Engineering For A Safer World

VAIL-Plant

ASSET INTEGRITY MANAGEMENT SOFTWARE

VELOSI

CONTENTS

VAIL-PLANT

ASSET INTEGRITY MANAGEMENT SOFTWARE

VAIL-Plant is a leading fully certified (API 580 and ASME B31.8S) Asset Integrity Software Solution specifically designed for Oil & Gas, Power and Petrochemical industries which facilitates inspection and maintenance management cycles by using RBI, RCM, SIL and FMECA approaches. VAIL-Plant is an effective asset management tool that contributes to ensure the company's assets health and performance by enabling the plant operators to improve overall control of their asset condition by optimizing inspection, asset monitoring and linking to their maintenance systems.

VAIL-Plant helps maintain history and records, evaluates asset conditions, identifies highest risk assets, prevents plants from damage and corrosion, prioritizes and manages the efforts of an inspection program and calculates the man-hour resource planning.

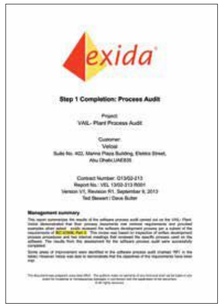
VAIL-Plant Certifications

VAIL-Plant Software has been certified to meet the requirement of Industry Standards API 580, ASME B31.8S and IEC61508 Software Development requirement that ensures the integrity of Software. VAIL-Plant is also SAP-certified for Integration with SAP ERP System.


Certificate / Certificat
Zertifikat / 合格証
VEL 1512081 C001
VAIL-Plant PFSRS, PSRS/ON, PSRS/OFF Modules
(RBI Function)
Velosi Asset Integrity Ltd.
Abu Dhabi, UAE835
API 580:2016


Certificate / Certificat
Zertifikat / 合格証
VEL 1606095 C001
VAIL-Plant PSRS/ON, PSRS/OFF Modules,
Including offline GIS function
Velosi Asset Integrity Ltd.
Abu Dhabi, UAE835
ASME B31.8S:2012


Certificate
SAP INTEGRATION CERTIFICATION
SAP SE hereby confirms that the interface software for the product **VAIL-Plant 10.10** of the company **Velosi Asset Integrity Ltd** has been certified for integration with SAP Enterprise Resource Planning **based on an ICC Integration Architecture.**
This certificate confirms the technical compliance of **VAIL-Plant 10.10** with SAP certification procedures.
The certification test is documented in report no. **12871** and expires on **April 3, 2022.**
SAP Test System: SAP ERP 6.0 EHP 5
Certified Functions:
Read Functional Location Details from SAP
Read Equipment Details from SAP
Unicode Communication supported
Integration with SAP Enterprise Resource Planning
Christoph Claus
Walldorf, April 3, 2019
SAP Certified
THE BEST IN IM


exida
Step 1 Completion: Process Audit
Project:
VAIL- Plant Process Audit
Customer:
Velosi
Suite No. 402, Marina Plaza Building, Elektra Street,
Abu Dhabi,UAE835
Contact Number: 01/SQ-213
Report No.: VEL 13/02-213 R001
Version V1, Revision R1, September 9, 2013
Test Steward / Dave Butler
Management summary

API 580: 2016
Risk Based Inspection process compliance

ASME B31.8S : 2012
Compliance with ASME B31.8S & Geographical Information System (GIS)

VAIL-Plant SAP Integration:
VAIL-Plant is certified to be integrated with SAP PM-PCS for ECC5.0/ ECC6.0

IEC 61508:
Software Development Process Certification

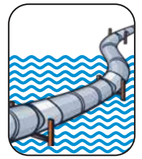
VAIL-PLANT DASHBOARD

VAIL-PLANT MODULES

Asset Performance Management System

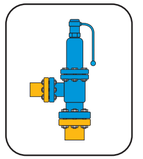
Pressurized Equipment Management System

Pipeline Integrity Management System Onshore



Pipeline Integrity Management System Offshore

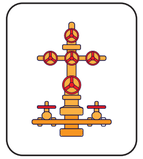
Electrical, Instrumental & Rotary Management System



Pressure Safety Valve & Relief Valve Management System

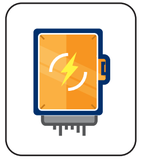
Structure Integrity Management System

Lifting Equipment Management System



Well Integrity Management System

Civil Integrity Management System



Cathodic Protection Management System

Hull Integrity Management System

Flexible Pipeline Integrity Management System

Inspection Scheduling Management System

Computerized Maintenance Management System

Enterprise Resource Planning Interface

Control Panel

VAIL-PLANT ASSET INTEGRITY MANAGEMENT SOFTWARE

Touch Points:

Modular Approach – different modules specific to user requirements.

Hierarchy Recording and Management

Asset Performance Management – Graphical Dashboard overview.

Equipment Condition Monitoring

Covers a wide range of equipment types i.e. Pressure Vessels, Columns, Drums, Process Piping, Steel Structures, Pipelines, Lifting Equipment, Electrical Systems, Instrumentation/Control Systems, Rotating Equipment, Hull/FPSO, Wellheads, Cathodic Protection, etc.

Root Cause Analysis to handle the analysis of different types of failures.

Equipment Inspection, Maintenance, Failure, Replacement History management.

Identification and Evaluation of Integrity KPIs (Inspection and Maintenance).

Risk Matrix Configuration.

Facilitates the process of Risk Based Inspection, Reliability Centered Maintenance, Failure Mode Effects and Criticality Analysis, Safety Integrity Levels and Safety Relieve Management.

VAIL-PLANT ESSENTIALS

Following features of VAIL-Plant application are available for each module:

Inspection Maintenance

- Workflow configuration for Inspections.
- Customizable inspection / maintenance business process.
- Inspection management with identified user roles.

Integration

- ERP Integration with SAP, MAXIMO, Infor EAM, Oracle ERP, EPICOR ERP etc.
- Integrated with Arc GIS to display Geographical Data.
- Interface with Inspection Data logger, Outlook, AutoCAD, Third party RBI software and Active Directory.

