|  |  |
| --- | --- |
| **Inspection Report** | **Post Inspection Memorandum** |
| **Inspector/Submit Date:** |       | **NC Required?** |       |
| **Inspection Tracking # :** |       |
|  | **NC Tracking # :** |       |
|  |
| **Name of Operator:**       | **OPID #:**       |
| **Name of Unit(s):**       |  |
| **Records Location:**       |  |
| **Unit Type & Commodity:** Natural Gas |
| **Inspection Type:**       | **Inspection Date(s):**       |
| **PUC Representative(s):**       | **Field Days:**       |  |

|  |  |  |
| --- | --- | --- |
| **Persons Interviewed** | **Titles** | **Phone No.** |
|       |       |       |
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| **Summary:** |
| --- |
|       |

| **Findings:** |
| --- |
|       |

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| --- |
| **Description of compressor station:** |
|       |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Engine**  | **Compressor**  | **Install Year** | **Horse power** | **Max. Press.**  |
|       |       |       |       |       |
|       |       |       |       |       |
|       |       |       |       |       |
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|       |       |       |       |       |

|  |
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| **Compressor Piping** |
| Suction:  |
| Material       Grade       Install Date       Size       Wall thickness       MAOP       MOP       Gas Temp       |
|

|  |
| --- |
| Interstage: |

Material       Grade       Install Date       Size       Wall thickness       MAOP       MOP       Gas Temp       |
| Discharge: |
| Material       Grade       Install Date       Size       Wall thickness       MAOP       MOP       Gas Temp       |
|  |

| **PIPE SPECIFICATIONS** |
| --- |
| .51 |  .55 | Steel Pipe  |
|  |  | **▪** | Manufacturer: |       |
|  |  | **▪** | Manufacturing Standard: |       |
|  |  | **▪** | Pipe Grade: |       |
|  |  | **▪** | Outside Diameter (D): |       |
|  |  | **▪** | Wall Thickness (t): |       |
|  |  | **▪** | Type of Longitudinal Seam: |       |
|  |  | **▪** | Specified Min. Yield Strength: |       |
|  |  | **▪** | Joint Design - Bevel: |       |
|  |  | **▪** | External Coating: |       |
|  |  | **▪** | Internal Coating: |       |
|  |  | **▪** | Minimum Joint Length: |       |
|  |  | **▪** | Footage or Miles: |       |

