SECTION 02680
FUEL DISTRIBUTION

PART 1 -- GENERAL

1.01 WORK INCLUDED

A. Work includes fuel distribution systems from the storage tanks to and including fuel dispensers.

B. Site monitor wells.

C. Provide all bedding material as specified on drawings and these specifications.

1.02 RELATED WORK

A. Section 02050 - Excavation, Demolition and Disposal

B. Section 02223 - Backfilling

C. Section 02231 - Aggregate Base Course

D. Section 03300 - Concrete

E. Section 13201 - Underground Storage Tanks

F. Section 13202 - Aboveground Storage Tanks

1.03 REFERENCES

Alaska Department of Transportation and Public Facilities

1988 Edition — Alaska Standard Specification for Highway Construction.

American Society for Testing and Materials

ASTM D 1557-78 — Moisture density relations of soils and soil-aggregate mixtures using 10-lb (4.54 kg) rammer and 18-inch (457 mm) drop.

American Society for Testing Materials

ASTM D 2922-81 — Density of soils and soil-aggregate in place by nuclear methods (shallow depth).

American Society for Testing Materials

ASTM D 3017-88 — Standard test method for water content of soil and rock in place by nuclear methods (shallow depth).

American National Standards Institute (ANSI) Standards

Standard B31.3	Petroleum refinery piping.
Standard B31.4	Liquid petroleum transportation piping systems.

American Petroleum Institute (API) Recommended Practices

Publication 1625	Installation of underground petroleum storage systems.

National Fire Protection Association (NFPA) Standards

Standard 30	Flammable and combustible liquids code.

Petroleum Equipment Institute (PEI) Recommended Practices

RP-100-86	Recommended practices for installation of underground liquid systems.

Underwriters Laboratories (UL) Standards

UL 567	Pipe connectors for flammable and combustible and LP gas.
UL 971	UL-listed non-metal pipe.
UL 107	Glass fiber reinforced plastic pipe and fittings for flammable liquids.
UL-CAN-4-S633-M81	Flexible underground hose connectors.

Uniform Fire Code (UFC)

Article 79	Flammable and Combustible Liquids

U.S. EPA Regulations

40 CFR 280	Technical standards and corrective action requirements for owner and operators of underground storage tanks (UST).

1.04 QUALITY ASSURANCE

A. Reference to a particular organization's standards shall be in accordance with those standards unless more restrictive criteria is indicated herein.

B. Installation of new piping and equipment shall be accordance with the manufacturer's installation instructions and API Recommended Practice 1615, "Installation of Underground Petroleum Storage Systems".

C. All work and materials shall be in accordance with requirements of all applicable state and local codes, regulations and ordinances, the National

Electrical Code, Uniform Building Code, Uniform Plumbing Code, Uniform Mechanical Code and Uniform Fire Code (locally adopted editions), the latest standards of the NFPA National Fire Codes, and the rules and regulations of all other authorities having jurisdiction. Nothing in drawings and specifications shall be construed to permit work not in conformance with applicable codes, rules, and regulations.

D. Where drawings or specifications call for material or construction of a better quality or large sizes than required by the above mentioned codes, rules and regulations, the provision of the specifications shall take precedence.

E. The Contractor shall furnish without any extra charge any additional material and labor when required for compliance with these codes, rules and regulations, even though the work may not be mentioned in the specifications or shown on the drawings. It shall be the responsibility of the successful bidder to bid in accordance with the minimum requirements of the applicable codes, rules, and regulations.

F. All electrical motors, starters, controls, devices and wiring shall comply with standards of NEC and shall be UL listed and so identified.

1.05 DRAWINGS

A. Drawings are diagrammatic and show the general design, arrangement and extent of the systems. Do not scale or attempt to use drawings for roughing in measurements, nor use as shop drawings. Make field measurements and prepared shop drawings for submittal. Coordinate work with shop drawings of other specification divisions.

B. Contractor shall investigate the capacity and space requirements of the proposed equipment before submitting shop drawings.

