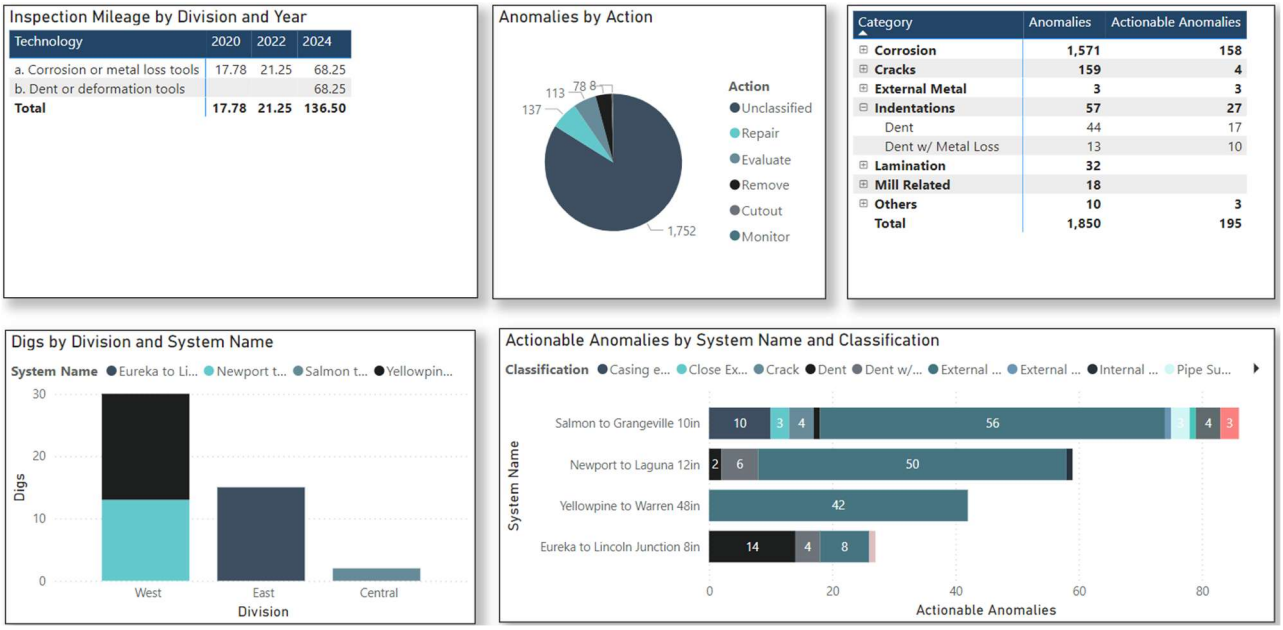
# Cognitive Integrity Management (CIM)




Cognitive Integrity Management™ (CIM) is a born-in-the-cloud Software-as-a-service “SaaS” solution that manages the compliance and integrity of oil and gas assets. CIM is a fully integrated enterprise-level solution in the highly secure Microsoft cloud that uses advanced data science and machine learning to assist pipeline operators in managing the integrity and risk of their assets through the integration, alignment, analysis, and reporting of assessment data and information.

## Assessment Planning

Plan and manage integrity assessments and their corresponding results. Capabilities include:

- Plan and document inline inspection and identify re-assessment intervals for each assessment type.
- Use the machine learning ingestion algorithm to identify and classify anomalies from multiple ILI technologies and service providers, normalizing every anomaly to a standardized classification.
- Align current ILI to previous with girth weld matching and align ILI to GIS information to provide additional relevant pipeline information, such as the locations of High-Consequence Areas (HCAs), pipe coating type, depth of cover, etc.
- Match anomalies across all inline inspections with complex matching, including one-to-many (pits), many-to-one, and many-to-many matching.

