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NAVAJO TRIBAL UTILITY AUTHORITY

CONSTRUCTION COPY

TECHNICAL SPECIFICATIONS
FOR
MATERIALS AND WORKMANSHIP
FOR NATURAL GAS FACILITIES

October 2004

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Definition of Terms

Owner:	The organization or its representative authorizing and administering the construction project.
Contractor:	The organization or its representative performing the construction.
Operating Utility:	The organization or its representative operating the gas utility affected by the construction.
Roadway Authority:	The authority or agency with jurisdiction over the roadway.
Approved Equal:	A substitute in materials that is considered by the **Operating Utility** to be equal to the item listed in the specifications or standards.

TECHNICAL PROVISIONS

TP 1.0 EXCAVATION, TRENCHING, AND BACKFILLING FOR NATURAL GAS FACILITIES

1.01 Scope of Work

The work covered by this section includes the furnishing of all plant, labor, tools, equipment, and material, and performing all operations in connection with excavating, trenching and backfilling, for installations of all natural gas utility pipelines, related structures and accessories. This includes the necessary clearing and grubbing, pavement cutting, compaction, pavement restoration, grading, and cleanup, all in accordance with these Technical Provisions and applicable drawings. The final installation also shall meet the requirements of Section 2.0, Natural Gas Line Separation Requirements.

If there is a conflict between these Technical Provisions and any other section of the specifications and/or drawings, then the most stringent, as determined by the Owner shall apply.

1.02 Layout and Staking

All layout and staking for site work shall be performed by a licensed engineer or land surveyor, approved by the Owner, who is to be paid by the Contractor, unless other arrangements are negotiated. Copies of survey notes shall be submitted to the Owner, with one or more copies to remain on the job site at all times.

1.02.01 Right-of -Way Clearing And Preparation for Steel Pipe

The owner generally will obtain rights-of-way. Prior to any grading, the Contractor shall grade approximately six (6) inches of the topsoil aside for the purpose of reseeding upon completion of the project. The topsoil shall be reused to reseed the entire right-of-way that was graded within the project. The contractor shall be responsible for reseeding. The pipeline right-of-way shall be cleared of all brush, timber, rocks and small boulders to width designated on the plans – usually 30 feet. This cleared width shall be located (going up station numbers) 10 feet left on one side of the survey line of the pipeline ditch and (going up station numbers) 20 feet right on the outer side as directed by the owner or Engineer. Stumps shall be cut at the ground surface and shall be completely removed on a strip eight feet (8 ft.) wide centered on the centerline of the ditch.

1.02.02 Protection Of Rights And Property Of Others

Where the pipeline crosses fenced enclosures, the Contractor shall open the fences and install temporary gates prior to stringing any pipe. The contractor shall notify the land users and obtain consent prior to the installation of gates and where practical, comply with land user's wishes in connection therewith. The Contractor shall be responsible for any loss or inconvenience caused to the land user resulting from negligence on the part of the Contractor or his employees by virtue of the fence having been opened or gates not being closed. Upon completion of construction, all fences shall be restored in a satisfactory manner and to conditions equivalent to those prior to construction.

1.03 Safety Precautions

Where conditions at road crossings are altered in such a manner as to make such locations dangerous to traffic, the Contractor shall comply with local or state regulations relative to placing appropriate warning signals and flares at such locations; or in the absence of such regulations, contractor shall place such traffic signs which shall be visible during the day and appropriate flares visible at night at a safe distance from excavation areas in both directions. In addition, when in the opinion of the inspector, barricades or guardrails are necessary; the contractor shall provide the same at no additional cost to the Owner.

The Contractor shall take due precaution to avoid damage to existing pipeline, water mains or any other underground or overhead facilities. The contractor shall solely be responsible for damages to such facilities and shall hold and save the Owner harmless against any actions or claims arising in connection therewith. The waterlines and any other existing underground utilities shall be marked by the Contractor prior to digging in these designated areas. The Contractor shall notify the owner twenty-four (24) hours prior to digging near water lines or other existing underground utilities.

1.04 Temporary Bridges And Backfilling

Road Crossings. Where the pipeline ditches crosses public road or private roads or drives, the Contractor shall install adequate, temporary bridges the full width of the road to ensure safety of traffic over the ditch until the pipe can be installed and properly backfilled. Where necessary, the Contractor shall provide stock crossing for property owners or tenants or for moving equipment from one location to another.

The Contractor shall, at his own expense, promptly repair, satisfactory to the inspector and public officials or representatives having jurisdiction over the same, all bridges, culverts, privates roads, fences or any other property damaged or destroyed during the progress of the work.

1.05 Operations During Inclement Weather

In order to protect the owners rights-of-way and the interest of other adjacent to said rights-of-way against undue damage, work shall not be carried on during inclement weather or other conditions which in the opinion of the inspector would damage said rights-of-way or property of others. When so advised or requested by the inspector, the Contractor shall cease operations until the inclement conditions have ceased or improve.

1.06 Unloading, Storing, Hauling And Stringing Steel Pipe

The Contractor shall deliver the pipe to a predetermined location. The Contractor shall notify the Owner of the expected delivery date of the pipe and the approximate rate of delivery. The Contractor shall be responsible for loading and delivering the pipe to the jobsite and stringing all pipes. In the event for any reason the pipe cannot be strung along the alignment when delivered to the site the Contractor, at his own expense, shall be responsible for unloading the pipe and stockpiling the pipe until such time that he may be able to string it along the alignment. The temporary storage of any pipe shall be at or near the job site. Any easement required for storage space shall be the responsibility of the Contractor.

The Contractor shall be responsible for the pipe after receipt and shall repair any damages to the pipe resulting from loading, unloading and hauling to the site of work. The unloading, hauling, stringing or storing shall be done in such a manner that the pipe will not be damaged. In no event shall the pipe be rolled or dropped from stringing trucks and care shall be taken not to damaged the pipe insulation or distort the circular ends of the pipe.

1.07 Protection of Existing Utilities

It shall be the Contractor's responsibility to determine the locations of all known existing underground utilities not shown on the drawings and to confirm the exact locations of those existing utilities shown on the drawings. All existing utilities shall be protected from damages during excavation and backfilling of trenches and if damaged, shall be repaired at the expense of the Contractor.

1.08 Excavation

1.08.01 General

It is expected that all excavation required for the performance of the work shall be made by open cut methods unless otherwise shown on the drawings or as required by applicable encroachment permits.

1.08.02 Grading

All grading in the vicinity of the construction shall be controlled to prevent surface water from flowing into the excavation. Any water accumulated in the excavation shall be removed by pumping or other approved methods at the contractor's expense. During excavation, material suitable for embedment and backfilling shall be piled in an orderly manner a sufficient distance back from the edges of the bank to avoid overloading and to prevent slides or cave-ins. Material unsuitable for backfilling shall be hauled from the job site and disposed of by the Contractor at approved disposal sites.

1.08.03 Pavement Cutting

Where it is necessary to remove sections of asphalt pavement, the asphalt shall be clean-cut with approved equipment in a neat line 6-inches back from the outside edge of the excavation in order to provide a key when restored.

Where it is necessary to remove sections of concrete pavement, the concrete shall be saw-cut to a depth of not less than 1-1/2-inches with neat vertical lines in such a manner that the adjoining surfaces will not be damaged.

1.08.04 Excavation For Steel Pipe

Alignment of the pipeline shall be staked by the Owner, unless other arrangements are specified. The Contractor shall clear the rights-of-way and dig the ditch along the staked alignment. Ditching operations shall be kept ahead of welding and laying operations.

The ditch shall be finished to a minimum width of eighteen inches (18") and to sufficient depth to provide a minimum cover of forty-two inches (42") over the pipe (to top of pipe) or to the covers as indicated on the drawings. At locations where the ditch crosses roads, streets, highways, ditches, arroyos or other drainage depressions and at points where the contour of the earth may require greater depths to eliminate unnecessary bending of the pipe, the Contractor shall excavate to allow for a minimum cover of five feet (5'). In following the contour of the ground along the alignment, bends in the pipe will be kept to minimum by cutting the ditch deeper at the crest of hills and approaches to road crossing and arroyos. Unnecessary bending of the pipe shall be eliminated by operating the ditching machine at various depths at such locations in lieu of finish grading the ditch bottom where practicable.

The finished ditch shall be free of loose rock or hard clods of earth, which could injure or damage the pipe coating when lowering the pipe into the ditch.

All road and highway crossings shall be made in accordance with the requirements of the respective public authority having jurisdiction over the same and also to the satisfaction of the inspector. Crossings that are paved or have hard surfaced highways generally shall be bored.
The Contractor shall be responsible for keeping the ditch in good condition until final in-place bedding of the pipe. No claims shall be made against the owner for cribbing, bracing or the use of other materials required to prevent caving of ditch banks. If bank caving occurs while lowering the pipe into the ditch in such a manner as to result in improper bedding of the pipe, or reduce the cover to minimum of less than forty-two inches (42”), the Contractor shall re-excavate the ditch and clean around the pipe until the desired condition is obtained to the satisfaction of the inspector.

1.08.05 Protection of Excavations

The Contractor shall provide suitable sheathing, shoring and bracing to protect all excavations as required, and provide safe working conditions, as directed by the Owner and in conformance with applicable OSHA, and all other safety regulations. Damages resulting from settlements, slides, cave-ins, flooding, pipeline breaks, and other causes shall be repaired by the Contractor at his expense. Suitable signs shall be so placed as to show in advance where construction, barricades, or detours exists.

The Contractor shall at all times perform his work so as to insure the least possible obstruction to traffic, inconveniences to the general public and the residents in the vicinity of the work, and to insure the protection of persons and property in a manner satisfactory to the Owner. No road or street shall be closed to the public except with the permission of the proper authority. Fire hydrants on or adjacent to the work site shall be kept accessible to fire fighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the use of sidewalks, and the proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches.

1.08.06 Rock Excavation

If given special consideration, rock is considered to exist when excavation cannot be accomplished using a 790E John Deere Class track hoe with a rock bucket without stressing the machine. The Owner shall be the sole party in determining the existence of rock and the appropriate means of removal. The quantity of rock shall be determined in cubic yards of material removed. All other trenching and excavations, regardless of materials encountered, equipments used, or methods required for excavation, will be unclassified.

1.08.07 Excavation for Structures

Excavation for items such as sewer lines, valves, waterlines, steam tunnels, culverts, subterranean form work, and other structures shall be to the necessary depth and sufficient width to leave at least 12-inches of space between the structure’s outer surface and the embankment or shoring used to stabilize the banks.

1.08.08 Over-Excavation

Whenever solid or loose rock, rocky soil with rocks larger than three inches in their largest dimension, or otherwise unsuitable soils which are incapable of properly supporting the pipe or structure are encountered in the trench bottom, all unsuitable material, as determined by the Owner, shall be over-excavated to a minimum depth of 6-inches below the pipe or structure and removed.

Except at locations where over-excavation is required, care shall be taken not to excavate below the depths indicated. In the event of accidental over-excavation, the trench bottom grade will be restored in the same manner as areas intentionally over-excavated.

1.08.09 Trench Excavation

The sides of all trenches for the installation of utility piping systems shall be as nearly vertical as soil conditions will permit from ground level to the pipe. When trenching 2-inch or less PE gas service lines, the width of the trench shall be approximately 6 inches in width. When trenching for 4-inch PE, the trench width shall be approximately 8 inches in width. For all steel lines, 4-inch and less, the minimum trench width shall be 18 inches to allow for proper compaction. For lines larger than 4-inch, or for special conditions, the trenching width shall be as stated on the plans or as developed by the Gas Engineering Department. The trench width above the level of the top of the pipe may be as wide as necessary for shoring or sheathing and for proper installation of the work.

The depth of all trenches shall be as indicated on the drawings. If not otherwise specified, the depth of all trenches shall be in accordance with the specifications for the installation of natural gas line.

Unless otherwise required by applicable permits to be less, the maximum length of trench that may be left open at any one time shall not exceed 100 feet.

1.09 Placement and Compaction of Pipe Embedment and Backfill Material

1.09.01 Pipe Embedment

Pipe embedment is defined as that material required to bring the trench bottom up to grade and that material placed alongside and above the pipe to a level of at least 6-inches over the top of the pipe. Pipe embedment shall be selected earth or sand, which contains no stones, dry or frozen lumps greater than 3/4-inch in diameter, or other unsuitable material as defined by the Owner. Embedment and the first 6-inches of backfill above the top of the pipe in rock excavation shall be done in the presence of the Owner. Any backfilling, done in violation of this provision shall be cause for removal and replacement at the expense of the Contractor even though the work is found to be in accordance with these specifications.

Bedding: Bedding is that portion of pipe embedment zone beneath the pipe. If the native soil is suitable for bedding, the bottom of the trench shall be accurately shaped to provide uniform bearing and support for the entire length of the pipe. Imported bedding material shall likewise be placed to provide uniform and adequate longitudinal support under the pipe. Bedding material shall be placed and compacted in lifts not to exceed 6-inches in loose measure.

Haunching: Haunching is that portion of the pipe embedment zone from the bottom of the pipe to the springline of the pipe. Haunching material shall be placed and hand tamped to provide adequate side support to the pipe while avoiding both vertical and lateral displacement of the pipe from proper alignment.

Initial Backfill: Initial backfill is that portion of the pipe embedment zone from the springline of the pipe to a minimum level of 6-inches above the top of the pipe. Initial backfill material shall be placed and compacted in lifts not to exceed 6-inches in loose measure. Compaction shall be performed in such a manner so as to avoid damage and disturbance of the embedded pipe.

Final Backfill: Final backfill is defined as that material used in the area between the Initial Backfill and the existing ground surface. Material shall be placed and compacted in lifts not to exceed 6-inches in loose measure except as otherwise specified.

1.09.02 Compaction Requirements

Unless otherwise specified by permit issued by the roadway authority or by special arrangement between the Operating Utility and the Owner, bedding, haunching, initial backfill, final backfill, and gravel resurfacing shall be compacted to the following percentages of maximum density as determined by ASTM D 1557 (If using Standard Proctor ASTM D 698, add 5% to all compaction requirements listed in the table below). In-place densities of materials shall be determined by the sand-cone method, ASTM D 1557 or by nuclear method, ASTM D 2922.

Percent of Maximum Density – D1557

Backfill Location	Bedding Backfill	Haunching Backfill	Initial Backfill	Final Backfill
Roadway Rights-of-Way Within Roadway Prism	95% *	95%	95%	95%
Roadway Rights-of-Way Outside of Roadway Prism	90% *	90%	90%	95%
All Other Conditions	85%	85%	85%	85%

* or the existing conditions within the undisturbed bottom of the trench.

1.09.03 Water Jetting

The introduction of water to the pipe embedment or final backfill material shall not be permitted as a means of compaction.

1.10 Imported Backfill

The owner shall coordinate to the best of his ability a suitable location from which backfill material may be imported and unsuitable material may be disposed.

1.10.01 Imported Pipe Embedment

If the native soil is unsuitable, the Contractor shall import suitable pipe embedment material. Pipe embedment shall be select earth or sand which contains no stones, dry lumps, or frozen lumps greater than 3/4-inches in diameter and shall be defined as 100% passing 3/4-inches, 40-99% passing # 4 sieve and 30% or less passing # 200 sieve. Unsuitable material is defined as solid or loose rock, soils with rocks larger than 3/4-inches in their largest dimension, or other unsuitable soils which are, as determined by the Owner, incapable of properly supporting the pipe

1.10.02 Imported Final Backfill

If the native soil is unsuitable for use as final backfill, the Contractor shall import suitable final backfill. Imported final backfill may be any material, which is locally available and is capable of being compacted to the required density. This material shall be free of boulders and rocks larger than 6-inches in their smallest dimension, frozen clumps of dirt, organic material, or rubble, which could damage the pipe.

1.11 Bedding and Backfill for Structures

1.11.01 Bedding

Bedding material for structures is defined as that material beneath the structure. This material shall be as specified in the standard detail for each structure.

1.11.02 Backfill

All backfill must meet compaction requirements. The material and the required compaction of such shall be the same as that specified for in the final backfill on pipelines, or as specified in the drawings.

1.12 Settlement of Adjacent Structures

Throughout the warranty period of the contract, the Contractor shall be required to fill and compact any areas where settlement has taken place and shall also be responsible for the settlement of any adjacent structure or object caused by any excavation performed under his contract.

1.13 Surface Restoration and Resurfacing

1.13.01 Surface Restoration

The following requirements shall be followed unless alternative specifications are set forth by the roadway or other rights-of-way crossing permits, or as arranged between the Operating Utility and Owner.

After the piping and structures have been installed and all backfilling completed, areas, which were disturbed, shall be brought to true grades. All slopes shall be trimmed and dressed, and all surfaces graded to maintain existing drainage. All streets, alleys, driveways, sidewalks, curbs, or other surfaces, which have been disturbed or damaged, shall be resurfaced or replaced. All excess excavated materials shall be properly disposed of by the Contractor.

1.13.02 Roadway Patching

Whenever existing roadways are disturbed during the course of construction, the Contractor shall restore the roads to their original condition.

For ease of compaction, the Contractor may use well graded gravel, crushed stone, or flow-able fill from a Ready Mix plant as backfill as approved by the roadway agency. For final backfill, the material shall be clean, vary in size from 3/8-inches to 1-1/4-inches with not more than 10 percent of the material less than 3/8-inches in size and shall be compacted in 6-inch layers or as directed by the Owner. Flowable fill is defined as one bag concrete, with gradations of 100% passing the 3/8 sieve, and less than 25% passing the #200 sieve. The slump should be between 5” and 8”, and the 28 day strength should be between 50 psi and 150 psi.

Surfacing shall be replaced where the roadway has gravel, crushed stone, asphalted, or concrete surfacing. Gravel or crushed stone shall be replaced in quantities and locations as directed by the Owner, or as required by the roadway permitting authority. Asphalt mix or concrete surfacing shall be replaced, and in the case of asphalt, appropriately compacted (e.g., tamped) in the roadway to a depth equal to existing roadway surface but not less than 2-inches in asphalt or 6-inches in concrete. A compacted stabilized gravel or crushed stone base 6-inches in depth shall be placed in the roadway at all locations where surfacing is required prior to placement of the bituminous or concrete wear course, unless other requirements are stipulated by the roadway authority.

The Contractor shall obtain any and all necessary written permissions, easements, and permits from federal, state, and county agencies prior to beginning any roadway excavation.

TECHNICAL PROVISIONS

TP 2.0 NATURAL GAS LINE SEPARATION REQUIREMENTS

2.01 General

The requirements are to be followed to provide safety by separation of utilities and use of special piping materials. All measurements shall be the clearance between pipes (pipe O.D. to pipe O.D.).

2.02 Horizontal Separation of Natural Gas Lines and Other Utilities

When gas mains or service lines are laid parallel to other utilities, a horizontal distance between the new installation and any existing utilities should not be less than 5 feet. Each line shall be laid in a separate trench or the space between the lines filled with compacted backfill. The requirements for this separation shall apply to all other buried utilities, telephone and cable TV; however, all stipulations of the electric, or other subsurface utilities must be met.

When physical conditions such as an existing obstruction will not allow the required 5 foot horizontal separation, the utilities may be closer than 5 feet if written approval is given by the Owner.

2.03 Vertical Separation of Natural Gas Lines and Other Utilities

2.03.01 Gas Above All Utilities

When gas lines cross other utilities, the gas line shall cross above all utilities, with a minimum vertical separation of 12 inches. If necessary, the depth of the gas line may be reduce to meet a 12 inch vertical separation, but must not be less than 24 inches for mains or 18 inches for services, measured from top of pipe to grade. When a minimum of 24 inches for the mains and 18 inches for the services cannot be met, then the gas line must cross below the utility in question. This will be permitted only at the concurrence of the Gas Engineer. When the 12 inch vertical separation cannot be met, a compacted soil or concrete barrier will be used or other methods approved by the Gas Engineer. **NOTE: For electric and gas line crossings, if the vertical separation is less than 18 inches, the contractor shall place a 4-inch thick by 3-foot square concrete slab between the centerlines of the crossing utilities.**

2.04 Gas Line Separation from Manholes

No gas pipe shall pass through, under, or come into contact with any part of a sewer manhole.

2.05 Gas Line Separation Within 5 feet of a Structure

This section shall apply to that portion of gas service lines located within five feet of the house. For new construction, all service lines shall have a 5 feet minimum horizontal separation. The service lines can be laid closer than 5 feet, if the bottom of the gas service line is at least 12-inches above the top of the sewer or water service line with no joints until the separation requirement is met**. Gas service lines and meter risers shall not be placed under or within 3 horizontal feet of doors or windows that may be opened, and any vents or other opening into the building, and shall meet the National Plumbing Code, and National Electric Code.**

2.06 Separations Between Gas Lines and Components of the Sewage Disposal System

Gas lines shall not be installed within 10 feet of a septic tank, within 25 feet of a drain field, or 20 feet from an outhouse. Also, gas lines shall not be installed within 50 feet of the perimeter fence of an **individual** lagoon, or within 100 feet of the perimeter fence of a **community** lagoon.

TECHNICAL PROVISIONS

TP 3.0 GAS MAINS, GAS SERVICE LINES, AND APPURTENANCES

3.01 Scope of Work

The work covered by this section includes the furnishing of all plant, labor, tools, equipment, and material; performing all operations in connection with the construction of gas mains, including the placing of all necessary valves, fittings, and appurtenances, and the construction of gas service lines, including saddles tap tees, valves, risers, gas stops, gas meters, and appurtenances, in accordance with these technical provisions and applicable drawings.

3.02 Gas Mains

3.02.01 General

This section covers the requirements for polyethylene and steel pipes and fittings for underground gas distribution systems. The piping construction shall be performed in accordance with engineered construction plans provided by the Owner. Pipe, fittings and the installation shall meet the applicable requirements of the U.S. Department of Transportation, Pipeline Safety Regulations, Title 49, Code of Federal Regulations, Part 192.

All work shall be inspected by an Authorized Representative of the Owner who shall have the authority to halt construction if, in his opinion, these specification of standard construction practices are not being followed. Whenever any portion of this technical provision is violated, the Owner shall by written notice order further construction to cease until all deficiencies are corrected.

3.02.02 Polyethylene (PE) Pipe and Fittings

Materials used for the manufacture of polyethylene pipe and fusible fittings shall be Performance Pipe Yellowstripe® 8300 Series, PE 3408, premium high-density polyethylene compound, meeting cell classification numbers 345464C for black and 345464E for stripes, and 345564C for yellow pipe per ASTM D 3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

The polyethylene pipe shall be manufactured and tested in accordance with the latest published edition of ASTM D 2513, specification “Thermoplastic Gas Pressure Pipe, Tubing and Fittings, ASTM D 2683 specification, “Socket-type Polyethylene Fittings for outside Diameter-Controlled Polyethylene Pipe”, ASTM D 3261, “Butt Fusion Polyethylene (PE) Plastic Fittings for Polyethylene”, Plastic Pipe and Fittings, and to the U.S. Department of Transportation Title 49, Part 192, “Transportation of Natural and or Other Gas by Pipeline - Minimum Safety Regulations”. The same manufacturer shall supply polyethylene pipe and heat fusion fittings. Pipe and fittings from different manufacturers shall not be interchanged.

The pipe shall be the four equally spaced longitudinal yellow stripes extruded into the pipe OD or the yellow pipe highly visible identification of gas service and in compliance with APWA/ULCC standards for color-coding of gas distribution lines. The pipe shall be equal to Performance Yellowstripe® 8300, SDR 11. The designation PE 3408 and indication of pipe size, material, manufacture, pressure rating, and temperature rating, and as appropriate, type and grade shall be stamped or die-marked on the pipe. The die stamp must have a blunt or rounded edge that will minimize stress concentration.

All fittings for 4 inch and above Polyethylene shall be butt-fusion; no mechanical fittings will be accepted.

The polyethylene pipe maximum allowable operating pressure (MAOP) may not exceed 100 psig for plastic pipe used in distribution systems. The following table shows the typical data represented by Performance pipes. All dimensions are Iron Pipe Size (IPS) with the Standard Dimensions Ratio (SDR) equal to 11.

Nominal Size (in.)	**Outside Diameter** (in.)	**Minimum Wall** (in.)	**Inside Diameter** (in.)	**MAOP** (psig per CFR Part 192 @ 100 F or less)
1	1.315	0.120	1.075	100
2	2.375	0.216	1.943	100
4	4.5	0.409	3.682	100

All joints are to be mechanically joined, socket fusion, and or butt fusion as specified by the manufactures' procedures in accordance with ASTM D 2513, Category 1, Joining, and the requirements of the Owner. Please note the utility does not use 3" pipe.

The installation of all polyethylene pipes must provide enough flexibility to allow for expansion and contraction of the material with temperature changes. It is desirable to slightly snake the pipe in the trench prior to trimming and joining adjacent sections.

Plastic pipe with scratches, gouges, or grooves deeper than one-tenth (0.10) the wall thickness on the OD of the pipe shall be rejected. Localized pipe damage may be cut out and the undamaged portion of the pipe may be used with the approval of the Owner. The damaged sections of pipe shall be completely destroyed or immediately removed from the job site.

3.02.03 Joining of polyethylene pipes

To produce strong gastight joints, written procedures for butt fusion, socket fusion, and Permanent mechanical joining of polyethylene pipe and fittings for underground gas distribution systems shall be observed by following the manufacturer's instructions for installation. All joining shall be made according to procedures that have been qualified and approved by the Utility and in accordance with Title 49, CFR, Part 192, §192.273 (b), §192.283 (a) and §192.285 (a).

All persons making heat fusion joints or making inspections shall be qualified to make joints in reference to an approved qualified fusion procedures, by means of an Operator Qualification process through the states of New Mexico and Arizona. Each operator must be annually qualified by taking the written tests and with hands-on training required by Operator's Qualification. Records of qualified personnel and certification of qualification training received not more than 12 months shall be maintained before commencing construction. The Contractor shall ensure that all persons making heat fusion are qualified in accordance with this section.

3.02.04 Steel Pipe (X-tru Coated & Black) and Fittings for Gas Mians

The pipes and fittings to be used shall be for high-pressure (60psi-400psi) natural gas distribution. The pipes furnished by Contractor shall consist typically of 4" steel pipe coated with Performance polyethylene extruded coating; .035" minimum coating thickness, .010" adhesive thickness, 4.5" coating cutback, 4" adhesive cutback and with plastic end caps on each end, in accordance with American Society for Testing and Materials (ASTM) D-1238. Steel pipe: Standard 4" diameter by 40-45 foot double random lengths with plain beveled ends, .237" specified wall thickness, 4.50" outside diameter, 4.026" inside diameter shall be provided through a manufacturer and in accordance with the American Petroleum Institute (API) specification 5L, Grade B, Product Specification Level (PSL) 2, Electric Resistant Weld (ERW).

Thinner wall 4-inch .188/8.66#/ft. ERW pipe with the same extruded coating as above is permissible as approved by the owner for buried installations **only**.

The 6" pipes shall consist of 6.625" O.D, .280" wall thickness, 6.065" I.D. with plain beveled ends and double random lengths. Complete with .010" adhesive coating and a .035" Yellow Performance Polyethylene extrude coating, 4" adhesive coating cutback and 4 ½" polyethylene coating cutback, with end caps, in accordance with API 5L Grade B, ERW steel pipes and ASTM D-1238.
The pressure, which pushes a pipeline to transmission status, differs from pipe to pipe. The specified minimum yield strength (SMYS) of pipe differs from brand to brand. NTUA uses API 5L, Grade B pipe, which has specified minimum yield strength of 35,000 psi. The Hoop stress in a steel pipe is determined by its pressure, diameter, and thickness by the formula:

$$S = \frac{P \times D}{2 \times T}$$

S = Hoop Stress
P = Operating Pressure
D = Outside Diameter, inches
T = Wall Thickness, inches

Example: 4-inch pipe operating at 200 psi has an outside diameter of 4.5 and a wall thickness of 0.237 and a Hoop stress of 1898.7 psi.

The following table shows the different pressures produced, for a particular size pipe, given a Hoop stress that is at 20% SMYS.

Pipe Size (in.)	**Outside Diameter** (in.)	**Wall Thickness** (in.)	**20% SMYS** (psi)	**Max. Pressure** (psi)
2	2.375	0.154	7000	908
4	4.5	0.237	7000	738
6	6.625	0.280	7000	592
8	8.625	0.322	7000	523

The following table is a list of the dimensions for standard API 5, Grade B plain-end pipes:

Nominal Size (in)	**Outside Diameter** (in)	**Wall Thickness** (in)	**Weight Per Foot** (lb/ft.)	**Inside Diameter** (in)
1	1.315	0.133	1.68	1.049
2	2.375	0.154	3.75	2.076
4	4.5	0.237	11.00	4.026
6	6.625	0.280	19.45	6.065

The following table lists the dimensions for various other schedule type pipes called out for and utilized at different applications throughout the distributions system of natural gas.

		NOMINAL WALL THICKNESS (in.)	
Nominal Pipe size (in.)	**Outside Diameter** (in.)	**Schedule 40**	**Schedule 80**
1	1.315	0.133	0.179
2	2.375	0.154	0.218
4	4.5	0.237	0.337
6	6.625	0.280	0.432
8	8.625	0.322	0.500

Weld elbows and tees are to be standard black schedule 40, nominal pipe size, long radius butt weld fittings, preferred vendors, Vincent Supply, Red Man, or equal to as approved by Owner.

3.02.05 Welding of Steel Pipe

Swabbing: Each joint of pipe shall be swabbed with an appropriate disc of proper diameter to remove dirt, mill scale, and other foreign substances before placing the joint in alignment for welding.

Welding equipment and supplies: All welding machines, line up clamps, beveling machines and other equipment and supplies used in connection with welding work shall be furnished by the contractor. Said welding equipment shall be satisfactory to the owner and shall be kept in good mechanical condition so as to produce sound, high quality welds. Any equipment not satisfactory to the owner or his representative must be replaced with satisfactory equipment.

Type and Method of Welding: All welding shall be electric "shielded arc" process. Three or more beads shall be required and the size of rods used shall be according to the thickness of the pipe and as specified by the Inspector. Stubs of welding rods shall not be disposed of in the ditch; instead, stubs and rejected welding rods shall be collected in containers and disposed of at the end of the day as directed by the inspector. As an example, for 2-inch through 4-inch pipe, the first bead shall be weld E6010, 1/8" or 5P+ welding rods. The third bead shall be capped with a Shield Arc 85, 5/32" or 3/16" welding rods.

Qualification of Welders: The contractor shall only use skilled workman certified for welding. Each welder employed by the Contractor shall be required to pass Pipeline (Fixed) Bellhole Welding Tests. For making such tests specimens one inch (1") in width shall be cut from the nipples at right angles to the weld. The strip

specimen shall be subject to tensile, root bend and face bend tests. The manner of performing the tests and the tests result shall be in accordance with API 104, *Standards for Welding Pipelines and Related Facilities*. The cost of all welding tests shall be borne by the contractor. In the event that neither the owner nor the Contractor is satisfied with the test results, the welder shall not be employed.

Further Test of Welders: As a further test on the quality of the welding, the owner may request that a weld line be cut at the concurrence of the inspector. The cut-out and subsequent tie-in cost of the test specimen shall be at the expense of the contractor.

Tests of Welds in the Line: The owner may employ tests or other means considered desirable to test the work of welders by inspection of welds in the line. If the cut-out methods of welds is employed, the owner may, with the concurrence of the Inspector, cut out and test any section designated by him. Any test that fails shall disqualify the welder from doing any welding on the said project and shall prompt another cut-out test at a random location selected by the Owner. If this second test fails, the contractor shall x-ray the entire exposed section of line at his expense. If problems exist in the x-ray process, at the Owner's discretion, the contractor may be required to pressure test the entire section(s) of line already installed at the contractor's expense.

Replacement of Line at Tests Welds: When welding the line together after test welds have been cut out, one replacement weld shall be used if it is practicable to pull the line back into position: otherwise, two welds shall be made by fitting a "pup joint" which shall have a minimum length of forty-eight inches (48").

Cleaning and Beveling: Prior for aligning for welding, beveled ends of each pipe joint shall be thoroughly cleaned of all paint, rust, mill scale, dirt or other foreign matter to avoid defects in welds. Any satisfactory method of cleaning, subject to approval of the Inspector, may be used for cleaning operations. When necessary to maintain correct alignment and spacing of pipe, the contractor shall cut and bevel all pipe ends as required. Such precutting and beveling shall be preformed at the Contractor's expense using a beveling machine approved by the owner.

Aligning and Welding: Aligning and welding the pipe shall conform to the following conditions and requirements:

a. The root opening (space between abutting ends) shall not be less than sixteenth of an inch (1/16") and no more than one eighth of an inch (1/8"). The alignment of abutting pipe ends shall be such as to minimize the offset in pipe surfaces. The offset shall not exceed one sixteenth of an inch (1/16").
b. When the pipe is welded together above the ground, the working clearance around the pipe at the weld shall not be less than sixteen inches (16"). When the pipe is welded in the trench, the bell hole shall be sufficient to provide the welder ready access to the joint. All position welds shall be made with the pipe resting on skids at the specified height over or at the side of the ditch.

c. When performing Manual Arc Welding, the entire root bead shall be deposited with the pipe held in a stationary position.
d. Welded pipe joints are to be made with a minimum of three beads. The proper amperage for the size and type of rod shall be maintained at all times to assure proper fusion and maximum penetration. The first bead shall be applied completely around the pipe. Prior to applying additional beads, each preceding bead shall be cleaned of all scale, coating and slag. After completing the welded joint, it shall be cleaned free of scale and oxide.
e. When aligning the pipe over the ditch for positioning welding, no tack welds shall be permitted. Instead, each joint shall be held in alignment by means of a line-up clamp while the stringer bead is applied. The first bead shall be applied around the pipe from top center to bottom center. The line-up clamp shall be left in position until a continuous seal has been applied on each side of the pipe joint. After the line-up clamp has been removed, the hot pass bead shall be applied immediately before the stringer bead cools. Each bead shall be cleaned of scale, slag, dirt, etc. satisfactory to the inspector prior to application of a succeeding bead.
f. The filler and finish beads shall be such that the completed weld shall have a substantially uniform cross-section around the entire circumference of the pipe. At no point shall the crown be below the outside surface of the pipe and preferably shall be crowned slightly above the same, but, it shall not be raised above the metal of the pipe more than one sixteenth of an inch (1/16”). The face of the completed weld should be approximately one eighth of an inch (1/8”) wider that the width of the original groove. No miter welds shall be permitted. The completed weld shall be free of pin holes, air pockets, non-metallic inclusions, oxides or any other defects.
g. Welding shall not be permitted when weather conditions are unsatisfactory which, in the opinion of the Inspector, would impair the quality of the welds. The Contractor shall provide wind breaks which will give adequate protection to the welder and welding operations when in the opinion of the Inspector such equipment is necessary.
h. It shall be the responsibility of the Contractor to protect all welding rod from moisture. Welding rod found damaged in any manner as a result of negligence of the Contractor shall be replaced at the expense of the Contractor. Any welding rod found to be defective should be discarded.

3.02.06 Laying of Steel Pipe

Bending and Slack: The pipe shall be laid to conform to the bottom of the ditch. Bending shall be required only when changes in grade are such that the pipe will not lie naturally in the bottom to provide proper cover unless bent. All bends shall be made cold by the use of sectional bending shoe, which will not flatten or reduce the wall thickness of the pipe or produce wrinkles. Care shall be taken to avoid buckling of the pipe or weakening of welds. The curvature of all bends is to be distributed throughout as great a length of pipe possible. No heated or fire bends

shall be allowed. The coating of the pipe shall be protected in all instances, including any bending process.

Slack: The necessary amount of slack is to be obtained by laying the line alternately over to the side of the ditch.

Under Lines and Conduit Crossing: Where the pipeline crosses existing water gas, oil, or sewer lines, the pipeline shall be laid under the existing a minimum of twelve inches (12"), or as may be directed by the Inspector.

Night Capping: The open end of the pipe shall be securely closed at the end of each day's work by tack welding a suitable metal cover over the ends of the pipe or installing patented nightcaps to prevent the entrance of water, trash, small animals or other obstructions. Caps shall not be removed until work is again resumed. Where the lines are left apart at intervals for pigging or to be later tied-in under roads, highways, etc., both ends shall be fully capped.

Spacing of Stringer Beads: The first bead welding operations shall not be advanced ahead of finished welding operations to the extent that the section of line having unfinished welds might be damaged as a result of expansion or contraction of the pipe from temperature changes. Should a section of line or joints with unfinished welds be damaged as a result of falling from skids, or for any other reason, it shall be repaired by the Contractor at no cost to the Owner.

3.02.07 Coating And Wrapping Joints

If coated and wrapped pipe is to be installed, the coating shall be carefully protected and preserved during hauling and installing in the ditch. Prior to placing in the ditch, all pipe shall be carefully inspected, all holidays and other defects or damages shall be repaired to the satisfaction of the Inspector.

Prior to welding, the pipe covering shall be removed from the surface where heat from the welding operations will damage the coating, Wet burlap sacks or similar material shall be placed around the pipe to protect the pipe area subject to heat damage. After installation of accessories, all bare piping, connections, fitting and other parts of the piping work subject to galvanic corrosion shall be protected prior to backfilling.
Protective covering to be field-applied shall consist of initial coating of Polyken primer No. 1027 Series and a final wrap tape No. 900 Series furnished by the Contractor. Strict adherence shall be made to the manufacture's instructions and recommendations in the application of the covering material.

Prior to application of the tape, the existing coating shall be trimmed back to remove any damaged section of coating to a point where the existing coating is tightly bonded to the pipe. All surfaces shall be repaired by wire brush and wiped clean and dry. A coating of primer shall first be applied prior to the pipe on half-lap and shall be neatly formed around corners and irregular surfaces. The application shall be performed in such a manner that the tape shall tightly adhere and be

securely bonded to the pipe or fittings and to preceding layers to form protective covering which will prevent air and moisture from coming in contact with metal surfaces. The applied tape shall overlap shop-applied pipe covering by not less than four inches (4") at pipe ends and by not less than two inches (2") on both sides of holidays or damaged areas of existing coatings and at pipe taps. The tape shall be applied in a neat and workman like manner without loose ends, unnecessary wrinkles, bulges, changes in wrapping direction, etc.

The Contractor shall properly store to prevent damage, theft, deterioration or waste of coating and wrapping materials consigned to the job. Primer paint shall be stored in the Contractor's warehouse or storage bin at all times and only hauled to the site for one day's requirements. Only enough coating materials for one day's supply are to be hauled directly to the site of the project where they are to be used. They shall not be strung or dumped along the rights-of-way.

The Contractor, at his own expense, shall run a holiday detector over the complete pipeline in the presence of the Inspector immediately prior to placing the pipe into the ditch. Any holiday or pinholes detected by the holiday detector shall be immediately repaired by removing a portion of the coating and applying a coat of primer and wrapping the detected area with at least two complete turns of wrapping tape. The repaired point of the pipe shall then be retested to determine if the repairs were effective. The holiday detector used shall be of the type recommended by the manufacture of the coating materials and shall in no case be operated at a higher voltage than that specified by the coating manufacture. The above described testing shall be done at all times in the presence of the Inspector.

3.02.08 Tracing Wire

All buried Polyethylene gas pipe lines will require No. 12 underground insulated Tracing Wire to be placed 12" maximum above the gas pipe. All Tracing Wire must have continuous contact throughout the gas system. Connections will need to be completed with underground rated wire connectors supplied by Contractor.

3.02.09 Warning Tape

Warning tape is to be supplied by NTUA. Warning tape is to be installed at a minimum of 10" below finish grade, and at a maximum of 24" above the top of the pipe.

3.02.10 Carsonite Signs

Yellow carsonite signs and decals are to be supplied by the Owner but installed by the Contractor. Carsonite signs are to be installed at all elbows, bends, tees, valves and on continuous straight lines-of-sight at 500 foot increments, unless the terrain requires more frequent placement. Carsonite signs are to be offset approximately 1 foot from the centerline of the gas line installation.

3.03 Valves For Gas Mains

3.03.01 Key Valves

All key valves shall meet or exceed DOT, CFR 49 Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards" and ANSI B16.40; "1985 American National standard for Manually Operated Thermoplastic Gas Shut-off Valves in Gas Distribution Systems", ASTM D-2513, "Standard Specification for Thermo-plastic Gas Pressure Pipe, Tubing and Fittings".

Distribution or service 2-inch or 4-inch shut-off valves are to be polyethylene (PE) 3408, with 2-inch wrench head. The 2-inch size shall be joined using either the Perfection's Permasert® coupling or butt fusion, but 4-inch size shall be the butt fusion outlet ends only to accommodate SDR 11 pipe. Buried steel valves are to be full port, steel body, weld-by-weld, ball valves, with non-rising stem, and 2" wrench head. Valve working pressure rating shall be 100 psig for intermediate pressure (5 psig – 60 psig) and 740 psig for high pressure mains (100psig – 400 psig) minimum or as specified by the Owner. All high pressure valves shall be self-lubricating and manufactured by Baylon. Other valves may be Permaserts, Rock Wells, Nordstorm, Baylon, or approved equal. No flange type valve shall be permitted for underground service, but shall be used on various above ground facilities.

3.03.02 Valve Boxes (Fabricated)

Valve boxes shall be installed on all buried valves and shall be fabricated from a single section of 8" SCH 10 or greater steel pipe unless specified differently on the plans. All lids are to be fabricated from ¼" steel plate and shall be ~ 9" in diameter and must be weld-marked "GAS", and include the size and type of line ("STL' or "PE"). The direction of flow will line up with the bolt pattern.
Valve box shall extend approximately 6" to 10" above the surface of the ground, except in traffic areas, but may not rest on the body of the valve. All valve boxes not in traffic areas must be protected with 2" guardrails, painted yellow. All other designed as specified by owner. Fabricated valve boxes available from suppliers and approved by the utility shall be installed in areas of pedestrian and vehicular traffic (see drawing per Utility Company for fabricated valve boxes).

3.03.03 Valve Installation

Before installing the valve, care shall be taken to see that all foreign material and objects are removed from the interior of the valve. All valves that are welded must be open during the welding process. The valve shall be opened and closed to see that all moving parts are in working order, and left open during pressure testing procedures.

All valves key stems shall be set at a 90 degrees vertical angle and joined to the pipe in the manner determined by the type of valve. Valve box bases shall be set over the valve in such a manner that the valve box does not touch or transfer stress

to the valve. Old rubber mats or cut and shaped tires may be used under the fabricated valve box to provide a cushion between the body of the valve and pipe section of the valve box.

3.04 Gas Main Crossings

3.04.01 Wash Crossings

Gas mains shall be installed as shown on the plans. The Contractor shall divert surface flows, and perform all steps necessary to maintain proper bedding conditions and alignment. Typically a 6-foot minimum depth of bury is required at the centerline of the wash.

3.04.02 Road Crossings

In lieu of boring, roads may be open cut for gas line and casing installation. The original surface pavement on all open cut roadways shall be either cut square or sawed straight. As with open cut, if boring is required the steel conduit shall be extended from right-of-way to right-of-way. The Contractor shall obtain written permission from the appropriate agency prior to beginning any roadway excavation. Backfill within the limits of a roadway prism may require special compaction in accordance with the requirements of the roadway crossing permits.

Surfacing shall be replaced where the roadway has gravel, concrete, or asphalted paving in the same thickness as were removed, or as specified by the Owner, and completed as soon as possible following backfilling.

Gas line road crossings shall be installed within ¼" wall thickness steel casing unless otherwise specified. The casing ends shall be supported with compacted soil to prevent sagging, and the ends shall be secured with approved rubber end boot in sizes 6" x 2", 8" x 4" or 10" x 6" size depending the size of the casing and the pipe. The insulator boots at the ends must be clamped with stainless steel straps to hold the boots in place. Properly sized centralizers must be paced 10 feet apart on the entire pipe within the casing to keep the pipe and black steel pipe casing separated.

Within streets and roads that do not require casing, hole-hogging under the road is an alternative construction technique. Steel or PE pipe can be installed through the bored hole, but the ground must be free of rocks and other debris to control depth and prevent PE pipe from damage.

3.05 Gas Service Connections Materials

3.05.01 Polyethylene (PE) Pipe

Performance Pipe YELLOWSTRIPE® 8300 Series, PE 3408, SDR 11 pipe shall be 2, and 1 inch Iron Pipe Size (IPS), 100 psi operating pressure and in conformance with ASTM D 2513. The pipe shall be produced from a high density ultra-high molecular weight PE pipe compound. The designation PE 3408 and indication of

pipe size, material, manufacture, pressure rating, and temperature rating, and as appropriate, type and grade shall be stamped or die-marked on the pipe. The die stamp must have a blunt or rounded edge that will minimize stress concentration. The pipe shall have yellow stripes indicating the national color code of natural gas, or can be yellow pipe.

3.05.02 Service Line Fittings and Connections

Fittings and connections for natural gas service line shall be Performance Pipe YELLOWSTRIPE® 8300 Series, PE 3408, SDR 11. Pipe shall be marked ASTM D 2513 to indicate size, material, manufacture, pressure and temperature rating, and as appropriate, type, grade, brand and model. Heat-fusion or socket-fusion joining must be completed following the manufacture's instructions. Mechanical joining of PE piping must contain a rigid and **not** a split tubular stiffener, and be compatible with the plastic being joined. **NO** electric fusion, adhesive joints, or compression fittings shall be permitted.

3.05.03 Saddles Tees

Saddle tees shall be specific for the type, size, and pressure rating of the mainline as recommended by the saddle manufacturer. Each saddle tap tee used to make a hot tap must be designed for the minimum operating pressure of 100 psig. Saddles shall be full-encirclement, mechanical tapping tees or fusion-type saddles constructed of 3408 high-density PE. Mechanical saddles must be designed to ensure a reliable, gas tight, connection, and must provide a body sleeve that threads and locks itself to the main. Saddles and saddle components must meet or exceed the requirements of ASTM D 2513, ISO 4437, CSA B137.4. The Preferred manufacturer is the Perfection Saddle Tees. Compression saddle tees are not acceptable.

3.05.04 Service Valves (for 2" and above service connections)

Service valves shall meet or exceed DOT, Pipeline Safety Regulations Title 49, CFR, Part 192, §192.145 and 192.191, ANSI B16.40, ASTM D-2513, ASTM A 126, ASTM 126 and API 6D. Valves are to be Polyvalve constructed of 3408 high density PE.

3.05.05 Excess Flow Valve Customer Notification

The CFR, Title 49, Part 192, §192.383, Excess Flow Valve Customer Notification, applies to single residential customers who receive gas thru the distribution system operated by the utility. As required by law, customer may accept or reject to having an Excess Flow Valve installed on their service line. This Notification must explain the safety and purpose of the Excess Flow valve. The utility operator shall inform the customer of the cost involved with installing an excess flow valve – the labor, parts, transportation, and procurement charges. In addition, the utility operator must inform the customer he will incur all future maintenance and replacement costs associated with the excess flow valve. The Notification form

must be signed by the owner and customer, and shall be part of the transfer agreement.

3.05.06 Excess Flow Valve (EFV)

Under CFR, Title 49, Part 192, §192.381, Service Lines: Excess flow valve performance standards: excess flow valves are installed on a service line that operate continuously throughout the year at not less than 10 psig. The valve shall close automatically at flows 50% above the customer's established flow rate, and allow pressures to equalize across the valve at 5 percent of the manufacturer's specified closure flow rate, up to a maximum of 20 cubic feet per hour. The EFV shall be marked and identified on the as-built drawings. All EFV shall be designed for a trip flow rate of 400 standard cubic feet per hour. The EFV shall be installed 12" downstream at the service tap connection and as shown on the detail drawing, two 1" high density 3408 PE couplings will be utilized as additional fittings to install Perfection Corporation Excess Flow Valve for 1" gas service lines. Fusible or Permasert EFVs as manufactured by Perfection are recommended.

3.05.07 Gas Anodeless Risers

Anodeless gas Risers shall meet ASTM D 2513, Category 1, ANSI B 1.20, ANSI B 31.8, US DOT 192, NFPA-58, and CSA B 137.4. The gas carrying steel pipe nipple shall meet the requirements of ASTM A53 pipe. All risers shall be factory leak tested to 150 psig. Polyethylene tubing shall be 1" or 2" IPS, high density 3408 PE. The steel pipe coating shall be fusion bonded epoxy (FBE), and shall be 3 to 10 mils in thickness, with the epoxy coating continuing through half the threaded nipple. Risers shall be pre-bent, 36-inch horizontal length and 30-inch vertical rise, with a PE 3408 pig tail as manufactured by Perfection. The entire steel casing of the anodeless riser shall be primed with #1027 Polyken primer and taped with #900 Polyken tape. Tracing wire clamps shall be installed on the shield riser located 1-inch just below the gas stop. Risers shall be compacted in place to provide a rigid and sturdy setting.

3.05.08 Gas Stop

Gas stop must meet ANSI B16.33, ANSI B1.20.1, shall be 1" FIPT Inlet /Outlet x 1" Insulated Union With Threaded Tailpiece, 100 psig. Black Iron Body-Brass Plug, Flat Head with Lockwings. Valve stops shall be McDonald 6266B. Larger size valves shall be a specified on the project drawings.

3.06 Gas Service Line Installation

Gas service lines and appurtenances shall be installed in accordance with TP 1.0, Excavation, Trenching, and Backfilling for Gas Utilities, and TP 2.0, Gas Line Separation Requirements. A minimum of 1.5 feet of cover is required for gas service lines.

Service lines shall be cut using tools specifically designed to leave a smooth, even, and square end on the pipe. The cut ends shall be reamed to the full inside diameter of the pipe. Pipe ends are to be connected using fittings that seal to the outside surface of the pipe, which shall be cleaned and smoothly finish before installation.

All 1 and 2-inch service connections to gas mains 2-inch and larger of PE pipe 3408 SDR11 shall be made using saddles tees depending on the anticipated load and distance from the point of tap to the metering point. Particular care shall be exercised to assure that the main is not damaged by the installation of the saddle. The saddle shall be aligned on the gas main so that it is at a 90-degree angle above the top of the pipe.

When making service connections to steel pipe, a sacrificial anode is to be placed on the existing steel main a minimum of 12" away from the steel service tap.

3.07 Pressure Test

Pressure tests shall be according to the DOT, Part 192, Subpart J, Test Requirements, §192.513, each segment of plastic pipeline must be tested in accordance with this section.

3.07.01 PE Pipe

All test equipment, labor, appurtenances, and materials, and the performance of all operations in accordance with the specifications are the responsibility of the Contractor; however, the operating utility reserves the right to inspect all testing equipment and review all procedures.

The test must be at least 150 percent of the maximum operating pressure or 100 psig whichever is greater. Two pressure gauges mounted side by side will be used, and when testing, the test pressure should be elevated approximately 10 psig above the anticipated test pressure, and then bled down to the actual test pressure. During the test, the temperature of thermoplastic material may not be more than 100 degrees Fahrenheit, or the temperature at which the material's long term hydrostatic strength has been determined under the manufacture's specification, whichever is greater. Pressure gauges used in testing shall be graduated at a maximum of 5-psi increments. The duration of tests shall be followed according to the Duration Test Chart.

Nominal Pipe Size In Inches	Minimum Test Time 100 feet	Minimum Test Time Per 1000 Feet
½	15 Minutes	1 Hour
1	15 Minutes	1 Hour
2	15 Minutes	2 Hours
4	15 Minutes	2 Hours

The designated NTUA Inspector is responsible to obtain and record all test procedures and results for the Gas Engineering Department. All records of tests

performed on a pipeline will be retained for the life of the pipeline. Gas Engineering Department is responsible for the maintenance of those records.

