GENERAL CONDITIONS AND SPECIFICATIONS FOR PIPELINE-CONSTRUCTION
BY AND BETWEEN
EmKey Gas Processing, LLC, AS COMPANY
AND
John Anderson Construction, Inc., AS CONTRACTOR

I. RIGHT-OF-WAY AND SURVEY

A. RIGHT-OF-WAY

1) The Company shall provide a right-of-way on private and public property for the construction of the pipeline and any other facilities which are to be permanently affixed to the land; including permits to cross under all roads, highways, railroads, waterways, and public utilities as required by law. Contractor shall furnish all special permits for hauling large and bulky loads, and any other permits not furnished by the Company, which may be necessary in such construction operations.

2) Company shall furnish Contractor with a booklet, which shall advise Contractor of certain restrictions and requirements (collectively referred to as the Special R.O.W. Provisions) with respect to all or any part of the right-of-way. Contractor shall strictly comply with all Special R.O.W. Provisions and shall indemnify and hold the Company harmless from and against any claims, actions, court costs, attorney's fees, expenses, damages or liability of whatsoever nature, including damages outside or inside the rights-of-way, in connection with any alleged or actual failure to comply with the Special R.O.W. Provisions.

3) Subject to the Special R.O.W. Provisions and other provisions of the Contract, Company shall be solely responsible and liable for those damages to crops, shrubs and trees within the boundaries of the right-of-way which were inflicted as a direct and necessary result of the performance of the work and which were not caused by the negligence of Contractor. Contractor shall confine all work performed under the Contract to the area within the boundaries of the right-of-way provided by Company. All damages on or off the right-of-way, caused by or inflicted by the Contractor, due to negligence of the Contractor, will be the sole responsibility of the Contractor.

4) Should the Contractor desire to obtain the use of any private roads or other property off the right-of-way to gain access to any work area, Contractor shall at its own expense make such agreements for the use, maintenance (including dust control), and restoration of such roads and property, and shall be responsible for and shall indemnify and save Company harmless from and against all damages

incident to the use thereof. All such agreements shall be in writing and submitted to the Company. The Company will then forward the change order request to the PSC, or other authorized governing agency, for approval. No work shall be authorized until such approval is received.

5) Contractor shall comply with all laws, ordinances, rules and regulations of all legally constituted authorities bearing on the conduct of work and specifications without limitation of the immediately foregoing, Contractor shall perform all acts required under and shall fully comply with any statute in any jurisdiction in which the work is performed.

6) Contractor shall conform to the requirements of highway, railroad, and stream crossing permits, and at all times shall conform to all safety requirements pertaining to such crossings. Contractor shall conform to the requirements and restrictions specified by any governmental authority, including, but not limited to, those provided by the Company and incorporated in the General Conditions, Pipeline Specifications, Alignment Sheets and Construction Drawings.

7) Contractor shall take all necessary precautions to protect and to avoid damage to, or interference with, existing improvements, fixtures or facilities of Company or others, including but not limited to utility facilities, real and personal property of owners or tenants, existing pipelines, sewers, water or gas mains, and electric or telephone installations and to protect and avoid interference with the safe operation thereof. Contractor shall in no way interfere with, connect, cut into, or otherwise disturb such facilities without first obtaining the written consent of the Company's Representative. Further, Contractor shall reimburse Company for, and indemnify and hold Company harmless from and against any and all loss, costs, damage, expense, claims, suits, and liability, including reasonable attorney's fees, on account of loss or damage to such facilities, or on account of a suspension of service of existing facilities which was not expressly authorized by Company in writing. Contractor's responsibility extends to all facilities of the Company and the facilities of others whether or not they are indicated on plans. Contractor's liability includes, but is not limited to, loss of gas, oil, or other products and repairs to said facilities made necessary by the acts of Contractor, its agents, servants, or employees. In those states, or other political subdivisions, in which a "one call" or other damage prevention program exists, Contractor shall give all notices and perform all acts required or recommended by such program.

8) If Contractor performs maintenance on his vehicles on the right-of-way, proper disposal must be made of any fluids and or debris resulting from this maintenance.

B. SURVEYS

1) Company shall survey the pipeline route, unless otherwise specified, and shall mark the same appropriately. Contractor shall lay the pipeline or any other facilities to be constructed under this Contract within the easement as surveyed and marked. Contractor shall inform Company's Representative immediately if it discovers any gaps in the marked route or if there are more routes marked than are required for the number of pipelines to be constructed. Contractor shall mark the ROW boundaries on both sides of the ROW in such a manner as to eliminate any confusion as to the ROW boundary limits.

II. CLEARING AND PREPARING RIGHT-OF-WAY

A. CLEARING AND PREPARING RIGHT-OF-WAY

1) Erosion and filtration control to be installed during clearing operation. The right-of-way shall be cleared to the width specified by Company. It shall be cleared of the trees, brush and other vegetation to provide for the efficient use of machinery and equipment necessary to construct the pipeline. Restrictions in right-of-way agreements prohibiting the cutting or damaging of certain trees shall be made known to the Contractor, and Contractor shall conduct his work in such a manner as to comply strictly with such restrictions.

2) All brush and tree limbs are to be piled along the R.O.W. and stumps are to be buried unless specified differently in special conditions, or as specifically requested in the PSC Permit or by company otherwise.

3) Contractor shall furnish any and all materials required for such temporary bridges, culverts, roadways and other temporary facilities, which may be needed to provide for the passage of all equipment necessary for construction operations as specified in the PSC Permit. Under no circumstances shall the Company's line pipe or casing pipe be used for temporary bridges or culverts.

