



Pipeline leak Regulation consequences French case CONCAWE COPEX 2022

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I - REX PLIF leak in 2019

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• Pollution of 4 ha of field and 4 watercourses,

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piezos installed in the field, Water table OK.

REX PLIF leak in 2019 (2/2)



The rupture of the PLIF results from the progressive development of a **Near Neutral pH Stress Corrosion Cracking** (NNpHSCC).





- Slight detachment of the coating at the Longitudinal weld
- Shield effect blocking the cathodic protection
- Creation of a slightly acidic electrolyte (pH 6 to 8,5)
- Corrosion by pitting or craters then cracking in bottom
- Mechanism assisted by pressure cycling



Figure 3: Main steps of the NN-pH-SCC mechanism (8).

Preliminary Stage: Development of initiation conditions or Medium incubation



II - Budgetary impact of a pipeline leak

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Budgetary impact of a pipeline leak

A pipeline leak generates immediate and induced budgetary impacts.

Immediate costs

- Emergency response
- Clearance
- Repair & environmental restoration
- Loss of operations and results
- Dedicated regulatory obligations to restart



Crude oil pipeline leak – south of France in 2009



Induced costs

- increased research and defect analysis
- Compensation and business interruption for third parties
- Increased insurance premium
- Legal costs
- Compensation following legal decision

But ...

Regulation impacts after a pipeline Leak

- One of the overlooked post-leak impacts concerns new regulatory obligations
- Obligations to be applied by the pipeline operator concerned
- Obligations of new regulation due to the regulator consider that there is a shortfall
- In France, over the last 15 years, pipeline regulations have undergone more than 4 changes
- Par of the evolutions concern risk of crack and SCC defects
- One of the Main changes is also to cover all types of degradation in focusing on ILI technologies and reducing the periodicity between 2 runs.





Leak detection system



III - Challenge to apply the new pipeline regulation in France

Challenges to apply the new pipeline regulation in France



- the improvement of crack tools accuracy for early detection of cracks and SCC especially near welds, spiral welds, in dents, in roof effect,
- the development of new technologies for crack detection without coupling for Gas line
- the best frequency of ILI inspection taking in account the accuracy of the tools
- the run comparison for crack defects
- the analysis of circumferential defect: assessment according to the loading mode
- the records (cycling) and the residual fatigue life analysis, according to design factor DF must be done to prove that degradation modes cannot occur – methods defined in "Exclusion Guide" (DF>0,4 for Welded pipe and DF>0,6 Seamless)
- The correlation between ILI and other NDT's
- The best frequency between two PIG runs
- The level of accuracy for leak detection



Thank you