1 Introduction to Elements of Pipeline Design

1.1 Definitions
1.2 Pipeline Systems (Gathering, Transmission and Distribution)
1.3 Fluid Properties
1.4 Materials for Pipelines
1.5 Effects of Pressure and Temperature
1.6 Codes and Standards
1.7 Environmental Factors
1.8 Economics

2 Pipeline Routing, Survey and Geotechnical Guidelines

2.1 Preliminary Route Selection
2.2 Key Factors in Route Selection
2.3 Engineering Survey
2.4 Geotechnical Design

3 Pipeline Mechanical Design

3.1 High Vapor Pressure and Low Vapor Pressure
3.2 Class Location
3.3 Pressure Design Formula for Steel Pipe
3.4 Restrained and Unrestrained Pipes
3.5 Pipeline Stress Limits
3.6 Depth of Cover and Clearances
3.7 Valve Assemblies
3.8 Scraper Traps (Pig Traps)
3.9 Pipeline Crossings
3.10 Open Cut Crossings
3.11 Typical Crossings
3.12 Horizontal Directional Drilling (HDD)
3.13 Buoyancy Control Requirements
3.14 Pipeline Coating Selection

4 Pipeline Materials

4.1 Elements of Pipeline Material Design
4.2 Notch Toughness Requirements for Steel Pipes
4.3 Sour Service Requirements

4.4 Oilfield Water Service

5 Pipeline Installation and Construction

5.1 Construction Survey and Routing
5.2 Clearing
5.3 Grading
5.4 Loading, Hauling and Stringing
5.5 Bending
5.6 Welding
5.7 Non- Destructive Testing
5.8 Trenching
5.9 Coating
5.10 Lowering-In
5.11 Backfill
5.12 Tie-Ins

6 Pipeline Pressure Testing

6.1 Purpose of Pressure Testing
6.2 Pressure Testing Medium
6.3 Pressure Testing Limits (Strength and Leak Tests)
6.4 Test Head Assemblies
6.5 Water Sources
6.6 Disposal of Water
6.7 Drying and Cleaning
6.8 Tie-ins and Commissioning

7 Special Topics

7.1 Oilfield Steam Distribution Pipelines
7.2 Aboveground Pipeline Design
7.3 Composite Reinforced Steel Pipelines

8 Pipeline Engineering Drawings

8.1 Base Maps and Survey Plans
8.2 LiDAR Profiles
8.3 Pipeline Schematics (PFDs)
8.4 Alignment Sheets
8.5 Right of Way Configuration Drawings
8.6 Crossing Drawings

8.7 Pipeline Typicals
8.8 HDD Drawings
8.9 Valve Site Plot Plans
8.10 Piping Plans
8.11 Piping Sections
8.12 Isometrics

9 Pipeline Engineering Deliverables (From EPC Point of View)

9.1 Project Execution Plan (PEP)
9.2 Design Basis Memorandum (DBM)
9.3 Class 3 Cost Estimate
9.4 Pipeline Design Reports (Wall Thickness, Coating, Crossings, Valves, Bends, CP)
9.5 Pipeline Drawings
9.6 Mechanical Drawings
9.7 Process Drawings
9.8 Procurement (MTO, MRs, RFQ, RFP, Bid Tabs)
9.9 Construction Contract
9.10 As-Builts

10 Regulatory

10.1 Regulatory Bodies
10.2 Application Procedure