



VAIL-Pipeline

Pipeline Integrity Management System For onshore and offshore installation

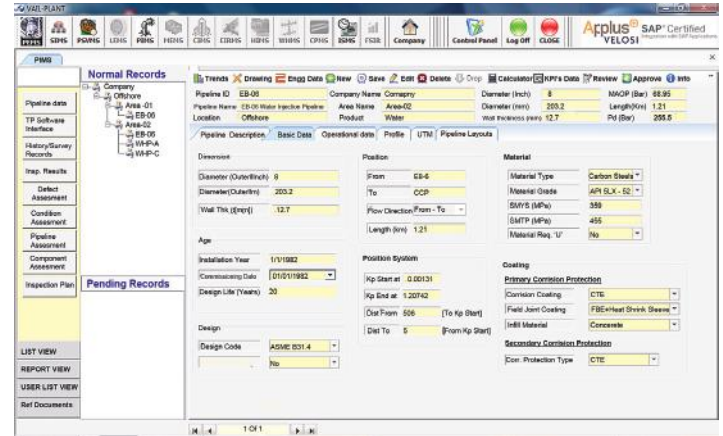
Pipeline Integrity Management

Pipelines are subject to regular statutory inspections, verifications and re-certifications just as often as facilities containing and transporting hazardous products and pressure equipment are. Until recently, such requirements were enforced and it was regulated that pressure testing of oil pipelines should occur every ten years.

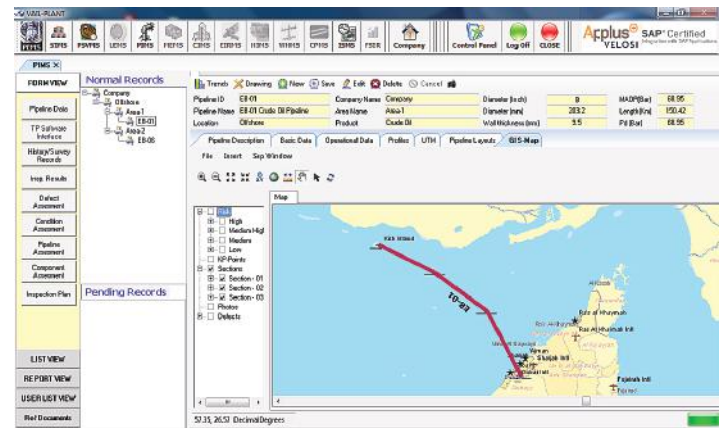
Operators are now asked to have a comprehensive integrated Pipeline Integrity Management (PIM) system in place. One which is more than just an inspection and maintenance program but a management system including engineering, operation, inspection, maintenance, HSE and corporate communications as key components of the system.

WHY VAIL-Pipeline

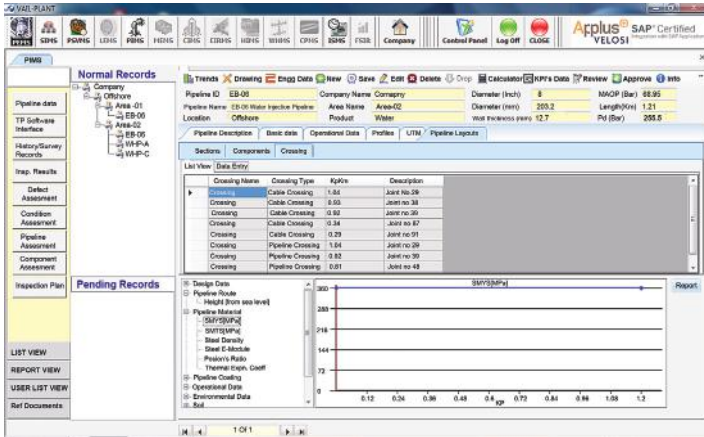
- VELOSI brings a wealth of experience in many integrity management related fields such as HSE, system certification, risk assessment, fitness for services evaluation, risk based inspection and maintenance
- VELOSI amalgamates all the necessary skills, expertise and operational support locally in a variety of geographic regions to offer the best PIMs available in the market to clients worldwide
- It is amongst the best available solutions for Pipeline Integrity Management that facilitates for both onshore and offshore pipelines
- A highly user friendly inspection management tool
- Optimum inspection periods are formally obtained based on an implicit time dimension of risk.



