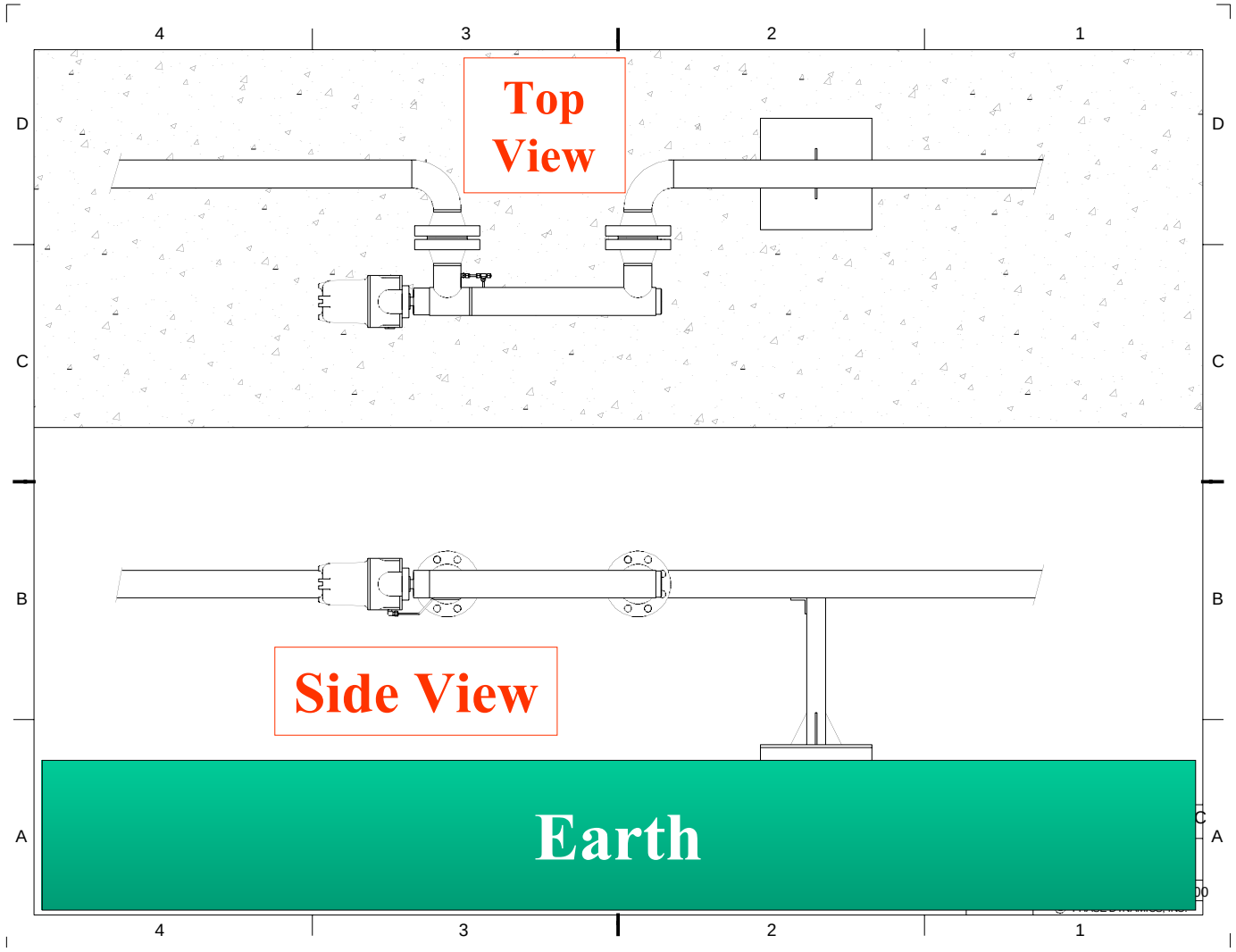
