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Contractor Construction Quality Management Guide

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Contractor Construction Quality Management Guide

I. PURPOSE and SCOPE

The intent of this white paper is to provide guidance for the implementation of a Quality Management Program during construction of Pipeline Facilities by an operator's contractor. This is guidance only. Practices may be different for different companies based on size, geography, system variables, etc.

There was a separate effort to create a white paper that addresses the broader concept of Quality Management for Gas Operations. See "Developing and Implementing a Quality Assurance Program for Natural Gas Operations", November 5, 2015.

This white paper is directed to only quality management of construction by contractors. It assumes that issues such as Quality Leadership, Management Commitment, Responsibilities, Authorities and Resources have been established.

The Guidance is broken down into the broad categories that follow the timeline of a typical Construction Project.

These categories include:

II. DEFINITIONS

- **Company Authorized Representative** *is a generic term for someone employed by the operator with the authority to assess compliance with terms of the contract or specifications. This person may be involved with the project such as a Project Manager or Construction Manager. Or, this person may have back office responsibility for review of records. Unlike the inspector, this individual may or may not visit the construction site.*

- **Contract** – *The written agreement executed by the operator and contractor that details the obligations of the parties, including but not limited to standards for the performance of the work, furnishing of labor, equipment and materials, and the basis of payment.*

- **Contractor** *is a person or company, independent of the operator, who agrees to furnish materials, services or personnel that meet the specifications of the operator and applicable standards at a mutually agreed price.*

- **Inspection** *is the action of reviewing, witnessing and/or verifying that the task/work has been completed satisfactorily and in conformance with all applicable standards and specifications.*

- **Inspector** *is a generic term for any individual assigned responsibility for inspection. The individual assigned to perform the inspection should not perform the construction task requiring inspection. This individual typically works in the field.*

  An inspector should have an appropriate level of training or experience with the requisite knowledge, skills and abilities to complete an assigned inspection. Such training may include: on-the-job training, classroom instruction, demonstrations, or other methods deemed appropriate by the operator. Prior construction or supervisory experience may be an acceptable substitute for some of the training. Some operators may choose to include inspectors in their Operator Qualification process.

  Inspectors may be the operator's employee, contractor's employee and/or a third party. Titles vary for the individuals performing inspections and include inspector, oversight personnel, a Company Authorized Representative, and/or Job Supervisor/Foreman.

- **Project -** *The unit price, lump sum or time & material work as defined by the terms and conditions of the construction contract.*

- **Operator** *as defined in 49 CFR 192.3 is an individual, firm, joint venture, partnership, corporation, association, state, municipality, cooperative association, or joint stock association, and including any trustee, receiver, assignee, or personal representative thereof who engages in the transportation of gas.*

- **Quality** *is conformance to requirements. It is the characteristics of a product or service which upholds its ability to satisfy stated or implied needs.*

- **Quality Performance Standard** – *Zero Defects.*

- **Quality Assurance** *(QA) comprises those actions necessary to provide adequate confidence that products, processes or systems comply with requirements such as specifications and standards. The focus is on providing assurance that processes are adequate and effective.*

- **Quality Control** *(QC) comprises operational techniques and activities, including inspections, necessary to control the characteristics of a product or service (i.e. characteristics that can be measured against codes, drawings, specifications). The focus is on preventing defective products or services from being passed on.*

- **Specifications** – *documentation which describes the work, which supports the plans, and which describes the types and qualities of materials and equipment, the methods of installation of such materials and equipment, and the results to be achieved.*

- **Standards** *A group of documents that specify requirements for construction and operation of natural gas pipelines. These include The Minimum Federal Safety Standards (49 CFR 192) and standards issued by other organizations and incorporated by reference in Part 192. Unlike Specifications created by the operator, these are typically written by organizations beyond the control of the operator.*

III. PROJECT INITIATION

A. Establishing Roles and/or Responsibilities

There may be several individuals involved in any one construction project. It is important that the roles and expectations be discussed and agreed before the project starts. Roles to be discussed include:

1. Workers

The workers on the job should be responsible to safely perform their work in accordance with procedures. They should be able to stop a job for any safety or compliance issues; and should be able to raise those issues without fear of reprisal. The worker must be Operator Qualified (OQ) to perform an OQ task independently. Unqualified workers can perform some OQ tasks when under the direct observation of a qualified individual.

Some tasks such as tapping an energized pipeline, welding, fusion, and/or joining pipe, can only be performed by qualified workers.

Workers are responsible for both personal and pipeline safety. This includes verifying that they have the applicable personal protective equipment (PPE) required to be worn/utilized on the jobsite in accordance with procedures, the proper equipment, materials, tools and available standards/procedures.

2. Job Supervisor / Foreman

The contractor's Job Supervisor or Foreman is responsible for the safe completion of the assigned work within the limits of the design specifications and procedures. Contractor titles for this person may vary to include a wide range of contractor management. This is typically the person to whom the inspector raises issues.

The contractor's Job Supervisor or Foreman is responsible to verify that all workers are in compliance with PPE requirements per the applicable procedures and that all appropriate and applicable work area protection is in place on the jobsite. The contractor's Job Supervisor or Foreman is also responsible for pipeline safety issues and determining that the proper materials are used and proper construction techniques are followed. This person verifies the protection of people and property during the safe completion of the work.

3. Inspector

As listed in the definitions, the inspector is responsible to review, witness and/or verify that the work has been completed satisfactorily. As in other steps of construction, during any inspection, work stoppage should occur if certain non-compliance is observed.

In the course of inspection, if certain phases of the work are not being done in accordance with the plans and specifications (non-conformances), or when other problems occur, these errors, violations, or problems should be documented and reported to the appropriate operator or contractor designated representative for further action.

The inspector should be able to fully read, comprehend, and interpret the contract, plans and specifications. The inspector typically does not have the authority to unilaterally alter any specification or design requirements. However, the inspector would be integral to any change management process by identifying the need for a change and passing the supporting information through the change management process.

The inspector may be involved in the review and acceptance of any project documentation from the contractor. This includes as-built documentation and contractual documentation.

4. Company Authority

This is the individual with the authority to change specification requirements after completion of whatever internal change management process is in effect.

5. Public Relations

There should be an understanding between the inspector and/or Company Authorized Representative and the Job Supervisor / Foreman regarding contact with the public and the customers.

6. Media Relations

There should be an understanding of who is authorized to answer media inquiries regarding the construction project. Typically the operator's media relations personnel would handle all such inquiries after consultation with the inspector and / or Job Supervisor.

7. Ethics

It is important that the actions of the operator and the contractor be conducted to the highest ethical standards. Follow policies and procedures on ethical standards.