C. Where conditions necessitate a rearrangement, prepare and submit to the Contracting Officer, for review, drawings of the proposed rearrangement. Because of the small scale of the drawings, it is not possible to show all offsets, fittings, and accessories which may be required. Carefully investigate the conditions and the work of other trades and arrange work accordingly, furnishing such fittings, traps, valves and accessories as may be required to meet such conditions.

1.06 SUBMITTALS

A. General: Submittals shall be in accordance with Section 01300, Submittals. Submit all product data and shop drawings in one complete submittal with each submittal copy in a binder with index and tabbed dividers. Partial submittals will not be acceptable except with the prior approval of the Contracting Officer and then only in special cases where an accelerated review is necessary so that the progress of the project is not impeded. Submittals not conforming in physical form and content with the provisions of the drawings and specification will be rejected without review and a complete resubmittal required.

B. Product Data: Submit all catalog data and other descriptive literature to fully substantiate the conformance with specification of equipment and materials submitted. Mark product data to indicate exactly those items that are to be provided and cross out unrelated or non applicable items. In addition, submit manufacturer's detailed installation instruction on all equipment and materials submitted.

C. Shop Drawings: Submit drawings for fabrication and installation of all system components. Include fully dimensioned layout of all piping, equipment and all associated connection details. Coordinate shop drawings with work of other trades.

1.07 JOB CONDITIONS

A. Fees, certificates, warranties:

1. The Contractor shall arrange and pay for all required permits, fees, connection charges, taxes, and other miscellaneous charges necessary to execute the work. Submit drawings and specifications to the State Fire Marshall and/or local Fire Marshall for review and approval prior to beginning construction.

2. The Contractor shall deliver to the Contracting Officer all certificates of approval issued by the state, county, local or other authorities having jurisdiction over the work performed. Certificates shall be forwarded promptly when received by the Contractor.

3. Equipment specified shall be covered by the manufacturer's standard warranty on the new equipment for 1 year from the date of issuance of the Certificate of Substantial Completion and as further protected by the manufacturer's standard warranty. If within 12 months from the Date of Substantial Completion any of the equipment herein described is shown to be defective in workmanship or materials, it shall be replaced or repaired free of charge by the Contractor.

B. Product Handling:

1. Contractor is responsible for protection of all material, equipment, and apparatus provided from damage, water, and dust, both in storage and when installed, until final acceptance.

2. Provide temporary storage facilities for material and equipment.

3. Material, equipment, or apparatus damaged because of improper storage or protection will be rejected and replaced at Contractor's expense.

C. Special Requirements:

1. Maintain emergency and service entrances usable to pedestrian and vehicle traffic at all times. Where trenches are cut, provide adequate bridging for traffic when required by Contracting Officer.

D. Schedule of Work: Arrange work to comply with schedule of construction. (Completed by Specifier)

E. Coordination of Work: The Contractor shall coordinate all trades whose work is adjacent, in order to avoid field interference and delay in execution of the work of all trades. Furnish detailed advance information regarding all requirements related to work by others.

1.08 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Section 01700, Contract Closeout.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Materials and apparatus shall be new unless otherwise specified, and each shall have all necessary trimmings, accessories and controls required to make it functionally complete. All items of the same type shall be of the same manufacturer. All phases of the work will be performed by competent workmen, skilled in their respective trades.

B. All materials, equipment and processes requiring approval of the Underwriters Laboratories or other nationally recognized testing agency shall be labeled so approved in accordance with the provisions of the State of Alaska.

2.02 FLEXIBLE PIPING SYSTEM

A. Double wall flexible piping system shall be Enviroflex as manufactured by Total Containment, Inc., or equal. Piping shall be UL listed for underground piping of flammable liquids. The double-wall piping system shall consist of a flexible inner primary pipe contained within a flexible outer containment pipe, each making connection within a series of surface access containment chambers. All piping runs shall be continuous, whereby there shall be no fittings or piping connections, for either the primary or secondary containment pipe which are not visible or accessible from the above ground surface. The secondary containment system shall provide water tight containment of the primary piping.