| **DESIGN REQUIREMENTS** | **S** | **U** | **N/A** | **N/C** |
| --- | --- | --- | --- | --- |
| **.51** | **MATERIAL SPECIFICATIONS** |  |
|  |  | .55 | Does the steel pipe meet one of the **API** or **ASTM** listed specifications?  |     |     |     |     |
|  |  | .63(a) | Are pipe, valves, and fittings properly marked for identification? |     |     |     |     |
|  |  | .63(c) | Were pipe, valves, and fittings marked with other than field die stamping? |     |     |     |     |
| **.101** | **PIPE DESIGN** |  |
|  |  | .105(a) | Was the pipeline designed in accordance with this formula: **P = (2St/D) x F x E x T** |     |     |     |     |
|  |  | .111 | Is a design factor of 0.50 used if the compressor station is in Class 1 and Class 2areas? |  |
|  |  | .112 | If the pipeline is designed to the alternative MAOP standard in 192.620 (80% SMYS) Refer to Attachment 1 for additional design requirements.  |  |
|  |  | .113 | Is the **longitudinal joint factor (E)** for steel pipe equal to **1**? (See table) |     |     |     |     |
|  |  | .115 | Is the **temperature derating factor (T)** for steel pipe equal to **1**? (See table) |     |     |     |     |
| **.141** | **DESIGN of PIPELINE COMPONENTS** |  |
|  |  | .143(b) | The design and installation of pipeline components and facilities must meet applicable requirements for corrosion control found in subpart I of this part. |     |     |     |     |
|  |  | .145 | Does each valve meet minimum requirements of **API 6D** or a national or international standard that provides an equivalent performance level? |     |     |     |     |
|  |  | .147 | Does each flange or flange accessory meet the minimum requirements of **ASME/ANSI 16.5, MSS SP44, or ASME/ANSI B16.25**, or equivalent? |     |     |     |     |
|  |  | .149 | Are steel butt welded fittings rated at or above the pressure and temperature as the pipe? |     |     |     |     |
|  | .159 | Is the pipeline designed with enough flexibility to prevent thermal expansion or contraction from causing excessive stresses in the pipe or component? |     |     |     |     |
|  | .161(d) | For a pipeline to operate at 50% of SMYS, are structural supports not welded directly to the pipe, but to a member that completely encircles the pipe? |     |     |     |     |
|  | .161(e) | Is each underground pipeline that is connected to a relatively unyielding line or fixed object provided with enough flexibility to allow for possible movement, or is it anchored? |     |     |     |     |
|  | .199 | Are pressure relief and pressure limiting devices designed and installed correctly? |     |     |     |     |
|  | .201 | Do pressure relief and pressure limiting devices have adequate capacity? |     |     |     |     |
| **.163** | **DESIGN of COMPRESSOR STATION** |  |
|  |  | .163(a) | Is each compressor building located on property under the control of the operator? |     |     |     |     |
|  |  |  | Is the distance to adjacent property far enough to prevent the spread of fire? |     |     |     |     |
|  |  |  | Is there enough space around compressor buildings to allow free movement of firefighting equipment? |     |     |     |     |
|  | .163(b) | Are buildings constructed with non-combustible material? |     |     |     |     |
|  |  | .163(c) | Are there two separate and unobstructed exits on each operating floor of each compressor building? |     |     |     |     |
|  |  |  | Can exit doors be readily opened without keys? |     |     |     |     |
|  |  |  | Do doors swing outward ? |     |     |     |     |
|  |  | .163(d) | Does each fence around a compressor station have at least two gates? |     |     |     |     |
|  |  |  | Does each gate located within 200 feet of a building open outwardly and when occupied must be operated from the inside without a key? |     |     |     |     |
|  |  | .163(e) | Is electrical equipment and wiring installed per ANSI/NFPA 70? |     |     |     |     |
|  |  | .165(a) | Are compressors protected from liquids? |     |     |     |     |
|  |  | .165(b) | Do liquid separators have a manual drain?  |     |     |     |     |
|  |  |  | If slugs of liquid could be carried into the compressor, automatic liquid removal, compressor shutdown, or high liquid level alarm? |     |     |     |     |
|  |  |  | Are liquid separators manufactured in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code or a design factor less than or equal to 0.4 if constructed of pipe and fittings with no internal welding? |     |     |     |     |
|  |  | .167(a) | Does the compressor station have an emergency shutdown system?(Except for unattended field compressor stations of 1,000 horsepower (746 kilowatts) or less) |     |     |     |     |
|  |  |  | Is the ESD able to isolate station and blowdown station piping? |     |     |     |     |
|  |  |  | Is discharge of gas from the blowdown piping at a location where the gas will not create a hazard? |     |     |     |     |
|  |  |  | Will ESD shutdown compressor, gas fired equipment and electrical facilities (except emergency lighting and circuits needed to protect equipment)? |     |     |     |     |
|  |  |  | Are there at least two ESD stations outside gas area near exits gates or emergency exists, not more than 500 feet (153 meters) from the limits of the station? |     |     |     |     |
|  |  | .169(a) | Does compressor station have overpressure protection devices of sufficient capacity to prevent pressure greater than 110% MAOP? |     |     |     |     |
|  |  | .169(b) | Do relief valves vent in safe location? |     |     |     |     |
|  |  | .171(a) | Are there dequate fire protection facilities? If fire pumps are a part of these facilities, their operation may not be affected by the emergency shutdown system. |     |     |     |     |
|  |  | .171 (b) | Does each station prime mover, other than an electrical induction or synchronous motor, must have an automatic device to shut down the unit before the speed of either the prime mover or the driven unit exceeds a maximum safe speed. |     |     |     |     |
|  |  | .171(c) | Does each station have a shutdown or alarm device that operates in the event of inadequate cooling or lubrication of the unit? |     |     |     |     |
|  |  | .171(d) | If the station gas engine operates with pressure gas injection is it equipped so that stoppage of the engine automatically shuts off the fuel and vents the engine distribution manifold. |     |     |     |     |
|  |  | .171(e) | Each muffler for a gas engine in a compressor station must have vent slots or holes in the baffles of each compartment to prevent gas from being trapped in the muffler. |     |     |     |     |
|  |  | .173 | Each compressor station building must be ventilated to ensure that employees are not endangered by the accumulation of gas in rooms, sumps, attics, pits, or other enclosed places.  |     |     |     |     |
|  |  |  | **Maintenance** |  |  |  |  |
|  |  | .731 | Compressor stations: Inspection and testing of relief devices.(a) Except for rupture discs, each pressure relieving device in a compressor station must be inspected and tested in accordance with §§192.739 and 192.743, and must be operated periodically to determine that it opens at the correct set pressure. |     |     |     |     |
|  |  | .731 | (b) Any defective or inadequate equipment found must be promptly repaired or replaced. |     |     |     |     |
|  |  | .731 | (c) Each remote control shutdown device must be inspected and tested at intervals not exceeding 15 months, but at least once each calendar year, to determine that it functions properly. |     |     |     |     |
|  |  | .735(a) | Flammable or combustible materials in quantities beyond those required for everyday use, or other than those normally used in compressor buildings, must be stored a safe distance from the compressor building. |     |     |     |     |
|  |  | .735(b) | Are aboveground oil or gasoline storage tanks protected per NFPA No. 30? (Dikes) |     |     |     |     |
|  |  | .736(a) | Compressor stations: Gas detection.Not later than September 16, 1996, each compressor building in a compressor station must have a fixed gas detection and alarm system, unless the building is-(1) Constructed so that at least 50 percent of its upright side area is permanently open; or(2) Located in an unattended field compressor station of 1,000 horsepower (746 kilowatts) or less. |     |     |     |     |
|  |  | .736(b) | Except when shutdown of the system is necessary for maintenance under paragraph (c) of this section, each gas detection and alarm system required by this section must-(1) Continuously monitor the compressor building for a concentration of gas in air of not more than 25 percent of the lower explosive limit; and(2) If that concentration of gas is detected, warn persons about to enter the building and persons inside the building of the danger. |     |     |     |     |
|  |  | .736(b) | Each gas detection and alarm system required by this section must be maintained to function properly. The maintenance must include performance tests. |     |     |     |     |

