1. GENERAL

a. Amoco Oil Company shall furnish underground storage tanks to the site per Amoco specifications.

b. Tanks received at the site will be coated as a protection against rusting or corrosion. Contractor shall inspect this coating prior to installation in the hole and touch up areas where coating is damaged or missing. Touch up material is furnished by Amoco tank manufacturer and shall be delivered with the tanks.

2. SCOPE OF WORK

a. Unless specified otherwise in the Equipment Schedule, the Contractor shall furnish all labor and materials to complete the installation of all systems and equipment as shown hereon and as required by the contract.

b. Amoco Oil Company shall secure permits for underground storage tanks and underground piping. The General Contractor shall secure all additional permits required associated with the installation of the underground tanks, piping and related equipment. Amoco Oil Company shall pay all fees related to the permits.

c. Contractor shall be responsible for compliance with all local codes and regulations, Federal Occupational Safety and Health Acts of 1971 Regulations and Amoco's Specifications. All costs for any changes required due to Contractor's negligence in complying with aforementioned codes and regulations shall be borne by the Contractor.

d. No changes or substitutions shall be permitted without first obtaining the approval of the site by Amoco's Project/District Engineer.

e. Contractor shall furnish Amoco's Project/District Engineer a corrected site plan locating all tanks and piping as installed, i.e., "As Built" drawings.

f. Prior to final acceptance of the project, the Contractor shall furnish the Amoco Engineer a copy of the observation well boring log for his files.

3. EXCAVATION, TRENCHING AND BACKFILL

a. General

1. Excavations and trenches are to conform to the rules and regulations, specified by the Federal Occupational Safety and Health Act, Subpart P "Excavations, Trenching and Shoring".

2. Top of tank elevations shall be noted on the grading plan for Contractors use in establishing the depth of excavation.

3. Banks more than four feet high shall be shored or sloped to angle of repose where a danger of slides or cave-ins exist as a result of excavation.

4. Materials used for sheeting and sheet piling, bracing, shoring, and underpinning shall be in good serviceable condition and timbers used shall be designed and installed so as to be effective to the bottom of the excavation.

5. Surface water run-off shall not be allowed to accumulate in an excavation. Contractor shall provide protection to route all run-off water away from or around excavation.

6. Adequate physical barrier protection shall be provided at all remotely located excavations.

7. The Contractor shall be responsible for the proper abandoning of all existing observation wells and water wells which are not be be re-used with the new development. The Contractor shall abandon the wells by removing any casing or piping and filling completely with grout or as required by local, state or federal regulations. The Contractor shall give to the Amoco Engineer written certification that all wells have been abandoned as required and local, state and federal regulations have been met.

b. Excavation

1. Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e. sewer, water, electrical lines, etc., will be encountered and if so, where such underground installations are located. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.

2. Excavations shall be inspected by a competent person after every rainstorm or other hazard-increasing occurrence and the protection against slides and cave-ins shall be increased if necessary.

3. Excavated or other material shall not be stored closer than 6 feet to the edge of any excavation and shall be stored and retained as to prevent its falling or sliding back into the excavation.

4. If the stability of adjoining buildings or walls is endangered by excavations, shoring, bracing, or underpinning shall be provided as necessary to insure their safety.

5. All excavations are to be sized so as to provide minimum bedding, clearances, depth of burial and pitch of all tanks and lines as specified in the drawings.

6. Contractor shall excavate for underground tanks and piping, including removal of all obstructions noted on site plan which interfere with the installation and remove all excess material from the premises, unless otherwise required by Amoco's Project Engineer.

c. Trenches

1. Trenches shall be large enough to accommodate piping while allowing space for sufficient backfill material. See Section 5. a-4.

2. In vehicular traffic areas, trenches shall be of sufficient depth so as to permit six inches of bedding and a minimum of 18 inches of compacted backfill material and pavement.

3. Where employees are required to be in trenches three feet deep or more, ladders extending from the floor of the trench excavation, shall be provided and so located as to provide means of exit without more than twenty feet of lateral travel.

d. Backfill

1. All tank excavations shall be backfilled with materials conforming to one of the following: VERIFY WITH AMOCO PROJECT ENGINEER BACKFILL MATERIAL TO BE INSTALLED.

a. Pea gravel-naturally rounded aggregate nominal 1/4" (1/8" minimum; 3/4" maximum) in size and containing no clay, slag, cinders or debris.

b. Sand uniformly graded inert granular particles no more than 3/8" in size with no more than 8% passing at #200 sieve. Fines shall be non-plastic and material shall contain no clay, slag, cinders or debris.

2. All pump island forms shall be backfilled with clean sand.

3. All trenches for fiberglass piping shall be backfilled with a clean sand of pea gravel as per manufacturer's specifications.