B. Product compatability: All components of the double-wall piping system shall be compatible with the products to be stored.

C. Corrosion resistance: All components of the double-wall piping system shall be made of noncorrosive materials, or if metallic, such as the fittings and couplings, isolated from corrosion causing elements.

D. Structural integrity: The outer secondary containment system shall be of such a design and made of materials to have sufficient strength to withstand the maximum underground burial loads and tested in accordance with AASHTO M294. The flexible inner primary piping system shall be capable of withstanding liquid pressure five times greater than the designed operating pressures.

E. Integrity testing: The outer secondary containment systems shall undergo an air pressure hold test (3 to 5 psi) after installation and before the final backfill. The flexible inner primary piping system shall be subject to 60 psi air pressure hold test prior to final backfill.

F. Monitoring capability: The design of the secondary containment system shall permit any leak in the primary piping system to flow from its source to a surface access containment chamber which shall be fitted with an electronic leak detection system.

2.03 FIBERGLASS PIPING AND FITTINGS

A. Fiberglass piping and fittings shall be Ameron Dualoy 3000/L or equal. Piping and fittings shall be UL listed for underground piping of flammable liquids and shall conform to ASTM D 2310, D 2517 and D2996. Pipe shall be filament wound fiberglass reinforced epoxy with integral epoxy liner and exterior coating. Fittings shall be compression molded and filament wound fiberglass reinforced epoxy. Joining shall be bell and spigot tapered adhesive bonded joint with two-part epoxy adhesive for primary product piping system and 2 part clamshell wing nut bolted fittings for secondary containment fittings. Secondary containment piping and fittings shall be one pipe size larger than primary product piping and fittings. Both primary and secondary containment piping shall be sloped to drain back to tank at slopes indicated on drawings. Primary piping systems shall be 150 psig working pressure (-60 to 150 degrees F). Secondary containment piping systems shall be 5 psig working pressure.

2.04 TRACER TAPE

A. Underground tracer tape shall be minimum 6-inch wide plastic labeled "Caution - Buried Pipe Below" for all buried pipe except under building slabs. Tape shall be 24 inches maximum above top of pipe and continuous along length of pipe.

2.05 FUEL DISPENSER

A. Fuel dispenser shall be Bennett BN3913-562 or equal. Unit shall be UL listed for commercial and industrial applications and ready to operate with card and key lock systems.

1. Gallon pulsers and electric resets.

2. Lighted cabinet with red enamel finish.

3. Weights and measures four piston meters.

4. Single hose, 12 feet long x 1 inch diameter.

5. Standard 1/3 hp, 120v, 1 phase motor (optional 3/4 hp).

6. Positive displacement pump (optional submersible pump and remote dispenser).

7. Capable of handling 15% methanol blended fuel (optional 100% methanol).

8. Strainer rust-proof 100 mesh (optional 35 micron filter).

9. Product designation on both sides of cabinet.

B. Filter on hose connection shall be a Central Illinois C1-1000 or equal external Hydra-sorb water/sediment filter.

C. Nozzle shall be Emco Wheaton A2000, OPN 811, or equal.

1. UL approved.

2. Aluminum body.

3. Aluminum spout.

4. Buna N disc.

5. Graphite impregnated asbestos with Teflon packing (optional Buna N O-ring).

6. 1 inch threaded female NPT inlet with 3/4 inch bushing.

7. Stainless steel shut-off.

D. Hose breakaway coupling shall be Emco Wheaton EWA19-103, OPW 66, or equal. Coupling shall prevent damage to dispenser and fuel spills by drive-aways using a dry disconnect.

1. UL listed.

2. Automatic pull apart and flow shut-off.

3. Electroless nickel-plated aluminum body and plug.

4. Viton and Buna N O-rings.

5. Stainless steel ball and spring internal components.

6. Plastic external sleeve.

7. Plastic and celcon poppets.

8. Coupling with 6 inch spacer hose.

E. Hose swivel shall be Emco Wheaton EWA103, OPW 45, or equal. Ball and socket design shall allow the hose and nozzle to move smoothly and freely on any plane or axis.