Reporting

- Reporting Trends (Risk Levels, Leaks, Failures, Remnant Life, Corrosion Rates, Replacements, etc.)
- Standard Reporting,
- Ad-hoc Reporting.
- User list View with Graphical Representation

Search and Custom Query

- Flexible Form Based search functionality with full text and wild card Search.
- Custom Query functionality with user defined criteria on an ad-hoc basis.

Document Interface

- Reference Libraries (P&ID's, PFD's, Sketches, SOP's, Manuals, Isometrics, etc.)
- Interface with Document Controllers (SharePoint, Envision, OMNIDOCs, etc.)
- Drawings Management (Sample Sketch, Isometrics, GA Drawings, PFD Drawings, etc.)

Data Reliability

- Overall Management Dashboards
- Bulk Loading
- Data Importing/Exporting Templates
- Data Security, Role-based Security

RBI ASSESSMENT PROCESS

1. Collection of Engineering Data for each component.
2. Allocate Damage Mechanisms for every component.
3. Assessment of Probability of Failure (PoF) based on questionnaire specific to each damage mechanism.
4. Assessment of Consequence of Failure (CoF) based on questionnaire for each of the consequence categories: Business, Safety, Reputation, and Environment.

5. Assessment of Risk for each component by looking up the PoF and maximum CoF on the Risk Matrix.
6. Assignment of Inspection Effectiveness score and rating to each component based on a questionnaire.
7. Calculation of Next Inspection Date from Equipment Risk, Inspection Effectiveness, Historical Corrosion Rates, and the remnant life.

VAIL-Plant modules covering RBI Assessment Process:

- Pressurized Equipment Management System (PEMS)
- Pipeline Integrity Management System Onshore (PIMSON)
- Pipeline Integrity Management System Offshore (PIMSOFF)
- Civil Integrity Management System (CIMS)
- Hull Integrity Management System (HIMS)
- Structure Integrity Management System (SIMS)

FMECA ASSESSMENT PROCESS

1. Collection of Engineering Data for each component.
2. Allocate Failure Modes for every joint.
3. Assessment Probability of Failure (PoF) to shortlist the failure modes to be considered in the FMECA ability and consequence assessment is carried out.
4. Every failure mode is analyzed with respect to its effects and consequences. Subsequently, it is assigned Problem code, damage code, PMR and recommendations are given.

5. Every failure mode is assigned a Probability of Failure(PoF).
6. Every failure mode is assigned a consequence value for safety, business, environment, and capital aspects. Subsequently, it is assigned a maximum Consequence of Failure (CoF).
7. A Risk Rank is calculated for each failure mode and subsequently for the equipment.

VAIL-Plant modules covering FMECA Assessment Process:

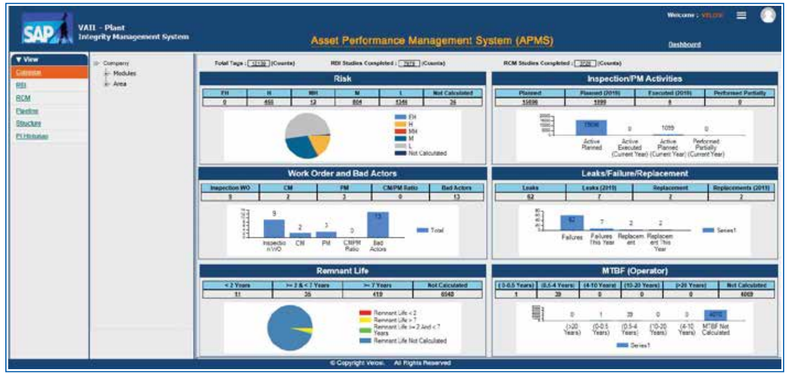
- Pressure Safety Valve & Relief Valve Management System (PSVMS)
- Electrical, Instrumental and Rotary Management System (EIRMS)
- Well Integrity Management System (WIMS)
- Lifting Equipment Management System (LEMS)
- Cathodic Protection Management System (CPMS)
- Flexible Pipeline Integrity Management System (FPIMS)

ASSET PERFORMANCE MANAGEMENT SYSTEM (APMS)

VAIL-Plant APMS module is an operator's single window specifically designed to equip oil and gas organizations to monitor the overall status of System Integrity parameters such as Remnant Life, Inspection Activities, Leaks/ Failures, Risk Ranking, Corrosion Rate, and Replacements via the dashboard. It allows the operator to perform extensive filtering to preview the desired output in form of graphs and reports for data analysis.

Module contains following main features:

- Single dashboard for RBI, RCM, Pipeline, Structure and Process Information Historian studies.
- View overall status of VAIL-Plant modules individually and altogether.
- Filter out the graphs with respect to the area and modules on the navigation tree.
- User defined graphical charts and data.
- View Total Tag Counts, Total number of completed RBI studies and Total number of completed FMECA studies on the screen.
- View the relevant details of the metric by clicking any graph or reported figure.
- Redirect to the modules to view the particular metric details.

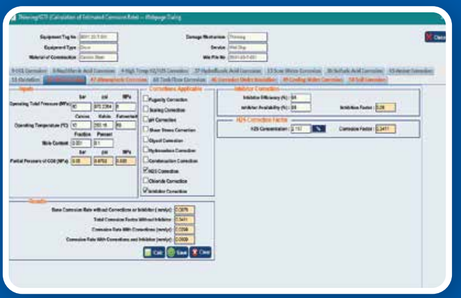


PRESSURIZED EQUIPMENT MANAGEMENT SYSTEM (PEMS)

VAIL-Plant PEMS module contains a comprehensive database for Piping and Pressurized Equipment such as Vessels, Tanks, Heat Exchangers, etc. It covers complete Risk Assessment Process and Facilitates Inspection Planning to predict the asset remaining life and next inspection date.