| **Comments:**  |
| --- |
|       |

| **.13(c)** | **WELDING AND WELD DEFECT REPAIR/REMOVAL REQUIREMENTS** | **S** | **U** | **N/A** | **N/C** |
| --- | --- | --- | --- | --- | --- |
|  | .225 (a) Are welding procedures qualified under **Section 5 of API 1104** or **Section IX of** **ASME Boiler and Pressure Code** by destructive test.  |     |     |     |     |
|  | (b) Are welding procedures recorded in detail, including results of the qualifying tests? |     |     |     |     |
|  | Note: Alternate welding procedures criteria are addressed in API 1104 Appendix A, section A.3. |     |     |     |     |
|  | .227 (a) Are welders qualified according to **Section 6, API Std. 1104** or **Section IX, ASME Boiler and Pressure Vessel Code**? (Welders qualified under an earlier edition may weld but may not requalify under earlier edition) |     |     |     |     |
|  |  (b) Welders may be qualified under **section I of Appendix C** to weld on lines that operate at **< 20% SMYS.**  |     |     |     |     |
| .229 (a) Are all welders on compressor station piping and components qualified by means other than nondestructive testing? |     |     |     |     |
|  (b) Has the welder welded with this same process and has a weld been tested and found acceptable according to **Section 6 or 9, API Std. 1104** at least twice each calendar year not to exceed 7 ½ months? (Welders qualified under an earlier edition may weld but may not requalify under earlier edition). (c) For “low stress” welder requalification requirements, references 192.229(d).  |     |     |     |     |
| .231 Is the welding operation protected from the weather conditions that could impair the quality of  the completed weld? |     |     |     |     |
| .233 Miter joints (**consider pipe alignment**) |     |     |     |     |
| .235 Are welding surfaces clean, free of foreign material, and aligned in accordance with the  qualified welding procedure? |     |     |     |     |
|  | **Repair and Removal of Weld Defects** |  |
| .245 (a) Are cracks longer than 8% of the weld length removed? |     |     |     |     |
|  For each weld that is repaired, is the defect removed down to clean metal and is the pipe  preheated if conditions demand it? |     |     |     |     |
|  (b) Are the repairs inspected to insure acceptability? |     |     |     |     |
|  If additional repairs are required, are they done in accordance with qualified written  welding procedures to assure minimum mechanical properties are met? |     |     |     |     |
|  |  (c) Repair of a crack or any other defect in a previously repaired area must be in accordance  with a written weld repair procedure, qualified under **§192.225** |     |     |     |     |