1. UL listed.

2. Aluminum body.

3. Buna N seal.

4. Chrome plated brass connector.

F. Dispenser containment sump shall be Ace Tank and Equipment Co. CN 447, Total Containment, Inc. DU 2215, or equal. Sump shall be designed for use with Bennett Series 3900 dispenser. Sump shall secure fire/impact valve in position with U-clamp and provide complete containment of fuel leaks within dispenser. Provide cathodic protection anodes on steel sumps.

G. Fire/impact safety valve shall be Emco Wheaton EWA60, OPW 10R, or equal. Valve shall automatically shut-off in event of a fire or impact.

1. Cast iron body and top.

2. Brass and stainless steel trim.

3. Stainless steel spring.

4. Buna N seal.

H. Fuel dispenser island concrete forms shall be Ace Tank and Equipment Co. CX936R6-12 or equal.

1. Steel construction.

2. Dimensions: 36 inches wide, 9 inches high, 6 inch radius ends.

2.06 FLEXIBLE CONNECTORS

A. Flexible connectors shall be Teleflex TL 6010 or equal.

1. UL approved for underground use.

2. Teflon inner core.

3. Stainless steel outer braid and ends.

4. Compatible with all fuels including alcohol blends.

B. Secondary Containment Boots shall be Teleflex TL6010498L24 or equal with stainless steel clamps and caps as required.

2.07 SITE MONITOR WELLS

A. Piping shall be schedule 40 PVC with .020 inch slots spaced at 1/4 inches in pipe section below ground water level only. Length and size as shown on drawings.

B. Monitor well handhole shall be Emco Wheaton EWA722-001, OPW 104AOW, or equal.

1. Cast iron lid and rim with API recommended warning label and permanently attached stainless steel hold down bolts.

2. Polyethylene handhole skirt of approximate 12 inch diameter with additional API recommended warning label inside handhole.

3. ABS plastic lockable cap and collar for 4 inch pipe.

4. Buna N O-ring seal.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. Install new piping and equipment in accordance with the drawings, applicable referenced publications, and the manufacturer's written instructions, checklists and warranty requirements for each system component.

B. Underground piping shall be laid in trenches excavated to proper line and grade and the piping shall be firmly supported to prevent settlement.

C. Trench excavations shall be as specified below:

1. Trench for piping shall be of adequate width for the proper laying of pipes. Care shall be taken not to over excavate. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portions of the pipe sections where it is necessary to excavate for fittings, bedding and for the proper sealing of pipe joints. Such depressions shall be dug after the trench bottom has been graded, and, in order that the pipe rest on the prepared bottom for as nearly its full length as practicable, depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Stones shall be

removed as necessary to avoid point bearing. Over excavation shall be backfilled as specified in Section 02223, Backfilling. Whenever wet or otherwise unstable material that is incapable of properly supporting the pipe is encountered in the bottom of the trench, such material shall be over excavated to a depth to allow for a stable pipe bed and backfilling per Section 02223, Backfillng.

2. The trenches shall not be backfilled until all required pressure tests and/or inspections are performed and until the systems as installed conform to the requirements specified herein.

D. Cap or plug piping and equipment connections during installation to prevent entry of dirt, sand, and grit.

E. All fuel and vent piping underground shall be buried a minimum of 24 inches below bottom of concrete slab with a slope of 1/4 inch per foot back to tank.

3.02 TESTING

A. Operate equipment successfully through ten successive complete cycles of operation.

B. Pressurize primary product pipe to 150 psig with water as test medium for 24 hours with no loss in pressure. Blow out piping completely with dry compressed air after successful completion of test. Leaks shall be repaired by cutting out leaking section, installing new pipe and fittings and retesting system.

C. Secondary containment piping system and tank vents shall be tested with compressed air at 5 psig. Soap fittings for leaks. Leaks shall be repaired by cutting out leaking section, installing new pipe and fittings and retesting system.

END OF SECTION