Module contains following main features:

- Engineering data capturing along with Hierarchy Management and capturing of Drawings, Isometrics, PFD's and P&ID's.
- Inspection History Recording with respect to multiple positions and TML's.
- Semi quantitative RBI methodology for risk evaluation and inspection planning against identified damage mechanisms compliance with API 580.
- Estimated Corrosion Rate Models based on API 581.
- Failure and replacement history recording.
- KPI's identifications & calculation/ evaluations.
- Short/Long Term Corrosion Rate and Remnant Life Calculations.
- Plant Inspection Requirements (PIR's) generation.
- Root Cause Analysis (RCA) against failures.
- Time, Cost & Resources (CTR) Management.
- Data importing from excel workspace templates.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

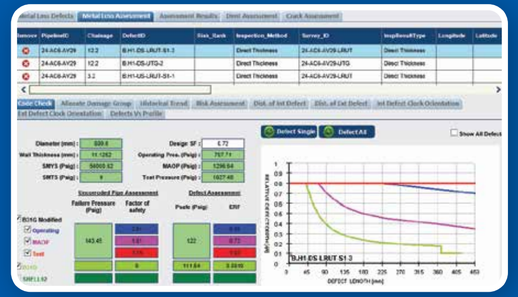


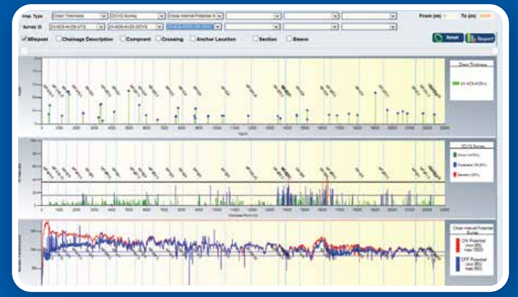
PIPELINE INTEGRITY MANAGEMENT SYSTEM ONSHORE AND OFFSHORE (PIMS)

VAIL-Plant PIMS modules for Onshore and Offshore pipeline is capable of managing and monitoring semi-qualitative Risk Assessment and Inspection planning for pipelines. Based on API 580, this module can be integrated with GIS to display data on geographical maps (e.g. pipeline route, equipment location, pipeline sections, etc).

Module contains following main features:

- Pipeline Profile Recording & Plotting.
- Probability of Failure (PoF) calculation and plotting along the pipeline (PoF Vs TIME) against applicable damage mechanism.
- Consequence of Failure (CoF) calculation against applicable damage mechanism.
- Risk Assessment against Stress Corrosion Cracking (SCC).
- External and Internal Corrosion Direct Assessment (ECDA & ICDA).
- Risk Assessment against third party damages.
- Corrosion calculation (NORSOK M-506).
- Scheduling of Integrity Management and Inspection.
- Defect Assessment based on B31.G, Modified B31.G & Shell 92.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.



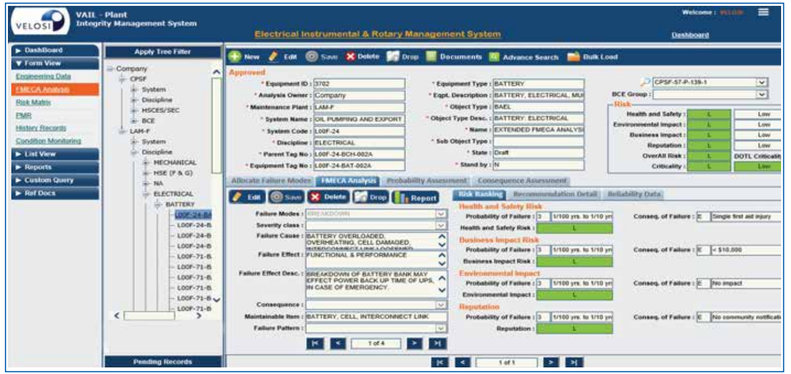


ELECTRICAL, INSTRUMENT AND ROTARY MANAGEMENT SYSTEM (EIRMS)

VAIL-Plant EIRMS module facilitates Reliability Centered Maintenance (RCM) and is capable of maintaining and organizing maintenance records and details of equipment such as Engine, Generators, Transmitter and Pressure Gauge etc.

Module contains following main features:

- Mean Time Between Failures (MTBF) and Mean Time To Repair (MTTR) calculations.
- Failure Mode, Effect and Criticality Analysis and their Criticality Matrix.
- Reliability Operator and Reliability Generic Data Recording.
- Hierarchy Recording and Management.
- Design / Operational Data Capturing.
- Functional Data Recording.
- Plant Maintenance Routines (PMR) generation.
- Work Order and Work Packs Generation.
- Inspection History Recording.
- Maintenance History Recording.
- Failures and Replacements Recording.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

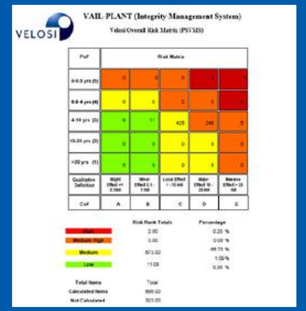


PRESSURE SAFETY VALVE MANAGEMENT SYSTEM (PSVMS)

VAIL-Plant PSVMS module is based on API 576 technology. It facilitates FMECA Assessment of different PSVs/ PRVs and is capable of maintaining and organizing Maintenance records, Datasheets, Drawings, Specification and Inspection Plan of Safety Relief Devices.

Module contains following main features:

- Integrity Management Dashboard to view overall Inspection Status for all the assets.
- Structural Hierarchy Management.
- Design Engineering Data Management.
- RBI Analysis for PSV's.
- Identification of Failure Mode.
- Failure Modes Effects Criticality Assessment.
  - Failure Mode.
  - Failure Effects.
  - Development of Risk Matrix for Safety, Environment and Economy.
  - Influencing factors/ causes/ maintainable items.
  - Generic Failure Data.
- Risk Evaluation for each Identified Scenario.
- Inspection Planning and Risk Management.
- Determination of PoF & CoF.
- Inspection History Recording.
- Failure and Replacement History Recording.
- Cost, Time & Resource management.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.