The test pressure shall be a minimum of 100 psig measured at the furthest point of the test section. No section shall be tested that is greater than one mile in length. The test shall be conducted in such a manner that existing mains, services lines, and service user's plumbing are not damaged. Damage caused by testing shall be corrected at the expense of the Contractor.
All connections, valves, saddle tees, gas risers up to the meter or gas stop, and plugs shall be tested with the main as far as is practicable. When testing piping systems above the Maximum Operating Pressure of 100 psig (High Pressure Distribution), special considerations shall be arranged with the Operating Utility.

If a loss in pressure indicates the need for repairs, the Contractor shall make such examinations as needed and perform such repairs at his expense as required by Owner. All tests and repairs shall be repeated by the Contractor until the specified pressure has been maintained for the appropriate time period, or to the satisfaction of the Owner.

3.07.02 Steel Pipe

All test equipment, labor, appurtenances, and materials, and the performance of all operations in accordance with the specifications are the responsibility of the Contractor; however, the operating utility reserves the right to inspect all testing equipment and review all testing procedures.

Testing Completed Line(General): Prior to the pipeline being completely installed and backfilled - or any portions thereof - the Contractor shall make arrangements to fill the line, or sections thereof, with compressed air to a pressure of 600 psig and test the completed line for leaks in accordance with the duration chart below. The maximum length for any line or segment thereof to be tested is one mile. All 24-hour tests shall have a chart recorder installed to record the variations in pressure. The inspector shall always be present during testing operations and will identify sections to be tested according to the inspector's best judgment. The Contractor shall furnish all equipment necessary for testing, at no cost to the Owner. Short sections of line to be installed under roads or highways shall be plugged and tested as above-described before cleaning and coating of the pipe.

When testing, the pressure should be elevated above the 600 psig test pressure until the gauges have stabilized and then the system may be bled down to 600 psig. Pressure gauges used in the test shall be graduated at a maximum of 10 psi increments. The duration of the test shall be accordance with the Duration Test Chart

Nominal Pipe Size (Inches)	**Minimum Test Time < 100 ft.**	**Minimum Test Time 100 – 500 ft.**	**Minimum Test Time 500–1000 ft.**	**Minimum Test Time > 1000 ft.**
Above 2”	**1 Hour**	**5 Hours**	**10 Hours**	**24 Hours**

Pigging the Line: To ensure that the completed line is free from water, dirt, small animals and other foreign objects, as well as defective workmanship such as flatten bends, the Contractor shall run a construction-type pig through the entire line, driven by compressed air. The pig shall be furnished and maintained by the Contractor, and it shall meet the approval of the Inspector.

Method Of Pigging: The pig must not be removed from any section of the line except in the presence of the Inspector. When a section of line has been pigged, that portion of the line shall be immediately tied into other pigged and tested sections in the presence of the Inspector. If the pig section cannot be tied into prior-tested section immediately, it shall be night-capped in the presence of the inspector, and the nightcap shall not be removed for tie-in purposes except in the presence of the inspector.

Care And Maintenance of the Pig: The metal disc of the pig shall be maintained at a diameter of one-half inch (1/2") less than the inside diameter of the pipe. If the disc becomes worn, it shall be built up with welding to maintain the required diameter. When, in the opinion of the Inspector, the rubber cups have become excessively worn or out-of-round, the contractor shall replace them with new cups.

Failed Test Of Completed Lines: If loss in pressure indicates the need for repairs, the Contractor shall make such examination as may be necessary and perform such repairs at his own expense as may be required by the owner. Tests and repairs shall be repeated by the Contractor until the specified pressure has been maintained for a 24-hour period or to the satisfaction of the owner.

3.07.03 Observation of Tests

Prior to the performance of the pressure test, the contractor shall have all equipment set up and ready for operation, and shall have performed an abbreviated test on the line to determine if the section should pass. The Contractor shall notify both the Owner and the Operating Utility a minimum of three working days in advance of the date that the Contractor plans to perform the pressure tests.

The Owner shall observe the testing to verify that the testing was performed according to the specifications and that the test data were properly and accurately recorded. The Owner will complete the required certification forms and submit them to the Operating Utility for approval. A letter of approval or disapproval of the test results and line installation will be sent from the Operating Utility to the Contractor.

The pipe inspections will follow all 49 CFR, Part 192.241, 192.235, 192.231, 192.225, 192.227, 192.243, and all other sections. Exhibit A shall be completed and filed with the utility

3.07.04 Purging of Newly Installed PE Service and Distribution Systems

After the new distribution system has been pressure tested, the system shall be purged with air at 100 psig to assure that all debris has been removed from the piping. Prior to purging, all gas stop plugs are to be removed, and each individual gas stop shall be operated quickly to assure that the connection at each of the saddle tees has been completely punched. Then the gas stop plugs shall be reinstalled and the stop left closed.

The outlet purging location shall be at the furthest riser and stop at the end of the segment being purged. The gas stop, initially closed, shall be opened slowly at the start, until the full ¼ turn is reached. Leave the stop valve open until pressure subsides. Once all purging is completed, it is very important that the riser used to purge the system be completed resealed. During the purging process, a representative of the utility shall be present.

The purging practices will follow 49CFR, Part 192.629, Purging of Pipelines. When a pipeline is being purged of **air** by use of **gas**, the gas must be released into one end of the line in a moderately rapid and continuous flow. If gas cannot be supplied in sufficient quantity to prevent the formation of hazardous mixture of gas and air, or if the purging is being done in a Class 3 or above location, a slug of inert gas - nitrogen gas - must be released into the line before the introduction of gas into the system. Each individual service lateral shall be purged and ready for meter services.

If a pipeline is being purged of **gas** by use of **air**, the gas must be released into one end of the line in a moderately rapid and continuous flow. If air cannot be supplied in sufficient quantity to prevent the formation of hazardous mixture of gas and air, a slug of inert gas - nitrogen gas - must be released into the line before the air.

3.08 Drainage Control

Erosion Checks: Erosion checks as shown on the plans shall be bladed or dozed across the finish backfill by the Contractor, or as directed by the Engineer, to prevent runoff from ponding or flowing along the pipeline or rights-of-way.

Ditching: The Contractor shall construct drainage control ditches in accordance with details shown on the drawings at locations determined by the Inspector after installation and backfilling operations have been completed. The bid price for the ditches shall be included in the unit bid prices, and no separate additional payment will be made thereafter.

3.09 Blow Down Station

Blow Down Stations on High Pressure Gas Main are to be installed 3 to 4 Miles apart or as specified by owner. Blow Down Stations shall consist of one major above ground flange valve that can control the gas main flow. Two 2” screw type valves are to be install on the relief stack on each side if the valve so that the station can isolate the

upstream or downstream of the section. The owner in all projects will specify the construction and design.

TECHNICAL PROVISIONS

TP 4.0 NATURAL GAS CATHODIC TEST STATION

4.01 Cathodic Test Station

4.01.01 General

This subpart prescribes minimum requirements for the protection of metallic pipelines from external, internal, and atmospheric corrosion. All metallic materials must have an external protection coating meeting the DOT, 49 CFR.

The Contractor shall install all cathodic test stations as indicated on design drawings and as recommended by the Owner and shall comply with the following design, construction, and material specification as follows:

All test station materials shall meet the minimum requirements of the National Association of Cathodic Engineer (NACE) approved specification to uniform with the CFR, DOT, Part 192, Sub Part I- Requirements for Corrosion Control, §192.769, External Corrosion Control; Test Station, and §192.471 External Control; Test Leads. The test station shall have an orange body with a red cap. The size of the test station shall be 3" nominal pipe size conduit and 6 feet in length. The test stations shall have five lead test terminals with "Warning – Gas Pipeline" (capitalized) and two NTUA logos imprinted on the orange body and shall be Big Fink Cathodic Protection Test Station, item # (501-385-OR), the product recommended is manufactured by COTT Manufacturing Co., 19755 Nordhoff Place, Chatsworth, CA. 91311-6606. Telephone number is 1-800-423-6387.

4.01.02 TEST WIRE ATTACHMENT

The following procedures for attaching test wires to steel pipe is the Owner's recommendation: file the point on the pipe to which the wires are to be attached to a rough bright surface to allow a good bond between the pipe and the weld metal; clean the surface to remove any metal filing debris. Cut the test wires to the required length, depending on the buried depth of steel pipe and length of test station. Sufficient slack should be provided to allow for backfilling and to insure there is enough wire above the ground for connections to the terminal.

NOTE: The test wire shall be the NACE standard white 12TW, with the plastic insulation. Other materials needed for wire attachment: Copper Adapter Sleeves, Cadweld Cartridges and Handicap.

Prepare the test wire by stripping approximately 1.5 inches of insulation from the wire end that is to be welded. Slip a copper sleeve over the wire end and crimp the sleeve tightly to the wire or bend the wire over the end of the sleeve. Place the tin disc in the Cadweld mold to hold the Thermit powder; pour the contents of the cartridge (5 gram charge) into the mold.

NOTE: Be sure the "to open" end of the cartridge is opened and not the bottom end. This insures that the starting powder necessary to ignite the Thermit powder will be on top after the contents of the cartridge have been poured into the mold. It may be necessary to squeeze the cartridge with the thumb and forefinger to loosen the starting powder. Be very careful to keep the starting powder charge dry, as it takes only a small amount of moisture to prevent the charges from igniting.

Continue the wire and steel pipe set up by wrapping the wire around the pipe, then tie off the wire allowing at least 6" of wire from the end for Cadwelding. Place the mold over the prepared area of the pipe and insert the wire end into the small opening at the bottom of the mold. Clean the hinged top of the mold and ignite the charge with the flint gun through the opening of the mold. After the mold has cooled down, remove it from the pipe. File or brush any oxidized material from the weld. Be sure a good bond exists between the weld and the steel pipe, and that the wire is firmly attached. After all loose particles have been cleaned from around the weld, apply one coat of Polyken Primer #1027 and install the Handicap patch over the weld. Make sure the bulb containing the grease is placed over the welded area. Tape both ends of the Handicap patch with 2" #900 Polyken tape and squeeze the bulb containing the grease with thumb and forefinger to provide an airtight seal.

4.01.03 TEST POST INSTALLATION

For initial stability of the cathodic test station post, insert a one-foot length of ¾" PVC or steel through the 3 inch by 6 feet test station. The insert shall be at right angle to the post and approximately 6 inches from the lower end of the post.

Bring the attached test wires up through the post, allowing two feet slack in each lead. Place the test station in an upright position directly over the pipeline so that the lower end of the post is three feet below grade. Then backfill dirt around the post.

To attach the test wires to the test terminal, strip one inch of plastic insulation from the end of each of the test leads. With needle nosed pliers, round the stripped ends to fit on the test terminal. Attach the test leads to the test box as required. If the test station is at a foreign line crossing, indicate which lead is from the foreign line and which lead is from the NTUA line inside the terminal box.

TECHNICAL PROVISIONS

TP 5.0 NATURAL GAS METERS AND APPURTENANCES

5.01 Scope of Work

This subpart prescribes minimum requirements for installing customer meters and service regulators.

5.02 General

Each gas meter must be installed outside the building at a readily accessible location and protected from corrosion and other damages. All meter installations shall conform to DOT, Title 49, Part 192, §192.353, §192.355, §192.357, and §192.359 and the Owner's design and specifications requirements.

5.03 Materials

5.03 .01 Residential Standard Gas Meters

The Owner shall supply the residential Sensus Meters R-275, Model 001-63-502-07 - temperature compensated, unless otherwise specified, and factory calibrated. Meter shall be diaphragm type natural gas meters, and have a maximum flow rate of 275 cubic feet/ hour (SCFH). The meter ferrule size shall be 20 Lt. (per ANSI B-109-1), swivel washers model no.001-61-154-02, and include the black iron swivel nut model no. 001-41-166-00. The index assembly type shall be the odometer type reading plastic with drains, clear polycarbonate index box and the kit part no. 001-63-656-50; consisting of Rockseal plug, seal cup, seal spacer and mounting screws. Meter is to be die-cast aluminum alloy to provide corrosion protection with minimum weight. All residential meter will be installed according to the Owner's design and specification; all meters must be soap tested at all fittings, and any leak detected will be immediately repaired.

5.03.02 Commercial Standard Gas Meters

The Owner shall provide (unless otherwise specified) and maintain commercial Invensys Meters - intermediate and large capacity diaphragm gas meters numbers: 415, 750, 1000, 1600, 3000, 5000 or 10,000. The Invensys gas meter shall be temperature compensated for natural gas with specific gravity of .60. The maximum cubic feet/ hour (SCHF) demand shall be determined for each project. The meter ferrule size shall be 45 Lt. The pressure on the meter shall be limited to 67% of the manufacture's shell test pressure as published according the Pipeline Safety and Regulation. The indexes shall be standard direct reading plastic for the smaller meters, or brass for the 750s through 10,000. The index cover box shall be clear lexan UV stabilized clear poly-carbon Rockseal.

The Contractor at his expense shall install the meter assembly as delineated by the Owner's specifications and designs. Upon completion of constructing the meter loop, all fittings must be soap-tested, and any leaks shall be immediately repaired.

5.03.03 Gas Service Regulators

All gas service regulators shall be supplied and maintained by the Owner, unless other arrangements are specified. Smaller service regulators are to be Invensys Model 043-182: 1" x 1" pipe size, straight through body, diaphragm type assembly with internal relief valve (IRV). The blue spring ranges part No. 143-08-021-01 with 3/16" orifice size having a maximum inlet pressure of 60 psig and an outlet pressure range of 5" to 8 1/2" water column. The manufacture shall be Invensys, Equimeter, or equal as approved by Owner.

Each regulator must be installed so as to minimize anticipated stresses upon the connecting piping and regulator. All nipples shall be Schedule 40. Connections may not be made to, or used with easily damaged material when installing the meters or regulators.

Regulators must be rain and insect resistance, and be located at a place where gas from the vent can escape freely into the atmosphere and away from any opening into the building, and must be protected from damage.

For all meters assemblies sizes 3000 and above, overpressure protection shall be designed to protect the customer's piping system. This overpressure protection device may be a relief valve, monitor regulator, shut-off device, or any similar device approved by the owner.

5.04 Gas Meter Loop Requirements

Vents, windows that open, doors, or other openings into the building; or electric equipment and meters, or any heat generating device shall not be allowed either over or within 36" of the gas meter loop. Also the meter shall not be installed within 36" of the end of a building unless specifically exempted by the utility. There must be approximately 4" between ground level and the bottom of the meter.

All gas stub-outs are to be 1" NPT and extended 8" out from the exterior wall of the building and be at a minimum of 20" from finish grade ground level. Gas stub outs are to be capped or taped to protect threads.

5.04.01 Gas Meter Activation

Letter of Certification: The scheduling for activating the meter will be initiated upon the receipt of "Letter of Certification". This certification must include a copy of the Plumber License Contract Number and a written affidavit showing the results of the house piping tests according to the National Plumbing Code identifying the house or houses that were tested, with dates, time duration, and testing pressure.

Load and Pressure: Load and inlet pressures must correspond with all planning documents. Any changes will need to be approved by the Gas Engineer.

Activating Gas Meter: Once all required documents are received, the Owner will schedule the activation of the gas meter with the customer or Contractor. The customer must arrange to have a representative or plumber present when the gas is activated. The Utility will supply the required pressure as accurately as possible down stream of the gas meter under peak load. Once the deliverable pressure is set, for the 3000 and above meters, the relief valve also shall be set. The multiplier check sheet, any variation in delivery pressure (from a 7" WC), the safety inspection report sheet, and all other required customer information shall be forward to the respective District for billing purposes.

Gas Meter Fencing: All 3000 and above gas meter shall be fenced. If the customer constructs a retaining wall, the utility may wave the requirement for fencing. The six-foot chain link fence will be sized according to the Meter Loop length, and the fencing or retaining wall shall have a minimum four-foot clearance around the meter and appurtenances. As part of the fencing, the utility will require either one or two gates – or a double gate – depending on the size and location of the meter.

Gas Meter Guard Rail: Four-inch guardrails will be installed in heavily traffic areas as determined by the utility.

5.05 Gas Regulator Station

Owner shall supply the gas regulators, unless other arrangements are specified. Regulators for city gate and farm taps will be determined on for each installation. The regulators shall be Fisher 627 Series as shown on the drawings developed by the utility. Contractor shall install as specified by NTUA's specification and designs.

EXHIBIT A

GAS LINE PRESSURE TEST CERTIFICATION

PROJECT NAME AND NUMBER:_____

GENERAL LOCATION OF LINE TESTED: _____
(Town/State)

DATE TEST WAS CONDUCTED: _____

TEST INSTRUMENT USED: (Serial number may be assigned by NTUA personnel)
(√ - type of instrument used and fill in information)

	Type	Manufacturer	Model/Serial number
	1. Gauges		
	2. Chart Recorder		
	3. Dead Weight		

PRESSURE TEST RESULTS:

Size of Pipe	Type of Pipe	Length of Pipe	Pounds Tested At	Duration Time	Results Pass / Fail	

REMARKS: _____
_____
_____

THE ABOVE TEST INFORMATION IS HEREBY CERTIFIED BY:

NAME (Print): _____ TITLE: _____

SIGNATURE: _____ DATE: _____

COMPANY: _____

ADDRESS: _____

WITNESS: _____

CERTIFICATION RECEIVED BY: _____ON: _____

Fencing Specification Requirement:

Standard fencing: Blow down station 10'x18' and farm taps 8'x10'. The installation of fencing and gates shall meet the minimum requirements of American Society for Testing & Materials (ASTM) specification. All fences will have visible Warning Signs located on all four sides installed by the Utility.

Following materials are typically used:

Chain link – 72", 9 gauge GAW, galvanized (2" mesh), 1.2 oz. zinc chain link fabric
Top rail – 1-5/8" DQ-40 pipe
Terminal post – 2-7/8" x 8', DQ-40 pipe. Concrete footing: 10" diameter, 24" depth
Line post – 1-7/8" x 9', schedule-40 pipe. Concrete footing: 12" diameter, 36"depth
Gate post – 2-7/8"x 10', DQ-40 pipe. Concrete footing: 10" diameter, 36" depth
Latch post – 2-7/8" x 9', DQ-40 pipe
Gate – Fabricated; 72"x 3', 1-7/8" pipe, .065" tube single swing gate
Malleable iron-gate fork latch – 1-7/8"x 2-7/8"
Heavy post hinge – 2-7/8"
Heavy gate frame hinge – 1-7/8"
Carriage bolt with nut - 3/8"x 3 ½"
Carriage bolt - 3/8" x 2-¼"
Regular brace band – 2-7/8"
Regular tension band – 2-7/8"
Pressed steel rail-end – 1-5/8
Aluminum tie wire - 6 ½" length, 11 GA
Smooth tension wire - 9 GA., attached to bottom of fence fabric
Steel hog ring – 12.5 GA
Galvanized barb wire – 12.5 GA, 2 PT, 3 strands on top
Pressed steel corner barb wire arm – 2-7/8"
Pressed steel barb wire arm – 1-7/8"x 1-5/8", 45 degre.5
Tension bar - 70" x 3/16" x 3/4"
Pressed steel cap – 2-7/8"
Carriage bolt with nut - 5/16" x 1-¼"
Bollards - 4"x5', schedule 40 pipe.
Fill bollards with cement
Concrete for all post footing
Install 6" layer of 1" base coarse material of gravel over 9 mil plastic, within the entire fence area.

Bollards specification requirements: Bollard for stations shall be 4" diameter steel pipe; 5' in length and stand 3' above the ground surface. Bollards must be painted yellow and have a 5 feet walk way. Bollards shall be set in an 20" x 20" x 24" concrete footing and each filled with concrete.

TECHNICAL PROVISIONS

TP 8.1 FINAL SITE UTILITY INSPECTION REQUIREMENTS

8.02 Final Inspection Package

The Contractor shall submit a complete site utility inspection package, which is to include the following items; all copies of which shall be legible.

8.02.01 As-Built Drawings

Four (4) blueline sets and one (1) set of size D Mylar "as-built" drawings which contain:

A. Cover Sheet
B. Rights of Way Plat Sheets
C. Utility Plan View Sheets
D. Gas Line Profile Sheets
E. Details Sheets - standard and specific drawings

8.02.02 As-Built Notebook

Four (4) three ring, loose leaf binders containing the following information:

A. Natural Gas Test Certification and Test Results Approved by the Operating Utility. See “Exhibit A” of TP 3.
B. Natural Gas line and Meter Test Certification and Test Results Approved by the Operating Utility. See “Exhibit A” or “Exhibit B” of TP 4
C. Executed Transfer Agreement with Cost of Plant. See “Exhibit A and B” of TP 5.
D. Gas Meter Serial Number Listing and Current Meter Readings.
E. Approved Tapping Permits.
F. Approved Natural Gas Material Submittals.
G. A set of 1.44 MB diskettes or CD in AutoCAD version specified in Drawing Standards.

8.03 Scheduling Final Inspection

The scheduling for the final inspection shall be coordinated with the Operating Utility by the Contractor. A complete as-built package is to be provided to the Operating Utility for review a minimum of 21 calendar days prior to the scheduled inspection.

8.04 As-Built Drawing Requirements

Each project site that contains utilities to be transferred to the Operating Utility must be submitted with the following requirements and sheets.

8.04.01 General Requirements for All Sheets

Each sheet must be stamped by an A/E* and prominently labeled, signed, and dated by the Contractor (excepting cover and rights of way sheets):

AS BUILT _____
(Name) (Date)

I certify that I have constructed this project following the standards set forth in TPs 1 - 4, and I have complied with all vertical and horizontal pipeline separation requirements.

All facilities shall be shown as constructed and references to "proposed" of "future" deleted.

Where appropriate, each sheet must have a north arrow. Whenever possible, the arrow shall be up or to the right of the sheet.

Where appropriate, each sheet must have a standard legend and bar scale. All existing mains must be solid lines.

All sheets must be numbered sequentially beginning with “Sheet 1 of (Total) Sheets.”

8.04.02 Cover Sheet

Since drawings occasionally cover several project sites, the location for each as-built site must be prominently identified by project number and project site location.

A map of the total Navajo Nation that shows the project location, a vicinity map with a scale of 1" = 2 miles, and north arrow is to be provided. These maps may be on a separate sheet or on the topographic boundary sheet.

The project site location, with the project number(s), should be shown on both Navajo Nation and vicinity maps.

8.04.03 Plat Sheet

Show site boundaries with bearings and distances, complete with ties to permanent state plane markers (Section Corners, established monuments, etc.) and bearing references. All bearings shall be in the appropriate State Plane System in NAD 83 if possible; all distances shall be ground distances. Indicate basis of bearing.

Show and describe location of elevation and vertical datum references. A broken line may be utilized if the benchmark is not within the drawing scope or scale.

Show each lot and street boundary defined with bearings and distances, if appropriate. Show street centerline bearing, distance, and curve data.

Provide statements "Street Rights of Way are Dedicated to the Common Use of Utilities" if appropriate, and "the operating utility is not responsible for the repair or replacements of improvements in utility easements disturbed during operation and maintenance activities."

Show minimum 20 foot wide easements for each utility (electric, natural gas, water, sewers, telephones, cable) not located within the street right of way. Add an additional 10-foot width for each additional parallel utility. The Owner will provide to the Contractor as-built drawings of utilities not constructed by the Contractor.

Utility or street rights of way may require expansion in localized areas to include all utility appurtenances (e.g., fire hydrant guards) which are not within the normal easement.

Provide a narrative legal description of the site boundary.

8.04.04 <u>Utility Plan View Sheet(s)</u>

On a sheet with a scale between 1"=20' and 1"=50', provide a plan view of the site that shows all utilities (e.g., propane, water, sewers, electric, natural gas, telephones, cable).

Show all lot, street, and easement boundary lines without bearing and distances.

Label all houses with final house numbers, numbers must be consistent.

Provide a legend, north arrow, and bar scale.

Show as-built routing of all gas mains and service lines. Emphasize gas mains by using bolder lines. Use a smaller but bold line for service lines. Reference the standard Operating Utility legend.

Label gas mains with size, type of material, pressure rating, and length of pipe from P.I. to P.I. Example: 4" steel, schedule 40, 232.00'.

Label gas service with size, type of material, and distance between main and point of service. Example: 2" PE, 50.00'.

Label natural gas main taps point to previous projects with

previous project number and as-built sheet number. Contractor shall contact the Operating Utility to determine this information.

Examples:	White Cone Composite	Red Water Housing
	IHS NA 88-114	NHA AZ 12-106
	Sheet 15 of 43	Sheet C-8

Show and label depth of bury at all locations where gas main varies from the standard depth of bury of 36 inches.

For the gas meter state the manufacturer model number and type of joint for the actual item used. As an option this information can be shown on the standard detail sheet next to the appropriate detail, or include submittals.

Show and label all gas main fittings actually used. Examples: 6" G.V., 6" DI TEE, 6" DI 45$_{o}$ BEND.

EXHIBIT "A" OF TP9

Note: (**This is an Example only**. The actual cost of Plant shall be attached to the Transfer Agreement.)

COST OF PLANT
Tuba City, Arizona

ITEM	QUANTITY	LABOR	MATERIAL	TRANS.	TOTAL
6" X-tru Stl Pipe .188	32229.58 ft.	$406,092.71	$225,607.06	$182,741.72	$814,441.49
6" Balon Flange Ball Valve	2 ea.	$64.00	$300.00	$28.80	$392.80
2" Balon Screw Ball Valve	3 ea.	$56.32	$1040.00	$25.34	$1121.66
6" 8-Hole Flange	10 ea.	$640.00	$600.00	$288.00	$1528.00
6" Gasket – 600#	20 ea.	$80.00	$80.00	$36.00	$196.00
Cap Black Malleable 2"	6 ea.	$5.76	$12.66	$2.59	$21.01
6x6x2 Reducing Weld Tee	6 ea.	$96.00	$150.00	$43.20	$289.20
Bolt Stud with Hex Nut	80 ea.	$640.00	$80.00	$288.00	$1008.00
6" STD 45 Weld Elbow	12 ea.	$768.00	$114.00	$345.60	$1227.60
10" Steel Pipe, black	160 ft.	$1800.00	$750.00	$810.00	$3360.00
Pipe Stl X-tru Coat 2"	30 ft.	$144.00	$106.50	$64.80	$315.30
Elbow 90 Weld Type 2"	2 ea.	$128.00	$8.82	$57.60	$194.42
6" STD 90 Weld Elbow	3 ea.	$192.00	$33.00	$86.40	$311.40
Primer Pipeline Polyken	20 ea.	$320.00	$297.40	$144.00	$761.40
Tape Polyken #900-12 2" size	40 ea.	$5.12	$165.20	$2.30	$172.62
Yellow Warning Tape	33 ea.	$158.40	$247.83	$71.28	$477.51
Markers Carsonite Yellow	35 ea.	$33.60	$355.95	$15.12	$404.67
Decal "Warning Gas Pipeline"	35 ea.	$3.36	$23.10	$1.51	$27.97
Cathodic Protection TP	5 ea.	$320.00	$4797.77	$144.00	$5261.77
6" Blow Down Station	1ea.	$1556.06	$2216.26	$700.23	$4472.55
6" Regulator Station	1ea.	$2139.68	$2646.18	$962.86	$5748.72
City Gate	1 ea.	$1827.30	$2970.47	$822.29	$5620.06
	Labor Subtotal:	$417,070.31			
		Material Subtotal:	$242,602.20		
			Transportation Subtotal:	$187,681.64	
				Subtotal:	$847,354.15
Fencing	3 ea.	$900.00			$900.00
Bollards	12 ea.	$1800.00			$1800.00
Gravel	3 ea.	$900.00			$900.00
Typar	3 ea.	$150.00			$150.00
				Subtotal:	$3750.00
				Misc.:	$170,220.83
		Grand Total (labor, material, trans.,misc., fencing)			$1,021,324.98

EXHIBIT "B" OF TP10
UTILITY TRANSFER AGREEMENT
for
NATURAL GAS FACILITIES

This agreement is made between _____, hereinafter called the Grantor and the **NAVAJO TRIBAL UTILITY AUTHORITY,** hereinafter call the Grantee. **WHEREAS,** the Grantor has constructed or caused to have constructed natural gas facilities located at or near_____
_____ as shown on the plans titled_____
_____, designed by _____,
and dated _____ and said facilities and related final as-built plans already have been inspected, accepted and approved by the Grantee, and;

WHEREAS, the Grantor wishes to convey to the Grantee all his interest in these facilities and appurtenances constructed at the above-mentioned location on or about the above-mentioned time, along with all rights, rights of way, and privileges so that the Grantee may own, operate, and maintain all such facilities and appurtenances.

NOW THEREFORE IT IS AGREED:

For consideration of $1.00 the receipt of which already has been acknowledged, the Grantor transfers, assigns, grants, and conveys to the Grantee all rights, titles, interests, easements, and rights of way in the aforementioned facilities, and;

The Grantee agrees to accept such aforementioned facilities, and further agrees to own, operate, and maintain such facilities in a reasonable and prudent manner until such facilities are determined to be no longer of any value. Further, the Grantor hereby warranties all such facilities against defects in workmanship and materials, and for design deficiencies, errors, and omissions for the period of one year beginning on _____and ending on _____.

A listing of the total inventory and Cost of Plant determined by the Grantor to be transferred to the Grantee is attached as EXHIBIT ____ and make a part of this Utility Transfer Agreement. The total Cost of Plant as appears on this document is $_____.

IN WITNESS THEREOF, both parties have signed and dated this agreement.

Grantor: by _____ Date:_____
Signature

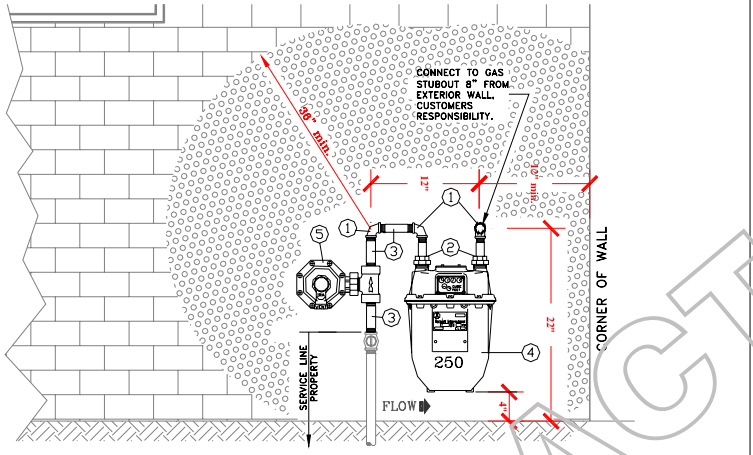
_____
Print Name

Navajo Tribal Utility Authority: by _____ Date:_____
Signature

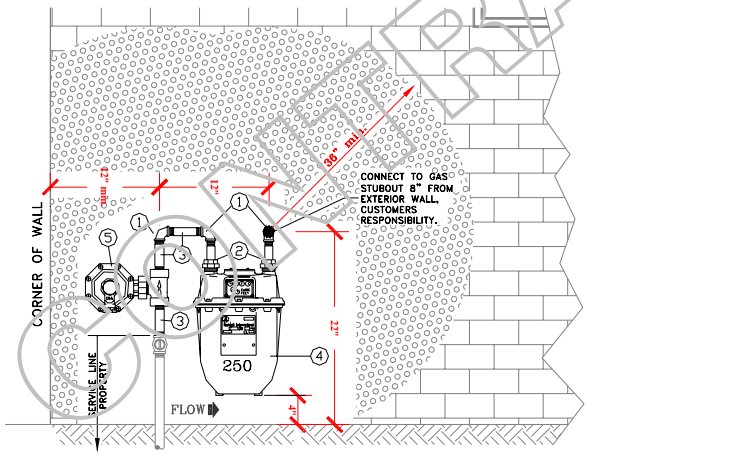
_____
Print Name

TABLE OF CONTENTS

NTUA RESIDENTIAL SINGLE GAS METER SET SPECS. :



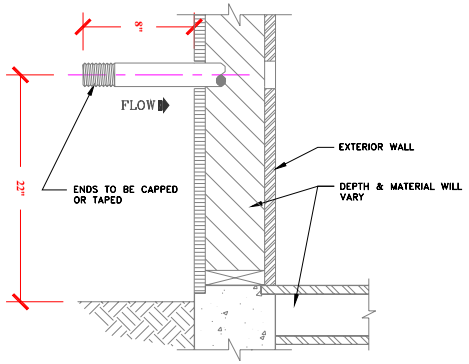
UPSTREAM PRESSURE = _____.
DOWNSTREAM PRESSURE =_____.



UPSTREAM PRESSURE = _____.
DOWNSTREAM PRESSURE =_____.

1. Service Line by NTUA. A minimum cover of 18" to the top of the pipe. A service line shield riser will be installed 12" to the left (facing the meter, refer to Meter Set Loop Clearance Drawing) of the gas stubout.
2. Gas Stop by NTUA.
3. Residential Regulator by NTUA
4. Residential Gas Meter by NTUA. Vents, opening, windows, doors or other opening into the building; electrical or other sources of ignition, chinmeys or other heat generating devices will not be allowed within 36" from the meter loop, a 12" minimum clearance from corner of building. Approximately 4" between ground level and the bottom of the meter. A service connection fee is required at the respective district.
5. 1" NPT Gas Stubout to extend 8" out from the exterior wall of the building and 22" above final grade. Capped/Tape to protect threads and free of any liquid dirt or any foreign object.
6. A Letter of Certification from a licensed plumber showing the results of the house piping tests shall be submitted in writting before NTUA will schedule any gas connections.

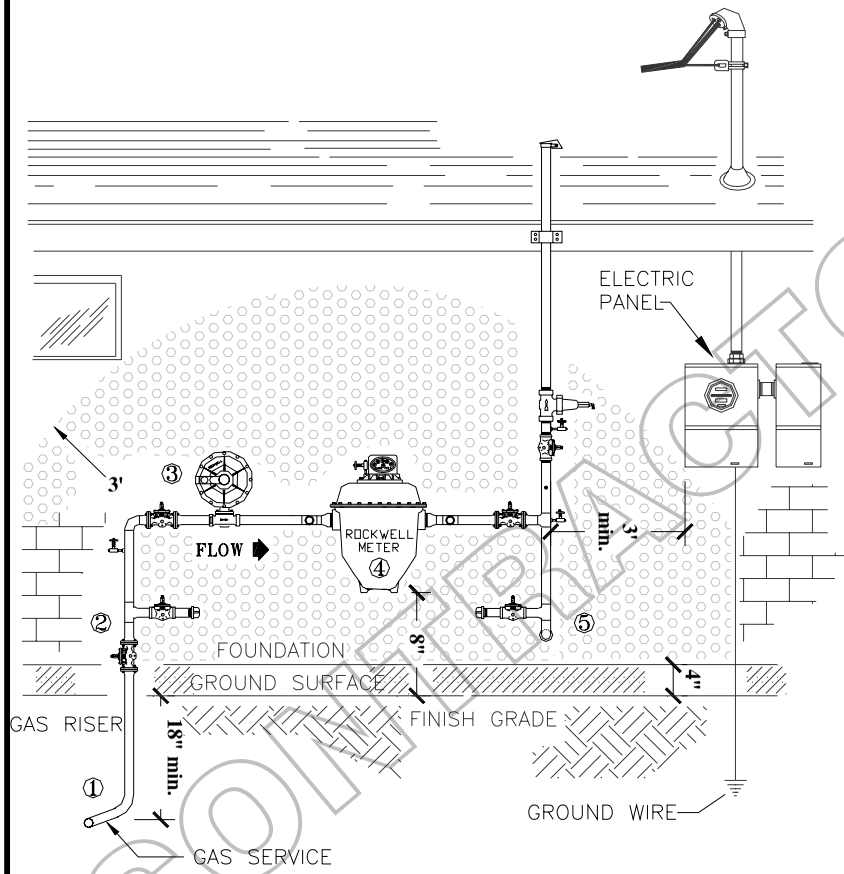
NOTE: STUBOUTS must extend out 8" minimum. If specification is not met, meter set will not be installed.



PROJECT NAME:
NTUA RESIDENTIAL SINGLE GAS METER GET SPECS.

Drawn By: WD YAZZIE	Scale: NTS
Updated By:NLAND AUGUST 25, 2004	Acad File Name: GMS-3.DWG
Project Manager: -	Job Order: -
Date: -	Estimate Name: -
Project Type: GAS	Drawing No: 1 OF 1

NTUA COMMERCIAL SINGLE GAS METER SET SPECS. :



1. **SERVICE LINE** by NTUA. A minmum cover of 18" to the top of the pipe. A 2" service line shield riser will be installed 18" to the left facing the meter) of the gas stubout.

2. **GAS STOP** by NTUA.

3. **COMMERCIAL REGULATOR** by NTUA.

4. **COMMERCIAL GAS METER** by NTUA. Vents, opening windows, doors or openings into the building; electric equipment or other sources of ignition, chimneys or other heat generating devices will not be allowed within 36" from the meter loop, a 12" minimum clearance from corner of building. Approximately 4" between ground level and the the bottom of the meter. A service connection is required at the respectve district.

5. **NPT GAS STUBOUT** to extend 8" out from the exterior wall of the building and 20" min. above final grade. Capped/ taped to protect threads and free of any liguid or dirt etc.

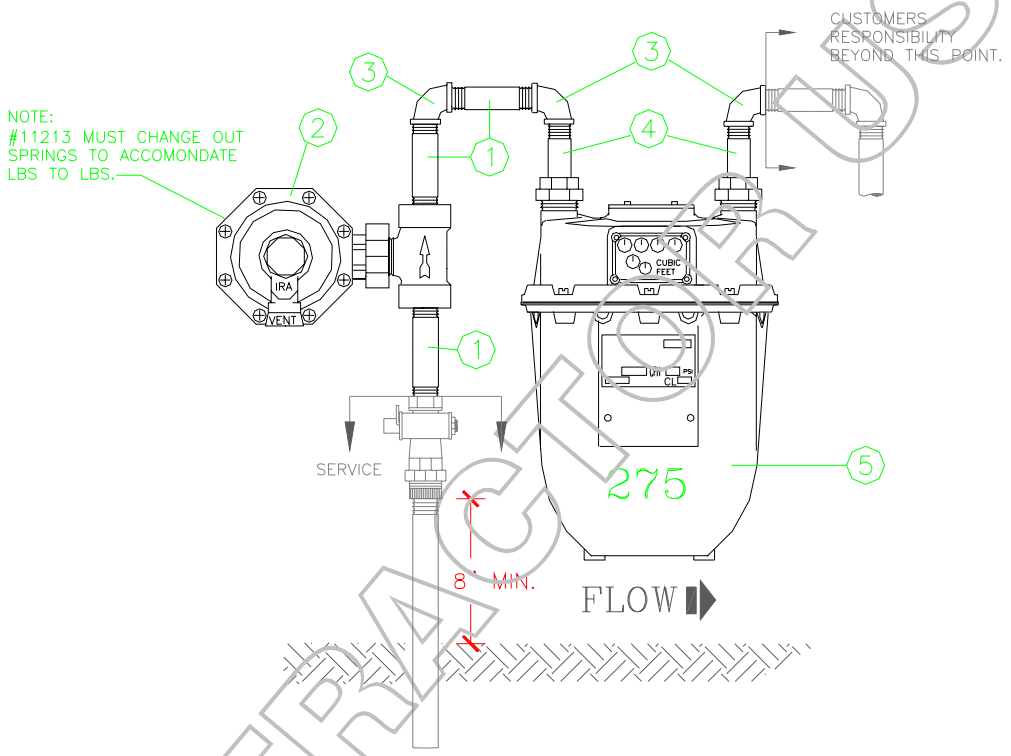
6. **A LETTER OF CERTIFICATION** from a licenced plumber showing the results of the house piping tests shall be submitted in writing before NTUA will schedule connection of gas.

PROJECT NAME:
NTUA COMMERCIAL SINGLE GAS METER GET SPECS.

Drawn By: WD YAZZIE	Scale: NTS	Project Manager: -	Date: -
Updated By: NLAND AUGUST 25, 2004	Acad File Name: GMS-3.DWG	Job Order: -	Estimate Name: -
Drawing No: 1 OF 1			Project Type: GAS

STANDARD 275 METER SET
POUNDS TO POUNDS

TCL= _____ cfh @ _____lbs.



ASSEMBLY DESCRIPTION: STANDARD 275 METER SET POUNDS TO POUNDS

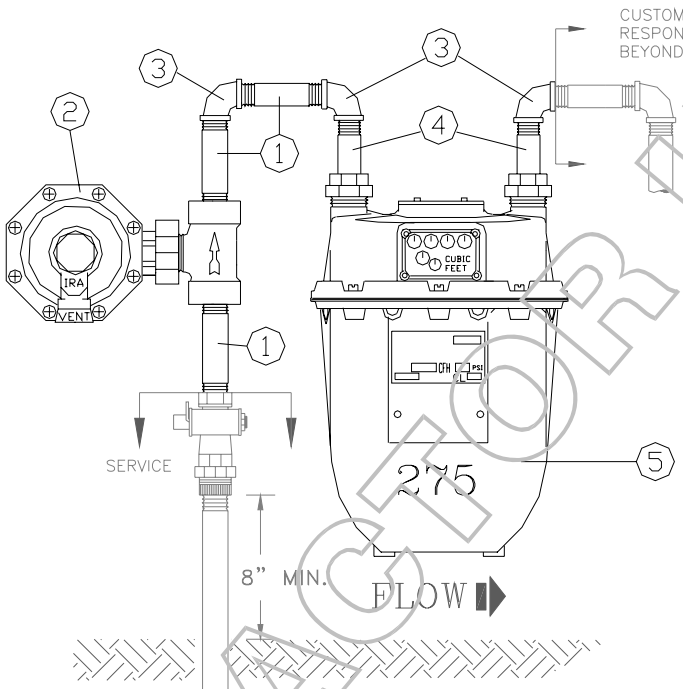
ITEM	PART DESCRIPTION	PART UNITS
1	1" X 4" BLACK NIPPLE	3 EA.
2	1" 143-80 HP REGULATOR FIPT	1 EA.
3	1" 90° BLACK ELBOW FIPT	3 EA.
4	1" 20 LP W NPT	1 EA.
5	275 METER	1 EA.
6	GREY PRIMER	1 EA.
7	LAWSON DARK GREY (ASA 49) #98762	2 EA.

TITLE:
STANDARD 275 METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M275P.DWG		Work Order No. GAS

STANDARD 275 METER SET
POUNDS TO OUNCES

TCL= _____ cfh @ _____lbs.



Upstream Pressure= 30 lbs.
Downstream Pressure= 7" w.c..

ASSEMBLY DESCRIPTION: STANDARD 275 METER SET POUNDS TO OUNCES

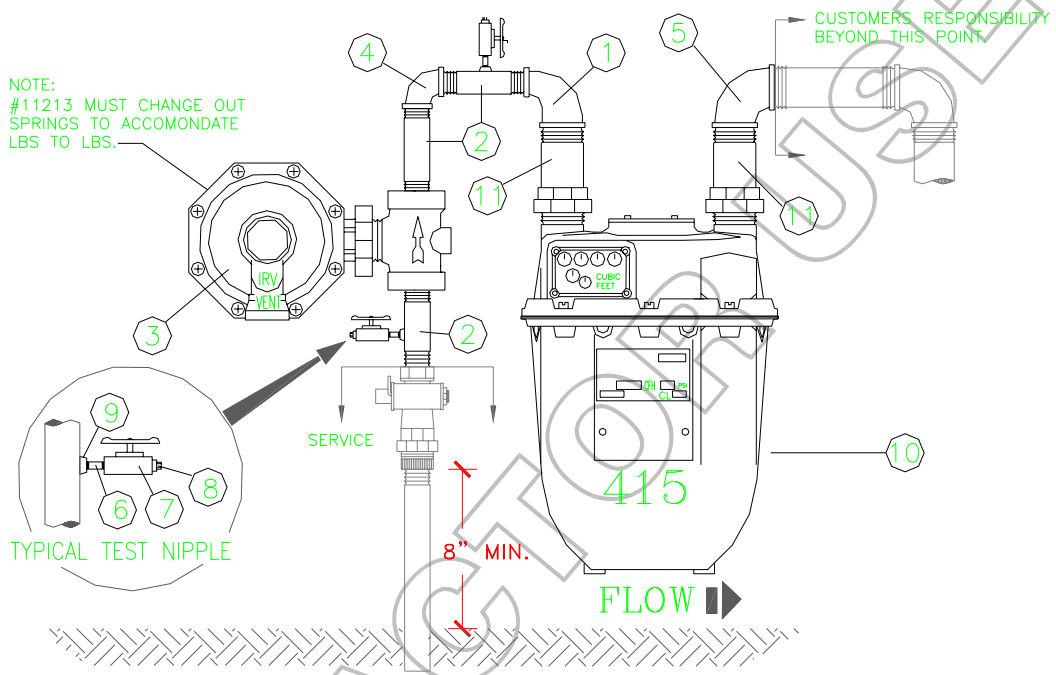
ITEM	PART DESCRIPTION	PART UNITS
1	1" X 4" BLACK NIPPLE	3 EA.
2	1" 143-80 HP REGULATOR FIPT	1 EA.
3	1" 90° BLACK ELBOW FIPT	3 EA.
4	1" 20 LP W NPT	1 EA.
5	275 METER	1 EA.
6	GREY PRIMER	1 EA.
7	LAWSON DARK GREY (ASA 49) #98762	2 EA.

TITLE:
STANDARD 275 METER SET POUNDS TO OUNCES

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLAND DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M275Z.DWG		Work Order No. GAS

STANDARD 415 METER SET
POUNDS TO POUNDS

TCL= _____ cfh @ _____lbs.



Upstream Pressure=_____.

Downstream Pressure=_____.

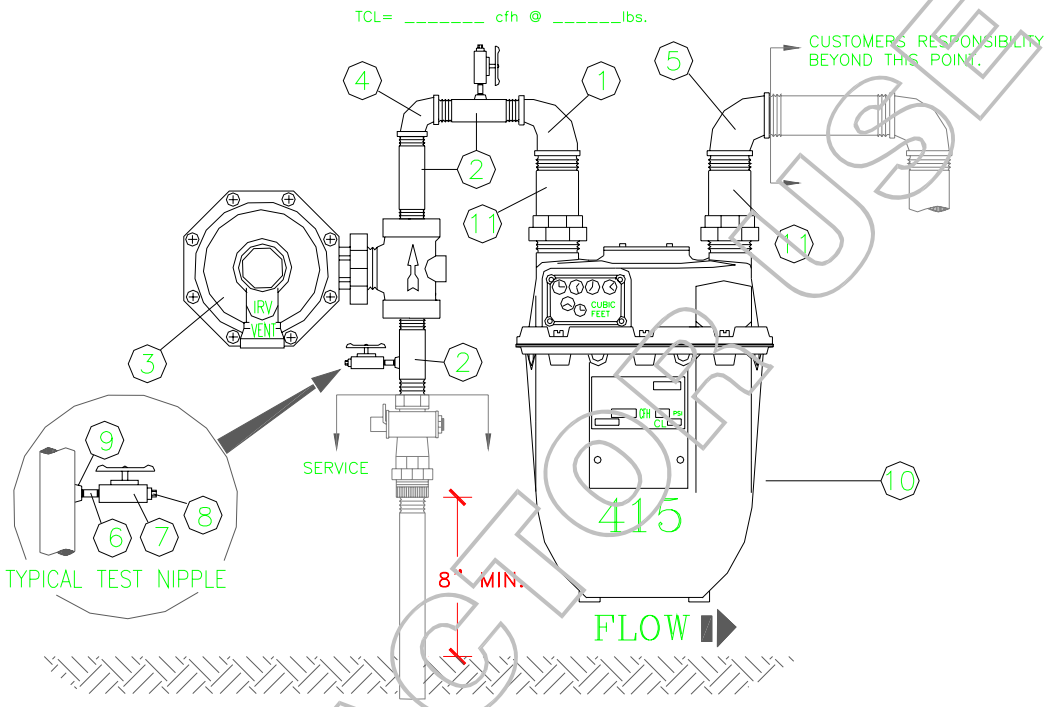
ASSEMBLY DESCRIPTION: STANDARD 415 METER SET POUNDS TO POUNDS

ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" X 4" BLACK NIPPLE	3 EA.
3	1" 143-80 HP REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1-1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 3" BLACK NIPPLE	2 EA.
7	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
8	1/4" BLACK PLUG MIPT	2 EA.
9	1/4" THREAD-O-LET FIPT	2 EA.
10	415 METER	1 EA.
11	1-1/2" NPT, 45LT SPUDS	2 EA.
12	GREY PRIMER	2 EA.
13	LAWSON DARK GREY (ASA 49) #98762	2 EA.

TITLE:
STANDARD 415 METER SET POUNDS TO POUNDS

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:		Drawing No.
QSMITH	–	–	NTS		1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M415P.DWG		Work Order No. GAS

STANDARD 415 METER SET
POUNDS TO OUNCES



Upstream Pressure=_____.

Downstream Pressure=_____.

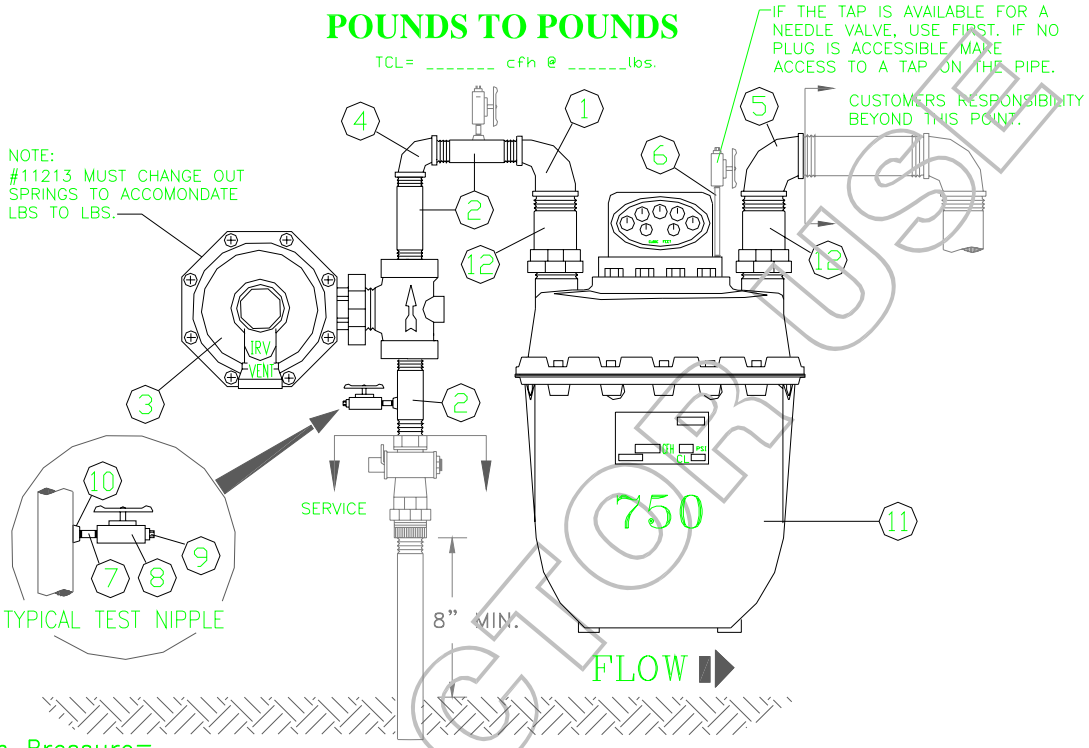
ASSEMBLY DESCRIPTION: STANDARD 415 METER SET POUNDS TO OUNCES

ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" X 4" BLACK NIPPLE	3 EA.
3	1" 143-80 HP REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1-1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 3" BLACK NIPPLE	2 EA.
7	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
8	1/4" BLACK PLUG MIPT	2 EA.
9	1/4" THREAD-O-LET FIPT	2 EA.
10	415 METER	1 EA.
11	1-1/2" NPT, 45LT SPUDS	2 EA.
12	GREY PRIMER	2 EA.
13	LAWSON DARK GREY (ASA 49) #98762	2 EA.

