Part 1. General

1.1.1 Summary

A. Furnish a complete double-containment piping system including piping, fittings, anchors, terminations, carrier pipe supports and associated pipe joining equipment.

1.1.2 References

A. The following standards apply to products used within this section:

ASTM D1505	ASTM D1598
ASTM D1599	ASTM D2122
ASTM D2837	ASTM D2839
ASTM D2657	ASTM D3350

B. The system design shall meet the requirements of ASME/ANSI B31.3 for design criteria where temperature and pressure fall within the limits of that code.

C. The system design shall meet the stated minimum requirements of Federal Regulations 40 CFR-280.

1.1.3 Definitions

A. Product Pipe --- Inside Pipe/Carrier Pipe
PE 100-RC: High density polyethylene with a minimum cell classification of: PE445584C

B. Containment Pipe --- Outside Pipe
PE 100: High density polyethylene with a minimum cell classification of PE346544C

1.1.4 System Description

A. System shall be a double-containment piping system of uniform materials and pressure rating as specified below.

B. System shall provide the ability to incorporate low point probe or manual leak detection as specified within the Leak Detection Section 2.11.

1.2 System Performance Requirements

System shall handle the following:

	Product Pipe	Containment Pipe
Operating Pressure		
Operating Temperature		
Test Pressure		
Media		

1.2.1 Submittals

Submit the following:

A. Product data for each type of double-containment specified including details of construction relative to materials, dimensions of individual components, profiles, and finishes.

B. Product certificates signed by manufacturer of double-containment product stating compliance with stated requirements.

C. Welder certificates certifying that welders comply with the installation procedures as outlined by ASTM D 2657 Section 9 prior to construction.

D. Qualifications of firms supplying double-containment piping. Firms must have a minimum of 10 years experience in the design, installation and operation of a thermoplastic double-wall piping system.

1.2.2 Quality Assurance

A. Obtain components from a single source having responsibility and accountability to answer and resolve problems regarding proper installation, compatibility, performance and acceptance.

B. Design, fabricate and install double-containment piping to meet ASME/ANSI B31.3 where applicable manufacturer shall provide thermal stress analysis demonstrating the ability of the double-containment piping system to handle the stated piping conditions with a restrained or a flexible design, as follows:

1. **Restrained Design**
The system shall be restrained with no accommodation for inner-pipe movement. Manufacturer or Design Engineer should be consulted for the proper location of anchors.

2**. Flexible Design**
The system shall be a flexible design with provisions to allow inner and outer pipe ability to move independent of one another. Anchors will be selectively used to direct thermal expansion into expansion loops, and/or offsets, etc. Manufacturer or Design Engineer should be consulted for the proper

location of anchors and expansion compensation design.

1.2.3 Delivery, Storage and Handling

A. Deliver double-containment piping as a factory assembled unit with protective wrapping/coverings.

B. Store products on elevated platforms in a dry location with protection from elements.

C. Lift, support, and transport double-containment piping per manufacturer's recommendations.

1.2.4 Warranty

Warranty period is one year after date of substantial completion of installation.

1.2.5 Extra Materials

Turn over to owner, at end of construction, necessary welding equipment as suggested by manufacturer for repair and maintenance of the double-containment product.

Part 2. Products

2.1 Manufacturers

Subject to the compliance with requirements and products that may be incorporated into the work include Chem Pro DC by Asahi/America, Inc., of Malden, Massachusetts, 1-800-343-3618.

2.2 Materials

A. Product Pipe: Pipe shall be made from virgin resin produced by one supplier. The resin shall be high density polyethylene material according to ASTM D-3350 and be as defined in 1.1.3.A.

B. Containment Pipe: Pipe shall be made from virgin resin produced by one supplier. The resin shall be PE 100, high density polyethylene material according to ASTM D-3350 and be as defined in 1.1.3.B.

2.3 Pressure Rating Pipes

Both inner and outer pipes shall conform to requirements for establishing a hydrostatic design basis.