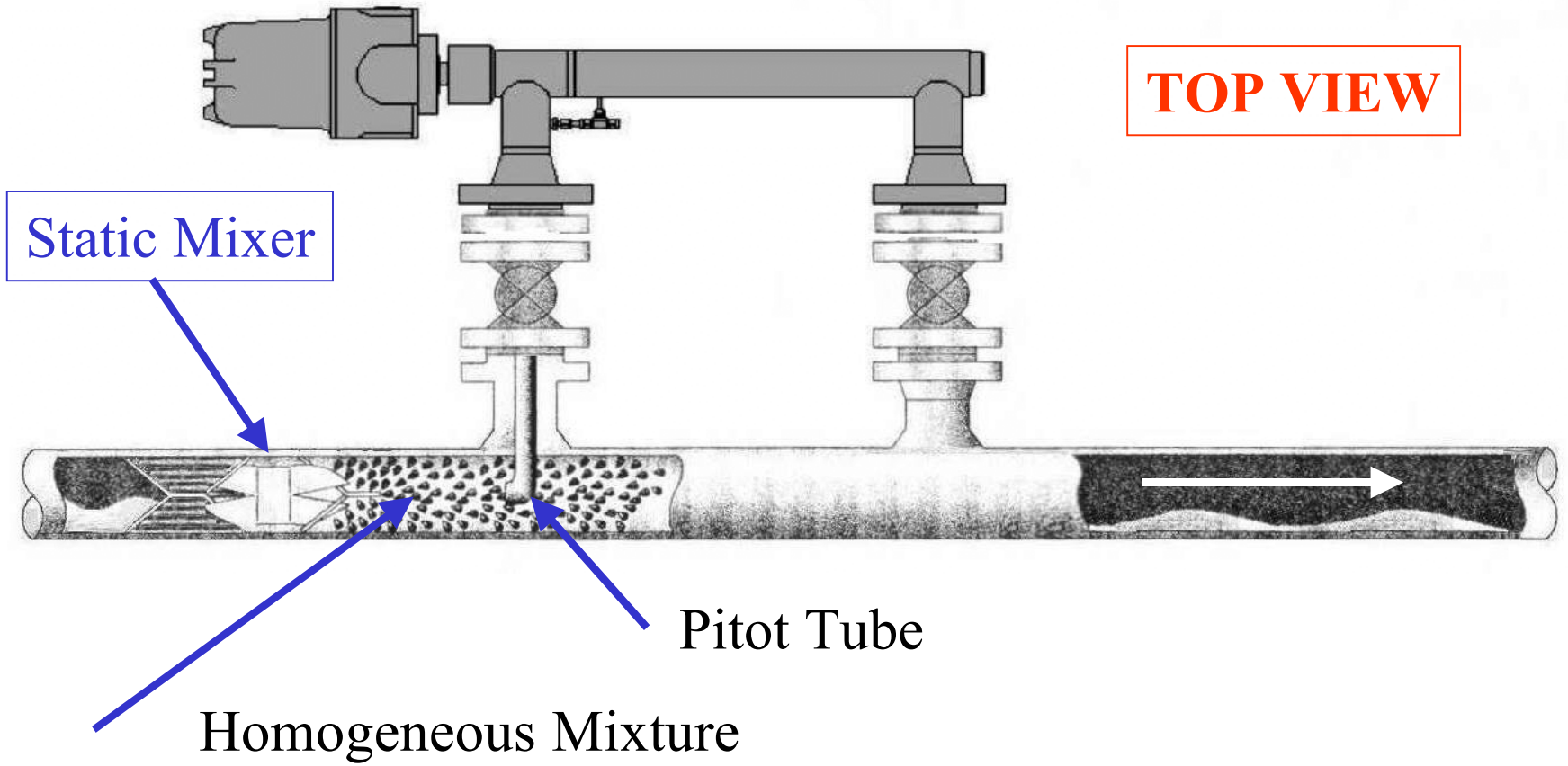
Installation Of Water Cut Analyzers