TITLE:
STANDARD 415 METER SET POUNDS TO OUNCES

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:		Drawing No.
QSMITH	–	–	NTS		1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M415Z.DWG		Work Order No. GAS

STANDARD 750 METER SET
POUNDS TO POUNDS



ASSEMBLY DESCRIPTION: STANDARD 750 METER SET POUNDS TO POUNDS

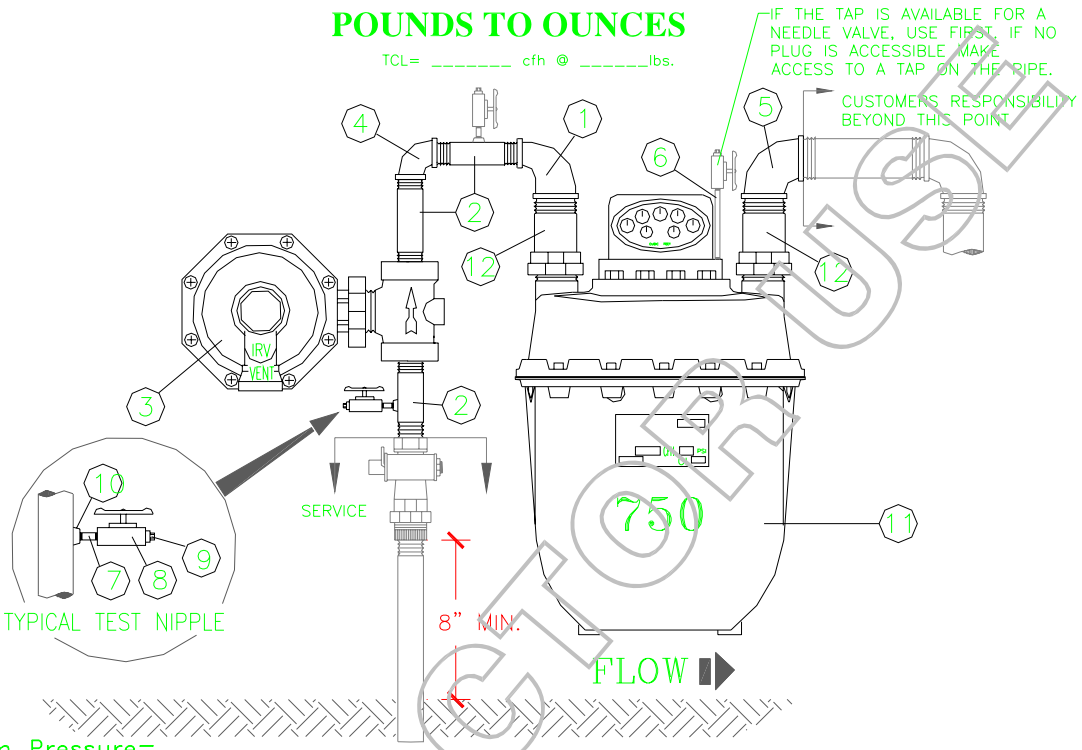
ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" 143-80 HP REGULATOR FIPT	1 EA.
3	1" 143-80 HP REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1-1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 4" BLACK NIPPLE (OPTION: SEE NOTE)	1 EA.
7	1/4" X 3" BLACK NIPPLE (OPTION: SEE NOTE)	2 EA.
8	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
9	1/4" BLACK PLUG MIPT	2 EA.
10	1/4" THREAD-O-LET FIPT (OPTION: SEE NOTE)	2 EA.
11	750 METER	1 EA.
12	1-1/2" NPT, 45LT SPUDS	2 EA.
13	GREY PRIMER	2 EA.
14	LAWSON DARK GREY (ASA49) #98762	2 EA.

TITLE:
STANDARD 750 METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLAND DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M750P.DWG		Work Order No. GAS

STANDARD 750 METER SET
POUNDS TO OUNCES

TCL= _____ cfh @ _____lbs.



Upstream Pressure=_____.

Downstream Pressure=_____.

ASSEMBLY DESCRIPTION: STANDARD 750 METER SET POUNDS TO OUNCES

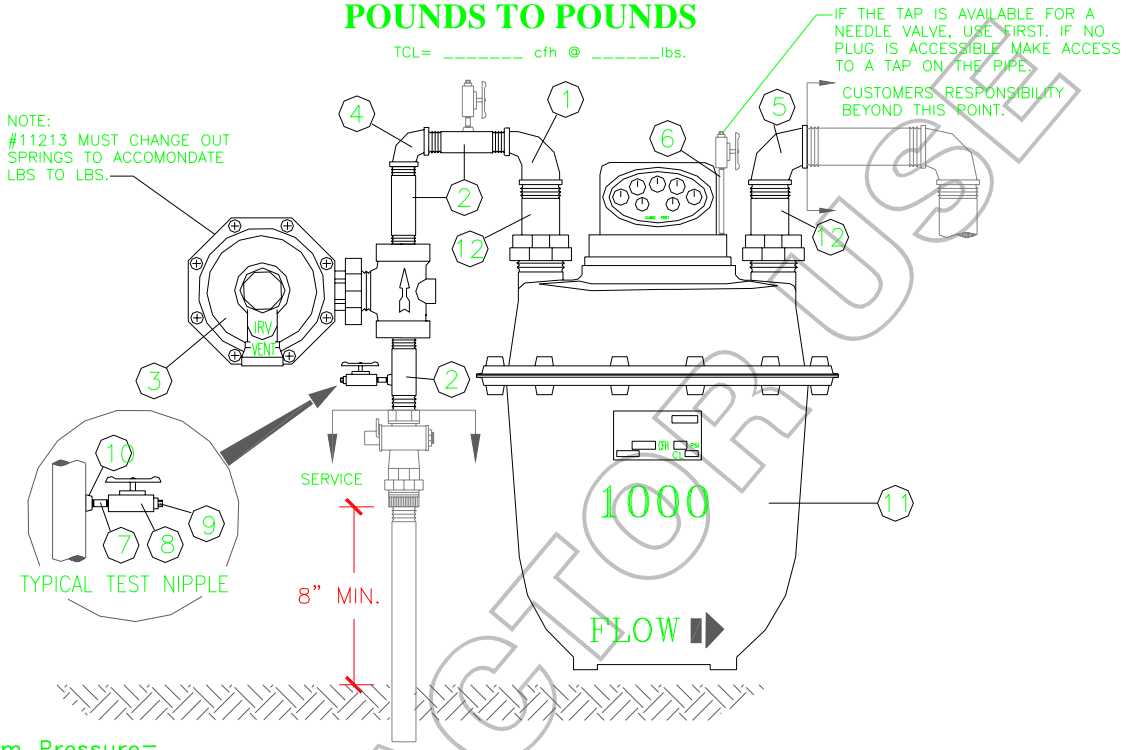
ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" X 4" BLACK NIPPLE	3 EA.
3	1" 143-80 REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1 1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 4" BLACK NIPPLE (OPTION: SEE NOTE)	1 EA.
7	1/4" X 3" BLACK NIPPLE (OPTION: SEE NOTE)	2 EA.
8	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
9	1/4" BLACK PLUG MIPT	2 EA.
10	1/4" THREAD-O-LET FIPT (OPTION: SEE NOTE)	2 EA.
11	750 METER	1 EA.
12	1-1/2" NPT, 45LT SPUDS	2 EA.
13	GREY PRIMER	2 EA.
14	LAWSON DARK GREY (ASA49) #98762	2 EA.

TITLE:

STANDARD 750 METER SET POUNDS TO OUNCES

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M750Z.DWG		Work Order No. GAS

STANDARD 1000 METER SET
POUNDS TO POUNDS



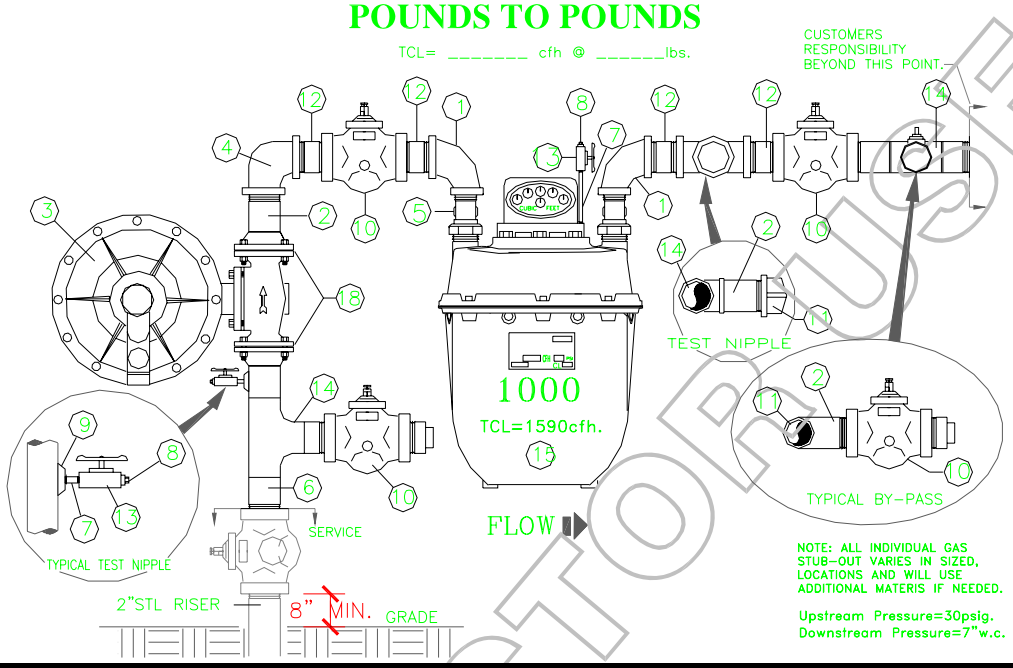
ASSEMBLY DESCRIPTION: STANDARD 1000 METER SET POUNDS TO POUNDS

ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" X 4" BLACK NIPPLE	3 EA.
3	1" 143-80 REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1 1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 4" BLACK NIPPLE (OPTION: SEE NOTE)	1 EA.
7	1/4" X 3" BLACK NIPPLE (OPTION: SEE NOTE)	2 EA.
8	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
9	1/4" BLACK PLUG MIPT	2 EA.
10	1/4" THREAD-O-LET FIPT (OPTION: SEE NOTE)	2 EA.
11	1000 METER	1 EA.
12	1-1/2" NPT, 45LT SPUDS	2 EA.
13	GREY PRIMER	2 EA.
14	LAWSON DARK GREY (ASA49) #98762	2 EA.

TITLE:
STANDARD 1000 METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M1000P.DWG		Work Order No. GAS

STANDARD 1000 2" METER SET
POUNDS TO POUNDS



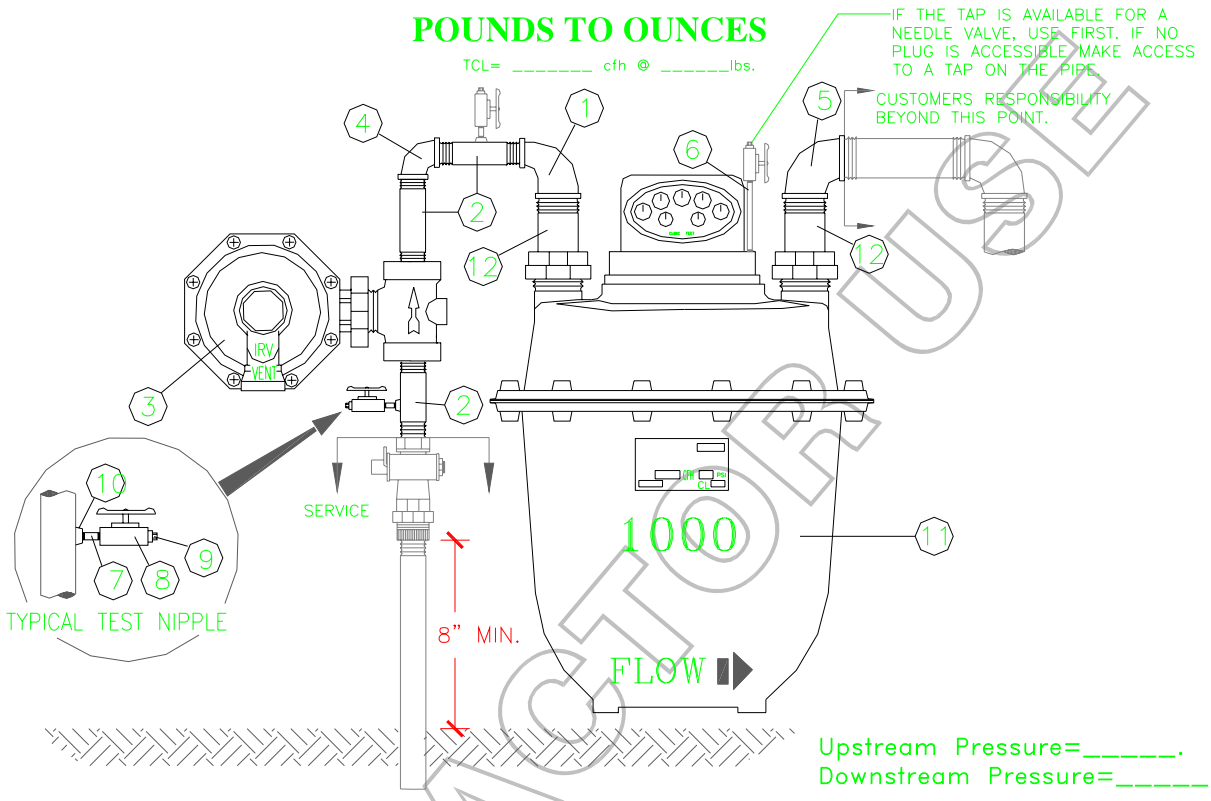
ASSEMBLY DESCRIPTION: STANDARD 1000 2" METER SET POUNDS TO POUNDS

ITEM	PART DESCRIPTION	PART UNITS
1	ELBOW 90 REDUCING BLACK FILPT 2" X 1-1/2"	2 EA.
2	1" X 6" STD BLK NIPPLE (CUT & THREAD)	3 EA.
3	REGULATOR SERVICE #243-12 2" FIPT	1 EA.
4	ELBOW 90 BLACK MALLEABLE 2" FIPT	1 EA.
5	1-1/2" METER SPUD	2 EA.
6	PIPE BLACK STD PLAIN ENDS 2"	5 FT.
7	NIPPLE BLACK STD 1/4" X 3"	2 EA.
8	PLUG BLK MALLEABLE 1/4"	2 EA.
9	FITTING TREAD-O-LET	1 EA.
10	VALVE PLUG FIG 142 2" SCREW TYPE	4 EA.
11	PLUG BLK MALLEABLE 2"	1 EA.
12	NIPPLE BLACK STEEL 2" X 4"	4 EA.
13	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
14	TEE STD STRAIGHT WELD TYPE BLACK 2"	3 EA.
15	G-1000 METER	1 EA.
16	GREY PRIMER	2 EA.
17	LAWSON DARK GREY (ASA49) #98762	2 EA.
18	2" STEEL FLANGE WN RF 150# 4-HOLES	2 EA.

TITLE:
STANDARD 1000 2" METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M1000P2.DWG		Work Order No. GAS

STANDARD 1000 METER SET
POUNDS TO OUNCES



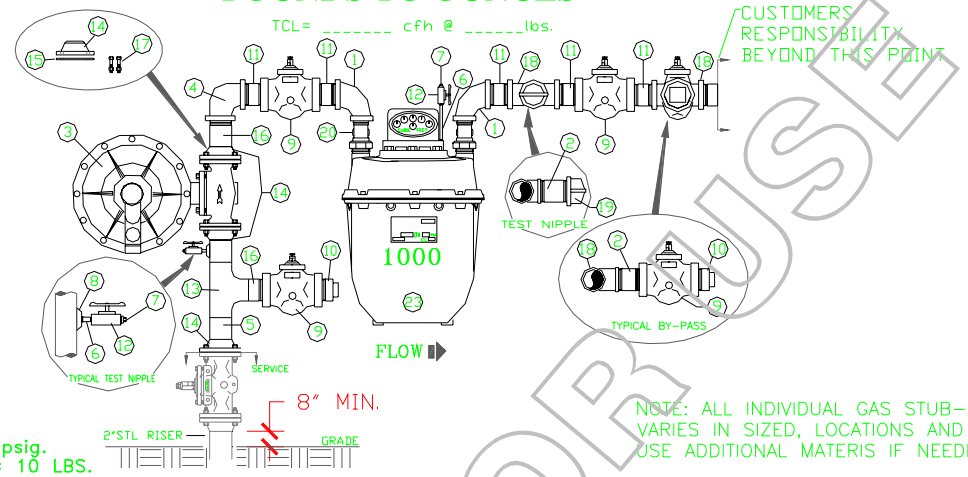
ASSEMBLY DESCRIPTION: STANDARD 1000 METER SET POUNDS TO OUNCES

ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" X 4" BLACK NIPPLE	3 EA.
3	1" 143-80 REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1 1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 4" BLACK NIPPLE (OPTION: SEE NOTE)	1 EA.
7	1/4" X 3" BLACK NIPPLE (OPTION: SEE NOTE)	2 EA.
8	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
9	1/4" BLACK PLUG MIPT	2 EA.
10	1/4" THREAD-O-LET FIPT (OPTION: SEE NOTE)	2 EA.
11	1000 METER	1 EA.
12	1-1/2" NPT, 45 LT SPUDS	2 EA.
13	GREY PRIMER	2 EA.
14	LAWSON DARK GREY (ASA 49) #98762	2 EA.

TITLE:
STANDARD 1000 METER SET POUNDS TO OUNCES

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:		Drawing No.
QSMITH	–	–	NTS		1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M1000Z.DWG		Work Order No. GAS

STANDARD 1000 2" METER SET
POUNDS TO OUNCES



Upstream Pressure=30psig.
Downstream Pressure= 10 LBS.

NOTE: ALL INDIVIDUAL GAS STUB-OUT VARIES IN SIZED, LOCATIONS AND WILL USE ADDITIONAL MATERIS IF NEEDED.

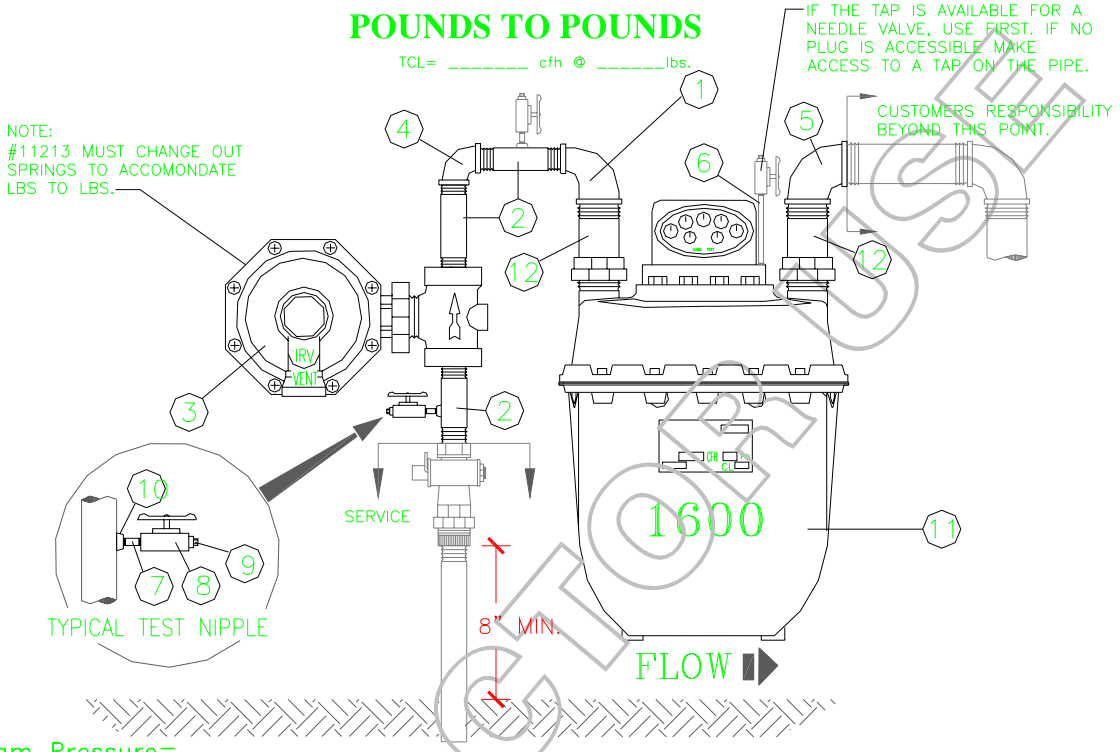
ASSEMBLY DESCRIPTION: STANDARD 1000 2" METER SET POUNDS TO OUNCES

ITEM	PART DESCRIPTION	PART UNITS
1	2" X 1-1/2" 90° ELBOW REDUCING FIPT	2 EA.
2	2" X 6" STD BLACK NIPPLE MIPT	2 EA.
3	2" FLANGE REGULATOR RPO LBS TO LBS.	1 EA.
4	2" ELBOW 90° BLACK FIPT	1 EA.
5	2" BLACK STEEL PLAIN END PIPE	2 FT.
6	1/4" X 2" BLACK NIPPLE MIPT	2 EA.
7	1/4" BLACK MALLEABLE PLUG MIPT	2 EA.
8	1/4" THREAD OLET FIPT	1 EA.
9	2" VALVE PLUG SCREW TYPE FIG 142	4 EA.
10	2" BLACK MALLEABLE PLUG MIPT	2 EA.
11	2" X 4" BLACK NIPPLE MIPT	5 EA.
12	1/4" NEEDLE VALVE #H4R1C-2	2 EA.
13	2" TEE WELD TYPE STEEL	1 EA.
14	2" STEEL FLANGE WN RF 150# 4 HOLE	3 EA.
15	2" RING GASKET 150# NON-ASBESTOS	3 EA.
16	2" X 6" STD BLK NIPPLE (CUT & WELD)	1 EA.
17	5/8" X 2-1/2" MACHINE BOLTS W/ NUTS	12 EA.
18	2" BLACK MALLEABLE TEE FIPT	2 EA.
19	2" BLACK MALLEABLE CAP FIPT	1 EA.
20	1-1/2" METER SPUD	2 EA.
21	SPRAY PAINT - GREY PRIMER	2 EA.
22	SPRAY PAING - LAWSON GREY (ASA49) #98762	2 EA.
23	G DIA - 1,000 METER	1 EA.

TITLE:
STANDARD 1000 2" METER SET POUNDS TO OUNCES

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:		Drawing No.
QSMITH	–	–	NTS		1 OF 1
Date: NLAND DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M1000Z2.DWG		Work Order No. GAS

STANDARD 1600 METER SET
POUNDS TO POUNDS



Upstream Pressure=_____.

Downstream Pressure=_____.

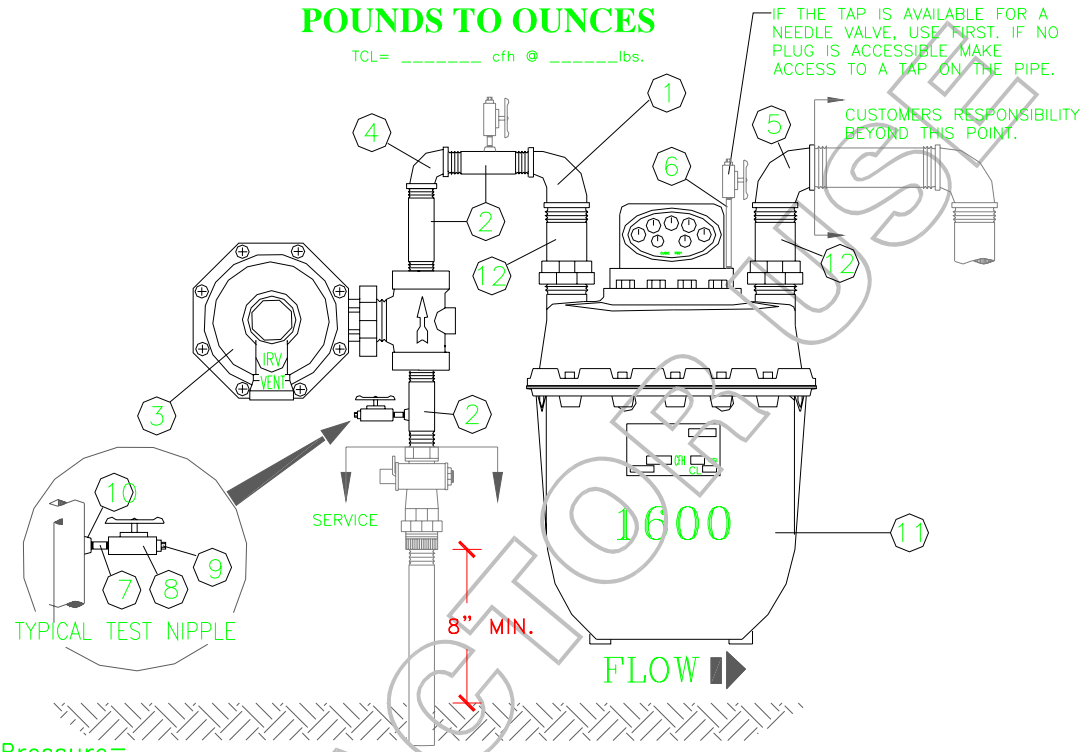
ASSEMBLY DESCRIPTION: STANDARD 1600 METER SET POUNDS TO POUNDS

ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" X 4" BLACK NIPPLE	3 EA.
3	1" 143-80 HP REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1-1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 4" BLACK NIPPLE (OPTION: SEE NOTE)	1 EA.
7	1/4" X 3" BLACK NIPPLE (OPTION: SEE NOTE)	2 EA.
8	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
9	1/4" BLACK PLUG MIPT	2 EA.
10	1/4" THREAD-O-LET FIPT (OPTION: SEE NOTE)	2 EA.
11	1600 METER	1 EA.
12	1-1/2" NPT, 45LT SPUDS	2 EA.
13	GREY PRIMER	2 EA.
14	LAWSON DARK GREY (ASA49) #98762	2 EA.

TITLE:
STANDARD 1600 METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M1600P.DWG		Work Order No. GAS

STANDARD 1600 METER SET
POUNDS TO OUNCES



Upstream Pressure=_____.
Downstream Pressure=_____.

ASSEMBLY DESCRIPTION: STANDARD 1600 METER SET POUNDS TO OUNCES

ITEM	PART DESCRIPTION	PART UNITS
1	1-1/2" X 1" BLACK REDUCING ELBOW FIPT	1 EA.
2	1" X 4" BLACK NIPPLE	3 EA.
3	1" 143-80 HP REGULATOR FIPT	1 EA.
4	1" 90° BLACK ELBOW FIPT	1 EA.
5	1 1/2" 90° BLACK ELBOW FIPT	1 EA.
6	1/4" X 4" BLACK NIPPLE (OPTION: SEE NOTE)	1 EA.
7	1/4" X 3" BLACK NIPPLE (OPTION: SEE NOTE)	2 EA.
8	VALVE SHUT-OFF 1/4" #H5R1C-2	2 EA.
9	1/4" BLACK PLUG MIPT	2 EA.
10	1/4" THREAD-O-LET FIPT (OPTION: SEE NOTE)	2 EA.
11	1600 METER	1 EA.
12	1-1/2" NPT, 45LT SPUDS	2 EA.
13	GREY PRIMER	2 EA.
14	LAWSON DARK GREY (ASA49) #98762	2 EA.

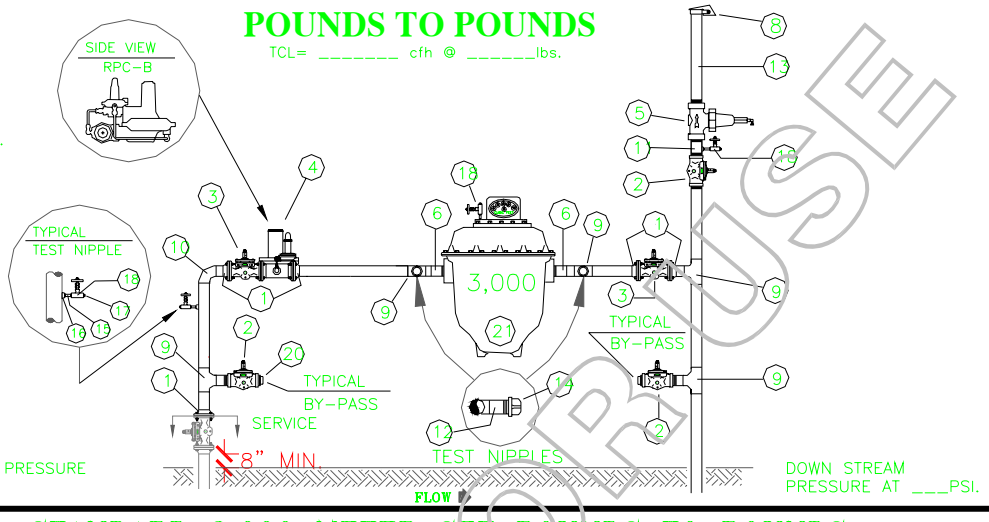
TITLE:
STANDARD 1600 METER SET POUNDS TO OUNCES

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M1600Z.DWG		Work Order No. GAS

STANDARD 3,000 METER SET
POUNDS TO POUNDS

TCL= _____ cfh @ _____lbs.

NOTE:
8' MIN. SPAN
3' MIN. FROM BLDG.



ASSEMBLY DESCRIPTION: STANDARD 3,000 METER SET POUNDS TO POUNDS

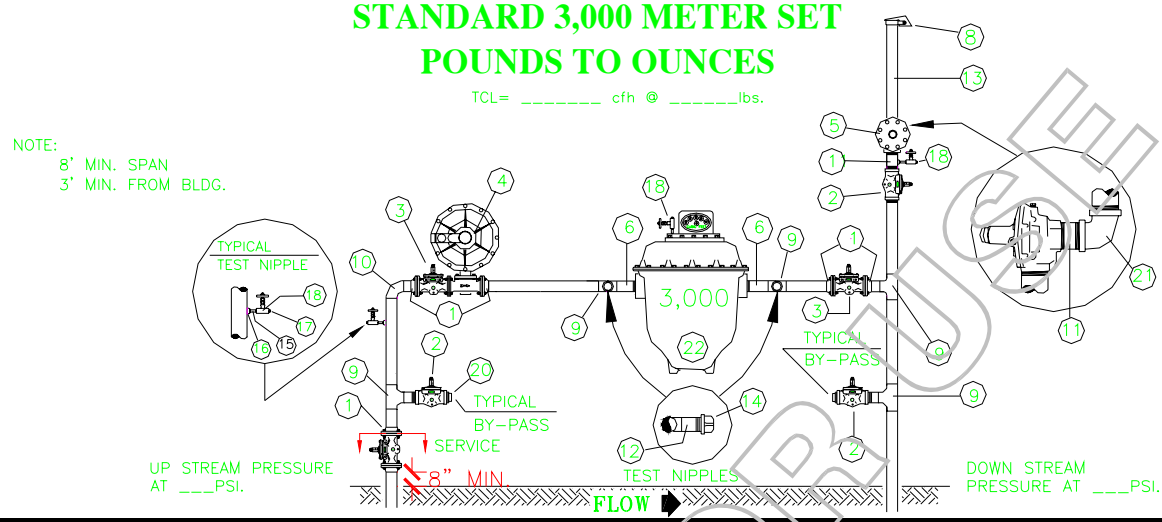
ITEM	PART DESCRIPTION	PART UNITS
1	2" STEEL FLANGE WN RF 150# 4 HOLES	5 EA.
2	2" FIGURE 142 SCREW VALVE PLUG	3 EA.
3	2" FIGURE 143 FLANGE VALVE PLUG	2 EA.
4	2" REGULATOR 243 RPC-B FLANGE	1 EA.
5	2" SERIES 1805 FISHER RELIEF VALVE	1 EA.
6	2" X 6" BLACK NIPPLE (1 END WELDED)	2 EA.
7	2" RING GASKET 150# NON-ASBESTOS	6 EA.
8	2-1/2" OD HEAVY DUTY MUFFLER RAIN CAP	1 EA.
9	2" STRAIGHT WELD STANDARD TEE	5 EA.
10	2" ELBOW 90° WELD TYPE - STD	1 EA.
11	2" X 4" BLACK NIPPLE	2 EA.
12	2" X 6" BLACK NIPPLE	2 EA.
13	2" BLACK STEEL PLAIN END PIPE	21 FT.
14	2" BLACK MALLEABLE CAP FIPT	2 EA.
15	1/4" X 4" BLACK NIPPLE	3 EA.
16	1/4" THREAD-O-LET	2 EA.
17	1/4" BLACK MALLEABLE PLUG MIPT	3 EA.
18	VALVE SHUT-OFF 1/4" #H5R1C-2	3 EA.
19	5/8" X 2-1/2" MACHINE BOLTS WITH NUTS	24EA.
20	2" BLACK MALLEALE PLUG MIPT	2 EA.
21	G 3,000 DIA	1 EA.
22	SPRAY PAINT - GREY PRIMER	6 EA.
23	SPRAY PAINT - LAWSON GREY (AWA49) #98762	6 EA.

TITLE:
STANDARD 3,000 METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: M3MP.DWG		Work Order No. GAS

STANDARD 3,000 METER SET
POUNDS TO OUNCES

TCL= _____ cfh @ _____lbs.



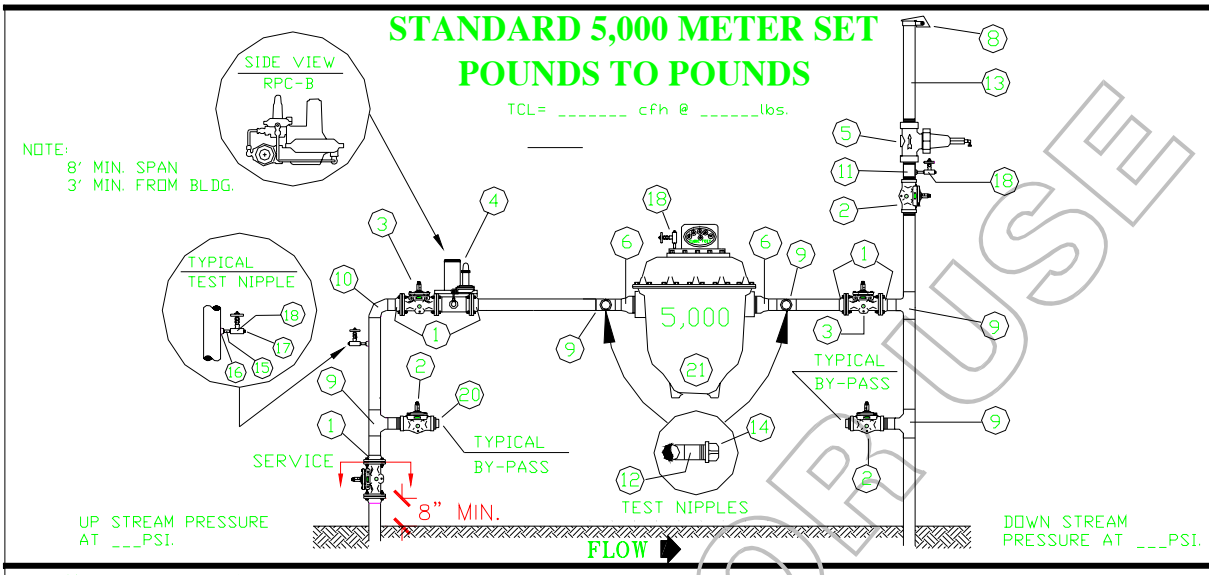
ASSEMBLY DESCRIPTION: STANDARD 3,000 METER SET POUNDS TO OUNCES

ITEM	PART DESCRIPTION	PART UNITS
1	2" STEEL FLANGE WN RF 150# 4 HOLES	5 EA.
2	2" FIGURE 142 SCREW VALVE PLUG	3 EA.
3	2" FIGURE 143 FLANGE VALVE PLUG	2 EA.
4	2" REGULATOR 243-12 RRC-B FLANGE	1 EA.
5	2" SERIES 289 FISHER RELIEF VALVE	1 EA.
6	2" X 6" BLACK NIPPLE (T END WELDED)	2 EA.
7	2" RING GASKET 150# NON-ASBESTOS	6 EA.
8	2-1/2" OD HEAVY DUTY MUFFLER RAIN CAP	1 EA.
9	2" STRAIGHT WELD STANDARD TEE	5 EA.
10	2" ELBOW 90° WELD TYPE - STD	1 EA.
11	2" X 4" BLACK NIPPLE	2 EA.
12	2" X 6" BLACK NIPPLE	2 EA.
13	2" BLACK STEEL PLAIN END PIPE	21 FT.
14	2" BLACK MALLEABLE CAP FIPT	2 EA.
15	1/4" X 4" BLACK NIPPLE	3 EA.
16	1/4" THREAD-O-LET	2 EA.
17	1/4" BLACK MALLEABLE PLUG MIPT	3 EA.
18	VALVE SHUT-OFF 1/4" #H5R1C-2	3 EA.
19	5/8" X 2-1/2" MACHINE BOLTS WITH NUTS	24 EA.
20	2" BLACK MALLEALE PLUG MIPT	2 EA.
21	2" ELBOW 90° MALLEABLE FIPT	1 EA.
22	G 3,000 DIA	1 EA.
23	SPRAY PAINT - GREY PRIMER	6 EA.
24	SPRAY PAINT - LAWSON GREY (ASA49) #98762	6 EA.

TITLE:
STANDARD 3,000 METER SET POUNDS TO OUNCES

Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: M3MZ.DWG		Work Order No. GAS

STANDARD 5,000 METER SET
POUNDS TO POUNDS



ASSEMBLY DESCRIPTION: STANDARD 5,000 METER SET POUNDS TO POUNDS

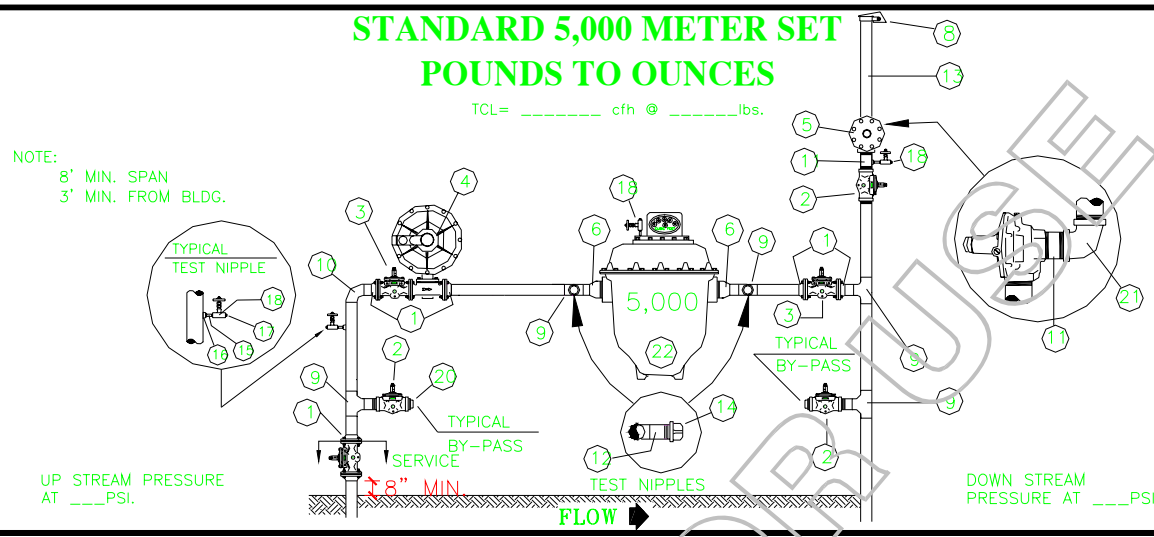
ITEM	PART DESCRIPTION	PART UNITS
1	2" STEEL FLANGE WN RF 150# 4 HOLES	5 EA.
2	2" FIGURE 142 SCREW VALVE PLUG	3 EA.
3	2" FIGURE 143 FLANGE VALVE PLUG	2 EA.
4	2" REGULATOR 243 RPC-B FLANGE	1 EA.
5	2" SERIES 1805 FISHER RELIEF VALVE	1 EA.
6	4" X 2" NIPPLE SWAGGE STD THRD.	2 EA.
7	2" RING GASKET 150# NON-ASBESTOS	6 EA.
8	2-1/2" OD HEAVY DUTY MUFFLER RAIN CAP	1 EA.
9	2" STRAIGHT WELD STANDARD TEE	5 EA.
10	2" ELBOW 90° WELD TYPE - STD	1 EA.
11	2" X 4" BLACK NIPPLE	2 EA.
12	2" X 6" BLACK NIPPLE	2 EA.
13	2" BLACK STEEL PLAIN END PIPE	21 FT.
14	2" BLACK MALLEABLE CAP FIPT	2 EA.
15	1/4" X 4" BLACK NIPPLE	3 EA.
16	1/4" THREAD-O-LET	2 EA.
17	1/4" BLACK MALLEABLE PLUG MIPT	3 EA.
18	VALVE SHUT-OFF 1/4" #H5R1C-2	3 EA.
19	5/8" X 2-1/2" MACHINE BOLTS WITH NUTS	24EA.
20	2" BLACK MALLEALE PLUG MIPT	2 EA.
21	G 5,000 DIA	1 EA.
22	SPRAY PAING - GREY PRIMER	6 EA.
23	SPRAY PAINT - LAWSON GREY (ASA49) #98762	6 EA.

TITLE:
STANDARD 5,000 METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLAND DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M5MP.DWG		Work Order No. GAS

STANDARD 5,000 METER SET
POUNDS TO OUNCES

TCL= _____ cfh @ _____lbs.



ASSEMBLY DESCRIPTION: STANDARD 5,000 METER SET POUNDS TO OUNCES

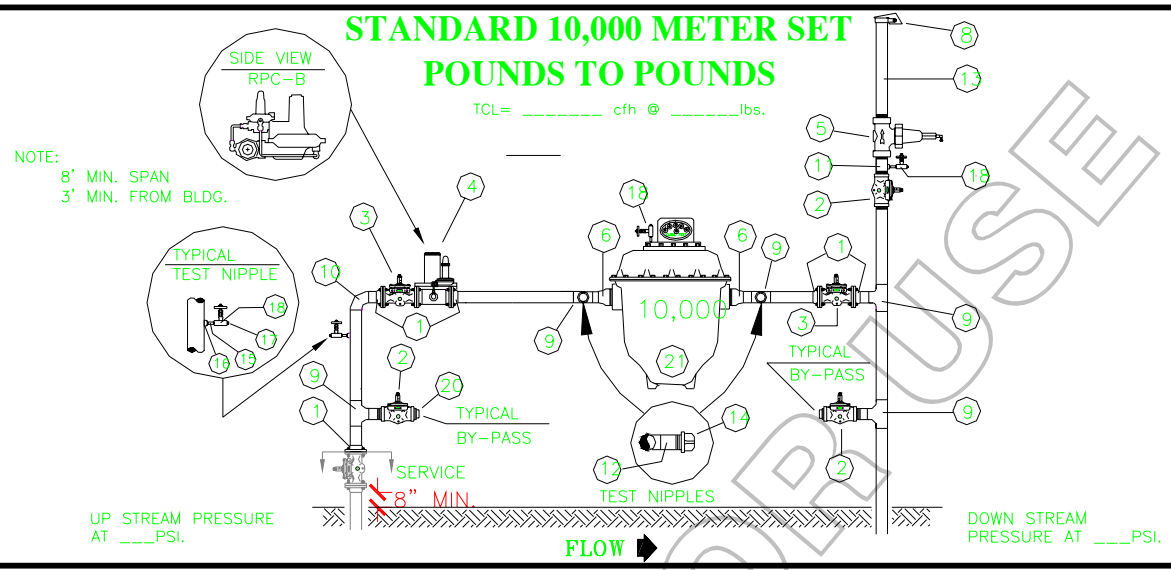
ITEM	PART DESCRIPTION	PART UNITS
1	2" STEEL FLANGE WN RF 150# 4 HOLES	5 EA.
2	2" FIGURE 142 SCREW VALVE PLUG	3 EA.
3	2" FIGURE 143 FLANGE VALVE PLUG	2 EA.
4	2" REGULATOR 243-12 FLANGE	1 EA.
5	2" SERIES 289 FISHER RELIEF VALVE	1 EA.
6	4" x 2" NIPPLE SWAGE STD THREAD	2 EA.
7	2" RING GASKET 150# NON-ASBESTOS	6 EA.
8	2-1/2" OD HEAVY DUTY MUFFLER RAIN CAP	1 EA.
9	2" STRAIGHT WELD STANDARD TEE	5 EA.
10	2" ELBOW 90° WELD TYPE - STD	1 EA.
11	2" X 4" BLACK NIPPLE	2 EA.
12	2" X 6" BLACK NIPPLE	2 EA.
13	2" BLACK STEEL PLAIN END PIPE	21 FT.
14	2" BLACK MALLEABLE CAP FIPT	2 EA.
15	1/4" X 4" BLACK NIPPLE	3 EA.
16	1/4" THREAD-O-LET	2 EA.
17	1/4" BLACK MALLEABLE PLUG MIPT	3 EA.
18	VALVE SHUT-OFF 1/4" #H5R1C-2	3 EA.
19	5/8" X 2-1/2" MACHINE BOLTS WITH NUTS	24 EA.
20	2" BLACK MALLEALE PLUG MIPT	2 EA.
21	2" ELBOW 90° MALLEABLE FIPT	1 EA.
22	G 3,000 DIA	1 EA.
23	SPRAY PAINT - GREY PRIMER	6 EA.
24	SPRAY PAINT - LAWSON GREY (ASA49) #98762	6 EA.

TITLE:
STANDARD 3,000 METER SET POUNDS TO OUNCES

Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: M5MZ.DWG		Work Order No. GAS

STANDARD 10,000 METER SET
POUNDS TO POUNDS

TCL= _____ cfh @ _____lbs.



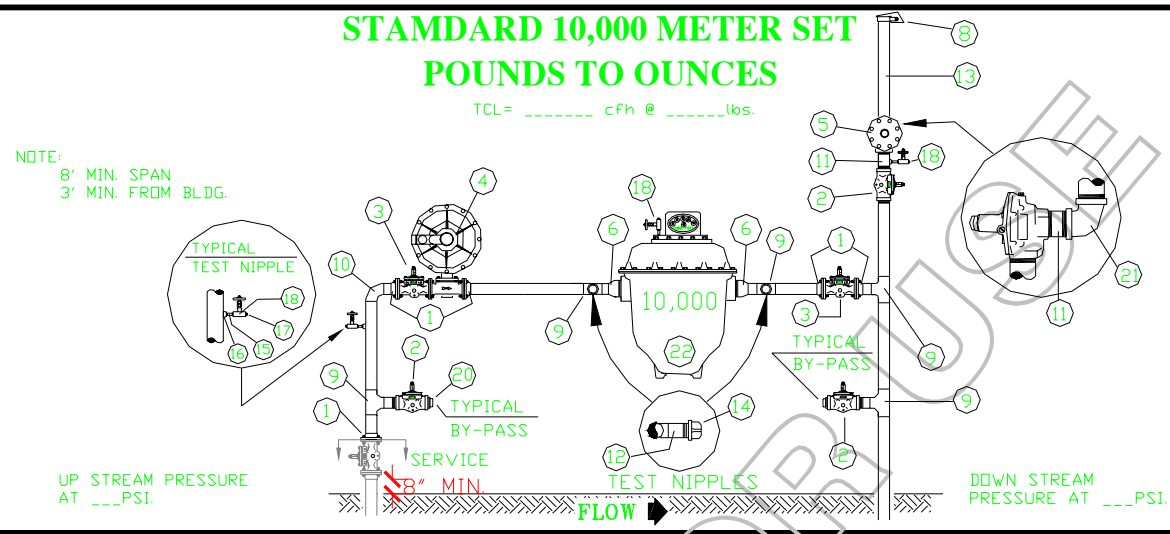
ASSEMBLY DESCRIPTION: STANDARD 10,000 METER SET POUNDS TO POUNDS

ITEM	PART DESCRIPTION	PART UNITS
1	2" STEEL FLANGE WN RF 150# 4 HOLES	5 EA.
2	2" FIGURE 142 SCREW VALVE PLUG	3 EA.
3	2" FIGURE 143 FLANGE VALVE PLUG	2 EA.
4	2" REGULATOR 243 RPC-B FLANGE	1 EA.
5	2" SERIES 1805 FISHER RELIEF VALVE	1 EA.
6	4" X 2" NIPPLE SWAGE STD THREAD	2 EA.
7	2" RING GASKET 150# NON-ASBESTOS	6 EA.
8	2-1/2" OD HEAVY DUTY MUFFLER RAIN CAP	1 EA.
9	2" STRAIGHT WELD STANDARD TEE	5 EA.
10	2" ELBOW 90° WELD TYPE - STD	1 EA.
11	2" X 4" BLACK NIPPLE	2 EA.
12	2" X 6" BLACK NIPPLE	2 EA.
13	2" BLACK STEEL PLAIN END PIPE	21 FT.
14	2" BLACK MALLEABLE CAP FIPT	2 EA.
15	1/4" X 4" BLACK NIPPLE	3 EA.
16	1/4" THREAD-O-LET	2 EA.
17	1/4" BLACK MALLEABLE PLUG MIPT	3 EA.
18	VALVE SHUT-OFF 1/4" #H5R1C-2	3 EA.
19	5/8" X 2-1/2" MACHINE BOLTS WITH NUTS	24EA.
20	2" BLACK MALLEALE PLUG MIPT	2 EA.
21	G 10,000 DIA.	1 EA.
22	SPRAY PAINT - GREY PRIMER	6 EA.
23	SPRAY PAINT - LAWSON GREY (ASA49) #98762	6 EA.