4. UNDERGROUND TANKS

a. Underground product storage tanks shall be furnished to the site by Amoco Oil Company and shall be STIP-3 or

b. Contractor to perform tank testing as required by Amoco Oil Company and as set forth in the specifications. Contractor shall notify Amoco Oil Company Project/District Engineer if local codes require additional testing other than specified herein.

c. Contractor to perform and provide to Amoco's Project Engineer documentation of all warranty validation testing required by tank manufacturer(s).

d. Ballasting and/or anchoring of tanks, if required, shall be performed according to manufacturers instructions and as approved by Amoco's Project Engineer.

e. The Contractor shall coordinate with Amoco Oil Company Project Engineer as to the date for delivery of the underground storage tanks to the site. It shall be the General Contractor's responsibility to have sufficient equipment and manpower at the site to unload the underground storage tanks. The tanks shall not be rolled from the delivery truck.

f. The Contractor, after the tanks have been removed from the delivery truck and securely chocked to prevent rolling, shall thoroughly inspect the tanks for damage such as dents, scratches, etc. Any damage observed shall be noted on the delivery ticket and acknowledged by both the Contractor and the delivery truck driver.

g. The Contractor shall measure the diameter and length of each tank delivered and record the information along with the UL number and the serial number of each tank. This information must be furnished to the Amoco Engineer prior to acceptance of the project by Amoco.

h. The Contractor shall remove all tank delivery bung caps and furnish and install tank plugs in all bungs. Before the tanks are installed in the excavation an air test of 5 p.s.i. maximum pressure shall be performed and all seams, bungs and welds tested using a soap or other approved solution to verify that the tank does not leak. Test for minimum of 30 minutes. Test shall be conducted per recommended practices set forth by the PEI. (Petroleum Equipment Institute.)

i. The Contractor shall be responsible to inspect the tanks for scratches to the protective coating and to touch up all areas required prior to installing tanks. See Section 1-b.

j. Underground tank anodes shall be inspected and tested with a continuity check to see that the anodes and test wires are in place and were not damaged during delivery.

k. Prior to placing the underground tanks in the excavation, the Contractor shall remove the air pressure from the tanks and after the tanks have been placed in the excavation and secured against rolling or other movement, the Contractor shall again place 5 p.s.i. air pressure maximum on each tank and again with a soap or other approved solution test all welds, seams, bungs, etc. to verify that the tank was not damaged in placing the tank in the excavation. After verification that the tank is tight, the Contractor shall remove the air pressure and proceed with the back fill process. Air pressure shall remain on all tanks during test procedure a minimum of 30 minutes.

5. PROJECT PIPING

a. General

1. All piping, fittings, risers, wrapping material, etc., shall be furnished and installed by the Contractor. Specific materials and equipment noted in the specification and/or in the drawings shall be furnished by Amoco Oil Company.

2. Installation of all pipe must be performed with care. Interior surface of all pipe and fittings shall be free of dirt, scale, metal, fiberglass particles, etc. before connecting.

3. Product piping shall be installed so as to slope upward continuously from tank to risers a minimum of 1/8" per foot. Vent piping shall slope 1/8" per foot continuously from tank to riser (1/4" per foot slope preferably). Traps or sags will not be permitted in any product or vent piping.

4. Piping shall be placed on prepared bed (6" minimum bed of backfill material) in such a manner as to minimize points at which one pipe may cross over another pipe, and shall not be supported with foreign objects as wood block, pipe, etc. At points where piping must cross over another pipe, a minimum of twice the nominal pipe diameter must separate the pipes.

5. Piping shall be run in as few trenches as practical.

6. The Contractor shall test all product lines and vent lines before any backfill material is installed at 50 psi of air pressure or as required by local or state inspection agencies. The Contractor shall use a soap solution to test lines and joints for leakage. The 50 psi air pressure will remain on all product lines and other underground piping during the entire construction of the project. The Contractor shall, during construction, monitor the pressure on all lines to see that damage has not occurred to any underground piping during the performance of work at the site by different trades.

b. Fiberglass Piping

1. All pipe runs are to be "fiberglass" pipe, sized in accordance with the drawings.

2. Non-metallic fittings shall be those manufactured by the supplier of the pipe being used. Mixing of different brands of non-metallic piping will not be permitted.

3. When non-metallic (fiberglass) piping is used Soilsafe 30 flex connectors are required in place of swing joints. Where connectors are to be backfilled, refer to the typical tank details and scope of work for specific flex connector specifications. There will be no substitutions for nonmetallic connectors.

4. Fiberglass pipe and fittings to be UL approved, nonmetallic for underground piping of petroleum and products. Piping shall be as manufactured by A.O. Smith (Red Thread II) or Amoron (Dualoy 3000-1). Substitutions will not be allowed.

5. Careful handling of fiberglass pipe is a must. Protect against abrasion from sharp or hard objects, impact damage from improper storage, transporting, laying or backfilling. All fiberglass pipe shall be inspected for damage, bruises or other imperfections prior to using in the piping system. Damaged pipe will not be allowed.