4) Extreme care shall be exercised by Contractor in conducting the right-of-way clearing operations so as to avoid damage or injury to adjacent property. All property corners, monuments, witness trees or other survey markers shall be preserved, and if accidentally dislocated or destroyed by the Contractor, shall be replaced to the satisfaction of the Company at the Contractor's expense.

B. FENCING

Fences which must be cut for the performance of this work are to be braced and gaps installed. Bracing and reinforcing are to be done prior to cutting. These gaps shall be kept closed by Contractor, except when actually being used.

Contractor will be liable for all damage claims arising from the straying of livestock due to Contractor's failure to close gates or gaps and to properly maintain fences. Woven wire fences of the chain link type in which splices or repairs would detract from strength or appearance may be tunneled under. After the work is completed, all fence gaps are to be removed and fences permanently repaired or permanent gates installed. Materials used for repair of fences shall match the original fence as nearly as practicable with regard to gauge, mesh style and appearance. These repairs shall be satisfactory to the landowner, his tenant or lessee, and to the Company. When required, Contractor will install gates and gate posts and other related materials along the right-of-way.

C. GRADING

Contractor shall remove all stumps in the right of way. Contractor shall perform such grading that, in the judgement of Company's Representative, is needed to minimize the necessity of overbends or sag-bends, and/or to prevent excess or irreparable damage to the property. Excess material shall not be scattered along the right-of-way in such a manner as to block natural drainage. Material removed from creek and riverbanks shall not be placed in the streambed or where stream flow or drainage will be obstructed. After the pipe has been laid, material excavated from hillsides, creek or riverbanks, and such other places shall be replaced in its original position and protected from slides and erosion by rip-rap, sack breakers, diversion terraces, or such other means as may be designated on construction drawings, right-of-way line lists, permit requirements and by the Company's Representative.

D. PRESERVATION OF SURVEY MARKERS

Before clearing and grading the right-of-way, Contractor shall move survey stakes back to the edge of the right-of-way and preserve them during all phases of the work for use in reporting progress and locations along the line. Cost of replacing survey stakes, which have been destroyed due to carelessness of Contractor, shall be paid by Contractor.

III. TRENCHING

A. TRENCHING

1) A flat-bottomed trench shall be dug to such depth as to provide a normal minimum cover of 40 inches (40”), unless specified otherwise.

2) Topsoil and subsoil will be separated while trenching in wetlands and agricultural lands with subsoil being returned to the open ditch first, followed by topsoil at surface.

3) Where boring is not required by construction permit for the pipeline crossing at highways, roads, railroads, drainage ditches adjacent to railroad or highway, crossings, creek and canal crossings, and river crossings, the trench shall be excavated to a depth which will provide a minimum, cover over the top of the pipe as shown in the construction permits and/or profile drawings.

4) The depth of cover shall be determined by measurement from the top of the pipe up to the grade level of the low side of the trench. In the event that the Company’s Representative shall direct that the trench be excavated and graded to a depth which shall result in a cover in excess of 48 inches, such excess shall constitute “Extra Depth of Trench”, unless such excess depth is required at highway, railroad, river, creek, ditch and canal crossing to meet the minimum cover requirements of paragraph 2 above, or unless such excess depth is indicated on construction drawings.

5) There shall be a clearance between the pipeline being laid and any foreign pipeline or any other underground structure of not less than twelve (12) inches. In cases where this clearance cannot be attained, other suitable precautions to protect the piping shall be taken, such as the installation of insulating material, installation of casing, or installation of other protective material as required. Deeper excavation of the ditch required due to crossing under foreign pipelines and tile lines shall not constitute “Extra Depth of Trench”.

6) Where the trench is excavated through land where livestock is confined, through fields under cultivation, across lanes or driveways, or where the trench is open-cut through roads, temporary crossings shall be constructed to permit the safe and expeditious passage of livestock, vehicles, equipment and persons from one side of the trench to the other.

7) The bottom of the trench shall be graded to provide a uniform support for each joint of pipe and sufficient loose earth shall be left in the trench to form a bed for the pipe. Where rock is encountered, Contractor shall

either place four (4) inches of rock free soil over the rock bottom of the ditch to provide a bed for the pipe, or install dirt filled sacks.

8) Padding material shall be furnished and installed by Contractor when required by Company's Representative.

B) ROCK EXCAVATION

Rock excavation is defined as solid rock which must first be broken up by means of drilling and blasting, or jack hammers, before excavation can be accomplished. Company reserves the right to approve the method to be used for the rock excavation. Company shall be given prior notice by Contractor of the method proposed for such rock excavation and Contractor shall not use any method disapproved by Company. The Contractor shall use all practical means of excavation with mechanical ditch excavating equipment before resorting to drilling and blasting, unless it is obvious, in Company's opinion, that drilling and blasting of rock is required to accomplish excavation. Contractor may utilize specialized rock excavation equipment in place of blasting if approved by Company. Rock excavation shall be sufficient to provide a normal minimum cover of 36 inches.

IV. BLASTING

A. All drilling and blasting shall be performed in a safe manner. All possible precautions shall be taken to avoid injury or damage to persons, livestock, and property. Without limitation, Contractor shall be responsible for all damage, on or off of the right-of-way, resulting from the use of explosives and shall indemnify and hold Company harmless from any and all liabilities, costs, and expenses (including attorney's fees and court costs) which may arise out of such damage. Blasting mats or earth padding shall be used where extreme care must be exercised to safeguard adjacent houses, property or other facilities from scatter of rock. Rocks or other debris scattered on adjacent land by blasting operations shall be immediately removed by Contractor. The Contractor's responsibility and obligation to indemnify Company under this section shall not be diminished, in any way, by the fact that Contractor shall not have been negligent or failed to exercise due care or by the fact that the negligence or failure to exercise due care of third parties or Company shall have contributed to such damage.