TITLE:
STANDARD 10,000 METER SET POUNDS TO POUNDS

Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: M10MP.DWG		Work Order No. GAS

STAMDARD 10,000 METER SET
POUNDS TO OUNCES



ASSEMBLY DESCRIPTION: STANDARD 10,000 METER SET POUNDS TO OUNCES

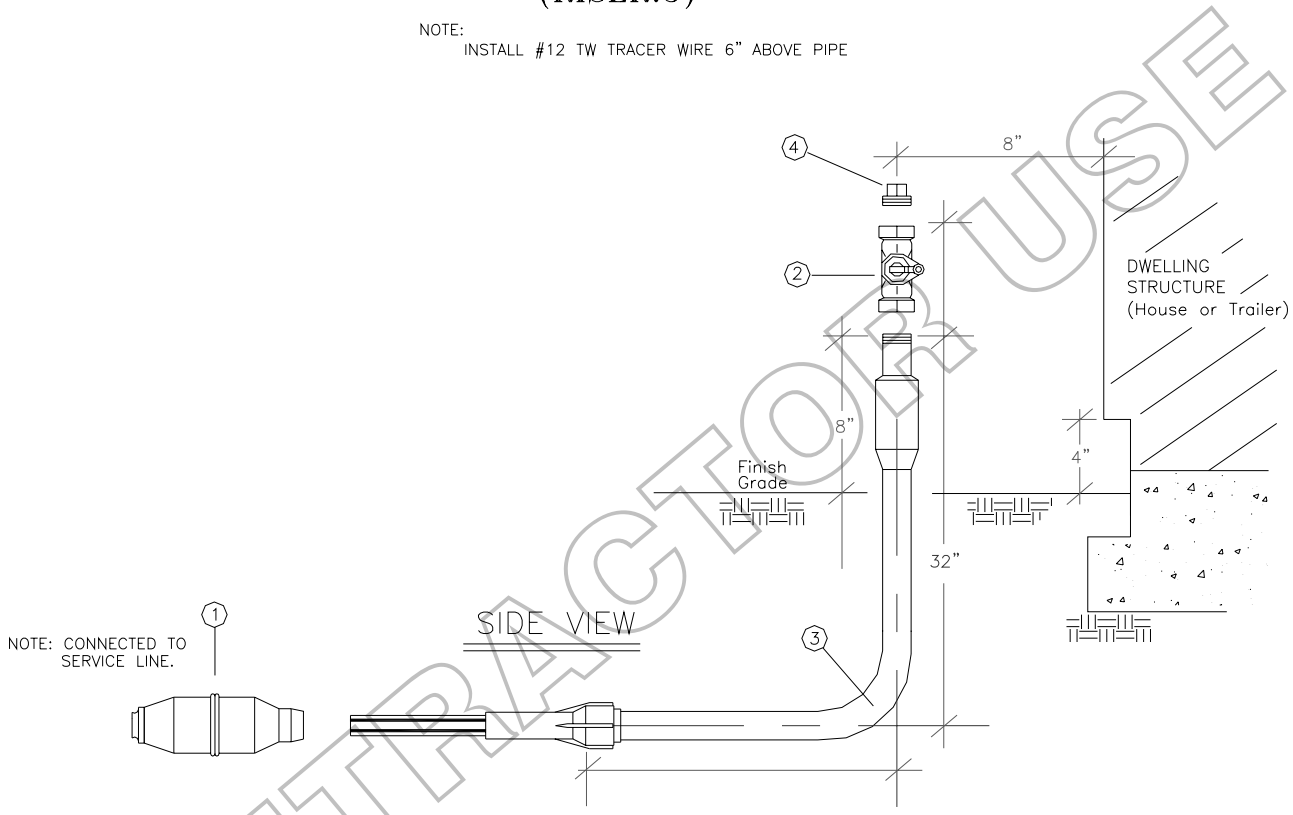
ITEM	PART DESCRIPTION	PART UNITS
1	2" STEEL FLANGE WN RF 150# 4 HOLES	5 EA.
2	2" FIGURE 142 SCREW VALVE PLUG	3 EA.
3	2" FIGURE 143 FLANGE VALVE PLUG	2 EA.
4	2" REGULATOR 243-12 FLANGE	1 EA.
5	2" SERIES 289 FISHER RELIEF VALVE	1 EA.
6	2" X 4" NIPPLE SWAGGE STD THREAD	2 EA.
7	2" RING GASKET 150# NON-ASBESTOS	6 EA.
8	2-1/2" OD HEAVY DUTY MUFFLER RAIN CAP	1 EA.
9	2" STRAIGHT WELD STANDARD TEE	5 EA.
10	2" ELBOW 90° WELD TYPE - STD	1 EA.
11	2" X 4" BLACK NIPPLE	2 EA.
12	2" X 6" BLACK NIPPLE	2 EA.
13	2" BLACK STEEL PLAIN END PIPE	21 FT.
14	2" BLACK MALLEABLE CAP FIPT	2 EA.
15	1/4" X 4" BLACK NIPPLE	3 EA.
16	1/4" THREAD-O-LET	2 EA.
17	1/4" BLACK MALLEABLE PLUG MIPT	3 EA.
18	VALVE SHUT-OFF 1/4" #H5R1C-2	3 EA.
19	5/8" X 2-1/2" MACHINE BOLTS WITH NUTS	24 EA.
20	2" BLACK MALLEALE PLUG MIPT	2 EA.
21	2" ELBOW 90° MALLEABLE FIPT	1 EA.
22	G 10,000 DIA	1 EA.
23	SPRAY PAINT - GREY PRIMER	6 EA.
24	SPRAY PAINT - LAWSON GREY (ASA49) #98762	6 EA.

TITLE:
STANDARD 10,000 METER SET POUNDS TO OUNCES

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:		Drawing No.
QSMITH	–	–	NTS		1 OF 1
Date: NLAND DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: M10MZ.DWG		Work Order No. GAS

STANDARD 1/2" RESIDENTIAL RISER
(RISER.5)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



ASSEMBLY:	ASSEMBLY DESCRIPTION:
RISER.5	STANDARD 1/2" RESIDENTIAL RISER

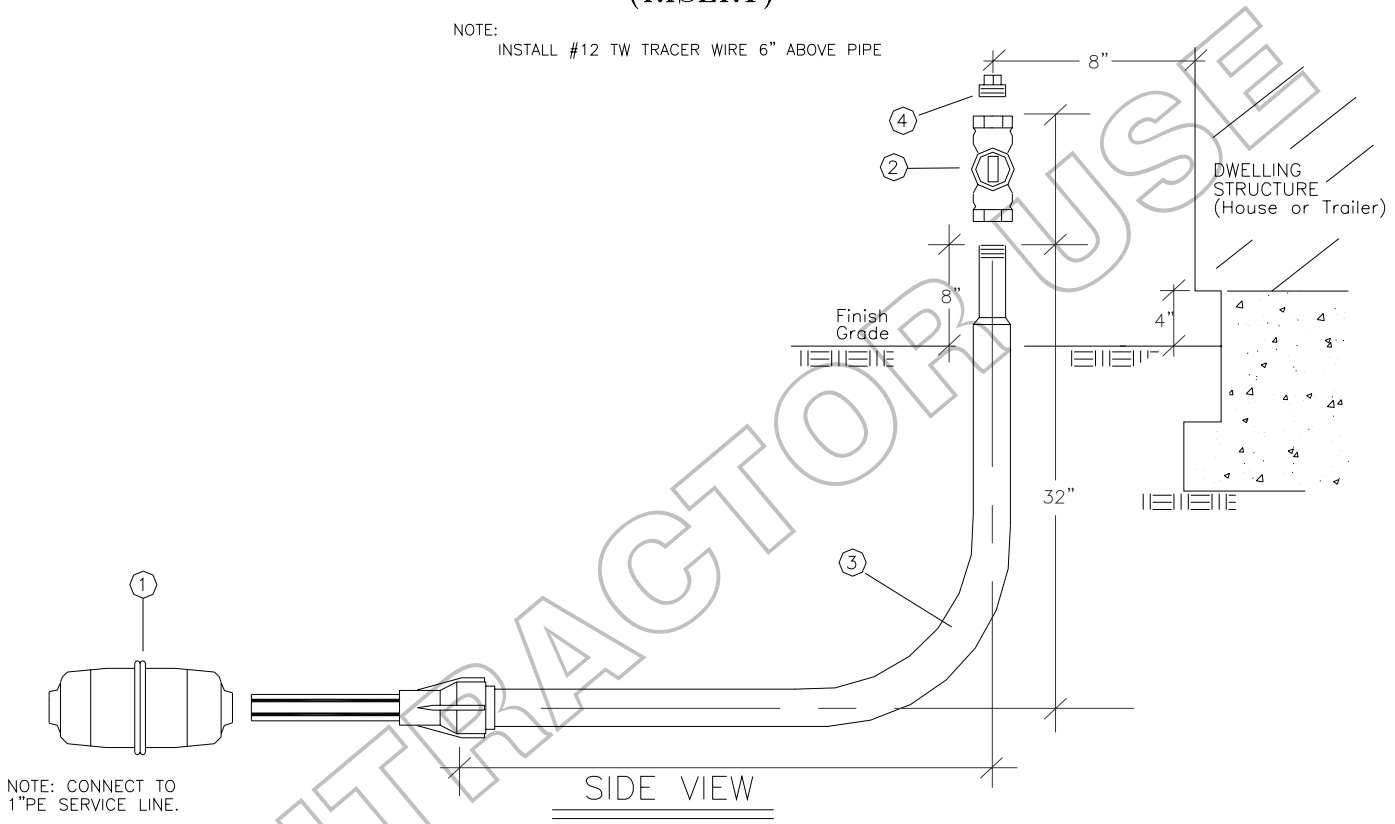
ITEM	PART DESCRIPTION	PART UNITS
1	PERMASERT COUPLING 1/2" IPS	1 EA.
2	STOP, GAS BLK AYD #106878 3/4"	1 EA.
3	RISER ANODELESS 3/4" MPT – 1/2" CTS	1 EA.
4	PLUG BLK MALLEABLE 3/4"	1 EA.
5	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.

TITLE:
STANDARD 1/2" RESIDENTIAL RISER

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS
Date: NLANO DECEMBER 15, 2005	Date: –	Date: –	Acad File Name: RISER.5.DWG
			Drawing No. 1 OF 1
			Work Order No. GAS

STANDARD 1" RESIDENTIAL AND COMMERCIAL RISER
(RISER1)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



ASSEMBLY:	ASSEMBLY DESCRIPTION:
RISER1	STANDARD 1" RESIDENTIAL AND COMMERCIAL RISER

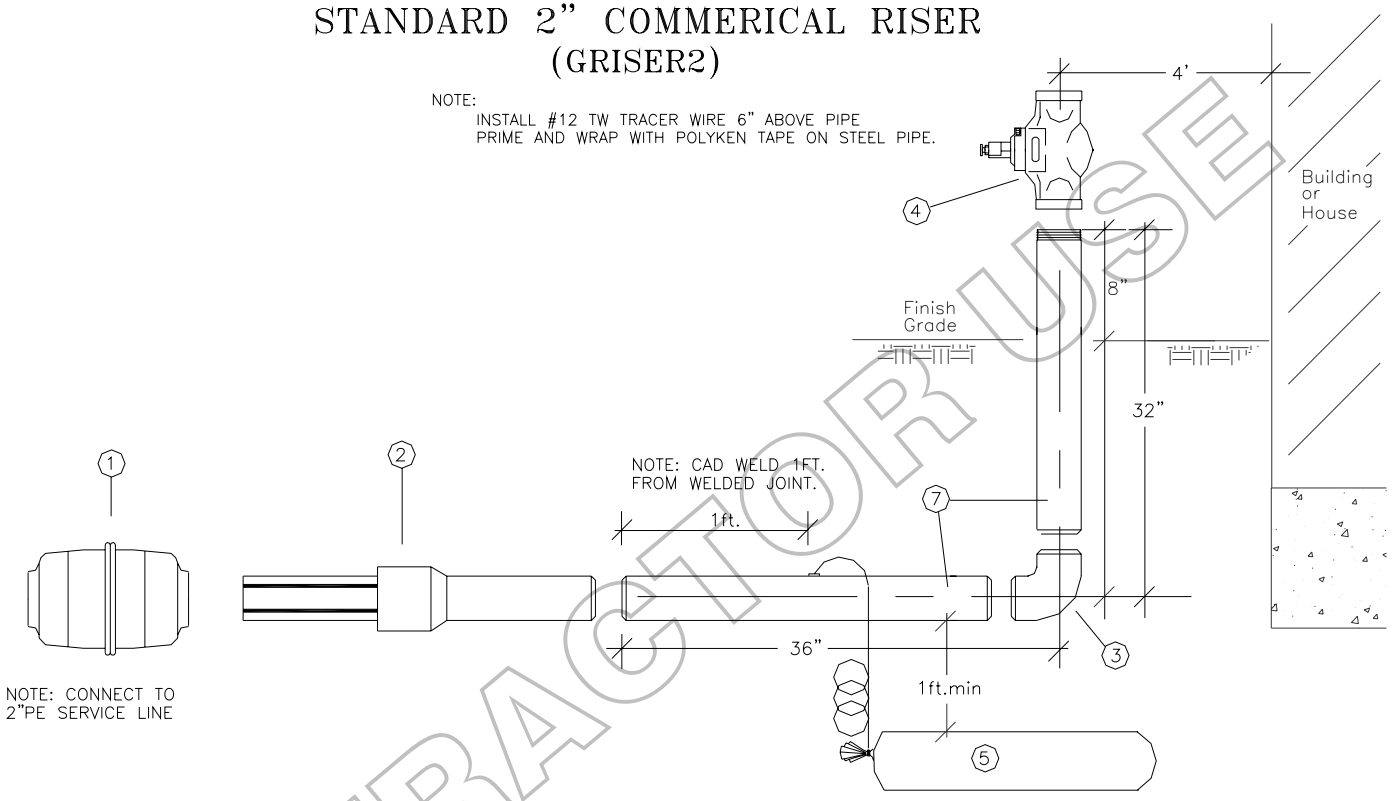
ITEM	PART DESCRIPTION	PART UNITS
1	PERMASERT COUPLING 1" IPS	1 EA.
2	STOP, GAS BLK AYD #62668 INSULATED 1"	1 EA.
3	TRANSITION FITING SERVICE RISER 1" PE 3408	1 EA.
4	PLUG BLK MALLEABLE 1"	1 EA.
5	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.

TITLE:
STANDARD 1" RESIDENTAIL AND COMMERCIAL RISER

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS
Date: NLANO DECEMBER 15, 2005	Date: –	Date: –	Acad File Name: RISER1.DWG
			Drawing No. 1 OF 1
			Work Order No. GAS

STANDARD 2" COMMERICAL RISER
(GRISER2)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP WITH POLYKEN TAPE ON STEEL PIPE.



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GRISER2	STANDARD 2" COMMERCIAL RISER

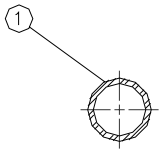
ITEM	PART DESCRIPTION	PART UNITS
1	2" IPS COUPLING PERMASERT	1 EA.
2	FITTING TRANSITION 1" PE-STEEL	1 EA.
3	2" STD WELDED 90 ELBOW	1 EA.
4	2" FIG. 142 ROCK PLUG VALVE SCREW	1 EA.
5	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
6	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.
7	PIPE STEEL X-TRU COATED 154 PE 2"	10 FT.

TITLE: STANDARD 2" COMMERCIAL RISER

Drawn By: QSMITH
Date: NLANO DECEMBER 15, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GRISER1.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD BLACK STEEL PIPE

NOTE: STANDARD ABOVE GROUND MATERIAL



SIDE VIEW – 1

SIDE VIEW – 2

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PB.5	PIPE, BLACK STD STEEL 1/2'

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE BLACK STD STEEL T&C 1/2"	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PB3/4	PIPE BLACK STD STEEL 3/4"

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE BLACK STD STEEL 3/4"	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PB1	PIPE BLACK STD STEEL 1"

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE BLACK STD STEEL 1"	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PB2	PIPE BLACK STD STEEL 2"

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE BLACK STD STEEL 2"	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PB4	PIPE BLACK STD STEEL 4"

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE BLACK STD STEEL 4"	1 EA.

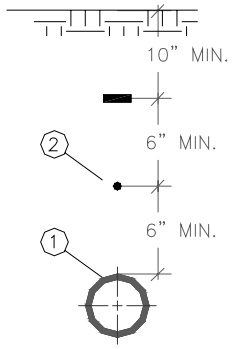
PROJECT NAME:

– – –

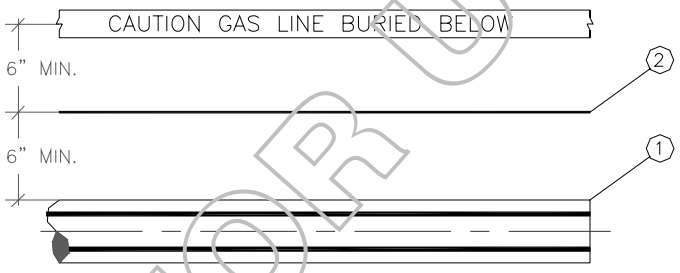
Drawn By: JOHNNY P	Scale: NTS	Project Manager: –	Date: –		Project Type: GAS
Updated By: NLANO DECEMBER 6, 2005	Acad File Name: PIPE-BLKSTL.DWG	Job Order: –	Estimate Name: –		Drawing No: 1 OF 1

STANDARD PE PIPE W/ TRACER WIRE

NOTE: –ADD EXTRA FOOTAGE OF #12 TRACER WIRE
–INSTALL #12 TRACER 6" ABOVE PIPE
–INSTALL WARNING TAPE 12" ABOVE PIPE
–SERVICE LINES ARE TO BE BURIED 18" UNDER REGULAR COVER



SIDE VIEW–1



SIDE VIEW–2

ASSEMBLY:	ASSEMBLY DESCRIPTION:
P.5	PIPE 1/2" PE SERVICE

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE 1/2" YELLOW PE 3408 SDR11	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
P1	PIPE 1" PE SERVICE

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE 1" YELLOW PE 3408 SDR11	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
P2	PIPE 2" PE SERVICE

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE 2" YELLOW PE 3408 SDR11	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
P4	PIPE 4" PE

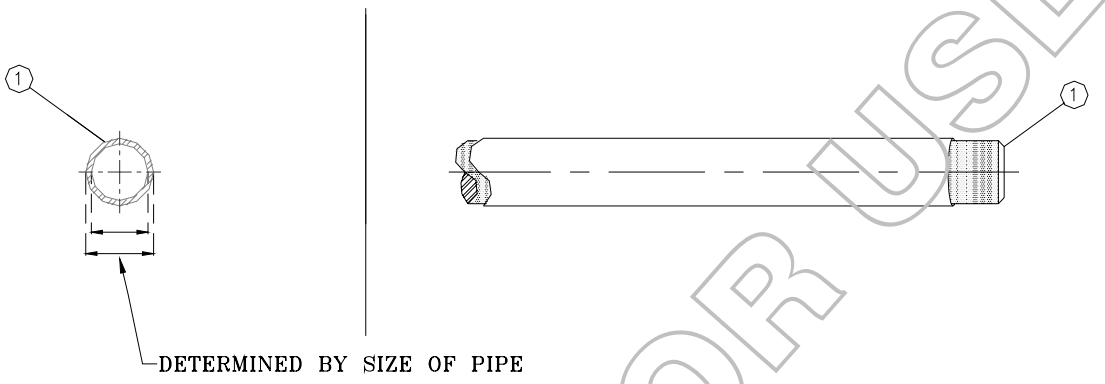
ITEM	PART DESCRIPTION	PART UNITS
1	PIPE 4" YELLOW PE 3408 SDR11	1 EA.

PROJECT NAME:
– – –

Drawn By: JOHNNY P	Scale: NTS	Project Manager: –	Date: –		Project Type: GAS
Updated By: NLANO DECEMBER 6, 2005	Acad File Name: P.5,P1,P2,P4.DWG	Job Order: –	Estimate Name: –		Drawing No: 1 OF 1

STANDARD X-TRU COAT STEEL PIPE

NOTE: USUALLY HIGH PRESSURE



SIDE VIEW – 1 SIDE VIEW – 2

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PX1	PIPE 1" STD STEEL X-TRU COAT

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE STEEL X-TRU COAT 133 PLAIN ENDS 1"	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PX2	PIPE 2" STD STEEL X-TRU COAT

ITEM	PART DESCRIPTION	PART UNITS
1	PIPE STL X-TRU COAT 154 PLAIN ENDS 2"	1 EA.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
PX4	PIPE 4" STD STEEL X-TRU COAT

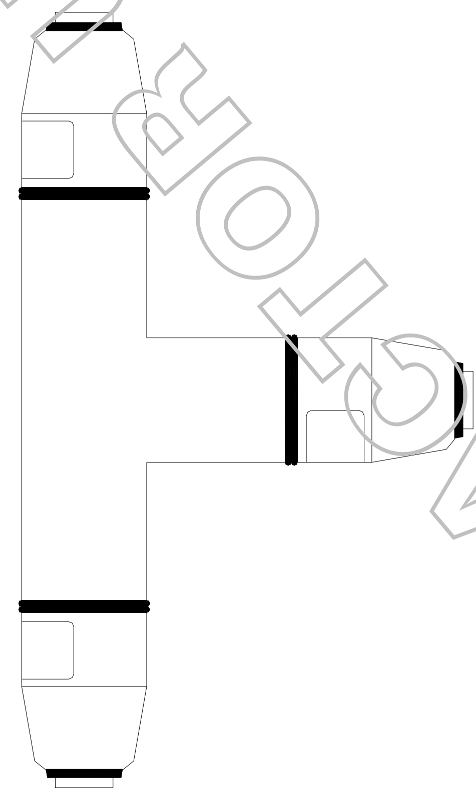
ITEM	PART DESCRIPTION	PART UNITS
1	PIPE STL X-TRU COAT 188 PLAIN ENDS 4"	1 EA.

PROJECT NAME:

— — —

Drawn By: NATASHA LANO	Scale: NTS	Project Manager: –	Date: –		Project Type: GAS
Updated By: NLANO DECEMBER 6, 2005	Acad File Name: PIPE-STL-X.DWG	Job Order: –	Estimate Name: –		Drawing No: 1 OF 1

STANDARD 3 WAY PERMASERT TEE
(Fit-3WT)



TOP VIEW

ASSEMBLY: FIT-3WT

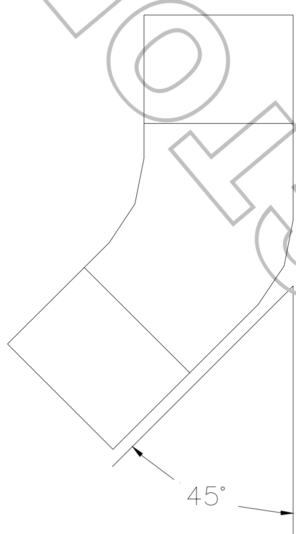
ASSEMBLY DESCRIPTION: 1/2" PE SERVICE LINE OFF 1" PE TAP

ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY 1/2" IPS PERMASERT #50199	1 EA.
2	TEE 3-WAY 1" IPS PERMASERT #50634	1 EA.
3	TEE 3-WAY 2" IPS PERMASERT #50316	1 EA.

TITLE:
1/2" PE SERVICE LINE OFF 1" PE TAP

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 8, 2005	Date: –	Date: –	Acad File Name: FIT-3WT.DWG		Work Order No. GAS

STANDARD ELBOW 4" X 45° BUTT FUSION
(Fit-4ELB45-FUS)



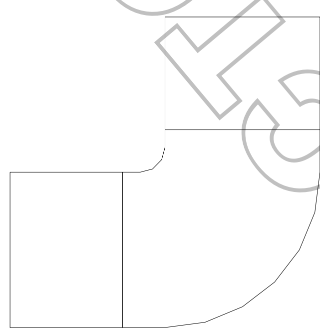
ASSEMBLY:	ASSEMBLY DESCRIPTION:
FIT-4ELB45-FUS	ELBOW 4" X 45° BUTT FUSION

ITEM	PART DESCRIPTION	PART UNITS
1	ELBOW 4" X 45° BUTT FUSION	1 EA.

TITLE:
STANDARD ELBOW 4" X 45° BUTT FUSION

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS	Drawing No. 1 OF 1
Date: NLANO DECEMBER 8, 2005	Date: –	Date: –	Acad File Name: FIT-4ELB45-FUS.DWG	Work Order No. GAS

STANDARD ELBOW 4" X 90° BUTT FUSION
(Fit-4ELB90-FUS)



SIDE VIEW

ASSEMBLY: FIT-4ELB90-FUS

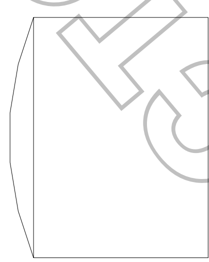
ASSEMBLY DESCRIPTION: ELBOW 4" X 90° BUTT FUSION

ITEM	PART DESCRIPTION	PART UNITS
1	ELBOW 4" X 90° BUTT FUSION	1 EA.

TITLE:
STANDARD ELBOW 4" X 45° BUTT FUSION

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS	Drawing No. 1 OF 1
Date: NLANO DECEMBER 8, 2005	Date: –	Date: –	Acad File Name: FIT-4ELB90-FUS.DWG	Work Order No. GAS

STANDARD 4" END CAP BUTT FUSION
(Fit-4EN-FUS)



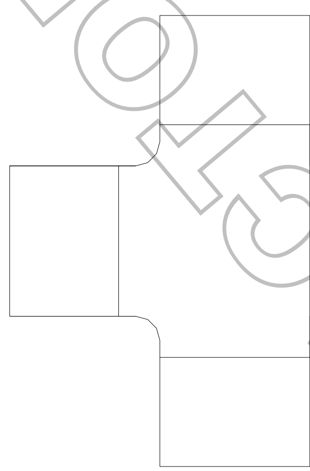
ASSEMBLY:	ASSEMBLY DESCRIPTION:
FIT-4EN-FUS	ELBOW 4" X 90° BUTT FUSION

ITEM	PART DESCRIPTION	PART UNITS
1	END CAP 4" BUTT FUSION	1 EA.

TITLE:
STANDARD 4" END CAP BUTT FUSION

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:	Drawing No.
QSMITH	–	–	NTS	1 OF 1
Date: NLANO	Date:	Date:	Acad File Name:	Work Order No.
DECEMBER 8, 2005	–	–	FIT-4EN-FUS.DWG	GAS

STANDARD TEE 3-WAY BUTT FUSION
(Fit-4T3W-FUS)



SIDE VIEW

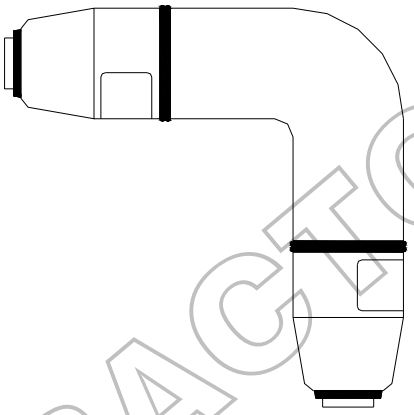
ASSEMBLY:	ASSEMBLY DESCRIPTION:
FIT-4T3W-FUS	4" TEE 3-WAY BUTT FUSION

ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY BUTT FUSION	1 EA.

TITLE:
STANDARD TEE 3-WAY BUTT FUSION

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS	Drawing No. 1 OF 1
Date: NLANO DECEMBER 8, 2005	Date: –	Date: –	Acad File Name: FIT-4T3W-FUS.DWG	Work Order No. GAS

STANDARD ELBOW PERMASERT
(Fit-ELB-IPS)



TOP VIEW

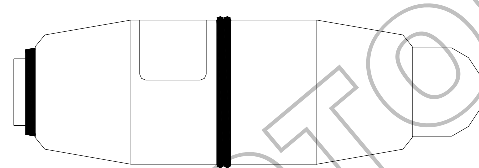
TITLE:	STANDARD ELBOW PERMASERT
Drawn By: QSMITH	Appr. Engrg: -
Date: NLANO DECEMBER 15, 2005	Date: -
	Appr. Mtr Shop: -
	Date: -
Acad File Name: FIT-ELB-IPS.DWG	Scale: NTS
Work Order No. GAS	Drawing No. 1 OF 1

ASSEMBLY:	ASSEMBLY DESCRIPTION:
FIT-ELB-IPS	STANDARD ELBOW PERMASERT

ITEM	PART DESCRIPTION	PART UNITS
1	ELBOW 1/2" X 90° CTS PERMASERT 3408 #50294	1 EA.
2	ELBOW 1" X 90° IPS PERMASERT 3408 #50636	1 EA.
3	ELBOW 2" X 90° IPS PERMASERT 3408 #50315	1 EA.

STANDARD END CAP PERMASERT
(Fit-EN-CA)

NOTE:
STUB-ONE END FUNCTIONAL CAP-BOTH ENDS FUNCTIONAL / FOR FUTURE GAS SERVICE EXTENSION



SIDE VIEW

ASSEMBLY: FIT-EN-CA

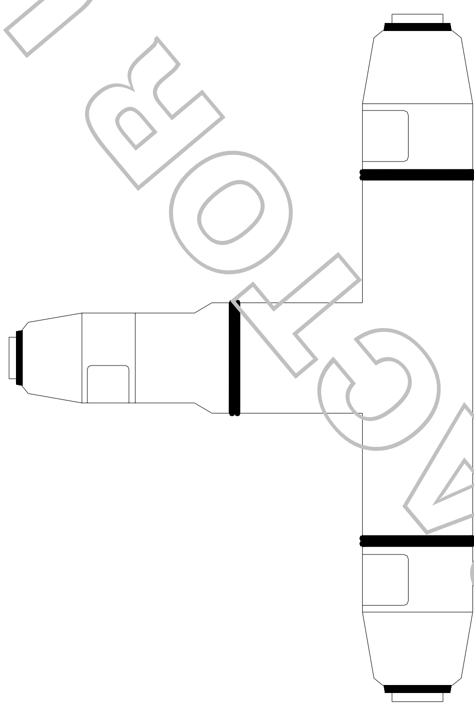
ASSEMBLY DESCRIPTION: STANDARD END CAP PERMASERT

ITEM	PART DESCRIPTION	PART UNITS
1	CAP, END 1/2" CTS WITH STIFFENER	1 EA.
2	CAP, BLIND END STUB 1" IPS #50612	1 EA.
3	CAP, BLIND END STUB 2" IPS #50317	1 EA.

TITLE: STANDARD END CAP PERMASERT

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:	Drawing No.
QSMITH	–	–	NTS	1 OF 1
Date: NLANO	Date:	Date:	Acad File Name:	Work Order No.
DECEMBER 15, 2005	–	–	FIT-EN-CA.DWG	GAS

STANDARD 3-WAY REDUCING PERMASERT TEE
(Fit-RDT)



ASSEMBLY: FIT-RDT

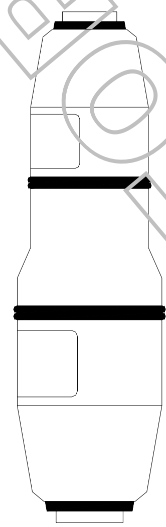
ASSEMBLY DESCRIPTION: STANDARD 3-WAY REDUCING PERMASERT TEE

ITEM	PART DESCRIPTION	PART UNITS
1	TEE REDUCER 1"X1/2"X1/2" IPS PERMASERT #51282	1 EA.
2	TEE REDUCER 2"X2"X2" IPS PERMASERT #51283	1 EA.

TITLE:
STANDARD 3-WAY REDUCING PERMASERT TEE

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 15, 2005	Date: –	Date: –	Acad File Name: FIT-RDT.DWG		Work Order No. GAS

STANDARD REDUCING COUPLING PERMASERT
(Fit-RED-CP)



ASSEMBLY: FIT-RED-CP

ASSEMBLY DESCRIPTION: STANDARD REDUCING COUPLING PERMASERT

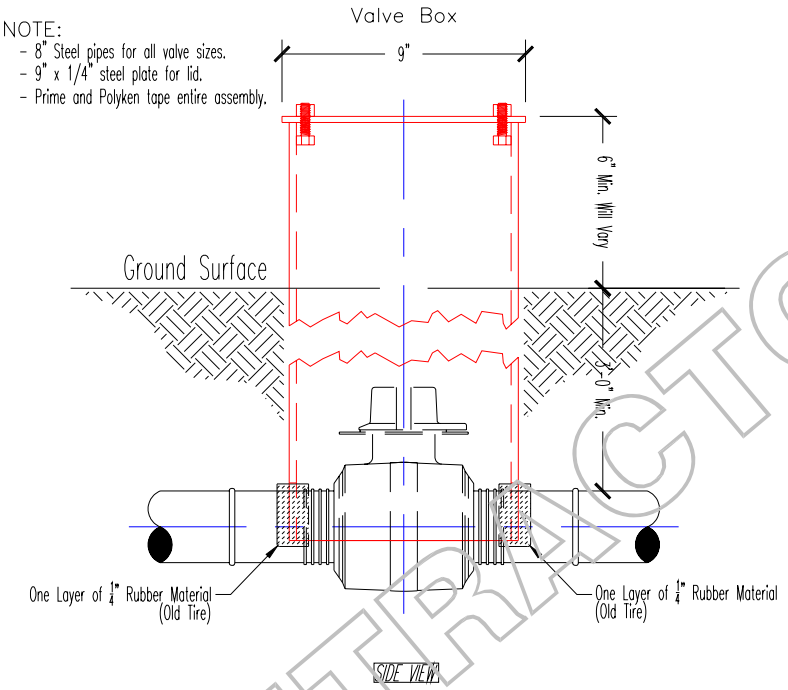
ITEM	PART DESCRIPTION	PART UNITS
1	COUPLING REDUCING 1" IPS X 1/2" CTS #50641	1 EA.
2	COUPLING REDUCING 2" IPS X 1" IPS #50627	1 EA.

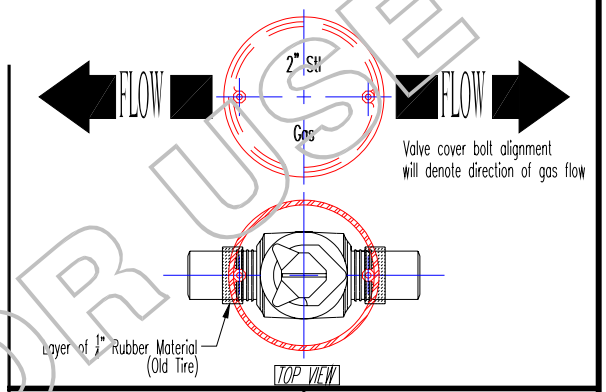
TITLE:
STANDARD REDUCING COUPLING PERMASERT

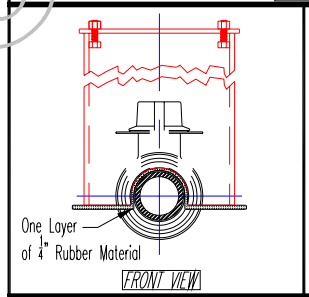
Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS	Drawing No. 1 OF 1
Date: NLANO DECEMBER 15, 2005	Date: –	Date: –	Acad File Name: FIT-RED-CP.DWG	Work Order No. GAS

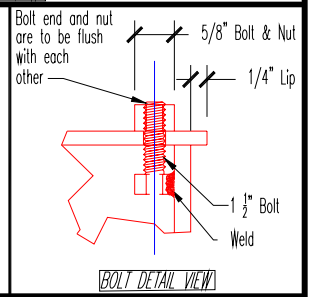
NTUA STANDARD FABRICATED VALVE BOX

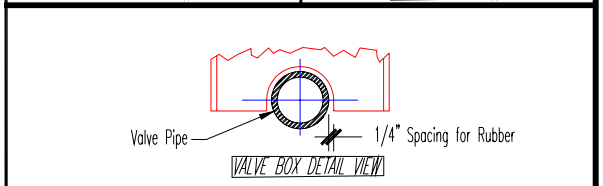
NOTE:
- 8" Steel pipes for all valve sizes.
- 9" x 1/4" steel plate for lid.
- Prime and Polyken tape entire assembly.











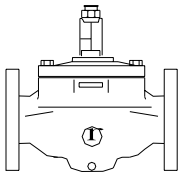
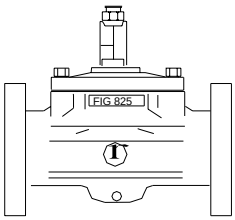
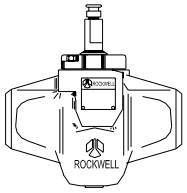
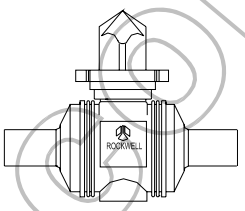
ASSEMBLY:	ASSEMBLY DESCRIPTION: NTUA STANDARD FABRICATED VALVE BOX

ITEM	PART DESCRIPTION	PART UNITS
1	8" STEEL PIPE	1 EA.

TITLE: NTUA STANDARD FABRICATED VALVE BOX

Drawn By: QSMITH
Date: NLANO JANUARY 11, 2006
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: VALVEASSY.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD FARM TAP REGULATOR STATION (FT-1)
(FOR HIGH PRESSURE GAS MAIN)

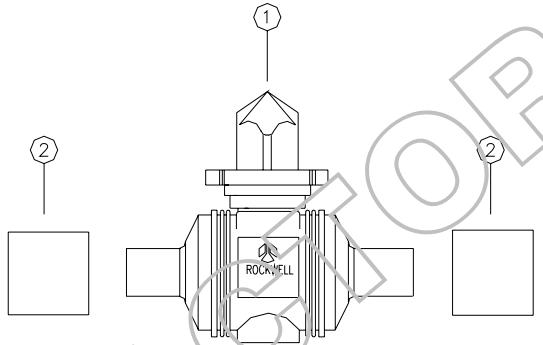
	SIZE	MATERIAL	VALVE DESCRIPTION
	2"	143	STL FLANGE VALVES
	4"	143	STL FLANGE VALVES
	2"	825	STL FLANGE VALVES
	4"	825	STL FLANGE VALVES
	6"	825	STL FLANGE VALVES
	2"	CAST IRON	VALVES
	4"	CAST IRON	VALVES
	2"	1943-1/2	STL WELD VALVES
	4"	1943-1/2	STL WELD VALVES
	2"	3408	POLYVALVES
	4"	3408	POLYVALVES
	2"	2406	POLYVALVES
	4"	2406	POLYVALVES

TITLE:
VALVES

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO JANUARY 11, 2006	Date: –	Date: –	Acad File Name: VALVES.DWG		Work Order No. GAS

STANDARD 2" POLYVALVE ROCK PLUG – FUSION (GV2PE–FUS)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE.



TOP VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GV2PE–FUS	STANDARD 2" POLYVALVE ROCK PLUG – FUSION

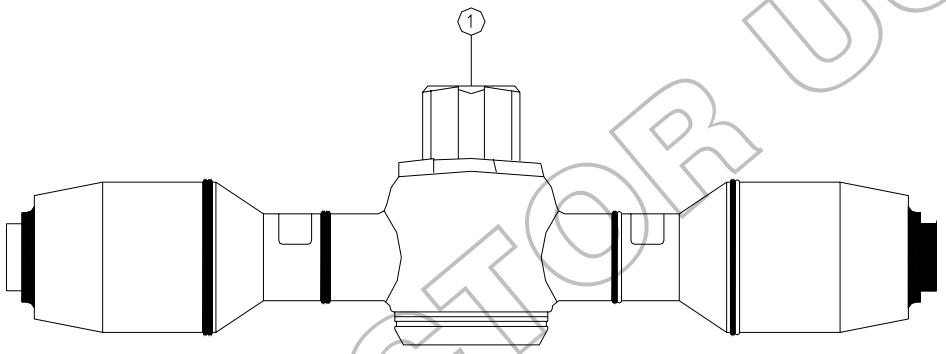
ITEM	PART DESCRIPTION	PART UNITS
1	2" VALVE ROCK PLUG POLYETHLENE	1 EA.
2	2" COUPLING SOCKET PE–3408 SDR9 POLY	2 EA.

TITLE: STANDARD 2" POLYVALVE

Drawn By: QSMITH
Date: NLANO JANUARY 11, 2006
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GV2PE–FUS.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" POLYVALVE
(GV2PE-IPS)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE.



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GV2PE-IPS	STANDARD 2" POLYVALVE

ITEM	PART DESCRIPTION	PART UNITS
1	2" VALVE ROCK PLUG POLYETHLENE	1 EA.

TITLE:
STANDARD 2" POLYVALVE

Drawn By: QSMITH
Date: NLANO JANUARY 11, 2006

Appr. Engrg: –
Date: –

Appr. Mtr Shop: –
Date: –

Scale: NTS

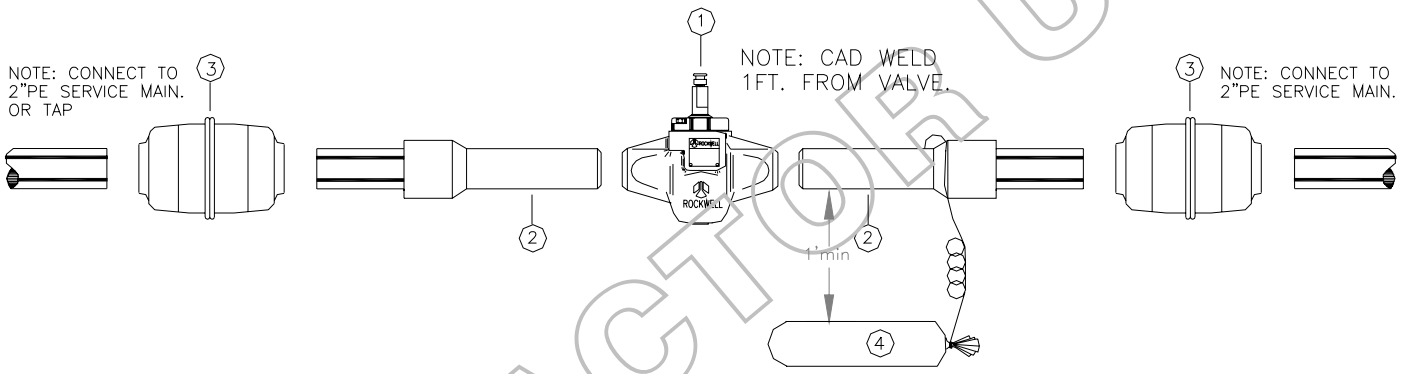
Acad File Name: GV2PE-IPS.DWG

Drawing No. 1 OF 1

Work Order No. GAS

STANDARD 2" STEEL VALVE WITH PE ATTACHMENTS (GV2ST-PE)

NOTE:
PRIME AND WRAP STEEL WITH POLYKEN TAPE.
INSTALL #12 TRACER WIRE 6" ABOVE PIPE.



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GV2ST-PE	STANDARD 2" STEEL VALVE WITH PE ATTACHMENTS

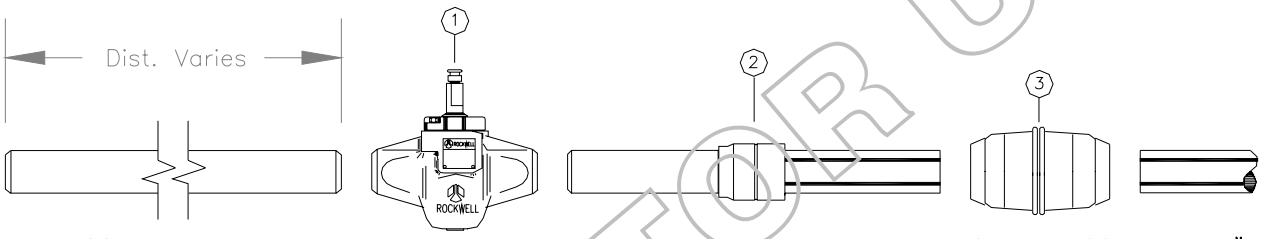
ITEM	PART DESCRIPTION	PART UNITS
1	VALVE ROCK WELD TYPE FIG. 1943-1/2 2"	1 EA.
2	FITTING TRANSITION 2" PE-STEEL	2 EA.
4	COUPLING 2" IPS, PERMASERT	2 EA.
5	ANODE MAGNESIUM ALLOY 17 LB. BAG	1 EA.
6	TAPE POLYKEN #900-12 2"X100' 2" SIZE	1 EA.

TITLE: STANDARD 2" STEEL VALVE WITH PE ATTACHMENTS

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GV2ST-PE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" STEEL VALVE WITH PE AND STEEL ATTACHMENTS (GV2ST-PE-ST)

NOTE:
PRIME AND WRAP STEEL WITH POLYKEN TAPE.
INSTALL #12 TRACER WIRE 6" ABOVE PIPE.



NOTE: CONNECT TO 2" TAP OR STEEL LINE

NOTE: CONNECT TO 2"PE GAS SERVICE MAIN

SIDE VIEW

ASSEMBLY: GV2ST-PE-ST

ASSEMBLY DESCRIPTION: STANDARD 2" STEEL VALVE WITH PE AND STEEL ATTACHMENTS

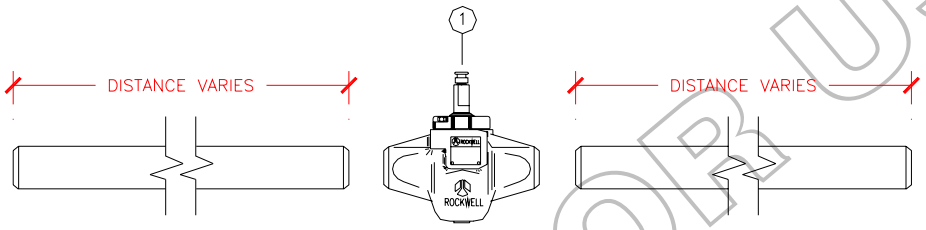
ITEM	PART DESCRIPTION	PART UNITS
1	VALVE ROCK WELD TYPE FIG. 1943-1/2 2"	1 EA.
2	FITTING TRANSITION 2" PE-STEEL	1 EA.
4	COUPLING 2" IPS, PERMASERT	1 EA.
5	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.
6	PIPELINE PRIMER POLYKEN #1027 1 GAL.	1 EA.

TITLE: STANDARD 2" STEEL VALVE WITH PE AND STEEL ATTACHMENTS

Drawn By: QSMITH
Date: NLANO JANUARY 11, 2006
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GV2ST-PE-ST.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" STEEL VALVE WITH STEEL ATTACHMENTS (GV2ST-ST)

NOTE:
PRIME AND WRAP STEEL WITH POLYKEN TAPE.
INSTALL #12 TRACER WIRE 6" ABOVE PIPE.



NOTE: CONNECT TO
2" TAP OR STEEL LINE

NOTE: CONNECT TO
STEEL LINE

SIDE VIEW

ASSEMBLY: GV2ST-ST

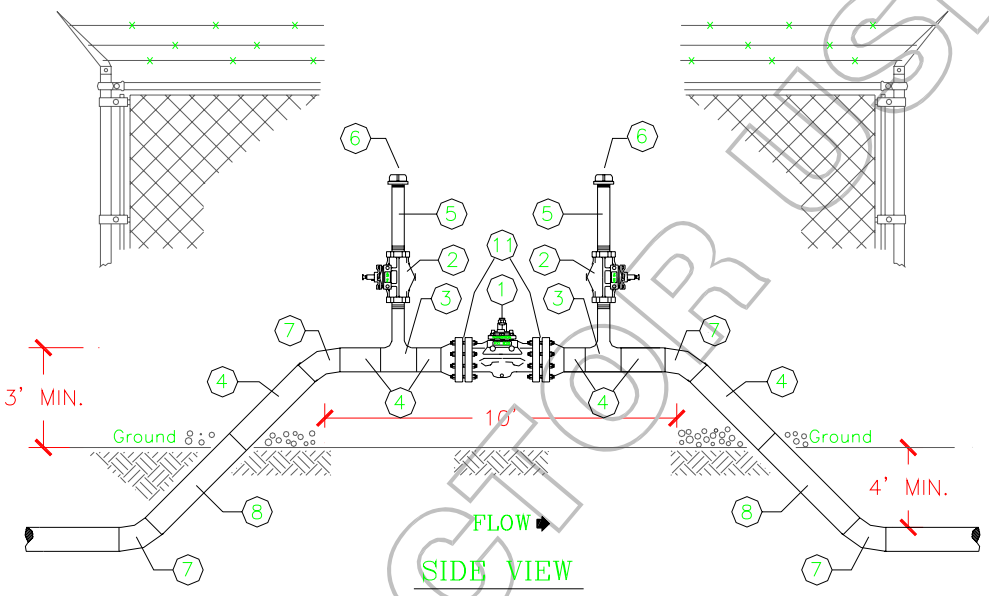
ASSEMBLY DESCRIPTION: STANDARD 2" STEEL VALVE WITH STEEL ATTACHMENTS

ITEM	PART DESCRIPTION	PART UNITS
1	VALVE ROCK WELD FIG. 1943-1/2 2"	1 EA.
2	TAPE POLYKEN 900 LB 2" X 100'	1 EA.
4	PRIMER POLYKEN #1027 1 GAL.	1 EA.

TITLE: STANDARD 2" STEEL VALVE WITH STEEL ATTACHMENTS

Drawn By: QSMITH
Date: NLANO JANUARY 11, 2006
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GV2ST-ST.DWG
Drawing No. 1 OF 1
Work Order No. GAS

TYPICAL STANDARD BLOWDOWN STATION
(FOR HIGH PRESSURE 4" STEEL MAIN)



- INCOMING / OUTGOING LINES:
  INCOMING CONNECTS TO HIGH RESSURE MAIN. OUTGOING CONNECTS TO INTERMEDIATE PRESSURE DISTRIBUTION MAIN.

- FENCE:
  NTUA TYPICAL STANDARD 6" STEEL BLOWDOWN STATION WITH 10'-0" X 18'-0" CHAINLINK FENCING WITH 3' GATE. (6'HtX10'WthX18'Lg.)

UP STREAM PRESSURE @_____PSI	DOWNSTREAM PRESSURE @____PSI

AS-BUILT BY:_____

AS-BUILT DATE:_____

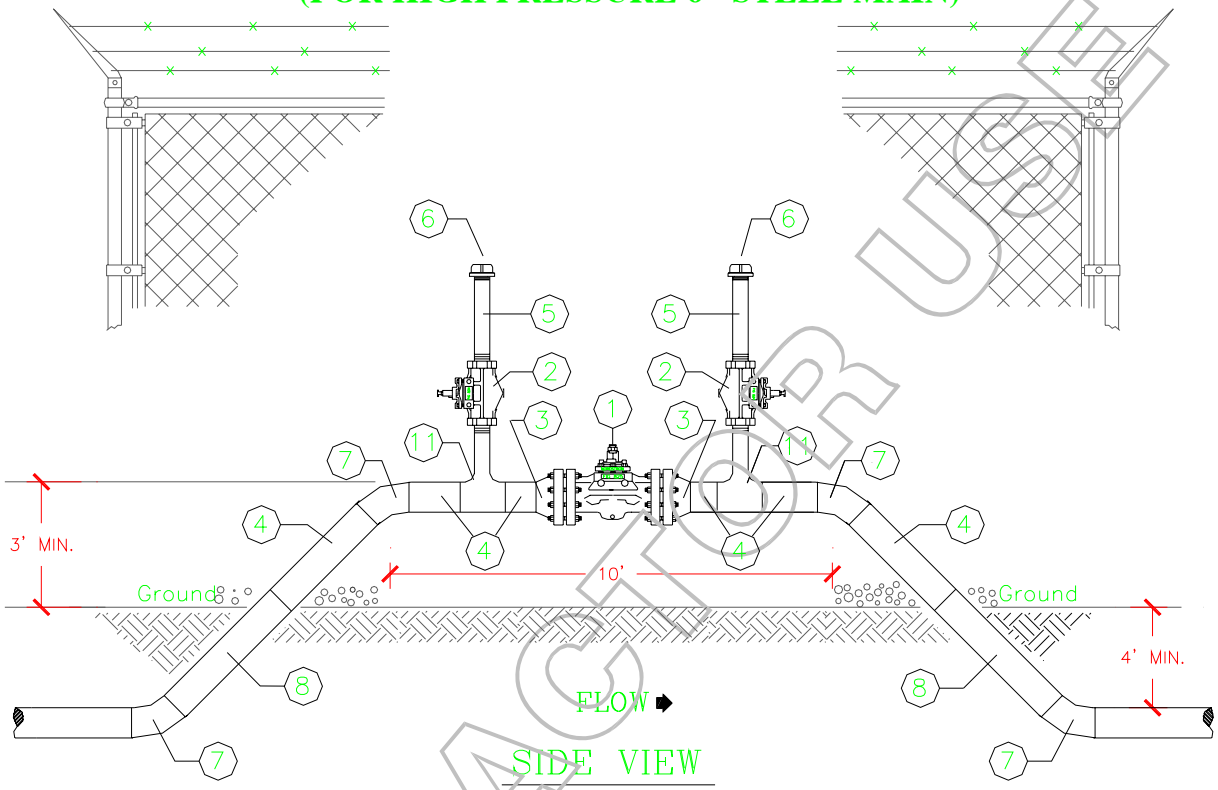
ASSEMBLY DESCRIPTION: 4 INCH BLOW DOWN STATION

ITEM	PART DESCRIPTION	PART UNITS
1	4" BALON FLNG-RF BALL VALVE 1480 psi. (4F-F63-RF)	1 EA.
2	2" BALON SCREW BALL VALVE 1500 psi (2F562N-SE)	2 EA.
3	4" X 2" TEE - WELD	2 EA.
4	4" BLACK STEEL PIPE	20 FT.
5	2" BLACK STEEL PIPE	6 FT.
6	CAP BLACK MALLEABLE 2"	2 EA.
7	4" STD 45° ELBOW - WELD	4 EA.
8	4" X-TRU COAT STEEL PIPE	21 FT.
9	PIPELINE PRIMER POLYKEN #1027 1 GAL.	1 EA.
10	POLYKEN TAPE 900 LB. 2" X 100'	8 EA.
11	NON-ASBESTOS RING 150# 4" GASKET	2 EA.