A. Product Pipe
The product pipe shall have a standard dimensional ratio of SDR-11 for pipes 1" through 12" and shall be pressure rated to 150 psi at 68^{o}F for all diameter sizes.

B. Containment Pipe
The containment pipe shall have a standard dimensional ratio of SDR-11 for 3"and shall be pressure rated to 150 psi, SDR-33 for all other diameters 4" and larger rated to 45 psi..

2.4 Pressure Rated Fittings

A. Product Fittings
Material shall meet requirements of 2.2.A, with all fittings having a standard dimensional ratio of SDR-7 for socket fusion.

B. Containment Fittings
Material shall meet requirements of 2.2.B and standard dimensional ratio of 2.3.B.
No split fittings will be allowed.

2.5 Unlisted Components

Any special fittings, welded areas, etc. not supplied as part of the normal product offering shall be classified as unlisted components. Products falling into this category shall be pretested to twice the maximum operating pressure for a period of 2 hours minimum.

2.6 Valves

Valving arrangements that are to be double contained shall be supplied preassembled and tested to 150% of the maximum operating pressures. Actuators, stem extensions, and other accessories shall be part of a preassembled package where appropriate.

2.7 Pipe Supports

Supports, guides, etc. for product pipe shall be provided of same resin as containment pipe. Supports shall be placed in a manner that a maximum of 0.1" deflection is allowed between supports. Supports shall allow axial movement of product pipe within containment pipe. Supports shall maintain a concentric relationship between product pipe and containment pipe. Supports shall supply a minimum of 1.5" wide surface area to prevent point loading of product pipe.

2.8 Anchors

Anchors shall be provided of same resin group as product pipe and containment pipe. Anchors shall be of same wall thickness as product and containment pipe, and be of unitary construction.

Anchors shall be fully pressure rated. Anchors shall be dogbone style by Asahi/America, Inc.

2.9 Simultaneous Weld Discs

Simultaneous weld discs shall be provided of the same resin group as product pipe and containment pipe. Molded simultaneous weld discs shall supply 4 openings on 90° spacing to allow for drainage and venting of the annular space. Fabricated simultaneous weld discs shall be designed with vent and drain openings. All simultaneous weld discs shall be sized to maintain alignment of product pipe within +/- 10% of wall thickness.

2.10 Vents/Drains

High-point vents and low-point drains shall provide adequate flows to completely drain annular space. Vents/drains shall be located per contract drawings. Vents/drains shall be of same resin as product pipe.

2.11 Leak detection

Shall be provided per contract drawings and leak detection manufacturer's requirements. Low Point leak detection stations shall be of same resin as pipe.

Part 3. Execution

3.1 Installation

A. Install double-containment piping to comply with manufacturer's recommended procedures.

B. Installers shall be pre-qualified through sufficient training in butt fusion techniques according to ASTM D2657 Section 9.

C. Hot gas welding shall not be allowed for wetted components.

D. Manufacturer/Manufacturer's Representative shall provide on-site training in the assembly, installation, and operation of double-containment system.

3.2 Testing

Testing shall be conducted in accordance with manufacturer's recommendations. The owner shall be notified at the time of test and choose to be present.

Pressure Systems

A. Product Pipe
Should be tested hydrostatically to 150% of operating pressure per ASME B31.3 part 345 or per local code.

B. Containment Pipe
The containment piping shall be tested hydrostatically to 150% of operating pressure per ASME B31.3 or per local codes. The product pipe must be pressurized to the same pressure as the test to prevent collapsing of product pipe.

Alternate to containment pipe hydrostatic test

To avoid moisture in the containment space, an air test can be conducted on the containment pipe. Pressure test is recommended at 5 psi and shall not exceed 10 psi. The inner carrier pipe shall be full of water and under pressure to avoid any possible collapse.
When testing with air, the ambient temperature should be above 32 °F and extra safety precautions for personnel shall be put in place during the test.