| **Comments:**  |
| --- |
|       |

| **.13(c)** | **WELD INSPECTIONS and NONDESTRUCTIVE TESTING REQUIREMENTS** | **S** | **U** | **N/A** | **N/C** |
| --- | --- | --- | --- | --- | --- |
| .241 Are inspectors performing visual inspection to check for adherence to the welding procedure  and the acceptability of welds as per Section 9, API Std. 1104, except for Subsection 9.7 for  depth of undercutting adjacent to the root bead? Note: If the alternative acceptance criteria in API 1104 Appendix A are used, has the operator performed an Engineering Critical Assessment (ECA)? |     |     |     |     |
| .243 (a) Is a detailed written **NDT** procedure established and qualified? |     |     |     |     |
|  (b) Are there records to qualify procedures? |     |     |     |     |
|  (c) Is the radiographer trained and qualified? (Level II or better) |     |     |     |     |
|  (d) Are the following percentages of each days field butt welds nondestructively tested: |  |
|  (1) **10%** in **Class 1** locations. |     |     |     |     |
|  (2) **15%** in **Class 2** locations |     |     |     |     |
|  (3) **100%** in **Class 3** and **4** locations, river crossings, within railroad or public highway  ROWs, tunnels, bridges, overhead road crossings: however, if impracticable may test not  less than **90%**. |     |     |     |     |
|  (4) **100% at pipeline tie-ins.** |     |     |     |     |
|  (e) Is a sample of each welder’s work for each day nondestructively tested? (see code for  exceptions) |     |     |     |     |
|  (f) Do the radiograph records and daily reports show: |  |  |  |  |
|  | ▪ Number of welds made. |     |     |     |     |
|  | ▪ Number of welds tested. |     |     |     |     |
|  | ▪ Number of welds rejected. |     |     |     |     |
|  | ▪ Disposition of rejected welds. |     |     |     |     |
|  | ▪ Is there a correlation of welds and radiographs to a bench mark? (Engineering station or survey marker) |     |     |     |     |

| **Comments:**       |
| --- |
| **.451** | **CORROSION REQUIREMENTS** | **S** | **U** | **N/A** | **N/C** |
|  | .455(a) | (1) | Does the pipeline have an effective external coating and does it meet the coating specifications if installed after July 31, 1971? |     |     |     |     |
|  |  | (2) | Is a cathodic protection system installed or being provided for?  |     |     |     |     |
|  | .471(a) | Are test leads mechanically secure and electrically conductive? |     |     |     |     |
|  | .471(b) | Are test leads attached to the pipe by cadwelding or other process so as to minimize stress concentration on the pipe? |     |     |     |     |
|  | .471(c) | Are bare test leads and the connections to the pipe coated? |     |     |     |     |
|  | .476 | Systems designed to reduce internal corrosion (a) New construction  |     |     |     |     |
|  |  | (b) Exceptions – offshore pipeline and systems replaced before 5/23/07 |     |     |     |     |
|  |  |  (c) Evaluate changes to existing systems |     |     |     |     |