TITLE:
BLOWDOWN STATION - 4"

Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: BLOWDN-4ST.DWG		Work Order No. GAS

TYPICAL STANDARD BLOWDOWN STATION
(FOR HIGH PRESSURE 6" STEEL MAIN)



– INCOMING / OUTGOING LINES:
INCOMING CONNECTS TO HIGH RESSURE MAIN. OUTGOING CONNECTS TO INTERMEDIATE PRESSURE DISTRIBUTION MAIN.

– FENCE:
NTUA TYPICAL STANDARD 6" STEEL BLOWDOWN STATION WITH 10'–0" X 18'–0" CHAINLINK FENCING WITH 3' GATE. (6'HtX10'WthX18'Lg.)

UP STREAM PRESSURE @_____PSI	DOWNSTREAM PRESSURE @_____PSI

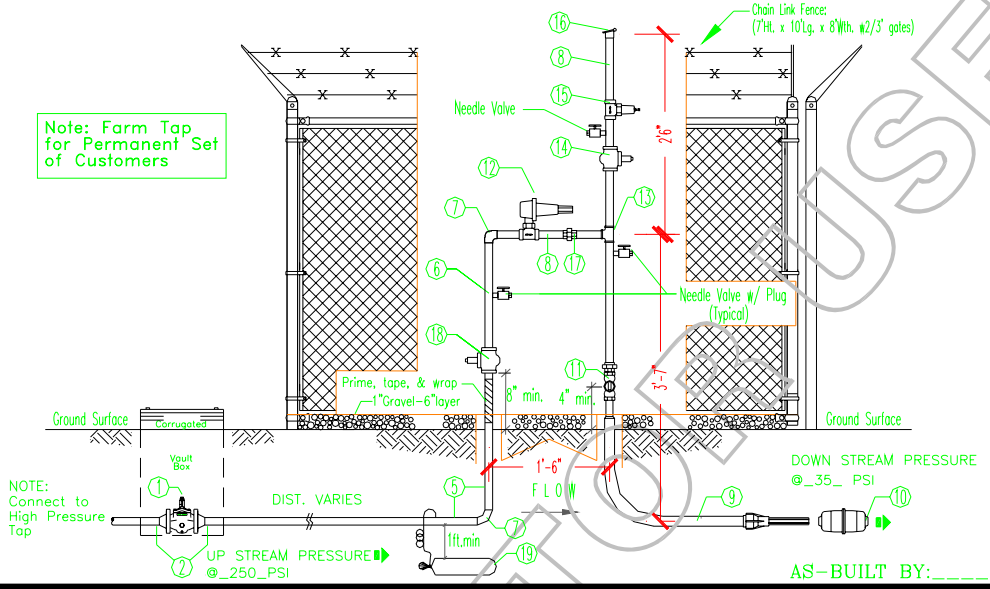
AS–BUILT BY:_____
AS–BUILT DATE:_____

ITEM	PART DESCRIPTION	UNIT
1	6" BALON FLANGE VALVE 640 psi (6F–F33–RF)	1 EA.
2	2" BALON SCREW BALL VALVE 1000 psi (2F–S42N–SE)	2 EA.
3	6" 8 HOLE FLANGE 600#	2 EA.
4	6" BLACK STEEL PIPE	21 FT.
5	2" BLACK STEEL PIPE	6 FT.
6	CAP BLACK MALLEABLE 2"	2 EA.
7	6" STD 45° ELBOW – WELD	4 EA.
8	6" X–TRU STEEL PIPE	20 FT.
9	TAPE POLYKEN #900–12 2"X100' 2" SIZE	8 EA.
10	PRIMER PIPELINE POLYKEN #1027 1 GAL.	1 EA.
11	6" X 2" TEE WELD	2 EA.

TITLE:
BLOWDOWN STATION – 6"

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: BLOWDN–6ST.DWG		Work Order No. GAS

STANDARD FARM TAP REGULATOR STATION (FT-1)
(FOR HIGH PRESSURE GAS MAIN)

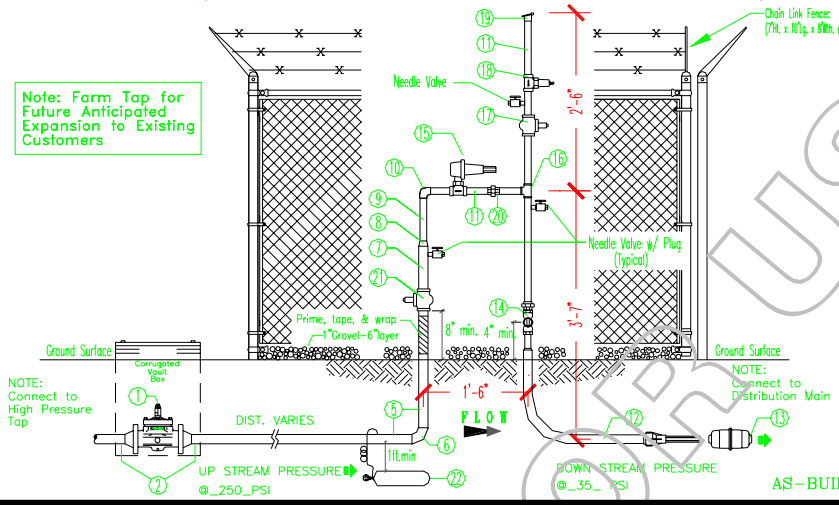


ITEM	PART DESCRIPTION	PART UNITS
1	1" FLANGE VALVE ROCK PLUG. FIG. 525	1 EA.
2	FLANGE STL WELD NECK RF600# 8-HOLE	2 EA.
3	GASKET NON-ASBESTOS RING 300# 1"	1 EA.
4	BOLTS 1/2" X 4" WITH HEX NUTS	8 EA.
5	PIPE STL X-TRU COAT 133 PLAIN 1" SCH 90	10 FT.
6	PIPE BLACK STD STL T&C 1" SCH 80	5 FT.
7	ELBOW 90° WELD TYPE STL 1" LONGRADIUS	2 EA.
8	PIPE STL X-TRU COAT 154 PLAIN 1" SCH 40	5 FT.
9	RISER TRANSITION SERVICE 1" PE-3408 SDR11	1 EA.
10	COUPLING 1" IPS, PERMASERT	1 EA.
11	STOP INSTULATED GAS AYMD #62668 1" SIZE	1 EA.
12	REGULATOR SERVICE #621-71 1"	1 EA.
13	TEE STD STRAIGHT WELD TYPE BLACK 1"	1 EA.
14	VALVE ROCK PLUG FIG. 142 1" SCREW TYPE	1 EA.
15	VALVE FISHER RELIEF 1805-1" 5-35	1 EA.
16	RAINCAP HD MUGGLER 1" OD	1 EA.
17	UNION BLACK MALLEABLE 1"	1 EA.
18	VALVE ROCK PLUG FIG. 542 1" SCREW TYPE	1 EA.
19	ANODE MAGNESIUM ALLOY 17 LB BAG	1 EA.
20	PRIMER PIPELINE POLYKEN #1027	1 EA.
21	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.

TITLE:
STANDARD FARM TAP REGULATOR STATION

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: RFT1.DWG		Work Order No. GAS

STANDARD FARM TAP REGULATOR STATION (FT-1)
(FOR HIGH PRESSURE GAS MAIN)

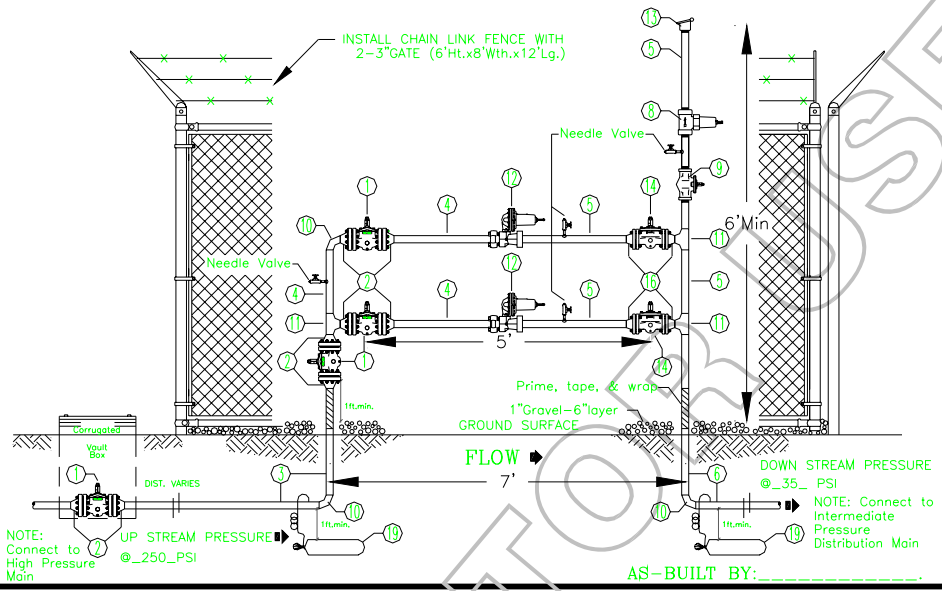


ITEM	PART DESCRIPTION	PART UNITS
1	VALVE ROCK PLUG FIG. 825 2" FLANGE TYPE	1 EA.
2	FLANGE STL WELDNECK RF300# 8 HOLE 2"	2 EA.
3	GASKET NON-ASBESTO RING 300# 2"	2 EA.
4	BOLT STUD WITH HEX NUT 5/8" X 2-1/4" BLK	16 EA.
5	PIPE STL X-TRU COAT 154 PLAIN 2" SCH. 80	10 FT.
6	ELBOW 90° WELD TYPE STL 2"	1 EA.
7	PIPE BLACK STD STL PLAIN 2" SCH. 80	2 FT.
8	REDUCER WELD TYPE BLACK STEEL 2" X 1"	1 EA.
9	PIPE BLACK STD STL T&C 1" SCH 80	2 FT.
10	ELBOW 90° WELD TYPE STL 1" LONGRADIUS	2 EA.
11	PIPE BLACK STD STL T&C 1" SCH 40	5 FT.
12	RISER TRANSITION SERVICE 1" PE-3408 SDR1	1 EA.
13	COUPLING 1" IPS, PERMASERT	1 EA.
14	STOP INSULATED GAS AYMD #62668 1" SIZE	1 EA.
15	REGULATOR (SELECTED ACCORDING TO LOAD)	2 EA.
16	TEE STD STRAIGHT WELD TYPE BLACK 1"	1 EA.
17	VALVE ROCK PLUG FIG. 142 1" SCREW TYPE	1 EA.
18	VALVE FISHER RELIEF 1805-1" 5-35	1 EA.
19	RAINCAP HD MUFFLER 1" OD	1 EA.
20	UNION BLACK MALLEABLE 1"	1 EA.
21	VALVE ROCK PLUG FIG. 524 2" SCREW TYPE	1 EA.
22	ANODE MAGNESIUM ALLOY 17 LB BAG	1 EA.
23	PRIMER PIPELINE POLYKEN #1027	1 EA.
24	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.

TITLE:
STANDARD FARM TAP REFULATOR STATION

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:		Drawing No.
QSMITH	–	–	NTS		1 OF 1
Date: NLANO	Date:	Date:	Acad File Name:		Work Order No.
DECEMBER 6, 2005	–	–	RFT2.DWG		GAS

STANDARD REGULATOR STATION - 250
(2" DISTRIBUTION REGULATOR STATION - 250)

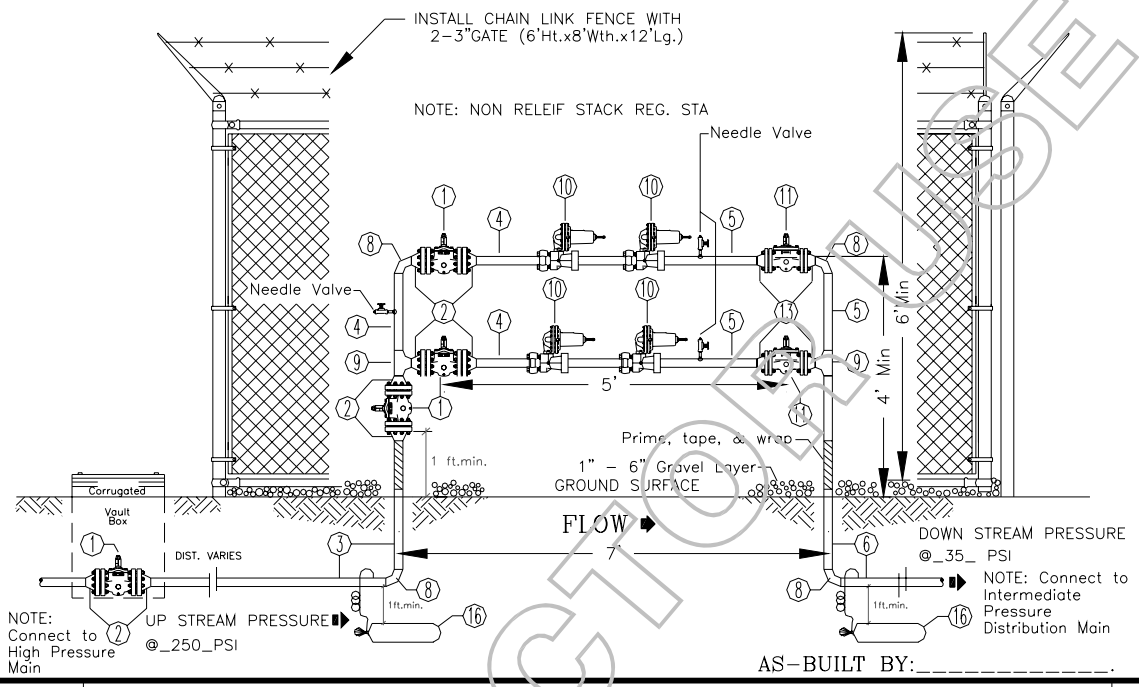


ITEM	PART DESCRIPTION	PART UNITS
1	FLANGE VALVE ROCK PLUG FIG 825 2"	4 EA.
2	FLANGE STEEL WN RF300# 8 HOLE 2"	8 EA.
3	PIPE STL X-TRU COAT 154 PLAIN SCH 80 2"	21 FT.
4	PIPE BLACK STD STL PLAIN SCH 80 2"	21 FT.
5	PIPE BLACK STD STL PLAIN SCH 40 2"	21 FT.
6	PIPE STL X-TRU COAT 154 PLAIN SCH 40 2"	21 FT.
7	GASKET NON-ASBESTOS RING 300# 2"	8 EA.
8	RELIEF VALVE 1805-31 2"	1 EA.
9	SCREW VALVE ROCK PLUG FIG 142, 2"	1 EA.
10	ELBOW STD-WELD 2" X 90°	3 EA.
11	TEE STD STRAIGHT WELD 2"	3 EA.
12	REGULATOR 2" - #630-32	2 EA.
13	RAIN CAP HD MUFFLER 2-1/2" OD	1 EA.
14	FLANGE VALVE ROCK PLUG FIG 143 2"	2 EA.
15	BOLT STUD WITH HEX NUT 5/8" X 3-1/4" BLK	64 EA.
16	FLANGE STEEL WN RF150# 4 HOLE 2"	4 EA.
17	BOLT MACHINE 5/8" X 2-1/2"	16 EA.
18	GASKET NON-ASBESTOS RING 150# 2"	4 EA.
19	ANODE MAGNESIUM ALLOY 17 LB BAG	2 EA.
20	POLYKEN TAPE 900 LB 2" X 100'	1 EA.
21	POLYKEN PRIMER #1027 1 GAL.	1 EA.

TITLE:
STANDARD REGULATOR STATION - 250

Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: REG250.DWG		Work Order No. GAS

STANDARD REGULATOR STATION - (250NRS)
(2" DISTRIBUTION REGULATOR STATION - 250NRS)

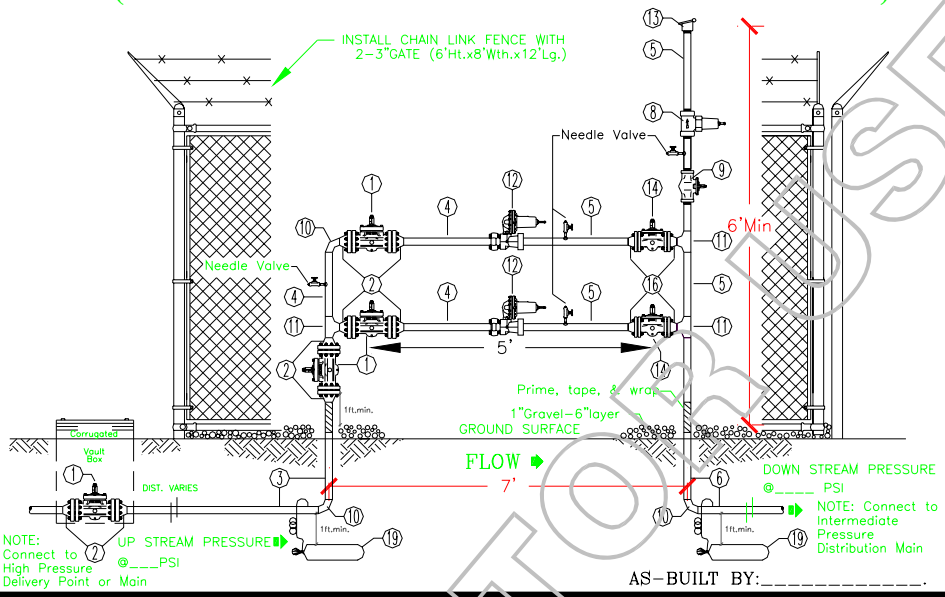


ITEM	PART DESCRIPTION	PART UNITS
1	FLANGE VALVE ROCK PLUG FIG 525 2"	4 EA.
2	FLANGE STEEL WN RF300# 8 HOLE 2"	8 EA.
3	PIPE STL X-TRU COAT 154 PLAIN SCH 80 2"	21 FT.
4	PIPE BLACK STD STL PLAIN SCH 80 2"	21 FT.
5	PIPE BLACK STD STL PLAIN SCH 40 2"	21 FT.
6	PIPE STL X-TRU COAT 154 PLAIN SCH 40 2"	21 FT.
7	GASKET NON-ASBESTOS RING 300# 2"	8 EA.
8	ELBOW STD - WELD 2" X 90°	4 EA.
9	TEE STD STRAIGHT WELD 2"	2 EA.
10	REGULATOR 2" (DETERMINED BY LOAD)	4 EA.
11	FLANGE VALVE ROCK PLUG FIG 143 2"	2 EA.
12	BOLT STUD WITH HEX NUT 5/8" X 3-1/4" BLK	64 EA.
13	FLANGE STEEL WN RF150# 4 HOLE 2"	4 EA.
14	BOLT MACHINE 5/8" X 2-1/2"	16 EA.
15	GASKET NON-ASBESTOS RING 150# 2"	4 EA.
16	ANODE MAGNESIUM ALLOY 17 LB BAG	2 EA.
17	POLYKEN TAPE 900 LB 2" X 100'	1 EA.
18	POLYKEN PRIMER #1027	1 EA.

TITLE:
STANDARD REGULATOR STATION - 250NRS

Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS	NTUA	Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: REG250S.DWG		Work Order No. GAS

STANDARD REGULATOR STATION - 400
(2" DISTRIBUTION REGLATOR STATION - 400)

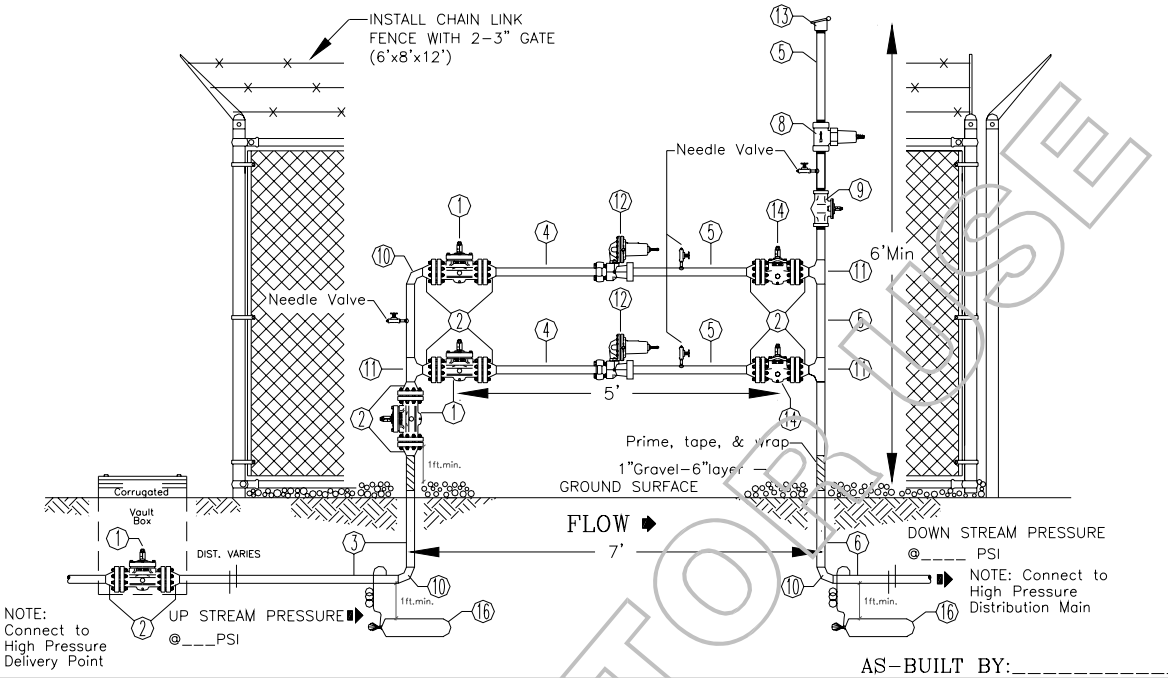


ITEM	PART DESCRIPTION	PART UNITS
1	FLANGE VALVE ROCK PLUG FIG 825 2"	4 EA.
2	FLANGE STEEL WN RF300# 8 HOLE 2"	8 EA.
3	PIPE STL X-TRU COAT 154 PLAIN SCH 80 2"	21 FT.
4	PIPE BLACK STD STL PLAIN SCH 80 2"	21 FT.
5	PIPE BLACK STD STL PLAIN SCH 40 2"	21 FT.
6	PIPE STL X-TRU COAT 154 PLAIN SCH 40 2"	21 FT.
7	GASKET NON-ASBESTOS RING 300# 2"	12 EA.
8	RELIEF VALVE 1805-31 2"	1 EA.
9	SCREW VALVE ROCK PLUG FIG 142, 2"	1 EA.
10	ELBOW STD-WELD 2" X 90°	3 EA.
11	TEE STD STRAIGHT WELD 2"	3 EA.
12	REGULATOR 2" - DETERMINED BY LOAD	1 EA.
13	RAIN CAP HD MUFFLER 2-1/2" OD	1 EA.
14	FLANGE VALVE ROCK PLUG FIG 143 2"	2 EA.
15	BOLT STUD WITH HEX NUT 5/8" X 3-1/4" BLK	64 EA.
16	FLANGE STEEL WN RF150# 4 HOLE 2"	4 EA.
17	BOLT MACHINE 5/8" X 2-1/2"	16 EA.
18	GASKET NON-ASBESTOS RING 150# 2"	4 EA.
19	ANODE MAGNESIUM ALLOY 17 LB BAG	2 EA.
20	POLYKEN TAPE 900 LB 2" X 100'	1 EA.
21	POLYKEN PRIMER #1027 1 GAL.	1 EA.

TITLE:
STANDARD REGULATOR STATION - 400

Drawn By:	Appr. Engrg:	Appr. Mtr Shop:	Scale:		Drawing No.
QSMITH	-	-	NTS		1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: REG400.DWG		Work Order No. GAS

STANDATD REGULATOR STATION - CITY GATE
(2" DISTRIBUTION REGULATOR STATION - CG)



AS-BUILT BY:_____.

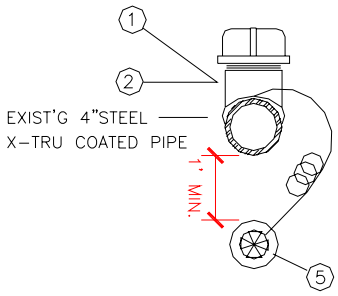
ITEM	PART DESCRIPTION	PART UNITS
1	FLANGE VALVE ROCK PLUG FIG 825 2"	4 EA.
2	FLANGE STEEL WN RF300# 8 HOLE 2"	12 EA.
3	PIPE STL X-TRU COAT 154 PLAIN SCH 80 2"	4 FT.
4	PIPE BLACK STD STL PLAIN SCH 80 2"	3 FT.
5	PIPE BLACK STD STL PLAIN SCH 40 2"	2 FT.
6	PIPE STL X-TRU COAT 154 PLAIN SCH 40 2"	4 FT.
7	GASKET NON-ASBESTOS RING 300# 2"	12 EA.
8	RELIEF VALVE 1805-31 2"	1 EA.
9	SCREW VALVE ROCK PLUG FIG 142, 2"	1 EA.
10	ELBOW STD-WELD 2" X 90°	3 EA.
11	TEE STD STRAIGHT WELD 2"	3 EA.
12	REGULATOR 2" (DETERMINED BY LOAD)	2 EA.
13	RAIN CAP HD MUFFLER 2-1/2" OD	1 EA.
14	FLANGE VALVE ROCK PLUG FIG 525 2"	2 EA.
15	BOLT STUD WITH HEX NUT 5/8" X 3-1/4" BLK	96EA.
16	ANODE MAGNESIUM ALLOY 17 LB BAG	2 EA.
17	POLYKEN TAPE 900 LB 2" X 100'	1 EA.
18	POLYKEN PRIMER #1027	1 EA.

TITLE:
STANDARD REGULATOR STATION - CITY GATE

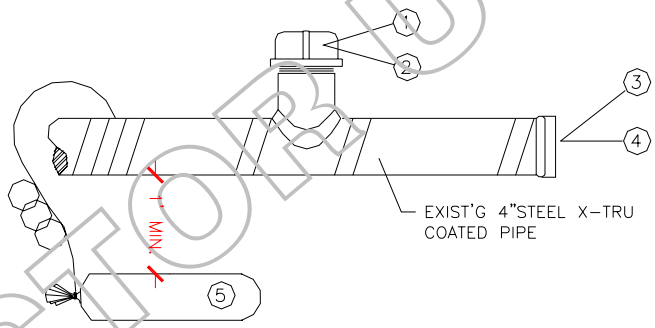
Drawn By: QSMITH	Appr. Engrg: -	Appr. Mtr Shop: -	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 6, 2005	Date: -	Date: -	Acad File Name: REG400H.DWG		Work Order No. GAS

TYPICAL 4" STEEL MAIN CAP OFF
(LOW AND HIGH PRESSURE MAIN)

NOTE:
PRIME AND WRAP PIPE WITH POLYKEN WRAP AT WELDED JOINT.
CAD WELD 1' AWAY FROM END CAP OR WELDED JOINT.



SIDE VIEW-1



SIDE VIEW-2

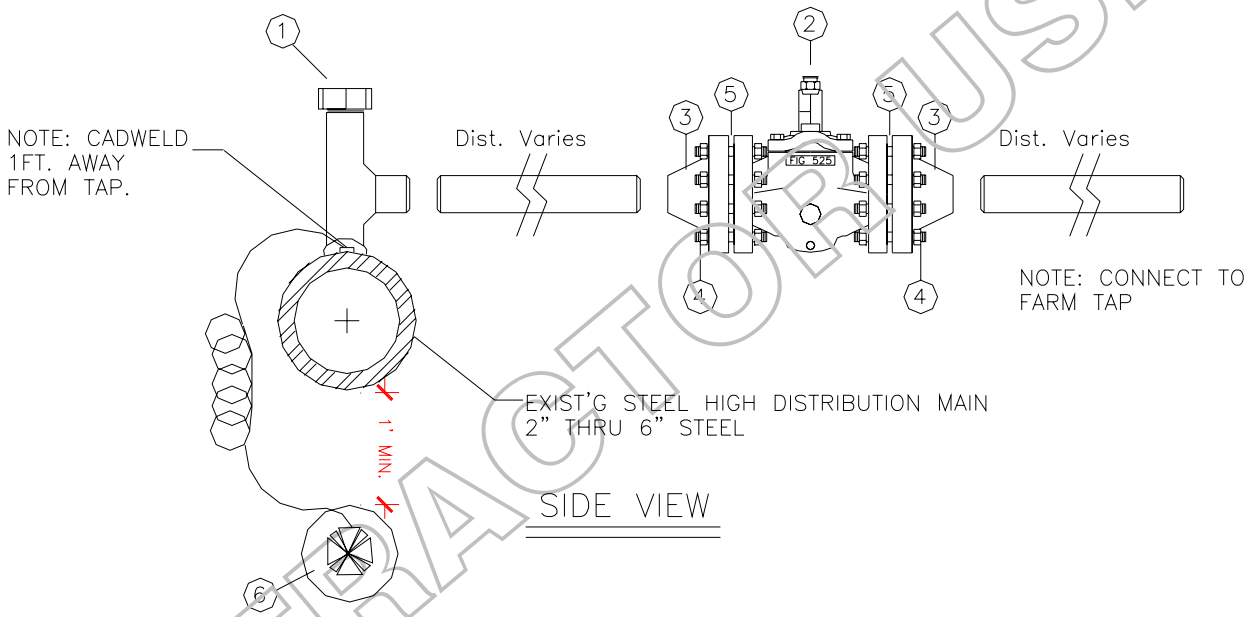
ASSEMBLY:	ASSEMBLY DESCRIPTION: TYPICAL 4" STEEL MAIN CAP OFF	
ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY WELD SHORTSTOP 4"	1 EA.
2	4" WELD CAP	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
5	TAPE POLYKEN 900 LB 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE: TYPICAL 4" STEEL MAIN CAP OFF

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: CAP-4.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 1" HIGH PRESSURE TAP OFF STEEL MAIN
(T1SHPM)

NOTE:
CONNECT TO 1" LINE
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.
ALL THREADS UNDERGROUND MUST BE IN A VAULT.



ASSEMBLY:	ASSEMBLY DESCRIPTION:
T1SHPM	STANDARD 1" HIGH PRESSURE TAP OFF STEEL MAIN

ITEM	PART DESCRIPTION	PART UNITS
1	WELD TAPE TAPPING TEE HP 1" X 3/4" X 1/4"	1 EA.
2	VALVE – LEAD WILL DETERMINE MATERIALS 1" BALON VALVE	1 EA.
3	FLANGE – 8 HOLE 600#	2 EA.
4	BOLTS –	16 EA.
5	GASKET – 8 HOLE GASKET 600#	2 EA.
6	ANODE MAGNESIUM ALLOY 17LB BAG	1 EA.
7	TAPE POLYKEN #900–12 2" X 100' 2" SIZE	1 EA.
8	PRIMER PIPELINE POLYKEN #1027	1 EA.

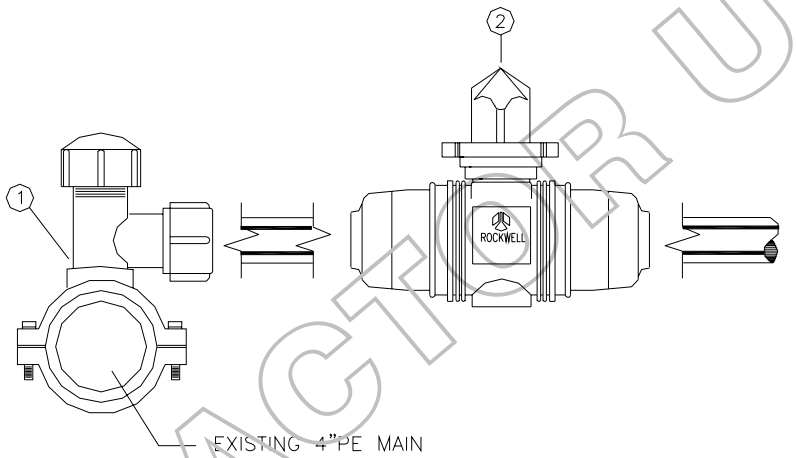
TITLE: STANDARD 1" HIGH PRESSURE TAP OFF STEEL MAIN

Drawn By: QSMITH | Appr. Engrg: – | Appr. Mtr Shop: – | Scale: NTS | Drawing No. 1 OF 1

Date: NLANO DECEMBER 28, 2005 | Date: – | Date: – | Acad File Name: T1SHPM.DWG | Work Order No. GAS

STANDARD 2" PE GAS SERVICE OFF 4" PE WITH POLYVALVE
(T2-4PP)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



SIDE VIEW

TITLE:	STANDARD 2" PE GAS SERVICE OFF 4" PE WITH POLYVALVE
Drawn By: QSMITH	Appr. Engrg: –
Date: NLANO DECEMBER 28, 2005	Date: –
	Appr. Mtr Shop: –
	Date: –
Acad File Name: T2-4PP.DWG	Scale: NTS
Work Order No. GAS	Drawing No. 1 OF 1

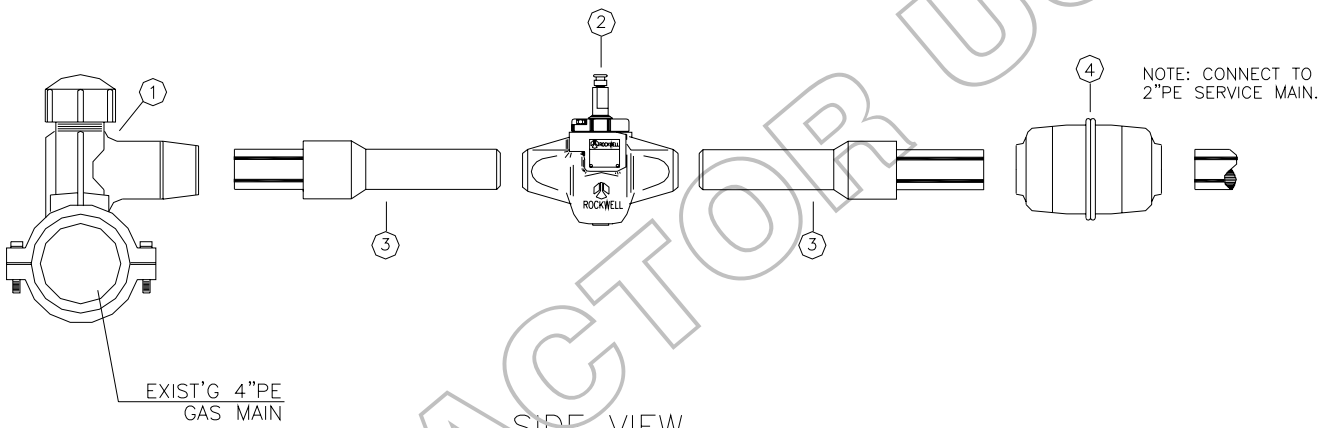
ASSEMBLY: T2-4PP

ASSEMBLY DESCRIPTION: STANDARD 2" PE GAS SERVICE OFF 4" PE WITH POLYVALVE

ITEM	PART DESCRIPTION	PART UNITS
1	TEE TAP 4" IPS X 2" IPS PERMASERT	1 EA.
2	VALVE POLYETHYLENE SHUT-OFF 2" IPS GAS	1 EA.

STANDARD 2" PE GAS SERVICE OFF 4" PE WITH STEEL VALVE
(T2-4PS)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



SIDE VIEW

TITLE:	STANDARD 2" PE GAS SERVICE OFF 4" PE WITH STEEL VALVE
Drawn By: QSMITH	Appr. Engrg: –
Date: NLANO DECEMBER 28, 2005	Date: –
	Appr. Mtr Shop: –
	Date: –
Acad File Name: T2-4PS.DWG	Scale: NTS
Work Order No. GAS	Drawing No. 1 OF 1

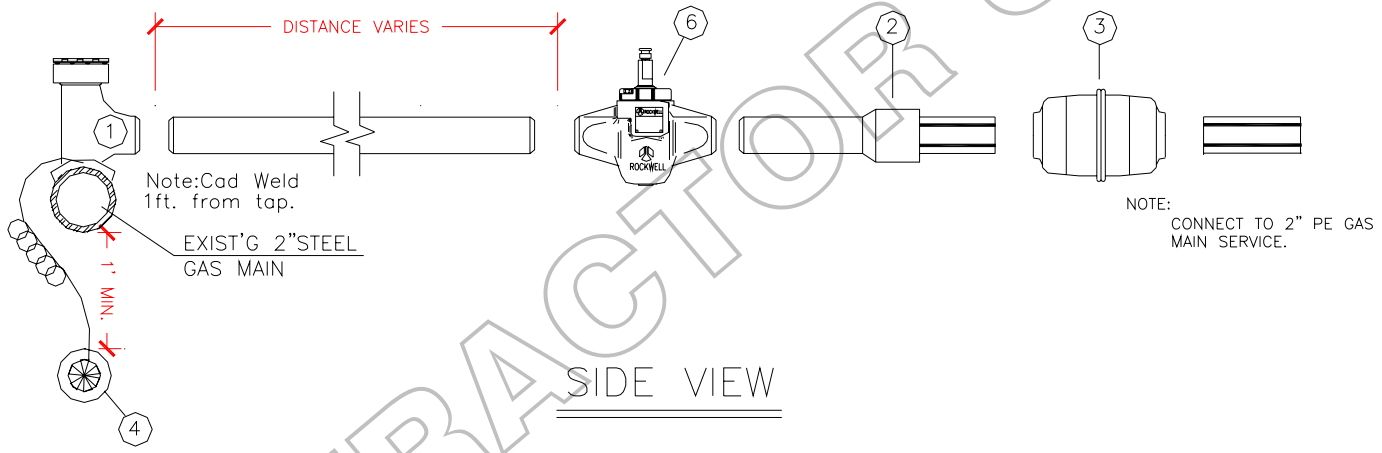
ASSEMBLY: T2-4PS

ASSEMBLY DESCRIPTION: STANDARD 2" PE GAS SERVICE OFF 4" PE WITH STEEL VAVLE

ITEM	PART DESCRIPTION	PART UNITS
1	TEE TAP 4" IPS X 2" IPS PERMASERT	1 EA.
2	VALVE 2F-US13-BW 2" BALON WELD BALL VALVE 285 psi	1 EA.
3	FITTING TRANSITION 2" PE-STEEL	1 EA.
4	COUPLING 2" IPS PERMASERT	1 EA,
5	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.
8	PRIMER PIPELINE POLYKEN #1027	1 EA.

STANDARD 2" PE GAS MAIN TAP OFF 2" STEEL
(T2PS)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



SIDE VIEW

NOTE:
CONNECT TO 2" PE GAS
MAIN SERVICE.

ASSEMBLY:	ASSEMBLY DESCRIPTION:
T2PS	STANDARD 2" PE GAS MAIN TAP OFF 2" STEEL

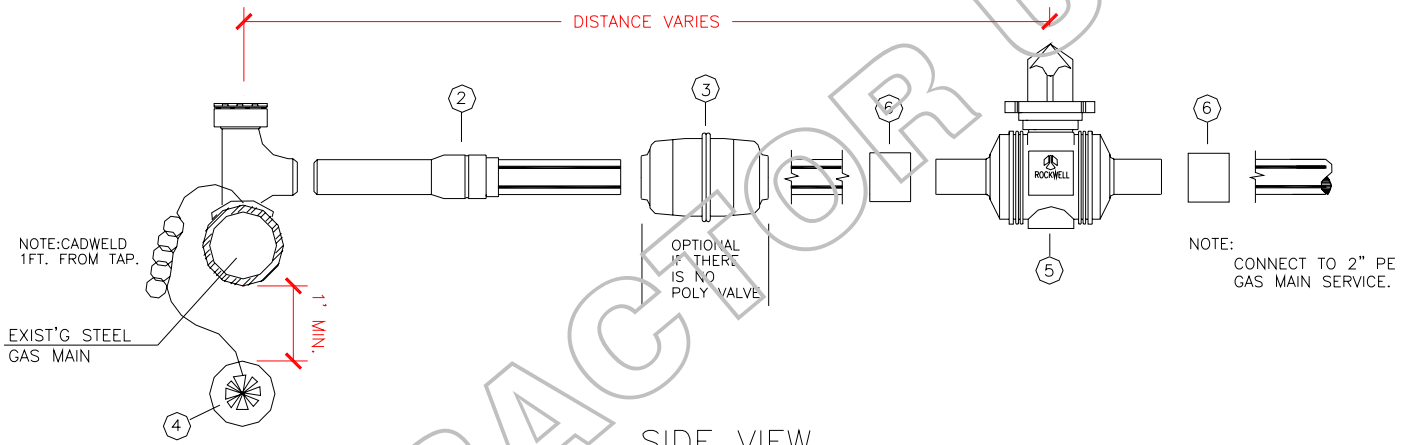
ITEM	PART DESCRIPTION	PART UNITS
1	SHORTSTOP WELD FITTING 2" WILLIAMSTON	1 EA.
2	TRANSITION FITTING POLY-ST YWL-STR 2"	1 EA.
3	COUPLING 2" IPS PERMASERT	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB	1 EA.
5	VALVE, ROCK WELD RIG 1943-1/2 2"	1 EA.

TITLE: STANDARD 2" PE GAS MAIN TAP OFF 2" STEEL

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: T2PS.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" PE GAS SERVICE EXTENSION OFF STEEL MAIN
(T2PSTM)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



SIDE VIEW

ASSEMBLY: T2PSTM

ASSEMBLY DESCRIPTION: STANDARD 2" PE GAS SERVICE EXTENSION OFF STEEL MAIN

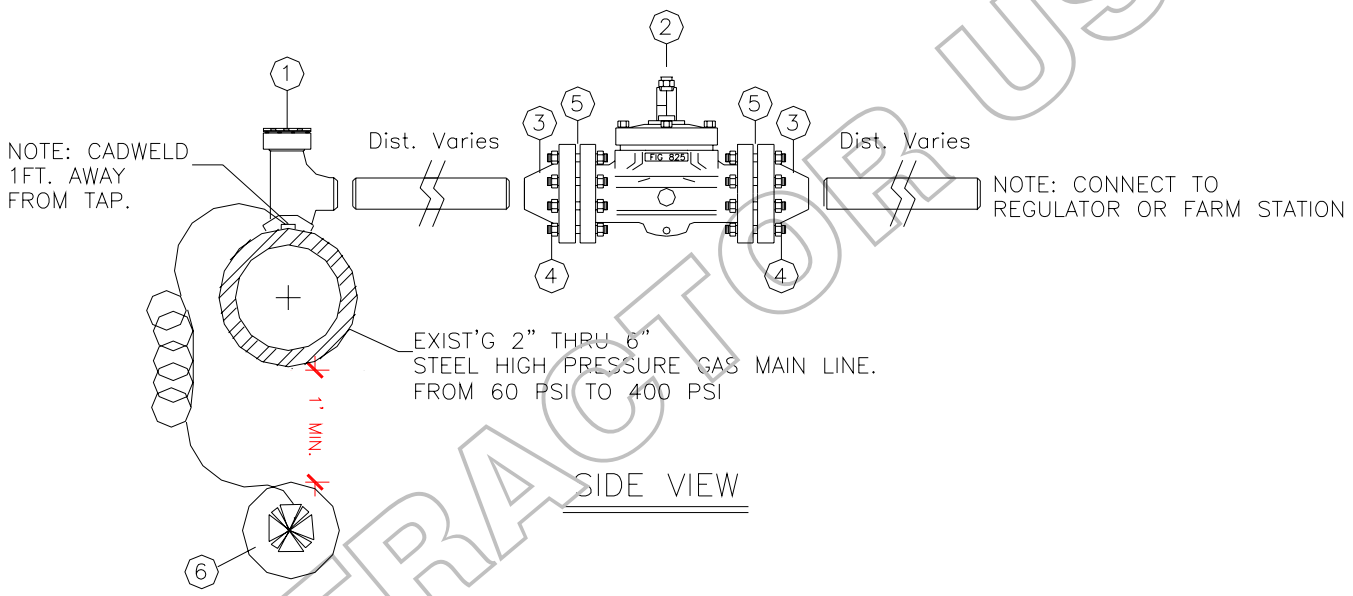
ITEM	PART DESCRIPTION	PART UNITS
1	TEE, 3-WAY TAP WELD SHORT 4"	1 EA.
2	TRANSITION FITTING 2" STL-PE 3408	1 EA.
3	COUPLING 2" IPS PERMASERT	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB	1 EA.
5	VAVLE ROCK PLUG POLYETHYLENE 2"	1 EA.
6	COUPLING 2" SOCKET 3408 SDR9 POLY	1 EA.

TITLE: STANDARD 2" PE GAS SERVICE EXTENSION OFF STEEL MAIN

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: T2PSTM.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" HIGH PRESSURE TAP OFF STEEL MAIN
(T2SHPM)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



ASSEMBLY:	ASSEMBLY DESCRIPTION:
T2SHPM	STANDARD 2" HIGH PRESSURE TAP OFF STEEL MAIN

ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY WELD SHORTSTOP 2"	1 EA.
2	VALVE ROCK PLUG FIG. 825 2" FLANGE TYPE	1 EA.
3	FLANGE STEEL WELD NECK RF300# 8 HOLE 2"	2 EA.
4	BOLT STUD WITH HEX NUT 5/8" X 3-1/4" BLK	16 EA.
5	GASKET NON-ASBESTOS RING 300# 2"	2 EA.
6	ANODE MAGNESIUM ALLOY 17LB BAG	1 EA.
7	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.
8	PRIMER PIPELINE POLYKEN #1027	1 EA.

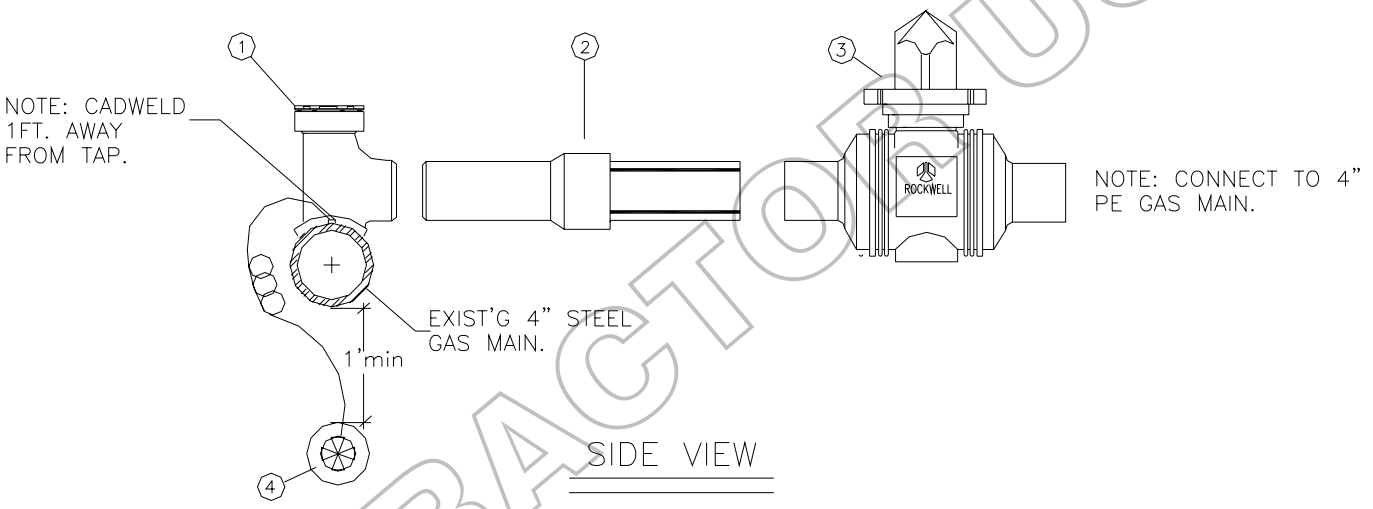
TITLE: STANDARD 2" HIGH PRESSURE TAP OFF STEEL MAIN

Drawn By: QSMITH | Appr. Engrg: – | Appr. Mtr Shop: – | Scale: NTS | Drawing No. 1 OF 1

Date: NLANO DECEMBER 28, 2005 | Date: – | Date: – | Acad File Name: T2SHPM.DWG | Work Order No. GAS

STANDARD 4" PE GAS MAIN EXTENSION OFF STEEL MAIN W/ POLYVAVLE (T4PVS)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



SIDE VIEW

ASSEMBLY: T4PVS

ASSEMBLY DESCRIPTION: STANDARD 4" PE GAS MAIN EXTENSION OFF STEEL MAIN WITH POLYVALVE

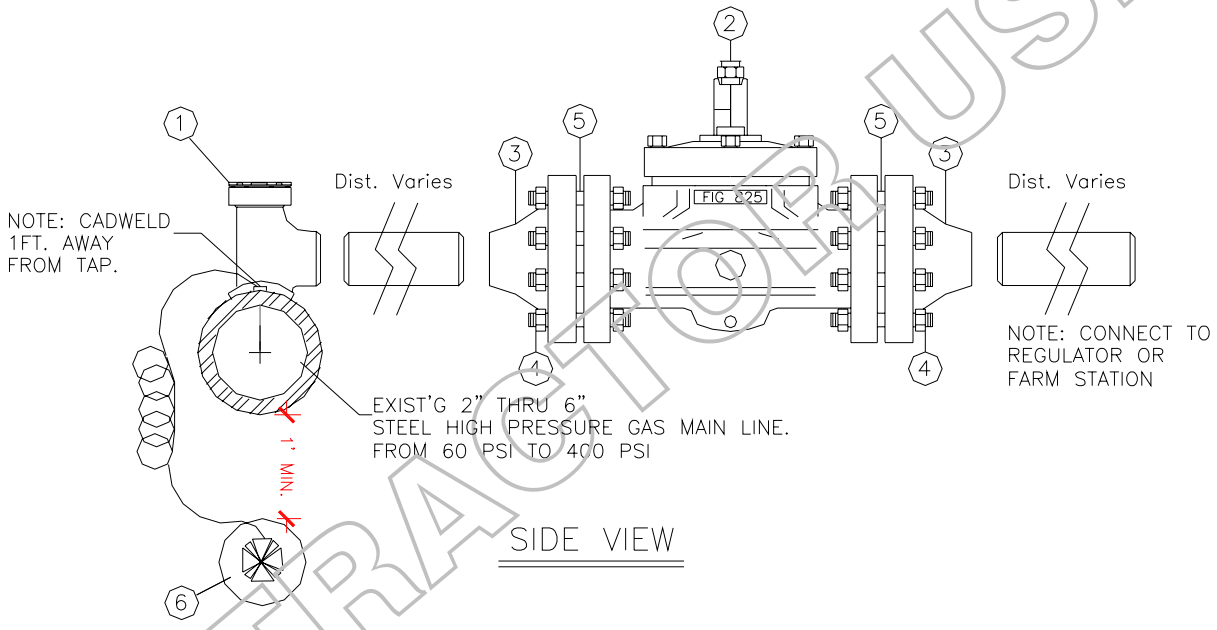
ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY WELD SHORTSTOP 4"	1 EA.
2	FITTING TRANSITION 4" PE-STEEL	1 EA.
3	VALVE POLYETHYLENE SHUT-OFF 4" IPS GAS	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB. BAG	1 EA.
5	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE: STANDARD 4" PE GAS MAIN EXTENSION OFF STEEL MAIN

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: T4PVS.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 4" HIGH PRESSURE TAP OFF STEEL MAIN
(T4SHPM)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.
ALL THREADS UNDERGROUND MUST BE IN A VAULT.