STRUCTURE INTEGRITY MANAGEMENT SYSTEM (SIMS)

VAIL-Plant SIMS module facilitates the Risk Based Inspection and Inspection Planning of structures like Onshore and Offshore steel structures. It enables the operator to perform Risk Based Inspection and Inspection Planning of Structure.

Module contains following main features:

- Maintains the hierarchical tree to provide better understanding of the structure's components according to their levels.
- Complete history recording of previously done inspections.
- Plant Maintenance Routines and Logistics Requirements.
- Facility Information.
- RBI Assessment.
- FMEA Analysis.
- Inspection Management.
- Inspection Flow Management.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

LIFTING EQUIPMENT MANAGEMENT SYSTEM (LEMS)

VAIL-Plant LEMS module has been developed to inspect the status of Lifting Equipment e.g. Crane, Clamps, Forklifts, Hoists etc. in Oil and Gas Industry. It provides a lifting gear inspection checklist thus making it easier for the operator to carry out lifting equipment testing.

Module contains following main features:

- Organization of a systematic hierarchy using two approaches – Plant wise as well as Discipline wise.
- Maintenance of reliability model to estimate the failure frequency and trends of lifting equipment.
- Assessment of equipment Operator historical data/ Generic reliability data.
- FMECA Assessment which focuses on:
  - Primary and Secondary Functions
  - Total or Partials Functional Failures
  - Failure Modes.
  - Failure Effects.
  - Failure Characteristic (age or not age related failures).
  - Failure Classification (Hidden or evident).
  - Influencing Factors (root causes).
  - Failure Criticality on Safety, Environment, Production and Capital.
- Operator Historical Data vs Generic Reliability Data comparison.
- Generation of PMR (Preventive Maintenance Routines).
- Production of maintenance & inspection recommendations to reduce the possibility of occurrence.
- Comprehensive checklists for most types of lifting equipment to facilitate Inspections.
- History Maintenance and calculation of MTBF & MTTR based on failures and replacements.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

WELL INTEGRITY MANAGEMENT SYSTEM (WIMS)

VAIL-Plant WIMS module equips the organizations with the facility to manage the risk of loss of good containment over the well lifecycle. It enables the operator to perform FMECA Analysis and Inspection Planning of various wellhead equipment.

Module contains following main features:

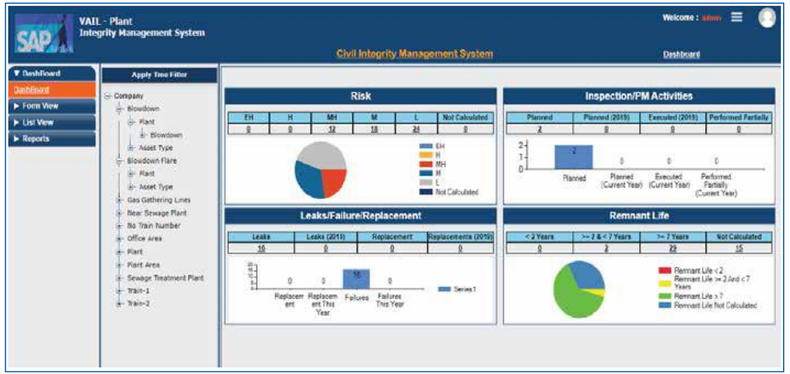
- Hierarchy Recording and Management.
- Design / Operational Data Capturing.
- Functional Data Recording.
- Reliability Operator and Reliability Generic data Recording.
- Failure Mode and Effect Analysis based on equipment type.
- Failure Mode, Effect and Criticality Analysis and their Criticality Matrix.
- Plant Maintenance Routines (PIR) generation.
- Work Order and Work Packs Generation.
- Inspection History Recording.
- KPI Calculator.
- Maintenance History Recording.
- Failures and Replacements Recording.
- Mean Time between Failures (MTBF) and Mean Time to Repair (MTTR) calculation.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

CIVIL INTEGRITY MANAGEMENT SYSTEM (CIMS)

VAIL-Plant CIMS module is dedicated for assessment and inspection management of civil natures like Concrete Structures, Pipe Sleeper, Flare, Water Well, Fencing, Culvert, Foundations, Roads & Paving, Buildings and Pipe Track Foundation, etc.

Module contains following main features:

- Engineering and layout information of all civil nature.
- Maintains the hierarchical tree to provide better understanding of the civils' components according to their levels.
- Defect Assessment, Risk Ranking and recommended repairs.
- Calculation of total defected area, estimated man days & their cost and overall cost for the recommended repairs.
- Inspection Planning & logistics requirements.
- Complete history recording of previously done inspections.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

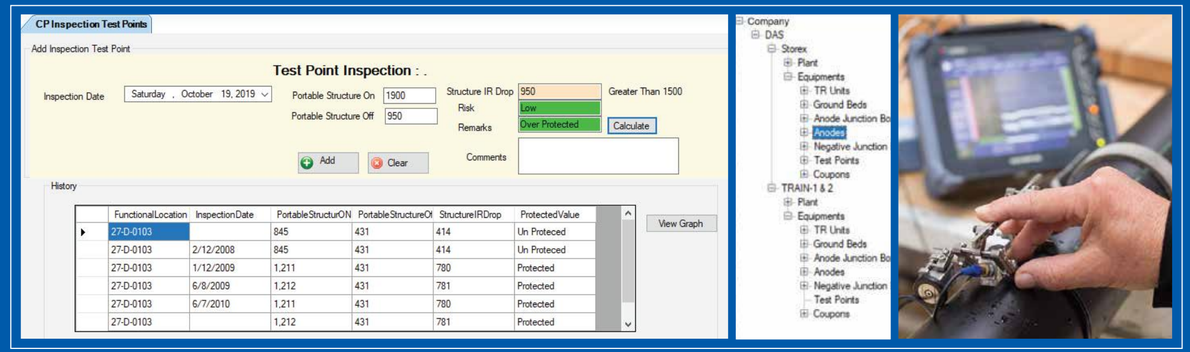


CATHODIC PROTECTION MANAGEMENT SYSTEM (CPMS)

VAIL-Plant CPMS module, maintains the Engineering Data and allows the operator to perform Risk Assessment and Inspection Management for different types of CP equipment such as Transformer-Rectifiers, Ground Beds, Anode Junction Boxes, Test Points, and Coupons, etc.