B. Blasting operations shall be conducted by persons thoroughly experienced in such work. Where governmental authorities require licensed "shooters" and blasting permits, such requirements shall be met by Contractor. Contractor shall obtain necessary permits at its expense and shall make prior notification to regulatory authorities and persons in the immediate vicinity in advance of any blasting.

C. Explosives shall be stored in a locked magazine according to standard practices as specified by the United States Bureau of Mines. Detonating caps shall not be stored with explosives, but shall be stored in a separate place in accordance with specifications of the Bureau of Mines. Explosives shall not be primed or fused until immediately before use.

D. Company's Representative shall make an initial inspection and spot check at frequent intervals of the on-site explosive magazine and magazine area, if one is used, but shall in no event be responsible therefore.

E. Contractor shall maintain a record log, which shall be available at all times to Company's Representative. This record shall include, but is not limited to, the following data for each blast detonated.

1) Plat of the blast hole spacings and depths and the location of the blast point in relation to alignment sheet stationing.

2) Type and strength of explosives, blasting caps and distribution of the delay periods used.

3) Total explosive per round and per group of delays.

4) Prevailing weather conditions, including wind directions and approximate relative humidity, and cloud conditions at time of blast.

5) Date and exact firing time of blast.

6) Name of persons in responsible charge of loading and firing and blasting permit number, if required.

7) When required by Company's Representative, seismic and/or shock wave intensity as well as displacement will be recorded for each detonation.

V. HAULING AND STRINGING

A. Pipe and other materials delivered to the Contractor, shall be promptly received, unloaded from delivery vehicle or loaded on trucks, and hauled to the Contractor's warehouse, Contractors or Companies pipe yard, or right-of-way. The unloading and handling of all materials shall be accomplished by the Contractors in a careful workmanlike manner and by the use of equipment and labor satisfactory to the Company's Representative. Contractor is responsible for any damage or loss upon receipt of pipe and other materials.

B. The hauling of pipe and other materials shall be done in such a manner as to comply with any rules and regulations of any governmental agency. The Contractor shall secure any special permits or licenses required from any such agencies.

C. Pipe shall be strung upon the right-of-way with due consideration of topographic conditions in connection with lining up, welding, creek, highway, and railroad crossings where multiple lengths and special handling is required.

D. In general, the pipe shall be strung on the right-of-way, but in some cases may be stacked at appropriate locations, welded and pulled into place in a manner that will not damage the pipe and coating, as approved and authorized by Company's Representatives.

E. Where pipe is being strung, sufficient gaps shall be left to provide for farm equipment, vehicular and cattle crossings where necessary.

F. Valves, casing, and other large and durable materials may be hauled and strung on the right-of-way provided such practice shall not result in their loss or damage. Small materials or materials easily lost or damaged shall be stored at convenient points in warehouses or other storage facilities provided by the Contractor at no additional cost.

G. Care shall be exercised by the Contractor in loading, unloading, hauling, and stringing operations, so as to avoid damage to pipe or coating. Proper equipment shall be used in loading and unloading pipe. In no event shall pipe be dropped or rolled from railroad cars or trucks. The use of buffers or other suitable means of protection may be required by the Company's Representative.

H. All pipe shall be visually inspected by Contractor at time pipe is received by Contractor. Damaged pipe shall be clearly marked and set aside in a manner which allows easy visual inspection. Company Representative will be notified of damaged pipe as it is received. Contractor may be held accountable for damaged pipe not discovered upon receipt.

VI. WELDING

A. SCOPE

This specification establishes the requirements for the field welding of line pipe and for welding of station piping, accessories, and attachments for construction of natural gas pipelines and related facilities and for the associated qualification of welders and welding procedures.

B. CODES AND STANDARDS

In addition to complying with the requirements of this specification, the following regulations, codes and standards, latest edition, shall apply as referenced to the fabrication, line-up, welding and inspection of the pipeline:

Code of Federal Regulations, Title 49, Part 192, “Transportation of Natural and Other Gases by Pipeline: Minimum Federal Safety Standards.”

1) American Petroleum Institute (API), Standard 1104, “Standard for Welding Pipelines and Related Facilities”.

American Welding Society (AWS) Specifications:

1) AWS A5.1, Mild Steel covered Arc-Welding Electrodes

2) AWS A5.5, Low Alloy Steel covered Arc-Welding Electrodes

3) AWS A5.2, Iron and Steel Gas Welding Electrodes

4) AWS A5.18, Mild Steel Electrodes for Gas Metal Arc-Welding

5) AWS A5.20, Mild Steel Electrodes for Flux-Cored Arc-Welding

6) AWS A5.29, Low Alloy Electrodes for Flux-Cored Arc-Welding

7) ASTM E164, “Practice for Ultrasonic Contact Examination of Weldments”.

8) ANSI/ASME B31.8, “Gas Transmissions and Distribution Piping Systems”.

C) PERSONNEL, EQUIPMENT AND MATERIALS

The Contractor shall furnish all personnel, equipment, tools and welding materials required.

D) WELDING PROCEDURES AND WELDERS QUALIFICATIONS

1) Prior to commencing welding on the pipeline, the Contractor and Company shall agree on the welding procedures to be used.

Each procedure shall include, but not be limited to, the following:

1) Description of welding process and equipment.