B. Environmental Permits and Agreements

At times, conditions specific to certain environmentally sensitive locations may exist. In these situations, additional permits may be required. These applications require specialized knowledge and experience.

The inspector and Job Supervisor/ Foreman should have an understanding of the applicable permitting and compliance requirements of the project and confirm that the required mechanisms are in place for compliance prior to the start of construction.

C. Verifying Training and Qualification

At the initial stages of a project the inspector and/or Company Authorized Representative should verify that project personnel have the necessary training and qualification to complete the work.

1. Operator Qualification

> ***Part 192, Subpart N – Qualification of Pipeline Personnel***
>
> ***§192.801 Scope****. (a) This subpart prescribes the minimum requirements for* ***operator qualification of individuals performing covered tasks*** *on a pipeline facility.*
> *(b) For the purpose of this subpart,* ***a covered task*** *is an activity, identified by the operator, that:*
> *(1) Is performed on a pipeline facility;*
> *(2) Is an operations or maintenance task;*
> *(3) Is performed as a requirement of this part; and*
> *(4) Affects the operation or integrity of the pipeline.*
>
> ***AGA Commitment to Enhance Safety*** *issued in May 2012 included: "Extend Operator Qualification Program to include tasks related to new main & service line construction."*

a. The inspector and/or Company Authorized Representative should have a clear definition of the required qualifications for personnel on the project and verify

that all personnel assigned to the construction project have all appropriate qualification documentation prior to the start of work.

b. The inspector and/or Company Authorized Representative should have an understanding of each individual's level of qualifications including those who are qualified to perform a task without supervision and those who will be required to perform tasks under direct line of sight observation of another qualified individual.

c. Any time there is a change in personnel on the construction crew, the qualifications should be re-verified.

d. Contract documents may specify the qualifications required for the Supervisor/Foreman. The need for multiple crew members to have particular qualifications may also be specified.

e. Operator Qualification status for each individual can change during the course of a project. This could be as a result of:
   i. Disqualifications,
   ii. Expiration of the qualification period,
   iii. Achievement of new qualifications.

   A mechanism to notify an inspector and/or Company Authorized Representative of such changes should be established.

2. Drug and Alcohol Testing

> ***§199.1 Scope.*** *This part requires operators of pipeline facilities subject to part 192, 193, or 195 of this chapter to test covered employees for the presence of prohibited drugs and alcohol*
> ***§199.3 Definitions***
> ***Covered employee, employee, or individual*** *to be tested means a person who performs a covered function, including persons employed by operators, contractors engaged by operators, and persons employed by such contractors.*
> ***Covered function*** *means an operations, maintenance, or emergency-response function regulated by part 192, 193, or 195 of this chapter that is performed on a pipeline or on an LNG facility.*

Typically, those performing Construction on a new pipeline are not covered under DOT Drug and Alcohol Testing regulations. However, some tasks on that new pipeline such as tapping, and purging fall under Operations – Subpart L of Part 192 and would require Drug and Alcohol Testing. The operator should verify that

employees involved in covered functions are included in a DOT compliant Drug and Alcohol Testing program.

3. Welding Qualification

> ***§192.227 Qualification of welders.*** *(a) Except as provided in paragraph (b) of this section, each welder or welding operator must be qualified in accordance with section 6, section 12, or Appendix A of API Std1104 (incorporated by reference, see §192.7) or section IX of the ASME Boiler and Pressure Vessel Code ….*
> *(b) A welder may qualify to perform welding on pipe to be operated at a pressure that produces a hoop stress of less than 20 percent of SMYS by performing an acceptable test weld, for the process to be used, under the test set forth in section I of Appendix C of this part. Each welder who is to make a welded service line connection to a main must first perform an acceptable test weld under section II of Appendix C of this part as a requirement of the qualifying test.*
> ***§192.229 Limitations on welders****. (b) A welder or welding operator may not weld with a particular welding process unless, within the preceding 6 calendar months, the welder or welding operator was engaged in welding with that process.*
>
> Note: 192.229 continues with various other limitations on time periods between acceptable testing of welded joints

The inspector and/or Company Authorized Representative should verify the qualifications of any welder assigned to the project. This should include:

a. Identification of the qualification method;
b. Time since the welder last performed the welding process to be used on the project;
c. Time since a welder has had a weld tested;
d. The inspector should also check that a copy of the appropriate weld procedure is available to the welder.

4. Plastic Pipe Joining - Fusion Qualification & Mechanical Joining Qualification

> ***§192.285 Plastic pipe: Qualifying persons to make joints****. (a) No person may make a plastic pipe joint unless that person has been qualified under the applicable joining procedure by:*
>
> *(1) Appropriate training or experience in the use of the procedure; and*
>
> *(2) Making a specimen joint from pipe sections joined according to the procedure that passes the inspection and test set forth in paragraph (b) of this section.*
>
> *(c) A person must be re-qualified under an applicable procedure, once each calendar year at intervals not exceeding 15 months, or after any production joint is found unacceptable by testing under §192.513.*
>
> *(d) Each Operator shall establish a method to determine that each person making joints in plastic pipelines in the operator's system is qualified in accordance with this section.*

The inspector and/or Company Authorized Representative should verify the qualifications of anyone expected to fuse plastic pipe or makeup mechanical fitting joints. This should include:

a. Checking the documentation of the qualification;
b. Time since the individuals last performed the fusion or mechanical joining process to be used on the project (must be <12 months);
c. Verification that the individuals have not had joint failures above the specified limits;
d. Verification that the fusion equipment being utilized is approved for use and in proper working order.

D. Verifying Up-to-date Construction Documents

1. Construction authorization document provisions

a. Construction authorization documents vary widely among operators. These could include contracts, work orders, and/or job authorizations.
b. The construction authorization document typically describes the work either in detail ("install 1600 feet of 4" HDPE main….") or in general ("install HDPE main as directed by the Engineer…..").
c. It should contain a listing of all specifications and procedure manuals that are to be followed during project construction.
d. The construction authorization document may detail the rates of pay for each activity or material (pay items) and estimated quantities of materials.

2. Operator's Construction Specifications & Procedures

> **§192.303 Compliance with specifications or standards** requires that: *"Each transmission line or main must be constructed in accordance with comprehensive written specifications or standards that are consistent with this part."*

a. Operating manual or construction specifications should be on the construction site or available through a mobile device. This includes a copy of the appropriate weld procedure(s) and plastic pipe joining procedure(s).
b. There should be an indication of the revision date of each document to confirm that up to date documents are in use.
c. The operator should specify what specifications and procedures apply and what is the contractor's responsibility.
    i. For example, contractors may have to weld to operator specifications and procedures, but handle other activities such as safety, or construction activities through their own policies (see Contractor Procedures, below).
d. The requirements of the specifications and procedures form the basis for any quality inspection by detailing the standards and acceptance criteria for project activities.