Module contains following main features:

- Inspection and Maintenance history recording.
- Hierarchy recording and management by Equipment type as well as Plant Number.
- Capturing Design, Operational and Functional data based on Equipment type.
- Failure mode, effect and criticality analysis and their criticality matrix.
- Plant Maintenance Routines (PMR) generation.
- Capturing Test and Monitoring data based on Equipment type.
- Graphical trending of parameters such as efficiency level.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

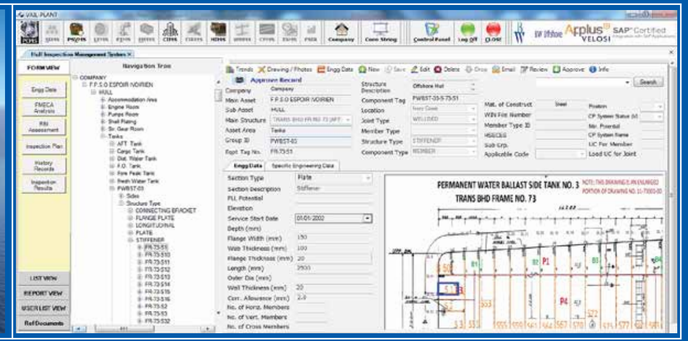


HULL INTEGRITY MANAGEMENT SYSTEM (HIMS)

VAIL-Plant HIMS module provides a rationalized approach to perform inspections of Hull structure and identifies the general and critical area for inspection activities.

Module contains following main features:

- Six inspection criteria (Coating Condition, General Condition, Pitting/Grooving, Deformation Fractures and Cleanliness) have been identified for each compartment & these are inspected for each zone.
- Compartments are divided into zones for inspection and grading of inspection criteria.
- Identification of Critical structural areas for a compartment/zone based on engineering analysis and in-service experience.
- The inspection criteria are graded with a score (rating) from 0 to 5. The scores are added for each zone and rolled up to get a normalized score for the compartment.
- Capability to identify the general inspection activities and inspection activities for critical areas.
- Damage Mechanisms Identification for each zone & Risk Evaluation.
- Inspection, Maintenance, Replacements, and Failure History Recording.
- Hull Inspection Routines (Inspection Packs) definition and execution.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

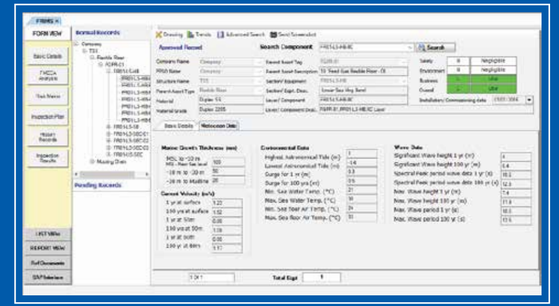


FLEXIBLE PIPELINE INTEGRITY MANAGEMENT SYSTEM (FPIMS)

VAIL-Plant FPIMS module allows to specifically to manage and process information regarding flexible pipeline's risk assessment and inspection planning. This module helps to assess the integrity of the pipeline and its immediate threats.

Module contains following main features:

- Identification of Degradation Mechanisms with reference to API 17B for exhaustive list of failure modes and possible defects for flexible risers.
- Division of Flexible Pipeline into subsystems and degradation loops.
- Probability of failure and consequences for each equipment.
- Evaluation of the impact of changes in process conditions and materials on installation risk and inspection program.
- Risk Analysis for each degradation mechanism.
- Determination of Confidence Grading.
- Development of detailed inspection plan.
- Risk Analysis of Flexible Pipeline.
- Drawings Management.
- Graphical Trends.
- Effective Reporting.
- Custom Query.

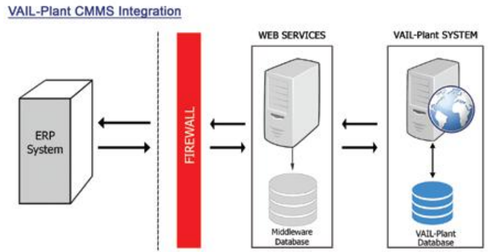


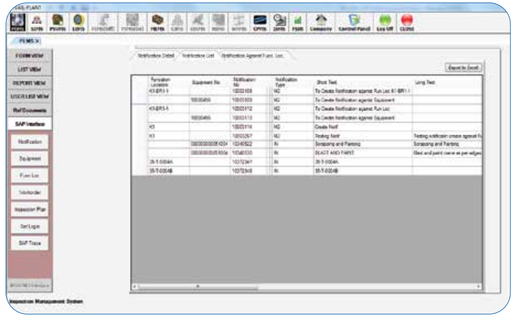
ENTERPRISE RESOURCE PLANNING INTERFACE (ERPI)

VAIL-Plant ERPI module allows the organizations to interface with other ERP software systems that they use to manage their business. VAIL-Plant CMMS System provides an interface to link with external applications very easily allowing the operator to exchange data , update and share information.

Module contains following main features:

- VAIL-Plant can be fully integrated with ERP software such as Oracle, SAP, InforEAM and MAXIMO.
- VAIL-Plant has been certified for integration with SAP ECC 6.0 based on ICC integration assessment in SAP PLM.
- VAIL-Plant can be integrated with Document Management System to exchange data.
- VAIL-Plant can be integrated with any third party RBI software to compare RBI results.
- VAIL-Plant Pipelines is integrated with Arc GIS and has the capability to display geographical data.
- VAIL-Plant has the capability to be integrated with Inspection Data logger: ULTRASONIC THICKNESS GAUGE (38DL PLUS).
- VAIL-Plant supports full integration to MS Office - Excel, Word Export/Import, and PDF Documents.