2) Description of the type and size of electrodes and/or type of filler metal, flux and/or gas shield.

3) Preheat requirements.

4) Description of deposition of welds as to size of electrode or filler wire and number of weld passes.

5) Dimensions of finished weld.

2) Procedure and welder qualification test welds shall be made, inspected and tested in accordance with the latest edition of API 1104.

3) Preparation of Pipe, Valves and Fittings, Etc.

1) The pipe shall be supplied in conformance to the requirements of API Specifications 5L or applicable ASTM Specifications.

a. Each beveled edge shall be cleaned by grinding and/or with a power driven steel wire brush. The cleaning shall extend at least one inch

b.

c.

d. from the edge on both the external and internal surface.

e. Burrs or small nicks in the beveled edges or excessive rust and scale shall be removed using a disc power grinder.

f. Surface defects exceeding the foregoing or which in the opinion of the Company's Representative cannot be repaired satisfactorily shall be removed by a field cutting and beveling machine or a mechanical beveler.

g. When flame cutting is required, the cut edges shall be ground or filed to the dimensions, smoothness and regularity of the original factory bevel.

h. Immediately prior to line-up, the Contractor shall inspect each pipe along its entire length for nicks, dents, gouges, laminations, damage to coatings, and other surface defects.

2) Alignment

a. Each pipe joint shall be aligned prior to being welded to the preceding pipe joint to form continuous sections of pipeline. Welds joining the sections of the pipeline, valve installations or similar welds classed as tie-in welds shall be made in the trench. Otherwise the alignment and welding shall be made alongside the ditch or on the right-of-way with the pipe supported on skids or sandbags at least sixteen inches above the ground.

b. Line-up clamps shall be used on all pipes except for making tie-in welds to valves and fittings.

The hammering of pipe ends to obtain proper line-up shall be kept to a minimum and shall only be carried out using bronze-faced hammers, but they shall not be used on valves.

c. Longitudinal weld seams in adjacent length of longitudinal welded pipe shall be located in alternate top quadrants.

3) Welding Procedures

The Contractor's personnel will be qualified in accordance with API Standard 1104. The following requirements are considered as essential details of the approved welding procedure:

a. Preheat

Preheating shall be required as follows:

When the ambient temperature is less than 32°F (0°C), a preheat to 175°F (80°C) shall be maintained during deposition of the first and second layer. When the ambient temperature is between 32°F and 50°F (0°C and 10°C), a hand warm preheat shall be maintained during deposition of the first and second layer.

Preheat may be required if such conditions prevail which might adversely affect weldability. In this case, the preheating temperature will be established by the Company's Representative.

The area of preheat shall extend around the entire circumference on each side of the weld joint at least three inches. Preheating may be done using any method as long as the entire area to be preheated is preheated evenly and uniformly. The preheat temperature shall be checked with temperature crayons.

b. Weld Deposition and Sequencing

c. First Weld Pass (Stringer Bead) ☐ Stringer be
shall be made by one or more welders. Internal line-up clamps shall not be removed until 100 percent of the first weld pass is completed. When external line-up clamps are used, at least 50 percent of the first pass shall be deposited before the clamp is removed. No movement of pipes shall occur when the line-up clamp is in position and welding has been carried out.

The pipe shall not be moved (raised, lowered, etc.) until the second pass is completed.

d. Second Pass (Hot Pass)

The second pass shall be deposited immediately after disposition of the first pass has been completed and the weld has been cleaned.

e. Filler and Finish Weld Pass (3^{rd}, 4^{th}, etc.)

The filler and finish passes shall be deposited using as many welders as required to maintain the desired progress. All stag and excessive weld build-up shall be removed before deposition of each succeeding weld pass.

All weld passes shall be completed around the entire circumference before commencing the succeeding weld pass. The starts and stops of weld beads from weld pass to weld pass shall be staggered. All slag and scale shall be removed by power tools from each bead for visual inspection immediately after each bead. After completion of the final (cap) weld pass, the completed weld shall be thoroughly cleaned of all slag and weld spatter.

There shall be no other welding on the pipe except that required to deposit the circumferential welds and to attach appurtenances, as shown on applicable construction drawings. Arcing on the surface of the pipe outside of the beveled ends shall be prohibited.

The cap welds shall be built-up not more than 1/16 above the surface of the pipe. The completed weld should be approximately 1/8 inch wider than the width of the original groove.

No section of pipe in which only “stringer” and “hot pass” beads have been applied shall be left at the end of any working day.

4) Weather Protection

If, in the opinion of the Company’s Representative, weather conditions require protection, an effective shield shall be placed over the welding area so that the quality of the weld is not impaired and the welder is not hindered by adverse weather conditions. Covering of the open pipe end at the beginning and end of each string is required.

E) QUALIFICATION OF WELDING PROCEDURES AND WELDERS

All welds intended for qualification purposes shall be made under simulated field conditions.

1) Qualification of Welding Procedures

a. General

Procedure qualification test welds shall be made on each procedure intended to be used.

b. Records

The details of each qualified procedure shall be recorded. This record shall show complete results of the procedure qualification tests.

c. Required Tests

Visual and/or radiographic examination shall be made before destructive testing, and the test results must comply with API Standard 1104, Section 6.0 “Standards of Acceptability”.

Test specimens for destructive testing, as described in API Standard 1104, shall be removed from each test weld. All tests shall be conducted in accordance with and meet the requirements of API Standard 1104.