3. Contractor Procedures

a. The contractor may have their own internal procedures to describe efficient construction methods and practices. These should be reviewed to verify consistency with contract and operator specifications and procedures.
b. Verify contractors have and are familiar with their procedures that are applicable to the project. Request a list of responsible personnel if applicable procedures/policies list them.

4. Manufacturer Procedures

a. Component manufacturers may include installation instructions in the packaging of the component. Installation of the component must follow these instructions. These should be reviewed to verify that there is no disagreement with operator procedures or specifications.
b. Similarly, equipment manufacturers may include equipment operation instructions which must be followed. These should also be reviewed to verify consistency with operator procedures and specifications.

c. As part of pre-construction review determine if any material or equipment is being used that is not covered by other documents and confirm that the contractor has manufacturer procedures for this.

5. Design Drawings

a. Prior to construction, operator employees should meet with the contractor to review construction drawings, contract specifications and design criteria to verify that the contractors are using the most current construction documents.

6. Change Management

a. Communication should be made at this time to establish who has the authority to make changes to the design and the level of change. For example, inspectors and/or Company Authorized Representatives may have authority to make certain types of field changes, while more complex changes may have to be routed through engineering. Major changes and changes in job scope should be documented following the operator's procedures.

IV. PROJECT PREPARATION

A. Safety

1. Responsibility For Safety

a. The responsibility for safety on the worksite should be detailed in contractual documents. Operators approach this issue in different ways. Some may, for example, require a contractor to follow the operator's safety rules. Others may require contractors have their own safety rules. Still others may require review and approval rights for the contractor's safety rules to confirm that they are just as stringent as the operator's rules.

i. There should be a clear understanding between the contractor, inspector and/or Company Authorized Representatives regarding the identification and resolution of safety hazards.

> *OSHA has issued a "Multi Employer Enforcement Policy" CPL 02-00-124 to guide their inspectors in assigning responsibility for hazards on a job site with more than one employer. They define four possible categories of employers:*
>
> - *Creating Employer – the employer that caused a hazardous condition that violates an OSHA standard.*
> - *Exposing Employer – An employer whose own employees are exposed to the hazard.*
> - *Correcting Employer – An employer who is engaged in a common undertaking, on the same worksite, as the exposing employer and is responsible for correcting the hazard. This usually occurs where an employer is given the responsibility of installing and/or maintaining particular safety/health equipment or devices.*
> - *Controlling Employer – An employer who has general supervisory authority over the worksite, including the power to correct safety and health violations itself or require others to correct them.*
>
> *An operator's inspector on a job site may fall into one or more of these categories based upon either the contract requirements or their own actions on a job site. Each category has varying degrees of responsibility for identifying, notifying and correcting hazards.*

Further guidance is also available in **Safety and Health Program Requirements for Multi-Employer Projects (ANSI/ASSE A10.33-2011)** which "…sets forth the minimum elements and activities of a program that defines the duties and responsibilities of construction employers working on a construction project where multiple employers are or will be engaged in the common undertaking to complete a construction project" (ASSE Tech Brief 1/18/12).

2. Availability of PPE

a. Confirm that the contractor's personnel have the appropriate Personal Protective Equipment required for the planned work.

3. Site Safety Plan

a. Site Safety Plan requirements may be contained within contract documents.
b. Confirm that provisions for reporting damages and the release of gas are in place. These plans should include contact to emergency responders through the 911 system and communications with the operator.

> ***PIPELINE INSPECTION, PROTECTION, ENFORCEMENT, AND SAFETY ACT OF 2006***
> *(d) PROHIBITION APPLICABLE TO EXCAVATORS.—A person who engages in demolition, excavation, tunneling, or construction— (3) and who causes damage to a pipeline facility that may endanger life or cause serious bodily harm or damage to property—*
> *(A) may not fail to promptly report the damage to the owner or operator of the facility; and*
> *(B) if the damage results in the escape of any flammable, toxic, or corrosive gas or liquid, may not fail to promptly report to other appropriate authorities by calling the 911 emergency telephone number.*

c. Confirm that there are provisions for monitoring the atmosphere of a trench and that appropriate equipment is available.
d. Confirm that provisions for reporting personnel injuries or property damage are in place.
e. Plans for work area protection
    i. Confirm appropriate work area protection is established. Follow requirements from Manual on Uniform Traffic Control Devices where required by State or local regulations.

4. Job Briefings

a. Verify that appropriate daily job briefings / tailboard meetings are conducted and documented if required. If necessary, job briefings / tailboard meetings may need to be repeated as new individuals arrive on site or as other conditions change.

B. Confirming required Notifications and Permits

1. Verify that required permits have been obtained and are on site. These may include:

a. Municipal Road Opening permits,
b. Environmental permits,
   i. ACOE river / stream crossing permits,
c. Railroad Crossing Permits,
d. City, County and/or State agency permits.

2. Confirm that 811 utility locating notification is made.

C. Control of Materials

1. Authorized components

a. Check that that the materials planned for use on the project comply with operator standards. Some companies may procure materials and turn them over to the contractor. Others may allow the contractor to procure the materials. This practice may vary based upon whether the materials are gas carrying components or consumables used during the construction process.

2. Inspection requirements before use

> **§192.307 Inspection of materials**. *"Each length of pipe and each other component must be visually inspected at the site of installation to ensure that it has not sustained any visually determinable damage that could impair its serviceability."*

a. Receiving Inspection

i. The first chance an operator or contractor has to inspect material is upon receiving. This may take place at an operator's warehouse or storeroom. Or, materials may be delivered directly to the job site ("street drop"). Acceptance criteria for this inspection should be specified. For example, for plastic pipe, a scratch or gouge that does not penetrate deeper than 10% of the pipe's wall thickness may be acceptable.
ii. Operator or contractors should inspect all incoming pipe shipments to verify the pipe is undamaged.
iii. Once the materials are subsequently moved to an installation site, the operator or contractor must perform another inspection.

b. **Proper Pipe Handling**

i. Coated Pipe should be delivered from trucks, trailers or railcars with padded cradles and fasteners. It should be unloaded, supported and racked to prevent damage to the coating. It should be inspected during the material receiving phase to confirm there are no defects.

ii. Plastic Pipe should be handled according to manufacturer recommendations. Typically this includes requirements to store the pipe in smooth, flat locations free of debris that could damage the pipe. They will also specify stacking heights for various sizes of pipe. Do not drop or drag plastic pipe. Do not use chains or wire rope to unload plastic pipe.

