



DEAN PIPELINE CONSTRUCTION TERMINOLOGY

Abandonment An abandoned pipeline is a pipeline that is physically separated from its source of liquid. An abandoned pipeline is no longer connected to the system.

Above Ground Marker (AGM) Known reference point to help with location of anomalies identified during in line inspections.

Aggregate pieces of broken or crushed stone or gravel used to make concrete, or more generally used in the process of erosion control and remediation.

Anomaly Any kind of imperfection, defect, or critical defect that may be present in the wall of the pipe.
Batching Pig. A utility pig that forms a moving seal in a pipeline to separate liquid from gas media or to separate two different products being transported in the pipeline. The most common configurations of batching pigs are cup pigs and sphere pigs.

Asbestos Removal procedures used to control fiber release from asbestos-containing materials in a building, or to remove them entirely, including removal, encapsulation, repair, enclosure, encasement, and operations and maintenance programs.

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Bellhole An excavation in a local area to permit a survey, inspection, maintenance, repair, or replacement of pipe sections.

Buckle A partial collapse of the pipe due to excessive bending associated with soil instability, land slides, washouts, frost heaves, earthquakes, etc.

Bulkheads a partition built in a subterranean passage to prevent the passage of air, water, or mud. a retaining structure of timber, steel, or reinforced concrete, used for shore protection and in harbor works.

Caisson a large watertight chamber, open at the top, from which the water is kept out and in which construction work may be carried out under water the water surface.

Calibration/Verification Digs. Exploratory excavations, or bellholes, of portions of the pipeline in which an in-line inspection tool has recorded an indication.

Cathodic Protection A technique to protect steel pipelines against the various forms of corrosion to which they are susceptible. Most pipelines are coated externally to offer protection against the natural corrosive qualities of the soil in which they are buried. Most also have some sort of cathodic protection to prevent corrosion – using either sacrificial anodes or impressed current anodes.

Characterization. The process of quantifying the size, shape, orientation, and location of an anomaly, defect, or critical defect after it has been detected. There are many degrees to which characterization can be successful. For example, one type of characterization of a mechanical-damage defect may be to determine whether the defect contains a cold worked region (severe) or not (less severe).

Classify. To separate the cause of indications into one of three categories, namely, anomalies, non-relevant conditions, or pipeline components.

Cleaning Pig. A utility pig that uses cups, scrapers, or brushes to remove dirt, rust, mill scale, or other foreign matter from the pipeline. Cleaning pigs are run to increase the operating efficiency of a pipeline or to facilitate inspection of the pipeline.

Close interval Survey A close interval survey is a measurement tool used to examine cathodic protection systems attached to pipelines to ensure adherence to inspection codes and standards. The survey is complete

by obtaining voltage measurements at fixed time intervals and pipeline length references an existing grounded electrode.

Coastal zone means the coastal waters and the adjacent shorelands (including the waters therein and thereunder) strongly influenced by each other and in proximity to the shorelands of the several coastal states.

Coating a covering that is applied to the surface of an object, usually referred to as the substrate. The purpose of applying the coating may be decorative, functional, or both.

Cold working. Distortion of the grains in the vicinity of a gouge. Cold working often occurs immediately under the visible gouge and can significantly reduce the mechanical properties of a pipe steel.

Composite Sleeve A composite sleeve repair is a full-encirclement fiberglass composite wrap installed around the pipe using multiple layers.

Concrete Mats articulating concrete mats are used primarily for pipeline protection, erosion control and shoreline stabilization. They are a proven long-term solution to traditional alternatives.

Configuration Pig. An instrumented pig that collects data relating to the inner contour of a pipe wall or of the pipeline. geometry pigs, camera pigs, and mapping pigs are types of configuration pigs.

Corrosion. A localized corrosion attack along the bond line of electric resistance welds (ERW) and flash welds (FW), that leads to the development of a wedge shaped groove that is often filled with corrosion products.