2) Qualification of Welders

a. Each welder shall be required to make at least one complete circumferential weld with the axis of the pipe fixed at a 45° angle to the horizontal fixed position, using a welding procedure that has been qualified.

b. The welder qualification test welds may be made on any one of the thicknesses of pipe to be used.

c. Welders will qualify welders by both visual examination, destructive testing, and/or by radiographic examination. The test results shall conform to the requirements of API Standard 1104.

d. A welder who has successfully completed the weld qualification tests in accordance with paragraph 6.1 shall be qualified within the limits of variables described in API Standard 1104.

If any of these essential variables are changed, the welder, using a new procedure, shall be requalified.

F) WELD IDENTIFICATION

1) Each welder shall identify that portion of each weld on which he has worked with his symbol number marked with a weatherproof crayon or other approved marker.

2) Each stringer bead welder shall put his symbol near the top of the side he worked on. The remaining welders shall put their symbols in sequence below the preceding welders.

G) QUALITY CONTROL OF PRODUCTION WELDING

e. Inspection

Welding may be visually inspected by the Company's Representatives during each deposition and after completion. Nondestructive testing may be performed on some or all completed welds. The extent of nondestructive inspection shall be based on the quality of welding as the work progresses, and in accordance with the requirements of applicable codes and standards.

f. Scheduling of Inspection

The Contractor shall schedule his work in such a manner as to permit the nondestructive inspection of completed welds not later than the day following the deposition of the stringer bead.

The nondestructive inspection contractor shall have the results of all inspections available for review by Contractor no later than the morning following the day the nondestructive test was taken.

H) REPAIR WELDING

1) Welds, which do not comply, with the "Standards of Acceptability" may be repaired in accordance with an approved procedure.

2) In all cases where repairs are authorized, the repair welding shall be done in accordance with API 1104, Section 7 and the U.S. Department of Transportation Pipeline Safety Regulations, Part 192.

3) All repair welds shall be examined by nondestructive inspection.

4) Should re-examination disclose the weld not to be acceptable, the weld will be removed.

VII. BENDING AND LAYING

A. Contractor shall make all necessary field pipe bends required in the construction of said line, but Company may at its option provide fabricated bends for installation at points where in its judgment the use of such bends is preferable. All overbends, sags and side bends shall be made and installed in such a manner that an adequate amount of slack is provided in the line. Bends shall not be made closer than four (4) pipe diameters to any field made circumferential weld and shall be completed without damage to the pipe or coating and with a minimum of distortion. Adequate means for preventing buckling shall be provided by Contractor. Any pipe buckled from any cause shall be cut out at Contractor's expense, and Contractor shall pay Company for all such buckled and distorted pipe at its actual cost per foot to Company. All field bends shall be made cold and with a segmented shoe type bending machine. Company reserves the right to reject the use of any bending machine if its operation is not considered to be satisfactory and to require Contractor to replace any such machine.

B. All bends shall not have a difference between the maximum and minimum diameters in excess of 2.5% of the normal pipe diameter, but not more than half of this total deviation (1.25%) shall be allowed along either the maximum or minimum diameter; The maximum deflection of the pipe shall not be more than 1-1/2 degrees in any length along the pipe axis equal to the diameter of the pipe.

C. The pipe bends shall be free from buckling, cracks, thinning of the pipe wall or any other evidence of damage and shall be made to conform to the profile of the bottom of the completed trench. Where the pipe has a longitudinal seam, the bend shall be made such that the seam will fall on or near the neutral axis of bending (1-1/2 of the circumferential distance from the maximum outside diameter to the minimum inside diameter).

D. Bends shall be planned so that the sag bends will rest firmly on the bottom of the trench. Overbends will have a four (4) inch minimum clearance from the bottom of the trench and side bends will have a minimum of six (6) inches clearance from the inside curve of the trench.

E. The longitudinal weld seams at the circumferential welds shall not be in line, but shall be in alternate top quadrants.

F. In all cases, the method employed in making pipe bends in the field shall be subject to the approval of the Company's Representative. Any bends that are unsatisfactory, in the opinion of the Company's Representative, shall be removed and replaced by the Contractor, at his expense.

G. The Company's Representative may require that pipe bends be set in the trench in advance of the laying crew, to test the bend radius and the grading of the trench.

H. Pup-joints shall be distributed over the length of pipe installed, allowing for a more consistent rate of progress.

I. Open ends shall be securely closed when work is not actually taking place to prevent entrance of foreign matter of any nature.

J. Each pipe joint shall be thoroughly swabbed to remove dirt and foreign matter from the pipe no more than ten (10) joints ahead of the welding crew.

VIII. FIELD JOINTS

A. GENERAL

a. The cleaning and coating of pipe not done by others shall be performed by the Contractor in accordance with the manufacturer's recommendations to the satisfaction of the Company's Representative. Company reserves the right to perform tests to determine the protection level and acceptability of the coating.

b. Contractor shall furnish all labor, equipment, and services necessary for application and testing of the coating materials. Company shall furnish materials.

c. The Contractor shall furnish tools and equipment required for application of the coating materials.

d. Equipment, both as to type and condition, employed by the Contractor for application of the coating materials shall be subject to the approval of the Company's Representative.

e. All coating operations shall be subject to the approval of the Company's Representative.

f. The cleaning and coating operation shall not precede the ditching operation unless so directed or approved by the Company's Representative. If so permitted, care shall be taken to protect the coating from damage from ditching operations.