iii. Pipe should be stored in a manner that prevents anything from entering the pipe, or any contaminants from contacting the pipe. Where the available pipe storage does not provide protection from water and debris, closing the ends of the pipe should be considered.

iv. Pipe should be strung leaving gaps for passage of equipment / vehicles.

c. **Appropriate Plastic pipe within allowable time limits**

i. Check that the plastic pipe includes a reference to ASTM D2513 and that the SDR is appropriate. Check the date on the printed information line on the pipe to verify that it is within the current regulatory established time period.

d. **Materials protected from damage at the job site**

i. Once materials are unloaded at the job site, precautions should be taken to prevent damage to the materials prior to use. This includes proper stacking of pipe, use of dunnage to raise pipe above surface level, prevention of debris, water, animals, and other contaminants from entering materials and pipe.

ii. Avoid compression, damage, or deformation to ends of plastic pipe.

e. **Process for segregating and reporting non-conforming materials**

i. Each operator should have a program for reporting material deficiencies. If they are discovered during receiving, they may need to be noted on the bill of lading in order to return the material. All such deficiencies should be documented so that they can be corrected and analyzed for trends. See Section V.H. “Non-conformances” of this white paper. If material needs to be stored temporarily before return to the supplier or manufacturer, these should be segregated from acceptable materials to prevent them from being installed in the system.

f. **Traceability**

i. Consider what material documentation will be required for the final as-built record and start to collect copies upon receipt of the material.

ii. If pre-tested pipe will be installed, verify that there is traceability from the pipe to be installed to the documentation of its pressure test.

V. INSPECTION

A. Conducting the Inspection Process

§192.13 requires that no person may operate a segment of pipeline unless *"(a)(1) The pipeline has been designed, installed, constructed, initially inspected, and initially tested in accordance with this part ."*

§192.305 Inspection: General
"Each transmission line or main must be inspected to ensure that it is constructed in accordance with this part."

Final Rule Published March 11, 2015
§192.305 Inspection: General
"Each transmission line and main must be inspected to ensure that it is constructed in accordance with this subpart. An operator must not use operator personnel to perform a required inspection if the operator personnel performed the construction task requiring inspection. Nothing in this section prohibits the operator from inspecting construction tasks with operator personnel who are involved in other construction tasks".

Note: On September 30, 2015, PHMSA published a notice that "delayed indefinitely" the effective date of the March 11 final rule related to §192.305.

At the time this document is being issued, a joint industry, State Regulator, and Federal Regulator group is working to further define inspection requirements and guidelines

1. The Transmission line and Main construction process must be inspected according to the existing requirements of §192.305. Although inspection for service installations is not specifically addressed, there are other regulatory requirements for service installations that must be met. Operators should confirm that they and their contractors understand what persons will be performing inspections.

2. Each operator needs to decide based on risk the level of real-time inspection (inspection as construction takes place). This is inspection of the task/work by either an operator's inspector or another contractor's employee such as a Job Supervisor / Foreman. Some projects may use a contract inspector on-site at all times. Others may allow for periodic random checking of the contractor. Some project characteristics to consider include:

a. Risk characteristics of the installation. The level of inspection may vary based upon Pipe diameter, MAOP, % SMYS, proximity to high risk buildings (Schools, Hospitals, etc.);
b. Level of experience and past performance of the particular contractor crew and foreman;
c. Complexity and public sensitivity to the project;
d. A previously published White Paper entitled "AGA Guidelines for Oversight of Construction for Transmission Pipelines, Distribution Mains and Services" April 2013 offered more examples of risk based factors. These are discussed in Section V. F. of this paper.

3. Each operator needs to consider whether to conduct a post-construction quality audit. This involves returning to the construction location and digging up the installation to check the actual conditions including compaction, depth, distance from other utilities, etc.

B. Inspector organizational independence

1. The operator should confirm that whoever is acting as an inspector did not perform the work being inspected. If a contractor employee is fusing pipe and an operator's inspector is not on-site, then another qualified crew member should inspect the fusion.

2. The operator also needs to confirm that anyone acting as an inspector has the organizational freedom to identify non-conformances without fear of reprisal.

C. Hold Points for utility witnessing

Several key inspection areas in construction or "Hold Points" should be considered for higher frequency inspection during the construction process. These may be for higher risk activities or for higher risk facilities (such as higher operating pressure). The operator can specify that the contractor cannot proceed with these activities until an operator representative is on-site and prepared for proper inspection. Examples of construction hold points may include, but are not limited to:

1. Directional Drilling Pull-back,
2. Pressure tests,
3. Pigging,
4. Drying out mains and regulator stations following Hydrostatic Testing,
5. Stopping the flow of gas,
6. Purging and Tie-ins,
7. Tracing Wire Continuity Tests or Electronic Marker Installation.

D. Types of Inspections

1. Inspections verify that work is completed according to the specifications provided by the operator from sources including, but not limited to; referenced regulatory or industry standards, referenced operator procedures/standards and specific contract language.

Inspection also includes consideration for safety, environmental permits/requirements, customer consideration and other items defined by the operator.

The following inspection categories provide general topics for inspection that can be used in a Contractor Quality Management Program to document and evaluate a contractor's performance in meeting an individual operator's requirements. Inspection will vary based on state requirements and individual operator requirements. Section E includes more detail on these inspection categories.

a. Daily pre-work Site Inspection

i. Safety briefings completed;
ii. Required damage prevention activities performed (if excavating);
iii. Required permits on-hand;
iv. Customer Communication made if required;
v. Traffic Control in place;
vi. Ambient conditions evaluated (conditions that could affect safety or construction practices).
vii. Pipe and other component inspection
viii. Instrument calibration.

b. Daily post-work Site Inspection

i. Required safety or environmental reporting complete (if necessary);
ii. Required damage prevention activities performed for next construction day (if necessary);
iii. Excavations/other work areas secured;
iv. Customer Communication made if required;
v. Traffic Controls removed or secured;
vi. Housekeeping check completed.

c. Open Trench Inspection (Daily)

i. Proper depth;
ii. Proper separation from existing utilities maintained;
iii. Trench within working easement;
iv. Spoil separated if required (i.e. top soil separated in agricultural areas);
v. Rock removed from spoil if spoil is to be used as backfill;
vi. Pipe handling;

vii. Welding;
viii. Plastic pipe joining, with tracer wire installed;
ix. Nondestructive testing (NDT or NDE).
x. Coating holiday detection;
xi. Proper support (valves, other stress points);
xii. Required documentation completed;
- As-builts
- Exposed pipe condition reports
- Test reports

xiii. Backfill with warning tape.