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
T4SHPM	STANDARD 4" HIGH PRESSURE TAP OFF STEEL MAIN

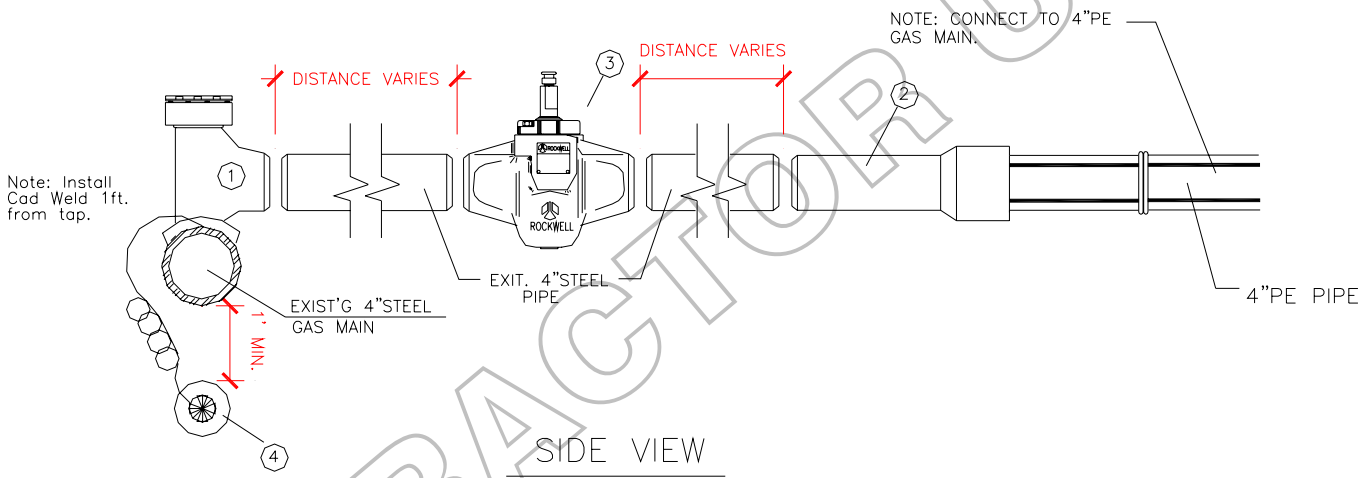
ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY WELD SHORTSTOP 4"	1 EA.
2	VALVE ROCK PLUG FIG. 825 4" FLANGE TYPE	1 EA.
3	FLANGE STEEL WELD NECK RF300# 8 HOLE 4"	2 EA.
4	BOLT STUD WITH HEX NUT 7/8" X 5-3/4" BLK	16 EA.
5	GASKET NON-ASBESTOS RING 300# 4"	2 EA.
6	ANODE MAGNESIUM ALLOY 17LB BAG	1 EA.
7	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.
8	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE:
STANDARD 4" HIGH PRESSURE TAP OFF STEEL MAIN

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: T4SHPM.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD PE MAIN OFF STEEL TAP WITH STEEL VALVE (T2SVS)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



SIDE VIEW

TITLE:	STANDARD PE MAIN OFF STEEL TAP WITH STEEL VALVE
Drawn By: QSMITH	Appr. Engrg: –
Date: NLANO DECEMBER 28, 2005	Date: –
	Appr. Mtr Shop: –
	Date: –
Acad File Name: T2SVS.DWG	Scale: NTS
Work Order No. GAS	Drawing No. 1 OF 1

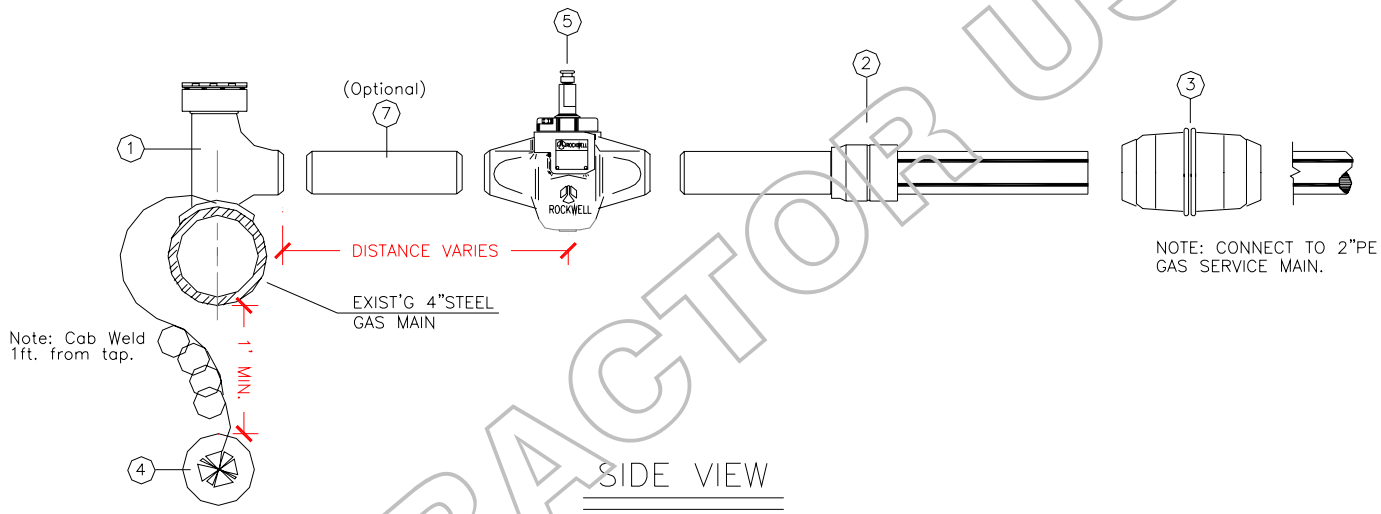
ASSEMBLY: T2SVS

ASSEMBLY DESCRIPTION: STANDARD PE MAIN OFF STEEL TAP WITH STEEL VALVE

ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY WELD SHORTSTOP 4"	1 EA.
2	FITTING TRANSITION 4" PE-STEEL	1 EA.
3	VALVE ROCK WELD TYPE FIG 1943-1/2 4" SIZE BALON	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB. BAG	1 EA.
5	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

STANDARD 2" PE GAS SERVICE EXTENSION OFF 4" STEEL WITH STEEL VALVE (GMN2PE-4S)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GMN2PE-4S	STANDARD 2" PE GAS SERVICE EXTENSION OFF 4" STEEL WITH STL VALVE

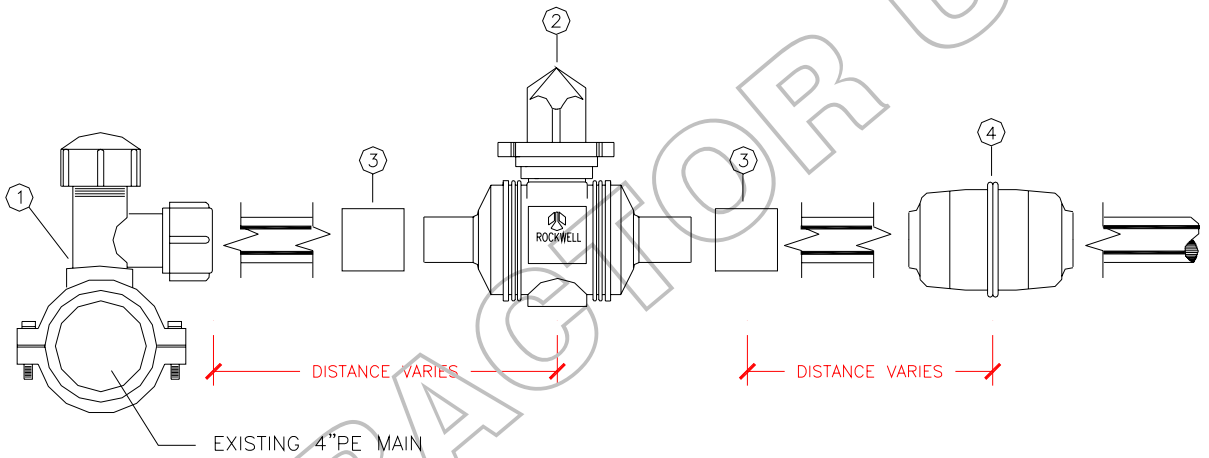
ITEM	PART DESCRIPTION	PART UNITS
1	TEE 3-WAY WELD SHORTSTOP 4"	1 EA.
2	FITTING TRANSITION 2" PE-STEEL	1 EA.
3	COUPLING 2" PERMASERT	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB. BAG	1 EA.
5	2F-US13-BW 2" BALON WELD BALL VALVE 285 psi.	1 EA.
6	TAPE POLYKEN #900-12 2" X 100' 2" SIZE	1 EA.
7	PIPE, STEEL BLK STD P/E (IF NEEDED)	1 EA.

TITLE: STANDARD 2" PE GAS SERVICE EXTENSION OFF 4" STEEL

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GMN2PE-4S.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" PE GAS SERVICE OFF 4" PE WITH POLYVALVE
(T2-4PP)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
T2-4PP	STANDARD 2" PE GAS SERVICE OFF 4" PE WITH POLYVALVE

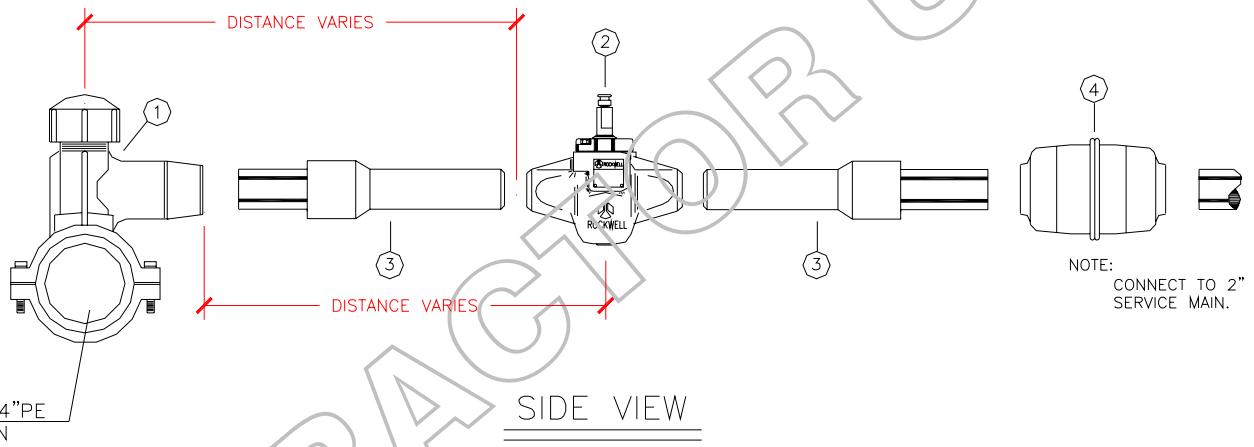
ITEM	PART DESCRIPTION	PART UNITS
1	4" X 2" TEE TAP PERMASERT	1 EA.
2	VALVE ROCK PLUG POLYETHYLENE 2"	1 EA.
3	2" PE COUPLING SOCKET 3408 SDR9 POLY	2 EA.
4	2" IPS COUPLING PERMASERT	1 EA.

TITLE: STANDARD 2" PE GAS SERVICE OFF 4" PE WITH POLYVALVE

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: T2-4PP.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" PE GAS SERVICE OFF 4" PE WITH STEEL VALVE
(T2-4PS)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL WITH POLYKEN TAPE



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
T2-4PS	STANDARD 2" PE GAS SERVICE OFF 4" PE WITH STEEL VALVE

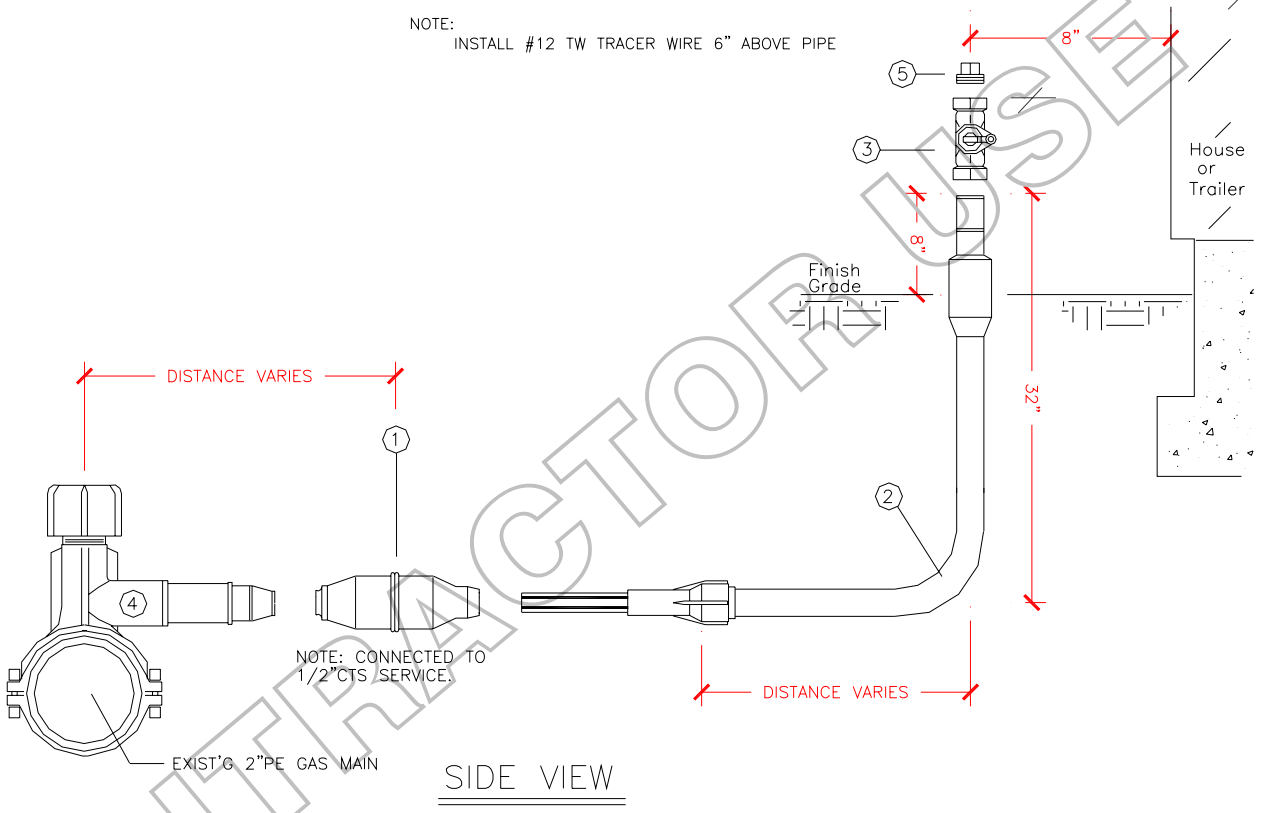
ITEM	PART DESCRIPTION	PART UNITS
1	4" X 2" TEE TAP PERMASERT #55992	1 EA.
2	2F-US13-BW 2" BALON WELD BALL VALVE 285 psi	2 EA.
3	FITTING TRANSITION 2" PE-STEEL	1 EA.
4	2" IPS COUPLING PERMASERT	1 EA.
5	TAPE PLYKEN #900-12 2" X 100' 2" SIZE	1 EA.

TITLE: STANDARD 2" PE GAS SERVICE OFF 4" PE WITH STEEL VALVE

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: T2-4PS.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 1/2"PE SERVICE LINE OFF 2"PE
(GSV1/2-2PE)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



SIDE VIEW

ASSEMBLY: GSV1/2-2PE

ASSEMBLY DESCRIPTION: STANDARD 1/2" PE SERVICE LINE OFF 2" PE

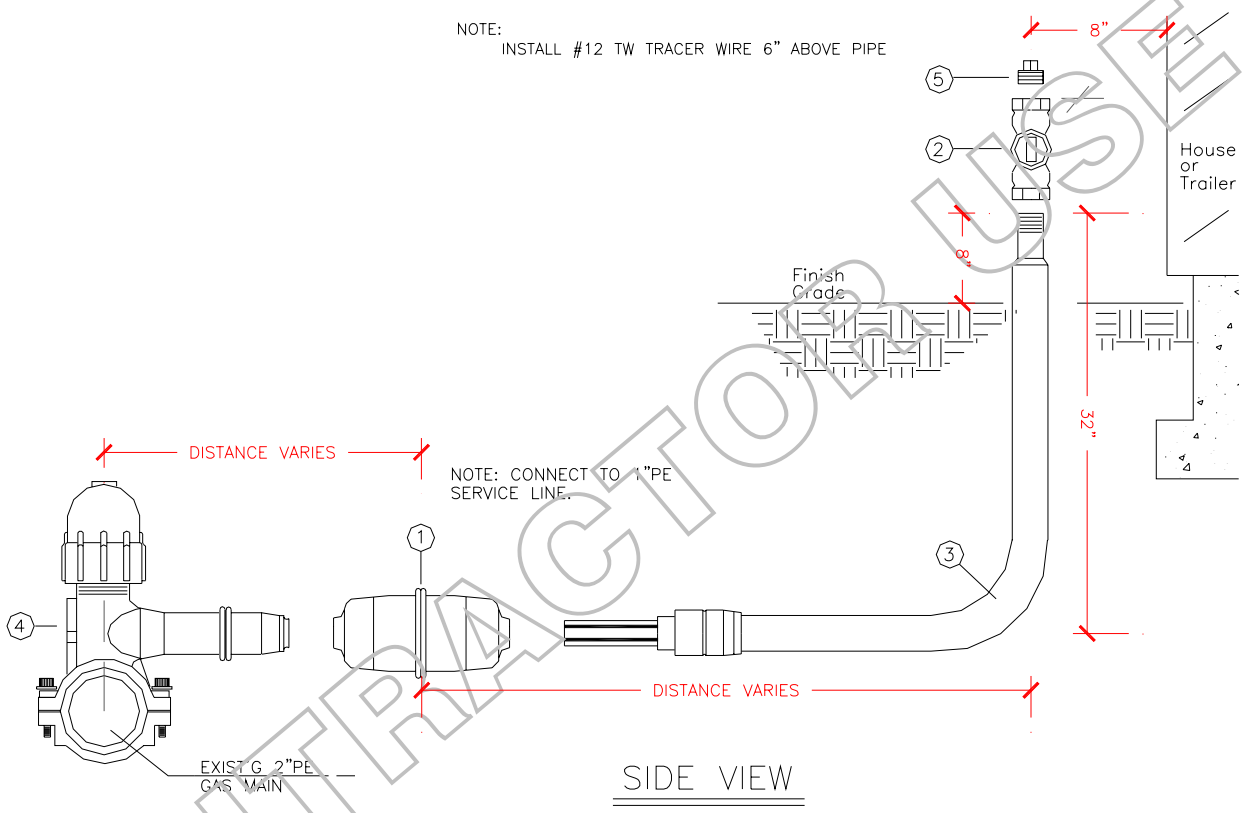
ITEM	PART DESCRIPTION	PART UNITS
1	1/2" CTS PERMASERT COUPLING	1 EA.
2	RISER ANODELESS 3/4" MPT-1/2" CTS	1 EA.
3	STOP GAS BLK AYD #106878 INSUL 3/4"	1 EA.
4	TEE TAP 2" IPS X 1/2" CTS PERMASERT #55702	1 EA.
5	PLUG BLK MALLEABLE 3/4"	1 EA.
6	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.

TITLE: STANDARD 1/2" PE SERVICE LINE OFF 2"PE

Drawn By: QSMITH
Date: NLANO DECEMBER 15, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV1/2-2PE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 1"PE SERVICE LINE OFF 2"PE
(GSV1PE-2PE)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GSV1PE-2PE	STANDARD 1" PE SERVICE LINE OFF 2" PE

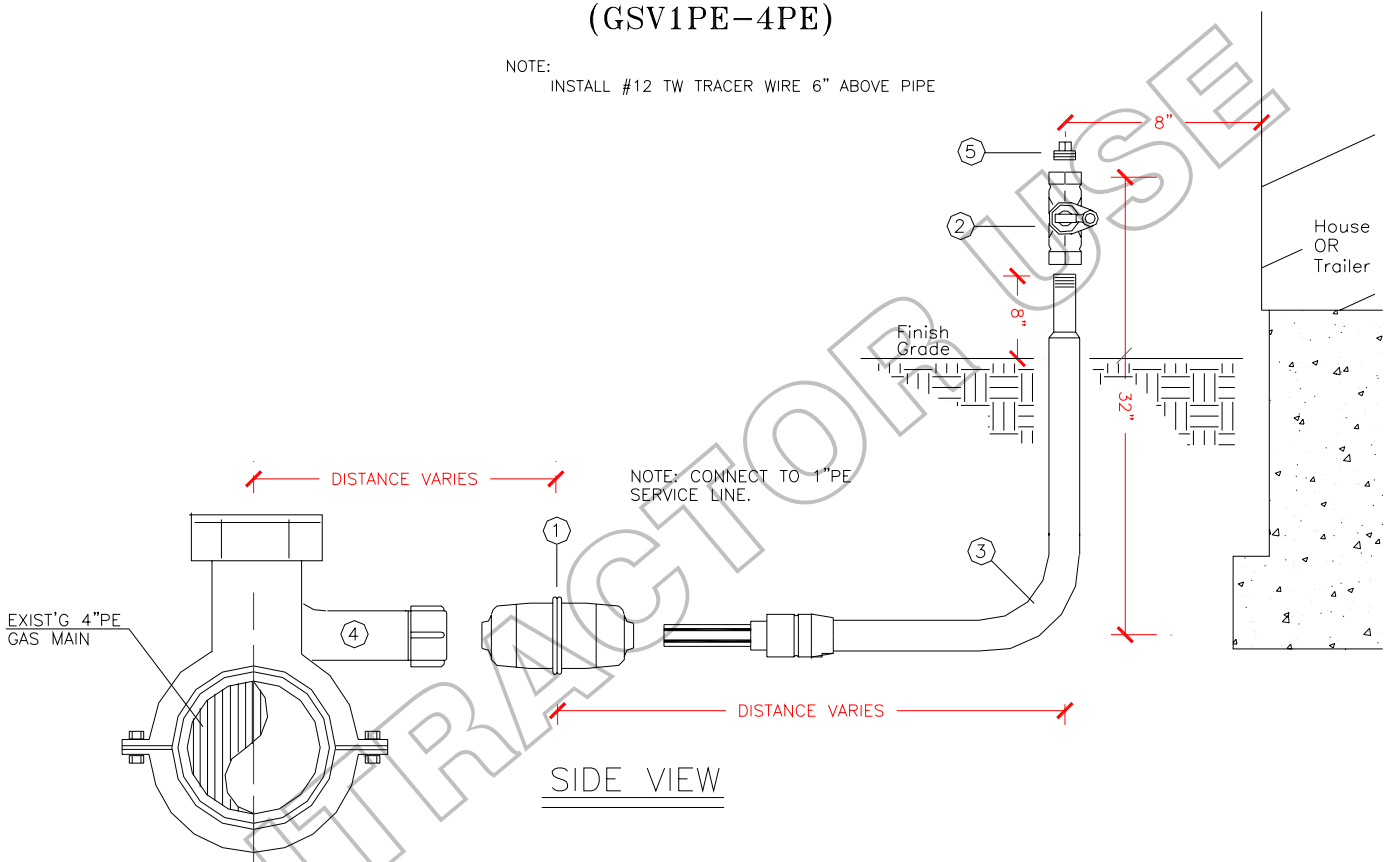
ITEM	PART DESCRIPTION	PART UNITS
1	PERMASERT COUPLING 1" IPS	1 EA.
2	STOP GAS BLK AYD #62668 INSULATED 1"	1 EA.
3	TRANSITION FITTING SERIES RISER 1" PE 3408	1 EA.
4	TEE TAP 2" IPS X 1" IPS PERMASERT #55951 SDR 11	1 EA.
5	PLUG BLK MALLEABLE 1"	1 EA.
6	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.

TITLE:
STANDARD 1" PE SERVICE LINE OFF 2"PE

Drawn By: QSMITH
Date: NLANO DECEMBER 15, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV1PE-2PE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 1" PE SERVICE LINE TAP OFF 4" PE
(GSV1PE-4PE)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



SIDE VIEW

ASSEMBLY: GSV1PE-4PE

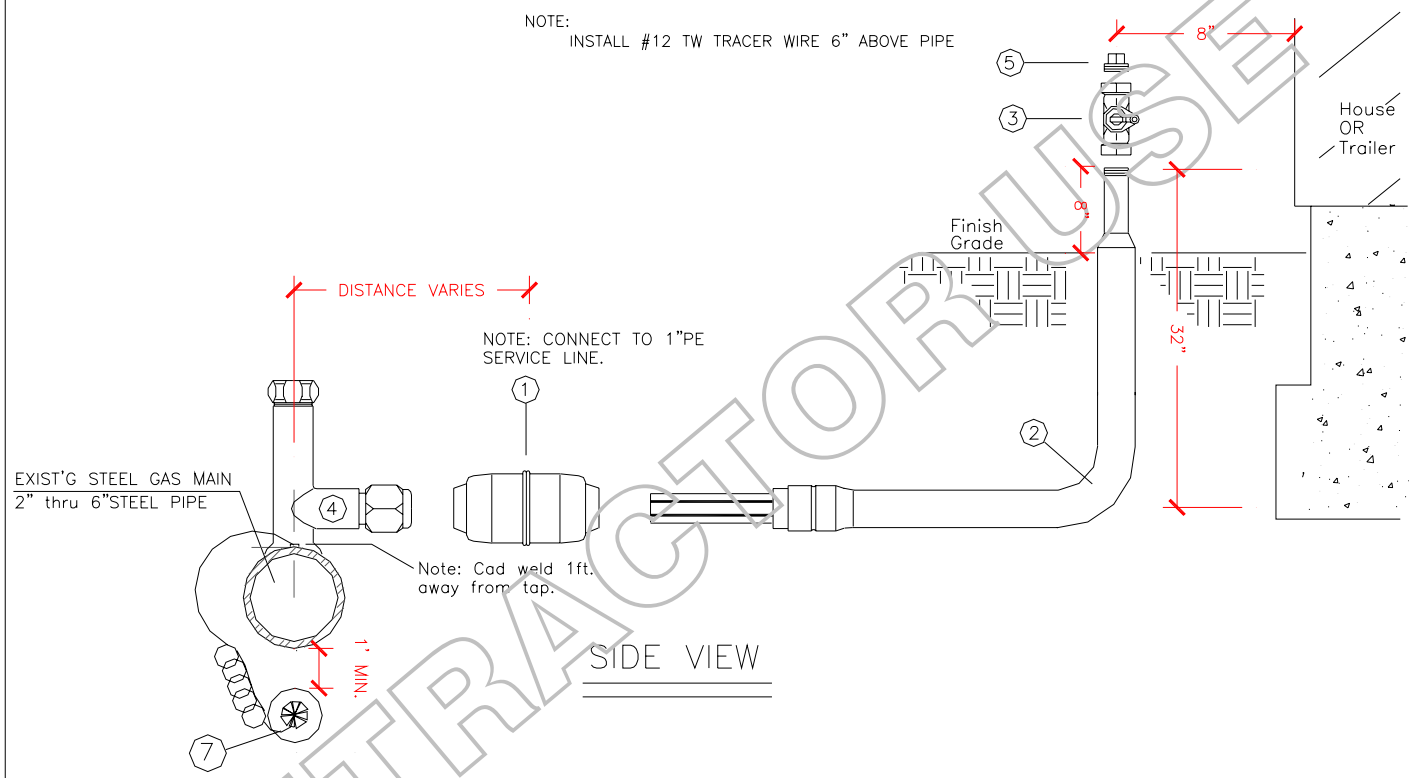
ASSEMBLY DESCRIPTION: STANDARD 1" PE SERVICE LINE TAP OFF 4" PE

ITEM	PART DESCRIPTION	PART UNITS
1	PERMASERT COUPLING 1" IPS	1 EA.
2	STOP, GAS BLK AYD #62668 INSULATED 1"	1 EA.
3	TRANSITION FITTING SERIES RISER 1" PE 3408	1 EA.
4	TEE TAP 4" IPS MAIN X 1" IPS COMP.	1 EA.
5	PLUG BLK MALLEABLE 1"	1 EA.
6	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.

TITLE: STANDARD 1" PE SERVICE LINE TAP OFF 4" PE

Drawn By: QSMITH
Date: NLANO DECEMBER 15, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV1PE-4PE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 1" PE SERVICE LINE OFF STEEL MAIN
(GSV1PE-STL)



ASSEMBLY: GSV1PE-STL

ASSEMBLY DESCRIPTION: STANDARD 1" PE SERVICE LINE OFF STEEL MAIN

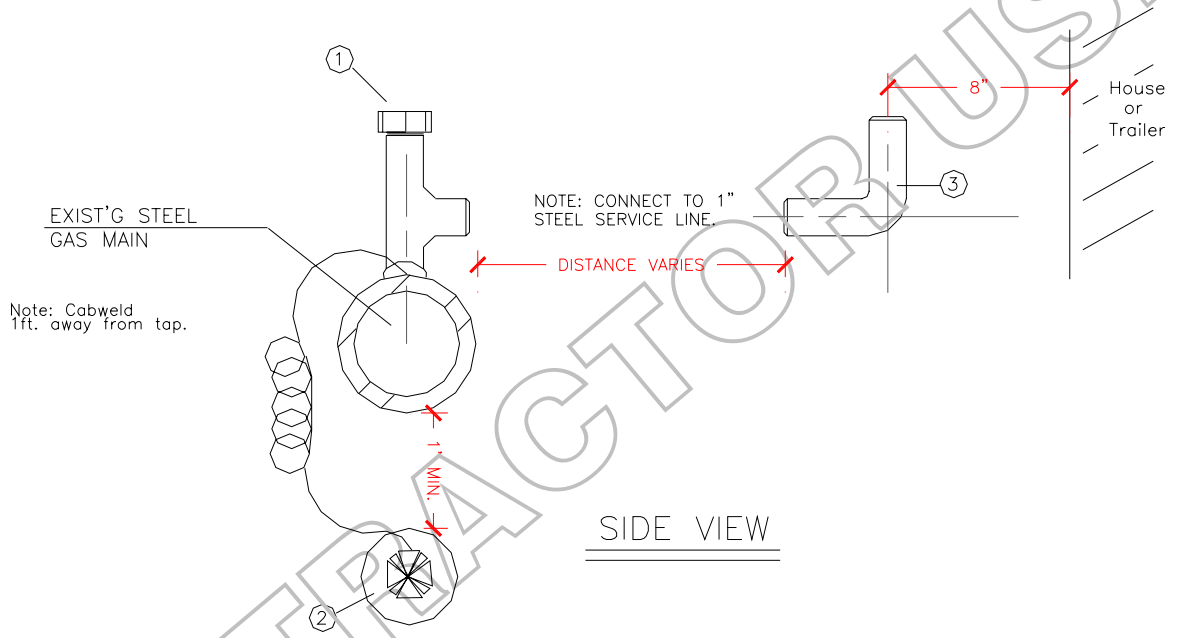
ITEM	PART DESCRIPTION	PART UNITS
1	1/2" IPS COUPLING PERMASERT	1 EA.
2	TRANSITION FITTING SERIES RISER 1" PE 3408	1 EA.
3	STOP, GAS BLK AYD #62668 INSUL. 1"	1 EA.
4	TEE WELD SERVICE 3/4" WELD X 1" IPS	1 EA.
5	PLUG BLK MALLEABLE 3/4"	1 EA.
6	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.
7	ANODE MAGNESUM ALLOY 17 LB.	1 EA.

TITLE: STANDARD 1" PE SERVICE LINE OFF STEEL MAIN

Drawn By: QSMITH
Date: NLANO DECEMBER 21, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV1PE-STL.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 1" STEEL GAS SERVICE TAP OFF STEEL MAIN
(GSV1STL-STL)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GSV1STL-STL	STANDARD 1" STEEL GAS SERVICE TAP OFF STEEL MAIN

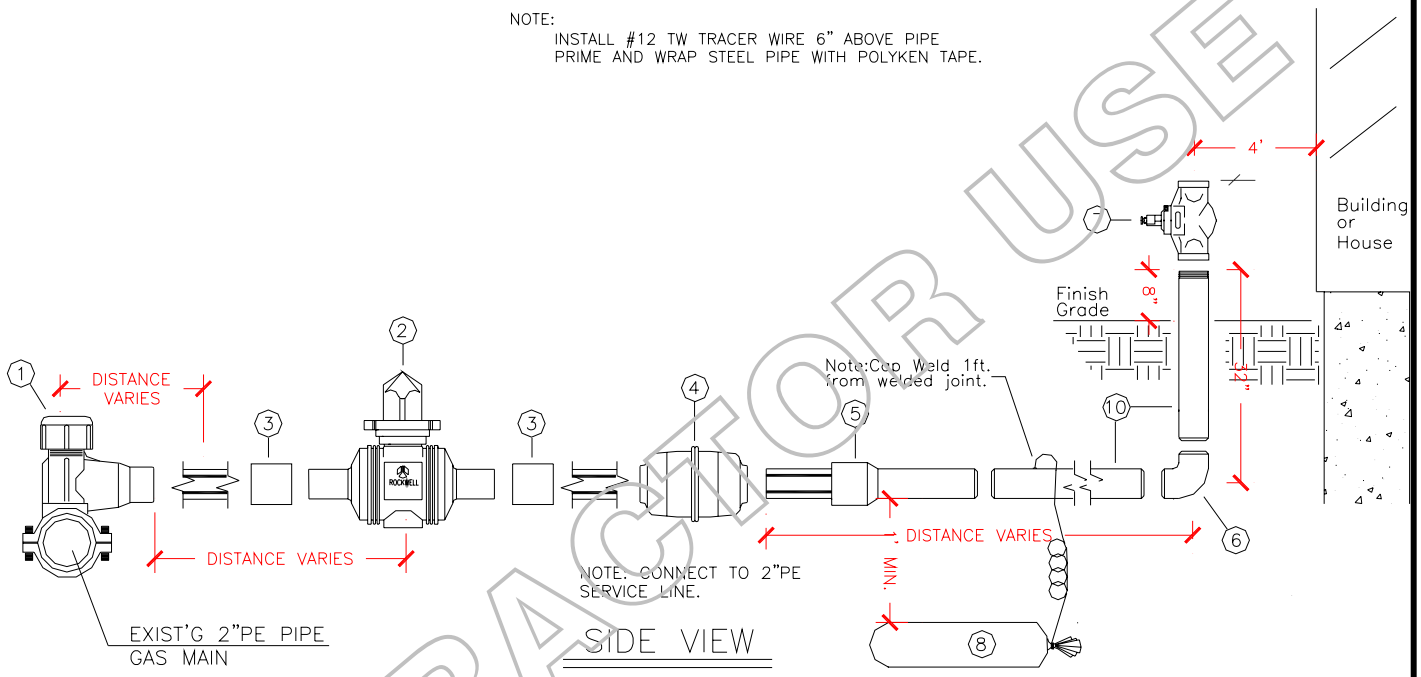
ITEM	PART DESCRIPTION	PART UNITS
1	TEE WELD SERVICE TAP 1" X 3/4" X 1/4"	1 EA.
2	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
3	ELBOW 90 WELD STD 1" LONGRADIUS	1 EA.
4	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.

TITLE: STANDARD 1" STEEL GAS SERVICE TAP OFF STEEL MAIN

Drawn By: QSMITH
Date: NLANO DECEMBER 21, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV1STL-STL.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" PE GAS SERVICE TAP OFF 2" PE
(GSV2PE-2PE)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



ASSEMBLY:	ASSEMBLY DESCRIPTION:
GSV2PE-2PE	STANDARD 2" PE GAS SERVICE TAP OFF 2" PE

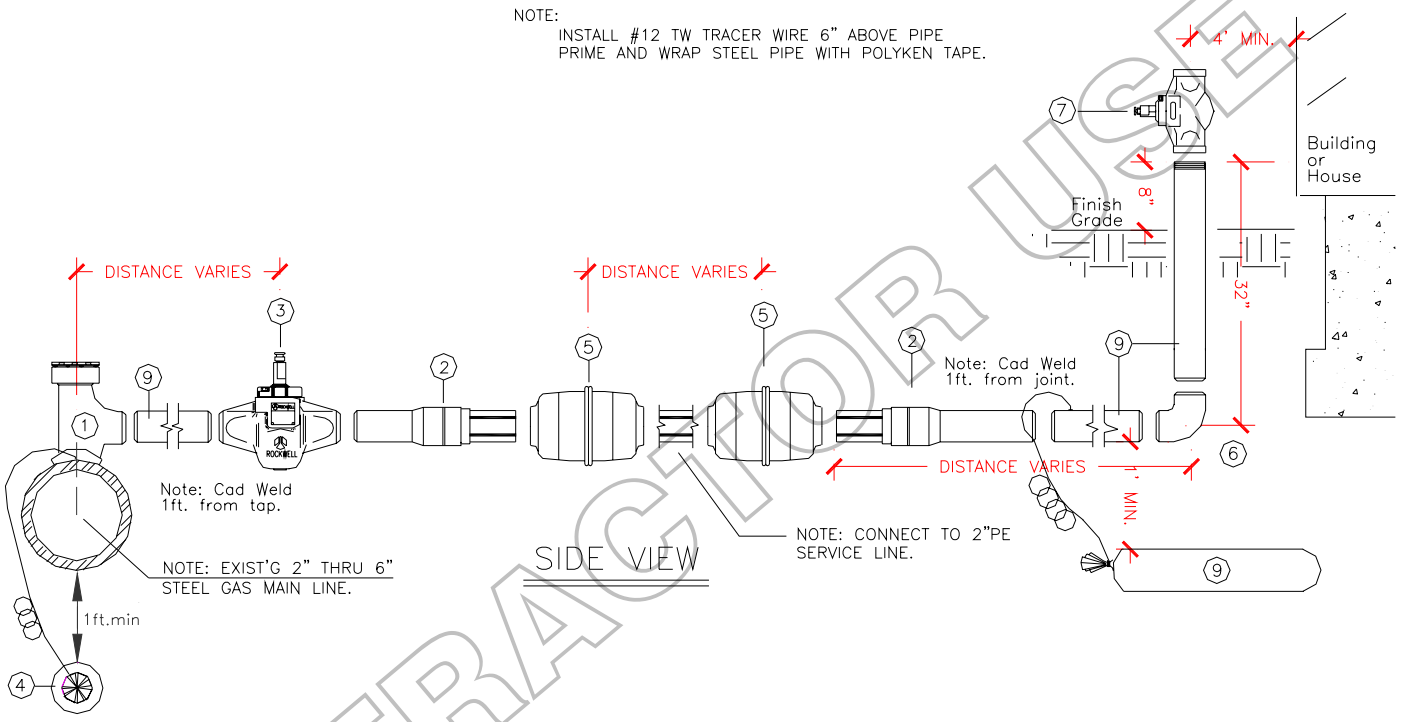
ITEM	PART DESCRIPTION	PART UNITS
1	TEE TAP 2" IPS X 2" IPS PERMASERT #55990	1 EA.
2	2" VALVE ROCK PLUG POLYETHYLENE	1 EA.
3	2" COUPLING SOCKET 4308 SDR9 POLY	2 EA.
4	2" IPS COUPLING PERMASERT	1 EA.
5	TRANSITION FITTING POLY-STL TWL-STR 2"	1 EA.
6	2" STD WELDED 90 ELBOW	1 EA.
7	VALVE ROCK PLUG FIG. 142 2" SCREW	1 EA.
8	ANODE MAGNESIUM ALLOY 17 LB	1 EA.
9	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.
10	PIPE STEEL X-TRU COATED 154 PE 2"	10 FT.

TITLE: STANDARD 2" PE GAS SERVICE TAP OFF 2" PE

Drawn By: QSMITH
Date: NLANO DECEMBER 21, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV2PE-2PE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" PE GAS SERVICE EXTENSION OFF STEEL MAIN
(GSV2PE-ST)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



ASSEMBLY:	ASSEMBLY DESCRIPTION:
GSV2PE-ST	STANDARD 2" PE GAS SERVICE EXTENSION OFF STEEL MAIN

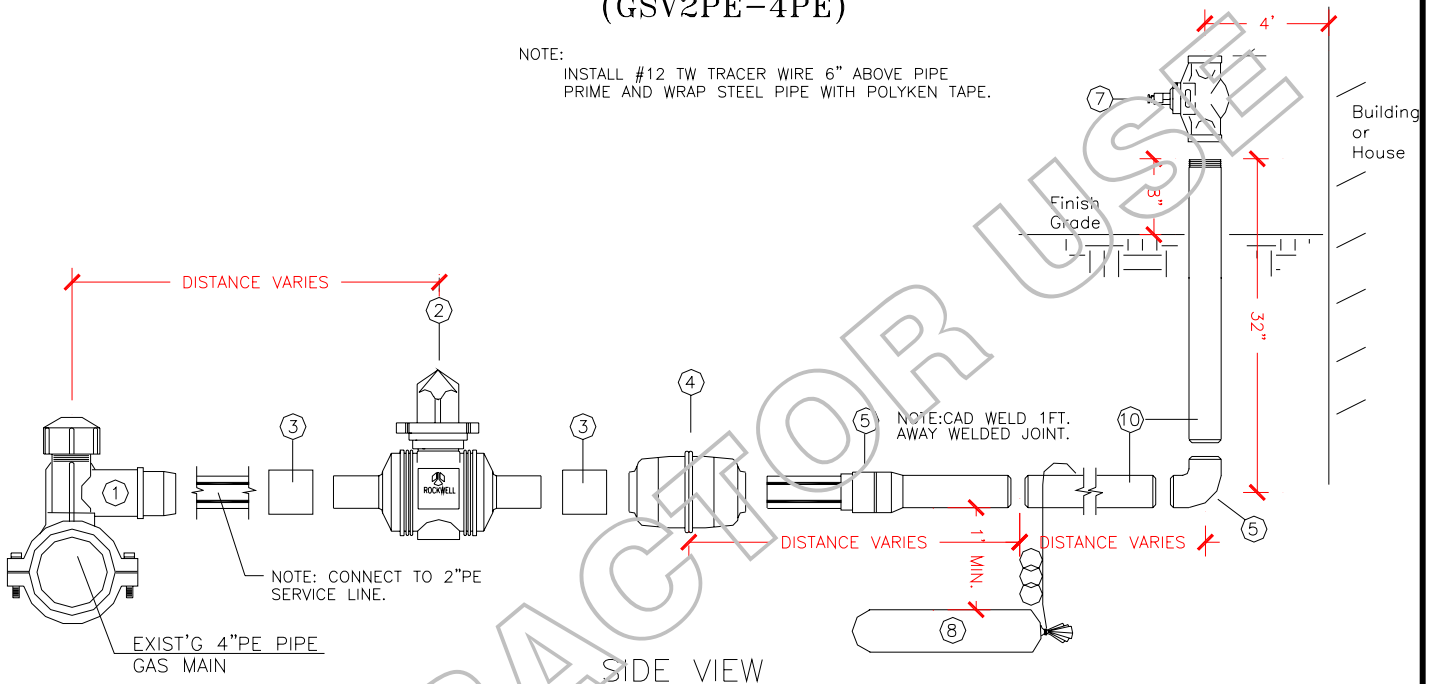
ITEM	PART DESCRIPTION	PART UNITS
1	2" 3-WAY TEE WELD TAP SHORTSTOP	1 EA.
2	FITTING TRANSITION POLY-STL YWL-STR 2"	2 EA.
3	2" VALVE 1943-1/2" ROCK WELD	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB.	2 EA.
5	COUPLING 2" IPS PERMASERT	2 EA.
6	2" STD WELD 90 ELBOW	1 EA.
7	2" FIG. 142 ROCK PLUG-SCREW VALVE	1 EA.
8	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.
9	PIPE, STEEL X-TRU COATED 154 PE 2"	10 FT.

TITLE: STANDARD 2" PE GAS SERVICE EXTENSION OFF STEEL MAIN

Drawn By: QSMITH
Date: NLANO DECEMBER 21, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV2PE-ST.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 2" PE GAS SERVICE OFF 4" PE 3408
(GSV2PE-4PE)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE
PRIME AND WRAP STEEL PIPE WITH POLYKEN TAPE.



SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION:
GSV2PE-4PE	STANDARD 2" PE GAS SERVICE OFF 4" PE 3408

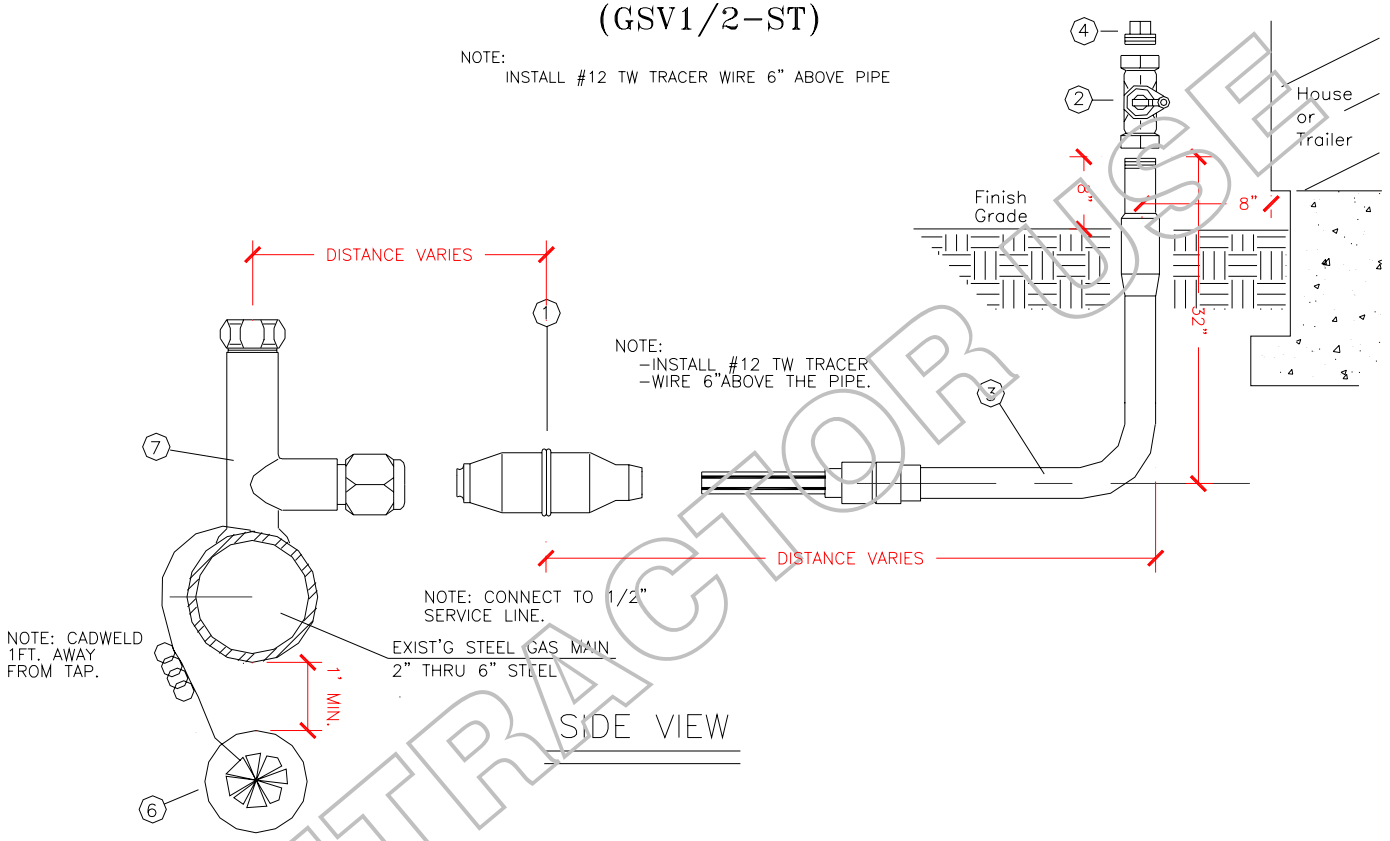
ITEM	PART DESCRIPTION	PART UNITS
1	TEE TAP 4" IPS X 2" IPS PERMASERT #55992	1 EA.
2	2" POLY-3408 VAVLE ROCK PLUG	1 EA.
3	2" COUPLING SOCKET PE-3408 SDR9 POLY	1 EA.
4	2" IPS COUPLING PERMASERT	1 EA.
5	TRANSITION FITTING PLY-ST YWL-STR 2"	1 EA.
6	2" STD WELD 90 ELBOW	1 EA.
7	2" FIG. 142 ROCK PLUG-SCREW VALVE	1 EA.
8	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
9	TAPE POLYKEN 900 LB 2" X 100 FT.	1 EA.
10	PIPE STEEL X-TRU COATED 154 PE 2"	10 FT.