## Assessment Analysis (Integrity Compliance) & Threat Monitoring

Conduct a comprehensive analysis of your assessment data using pre-defined conditions and analyses provided by relevant regulations, company requirements, industry best practices, and shared learnings across operators. Capabilities include:

- Conduct an analysis utilizing pre-defined conditions based on regulatory requirements and industry best practices with the option to add, customize, and rename conditions per client.
- Ability to modify the analysis based on HCA and class locations, tool tolerance, corrosion growth rate methods, and pipeline properties.
- Calculate a failure/burst pressure and safe operating pressure for all metal loss anomalies, utilizing ASME B31G and modified ASME B31G.
- Calculate a failure/burst pressure and safe operating pressure for all crack and crack-like anomalies utilizing Raju-Newman, LN-Secant, and MAT-8
- Calculate a corrosion growth rate (CGR) utilizing the matched pits and various growth rate models and methodologies, including pit-to-pit minimum, pit-to-pit maximum, and pit-to-pit average, or calculate a CGR from 3 or more inline inspections by fitting a multi-point trend line.
- Conduct a fitness-for-service assessment with the calculated corrosion growth rate to determine remaining life and recommended reassessment intervals for metal loss and crack/crack-like anomalies.
- Identify interacting features across multiple ILI reports and tool technologies, including a dent with metal loss, corrosion interacting with a seam weld, etc.
- Identify interacting features between ILI and a GIS-identified feature, i.e., metal loss within a road casing.
- Identify anomalies that meet a condition for action, e.g., evaluate, monitor, repair, etc.
- Easily flag anomalies that have been previously repaired to exclude them from a current dig plan.
- Auto-generate reports displaying the results of all calculations utilized in the analysis to provide supporting documentation for the Dig Plan.
- Visualize anomalies with a 3D viewer that visually displays the boxed anomalies and a map of the anomaly location on the pipeline system.
- Conduct an API 1163 Level 2 and Level 3 ILI performance validation utilizing PRCI's Performance Validation Guidelines and associated spreadsheet tool.
- Automatically create a record for every anomaly included in a Dig Plan, allowing for easy tracking of mitigative actions.

## Dig Management

Create dig plans, dig sheets, and pipe inspection reports for internal and external "field" use and ingest field data

back into CIM to close the assessment loop. Capabilities include:

- Efficiently group anomalies into digs using “Smart Dig”
- Auto-generate dig sheets and packages for every anomaly in a dig plan.
- Export a .kml file that provides GPS coordinates for use in Google Earth or similar applications.
- Auto-generate repair templates with pre-populated data to be given to NDE personnel.
- Upload repair data to automatically match field-found information with ILI-reported data, allowing for the creation of unity plots and the validation of ILI performance.
- Workflow approval for dig plans, including the date, time, and name of the creator and approver, is recorded automatically.

## Reporting and Data Visualization

CIM provides100+ auto-generated reports, available in real-time in a dedicated reporting module. Ad-hoc custom dashboards can also be created with associated filters, data selection, and presentation. Export report types shall include Microsoft® Excel, Word, and Adobe PDF. Some key reports are:

- Log Features: ILI report in a standardized format.
- Feature Lineage: ILI vs. ILI alignment; shows how the current ILI report aligns with the historical ILI report(s), feature by feature.
- GIS ILI Alignment: shows how ILI-reported features align with GIS-provided features.
- Metal Loss Growth Analysis
- API 1163 Level 2 and Level 3 reports, etc.
- Data Mart (New in 3.43): allows clients to mine their own data using PowerBI

## Vendor Portal

CIM has an optional Vendor Portal that allows ILI service providers or other contractors to upload reports directly to CIM, streamlining the report submittal process to the pipeline operator/client. The capabilities of a vendor portal include:

- Allow vendors to securely log in and upload the results of an assessment or inspection.
- Validate uploaded data and provide feedback indicating pass/fail status and the necessary fix for a successful upload.
- Allow the pipeline operator receiving the data to approve or reject the submitted report.
- Ensure data privacy and security by restricting access to vendor-specific data and functionality only.
- Enable communication between vendors and internal stakeholders, as necessary, e.g., notifications.

## GIS integration

CIM provides GIS integration to understand the pipeline’s integrity comprehensively.

- PODS 3.2+ data structure with the ability to export required tables and data.
- APDM & UPDM platform integration.