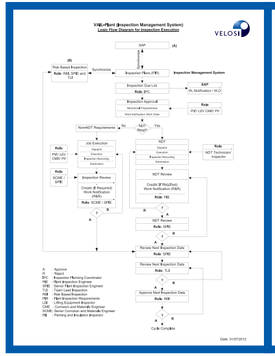


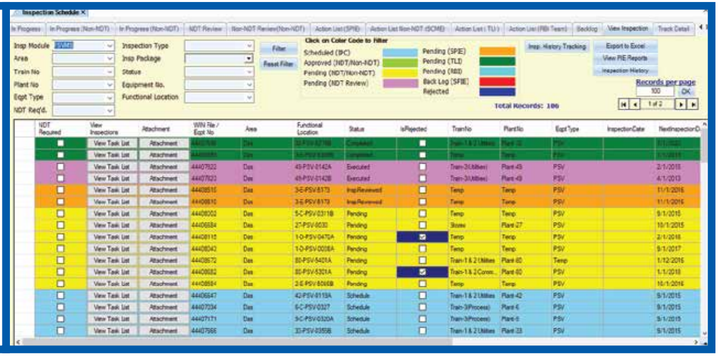
INSPECTION SCHEDULING MANAGEMENT SYSTEM (ISMS)

VAIL-Plant ISMS module coordinates with other VAIL-Plant modules to facilitate their Inspection planning and recordings. With ISMS, operator can schedule and execute inspection schedules generated while documenting the inspections to create work orders.

Module contains following main features:

- Capable to manage inspection activities for all types of assets/ equipment (tags). The system allows performing inspections on groups of tags, platforms and corrosion loops.
- Allows users to plan, schedule and execute PIR's. It automatically extracts inspection plans from CMMS such as SAP.
- Allows users to create work scopes, work packages for execution of PIR on a tag or a set of tags (package like boilers, pipe). Drawings, documents, specifications, previous history schedule date, previous readings, previous anomalies, etc. summarized in one document.
- Allows Reviewers and Approvers to enter remarks and comments and preserves the history of these remarks.
- Allows monitoring process of the PIR Plan.
- Bulk data importing from excel workspace templates for fast data feeding.
- Role based access, audit trails, data security and integrity.
- Comprehensive configuration ability to allow users to configure the system to adapt it to organizations' processes.
- Color coding to have a one-look summary of the status of inspections.



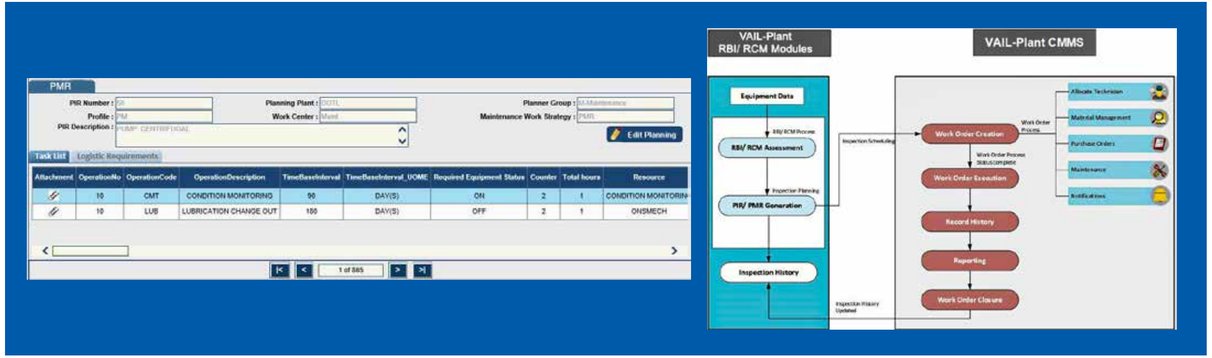


COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM (CMMS)

VAIL-Plant CMMS module addresses the work order creation and the preventive and corrective measure of tag along with its maintenance until inspection maintenance closeout. Using VAIL-Plant CMMS, it gets easier for operators to track work activities, parts usage, and asset lifecycle.

Module contains following main features:

- Improved planning and scheduling.
- Allows operator to plan, manage, schedule maintenance, and approve requests and work orders and continue to the next step.
- Proper Preventive Maintenance reduces equipment downtime.
- Protects and extends life of assets.
- Helps operations and maintenance staff be more productive.
- Maintaining asset/equipment inventory.
- Scheduling of “preventive” maintenance through a formal service and WO process.
- Tracking of “unscheduled” repairs.
- Tracking the cost of labour and materials.
- Managing parts and materials inventory.
- Budgeting for equipment maintenance and repair.
- Recording the equipment history from installation to replacement.



VAIL-PLANT

CASE STUDIES

CASE STUDY
INSPECTION MANAGEMENT SYSTEM

Client: ADNOC LNG
Location: Abu Dhabi, UAE
Region: Middle East

SERVICE(S):

Software Services

OBJECTIVE:

ADNOC LNG intends to appoint a contractor to supply a customized Inspection Management System software package, assist the user department to migrate and clean up the existing inspection and other relevant data, train the user department on administering the system, installation of the system and provide post implementation maintenance and support of the system.

SCOPE OF WORK:

The services included, but not limited to, the followings;

- Supply an off-the-shelf software package for the Inspection Management System.
- Customization of the software package to meet the user requirements.
- Assist users to clean up and migrate the existing inspection and other relevant data.
- Train the users in using/administering the system.
- Provision of services for installation of the system.
- Post implementation maintenance and support of the system.
- Documentation

DELIVERABLES

Velosi successfully submitted the following deliverables:

- VAIL-Plant Inspection Management System following seven (07) modules:
  - Pressurized Equipment Management System (PEMS).
  - Pressure Safety Valves Management System (PSVMS).
  - Structure Inspection Management System (SIMS).
  - Lifting Equipment Management System (LEMS).
  - Miscellaneous Equipment Management System (MEMS).
  - Cathodic Protection Management System (CPMS).
  - Inspection Scheduling Management System (ISMS).
- Hands on Training of VAIL-Plant Software.
- Annual Maintenance and Support.
- Submission of User and Admin Manuals.