Critical Defect. As used in this text, a subset of defect, for which an analysis, such as ASME B31G, would indicate that the pipe is approaching failure at pressures equal to maximum operating pressure or the maximum allowable operating pressure for the pipe.

Cup Pig. A utility pig that is supported and driven by cups made of a resilient material such as neoprene or polyurethane. At least one of the cups forms a piston-like seal inside the pipeline.

Defect. As used in this text, an anomaly for which an analysis, such as ASME B31G, would indicate that the pipe is approaching failure as the nominal hoop stress approaches the specified minimum yield stress of the pipe material.

Dent. A local depression in the pipe surface caused by mechanical damage that produces a gross disturbance in the curvature of the pipe without reducing the pipe wall thickness.

Detect. To sense or obtain a measurable indication from an anomaly in a pipeline.

Detection. The process of obtaining an inspection signal that is recognized as coming from a defect or anomaly. An in-line inspection tool can detect only those defects that produce signals that are both measurable and recognizable. Not all defects are detectable with all inspection systems.

Detection Limit. The largest anomaly that could be missed (not the smallest anomaly that could be found) by an in-line inspection tool.

Directional Drilling commonly called horizontal directional drilling or HDD, is a steerable trenchless method of installing underground pipe, conduit, or cable in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area.

Disbonded Coating. Any loss of bond between the protective coating and the steel pipe as a result of adhesive failure, chemical attack, mechanical damage, hydrogen concentrations, etc.

DOT. Department of Transportation.

Dummy Run. A preliminary run of a utility pig to verify safe passage of a fully instrumented tool through a section of pipeline. Dummy runs may also be used to remove debris from inside the pipeline.

Engineered Sheet Piling Box a watertight enclosure pumped dry to permit construction work below the waterline, enclosure is constructed of steel sheet pilings with inter locking sides.

Erosion. Destruction or removal of material by abrasive action of moving fluids (or gases) usually accelerated by the presence of solid particles or matter in suspension.

Erosion Control is the practice of preventing or controlling wind or water erosion in agriculture, land development, coastal areas, river banks and construction.

Evaluation. A review, following the identification of an anomaly, to determine whether the anomaly meets specified acceptance criteria.

False Call. An indication from an inspection that is classified as an anomaly where no imperfection, defect, or critical defect exists.

Fatigue – Progressive cracking in the base material, weld, or weld zone that is caused by pressure cycling or oscillatory stresses associated with the operation of the system.

FERC. Federal Energy Regulatory Commission.

Flux. The (scalar) number of flux lines crossing a unit area at right angles to the unit area. See magnetic flux.

Flux Density. (1) A measure of the intensity of magnetization produced by a magnetic field. (2) A vector quantity representing the number of flux lines crossing a unit area at right angles. Flux Leakage. The flow of flux out of a magnetic material, such as the wall of a pipe, into a medium with lower permeability, such as gas or air.

Full Encirclement Sleeve A full encirclement sleeve (full wrap) is a metal wrap installed around pipe for reinforcement and containing pressure.

Fusion Bonded Epoxy (FBE). A type of pipeline coating widely used to protect steel pipelines from corrosion. Pipeline coating is used together with cathodic protection to prevent corrosion on most steel pipelines. Regulations regarding pipeline coatings are found for Gas pipelines in 49 CFR 192.461, and for Hazardous Liquid pipelines in 49 CFR 195.557.

Gel Pig. A utility pig that is composed of a highly viscous gelled liquid. These pigs are often used for pipeline cleaning and are sometimes called gelly pigs.

General External Corrosion – Metal loss due to electrochemical, galvanic, microbiological, or other attack on the pipe due to environmental conditions surrounding the pipe.

General Internal Corrosion – Metal loss due to chemical or other attack on the steel from liquids on the inside of the pipe. Electrochemical attack can also occur in local cells, but this condition is less frequent.