d. Open Trench Inspection (post completion)

i. Required compaction achieved;
ii. Final permit requirements complete (environmental, road, etc.);
iii. Work area properly restored;
- Final grade
- Surface restoration (paved, seeded/strawed)
- Restore temporary access to ROW (fences, etc.)
- Vegetation is properly replaced or restored.

e. Directional Drill/Boring Inspection (Daily)

i. Bore/HDD entry/exit targets,
ii. Utility crossings or conflicts test holed,
iii. Drill mud,
iv. Welding,
v. Non-Destructive Examination (NDE),
vi. Coating,
vii. Pullback,
viii. Post pullback testing completed (hydro, ILI run).

f. Directional Drill/Boring Inspection (post completion)

i. Drill mud/fluids disposal;
ii. Final permit requirements complete (environmental, road, etc.);
iii. Work area properly restored:
- Matting removed from site
- Required compaction achieved
- Final grade
- Surface restoration (paved, seeded/strawed)
- Restore temporary access to ROW (fences, etc.).

E. Inspecting Specific Activities

The activities in this section are performed at various times during the construction process. This section provides guidelines for inspection.

1. Determining Excavation Compliance

a. General Excavation Practices

i. Verify markings are made by other utilities or their contractors under 811.

ii. Locate, mark, and hand excavate to expose all underground utilities and obvious obstructions prior to use of mechanical digging equipment within the excavation area.

iii. Follow CGA best practices and state law for Excavation for hand-digging in tolerance Zone, etc.

iv. Disturbance of pavement within Right-of-Way complies with requirements established by jurisdictional authorities.

v. Highway crossings are continually maintained until construction is completed.

vi. Railroad crossings are properly installed and comply with railroad company requirements.

vii. Sewer lines and drain tile are protected during pipe installation and any damages are immediately repaired.

viii. All employees/contractors working in or around any trench or excavation are responsible for determining that the area is safe before entering. Follow existing local, state and federal shoring/sloping requirements.

ix. Confirm that excavations and trenches that are unattended or remotely located from the actual work site are covered or barricaded to protect the public.

x. The size and depth of the excavation will be determined by the nature of the job. However, the overall objective should be to make the excavation as small as possible and yet permit the job to be safely and efficiently completed.

xi. Verify that the best location for the installation has been determined from the available information prior to the start of excavation or pavement cuts.

xii. Verify that exposed facilities are adequately and properly supported to minimize the possibility of damage.

xiii. When existing foreign underground facilities are exposed and found to be damaged, confirm that the property/facility owner has been notified.

xiv. Confirm foreign facilities are adequately and properly covered with backfill material that is at least as good as the previously existing backfill

material, with compaction and support that is at least as good as the previously existing compaction and support and with separation to other facilities, structures, improvements, rocks, caliche, debris or other injurious materials that is at least equivalent to the previously existing separation.

xv. Confirm that the appropriate operator company has been contacted when the contractor is using booms or excavating equipment within 10 feet of overhead power lines rated up to 50kV. Higher voltage lines often require greater clearance distances.

b. Environmental Sediment Control

i. Pipeline is constructed as specified at rivers, creeks and waterways.

ii. Erosion and Sediment Control Plan requirements are followed where required including:

- Storm water runoff considerations,
- Permanent and temporary stabilization,
- Protection of wetlands areas and critical buffer zones,
- Sediment traps.

c. Distance from other utilities

> **§192.325 Underground clearance**. *"(a) Each transmission line must be installed with at least 12 inches of clearance from any other underground structure not associated with the transmission line. If this clearance cannot be attained, the transmission line must be protected from damage that might result from the proximity of the other structure. (b) Each main must be installed with enough clearance from any other underground structure to allow proper maintenance and to protect against damage that might result from proximity to other structures. (c) In addition, each plastic transmission line or main must be installed with sufficient clearance, or must be insulated, from any source of heat so as to prevent the heat from impairing the serviceability of the pipe."*

i. Crossings of foreign facilities are made with a minimum clearance of 12-inches, where practical.

ii. Owners of foreign facilities are immediately notified of damages and repairs are made accordingly.

d. Depth

> **§192.327 Cover**. *This section defines the requirements for cover for transmission lines as a function of class location and soil conditions and also dictates the depth of cover for distribution mains.*

§192.361 Service lines: Installation prescribes the requirements for service line installations relative to "*(a) Depth"*

i. Cover and depth requirements for mains and services are met.
ii. If depth requirements cannot be met due to some other underground structure, operator approved additional protection to withstand anticipated external loads is provided.

2. Pipe Lowering/Installation

Contractor uses appropriate equipment for lowering pipe (includes heavy equipment for moving the pipe, temporary supports for the pipe in preparing to lower and attachment equipment used to lift the pipe, i.e. slings).

a. Proper permanent supports in place (if necessary) for pipe or appurtenances in the trench.
b. Non-desired objects (rocks, etc.) removed from trench and spoil which would damage coating during and after pipe installation.
c. Required padding in place.
d. The ditch bottom provides a continuous, uniform support for each joint of pipe.
e. On insertions, old pipe was prepared in accordance with operators requirements.
f. On Insertions, a visual inspection of the inserted end of the pipe is made to determine if the pipe was damaged.
g. Allowance was made for contraction of pipe.
h. Documentation required prior to backfill complete.

3. Directional Drilling

a. Bore/HDD entry/exit targets agree with construction drawings.
b. Crossings or conflicts in the drill path have been test holed and the elevations verified.
c. Proper matting/support for drill rigs/receiving equipment.
d. Drill mud appears to have proper consistency.
e. Lubricating head functioning properly for pullback.
f. Pipe coating proper for bore/drill construction.
g. Pullback consistent indicating minimal obstruction and proper lubrication.
h. A visual inspection of exposed pipe is made to determine if the pipe was damaged upon pull back.
i. A good practice is to record the depth of crossed utilities along with the separation distance from the gas facility.
j. Tracer wire continuity test is conducted after pull back.
k. Post pullback testing completed (hydro, ILI run).

l. Upon completion of the bore, examine the equipment with a voltage detector prior to handling to verify it has not come in contact with underground electric cables.
m. Drill mud/fluids properly disposed.
n. Matting removed from site.
o. Final permit requirements complete (environmental, road, etc.).
p. Post-installation mark out of the final drill path may be required by operator procedures.
q. All operator required records of the directional drill process are completed and submitted as a part of the as-built record.

4. Pipe Condition

a. Any plastic pipe scrapes or gouges are within the operator's and manufacturer's acceptance criteria (typically < 10% wall thickness).
b. Gouges and grooves on steel pipe are removed by grinding when within operator guidelines on depth and percent of wall thickness.
c. Dents, gouges and groves in steel pipe that are outside of acceptance criteria are removed by cutting out and replacing the section of pipe.