CASE STUDY
RISK BASED INSPECTION PROGRAM DEVELOPMENT FOR PETRONAS FLNG 1 (L) LTD. TOPSIDE STRUCTURE AND HULL

Client: PETRONAS
Location: Malaysia
Region: Southeast Asia

SERVICE(S):

Implementation of FIMS (Facilities Integrity Management System)

OBJECTIVE:

Establish Risk Based Inspection (RBI) Program for Topside Structure Including Turret, Hull Structure Including Cargo Tanks, Mooring System and Flexible Riser by carrying out comprehensive risk analysis.

Integration of recommended RBI IRP with class survey requirement including endorsement/approval from current Class Society.

SCOPE OF WORK:

The scope of work for the Risk Based Inspection Program Development for Petronas FLNG 1 (L) LTD Topside structure and Hull Structure:

- Topside Structure Including Turret
- Hull Structure Including Cargo Tanks
- Mooring System
- Flexible Riser
- RBI Software

VAIL Plant Software: RBI Software Package for risk assessment and recording of RBI data including inspection plan with database which shall be valid throughout the FLNG1 design life.

DELIVERABLES

Risk Based Inspection Program:

- Comprehensive RBI Study for Topside Structure.
- Tag Marked Drawings for SIMS and HIMS.
- Failure Rate and Risk Allocation
- RBI Report with results and conclusions.
- Recommendation on additional safeguards and action(s) where required.
- Inspection plan comprising of inspection method, coverage and frequency.

VAIL Plant Software Modules:

- SIMS
  Structure Integrity Management System
- HIMS
  Hull Integrity Management System
- ISMS
  Inspection Scheduling Management System
- Integration of VAIL-Plant Software with SAP

Asset Count

Asset Description	Asset Count
Topside Structure	34 Modules
Hull	18 Tanks, foundations & platforms
Flexible Riser	1 Flexible Riser
Mooring Chain	12 Mooring Chains

CASE STUDY

RBI IMPLEMENTATION AND PROVISION OF SOFTWARE

Client: Groupement Berkine
Location: Algeria
Region: Africa

SERVICE(S):

Risk Based Inspection (RBI) FMECA Study Analysis Software Provision, Implementation & Management

OBJECTIVE:

Customization of Asset Integrity Management System (AIMS) Software to enable GB to schedule, prioritize and execute the inspection plan along with database management and data collection for Risk Assessment.

Strategize a Risk Based Inspection (RBI) Program and FMECA Study Analysis for Groupement Berkine HBNS and El-Merk field assets in order to equip GB with an efficient and cost effective working method to identify degradation mechanisms and respective failure modes while proposing a credible risk mitigation plan.

SCOPE OF WORK:

VAIL Plant Software: Provision, Implementation and Management of VAIL Plant Software to continually manage assets for GB HBNS and El-Merk Facilities.

Training: Comprehensive Training and hands on familiarization of GB Engineers during implementation and development of designated software at GB Facilities.

RBI: Establish a comprehensive Risk Based Inspection (RBI) Program for Pipelines, Pressurized Equipment and Piping at HBNS and El-Merk facilities based on best practices and industrial standards to effectively manage corporate assets in order to gain maximum value, profitability and returns while safeguarding personnel, the community, and the environment.

FMECA: Implementing an FMECA based Risk Assessment Methodology for Pressure Safety Valves and Wellheads at HBNS and El-Merk facilities to optimize the preventive maintenance activities.

DELIVERABLES

Velosi submitted the following deliverables to Groupement Berkine:

Asset Integrity Management System:

- PEMS – Pressurized Equipment Management System.
  PIMSON – Pipeline Integrity Management System – Onshore.
  PSVMS – Pressure Safety Valve Management System.
  ISMS – Inspection Schedule Management System.
- Hands on Training of VAIL-Plant Software.
- Risk Based Inspection (RBI) Study at GB HBNS and El-Merk Facilities along with Results and Conclusions for the following assets: FMECA Study & Maintenance Plan for Wellheads and PSVs at HBNS and El-Merk Facilities along with Results and Conclusions.
- Preparation of Standard Operating Procedures (SOPs).

CASE STUDY

DEVELOPMENT, IMPLEMENT & SUPPORT OF RBI PROGRAM FOR FULL PRODUCTION FACILITIES OF WEST QURANA-2 FIELD

Client: LUKOIL
Location: Iraq
Region: Middle-East

SERVICE(S):

Asset Integrity Management System (AIMS)
Risk Based Inspection (RBI)
Software Implementation & Training

OBJECTIVE:

The development, implementation and support of RBI programs for field production facilities and pipelines during phase 1 and phase 2 development of the West Qurna-2 Field.

Implementation and maintaining RBI system properly, improves plant reliability and safety while reducing unplanned outages and repair costs.

Implementation of RBI helps to:

- Select cost effective and appropriate maintenance and inspection tasks.
- Shift from a reactive to proactive maintenance regime.
- Produce an auditable system.
- Implement a risk management tool (VAIL-Plant)

SCOPE OF WORK:

- Development of Asset Integrity Management Systems.
- Perform specific corrosion study for each equipment, piping & pipelines. Implement the RBI program for inspection data management and RBI analysis.
- Development of Written Scheme of Examination.
- Development of RBI software with inspection data management capabilities.
- Integration of RBI Software with ERP system (SAP).

DELIVERABLES

Asset Integrity Management System:

- Comprehensive RBI Program for Equipment, Piping & Pipelines, along with Results and Conclusions.
  - Remnant Life Assessment.
  - Inspection Plan.
  - Failure Rate and Risk Allocation.
- Written Scheme of Examination.