6. Fiberglass pipe: Cut with fine-toothed hacksaw blade or an abrasive wheel on a circular power saw. Use a saw guide or "Wrap Around" to ensure a square cut end. Cut pipe end must be within 1/8" of square.

7. All cut fiberglass pipe ends must be tapered to 1-3/4 degrees using one of the tapering tools available from the pipe manufacturer. Protect pipe during tapering to prevent damage to pipe. The finish taper shall be smooth, clean and free from surface defects. The length of taper for 2" diameter pipe is 1 5/8".

8. BONDING AND ADHESIVE SYSTEMS (Fiberglass Pipe): All fiberglass pipe surfaces to be bonded shall be cleaned with solvent as supplied by pipe manufacturer. If tapered section is wet or moist, dry with propane torch (do not overheat or burn the pipe). If temperature is below 60 degrees F (16 degrees C), warm all tapered surfaces with propane torch - do not overheat or burn the pipe or fitting. Joints are to be made up with epoxy adhesive as recommended by the pipe manufacturer. Adhesive shall be mixed thoroughly in accordance with manufacturer's instructions and shall be applied to both surfaces.

9. Follow pipe manufacturer's recommendations on cure time before disturbing joints or testing. If it is anticipated that the temperature will drop below 60 degrees F (16 degrees C) at any time during the curing process, heat shall be applied to the joints. Only chemical or electrical devices recommended by pipe manufacturer are acceptable for this purpose. No open flame or sparking devices are to be used.

10. Fiberglass to Steel Pipe Connections: Fiberglass threaded-end adapters are to be threaded into the steel pipe or fitting before bonding onto the fiberglass pipe. See 6-1.

c. Steel Piping

1. Steel pipe and fittings are to be used only to fabricate joints, balance lines, syphon lines, riser piping and aboveground vent line risers as set forth in the drawings.

2. Steel (Black) piping shall be Class A120 Schedule 40. Steel fittings shall be class 150 and/or 250 psi minimum malleable iron.

3. All buried steel (black) piping shall be coated with bitumastic seal coating, Sherwin Williams cold tar epoxy or equal after cathodic protection is connected and tested. Wrapping of pipe in lieu of painting to be done only with approval of Amoco Engineer, and shall comply to the following specifications. Wrapping material shall be 35 mil polyethylene tape "Polyken 930" as manufactured by Kendall Company (or approved equal.) Wrap overlap shall be one half width of wrapping material. Wrap 1-1/2" and 2" fittings with Polyken 900 (12 mils) with a 60% minimum overlap. In difficult areas, Polyken 931 may be used before wrapping with Polyken 900 if approved by Amoco Oil Company Engineer. Primer shall be Polyken 927 (above 40 degrees F) or Polyken 919 (above 10 degrees F) or approved equal.

4. Steel pipe and fittings shall be carefully protected against damage to protective coating and/or wrapping during handling, storage or installation.

5. Steel Pipe: Cut with a hand or power operated pipe cutter, as in normal fitting practice. Steel pipe ends are to be reamed.

6. Steel piping threaded joints, plug and connections must have clean cut threads and be made up with non-hardening joint compound insoluble in petroleum products approved by Amoco Oil Company representative. Approved joint compound:

1. Rectorseal
2. Gilbarco Pipe Joint Compound
3. Permatex 57
4. Approved equal

7. Vertical steel vent risers for tank system must be installed plumb. Provide steel angle strap to insure risers are well supported. Provide flex connectors for connection of non metallic vent lines to the steel vent line risers. Risers must have adequate protection and stability and be terminated a minimum of 12' above final design.

6. TESTING PIPING

a. General Contractor shall notify Amoco Oil Company Engineer at least two working days in advance of proposed testing in order that Amoco Engineer may be present during the testing procedure.

b. Contractor shall disconnect lines from tanks and cap prior to testing. Apply and release pressure slowly.

c. In the event it is discovered an underground line has a loss of pressure, all work shall cease until the problem with the underground line has been determined and the damage repaired. Again, the damaged line shall be tested at 50 psi air pressure, and only after it is determined that the damaged line has been satisfactorily repaired and the line is holding the 50 psi air pressure required, with the backfill material be replaced over this area.

d. Pressure shall not be removed from product lines until after paving is in place over tank area and pipe line runs, and all potential threat to piping is over.

e. After all forms are in place in the tank area and ready to pour concrete paving over tank area, the pressure may be released from the vent lines and the vent lines connected to the tank.

f. Prior to acceptance of the project by Amoco Oil Company, the Contractor shall furnish to the Amoco Engineer for his files, a certification that all ... cathodic protection systems have been installed and tested per requirements and are working properly. Potential readings at all points, must be documented on the certification. Certification form is furnished by Amoco Oil Company.

SEE SHEET TD-5 FOR CONTINUATION

Date	No.	Revisions	By

UNDERGROUND TANK INSTALLATION DETAILS

Scale:
Drawn By:
Checked By:
Approved:
District:
Date:
No. TD-4

Do not scale, use dimensions only