Geometry Pig. A configuration pig designed to record conditions, such as dents, wrinkles, ovality, bend radius and angle, and occasionally indications of significant internal corrosion, by making measurements of the inside surface of the pipeline.

Girth Weld – Cracks in the weld or weld zone of the butt welds that connect sections of pipe.

Gouge. Local damage caused by mechanical or forceful removal of metal from a local area on the surface of the pipe that may work harden the pipe and make it more susceptible to cracking.

Gouging. The process of creating a zone of mechanical damage that includes cold working, residual stresses, plastic distortion, and (generally) moved or removed metal.

Hard Spots. Local changes in hardness of the steel in the pipe resulting from nonuniform quenching procedures during the manufacture or changes in chemistry of the steel. Hard spots, when stressed, are subject to failure from mechanisms, such as hydrogen-stress cracking.

Holidays. Discontinuities in a coating, such as pinholes, cracks, gaps, or other flaws, that allow areas of the base metal to be exposed to any corrosive environment that contacts the coating surface.

Hydrostatic Retesting. Proof testing of sections of a pipeline by filling the line with water and pressurizing it until the nominal hoop stresses in the pipe reach a specified value.

Hot Tapping or Pressure Tapping, is the method of making a connection to existing piping or pressure vessels without the interruption of emptying that section of pipe or vessel.

Hydrostatic testing a way in which pressure vessels such as pipelines, facility piping, gas cylinders, boilers and fuel tanks can be tested for strength and leaks. The test involves filling the vessel or pipe system with a liquid, usually water, which may be dyed to aid in visual leak detection, and pressurization of the vessel to the specified test pressure. Pressure tightness can be tested by shutting off the supply valve and observing whether there is a pressure loss.

Identification. The process of differentiating a signal caused by one type of defect from signals caused by

other types of defects or pipeline features. Identification is particularly important for mechanical damage defects because their signals are so small that they can be mistaken as due to benign conditions. Mechanical-damage signals are also small compared to signals from metal loss and features such as valves.

In-Line Inspection (ILI) involves the evaluation of pipes and pipelines using “smart pigs” (both tethered and non-tethered) that utilize non-destructive examination techniques to detect and size internal damage.

Imperfection. An anomaly in the pipe that will not result in pipe failure at pressures below those that produce nominal hoop stresses equal to the specified minimum yield stress of the pipe material.

Incident. An event that is reported to U.S. Department of Transportation Office of Pipeline Safety that involves fatalities, injuries, property damage in excess of \$50,000, unintentional release of natural gas, customer outages, or other conditions that, in the opinion of the pipeline operator, are significant enough that they should be reported.

Inclusions. Foreign material or particles in a metal matrix. These are usually compounds, such as oxides, sulfides, or silicates, but may be any substance that is foreign to the matrix whether it is soluble or insoluble.

Indication. (1) Any measured signal or response from an inspection of a pipe above the normal baseline signal. (2) Measurements made during monitoring of cathodic protection systems.

Induction Coil Sensor. A type of sensor that measures the time rate of change in flux density. Induction coils do not require power to operate.

Inspection. (1) The process of examining a pipe using a destructive or nondestructive testing technique to look for anomalies or to evaluate the nature or severity of an indication. (2) The process of running a configuration tool or an in-line inspection tool through a pipe to detect anomalies.

In-Line Inspection (ILI). The inspection of a pipeline from the interior of the pipe using an in-line inspection tool.

In-Line Inspection Tool (ILI Tool). The device or vehicle, also known as an intelligent or smart pig, that uses a nondestructive testing technique to inspect the wall of a pipe. An in-line inspection tool is one type of instrumented tool.

Intelligent Tool. See in-line inspection tool.