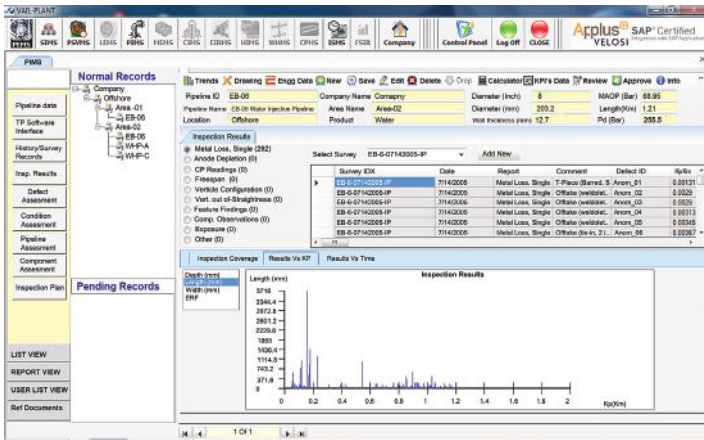
VAIL-Pipeline Main screen view



VAIL-Pipeline's new GIS feature



Pipeline Crossing



Inspection results Vs KP

Benefits and Features

The main benefits and features of VAIL-Pipeline can be summarized as follow:

- Implements company specific inspection strategies and best practices
- Reduces risk for non-planned shut downs
- Increases reliability and availability
- Provides the management with an aggregated overview of asset integrity
- Scalable to meet company specific work processes and asset portfolio
- Common storage for all life cycle data
- Benchmarking internally or against external best practices.

Key features

The major functional modules of VAIL-Pipeline include:

- Data management
- Analysis tools and code checks
- Risk assessments
- Planning and inspection management
- Built-in library of form such as corrosion mapping, SSC
- Dialog based input forms, DCVG and CIP information recording, SSC and MIC information recording,
- Coating fault information
- Metal loss assessment
- Soil receptivity and pH values
- Event log
- Surveys and inspection results,
- Defect assessment and condition assessment
- Short term and long term inspection planning
- Dynamic reporting features
- Key support functions include - document management, integration interfaces and a project execution environment.

Data Management

VAIL-Pipeline is based on the PODS (Pipeline Open Data Standard) data model with an offshore extension to cater for offshore objects like risers and subsea templates. The database is protected by a security system and role-based access restrictions on pipelines and groups of pipelines ensuring integrity of information.

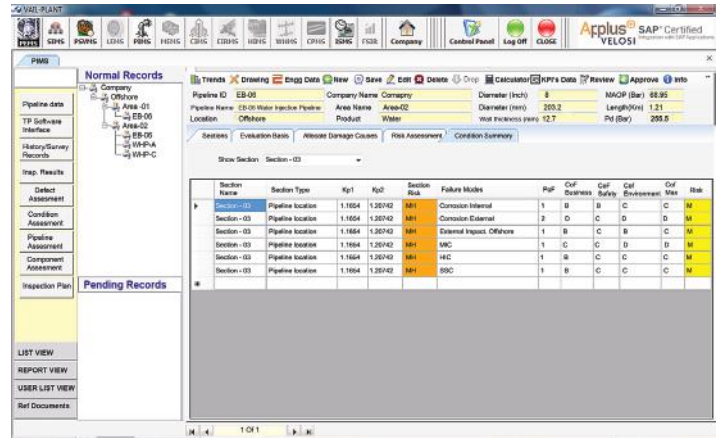
A specifically powerful capability in VAIL-Pipeline is the dynamic segmentation of pipelines associated with varying profiles such as location classes, pipeline sections and other specific user definition. The dynamic segmentation function is essential to the effectiveness and flexibility of the system.

Analysis tools and code checks

VAIL-Pipeline includes a pressure containment function for analysis of a pipelines' ability to withstand bursting due to pressure conditions along the pipeline. The pressure containment also includes a calculator for simulating design and operational parameters. The Metal Loss function includes multiple code checks for MAOP (Maximum Allowable Operating Pressure) and ERF (Estimated Repair Factor) as well as ballistic calculations for the projected metal loss condition based on various input profiles for predicted corrosion levels.