B) MATERIALS

a. The type of material shall be the following or Company approved equal:

1) 3M Pipe Wrap Tape

2) Scotchkote brand 312 Epoxy

3) Trenton Wax Tape

b. Coating:

1) All coating materials shall be stored in a dry place, kept from contact with concrete flooring and protected from the weather. Material, which in the opinion of the Company's Representative, shows evidence of deterioration while in the Contractor's custody may be rejected.

c. Sleeves and/or any Pipe Wrap or Tape shall be applied in a manner that shall prevent any wrinkles in the wrapping.

C) TESTING

Contractor shall test all coating with a holiday detector. Electrical inspection and repairs will be made while the coated pipe is being lowered in. Contractor shall furnish a holiday detector, acceptable to Company, along with necessary labor. Company shall specify the voltage setting of the detector for electrical inspection.

IX. LOWERING OF PIPE

A. The line shall be lowered into the trench in such a manner as to provide "slack" in the line.

B. Side bends and sag bends shall be lowered first wherever possible and weighted to serve as anchorage. Side bends shall be placed at the outside wall of the trench. Sag bends shall bear firmly against the bottom of the trench, and overbends shall have a minimum space of four (4) inches and not more than 12 inches between the bottom of the pipe and bottom of the trench. Loose ends shall be left at an overbend if required by the Company's Representative, so that the sag bend may be lowered and anchored before making the cut and tie-in weld.

C. When the trench runs through rock, the bottom of the trench shall be padded to prevent damage to the protective coating or covering on the pipe.

D. Coated pipe shall at all times be handled with equipment such as wide canvas slings designed to prevent damage to the coating. Bare cables, chains, hooks, metal bars or narrow skids shall not be permitted to come in contact with the coating.

E. The pipe shall be lowered in such a manner as to prevent damage to the coating from abrasions, scuffing or cracking.

F. Lowering-in and backfilling operations shall not be permitted except in the presence of or with the approval of the Company's Representative. Should lowering-in

or backfilling be performed in the absence of or without the approval of such Company's Representative then Contractor may be required to uncover the section of line for inspection at Contractor's expense.

G. The distance between the lowering-in operation and the backfill operation shall not exceed one (1) mile except at Company's option.

X. VALVES AND CONNECTIONS

A. All mainline valves, branch line tees and valves, drain and instrumentation connections cathodic protection leads, and other connections shall be installed at locations designated by the Construction Drawings and such other locations as may be required and designated by Company.

B. All valves and fittings to be buried shall be cleaned of all foreign matter, including scale, rust, grease and moisture. Coating is to be applied to a point above grade level. The remainder of the above ground facilities are to be cleaned, primed and painted.

XI. RAILROAD, HIGHWAY AND ROAD CROSSINGS

A) The installation of all railroad, highway and road crossings shall comply with the specifications and requirements of the railroad company, highway department and any governmental authority having jurisdiction and according to the permit for each crossing. Each public road crossing must satisfactorily pass inspection by the governmental authority having jurisdiction before Contractor shall be entitled to any payment in connection with each such crossing.

B) Locations for beginning and ending of boring shall be specified by the railroad or highway department, and said beginning and ending shall be longer only if directed and staked by Company's Representative.

C) Prior to the installation of coated pipeline through the casing, spacers shall be attached to the carrier pipe.

D) Casing vent lines, cathodic protection test leads, and warning signs shall be installed as directed by Company's Representative and as shown on Company drawings.

E) The carrier pipe shall be supported within three feet of both ends of the casing with sandbags to the extent that the casing will not be supporting the pipe after backfilling. No wood skids, or any other rigid supports shall be used.

F) In no case shall depth of trenching required at railroad, highway or road crossings or the approaches thereto constitute extra depth of trench.

G) In the event voids develop in a roadbed during boring operations, such voids on hard surface roads shall be filled by pressure grouting which shall consist of a

sand-cement slurry of at least two sacks of cement per cubic yard. Should voids develop on graded gravel and/or graded earthy roadbeds, such voids shall be uncovered and backfilled with suitable material pneumatically tamped in layers and surface replaced.

H) In the event permission is granted to open trench across a roadbed, all backfilling of such open trenching on the right-of-way shall be accomplished by placing suitable material in layers and each layer mechanically tamped with a pneumatic tamping device (or equal) until the degree of compaction is equal to or more than the density of surrounding undisturbed earth. In the event that the material removed from the open trench is not suitable for backfill and tamping due to water saturation or nature of material, then Contractor will obtain suitable material from other sources at its expense.

I) After backfilling, the surface of the road shall be replaced with material in quality and quantity in a manner satisfactory to the authority having jurisdiction.

J) Operations along highways shall be performed in a manner that minimizes the excavated material and equipment on pavements at all times.

K) Barricades, warning signs and flagmen shall be provided by the Contractor in accordance with all federal, state, and local requirements. Contractor, in addition, shall be bound to the construction specifications set forth in the various permits acquired by Company.

L) Where the Contractor must cross over railroads with the equipment at other than a public crossing, Contractor shall meet the requirements of each railroad company.

M) The carrier pipe shall be electrically insulated from the casing pipe.

XII. BACKFILLING

A. Backfilling shall follow the laying and lowering of the pipe as closely as possible and shall be done so that no excavated material remains scattered on adjoining ground.

B. Prior to backfilling, the line shall be inspected to be sure that there are no skids, brush, stumps, trees, boulders, or debris in the trench and no such material will be included in the backfill.

C. The trench shall be backfilled above ground level and backfill shall be placed over the center of the trench to a height that will insure complete filling of the trench after settlement. Backfill through cultivated field or fields suitable for cultivation shall be rounded off so as not to interfere with farming operations.

D. Where the right-of-way has been graded or leveled to facilitate the operation of trenching machines or other equipment, the backfill shall be completed so that the original contour of the ground will be restored unless otherwise directed by the Company's Representative.