| **.605(b)** | **CORROSION CONTROL PROCEDURES** | **S** | **U** | **N/A** | **N/C** |
| --- | --- | --- | --- | --- | --- |
| .453 Are corrosion procedures established for: |  |
| * Design
 |     |     |     |     |
| * Operations
 |      |     |     |     |
| * Installation
 |      |     |     |     |
| * Maintenance
 |     |     |     |     |
| .455 (a) For pipelines installed **after July 31, 1971**, buried segments must be externally coated and &(b) cathodically protected with **one year** after construction (see exceptions in code)  |      |     |     |     |
|  (e) Aluminum may not be installed in a buried or submerged pipeline if exposed to an  environment with a natural **pH in excess of 8** (see exceptions in code) |     |     |     |     |
| .457 (a) All effectively coated steel transmission pipelines installed prior to **August 1, 1971**, must be cathodically protected |      |     |     |     |
|  (b) If installed **before August 1, 1971**, cathodic protection must be provided in areas of active  corrosion for: bare or ineffectively coated transmission lines, and bare or coated c/s, regulator station, and meter station piping, and bare or coated distribution lines. |      |     |     |     |
| .459 Examination of buried pipeline when exposed: if corrosion is found, further investigation is required |      |     |     |     |
| .461 Procedures must address the protective coating requirements of the regulations.  External coating on the steel pipe must meet the requirements of this part. |      |     |     |     |
| .463 Cathodic protection level according to **Appendix D** criteria |      |     |     |     |
| .465 (a) Pipe-to-soil monitoring (**1 per yr/15 months**) |      |     |     |     |
|  (b) Rectifier monitoring (**6 per yr/2½ months**) |      |     |     |     |
|  (c) Interference bond monitoring (**as required**) |      |     |     |     |
|  (d) Prompt remedial action to correct any deficiencies indicated by the monitoring |      |     |     |     |
|  (e) Electrical surveys on bare/unprotected lines, cathodically protect active corrosion areas (**1 per 3 years/39 months**) |      |     |     |     |
| .467 Electrical isolation (**include casings**) |      |     |     |     |
| .469 Sufficient test stations to determine CP adequacy |      |     |     |     |
| .471 (a) Are test leads mechanically secure and electrically conductive? |      |     |     |     |
|  (b) Are test leads attached to the pipe by cad welding or other process so as to minimize stress  concentration on the pipe? |      |     |     |     |
|  (c) Are bare test leads and the connections to the pipe coated? |      |     |     |     |
| .473 Interference currents |      |     |     |     |
| .475 (a) Proper procedures for transporting corrosive gas? |      |     |     |     |
|  (b) Removed pipe must be inspected for internal corrosion. If found, the adjacent pipe must be inspected to determine extent. Certain pipe must be replaced. Steps must be taken to minimize internal corrosion. |      |     |     |     |
| .476 Systems designed to reduce internal corrosion  (a) New construction |      |     |     |     |
|  (b) Exceptions – offshore pipeline and systems replaced before 5/23/07 |      |     |     |     |
|  (c) Evaluate changes to existing systems |      |     |     |     |
| .477 Internal corrosion control coupon (or other suit. means) monitoring (**2 per yr/7½ months)** |     |     |      |     |
| .479 (a) Each exposed pipe must be cleaned and coated (see exceptions under **.479(c)**) |      |     |     |     |
|  Offshore splash zones and soil-to-air interfaces must be coated |      |     |     |     |
|  (b) Coating material must be suitable |      |     |     |     |
|  (c) Coating is not required where operator has proven that corrosion will: |  |
|  (1) Only be a light surface oxide, or |      |     |     |     |
|  (2)Not affect safe operation before next scheduled inspection |      |     |     |     |
| .481 (a) Atmospheric corrosion control monitoring (**1 per 3 yrs/39 months onshore; 1 per yr/15 months** **offshore**) |     |     |     |     |
|  (b) Special attention required at soil/air interfaces, thermal insulation, under disbonded coating, pipe supports, splash zones, deck penetrations, spans over water |      |     |     |     |
|  (c) Protection must be provided if atmospheric corrosion is found (**per §192.479**) |      |     |     |     |
| .483 Replacement and repaired pipe must be coated and cathodically protected (see code for exceptions) |      |     |     |     |
| .485 (a) Transmission: Procedures to replace pipe or reduce the **MAOP** if general corrosion has reduced the wall thickness? |     |     |     |     |
|  (b) Transmission: Procedures to replace/repair pipe or reduce **MAOP** if localized corrosion has reduced wall thickness (unless reliable engineering repair method exists)? |      |     |     |     |
|  (c) Transmission: Procedures to use **Rstreng** or **B-31G** to determine remaining wall strength? |      |     |     |     |
| .487 Remedial measures (distribution lines other than cast iron or ductile iron) |      |     |     |     |
| .489 Remedial measures (cast iron and ductile iron pipelines) |      |     |     |     |
| .491 (a, b) Do records or maps to show the location of cathodically protected piping, cathodic protection  facilities, are they retained for as long as the pipeline remains in service? |      |     |     |     |
|  |  (c) Are records of each test, survey, or inspection required by this subpart in sufficient detail to  demonstrate the adequacy of corrosion control measures or that a corrosive condition does not  exist? |      |     |     |     |

| **Comments:**  |
| --- |
|       |

| **.801 - .809** | **OPERATOR QUALIFICATION FIELD VERIFICATION** | **S** | **U** | **N/A** | **N/C** |
| --- | --- | --- | --- | --- | --- |
|  | Operator Qualification - Use PHMSA Form 15 Operator Qualification Field Inspection Protocol Form if applicable to the project. |      |     |     |     |
| **.620** | If performance of a construction task associated with implementing the alternative MAOP standard in 192.620 can affect the integrity of the pipeline, the operator treats those tasks as “covered tasks” and implements the requirements of subpart N as appropriate. |      |     |     |     |

| **Comments:**  |
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|       |

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Click icons to add photosand perform OQ Protocol 9 when fusion or other tasks are witnessed.