VAIL Plant Software Modules:

Velosi successfully delivered following module of VAIL-Plant software:

- PEMS – Pressurized Equipment Management System.
- PIMSON – Pipeline Integrity Management System – Onshore.
- ISMS – Integration of VAIL Plant Software with SAP.

Asset Count

Asset Type	Length (km.)
Pipeline 1	3.8
Pipeline 2	6.7
Pipeline 3	4.4
Pipeline 4	4.4
Pipeline 5	6.3
Total	**25.6**

Asset Type	Length (km.)
Equipment	263
Piping System	4096
Total	**4359**

CASE STUDY

PIPELINE INTEGRITY MANAGEMENT PROGRAM FOR SNGPL

Client: SNGPL
Location: Pakistan
Region: Asia

SERVICE(S):

Pipeline Integrity Management (PIMS).
Risk Based Inspection (RBI).
Software Implementation & Management.
Quality Control Program.

OBJECTIVE:

Development of Pipeline Integrity Management (PIM) Software in accordance with ASME B31.8S.

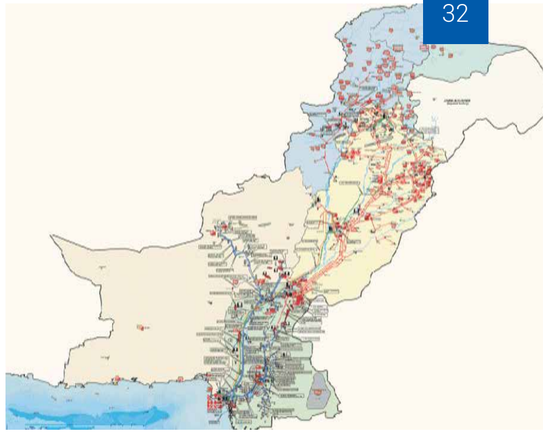
Strategize a Pipeline Integrity Management Program (PIMP) for SNGPL's pipelines and stations in order to equip SNGPL with a transparent and auditable working method to identify degradation mechanisms while proposing effective risk mitigation of earmarked assets.

SCOPE OF WORK:

VAIL Plant Software: Development of customized software in accordance with ASME B31.8S for various modules.

Training: Comprehensive Training and hands on familiarization of SNGPL Engineers and IT Officer during development, implementation of PIM Manual and designated software.

PIMP: Development of Pipeline Integrity Management Manual in line with ASME B31.8S. Implementation of PIM Program (PIMP) includes all the required field surveys & activities for 2 Buried Pipelines, Sales Metering Station & 1 Over Head Rover Crossing Line.



DELIVERABLES

Velosi successfully submitted following deliverables to SNGPL:

VAIL-Plant Software Modules:

- PEMS – Pressurized Equipment Management System.
- PIMSON – Pipeline Integrity Management System - Onshore.
- ISMS – Inspection Schedule Management System.
- EIRMS – Electrical Instrumentation Rotary Management System.
- CPMS – Cathodic Protection Management System.

Asset Integrity Management System:

- Implementation of PIM Program (PIMP).
- PIM Manual (ASME B31.8S).
- Comprehensive Training and hands on familiarization of VAIL-Plant.
- Preparation of Standard Operating Procedures (SOPs).

CASE STUDY

ASSET INTEGRITY MANAGEMENT SYSTEM FOR ONSHORE AND OFFSHORE TANAP ASSETS

Client: TANAP
Location: Turkey
Region: Europe

SERVICE(S):

VAIL-Plant Asset Integrity Management System (AIMS) Software Implementation & Management.

OBJECTIVE:

Development of an Asset Integrity Management Software to enable TANAP to schedule, prioritize and execute the inspection plan along with database management and data collection for Risk Assessment. Integration of AIMS Software with TANAP's SAP, GIS & Envision.

SCOPE OF WORK:

- Provision and Implementation of VAIL-Plant Software modules to facilitate TANAP requirement for efficiently managing the corrosion and inspection data as part of the Asset Integrity Management System.
- Transfer of data to Computerized Maintenance Management System (CMMS) ensuring that inspection plans are fully implemented as planned during the Operations.
- Integrate with Geographic Information system to view the Pipeline Locations in GIS map.
- Interface with TANAP Document Management System to establish the related links between Client's DCC, AIMS and CMMS.
- Detailed training courses to Client staff to ensure the program adoption and software usage are well understood by Client personnel and hands-on experience of AIMS software is transferred to TANAP staff.

DELIVERABLES

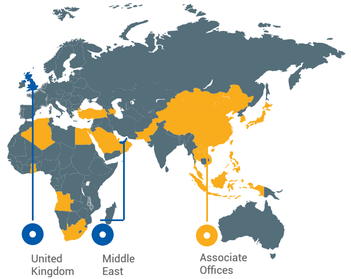
Velosi successfully submitted the following deliverables:

- VAIL-Plant Asset Integrity Management System Software Modules:
  - PEMS – Pressurized Equipment Management System.
  - PIMSOFF – Pipeline Integrity Management System - Offshore.
  - PIMSON – Pipeline Integrity Management System - Onshore.
  - PSVMS – Pressure Safety Valves Integrity Management System.
  - ISMS – Inspection Schedule Management System.
  - Control Panel.
- Integration of VAIL-Plant system with SAP Plant Maintenance Module.
- Integration of VAIL-Plant with ArcGis for Geographical Interface.
- Integration of VAIL-Plant with enVision Document Management System (EDMS).
- GO LIVE of VAIL Plant Software.
- Training of VAIL-Plant Software at client site.

OUR CLIENTS

ADNOC
BAPCO Bashayer Pipeline Company
BMC Brunei Methanol
PetroVietnam BSR
BUNDUQ
BW Offshore
Dragon Oil
equion Energía para la vida
Equipment Arakine
IDEMITSU
KJO Al Khafji Joint Operations
KPOC
LUKOIL
NEWFIELD
PETRONAS
PPL
Petro Energy E&P Oil & Gas Operating Company
SNGPL
sonatrach
TANAP

OFFICES WORLDWIDE



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Engineering For A Safer World

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