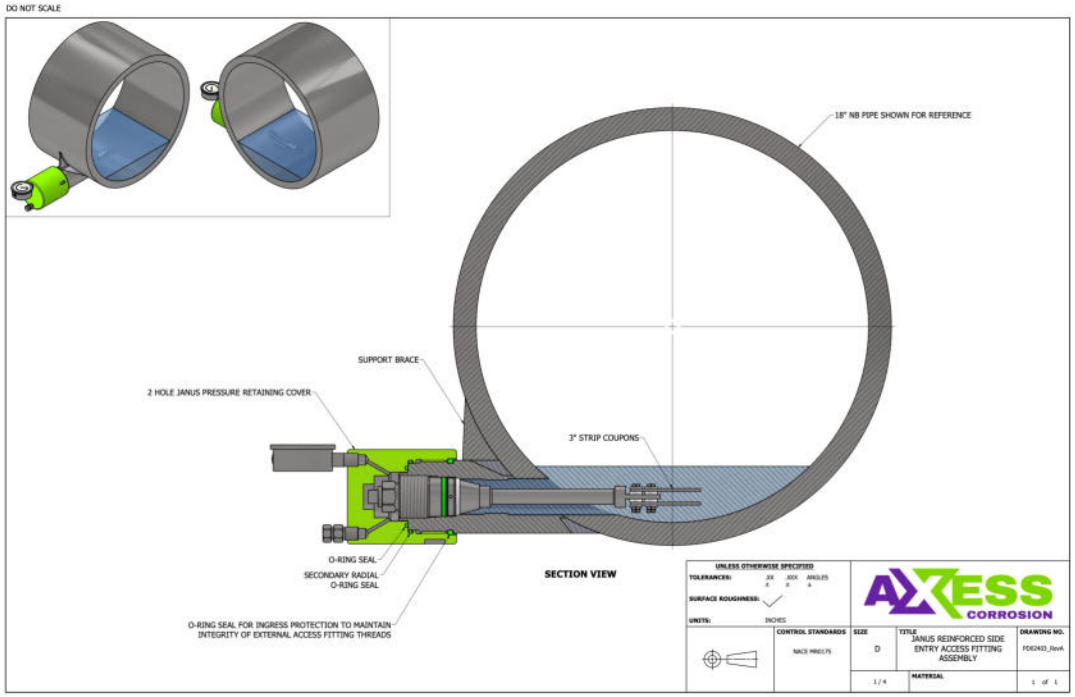
Tee trap arrangements

- Introduces a dead-leg branch that's is then connected to access fittings or sample points
- Monitoring a stagnant fluid makes the corrosion rate very unreliable
- Frequent flushing is required
- Cannot be used as a tool for optimizing chemical treatment



Technology overview

- A fitting designed for bottom of the line (BoL) monitoring from a side of the line (SoL) entry point
- Does not have limitations with ground clearance
- Example – Monitor in bottom 10% of a 12” pipe



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Technology Overview

- Less likely to accumulate debris and choke up the equalization ports
- Can be welded using SMAW, hot-tapped and the ”cookie” retained
- The fitting is designed for tapping Hollow option is also available

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Parameter	Value	Comments
Fitting Size	1" and 2" Mechanical and Hydraulic	
Maximum Operating Pressure	6,000 psi	10,000 psi available dependent on materials but online retrieving up to 6,000 psi
Maximum Pipe Size	60"	Incline can be adjusted
Minimum Pipe Size	4"	Incline can be adjusted
Maximum Operating Temperature	450°F / 232°C	Dependent on seal materials selected
Minimum Operating Temperature	-70°F / -56°C	Dependent on seal materials selected
Monitoring / Injection / Sampling Devices	All retrievable monitoring or injection and sampling devices (ER/LPR probes, Corrosion Coupons, Quills, Nozzles etc.)	Pitch and adjust flush holder in final stages of development for flush monitoring, enabling pigging operations etc. Potential for this design to be added to ER probes in future.

Lower Pressure System Installed Through Permanent Isolation

- All threads and nuts can be cumbersome to install and remove, resulting in technicians not installing the safety clamps
- Chains are commonly supplied but these have been known to erode and fall off
- Chains also introduce pinch point risk when retractors are not used (below 150psi)
- Quick release grips allow for easy installation and do not have to be removed