E. Rocks returned to the pipe trench shall be less than six (6) inches in diameter and be prevented from contacting the pipe by the use of rock shield banded around the pipe or by padding. Rocks in the trench shall have a dirt cover of not less than 12 inches through cultivated field or fields suitable for cultivation. When rock shield is not used, the coated pipe shall be protected by earth padding of not less than four (4) inches around the entire pipe circumference.

F. On sloping ground the Contractor shall place sack breakers (bags filled with earth) or pole breakers in the trench and surface diversion terraces to prevent the backfill from sliding or washing. Sacks required for sack breakers shall be furnished by Contractor. When required by Company's Representative, the Contractor shall protect the backfill by placing stone rip-rap, pole breakers or sack breakers in locations designated by Company's Representative after backfilling.

G. The backfilling shall be performed and completed without injury to the protective coating of the pipe, fittings or other appurtenances. Hand backfilling shall be used where necessary. Where the pipe has been newly coated or the coating otherwise repaired, the trench must not be backfilled until the coating has thoroughly hardened.

H. Where additional backfill material beyond that available from the trench excavation is required, such material shall be obtained by Contractor.

I. Any backfilling omitted because of installation of breakers, tie-in connections, test stations for corrosion control, concrete foundations, concrete blocks, valve boxes, and other installations shall be performed after such installations have been completed and approved.

J. The Contractor shall be responsible to rebackfill any sections of the line that sink from the first heavy rain. The Company will contact the Contractor in the event such repairs are necessary and Contractor shall make prompt repairs.

XIII. INTERNAL CLEANING

A. Contractor shall furnish all labor and equipment to internally clean and test the line. If necessary, temporary launchers and receivers shall be provided by the Contractor, and secured by welding or other safe method to prevent uncontrolled discharge of the pigs. The Contractor shall furnish all pigs.

B. If specified by the Company, pigs in two separate runs shall be propelled through the line by compressed air. The second pig shall have a sizing plate whose radius is 1 inch less than the pipe radius in front of the first cup on the pig. The results of these runs

shall determine if the line is free of debris, and that no pipe buckles or excessive out of roundness is in the section. If the air pressure needed to move the pig indicates an obstruction in the pipeline, additional pig runs may be required until such obstruction is removed by Contractor or otherwise accounted for to Company's satisfaction. Any obstructions which would prevent the pig from transversing the line or which would damage the sizing plate shall be located and repaired by the Contractor.

XIV. HYDROSTATIC PRESSURE TEST

A. GENERAL

d. Upon completion of the line or a substantial part thereof, the line shall be cleaned and tested in accordance with this section. Contractor shall give Company two (2) days notice prior to testing any section of the pipeline in order that Company can make proper notification to other parties.

e. The test procedure and the test pressure including test pressures for special construction such as rivers, highways, railroad crossings and other special construction on the construction drawings shall be specified by Company or by the Company's Representative.

B) TEST EQUIPMENT, MATERIALS AND LABOR FURNISHED BY CONTRACTOR.

f. If specified, Contractor shall provide filters suitable for the fill rate and acceptable to Company's Representative.

g. Contractor shall provide filling pumps with a capability as specified by the Company.

h. Contractor shall provide pressure pumps capable of increasing line pressure at a minimum rate of 200 psig per hour.

i. Contractor shall furnish and install all fill, test and dewatering fittings, manifold piping, valves, high pressure hose, pressure gauges, thermometers and all other test apparatus as may be required by Company.

j. Fittings, pipe, valves, and all other such equipment shall be of a rating adequate for the maximum test pressure specified. The use of cast iron materials shall not be permitted.

k. Contractor shall furnish weld caps, valves, blind flanges, gaskets and other such test equipment as required for the hydrostatic test if needed.

l. Contractor shall furnish and inject Methanol or other Company approved chemical additives to prevent freezing in exposed testing areas if required by weather conditions and Company's Representative. Contractor is

responsible for recovering and disposing of chemicals used in accordance with applicable environmental regulations.

C) DETERMINATION OF TEST PRESSURES AND TEST SECTIONS

The Contractor shall notify Company two (2) days in advance concerning plans for testing any section of the pipeline. Both the Contractor and the Company shall review the entire pipeline profile drawing, as supplied by the Company, before selecting test section locations. Changes of elevation, accessibility to test sites for equipment, availability of water, and other applicable factors shall be considered in determining locations and lengths of test sections.

a. The basic test pressure shall be the 1080 psig as recorded at the highest elevation in the test section. The maximum test pressure allowed shall be determined at the lowest elevation in the test section.

b. The test shall run for 12 continuous hours, during which the pressure shall in no case drop below pressures specified in Paragraph 1 above at the highest point in the test section.

D) PRETEST PROCEDURES

a. Contractor shall install test manifolds at points designated by Company. All welds made in the installation of the manifolds shall be in accordance with API Standard 1104 Specifications, however, non-destructive testing may not be required for these specified welds.

b. The test section shall be backfilled throughout its entire length except at valve settings and necessary bell holes, as approved by the Company.

c. All main line valves shall be placed in the full open position so that the valve seats and gate segments are not subjected to the test pressure. All check valves shall be secured in the full open position.

d. All vents and other connections shall be opened as required to eliminate air from the lines during filling operations.

e. Contractor shall introduce a squeegee (batching pig) into the line to eliminate air from the pipeline. Should the Contractor elect to fill the section from the middle, one (1) squeegee as described above, shall be placed in each direction of fill.