TITLE: STANDARD 2" PE GAS SERVICE OFF 4" PE 3408

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: GSV2PE-4PE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD 1/2" SERVICE LINE OFF STEEL
(GSV1/2-ST)

NOTE:
INSTALL #12 TW TRACER WIRE 6" ABOVE PIPE



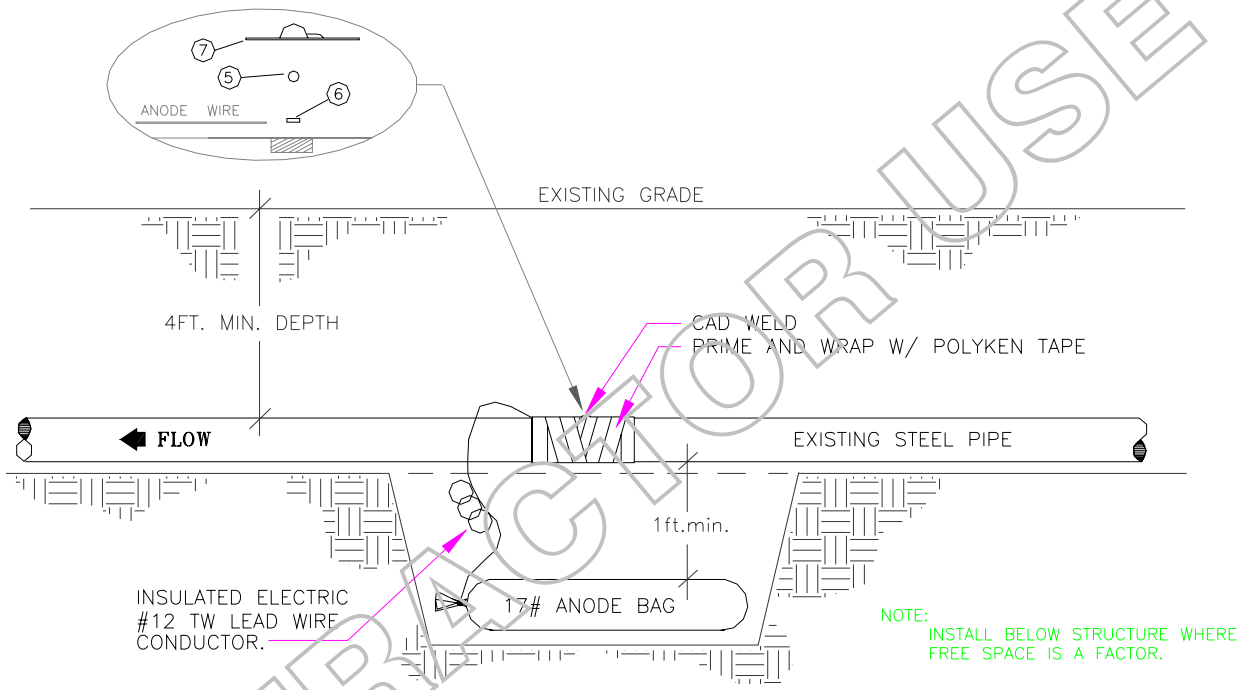
ASSEMBLY:	ASSEMBLY DESCRIPTION:
GSV1/2-ST	STANDARD 1/2" SERVICE LINE OFF STEEL

ITEM	PART DESCRIPTION	PART UNITS
1	PERMASERT COUPLING 1/2" CTS	1 EA.
2	STOP, GAS BLK AYD #106876 INSULATED 3/4"	1 EA.
3	RISER ANODELESS 3/4" MPT - 1/2" CTS	1 EA.
4	PLUG BLK MALLEABLE 3/4"	1 EA.
5	TAPE POLYKEN 900 LB 2" X 1000'	1 EA.
6	ANODE MAGNEIUM ALLOY 17 LB.	1 EA.
7	TEE WELD SERVICE 3/4" WELD X 1/2" CTS	1 EA.

STANDARD 1/2" SERVICE LINE OFF STEEL

Drawn By: QSMITH
Date: NLANO DECEMBER 20, 2005
Appr. Engrg: -
Date: -
Appr. Mtr Shop: -
Date: -
Scale: NTS
Acad File Name: GSV1/2-ST.DWG
Drawing No. 1 OF 1
Work Order No. GAS

TYPICAL SACRIFICIAL ANODE INSTALLATION



SIDE VIEW

ASSEMBLY: A1

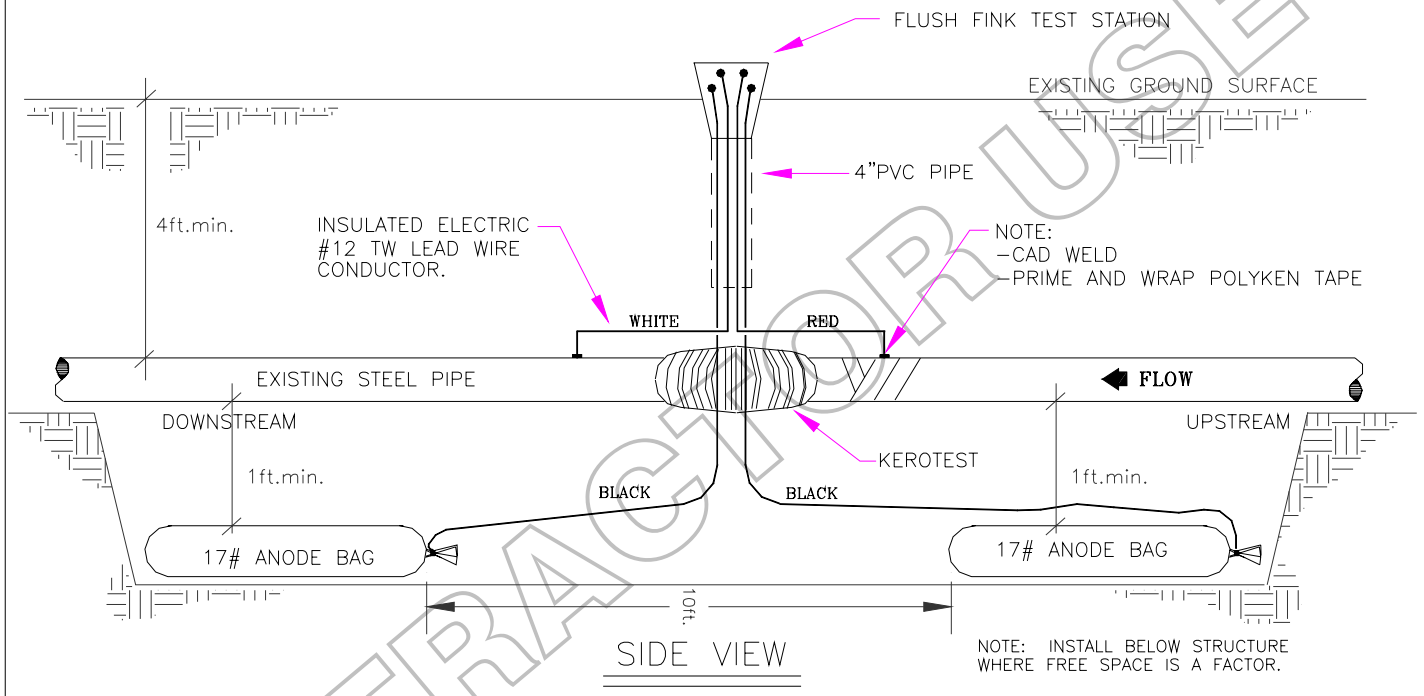
ASSEMBLY DESCRIPTION: TYPICAL SACRIFICIAL ANODE INSTALLATION

ITEM	PART DESCRIPTION	PART UNITS
1	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
2	TAPE POLYKEN #900-12 2" X 100'	1 EA.
3	TAPE 3/4" X 66 ELECTRICAL 3M 33+	1 EA.
4	PRIMER PIPELINE POLYKEN #1027	1 EA.
5	CAD WELD CARTRIDGES WITH DISC.	1 EA.
6	CRIMPIT COMPRESSION 1/0 - #12	1 EA.
5	HANDICAP 4" X 4"	1 EA.

TITLE: TYPICAL SACRIFICIAL ANODE INSTALLATION

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: A1.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANADARD KEROTEST INSTALLATION
(Distribution/Service)



ASSEMBLY: KTI

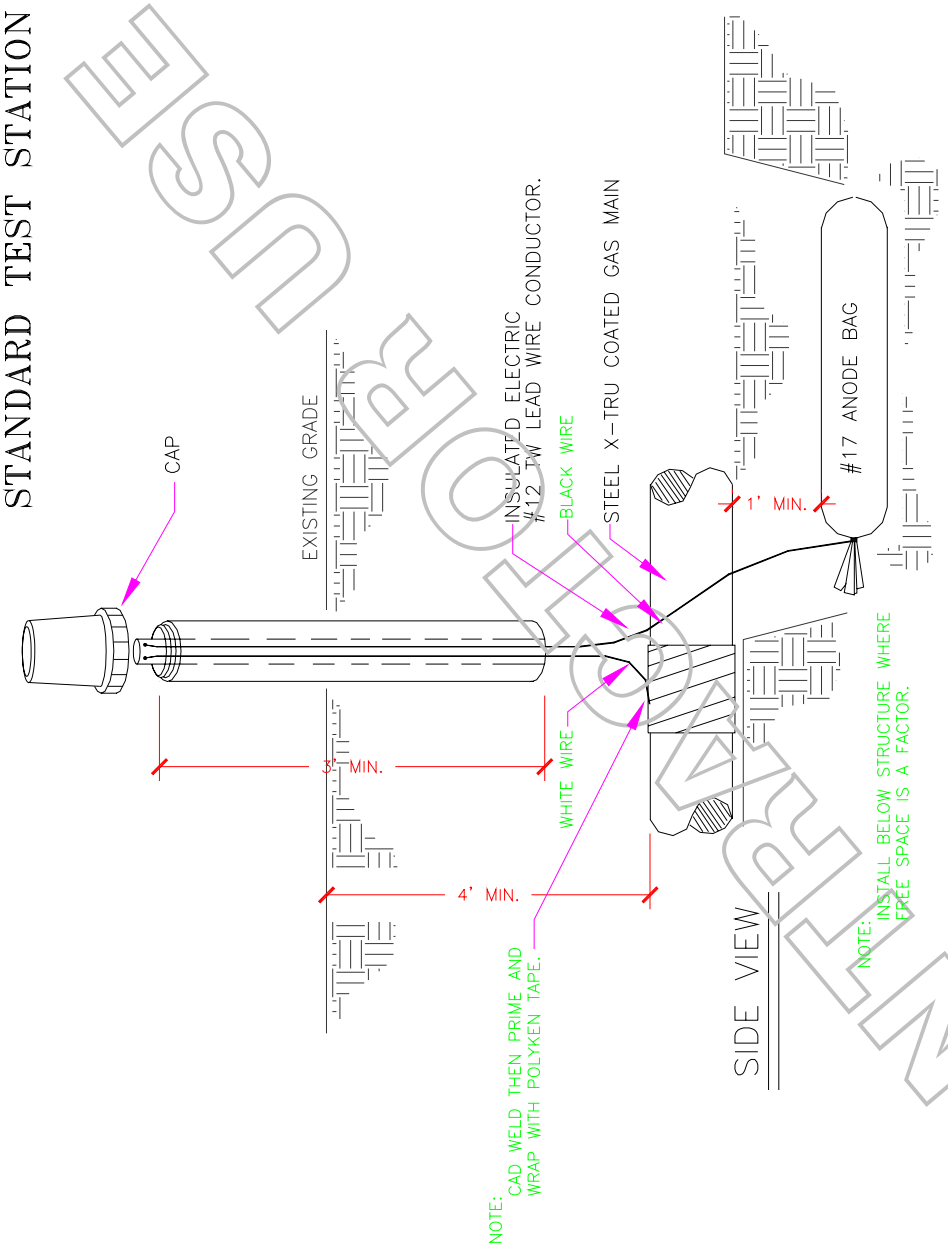
ASSEMBLY DESCRIPTION: STANDARD KEROTEST INSTALLATION

ITEM	PART DESCRIPTION	PART UNITS
1	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
2	TAPE POLYKEN #900-12 2" X 100'	1 EA.
4	TAPE 3/4" X 66 ELECTRICAL 3M 33+	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE: STANDARD KEROTEST INSTALLATION

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: KT1.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD TEST STATION



ASSEMBLY: TS

ASSEMBLY DESCRIPTION: STANDARD TEST STATION

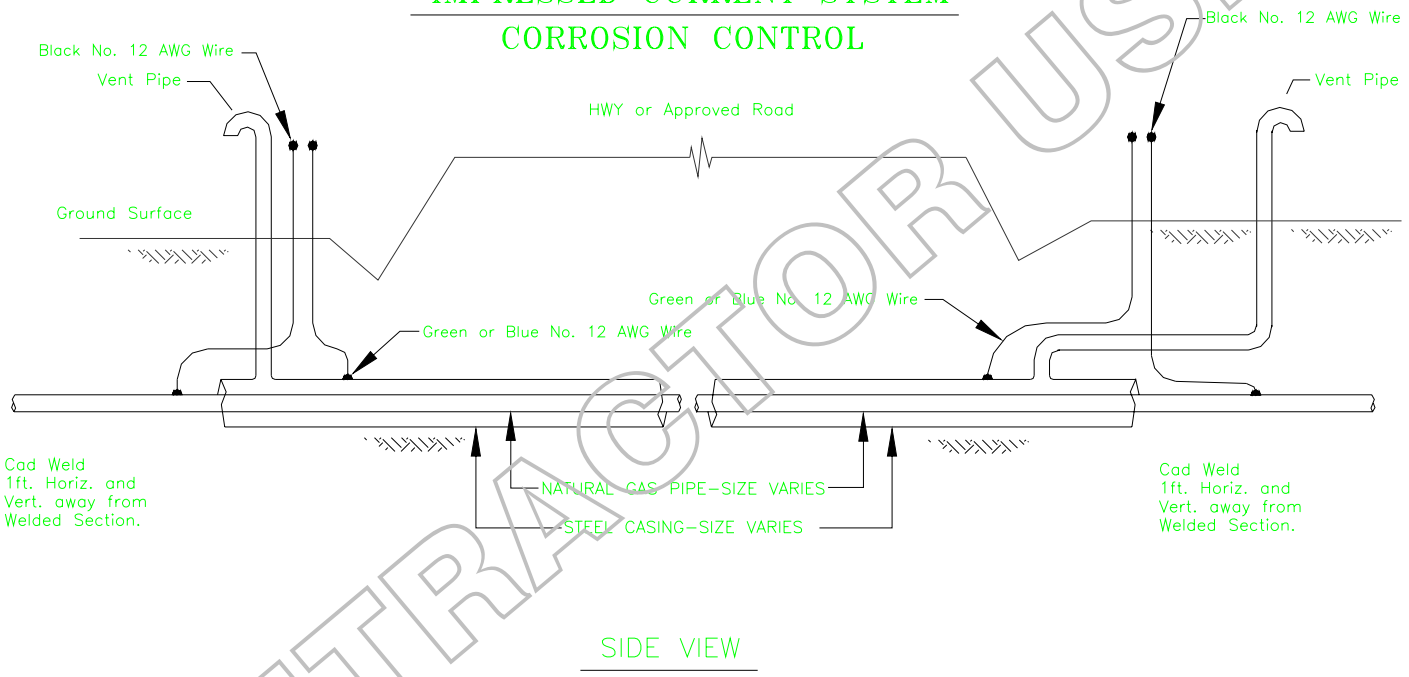
ITEM	PART DESCRIPTION	PART UNITS
1	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
2	TAPE POLYKEN #900-12 2" X 100'	1 EA.
4	TAPE 3/4" X 66 ELECTRICAL 3M 33+	1 EA.
5	PRIMER PIPELINE POLYKEN #1027	1 EA.
6	WIRE #12 THHN SOLID BLUE	1 EA.

TITLE: STANDARD TEST STATION

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 28, 2005	Date: –	Date: –	Acad File Name: TS.DWG		Work Order No. GAS

TYPICAL GAS LINE CASING X-ING TEST STATION
(HIGH PRESSURE LINE)

IMPRESSED CURRENT SYSTEM
CORROSION CONTROL



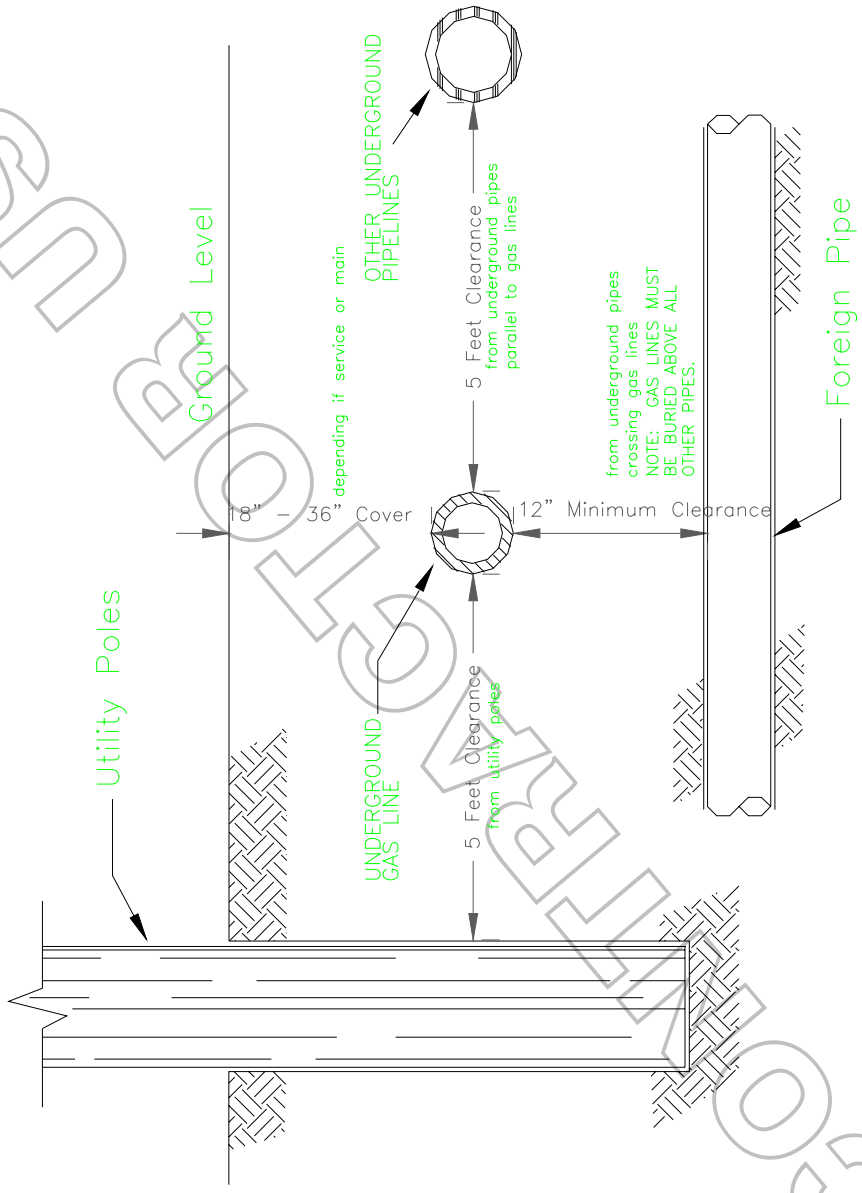
SIDE VIEW

ASSEMBLY:	ASSEMBLY DESCRIPTION: TYPICAL GAS LINE CASING X-ING TEST STATION

ITEM	PART DESCRIPTION	PART UNITS
1	WIRE #12 THHN SOLID BLUE COPPER	1 EA.
2	WIRE #12 THHN SOLID BLACK COPPER	2 EA.
4	TAPE 3/4" X 66 ELECTRICAL 3M 33+	1 FT.
5	TAPE POLYKEN 900 LB 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE: TYPICAL GAS LINE CASING X-ING TEST STATION

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: X-ING.DWG
Drawing No. 1 OF 1
Work Order No. GAS



TITLE:

VERTICAL AND HORIZONTAL CLEARANCE OF PIPE

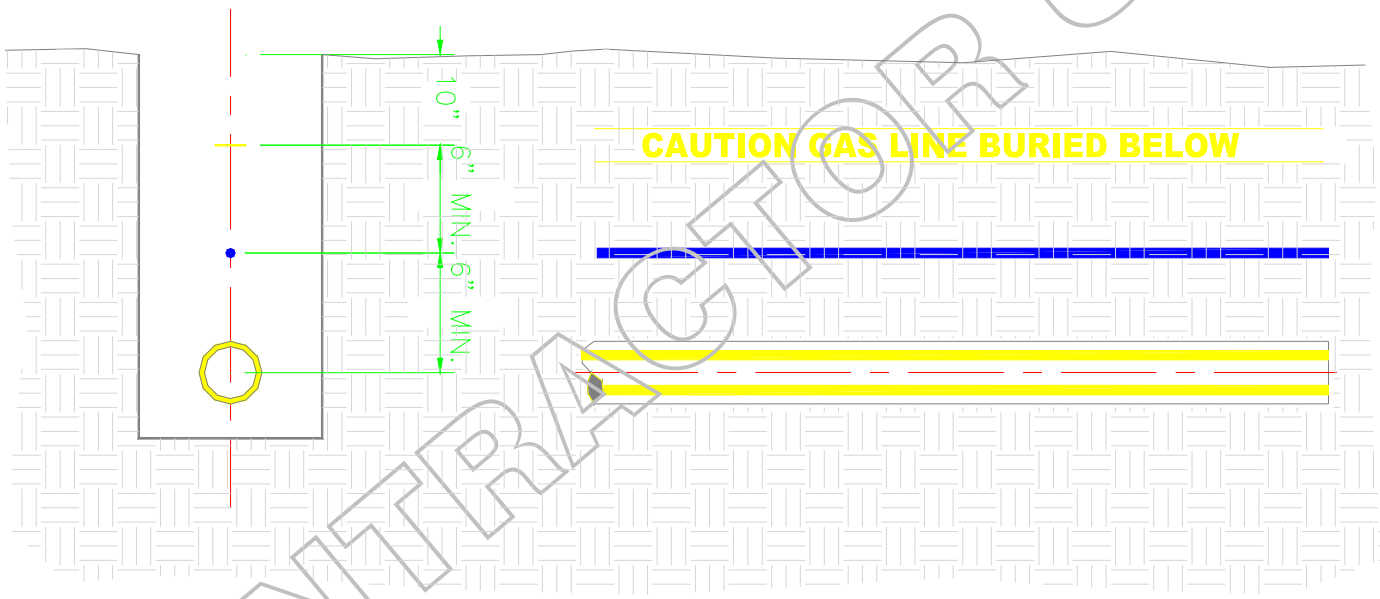
Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLANO NOVEMBER 8, 2005	Date: –	Date: –	Acad File Name: CLEARANCE.DWG		Work Order No. GAS

TITLE:
DEPTH OF PIPES

Drawn By: NLANO	Appr. Engrg: NTS	Appr. Mtr Shop: –	Scale: –	Drawing No. GAS
Date: NLANO NOVEMBER 8, 2005	Date: GAS LINE.DWG	Date: –	Acad File Name: –	Work Order No. 1 OF 1

DEPTH OF THE PIPES

NOTE:
- ADD EXTRA FOOTAGE OF #12 TRACER WIRE
- INSTALL #12 TRACER 6" MIN. ABOVE PIPE
- INSTALL WARNING TAPE 10" BELOW FINISH GRADE
- SERVICE LINES ARE TO BE BURIED 18" FROM GRADE



SIDE VIEW–1 SIDE VIEW–2

ASSEMBLY: GAS LINE

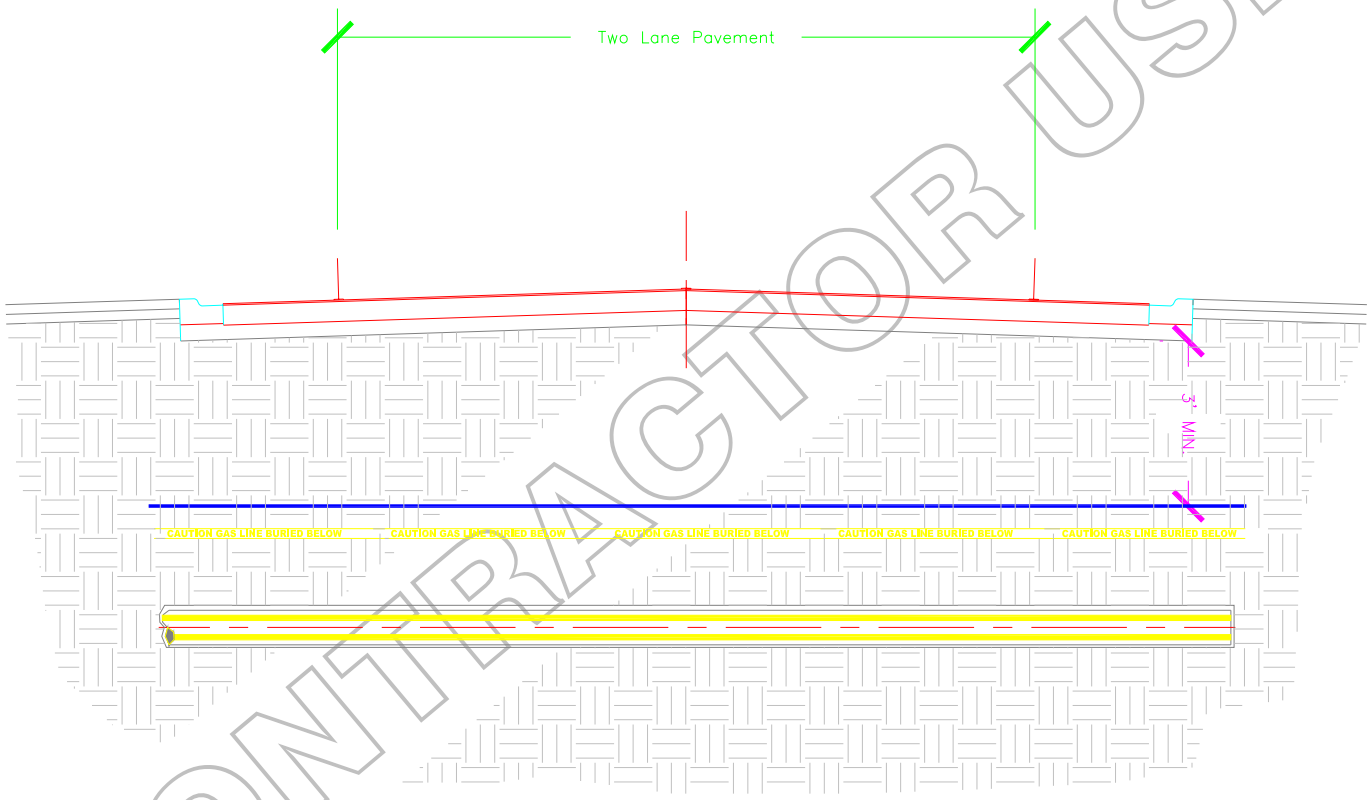
ASSEMBLY DESCRIPTION: DEPTH OF THE PIPE

PART DESCRIPTION	PART UNITS
TAPE WARNING – GAS LINE 3" X 1000FT.	1 EA.
WIRE #12 THHN SOLID BLUE COPPER	DESIRED FT.
PIPE 1–4" IPS YELLOWSTRIPE PE–3408 SDR–11	DESIRED FT.

TITLE:
STREET CROSSING

Drawn By: NLANO	Appr. Engrg: NTS
Date: NLANO NOVEMBER 8, 2005	Date: ROAD CROSSING
–	Appr. Mtr Shop: –
Date: –	Scale: –
Acad File Name: –	
Work Order No. 1 OF 1	Drawing No. GAS

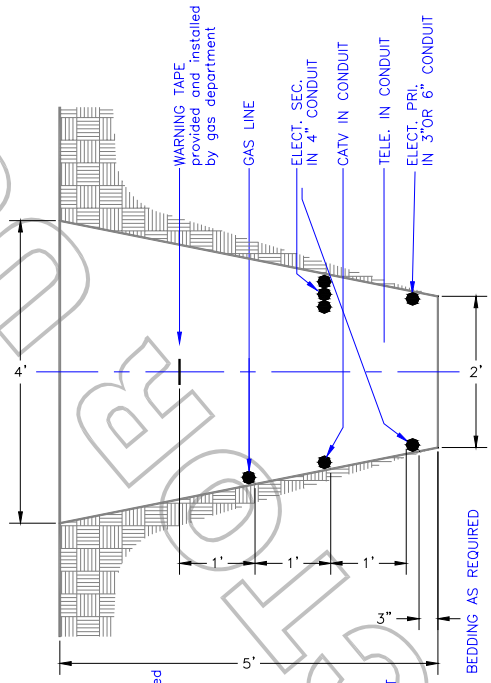
STREET CROSSING

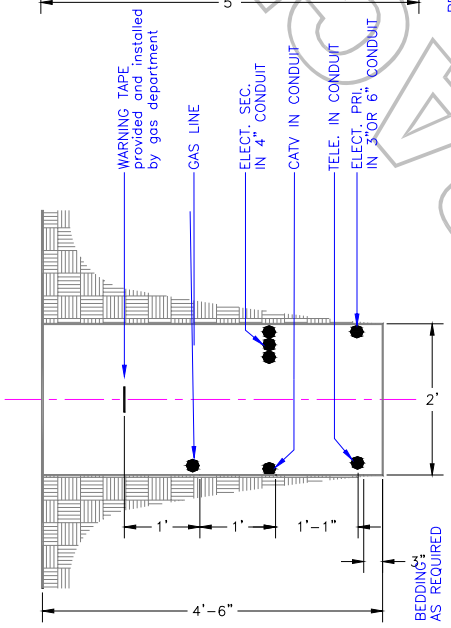


ASSEMBLY: STREET

ASSEMBLY DESCRIPTION: STREET CROSSING

PART DESCRIPTION	PART UNITS
TAPE WARNING – GAS LINE 3" X 1000FT.	1 EA.
WIRE #12 THHN SOLID BLUE COPPER	DESIRED FT.
PIPE 1–4" IPS YELLOWSTRIPE PE–3408 SDR–11	DESIRED FT.

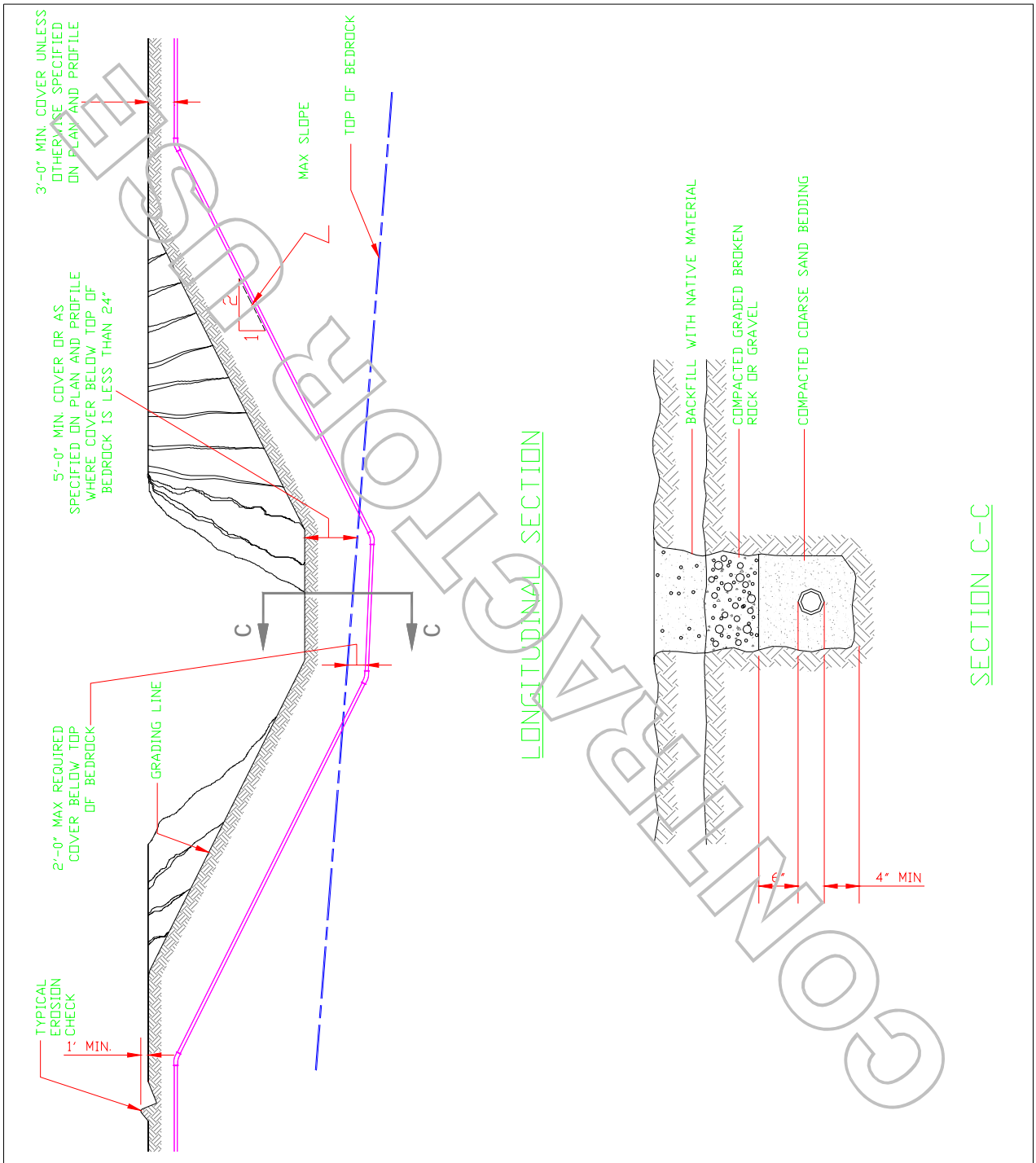




JOINT USE UTILITY TRENCH

TITLE:
JOINT USE UTILITY TRENCH

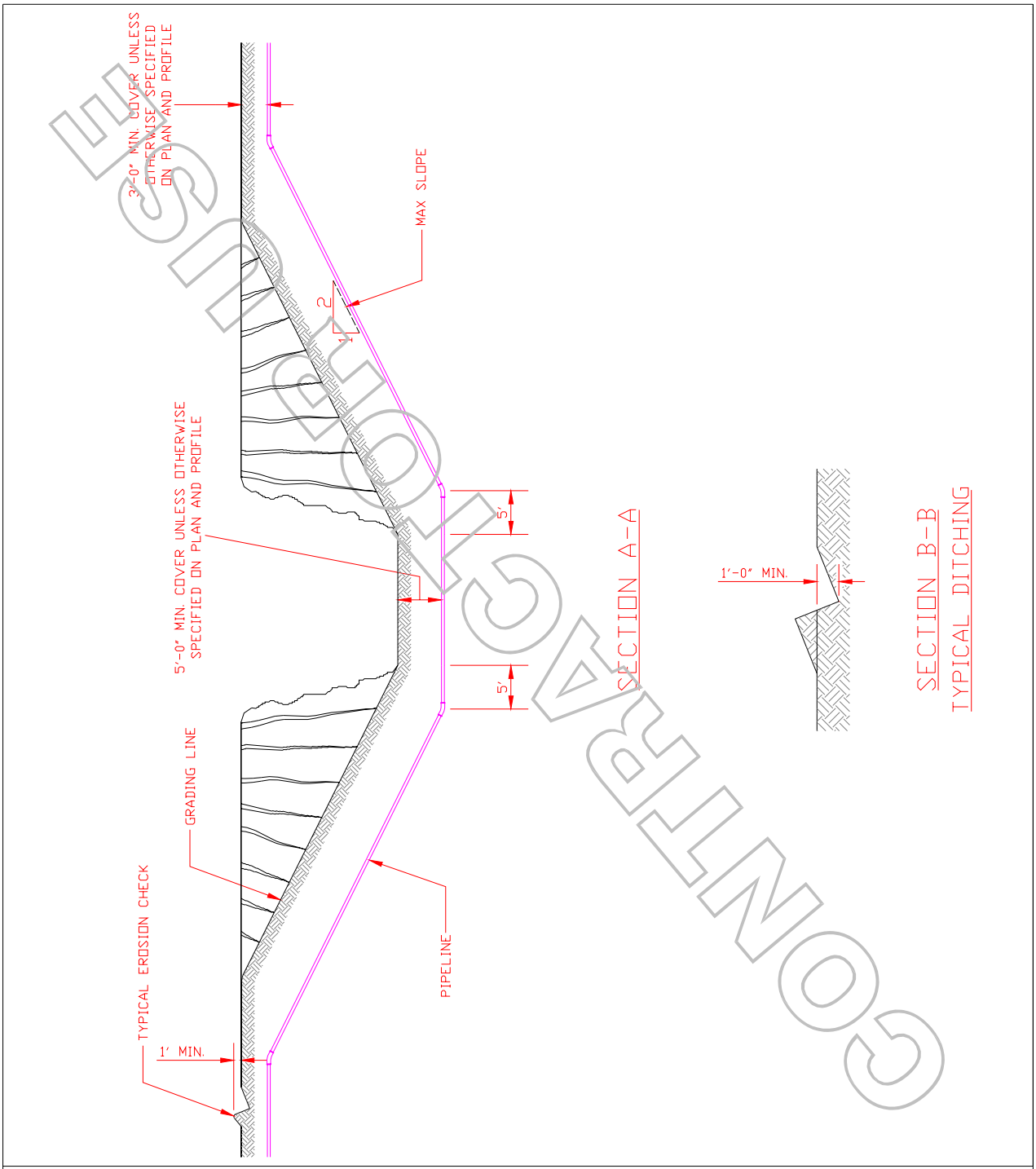
Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLAND DECEMBER 2, 2005	Date: –	Date: –	Acad File Name: GS-40-TRENCH		Work Order No. GAS



TITLE:

WASH CROSSING – BEDROCK

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLAND DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: W-CROSSING.DWG		Work Order No. GAS

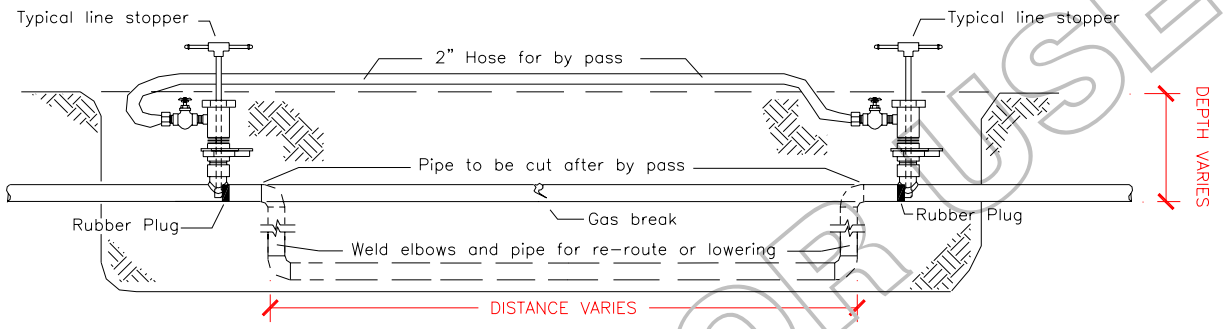


TITLE:

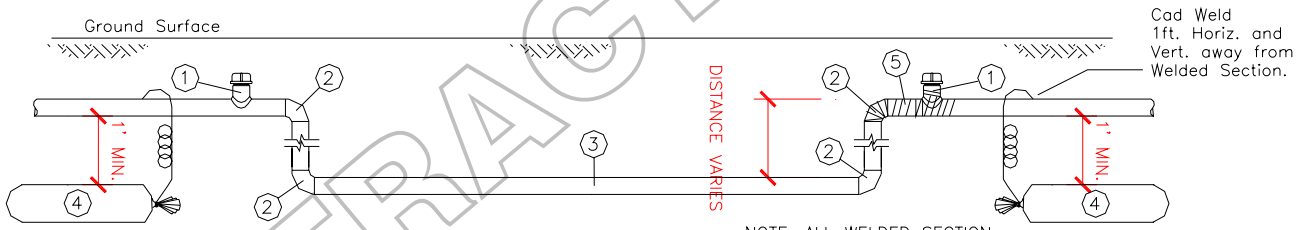
WASH CROSSING – TYPICAL

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: NTS		Drawing No. 1 OF 1
Date: NLAND DECEMBER 6, 2005	Date: –	Date: –	Acad File Name: W-CROSSING.DWG		Work Order No. GAS

TYPICAL GAS REPAIR, RE-ROUTE OR LOWERING LINE
(FOR LOW PRESSURE GAS LINE)



SIDE VIEW-1



SIDE VIEW-2

NOTE: ALL WELDED SECTION OF ELBOW OR JOINT WILL BE RE-PRIMED AND WRAP WITH POLYKEN TAPE.

ASSEMBLY:

ASSEMBLY DESCRIPTION:
TYPICAL GAS REPAIR, RE-ROUTE OR LOWERING LINE

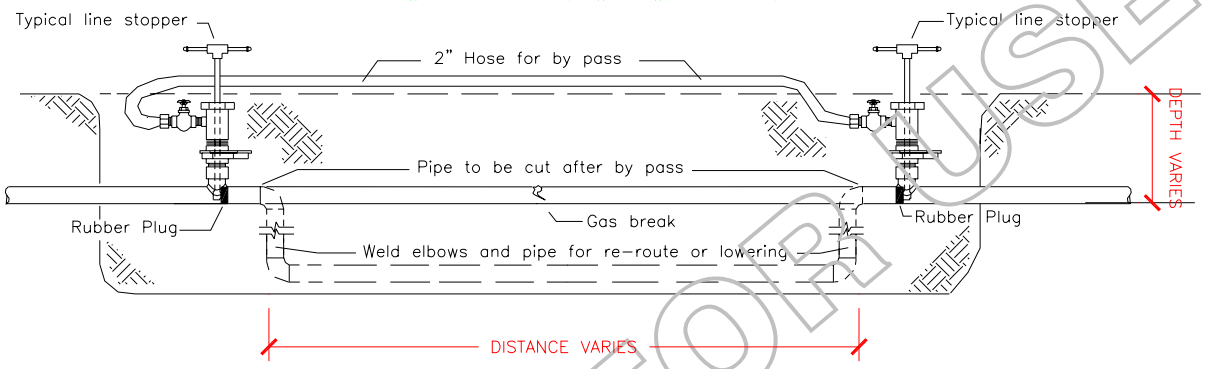
ITEM	PART DESCRIPTION	PART UNITS
1	2" WELD FITTING SHORT STOP	1 EA.
2	2" STD WELDED 90 ELBOW	1 EA.
3	PIPE STEEL X-COATED	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
5	TAPE POLYKEN 900 LB 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE:
TYPICAL GAS REPAIR, RE-ROUTE OR LOWERING LINE

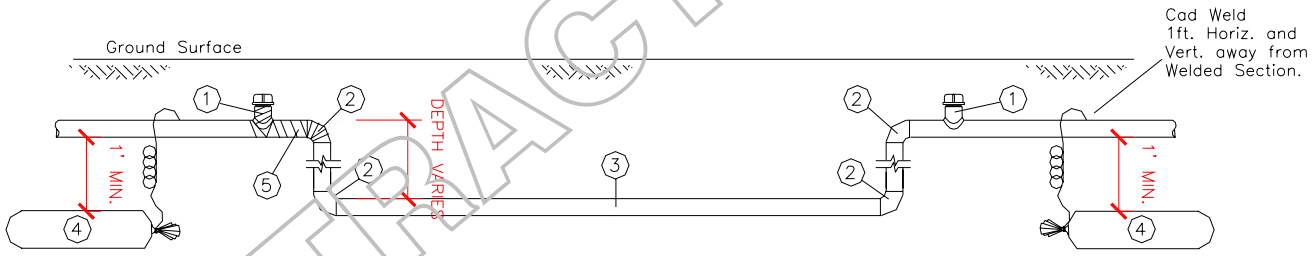
Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: RE-ROUTE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

TYPICAL GAS REPAIR, RE-ROUTE OR LOWERING LINE (FOR HIGH PRESSURE GAS LINE)

NOTE:
ALL WELDED SECTION OF ELBOW OR JOINT
WILL BE PRIME AND WRAP WITH POLYKEN TAPE.



SIDE VIEW-1



SIDE VIEW-2

ASSEMBLY:

ASSEMBLY DESCRIPTION:
TYPICAL GAS REPAIR, RE-ROUTE OR LOWERING LINE

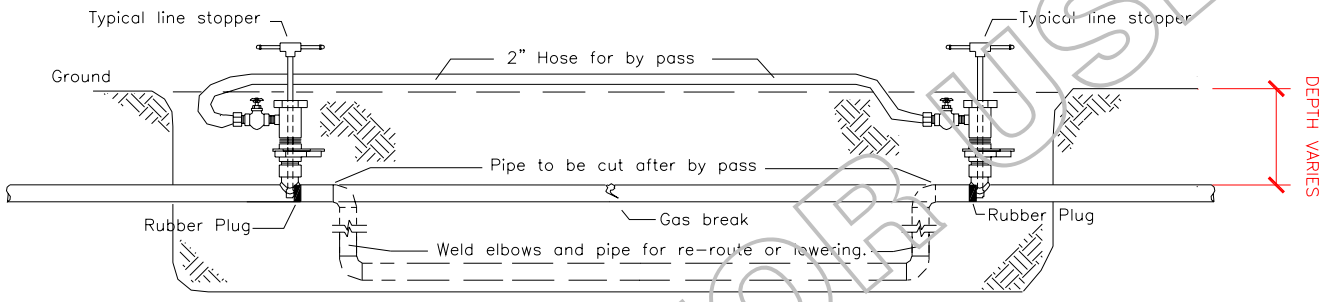
ITEM	PART DESCRIPTION	PART UNITS
1	2" WELD FITTING SHORT STOP	1 EA.
2	2" STD WELDED 90 ELBOW	1 EA.
3	PIPE STEEL X-COATED	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
5	TAPE POLYKEN 900 LB 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE:
TYPICAL GAS REPAIR, RE-ROUTE OR LOWERING LINE

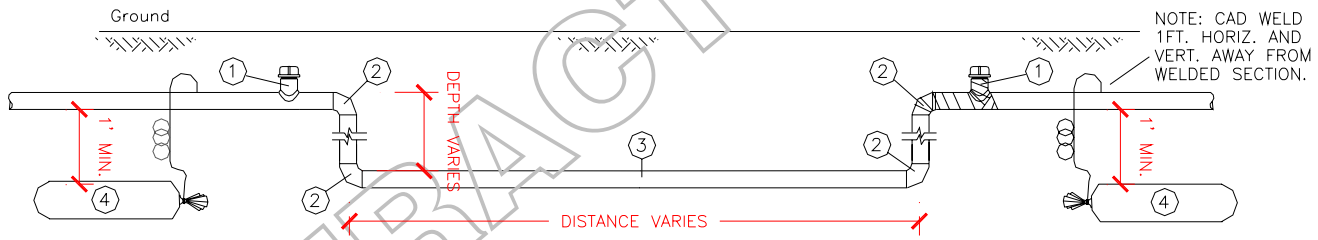
Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: RE-ROUTE.DWG
Drawing No. 1 OF 1
Work Order No. GAS

TYPICAL 4" GAS REPAIR, RE-ROUTE OR LOWERING LINE (FOR LOW PRESSURE DISTRIBUTION)

NOTE:
ALL WELDED SECTION OF JOINT WILL BE PRIMED AND WRAP WITH POLYKEN TAPE.



SIDE VIEW-1



SIDE VIEW-2

ASSEMBLY:

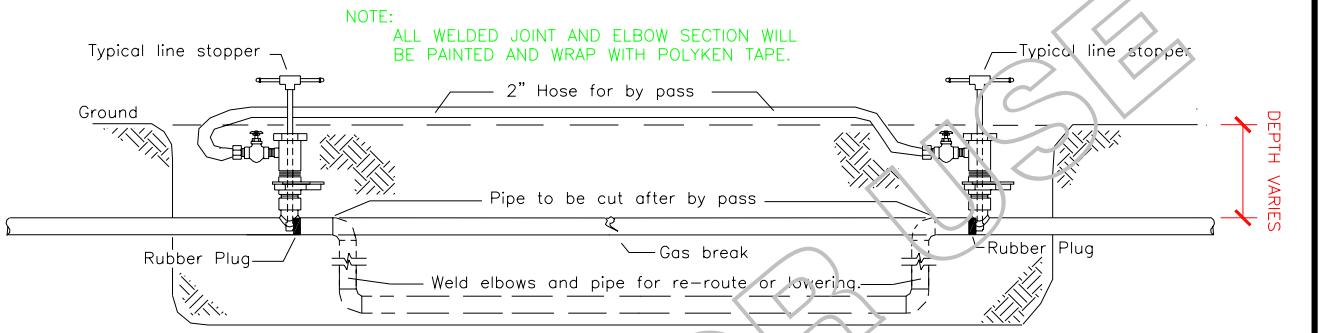
ASSEMBLY DESCRIPTION:
TYPICAL RE-ROUTE ON 4' STEEL MAIN (LOW PRESSURE)

ITEM	PART DESCRIPTION	PART UNITS
1	4" WELD FITTING SHORT STOP	1 EA.
2	4" STD WELDED 90 ELBOW	1 EA.
3	4" PIPE STEEL X-COATED	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
5	TAPE POLYKEN 900 LB 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

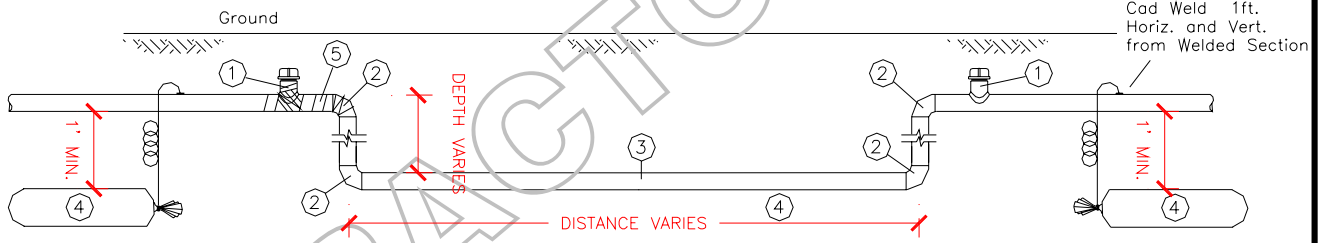
TITLE:
TYPICAL 4" GAS REPAIR, RE-ROUTE OR LOWERING LINE

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: RE-ROUTE-4.DWG
Drawing No. 1 OF 1
Work Order No. GAS

TYPICAL 4" GAS REPAIR, RE-ROUTE OR LOWERING LINE (FOR HIGH PRESSURE DISTRIBUTION)



SIDE VIEW-1



SIDE VIEW-2

ASSEMBLY:

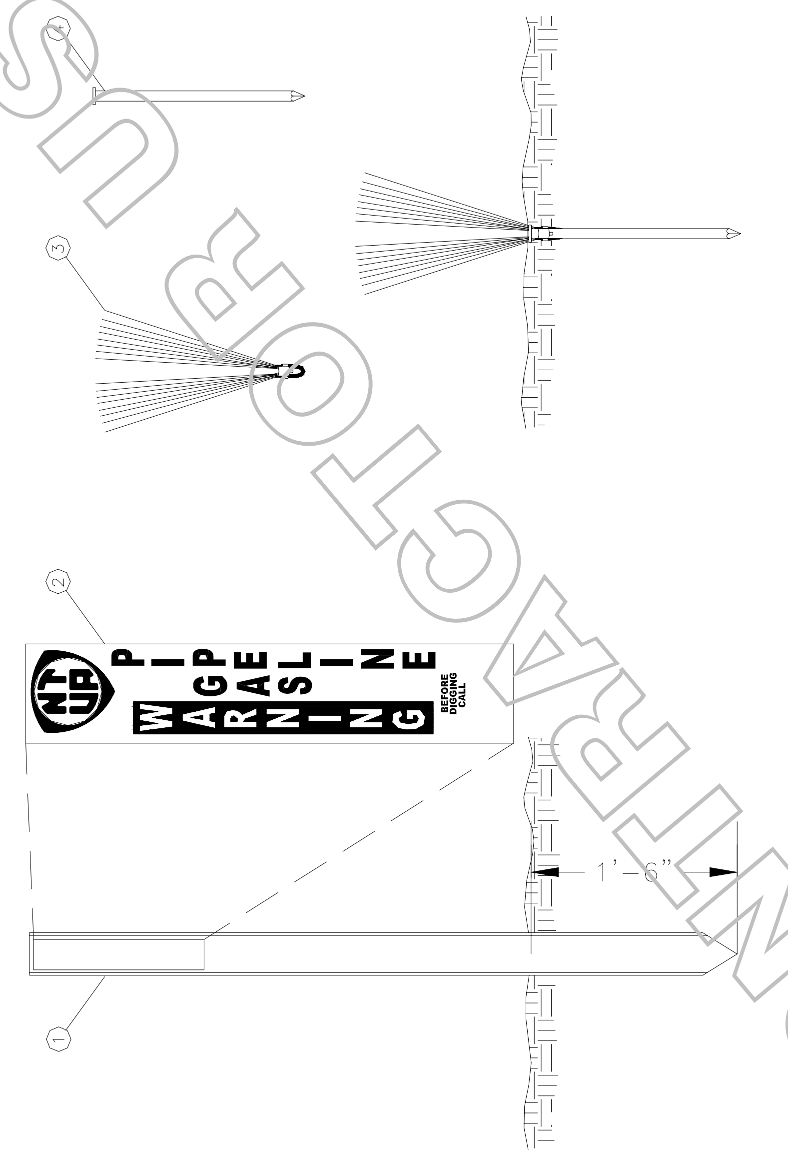
ASSEMBLY DESCRIPTION:
TYPICAL RE-ROUTE ON 4' STEEL MAIN (LOW PRESSURE)

ITEM	PART DESCRIPTION	PART UNITS
1	4" WELD FITTING SHORT STOP	1 EA.
2	4" STD WELDED 90 ELBOW	1 EA.
3	4" PIPE STEEL X-COATED	1 EA.
4	ANODE MAGNESIUM ALLOY 17 LB.	1 EA.
5	TAPE POLYKEN 900 LB 2" X 100' 2" SIZE	1 EA.
6	PRIMER PIPELINE POLYKEN #1027	1 EA.