Instrumented Tool or Pig. A vehicle or device used for internal inspections of a pipe, which contains sensors, electronics, and recording or output functions integral to the system. Instrumented tools are divided into two types: (a) configuration pigs, which measure the pipeline geometry or the conditions of the inside surface of the pipe, and (b) in-line inspection tools that use nondestructive testing techniques to inspect the wall of the pipe for corrosion, cracks, or other types of anomalies.

Joint. A single section of pipe that is welded to others to make up a pipeline. A joint of pipe is often 40-feet long.

Karst. Landscapes in which surface and groundwater flow occurs over and through soluble rocks with minimal filtration, such as limestone, resulting in changes over time that alter the bedrock and aquifer characteristics, and which can result in caves, caverns, sinkholes, and other irregular formations. The Virginia Cave Board has put together a useful FAQ on karst which can be downloaded [here](#).

Lack of Fusion (LOF). In a weld, any area or zone that lacks complete melting and coalescence (fusion) of a portion of the weld. This may occur between weld passes or between weld and base materials.

Lack of Penetration (LOP). In the welding process, failure to achieve fusion of the base metal to the desired or planned depth.

Lamination. A type of imperfection or discontinuity with separation or weakness, usually aligned parallel to the worked surface of a metal.

LNG. Liquefied Natural Gas Magnetic Flux. A measure of the amount of magnetization carried by a material.

Launcher A Pig Launcher is a designed and fabricated tool used to launch Pig's inside Crude Oil, Petroleum Products or Gas Pipelines. Pig refers to pipeline intervention gadgets that are used to perform multiple maintenance operations such as cleaning and inspection inside the pipelines.

Levee-dike, dyke, embankment, flood bank or stop bank is an elongated naturally occurring ridge or artificially constructed fill or wall, which regulates water levels. It is usually earthen and often parallel to the course of a river in its floodplain or along low-lying coastlines.

Line lowering returning pipeline to specified depth and the replacement of cover to achieve ample protection. This is achieved in marine, as well as, dry environments.

Magnetic Flux Leakage (MFL). An inspection technique in which a magnetic field is applied to a pipe section and measurements are taken of the magnetic flux density at the pipe surface. Changes in measured flux density indicate the presence of a possible defect. Also called MFL.

Mapping Pig. A configuration pig that uses inertial sensing or some other technology to collect data that can be analyzed to produce an elevation and plan view of the pipeline route.

Marine Environment means the physical, atmospheric, and biological components, conditions, and factors that interactively determine the productivity, state, condition, and quality of the marine ecosystem. These include the waters of the high seas, the contiguous zone, transitional and intertidal areas, salt marshes, and wetlands within the coastal zone and on the OCS.

Marsh is a wetland that is dominated by herbaceous rather than woody plant species. Marshes can often be found at the edges of lakes, streams, rivers, and larger bodies of water.

Maximum Allowable Operating Pressure (MAOP). The maximum internal pressure permitted the operation of a pipeline as defined by the Code of Federal Regulations.

Maximum Operating Pressure (MOP). The maximum internal pressure expected during the operation of a pipeline, which cannot normally exceed the maximum allowable operating pressure.

Measurable. Producing an inspection signal that is above the noise level inherently present in the pipe.

Mechanical Damage. Any of a number of types of anomalies in pipe caused by the application of an external force. Can include dents, gouges, and metal loss.

Mechanical Distortion. Changes in wall thickness or changes in the cylindrical shape of a pipe. A gouge, because it includes cold working, residual stresses,

Mechanical Pipeline Clamp Leak Repair Clamps is a device that is used to repair and seal a pipeline containing a leak.

Metal Loss. Any of a number of types of anomalies in pipe in which metal has been removed from the pipe surface, usually due to corrosion or gouging.

Monitoring. Measurements or periodic inspections made at selected locations along the pipeline.

Nondestructive Evaluation (NDE). The evaluation of results from nondestructive testing methods or nondestructive testing techniques in order to detect, locate, measure, and evaluate anomalies.

Nondestructive Testing (NDT). The actual application of a nondestructive testing method or a nondestructive testing technique.