5. Fusion

> ***§192.273*** *General. (c) Each joint must be inspected to insure compliance with this subpart.*
> ***§192.283*** *Plastic pipe: Qualifying joining procedures c) A copy of each written procedure being used for joining plastic pipe must be available to the persons making and inspecting joints*

a. Ambient conditions are conducive for fusing.
b. Fuser has proper qualifications for the type of fusion, pipeline size and material.
c. Fusion machines are types approved by operator fusion procedures.
d. Pipe is properly cut and prepped at ends to be fused.
e. Fusion machine is functioning properly.
f. Visual inspection of pipe line-up is acceptable.
g. Fusion parameters (temp, times, required force) meet required specifications for the type of pipe and fusion equipment.
h. Fusion temperature has been checked by operator approved methods.
i. Temperature verification equipment is calibrated and working properly.
j. Fusion bead appearance is consistent with the material type according to operator procedures.

6. Pipe Joining by Mechanical Coupling

> ***§192.273*** *General. (c) Each joint must be inspected to insure compliance with this subpart.*
> ***§192.283*** *Plastic pipe: Qualifying joining procedures c) A copy of each written procedure being used for joining plastic pipe must be available to the persons making and inspecting joints*

a. Flanged connections
   i. Flanges are proper pressure classification.
   ii. Gaskets are proper for pressure classification.
   iii. Nuts, bolts and studs are proper.
b. Mechanical couplings
   i. Coupling pressure rating is correct for pipeline.
   ii. Coupling is aligned correctly according to operator procedures or manufacturer instructions and tightened to the specified torque.
   iii. Pipeline sections being joined are not in a bind.
   iv. Coupling is reinforced according to operator procedures or manufacturer instructions.
c. Threaded
   i. Threaded pipe meets minimum gauge according to operator procedures.
d. Stab
   i. Proper Stab depth achieved.
e. Documentation
   i. Installer ID recorded as required.

7. Welding

> ***§192.241 Inspection and test of welds.*** *(a) Visual inspection of welding must be conducted by an individual qualified by appropriate training and experience to ensure that:*
> *(1) The welding is performed in accordance with the welding procedure; and*
> *(2) The weld is acceptable under paragraph (c) of this section.*

a. Pre-weld activities
   i. Verification that welders are certified on the procedures for the work to be performed.
   ii. Welding rods are correct for the material and in accordance with operator welding procedures and stored properly if required (for example, low hydrogen rods in ovens).
   iii. Welding machines are set correctly according to operator procedures.
b. Ambient conditions are considered.

c. Pre-heat is performed if necessary based on ambient conditions, type of pipe, operator welding procedures, etc.
d. Proper grounding is observed.
e. Verification that pipe is not magnetized is performed and proper demagnetization equipment is available if necessary.
f. Weld ends are properly prepped for welding.
g. Pipe or fittings are properly aligned and clamped.
h. Seams on pipe are alternated if pipe has seams.
i. Proper type and size of welding rod is used.
j. Welding is performed according to procedure.
k. Welding Procedures comply with specified requirements.
l. Welding machines and appurtenances are suitable for the work and are maintained in good condition.
m. A visual inspection is made of all welds for obvious defects.
n. Welds not meeting specified requirements are rejected.
o. A defective weld that cannot be repaired following approved procedures must be cut out, removed and replaced by a cylindrical piece of pipe of equal or greater design strength, or repaired by installing a full encirclement welded split sleeve of appropriate design.
p. Welders failing to meet welding requirements are disqualified.
q. Welds are non-destructively tested where specified.
r. Defective welds are repaired or removed as specified.

8. Non-Destructive Testing

> ***§192.241 Inspection and test of welds*** *(b) The welds on a pipeline to be operated at a pressure that produces a hoop stress of 20 percent or more of SMYS must be nondestructively tested in accordance with §192.243, except that welds that are visually inspected and approved by a qualified welding inspector need not be nondestructively tested if:*
>
> *(1) The pipe has a nominal diameter of less than 6 inches (152 millimeters); or*
>
> *(2) The pipeline is to be operated at a pressure that produces a hoop stress of less than 40 percent of SMYS and the welds are so limited in number that nondestructive testing is impractical.*

a. Verify type of non-destructive examination (NDE) to be performed according to construction details and operator procedures.
b. Confirm welding personnel properly identify welds to verify that proper sampling for all welders can be performed if not performing 100% radiography.
c. Verify NDE contractor is approved by operator.
d. Verify that welds are properly cooled prior to NDE work performed.
e. Confirm that contractor has welder certified to repair welds that do not meet approval criteria.

9. Coating

a. Consider ambient conditions and verify that the contractor has proper facilities and preheats according to weather conditions.
b. Confirm that the contractor is using correct coating materials of a type approved by the operator and verifies shelf-life of products specified by operator procedures or design specifications.
c. Verify contractor allows welds to properly cool and prepares coating surface correctly according to operator policy and product specifications.
d. Verify that the contractor following proper product mixing instructions (if necessary) and follows time allowed to use material.
e. Confirm that the contractor is following operator procedures or design specifications for identifying coating defects and repairing properly.
f. Underground valves and assemblies are satisfactorily pre-coated as specified.
g. Holiday detectors are used on pipe just prior to lowering in ditch:
    i. Contractor furnishes suitable holiday detectors with operators.
    ii. Detectors are operated to provide spark which would span a gap twice the coating thickness.
    iii. Holiday detectors are tested, as a minimum, each day before work started, before noon, after noon and at end of work.
    iv. All holidays are repaired and retested with detectors.
    v. Lowering-in operations are not continued if holiday detectors are not properly operating.
    vi. Holiday detector testing is recorded as required by the operator's procedures.
h. Electrical test leads are installed at designated locations by an operator approved method.
i. Test lead connections and bare ends of lead wires are coated and/or wrapped.
j. Verify that the casing pipe is coated and wrapped as specified.
k. Confirm that all defective coating is repaired before backfilling.
l. Confirm that all aboveground piping is cleaned and coated appropriately.
m. Verify that coated steel pipelines and facilities are cathodically protected (within one year of installation).
n. Verify that underground coatings are not installed above ground unless they contain ultraviolet inhibitors to prevent deterioration of the coating when exposed to sunlight, or the coating is painted.
    i. Paint typically does not adhere well to polyethylene and polypropylene coatings.
    ii. Above ground coatings cannot be used on pipe that is to be buried unless specified by the manufacturer.