TITLE:
TYPICAL 4" GAS REPAIR, RE-ROUTE OR LOWERING LINE

Drawn By: QSMITH
Date: NLANO DECEMBER 28, 2005
Appr. Engrg: –
Date: –
Appr. Mtr Shop: –
Date: –
Scale: NTS
Acad File Name: RE-ROUTE-4.DWG
Drawing No. 1 OF 1
Work Order No. GAS

STANDARD GAS LINE MARKERS



ASSEMBLY: MARKERS

ASSEMBLY DESCRIPTION: GAS LINE MARKERS

ITEM	PART DESCRIPTION	PART UNITS
1	CARSONITE SIGN POST 62" YELLOW	1 EA.
2	LAMINATED GAS PIPELINE DECALS YELLOW	1 EA.
3	LINE MARKERS, WHISKERS YELLOW	1 EA.
4	6" NAILS FOR WHISKERS 50 LB BOX	1 EA.

TITLE:

GAS LINE MARKERS

Drawn By: QSMITH	Appr. Engrg: –	Appr. Mtr Shop: –	Scale: MTS		Drawing No. 1 OF 1
Date: NLANO DECEMBER 2, 2005	Date: –	Date: –	Acad File Name: MARKERS.DWG		Work Order No. –

DIVISION SEVEN – MATERIAL AND PIPE COMPONENTS

7.1 GENERAL

Whenever possible, manufacturers' data specific to the vintage and/or type will be maintained for use in planning leakage surveys, replacement and repairs. Minimum requirements for the selection and qualification of pipe and components for use in a pipeline will be stated in the following subsections.

Materials for pipe and components must be:

A. Able to maintain the structural integrity of the pipeline under temperature and other environmental conditions that we may anticipate;

B. Chemically compatible with any gas that NTUA distributes and with any other material in the pipeline with which they are in contact; and

C. Qualified according to the applicable requirements in 49 CFR Part 192.51.

7.2 STEEL PIPE

Criteria for use of steel pipe are determined by both its use (operating pressure) and its age, according to provisions of this subsection and applicable regulations.

i. New steel pipe is qualified for use if:

1. It was manufactured according to a listed specification;
2. It meets the requirements of 49 CFR 192, Appendix B, Paragraph II or, if it were manufactured before November 12, 1970, it meets the requirements of 49 CFR 192, Appendix B, Paragraph II or III;
3. It is used according to subparagraphs "c" or "d" of this subsection.

B. Used steel pipe is qualified for use if:

1. It was manufactured according to a listed specification and meets the requirements of 49 CFR 192, Appendix B, Paragraph II(C);
2. It Meets the requirements of 49 CFR 192, Appendix B, Paragraph II or, if it were manufactured before November 12, 1970, it meets the requirements of 49 CFR 192, Appendix B, Paragraph II or III;

3. It has been used in an existing line of the same or higher pressure and meets the requirements of 49 CFR 192, Appendix B, Paragraph II(C); or
4. It is used according to subparagraph "c" of this subsection.

C. New or used steel pipe may be used at a pressure resulting in a hoop stress of less than 6,000 psig where no close coiling or close bending is to be done, if visual examination suggests that the pipe is in good condition, that is free of split seams and other defects that would cause leakage. If it is to be welded, steel pipe that has not been manufactured to a listed specification must also pass the weldability tests prescribed in 49 CFR 192, Appendix B, Paragraph II(B).

D. Welding material must be chosen according to the compatibility requirements of material to be joined and location to be welded [1].

E. Steel pipe that has not been previously used may be used as replacement pipe in a segment of pipeline if it has been manufactured before November 12, 1970 according to the same specification as the pipe used in constructing that segment of pipeline.

F. New steel pipe that has been cold expanded must comply with the mandatory provisions of API Specification 5L.

7.3 PLASTIC PIPE

Criteria for use of plastic pipe are determined by both its use (operating pressure) and its age, according to the provisions of this subsection and applicable regulations.

A. NTUA qualifies new plastic pipe for use under this part if:

1. It is manufactured according to a listed specification; and
2. It is resistant to chemicals with which contact may be anticipated.

B. NTUA never qualifies used plastic pipe for use under this part.

[1] Refer to NTUA's qualified welding standards

C. For the purpose of this subparagraphs "A(1)" of this subsection, where pipe of a diameter included in a listed specification is impractical to use, pipe of a diameter between the sizes included in a listed specification may be used if it:

1. Meets the strength and design criteria required of pipe included in that listed specification; and
2. Is manufactured from plastic components that meet the criteria for material required of pipe included in that listed specification.

D. An electrical number twelve conductor must be installed with direct burial plastic pipe, 6" above the pipe, to simplify locating with and an electronic detector unless other means are available for locating the pipe underground. This electronic conductor must never touch the pipe. This conductor must be a coated metal wire or coated tape, and should be corrosion-resistant. Leads into curb boxes, valve boxes, and on service risers can be used for direct connection of locating equipment [2].

E. The Office of Pipeline Safety (OPS) has alerted all operators of gas pipeline facilities that wrapping an electrically conductive tracer wire around plastic pipe has resulted in conducting lightning through the wire, thereby damaging and causing the plastic pipe to leak. Accordingly, each gas pipeline operator using a conductive wire as a means to comply with Section 192.321 should lay the wire along the pipe with 6" of separation, rather than wrap the wire around the plastic pipe.

7.4 MARKING OF MATERIALS

Materials shall be marked in accordance with the provisions of this subsection and applicable regulations.

A. Except as provided in subparagraph "C" of this subsection, each valve, fitting, length of pipe, and other component must be marked as prescribed in the specification or standard to which it was manufactured or must be marked to indicate size, material, manufacturer, pressure rating, and temperature ratting, and as appropriate, type, grade, and model.

B. Surfaces of pipe and components must never be field stamped.

C. Subparagraph "A" of this subsection does not apply to items

[2] Reference 40 CFR 192.321

manufactured before November 12, 1970, that meet all the following:

1. The item is identifiable as to type, manufacturer, and model; and
2. Specifications or standards giving pressure, temperature and other appropriate criteria for the use of items are readily available.

7.5 QUALIFYING COMPONENTS

Notwithstanding any standard incorporated by reference in 49 CFR 192, Appendix A, a metallic component manufactured in accordance with other editions of those standards is qualified for use under that part if:

A. It can be shown through visual inspection of the cleaned component that no defect exists which might impair the strength or tightness of the component; and

B. The edition of the standard under which the component was manufactured has equal or more stringent requirements for pressure testing, materials, and pressure and temperature ratings than the edition of that standard currently listed in Appendix A.

7.6 VALVES

The following criteria shall apply to valves.

1. Except for plastic valves, each valve must meet the minimum requirements, or equivalent, of API 6d. A valve may not be used under operating conditions that exceed the required pressure temperature ratings.

B. Each plastic valve must comply with the following:

   1. The valve must have a maximum service pressure rating for temperatures that equal or exceed the maximum service temperature.
   2. The valve must be tested as part of the manufacturing as follows:

C. With the valve in the fully open position, the shell must be tested with no leakage to a pressure at least 1.5 times the maximum service rating.

D. After the shell test, the seat must be tested to a pressure no less than 1.5 times the maximum service pressure rating. Except for swing check valves, test pressure during the seat test must be applied successively on each side of the closed valve with the opposite side open. No visible leakage is permitted.

E. After the last pressure test is completed, the valve must be operated through its full travel to demonstrate freedom from interference.

C. Each valve must be able to meet the anticipated operating conditions.

D. No valve having shell components made of ductile iron may be used at pressures exceeding 80% of the pressure ratings for comparable steel valves at their listed temperature. However, a valve having shell components made of ductile iron may be used at pressures up to 80% of the pressure ratings for comparable steel valves at their listed temperature, if:

1. The temperature adjusted service pressure does not exceed 1,000 psig; and
2. Welding is not used on any ductile iron component in the fabrication of the valve shells or their assembly.

7.7 FLANGES AND ACCESSORIES

The following criteria apply to flanges and flange accessories.

A. Each flange or flange accessory (other than cast iron) must meet the minimum requirements of ANSI B16.5 MSS SP-44, or the equivalent.

B. Each flange assembly must be able to withstand the maximum pressure at witch the pipeline is operated at to maintain its physical and chemical properties at any temperature to which it is anticipated that it might be subjected in service.

B. Each flange on a flange joint in cast iron pipe must conform in dimensions, drilling, face and gasket design to ANSI B16.1 and be cast integrally with the pipe, valve, or fitting.

7.8 STANDARD FITTINGS

The following criteria apply to standard fittings:

A. The minimum metal thickness of threaded fittings may not be less than

specified for the pressures and temperatures in the applicable standards referenced in this part, or their equivalent [3].

B. Each steel butt weld fitting must have pressure and temperature ratings based on stresses for pipe of the same or equivalent material. The actual bursting strength of the fitting must at least equal the computer bursting strength of pipe of the designated material and wall thickness, as determined by a prototype that was tested to at least the pressure required for the pipeline to which it is being added.

7.9 TAPPING TEES

The following criteria apply to tapping.

A. Each mechanical fitting used to make hot tap must be designed for at least the operating pressure of the pipeline.

B. Each tap made on a pipeline under pressure must be performed by a qualified individual making the hot tap.

7.10 TRANSPORTING OF PIPES

The transportation is performed in accordance with API RP 5L1.

[3] Note it is NTUA's policy never to use threaded fittings below groun

DIVISION TEN – WELDING

10.1 GENERAL

This division prescribes the NTUA's minimum requirements for welding steel and plastic materials pipeline components.

This division does not apply to welding that occurs during the manufacture of steel pipe and plastic pipeline components.

10.2 WELDING

All welding will be performed by a welder in accordance with welding procedures and deemed qualified by NTUA to produce welds on systems meeting the requirements of this division. The quality of the test welds used to qualify the procedures shall be determined by destructive testing.

10.3 QUALIFYING WELDERS

NTUA will qualify each welder in accordance with the API Standard 1104 and Inspected by NTUA.

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.

Welders must be qualified within every 15 calendar months, but at least once each calendar year.

10.4 LIMITATIONS OF WELDERS

Welders must be qualified within every 15 calendar months, but at least once each calendar year.

10.5 PROTECTION FROM WEATHER

The welding operation must be protected from weather conditions that would impair the quality of the completed weld.

10.6 MITER JOINTS

A miter joint on steel pipe to be operated at a pressure that produces a hoop stress of 30 percent or more of SMYS may not deflect the pipe more than 3 degrees.

A miter joint on steel pipe to be operated at a pressure that produces a hoop stress of less than 30 percent, but more than 10 percent, of SMYS, may not deflect the pipe more than 12 ½ degree and must be a distance equal to one pipe diameter or more away from any other miter joints, as measured from the crotch of each joint.

A miter in a steel pipe to be operated at a pressure that produces a hoop stress of 10 percent or less of SMYS may not deflect the pipe more than 90 degrees.

10.7 PREPERATION WELDING

Before beginning any welding, the welding surfaces must be clean and free of any material that may be detrimental to the weld, and the pipe or component must be aligned to provide the most favorable condition for depositing the root bead is being deposited.

10.8 INSPECTION OF TEST AND WELDS

Visual inspection of welding must be conducted to insure that the weld is performed in accordance with the welding procedures on a pipeline.

The acceptability of a weld that is nondestructive tested or visually inspected is determined according to the standards in API Standard 1104. However, a girth weld is unacceptable under those standards for reason other than a crack, if API 1104 applies to the weld, the acceptability of the weld may be further determined.

10.9 NONDESTRUCTIVE TESTING

Nondestructive testing of welds must be performed by any process, other than trepanning, that will clearly indicate defects that may affect the integrity of that weld.

Nondestructive testing well be in accordance with written procedures and by persons who have been trained and qualified in the established procedures and with the equipment employed in testing.

A randomly selected weld will be tested from the field in class location II and III. The procedure will be established for the proper interpretation of each non-destructive test of a weld to ensure the acceptability of the weld. Records of the nondestructive test will be kept on record of that system for the life of the pipeline.

10.10 REPAIR OR REMOVAL OF DEFECTS

Each weld that is unacceptable by NTUA must be removed pr repaired. Each weld that is repaired must have the defect removed down to sound metal and the segment to be repaired must be preheated if conditions exist which would adversely affect the equality of the weld repair. After the repair, the segment of the weld that was repaired must be inspected to ensure its acceptability.

Any visual of a crack or defect on the recent repair weld must be removed and proceed with a new welded segment.

10.11 WELDING OF PLASTIC PIPE

Joining of plastic pipe must be conducted by butt fusion and or socket fusion, no other type of joining shall be accepted by NTUA.

No plastic pipe should be threaded or miter joint, nor, should they be joined by adhesive, solvent cement, or adhesive.

A butt fusion joint must be joined by a device that holds the heater element square to the ends of the piping, compress the heated ends together, and hold the pipe in proper alignment while the plastic hardens.

No heat shall be applied by open flame or torch.

10.12 QUALIFYING JOINING OF PLASTIC PIPE

NTUA will conduct training in the procedures of joining plastic pipe and a written test that require a passing grade of 90 percent or better, to be able to conduct a practical test. See division Thirteen- Operator Qualification.

10.13 QUALIFYING PERSONS TO MAKE JOINTS

No persons shall make plastic joints unless that person is qualified under the NTUA Qualification Program.

Ach individuals can be qualified every two years for joining plastic pipes. Appropriate training or experience in the use of the procedure and making specimen joint from pipe sections joined according to the procedure that passes the inspection and test set forth.

The specimen will be visually examined during and after assembly or joining and found to have the same appearance as a joint or photographs of a joint that is acceptable.

Three straps longitudinal will be cut from the butt fusion specimen and will be carefully examined and found not to contain voids or discontinuities on the cut surface of the joint area, and not to be deformed by bending, torque, or impact, and if failure occurs, it must be not initiate in the joint area.

If persons does not make any butt fusion within a 12 month period, must be re-qualified within 12 months. Persons making joints within a 6-month period can be re-qualified within 2 years.

10.14 INSPECTION OF PLASTIC PIPE JOINTS

No persons may carry out the inspection of joints in plastic pipes required by NTUA's OQ Program, unless, that person has been qualified by appropriate training or experience in evaluating the acceptability of plastic joining procedures.

NAVAJO TRIBAL UTILITY AUTHORITY

DIVISION FOURTEEN- OPERATOR QUALIFICATION PROGRAM

14.1 GENERAL

This program is designed and established to meet or exceed the requirements set forth by the Department of Transportation (DOT) Code of Federal Regulations (CFR) part 192 Subpart N, 192 805, Qualification of Pipeline Personnel.

14.2 PURPOSE

The purpose of this program is to ensure that all individuals are qualified to operate and maintain natural gas lines and pipeline facilities, to recognize and react appropriately to abnormal operating conditions that may indicate a dangerous situation or a condition exceeding design limits.

14.3 COVERED TASKS CLASSES

This also will insure the individual's ability to perform specific covered task, and must be able to react in conjunction with those covered task.

All tasks are broken up into three categories or classes. These classes are separated based on skill level, technical or schooling requirements, re-qualifying time frame, and evaluator of the task. The classes are class A, B and C.

Class A tasks are tasks that every natural gas operator working for NTUA should or could be able to do. For example, every operator should be able to make a gas leak survey above ground, below ground and in a building. All class A tasks must be re-qualified every two years with and must qualify with in three months after the expiration date. All exams performed for a class A task must pass with a 90 percent or better. NTUA will provide in-house training for these tasks. Evaluators for class A tasks include Foremen, designated NTUA Inspectors, Gas Engineering Technicians/Journeymen or the Gas Engineer. Gas Foremen can be evaluated by the designated NTUA Inspector, Technicians, Journeymen or the Gas Engineer. The designated NTUA Inspector, Technicians, Journeymen and the Gas Engineer can qualify each other as long as the person doing the evaluating is knowledgeable in the field of the covered task.

Class B tasks are semi-specialized tasks. This means that an operator had to attend specialized vocational school prior to applying for qualification under those tasks. For example, welders will need to have a Welding Certificate or can be certified prior to qualifying under NTUA's welding certification standards and must take courses in the Apprenticeship program before becoming a Journeyman. An apprentice can apply for qualification of a class B task if he completes that segment of his apprenticeship program. All class B tasks must re-qualify every year, with the time between qualifications not to exceed fifteen months. All application exams pass with a score of 100%, all oral exams pass at 90% or better. Only a designated NTUA

Inspector or the Gas Engineer can be evaluators of class B tasks. The Inspector and the Gas Engineer can be evaluated by each other as long as the evaluator is knowledgeable in the field of the covered task.

Class C tasks are highly specialized tasks. This means that an operator had to attend specialized technical school prior to applying for qualification under those tasks. For example, Cathodic Protection Technicians have to attend NACE courses in cathodic protection prior to qualifying. Due to the time it takes to take these classes, the time between re-qualifications is five years, with updating qualification needs to take place within 3 months after the expiration date, Cathodic Protection Technicians can re-qualify by maintaining their NACE membership. All exams performed for Class C tasks must pass with 75% or better (industry standard). Only a Manufacturing Specialist or Professional Engineer of that field, like NACE membership means that the Cathodic Protection Technician is qualified to perform Corrosion tasks despite the class of the task.

14.4 QUALIFICATION METHODS

NTUA will use only two methods for qualifying individuals. They are Work Performance History and Performance on the job. Work Performance History will only be used only in the transitional part of the qualification of operators and to evaluate an operators need for re-qualification as a result of an incident. Performance on the job will be the main qualifying method for NTUA. To qualify, the operator must show their ability to perform the task correctly. The Operator must also show their ability to handle abnormal operating conditions dealing with those covered tasks by taking an oral exam during their on the job performance test. The passing grade for exams of different classes is stated in the section above.

14.5 TRANSITIONAL QUALIFICATION

Transitional qualification is a one-time qualifying procedure of employees within NTUA that are working for NTUA when this plan goes into effect. This means a NTUA operator trying to transitional qualify on a covered task must show that they performed that covered task for NTUA prior to the implementation of this plan.

The steps for qualifying a NTUA operator under transitional qualification for a class A task is as follows:

1. Work Performance History Review will be performed on each operator for each covered task the operator is to transitionally qualify on. To qualify records must be produced to show that the operator has successfully completed those tasks in the previous two years. Records include construction records, leak survey reports, leakage maintenance and abandonment reports (LMRs), patrolling reports, leak call reports, etc.
2. If no records can be found or the records are not adequate to show ability to perform the covered task, the operator can be subjected to a Performance on the Job evaluation. Remember the Operator must show his ability to perform the task correctly and must pass the oral exam with at least a 90%.

3. If the operator does not pass the Performance on the Job (POJ) evaluation, the operator can then attend a training course to refresh their skills. The operator must then have another Performance on the Job evaluation conducted within one month from the date of the first evaluation.
4. If the operator does not pass the second POJ evaluation, they are not qualified under that task. The operator must wait twelve months prior to applying for qualification of that covered task as an initial qualifier.

The steps for qualifying a NTUA operator under transitional qualification for a class B task is as follows:

1. The operator must pass a POJ evaluation, no Work History Review will be performed for class B covered tasks except to determine if an operator needs more schooling.
2. If the operator does not pass the POJ evaluation, the operator can retake the POJ evaluation within one month of the first evaluation. Remember the operator must pass a class B application evaluation with a score of 100%, and the oral exam with a scored of 90% or better.
3. If the operator does not pass the second POJ evaluation, they are not qualified under that task. The operator must wait twelve months prior to applying for qualification of that covered task as an initial qualifier.

The steps for qualifying a NTUA operator under transitional qualification for a class C task is as follows:

1. Work Performance History Review will be performed on each operator for each covered task the operator is to transitionally qualify on. The Cathodic Protection Technician will be qualified if he or she maintains their NACE qualification.
2. If no records can be found or the records are not adequate to show ability to perform the covered task, the operator can be subjected to a POJ evaluation. Remember for a class C task, the evaluator must be a Manufacturing Specialist or Professional Engineer of that field, like a NACE Professional Engineer.
3. If the operator does not qualify with a 75% or better, the operator has two months to prepare for a second POJ evaluation. If the operator still does not pass, the operator must return to specialized schooling before returning for evaluation as an initial qualifier.

14.6 INITIAL QUALIFICATION

Initial qualification is to qualify operators who did not meet the requirements of transitional qualification, are new to NTUA since the implementation of this plan.

The steps for qualifying an operator under initial qualification for a class A task is as follows:

1. The operator must take a training course followed by a POJ evaluation. Remember, the operator must pass with a 90% or better.
2. If the operator does not pass, they can retake the course and evaluation within one month of the first evaluation. If they do not pass again, or do not take the course again, then they are not qualified under that task. The operator must wait 12 months prior to applying for qualification again as an initial qualifier.

The steps for qualifying an operator under initial qualification for a class B task is as follows:

1. The operator must show certification from accredited vocational school prior to taking the evaluation. The operator must also show that they have performed the covered task or finished schooling within the past 5 years.
2. If the operator completes step one, they must then complete a POJ evaluation. Remember the operator must pass a class B application evaluation with a score of 100%, and the oral exam with a score of 90% or better.
3. If the operator does not pass the first evaluation, they can retake the evaluation within one month from the first evaluation. If they do not pass again, or do not take the evaluation, the operator is not qualified under that task. The operator must wait 12 months prior to applying for qualification again as an initial qualifier.

The steps for qualifying an operator under initial qualification for a class C task is as follows:

1. The operator must show certification from accredited specialized schooling where a Professional Engineer or a Manufacturing Specialist has evaluated their ability and passed their course with a 75% or better. Cathodic Protection Technicians can show their up to date NACE membership documentation for qualification of that task. All other operators must have attended their respective schooling with the past 5 years.
2. If the operator cannot show the correct certification, that operator is not qualified until they can show certification.

14.7 RE-QUALIFICATION

Re-qualification is for NTUA operators and contractors who want to renew their current NTUA operator qualifications. If an operator or contractor does not re-qualify in the appropriate time frame, they must qualify as an initial qualifier.

The steps for qualifying an operator under re-qualification for a class A task is as follows:

1. The operator must perform a POJ evaluation every 2 years, qualifying within 3 months of their expiration date, to remain qualified. Remember, the operator must pass with a 90% or better for class A.
2. If the operator does not pass the first evaluation, they can retake the POJ evaluation within 1 month from the first evaluation.
3. If the operator does not pass the second evaluation, they must attend a training course and a POJ evaluation within one month from the second evaluation. If the operator does not qualify on the third try, they are not qualified to perform that covered task. The operator must then wait one year before they can qualify as an initial qualifier of that task.

The steps for qualifying an operator under re-qualification for a class B task is as follows:

1. The operator must perform a POJ evaluation every year, with the time between evaluations not to exceed 15 months, to remain qualified. Remember the operator must pass a class B application evaluation with a score of 100%, and the oral exam with a score of 90% or better.
2. If the operator does not pass the first evaluation, they can retake the POJ evaluation within 1 month from the first evaluation. If the operator does not pass the second evaluation, the operator is not qualified to perform that covered task. The operator must wait one year before he can qualify under that task as an initial qualifier.

The steps for qualifying an operator under re-qualification for a class C task is as follows:

1. The operator must perform a POJ evaluation every 5 years, with the qualification occurring within 3 months of the expiration date. Cathodic Protection Technicians can maintain their NACE membership as a method of remaining qualified for any task pertaining to their NACE membership.
2. If the operator does not pass the first POJ evaluation, they have two months to retake the POJ evaluation. Remember class C tasks can only be evaluated by a Manufacturing Specialist or a Professional Engineer of that field, and they must pass their evaluations with a 75 % or better.
3. If the operator does not pass the second POJ evaluation, they are not qualified to perform those tasks. The operator must wait one year before they can qualify as an initial qualifier.

CONTRACTORS

The term "contractor" means any operator that is not employed by NTUA that performs work on an NTUA pipeline facility at the request of NTUA. This includes all workers, performing covered tasks for NTUA, who work for a contracting company or a consulting firm that is working for NTUA. Contractors qualifying for class A tasks can only be qualified by a designated NTUA Inspector, Technician, Journeyman or the Gas Engineer. Contractors qualifying for class B tasks can only be qualified by a designated NTUA Inspector or the Gas Engineer.

The steps for qualifying contractors under initial qualification for a class A task is as follows:

1. The contractor will be subjected to a POJ evaluation. Remember the contractor must show his ability to perform the task correctly and must pass the oral exam with at least a 90%.
2. If the operator does not pass the POJ evaluation, they are not qualified under that task. The operator must wait twelve months prior to applying for qualification of that covered task again.

The steps for qualifying contractors under initial qualification for a class B task is as follows:

1. All contractors must provide documentation of their operator's vocational school certification prior to applying for qualification.
2. The contractor must pass a POJ evaluation; no Work History Review will be performed for class B covered tasks except to determine if a contractor needs more schooling. Remember the contractor must pass a class B application evaluation with a score of 100%, and the oral exam with a score of 90% or better.
3. If the contractor does not pass the POJ evaluation, they are not qualified under that task. The contractor must wait twelve months prior to applying for qualification of that covered task again.

The steps for qualifying contractors under initial qualification for a class C task is as follows:

1. All contractors qualifying under class C task must prove their ability through specialized schooling where they were evaluated by a Manufacturing Specialist or a Professional Engineer in that field. Contractors with current NACE membership are qualified for the covered tasks they are schooled in. Manufacturing Specialists are Professional Engineers are qualified for their field of study.
2. Contractors who do not meet the above requirements are not qualified for those covered tasks. Contractors cannot qualify for a class C task until those requirements are met.

Contractors re-qualify the same as regular NTUA operators, except the contractors must come to NTUA for the re-qualification of their employees (not the other way around).

14.8 NON-QUALIFIED OPERATORS

Non-qualified operators may perform a covered task if DIRECTLY SUPERVISED BY A QUALIFIED OPERATOR. A qualified operator can supervise no more that **TWO** non-

qualified operators performing covered tasks. THE QUALIFIED OPERATOR IS RESPONSIBLE FOR THE WORK OF A COVERED TASK PERFORMED BY A NON-QUALIFIED OPERATOR.

14.9 EVALUATION OF OPERATORS DUE TO AN INCIDENT

If an above mentioned evaluator has reason to believe that a qualified operator's performance of a covered task has contributed to an accident or an abnormal operating condition, the evaluator must subject the operator to a drug & alcohol test and a subsequent POJ evaluation, for the covered task in question, prior to returning to work as a qualified operator of that covered task.

The drug & alcohol testing procedure and time frame are stated in NTUA's Drug Testing Procedures Manual. Evaluation of the individual must take place within one week of the incident. The operator will not be qualified until he takes the POJ. If the operator does not pass the POJ, he will remain unqualified. The operator can take the training course and POJ evaluation within one month of the previous POJ evaluation to regain qualification. If the operator refuses to take the training or does not pass the evaluation he will remain not qualified. The operator must wait 12 months prior to applying for qualification of that task as an initial qualifier.

14.10 FUTURE POLICY CHANGE

If NTUA's policy, operation or maintenance procedures change in a manner that effects NTUA's Operator Qualification program or it's covered tasks, then all gas operators, the change applies to must be notified in writing about the change, and the change must be incorporated into the Operator Qualification program.

14.11 RECORD KEEPING

All records for NTUA's Operator Qualification program must meet the following requirements and contain the following information:

1. All records must have the Operator's Name.
2. All records must have the Operator's Social Security Number and Employee Number.
3. All records must have the name of the qualified covered task the operator is qualified for.
4. Records must include the Method of Evaluation, Justification Records, and Evaluation Results for all current qualifications.
5. Records must include the time frame for each qualification, i.e. the last time the operator qualified for that covered task and the qualification expiration date for that covered task.
6. All records must be retained for at least 5 years.
7. Records must be retained for at least 5 years after the operator has ceased employment with NTUA.
8. The master copy of all records will be maintained at the Gas Engineering Department.

14.12 COVERED TASK LIST

The covered task list comprises of all tasks that NTUA will qualify all operators performing those tasks for NTUA. The list comprises of seven sections, name, task class, and the four-part test and if NTUA is going to qualify the task. Details of the each task, the job class for each task, the four-part test, and the reasoning for including the task in the O.Q. program are in the section after the covered task list.

Task name	Task class	Pipeline facility	O&M task	DOT required	Affect integrity	NTUA qualify
Above G Leak Surveying	A	Y	Y	Y	Y	Y
Below G Leak Surveying	A	Y	Y	Y	Y	Y
In House Leak Surveying	A	Y	Y	Y	Y	Y
Meter Reading	A	Y	Y	N	N	N
Odorant Test	A	Y	Y	Y	N	Y
Maintain Odorant Station	B	Y	Y	Y	Y	Y
Installing Rectifier	C	Y	Y	Y	Y	Y
Rectifier Reading	A	Y	Y	Y	Y	Y
Maintenance Rectifier	C					
Pipe to soil readings	A	Y	Y	Y	Y	Y
Installing Insulator kits	A	Y	Y	Y	Y	Y
Installing Anodes	A	Y	Y	Y	Y	Y
Inspect corrosion pitting	A	Y	Y	Y	Y	Y
Inspect Atm Corrosion	A	Y	Y	Y	Y	Y
Patrolling river crossings	A	Y	Y	Y	Y	Y
Inspect uncovered pipe	A	Y	Y	Y	Y	Y
Pipeline Locating	A	Y	Y	Y	Y	Y
Inspecting C.P. stations	A	Y	Y	Y	Y	Y
Installing pipeline markers	A	Y	Y	Y	Y	Y
Installing meter sets	A			N		
Removing meter sets	A	Y	Y	N	Y	Y
Painting meter sets	A	Y	Y	Y	Y	Y
Painting regulator stations	A	Y	Y	Y	Y	Y
Maintenance reg devices	A	Y	Y	Y	Y	Y

Maintenance relief devices	A	Y	Y	Y	Y	Y
Overhaul/install regulators	B	Y	Y	Y	Y	Y
Overhaul/install relief devices	B	Y	Y	Y	Y	Y
Reg station maintenance	A	Y	Y	Y	Y	Y
Above ground valve check	A	Y	Y	Y	Y	Y
Below ground valve check	A	Y	Y	Y	Y	Y
Greasing valves	A	Y	Y	Y	Y	Y
Pressure chart change out	A	Y	Y	N	Y	Y
Fence & Lock check	A	N	Y	N	N	N
Rec station signs check	A	N	Y	Y	Y	Y
Painting facilities	A	Y	Y	Y	Y	Y
Maintenance filters	B	Y	Y	Y	Y	Y
Remove/install flange items	A	Y	Y	Y	Y	Y
Programming E.C.s	B	Y	Y	N	N	N
Downloading E.C.s	B	Y	Y	N	N	N
Installing E.C.s	B	Y	Y	N	Y	Y
Flow proving com.meters	B	Y	Y	N?	N?	Y
Dig new trench	A	N	N	N	N	Y
Reroute trench	A	Y	Y	Y	Y	Y
Backfilling trench	A	Y	Y	Y	Y	Y
Installing tracing wire	A	Y	Y	Y	Y	Y
Installing warning tape	A	Y	Y	Y	Y	Y
Line stopping high pressure	B	Y	Y	Y	Y	Y
Line stopping low pressure	B	Y	Y	Y	Y	Y
Making hot taps	B	Y	Y	Y	Y	Y
Joining pipe by welding	B	Y	Y	Y	Y	Y
Patching pipe by welding	B	Y	Y	Y	Y	Y
Pipe end sealing by welding	B	Y	Y	Y	Y	Y

Butt fusion P.E. pipe	A	Y	Y	Y	Y	Y
Socket fusion P.E. pipe	A	Y	Y	Y	Y	N
Joining P.E. w/permaserts	A	Y	Y	Y	Y	Y
Steel pipe threading	A	Y	Y	Y	Y	Y
Compression fittings	N/A	Y	Y	Y	Y	N
End capping of P.E.	A	Y	Y	Y	Y	Y
Ace.&Oxy. Welding	B	Y	Y	Y	Y	Y
Squeezing off P.E. pipe	A	Y	Y	N	Y	Y
Squeezing off steel pipe	N/A	Y	Y	N	Y	N
Pigging steel lines	A	Y	Y	Y	Y	Y
Pigging P.E. lines	A	Y	Y	Y	Y	Y
Taking reading @ H2S plant	A	Y	Y	Y	Y	Y
Changing Solu. @ H2S plant	A	Y	Y	Y	Y	Y
Maintenance of H2S plant	B?	Y	Y	Y	Y	Y
“Blow down” lines	A	Y	Y	Y	Y	Y
Taping underground valves	A	Y	Y	Y	Y	Y
Taping steel pipe	A	Y	Y	Y	Y	Y
Testing H.P. steel pipe	A	Y	Y	Y	Y	Y
Testing L.P. steel pipe	A	Y	Y	Y	Y	Y
Testing L.P.P.E. pipe	A	Y	Y	Y	Y	Y
Calibrating flame pack	A	N	Y	N	Y	Y
Calibrating C.G.I.	A	N	Y	N	Y	Y
Inspect Steel pipe using “holiday” detector	A	Y	Y	Y	Y	Y
Steel pipe handling	A	Y	Y	Y	Y	Y
P.E. pipe handling	A	Y	Y	Y	Y	Y
Road boring	A/B	Y	Y	Y	Y	Y
Compacting backfill	A	Y	Y	Y	Y	Y
Increasing M.A.O.P.	B	Y	Y	Y	Y	Y
Increasing O.P.	A	Y	Y	Y	Y	Y
Inspecting fusion joints	B	Y	Y	Y	Y	Y

Inspecting welded joints	B	Y	Y	Y	Y	Y
Non-destructive testing	B	Y	Y	Y	Y	Y
Destructive testing	B	Y	Y	Y	Y	Y
Installing casing	B	Y	Y	Y	Y	Y
Abandoning services	A	Y	Y	Y	Y	Y
Activating services	A	Y	Y	Y	Y	Y
Abandoning facilities	A	Y	Y	Y	Y	Y
Installing impulse lines	B	Y	Y	Y	Y	Y
Maintenance impulse lines	A	Y	Y	Y	Y	Y
Overhauling impulse lines	B	Y	Y	Y	Y	Y
Purging mains and services	A	Y	Y	Y	Y	Y
Installing excess flow valve	A	Y	Y	Y	Y	Y
Maintain excess flow valve	A	Y	Y	Y	Y	Y

14.13 DETAILS OF THE COVERED TASK LIST

1. *Above ground leak surveying*

a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. An above ground leak survey is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require leak surveying (192.723).
e. Affects the integrity in the fact that a missed leak can seriously affect integrity.
f. NTUA will qualify due to the four-part test.

2. *Below ground leak surveying*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. A below ground leak survey is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does require leak surveying (192.723).
e. Affects the integrity in the fact that a missed leak can seriously affect integrity.
f. NTUA will qualify due to the four-part test.

3. *In house leak surveying*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. In house leak survey is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require leak surveying in a building.
e. A missed leak can seriously affect the safety of the public.
f. NTUA will qualify due to the safety of the public.

4. *Meter reading*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require meter reading.
e. Does not affect the integrity of the pipeline.
f. NTUA will not qualify because it has no bearings on pipeline integrity.

5. *Odorant testing*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires all gas sold for use has a distinctive odor (192.625).
e. Affects the integrity of the pipeline in the fact that if customers cannot smell gas, a hazardous situation can exist.
f. NTUA will qualify because of the four-part test.

6. *Maintain odorant station*
a. This task is a class B task because the operator needs to be a meter journeyman to perform this task.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does require correct amount of odorant in a line (192.625).
e. Does not affect the integrity of the pipeline like the previous task.
f. NTUA will qualify because of the four-part test.

7. *Installing rectifiers*
   a. This task is a class C task because it requires NACE certification to perform.
   b. It is performed on a pipeline facility.
   c. Can be performed in the regular operation of a facility.
   d. DOT requires cathodic protection of all steel lines (192 subpart I).
   e. Affects the integrity of the pipeline.
   f. NTUA will qualify because of the four-part test.

8. *Reading rectifiers*
   a. This task is a class A task because it is a task that all gas operators should be able to perform.
   b. It is performed on a pipeline facility.
   c. It is performed in the regular operation of a facility.
   d. DOT requires cathodic protection (192 subpart I).
   e. Affect the integrity of the pipeline.
   f. NTUA will qualify because of the four-part test.

9. *Maintenance rectifiers*
   a. This task is a class C task because it requires NACE certification to perform.
   b. It is performed on a pipeline facility.
   c. It is performed in the regular operation of a facility.
   d. DOT requires cathodic protection (192 subpart I).
   e. Does affect the integrity of the pipeline.
   f. NTUA will qualify because of the four-part test.

10. *Pipe to soil readings*
   a. This task is a class A task because it is a task that all gas operators should be able to perform.
   b. It is performed on a pipeline facility.
   c. It is performed in the regular operation of a facility.
   d. DOT requires Cathodic Protection (192 subpart I).
   e. Does affect the integrity of the pipeline.
   f. NTUA will qualify because of the four-part test.

11. *Installing insulator kits*
   a. This task is a class A task because it is a task that all gas operators should be able to perform.
   b. It is performed on a pipeline facility.
   c. It is performed in the regular operation of a facility.
   d. DOT requires Cathodic protection (192 subpart I).
   e. Does affect the integrity of the pipeline.
   f. NTUA will qualify because of the four-part test.

12. *Installing anodes*
   a. This task is a class A task because it is a task that all gas operators should be able to perform.
   b. It is performed on a pipeline facility.
   c. It is performed in the regular operation of a facility.
   d. DOT requires Cathodic protection (192 subpart I).
   e. Does affect the integrity of the pipeline.
   f. NTUA will qualify because of the four-part test.

13. *Inspect corrosion pitting*

This task is a class A task because it is a task that all gas operators should be able to perform.
It is performed on a pipeline facility.
It is performed in the regular operation of a facility.
DOT requires Cathodic protection investigation (192 subpart I).
Does affect the integrity of the pipeline.
NTUA will qualify because of the four-part test.

14. *Inspect atmospheric corrosion.*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT requires Cathodic protection investigation (192 subpart I).
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

15. *Patrolling river crossing*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT requires patrolling (192.721).
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

16. *Inspecting uncovered pipe*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT requires pipe inspecting (192.241).
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

17. *Pipe Locating*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT requires the ability to locate a pipe.
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

18. *Inspecting C.P. stations*

    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT requires cathodic protection (192 subpart I).
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

19. *Installing pipe markers*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT requires pipe locating.
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

20. *Installing meter sets*
    b. This task is a class A task because it is a task that all gas operators should be able to perform.
    c. It is performed on a pipeline facility.
    d. It is performed in the regular operation of a facility.

e. DOT does not require meter sets.
f. Does affect the integrity of the pipeline.
g. NTUA will qualify because improper installation can affect operational integrity.

21. *Removing meter sets*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require meter sets.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because improper removal can affect operational integrity.

22. *Painting meter sets*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires protection from atmospheric corrosion (192 subpart I).
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

23. *Painting regulator stations*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires protection from atmospheric corrosion (192 subpart I).
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

24. *Maintenance regulator devices*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working regulating devices.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

25. *Maintenance relief devices*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working relief devices.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

26. *Overhaul/install regulators*
a. This task is a class B task because it requires Meter Journeyman certification.

b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working regulating devices.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

27. *Overhaul/install relief devices*
a. This task is a class B task because it requires Meter Journeyman certification.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working regulating devices.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

28. *Regulator station maintenance*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working regulator stations (i.e. valves, etc.)
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

29. *Above ground valve check*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working valves (key and non key valves).
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

30. *Below ground valve check*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working valves (key and non key).
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

31. *Greasing valves*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working valves (key and non key).
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

32. *Pressure chart change out*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require pressure charts.
e. Does not affect the integrity of the pipeline.
f. NTUA will not qualify because of the four-part test.

33. *Fence & lock check*

a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require fences and locks.
e. Does not affect the integrity of the pipeline.
f. NTUA will not qualify because of the four-part test.

34. *Regulator station signs check*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires signs on regulator stations.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

35. *Painting of all other facilities*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires all facilities to be protected from atmospheric corrosion.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

36. *Maintenance filters*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT requires properly working filters.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

37. *Remove/Install flange items*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT regulates all flange fittings.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

38. *Programming Electro Correctors*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require electro correctors.
e. Does not affect the integrity of the pipeline.
f. NTUA will not qualify because of the four-part test.

39. *Downloading Electro Correctors*
a. This task is a class A task because it is a task that all gas operators should be able to perform.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT does not require electro correctors.
e. Does not affect the integrity of the pipeline.
f. NTUA will not qualify because of the four-part test.

40. *Installing Electro Correctors*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT does not require electro correctors.
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because it can affect the integrity of the system.

41. *Flow proving commercial meters (in field)*
    a. This task is a class B task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT does not require properly working meters.
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because it can affect the integrity of the system.

42. *Dig new trench*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It can be performed in the regular operation of a facility.
    d. DOT does not regulate how to dig a trench.
    e. Does not affect the integrity of the pipeline.
    f. NTUA will qualify because potential damage to property, life and other utilities.

43. *Reroute trench*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT regulates how to excavate near a gas line.
    e. Does affect the integrity of a pipeline.
    f. NTUA will qualify because of the four-part test.

44. *Backfilling*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It is performed in the regular operation of a facility.
    d. DOT regulates how to backfill on a pipeline.
    e. Does affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

45. *Installing tracing wire*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.
    c. It can be performed in the regular operation of a facility.
    d. DOT regulates how tracing wire is put into the ground with pipe.
    e. Can affect the integrity of the pipeline.
    f. NTUA will qualify because of the four-part test.

46. *Installing warning tape*
    a. This task is a class A task because it is a task that all gas operators should be able to perform.
    b. It is performed on a pipeline facility.

c. It can be performed in the regular operation of a facility.
d. DOT requires warning tape on all P.E. pipes.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

47. *Line stopping on high-pressure pipe*
a. This task is a class B task because the task requires a welder.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT regulates how to weld on pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

48. *Line stopping on low-pressure pipe.*
a. This task is a class B task because the task requires a welder.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT regulates how to weld on pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

49. *Making hot taps*
a. This task is a class B task because the task requires a welder.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT regulates how to weld on pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

50. *Joining pipe by welding*
a. This task is a class B task because the task requires a welder.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT regulates how to weld on pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

51. *Patching pipe by welding*
a. This task is a class B task because the task requires a welder.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT regulates how to weld on pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

52. *Pipe end sealing by welding*
a. This task is a class B task because the task requires a welder.
b. It is performed on a pipeline facility.
c. It is performed in the regular operation of a facility.
d. DOT regulates how to weld on pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

53. *Butt fusion of P.E. pipe*
a. This task is a class A task because all workers should be

able to perform butt fusion.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to butt fuse pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

54. *Socket fusion of P.E. pipe*
a. This task is a class A task because all workers should be able to perform butt fusion.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to fuse pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

55. *Electro fusion of P.E. pipe*
a. This task is not classified because NTUA does not accept electro-fused pipe.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to fuse pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will not qualify electro fusion because NTUA does not accept electro fusion.

56. *Joining P.E. pipe with premaserts*
a. This task is a class A task because all workers should be able to perform join pipe.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how P.E. pipe is joined.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

57. *Steel pipe threading*
a. This task is a class A task because all workers should be able to perform threading.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how pipe is threaded.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

58. *Compression fittings*
a. This task is not classified because NTUA does not accept compression fittings.
b. IT can be performed on a pipeline facility.

c. It can be performed in the regular operation of a facility.
d. DOT regulates how pipe is joined.
e. Does affect the integrity of the pipeline.
f. NTUA will not qualify because NTUA does not accept compression fittings.

59. *End capping of P.E.*
a. This task is a class A task because all workers should be able to use permaserts.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to cap pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

60. *Ace. & Oxy welding*
a. This task is a class B task because it requires a welder.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to weld.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

61. *Squeezing off P.E. pipe*
a. This task is a class A task because all workers should be able to squeeze off P.E.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to handle P.E. pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

62. *Squeezing off steel pipe*
a. This task is not classified because NTUA does not accept the squeezing off of steel.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to weld.
e. Does affect the integrity of the pipeline.
f. NTUA will not qualify because NTUA does not accept the squeezing of Steel pipe.

63. *Pigging steel lines*
a. This task is a class A task because all workers should be able to pig steel lines.

b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to pig (not to harm the pipe & rid line of contaminants).
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

64. *Pigging P.E.lines*
a. This task is a class A task because all workers should be able to pig P.E. lines.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to handle pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

65. Taking readings at H2S plant
a. This task is a class A task because all workers should be able to take readings.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT does not regulate how to take H2S readings.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the potential hazard to the public.

66. *Changing solution at H2S plant*
a. This task is a class A task because all workers should be able to change solution.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT does not regulate how to change solution at a H2S plant.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the potential danger to workers and public.

67. *Maintenance H2S plant*
a. This task is a class A task because all workers should be able to maintain the plant.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how regulators, valves and dehydrators operate.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

68. *"Blow down" lines*
a. This task is a class A task because all workers should be able to "blow down" lines.

b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates that pipes need to be free of contaminants.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

69. *Taping underground valves*
a. This task is a class A task because all workers should be able to tape valves.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates the need for cathodic protection.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

70. *Taping steel pipe*
a. This task is a class A task because all workers should be able to tape steel pipe.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates the need for cathodic protection.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

71. *Testing H.P. steel pipe*
a. This task is a class A task because all workers should be able to test H.P. steel pipe.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to test pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

72. *Testing L.P. steel pipe*
a. This task is a class A task because all workers should be able to test L.P. steel pipe.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to test pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

73. *Testing L.P.P.E. pipe*
a. This task is a class A task because all workers should be able to test L.P.P.E. pipe.

b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to test pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

74. *Calibrating flame pack*
a. This task is a class A task because all workers should be able to calibrate a flame pack.
b. It is not performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT does not regulate how to calibrate a flame pack.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the danger to the public on a missed leak.

75. *Calibrating C.G.I.*
a. This task is a class A task because all workers should be able to calibrate a C.G.I.
b. It is not performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT does not regulate how to calibrate a CGI.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the danger to the pubic on a missed leak.

76. *Inspecting steel pipe using a "Holiday" detector*
a. This task is a class A task because all workers should be able to use a holiday detector.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates inspection of steel pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

77. *Steel Pipe handling*
a. This task is a class A task because all workers should be able to handle steel pipe.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how steel pipe is handled.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

78. *P.E. pipe handling*
a. This task is a class A task because all workers should be able to handle P.E. pipe.

b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how P.E. pipe is handled.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

79. *Road boring*
a. This task is a class A task because all workers should be able to bore under a road.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to bor under a road.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

80. *Compacting backfill*
a. This task is a class A task because all workers should be able to compact backfill.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how compaction is supposed to be.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

81. *Increasing M.A.O.P.*
a. This task is a class B task because the operator needs to be a Journeyman or an Engineer.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to up-rate the M.A.O.P.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

82. *Increasing O.P.*
a. This task is a class A task because all workers should be able to increase the O.P.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to up-rate the operating pressure.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

83. *Inspecting fusion joints*
a. This task is a class B task because it requires a welder or inspector.
b. It can be performed on a pipeline facility.

c. It can be performed in the regular operation of a facility.
d. DOT regulates how to inspect fusion joints.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

84. *Inspecting welded joints*
a. This task is a class B task because it requires a welder or inspector.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to inspect welded joints.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

85. *Non-destructive testing*
a. This task is a class B task because it requires a welder or inspector.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to inspect welded joints.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

86. *Destructive testing*
a. This task is a class B task because it requires a welder or inspector.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to inspect welded joints.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

87. *Installing casing*
a. This task is a class B task because it requires a welder.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to weld pipe.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

88. *Abandoning services*
a. This task is a class A task because it is a task all operators should be able to do.
b. It can be performed on a pipeline facility.

c. It can be performed in the regular operation of a facility.
d. DOT regulates how to abandon services.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

89. *Abandoning facilities*
a. This task is a class A task because it is a task all operators should be able to do.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to abandon facilities.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

90. *Installing impulse lines*
a. This task is a class B task because it requires a gas meter journeyman.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates impulse lines.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because it can affect the integrity of the pipe.

91. *Maintenance impulse lines*
a. This task is a class A task because any operator should be able to do this task.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT regulates how to care for impulse lines.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because it can affect the integrity of the pipe.

92. *Overhauling impulse lines*
a. This task is a class B task because it requires a gas meter journeyman.
b. It can be performed on a pipeline facility.
c. It can be performed in the regular operation of a facility.
d. DOT does regulate how to overhaul impulse lines.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

93. *Purging mains and services*
a. This task is a class A task because all operators should be able to purge lines.
b. It can be performed on a pipeline facility.

c. It can be performed in the regular operation of a facility.
d. DOT regulates how to purge lines.
e. Does affect the integrity of the pipeline.
f. NTUA will qualify because of the four-part test.

14.14 NAVAJO TRIBAL UTILITY AUTHORITY

OPERATOR QUALIFICATION FORM

OPERATOR NAME: _____

OPERATOR'S SS#: _____OPERATOR'S EMPLOYEE #: _____

COVERED TASK NAME: _____

TRANSITIONAL/INITIAL/RE-QUALIFICATION: _____

DATE OF EVALUATION: _____TIME:_____

EVALUATOR: _____

EVALUATION METHOD: _____

RESULTS:

_____

_____

_____

_____

EVALUTION METHOD: _____

RESULTS:

_____

_____

_____

_____

QUALIFICATION IS GOOD TILL: _____

ATTACH ANY DOCUMENTS FOR SUPPORTING DETAIL (NEED NOT BE ORIGIANALS)