Nondestructive Testing Method (NDT Method). A particular method of nondestructive testing, such as radiography, ultrasonics, magnetic testing, liquid penetrants, visual, leak testing, eddy current, and acoustic emission.

Nondestructive Testing Technique (NDT Technique). A specific way of utilizing a particular nondestructive testing method that distinguishes it from other ways of applying the same nondestructive testing method. For example, magnetic testing is a nondestructive testing method while magnetic flux leakage and magnetic particle inspection are nondestructive testing techniques. Similarly ultrasonics is a nondestructive testing method, while contact shear-wave ultrasonics and contact compression-wave ultrasonics are nondestructive testing techniques.

Non-Relevant Indication. A response recorded on a chart, data display, or record that comes from a source outside the pipeline, such as foreign objects in the ditch.

Obstructions. Any restriction or foreign object that reduces or modifies the cross section of the pipe to the extent that gas flow is affected or in-line inspection pigs can become stuck (ovality, collapse, dents, under-

sized valves, wrinkles, bends, weld drop through). Also any foreign object in the pipeline. (See pipe collapse)

OPS. Office of Pipeline Safety

Ovality. A condition in which a circular pipe forms into an ellipse, usually as the result of external forces.

PHMSA. Pipeline and Hazardous Materials Safety Administration

Pig. A generic term signifying any independent, self-contained device, tool or vehicle that moves through the interior of the pipeline for purposes of inspecting, dimensioning, or cleaning. All pigs in this report are either utility pigs or instrumented tools.

Piggable fitting gets its name for the ability to run a "pig" or "smart pig" through a pipeline. This is done for a variety of different reasons from pipeline inspection to cleaning. Piggable fittings are installed with a desired radius to allow for unobstructed flow.

Piggable Valve full-bore ball valves and gate valves with full opening are identified as piggable valves. There is no identified restriction in the inside diameter of these valves.

Pipe. As used in this text, the steel pipe exclusive of protective coatings or attachments that is used to transport natural gas.

Pipeline. That portion of the pipeline system between the compressor stations including the pipe, protective coatings, cathodic protection system, field connections, valves and other appurtenances attached or connected to the pipe.

Pipeline Component. A feature, such as a valve, cathodic protection connection or tee that is a normal part of the pipeline. The component may produce an indication that is recorded as part of an inspection by an in-line inspection tool or configuration pig.

Pipeline Pickling the addition of chemically treated water to a piece of equipment or pipeline to protect the internal integrity of the equipment until it is appropriate to be removed.

Pipeline System. All portions of the physical facilities through which gas moves during transportation including pipe, valves, and other appurtenances attached to the pipe, such as compressor units, metering stations, regulator stations, delivery stations, holders and other fabricated assemblies. (See 49 Code of Federal Regulations 192).

Pit. Local concentrated-cell corrosion on the external or internal surfaces that results from the eneration of a potential (voltage) difference set up by variations in oxygen concentrations within and outside the pit. The oxygen-starved pit acts as the anode and the pipe surface acts as the cathode.

Plastic Strains. Strains beyond the elastic limit of a material due to mechanical damage. Plastic strains and cold working are related, but not the same.

Pole Piece. A magnetic material that channels a magnetic field from a magnet into a pipe material.

Pole Spacing. The distance between pole pieces of a magnetizing assembly.

Porosity. Small voids or pores, usually gas filled, in the weld metal.

Plugging. One of the safest and most reliable solutions for isolating pressurized sections of pipeline. Pipeline plugs serves as a temporary block valve and allows operators to bypass through the housing so that repairs and maintenance activities can be performed without shutdown or interruption of service.

Procurement. A simple purchasing arrangement with a supplier. It may also involve a more complex arrangement with the seller or a group of suppliers that ties required quantity, quality, and delivery into a project scope.