10. Cleaning and Pressure Testing

a. The pipeline is thoroughly cleaned (pigged) before testing using the method, sequence and equipment specified, if required.

b. The pipeline is tested as specified after internal cleaning.
c. Pressure is stabilized prior to start of test time.
d. The test after installation is conducted as specified and the test pressure is maintained for the specified time period.
e. Test equipment and procedures are satisfactory. Confirm that only approved and properly calibrated pressure- indicating devices are used for pressure testing.
f. Pipe is successfully dewatered and dried out after hydrostatic testing.
g. Soap test of fittings not included in pressure test is performed.
h. Air is suitably purged from the pipeline before the pipeline is placed in service.
i. All test records are completed and retained in the job package which is forwarded to the appropriate operator representative.

11. Tie-In Process

a. Pressure gauges are established to monitor pressure.
b. Hot tap procedures are properly performed.
c. Purging operations are properly performed and odorant detected.
d. Proper PPE used and operable fire extinguisher is in place as required.
e. Static control and grounding methods are used as required.
f. Squeeze off points are properly identified.
g. CGI (Combustible Gas Indicator) is calibrated and used during purging operations.
h. Abandoned pipe is purged and sealed as required.

12. Cathodic Protection

a. Pipe-to-soil potential readings are taken as required.
b. Anodes are properly connected and installed to specifications.
c. Isolation fittings are properly installed as required.
d. Test Stations are properly connected in accordance with specifications.
e. Pipe removed is inspected for internal corrosion as required.

13. Backfill & Compaction

***192.319 Installation of pipe in a ditch**. "(b) When a ditch for a transmission line or main is backfilled, it must be backfilled in a manner that:*

(1) Provides firm support under the pipe; and

(2) Prevents damage to the pipe and pipe coating from equipment or from the backfill material."

***§192.361 Service lines: Installation** prescribes the requirements for service line installations relative to "(b) Support and backfill"*

a. Confirm that all documentation required prior to backfill is complete. This may include material information, position of welds, GPS location for fittings, etc.
b. Confirm that all coating is complete and cured properly for backfill.
c. Confirm that any required support is completed for valves, fittings, etc.
d. Verify proper padding material according to design specifications and padding meets requirements for facility coverage.
e. Determine that remainder of backfill material meets operator specifications and is free of rocks and undesired fill.
f. No foreign substances or refuse material is contained in the backfill material.
g. Verify that the contractor installs tracer wire for plastic pipe installation according to operator procedures.
h. Verify that the contractor installs any other locating tape, electronic markers or other facilities according to operator procedure or design specifications.
i. Verify that the contractor is backfilling in the number and depth of lifts required by the operator and in a manner that does not to damage installed facilities.
j. Mechanical tamping is utilized where required by jurisdictional authorities or operator specifications.
k. Banks of streams or draws are rip-rapped where necessary to prevent backwashing over the trench.
l. Shoring, rip-rap, sack breakers, terraces or drainage ditches are utilized where necessary to protect the backfill.
m. Backfill of roadways, draws and creeks is suitable to jurisdictional agencies and the completed backfill does not affect traffic or drainage.
n. Appropriate operators are contacted when damage occurs to foreign pipelines or other facilities during backfilling and they are repaired.
o. Excessive spoil which could not be returned to the trench is suitably disposed of properly.
p. Surface soil is returned to its original position in cultivated area where required.

14. Services

a. Excess Flow Valve is installed, if required.
b. Proper protection for shear points and casings is installed.
c. Curb Valve is installed as required.
d. Meter manifold, service regulator and riser are installed properly, plumb and square.
e. Sufficient separation is achieved from the service regulator vent to electric facilities and openings into the building.
f. Unused service riser meter valve is closed and locked.
g. Meter manifold and piping is properly coated to protect from atmospheric corrosion.
h. Appropriate meter protection is installed.

15. Right of Way Maintenance and Restoration

a. Fences are securely braced before cutting. Temporary gates are constructed, and watchmen are furnished to maintain these gates where necessary.
b. Lights, markers, signs and guards are provided where necessary to protect, persons, vehicles, or livestock.
c. Suitable temporary passageways, fences, walks, etc. are provided and maintained for continuous traffic control.
d. Irregularities in topography are graded out and top soil is preserved where specified.
e. Compliance with Right-of-Way requirements is maintained, property damages are minimized and work is confined to the Right-of-Way.
f. Right-of-Way is properly cleared and debris is disposed of satisfactorily.
g. Top soil is preserved for replacement to its original position, where required.
h. Trees, shrubs, hedges, lawns, etc. are preserved where specified.
i. Fences or hedge gaps are permanently replaced during clean-up with materials comparable to the original facility.
j. Where paralleling existing pipelines, construction equipment is not operated over and excessive spoil is not left on those pipelines.
k. Continuous service of communication lines crossed during construction or movement of equipment is maintained.
l. Every effort is made during clean-up operations to leave a good impression with property owners and tenants affected by construction.
m. Pipeline marker signs are installed at all roadways, railroads or other special designated locations.
n. Excessive or defective materials are returned to storage sites and the pipe joints are beveled and cleaned before storing.

16. Contract Compliance

a. Often an additional duty of an inspector is to verify compliance with contract provisions. This may include:
    i. Recording of quantities of materials received or removed such as spoils, sand, and asphalt.
    ii. Check of all materials to make sure they comply with plans and specifications.
    iii. Confirming completion of daily pay items.
    iv. Preparing and/or checking weekly or monthly construction progress reports.

F. Sampling Inspections - Sample rates based upon risk

> ***AGA Commitment to Enhance Safety*** *issued in May 2012 and updated October 2015 includes: "Review and revise established construction procedures to provide for appropriate (risk based) oversight of contractor installed pipeline facilities."*

1. The frequency of Inspection for Distribution construction projects should be dictated by the complexity of the project.

Examples that may need more frequent inspection include: high pressure facilities, deep excavations, heavy traffic control, tie-ins, boring operations, gas handling, extensive paving, etc.

a. A previously published White Paper entitled "AGA Guidelines for Oversight of Construction for Transmission Pipelines, Distribution Mains and Services", April 2013, offered the following examples of risk based factors:

i. *"Complexity of project (Transmission main, distribution main or service)*
ii. *Size/ length of project (diameter and/ or miles)*
iii. *Number of construction personnel*
iv. *Number of construction locations (spreads)*
v. *Complexity of construction tasks*
vi. *Is the project new construction or reconstruction?*
vii. *Is the work being performed by company or contractor personnel?*
viii. *Experience level of personnel*
ix. *Are the tasks performed frequently or infrequently (e.g. daily vs. annually)?*
x. *Results of previous oversight evaluations of construction personnel*
xi. *Underground clearance from other utilities and structures*
xii. *Other factors".*

2. One approach is to apply statistical sampling to the inspections. ANSI/ASQ Z1.4 and related computerized calculators can be a reference to help determine sample sizes. This may involve:

a. Determination of the risk of a nonconformance within an activity (Critical, Major or Minor).
b. Assignment of an acceptable quality level (%) for the activity.
c. Determination of the population size of the activity (how many times does it occur over a period of time).
d. Establishing the desired statistical confidence level for the series of inspections.
e. Using these factors and determining the sampling plan for the standard (or normal) number of inspections.
f. Adjustment of the sampling plan (number of inspections) based upon any discovered failures (tightened inspections, for example).