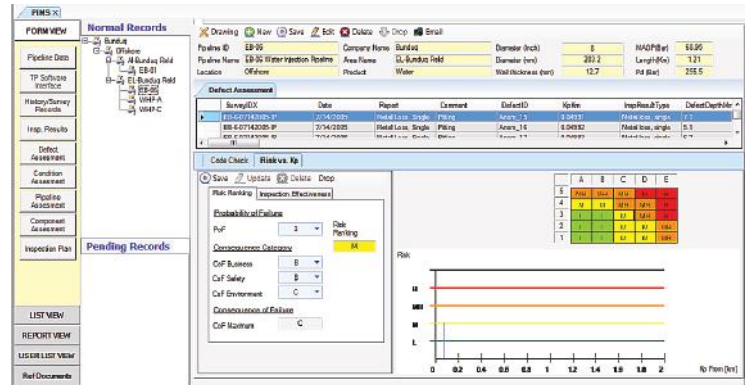
The integrity of the pipeline with corrosion defects, internal or external can be evaluated based on commonly used codes (guidelines):

- DNV-RP-F101, Part A and B
- ASME B31G
- RSTRENG (0.85 dl)
(not to be confused with RSTRENG FE-approach)
- Shell '92
- PCORRC
- BS 7910.



Condition Summary - Pipeline Location

An example with typical spread in results is shown in the illustration below. It is also possible to do sensitivity studies on MAOP, sizing accuracy and applied safety factors without changing the primary inspection/input data.



Risk Vs KP - Risk Ranking

Risk assessments

VAIL-Pipeline supports the semi-qualitative risk assessment methodology and provides selected quantitative risk assessment functions to qualify and document interpretations on the PoF scoring and resulting risk levels. Threats, CoF (Consequence of Failure) and PoF (Probability of Failure) can be based on various segmentation principles, such as pipeline sections, location and safety class, and the entire pipeline. It can also be refined and where need be adjusted by the pipeline engineer. The resulting risk will be displayed along the pipeline for each projected year. The risk assessment for components and critical areas (hotspots) can be performed in both an overview and detailed mode.

Long Term Inspection Planning and Management

The inspection planning module provides the engineer with functions to define inspections targeted for the entire pipeline or some selected sections. The long-term inspection plan is calculated from a combination of the risk assessment results and the prescribed inspection intervals.

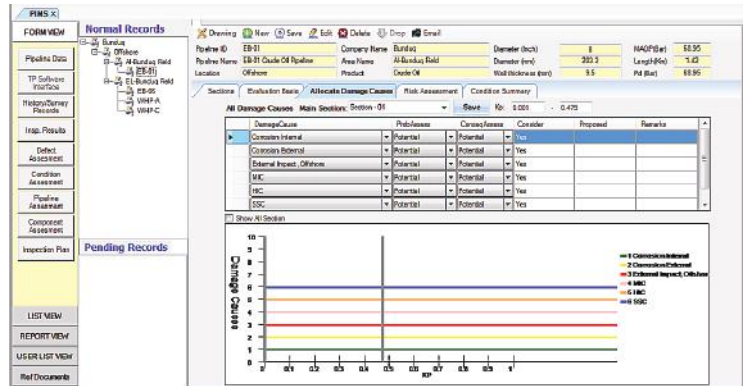
External Corrosion Direct Assessment (ECDA)

VAIL-Pipeline covers the following ECDA surveys with regards to inspection management.

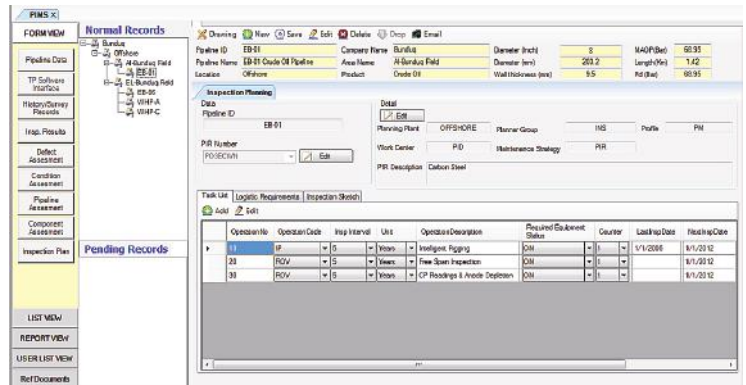
- Soil resistivity analysis
- Structure to soil analysis
- DCVG survey
- Pearson coating survey
- CIP (Close Interval Potential) survey
- Pipe to soil potential survey
- C-Scan current attenuation
- Pipeline current mapper.

Reporting features

- Pipeline data
- Survey and inspection results
- Defect assessment (with sub reports)
- Portfolio assessment (with sub reports)
- Pipeline assessment
- Condition evaluation summary
- Inspection task planning
- Pipeline risk assessment.



Allocation of Damage Causes



Inspection Planning - Task List