Radius Bends. The radius of the bend in the pipe as related to the pipe diameter (D). Example: A 3D bend would have a radius of three times the diameter of the pipe measured to the centerline of the pipe.

Receiver. A pig receiver is a device to get a pig out of a pipeline without interrupting flow.

Recognizable. Producing a signal that can be identified as coming from a particular type of defect, e.g., mechanical damage.

Remanent Magnetization. The magnetization level left in a steel pipe after the passage of a magnetic in-line

inspection tool.

Remediation the action of remedying something, in particular of reversing or stopping environmental damage.

Removal The act of removing a piece of equipment (pipeline or facility equipment) that has been deemed unusable and has been evacuated of all liquids.

Rerounding. The process of changing the dent depth and shape by internal pressure in the pipe. Generally, dents due to third-party contact will reround, while dents due to rocks will not unless the rock causing the dent is removed.

Residual Stresses. Elastic stresses that were not present within the pipe wall before mechanical damage but that are present after the damage has occurred.

RSPA. Research and Special Programs Administration

Restoration. The act of restoring or state of being restored, as to a former or original condition, place, etc

Sandblasting. A stream of sand projected by compressed air during the cleaning process of metal or other surfaces.

Saturation. The degree of magnetization where a further increase in magnetic field strength produces a decrease in permeability of a material.

Seam Weld. Cracks in the weld or weld zone of the longitudinal seam weld of the pipe. Selective upon retrieval from the line, provides evidence of the worst-case obstruction in a given pipeline segment.

Stress-corrosion cracking (SCC). Environmentally assisted cracking that can result when the combined action of stress, an electrochemical cracking environment, and temperature causes cracks to initiate and grow in a susceptible line-pipe steel.

Shielded Corrosion. Corrosion between the pipe and the protective coating, which is not controlled by cathodic protection currents.

Slivers. A thin elongated anomaly caused when a piece of metal is rolled into the surface of the pipe. A sliver is usually metallurgically attached at only one end. In MFL inspections, a sliver is sometimes called a lamination.

Smart Pig. See in-line inspection tool.

Specified Minimum Yield Strength or Stress (SMYS). A required strength level that the measured yield stress of a pipe material must exceed, which is a function of pipe grade. The measured yield stress is the tensile stress required to produce a total elongation of 0.5 percent of a gage length as determined by an extensometer during a tensile test.

Sphere Pig. A spherical utility pig made of rubber or urethane. The sphere may be solid or hollow, filled with air or liquid. The most common use of sphere pigs is as a batching pig.

Survey. Measurements, inspections, or observations intended to discover and identify events or conditions that indicate a departure from normal operation of the pipeline.

Tenting. A tent-shaped void formed along the longitudinal seam-weld reinforcement in a pipe when the external coating is not in continuous intimate contact with the pipe and weld surfaces.

Test Leads Except for offshore pipelines, each buried or submerged pipeline or segment of pipeline under cathodic protection must have electrical test leads to examine for external corrosion control.

Tool. A generic term signifying any type of instrumented tool or pig.

Transducer. A device for converting energy from one form to another; for example, in ultrasonic testing, conversion of electrical pulses to acoustic waves and vice-versa.

Transmission Line. A pipeline, other than a gathering or distribution line, that transports gas from a gathering or storage facility to a distribution center or storage operates at a hoop stress of 20 percent or more of the specified minimum yield stress of the pipe, or transports liquids within a storage field.

Trap. Pipeline facility for launching and receiving tools and pigs. See Launcher/Receiver

UTC. Utility Trade Commission

Utility Pig. A pig that performs relatively simple mechanical functions, such as cleaning the pipeline.

Waterways a river, canal, or other route for travel by water.

Wrinkles. Ripples that occur on the inner radius of a pipe when the pipe is cold bent.

Yield Pressure. The pressure at which the nominal hoop stress in the wall of a pipe equals the specified minimum yield stress of the pipe grade.