3. Another approach is to establish inspection requirements applicable to each contractor crew including the activities to be inspected and the number of inspections per year.

4. Random post construction audits (dig-ups) can also be used. This is typically completed before final pavement restoration and can include verification of compaction before the dig-up.

G. Tracking Inspection Results

1. Consider the benefits of implementing a computer program and electronic database to capture information related to the inspection process in order to:

a. Document inspections electronically.
b. Develop an inspection database with research, calculation and reporting capabilities.
c. Identify trends and areas of focus based on inspection results.
d. Document any remedial action performed.
e. Capture the records for the entire company in one central location.

H. Non-Conformances

1. Process for identifying non-conformances

a. Deficiencies are identified including the date found, name of the individual noting the deficiency and a description of the deficiency.
b. Digital photos are taken, if required.
c. Material failures are documented and materials are segregated and saved for further analysis.

2. Stop Work Authority

a. Anyone involved with the construction project should have the authority to stop work and identify non-conformances with specifications.
b. This authority should be clear and unambiguous and should be free from any penalties or reprisals.

3. Resolving non-conformances

a. Contractor actions to resolve non-conformances should be documented regardless of whether the non-conformance can be corrected immediately on-site or whether further review is required.

b. The operator should consider if remedial work is necessary for previously installed facilities with the same characteristics as the failed component and/or process. This may include digging up and inspecting similar installations.

c. There should be a process in place for the inspector and / or Company Authorized Representative to indicate concurrence with the contractor's plan to resolve the nonconformance.

4. Tracking and adjusting individual qualifications due to non-conformances

> ***§192.805 Qualification program.*** *Each operator shall have and follow a written qualification program. The program shall include provisions to:*
>
> *(e) Evaluate an individual if the operator has reason to believe that the individual is no longer qualified to perform a covered task;*

a. If the cause of any non-conformance is found to be operator error, then the operator should evaluate the qualifications of the individual(s) involved. The need for retraining and/or requalification should be documented.

5. Identifying corrective actions to preclude future non-conformances

a. The contractor should work to correct the immediate non-conformance and also identify corrective actions required to preclude a future similar non-conformance.

VI. DOCUMENTATION

A. Verifying Proper Record Keeping

1. Material Traceability

a. Verify that the operator's requirements for maintaining material traceability are followed. This may include recording unique material identifiers through the use of bar codes or other electronic means.

2. Accurate as-built documentation (maps or mobile device recording)

a. Responsibility for maintaining up-to-date as-built documentation is usually detailed in the contract. This may be a responsibility of either the contractor or the operator's inspector.
b. The contract may also spell out the review process for these records including time limits for submittal.

3. Photographic Record

a. Photographic records can be useful to document the conditions and activities on the job site. These also provide a record that can be reviewed during later Quality Assurance audits.
b. Photograph any special event worthy of extraordinary attention and take notes to supplement the images including date time and location.
c. Photograph any condition that differs from what is shown on drawings or specifications
d. Take random area-wide photographs to document overall conditions both during pre and post-construction.
e. Select a convenient place near each major part of the project and photograph the work in progress regularly from that same location.
f. Signs of inactivity are just as important as activity photographs.
g. Verify that you are close enough to the work to show detail in the photograph and that the scale of items in the photograph can be easily determined: Use people, tape, or hardhat, for reference.
h. Label and save images in the project file. If required, include a photo placard filled out with details (time, date, location, etc.) in the image.
i. Photograph any existing damaged conditions or damage caused by a contractor.
j. If the camera has a date insert, make sure that it is properly set.

4. Process to resolve record discrepancies

a. There should be an established process to review as-built documentation for accuracy, completeness and consistency.
b. The process should identify responsibilities for investigating any discrepancies, making the changes and accepting the final document.
c. There should be a mechanism to provide feedback about any discrepancies to those responsible for collecting the as-built information.

5. Record retention

> ***§192.243 Nondestructive testing*** *(f) When nondestructive testing is required under §192.241(b), each operator must retain,* ***for the life of the pipeline****, a record showing by milepost, engineering station, or by geographic feature, the number of girth welds made, the number nondestructively tested, the number rejected, and the disposition of the rejects.*
> ***§192.517 Records.*** *(a) Each operator shall make, and retain* ***for the useful life of the pipeline****, a record of each test performed under §§192.505 (hoop stress ≥ 30% SMYS) and 192.507 (≥ 100 psig operating pressure)*
> *(b) Each operator must maintain a record of each test required by §§192.509 (steel main < 100psig), 192.511 (service lines), and 192.513 (plastic lines)* ***for at least 5 years.***

a. Verify that all required records are collected and submitted for retention according to operator policy.

VII. PERFORMANCE MEASUREMENT

A. Measuring Performance

1. Operators regularly measure the key interrelated variables of any project: Scope, Schedule and Budget.

2. The quality performance of the contractor can affect all three of those variables. Operators should create and monitor performance indicators of the quality activities to understand their impact on the project performance as a whole.

3. Some possible performance indicators are:

    a. Total number of non-conformances identified,
    b. Number of non-conformances identified per 100 inspections (or conversely, the percent of inspections completed without a non-conformance),
    c. Number of design changes required,
    d. Number of stop work orders issued,
    e. Number of welds or fusions requiring rework or repair,
    f. Number of days or hours lost due to rework,
    g. Number of unplanned customer outages,
    h. Number of unplanned events resulting in the release of gas,
    i. Number of unplanned events resulting in the release or spill of other hazardous materials,
    j. Number of customer or public complaints,
    k. Number of regulatory inspections resulting in a non-conformance,
    l. Number of local government inspections identifying non-conformances.

4. Performance measures can also include ranking or scoring systems to reflect the relative severity of the non-conformances in relation to each other. This can result in an overall score for a particular contractor.

5. Any system of performance measures should detail:

    a. The organization(s) responsible to collect the data, report the data, and review the data.
    b. The schedule and period of time between the reporting of the data (monthly, quarterly, etc.).