E) PRESSURING PROCEDURES

Upon Completion of the filling operations, the Contractor shall pressure the pipeline test section as described below. The Company may elect initially to test the pipeline section at a lower pressure than specified in the Contract.

a. Pressuring Operations

Pressure and temperature recording gauges and the dead weight tester shall be at one end of the test section where the pressure pump is located and a dial gauge at the other end. The final test pressure of both ends will be calculated according to the elevations at each end. Contractor may also be required to install gauges at other locations on the pipeline where the segment could be isolated from the test pressure by check or block valves.

b. Procedures for Locating and Repairing Leaks or Failures During Hydrostatic Testing

c. Should pressure deviations indicate that a leak exists, then the Contractor should check all possible sources of leaks by checking all valves, instrument lines, exposed piping and test equipment. Should no leaks be found then an underground leak is indicated.

d. At this point Contractor shall furnish labor and equipment to locate and repair the leak or failure. After repairs are made Contractor shall refill and restore the pressure to that point at which it failed or a leak was detected.

e. Should a leak occur due to faulty workmanship by Contractor or due to a failure or negligence of Contractor, then Contractor shall bear all costs incurred for locating and repairing such leak.

f. Should a leak occur due to faulty or defective material furnished by Company then Company shall reimburse Contractor for all costs incurred for locating and repairing of such leak and for the cost of bringing the test procedure to the point attained at the time the leak was detected.

g. Upon deciding that a leak exists in any test section then Contractor shall furnish Company the following information prior to proceeding to locate and repair the leak.

h. A list of equipment to be used in locating the leak for the approval of Company.

i. A list of personnel, including names and classifications to be utilized in locating the leak for the approval of Company.

j. Contractor shall not proceed to locate the leak until receiving approval of Company for the use of such equipment and personnel.

3) Procedure After Repair of Leak or Failure

After the repair of a leak or failure Contractor shall reinstate the necessary test procedure as outlined previously.

F) CHANGE IN PRESSURE

In the event a continuous decrease in pressure is observed, Contractor shall repressure the section to the specified test pressure. If a continuation of pressure loss is observed, a leak is evident. Therefore, the Contractor shall discontinue the testing until the leak has been located and subsequent repair (repairs) made. If the pressure stabilizes, Contractor shall repressure to specified test pressure and proceed with the test program.

G) DEWATERING OF PIPELINE SECTION

After successful completion of tests, dewatering of the pipeline section, at Company's option, shall be performed as follows:

a. Contractor shall open necessary vent valves to bleed test pressure off.

b. Contractor shall dewater the line and dump test water in a location and manner satisfactory to the Company. Permits required by Government authority shall be secured by Contractor and copy provided to Company's Representative.

c. Contractor shall run pigs through the pipeline to displace water. Contractor shall terminate dewatering and drying operations upon approval of Company.

XV. CATHODIC PROTECTION TEST LEADS

Coating materials shall be removed from the pipe or tank surface over an area just sufficient to make the connection. The steel surface shall be cleaned to white metal with a ceramic grinding wheel, rasp, or coarse file prior to welding the conductor. Use of resin impregnated wheels or discs will not be permitted. The #12 AWG test wire shall be welded to the pipeline by the exothermic process with only sufficient insulation removed from the #12 AWG test wire to allow placement in the welding mold. After the weld has cooled, all slag shall be removed, and the weld shall be tested with a sharp hammer blow to assure a proper metallurgical bond. All defective welds shall be removed and replaced. All exposed surfaces of copper and steel shall be covered with an elastomer filled shield encapsulating the connection.

XVI. CLEANING UP AFTER COMPLETION

A) Cleanup work shall follow completion of the backfill closely and shall comply to PSC Permit conditions. The Contractor shall conduct such work so that it shall be finished as soon as possible after completion of the pipeline. A

crown over the ditch line shall be provided after completion of cleanup. Crowns through fields suitable for cultivation shall be compacted and rounded so as not to interfere with farming operations.

B) Terraces and/or diversion ditches shall be constructed across the right-of-way on sloping ground to prevent erosion. Company's Representative shall approve the number, size, grade, and spacing of the terraces.

C) All waterways, ditches, and drains shall be cleaned out and restored to the condition prior to the commencement of construction.

D) The right-of-way and surrounding ground shall be cleaned of all rubbish and debris. Barrels, cans, drums, rubbish, waste and other refuse shall not be disposed of on adjacent property. In all cases such material shall be disposed of in a manner satisfactory to the Company's Representative. Where any remaining brush or timber is disposed of, such disposal shall be conducted as specified in "Clearing and Preparing Right-of-Way", Section II of these Pipeline Construction Specifications.

E) After all rock and rubbish has been removed and the grading completed, the right-of-way shall be smoothed by discing or by other means as required by Company to present a finished and workmanlike appearance. Immediately thereafter, areas designated by Company's Representative shall be fertilized and seeded with materials furnished by Contractor.

F) All fences which have been cut or removed during the construction work shall be permanently repaired in a first class and substantial manner and to match the original style of the fence so far as is possible. Where there is any doubt, in the opinion of the Company's Representative, as to the usability of old fence materials, Contractor shall furnish new wire and suitable post at its expense to rebuild said fences. Fence repairs shall be subject to approval of both the property owner and Company's Representative.

G) Contractor shall furnish labor and equipment for painting all aboveground piping and appurtenances as directed by Company's Representative. Contractor shall furnish paint.

H) All extra materials delivered to the Contractor by the Company and not actually used in the construction of the pipeline shall be returned by the Contractor without undue delay to a point designated by the Company's Representative.