Integrity Data Management and Integration

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1 Scope

This bulletin provides a compendium of methodologies and considerations for integrating the underlying data used to support integrity management. Any one approach, let alone the entirety of the document, may not be appropriate or applicable in all circumstances. The document reviews possible approaches for consideration by operators in the context of their specific circumstances.

The primary focus of this bulletin is the methodologies and processes used to spatially integrate and normalize the data to support the application of comparative techniques used in interpreting integrity data, with particular emphasis on in-line inspection (ILI) data. The document begins with a discussion of general data-quality processes, goals, and considerations such that data quality approaches can be considered in the context of the data integration processes.

An impediment to informed integrity decisions is the inability to efficiently review a broad spectrum of data in a format that has been normalized and spatially aligned. With the variations in organizational structures, integrity management programs, and technologies used across the pipeline sector, individual operators design data integration procedures that are customized to their organizational structure, processes, and pipeline systems.

Properly managed and integrated data support agile analytics to integrate new data as they become available and to recognize coincident events and patterns. The data source may be from within an organization, or may be external to the company, as in the case of representative data based on industry experience or manufacturing processes. The intent is to empower operators to efficiently analyze and integrate threat- and integrity-related data to support their integrity management programs.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies (including any addenda/errata).

API RP 1160, *Managing System Integrity for Hazardous Liquid Pipelines*

API RP 1163, *In-Line Inspection Systems Qualification*

API RP 1173, *Pipeline Safety Management Systems*

API RP 1176, *Recommended Practice for Assessment and Management of Cracking in Pipelines*

3 Abbreviations

AC alternating current

ACVG alternating current voltage gradient

BSEE Bureau of Safety and Environmental Enforcement

CFR *Code of Federal Regulations*

CIS close interval survey

CP	cathodic protection
DA	direct assessment
DCVG	direct current voltage gradient
DMA	discrete metal loss anomaly
DOC	depth of cover
ECDA	external corrosion direct assessment
ERF	estimated repair factor
EXT	external
FPR	failed pressure ratio
GIS	geographic information system
GPS	global positioning system
HCA	high consequence area
HDD	horizontal directional drill
ILI	in-line inspection
IMU	inertial mapping unit
INT	internal
IT	information technology
MAOP	maximum allowable operating pressure
MFL	magnetic flux leakage
MIC	microbiologically influenced corrosion
ML	metal loss
MOC	management of change
MOP	maximum operating pressure
MPI	magnetic particle inspection
MTR	mill test report
NAD27	North American Datum of 1927
NAD83	North American Datum of 1983
NDE	nondestructive examination

OD outside diameter

POD probability of detection

PODS Pipeline Open Data Standard

POI probability of identification

ROW right-of-way

RPR rupture pressure ratio

RTK real time kinematic

SCC stress corrosion cracking

SME subject matter expert

SMYS specified minimum yield strength

TDC top dead center

TPD third party damage

TQM total quality management

UT ultrasonic testing

WB wrinkle bend

WGS84 World Geodetic System 1984

4 Benefits to an Enterprise Data Management System

Managing pipeline integrity data historically involved the rather manual process of populating data within spreadsheets or disparate databases. Transitioning to an enterprise database to manage large pipeline integrity data sets provides an operator with several advantages, including the following:

— Improved auditing and traceability: When spreadsheets are created, the logic and judgment that is applied while an individual is manipulating data is not captured, or easily understood. In most cases, this logic exists only in the mind of the individual who created the spreadsheet, which may result in compliance risk.

— Improved tracking of data corrections: Propagating corrections to data errors across multiple dependent spreadsheets, or back to the original data sources, is difficult and may potentially introduce further errors.

— Improved safeguards against human error: Human errors, such as versioning errors and corruption errors, can compromise the integrity of data entry. Databases and their associated graphical interfaces facilitate the implementation of quality rules and constraints that mitigate the potential for human error.

— Improved resource utilization: Databases may provide improved efficiency over data management that uses disparate spreadsheets.