Examples
of
Good and Poor Methods

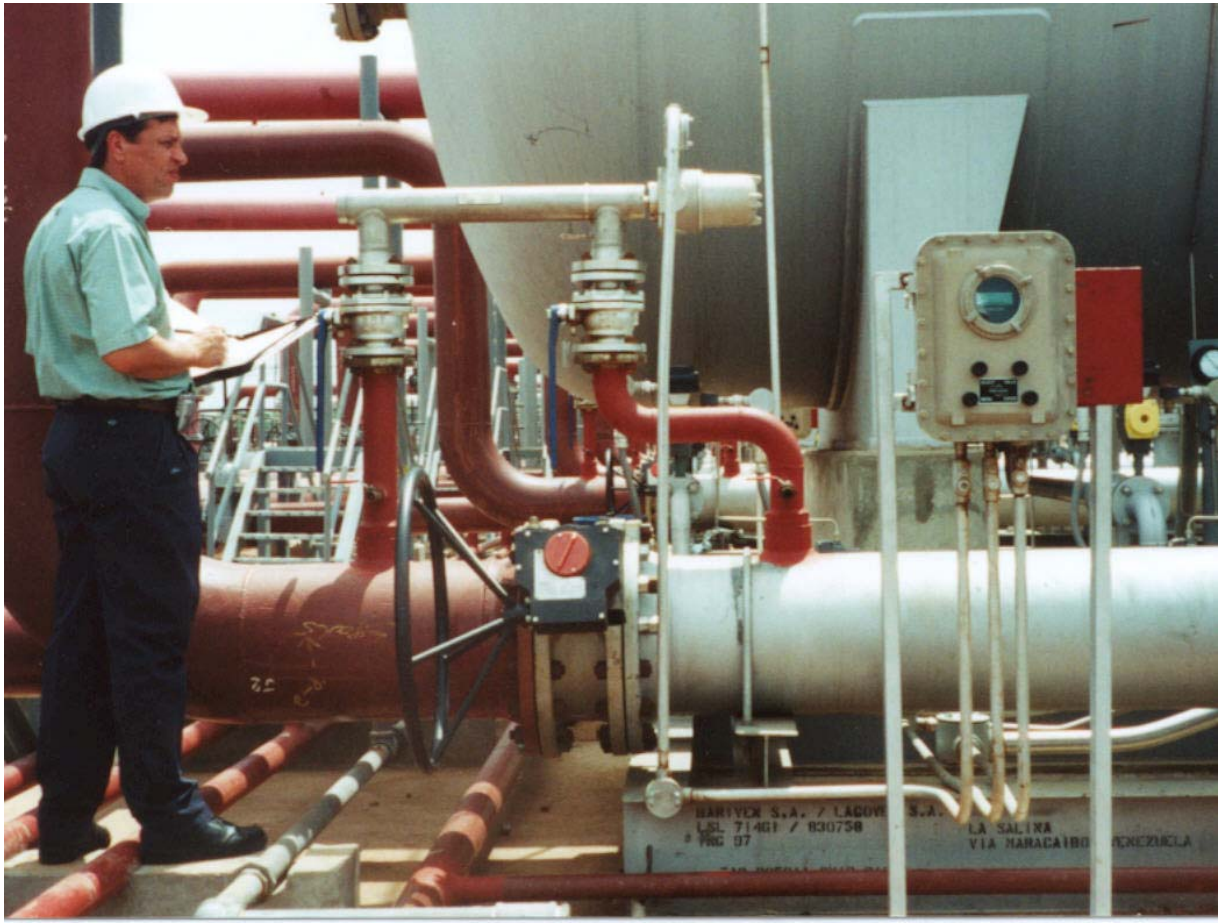
Flow Through Analyzer Installation



Correct Flow Through Installation

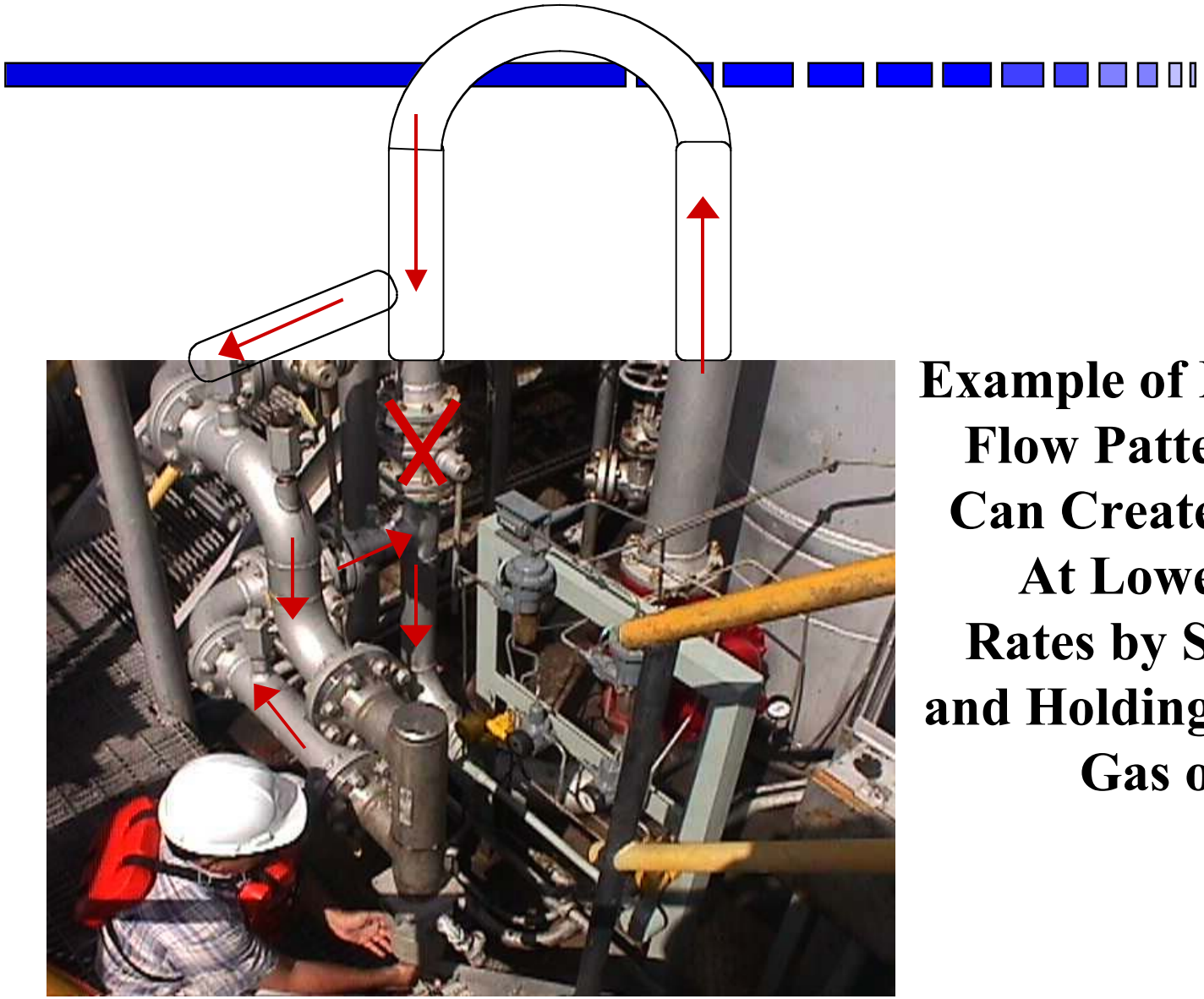


Incorrect Flow Through Installation



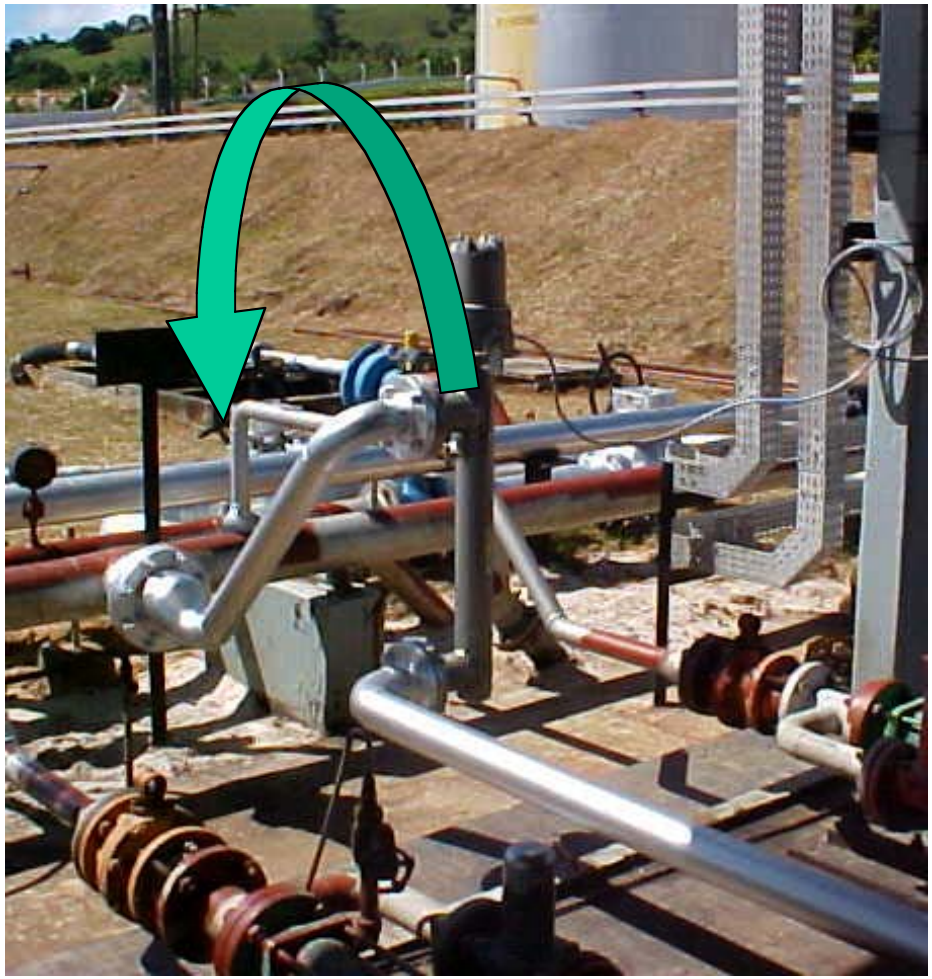
This Mounting Allows Gas or Oil to Build up In the Analyzer Unless The Flow Rate is High Enough to Flush it Through

Incorrect Flow Through Installation



Example of Meandering Flow Pattern Which Can Create Problems At Lower Flow Rates by Separating and Holding up Water, Gas or Oil

Incorrect Flow Through Installation



- **Analyzer Highest Place in the Piping - Should be In the Same Plane**
- **Analyzer on the Input Side of the Pump Instead of the Output**

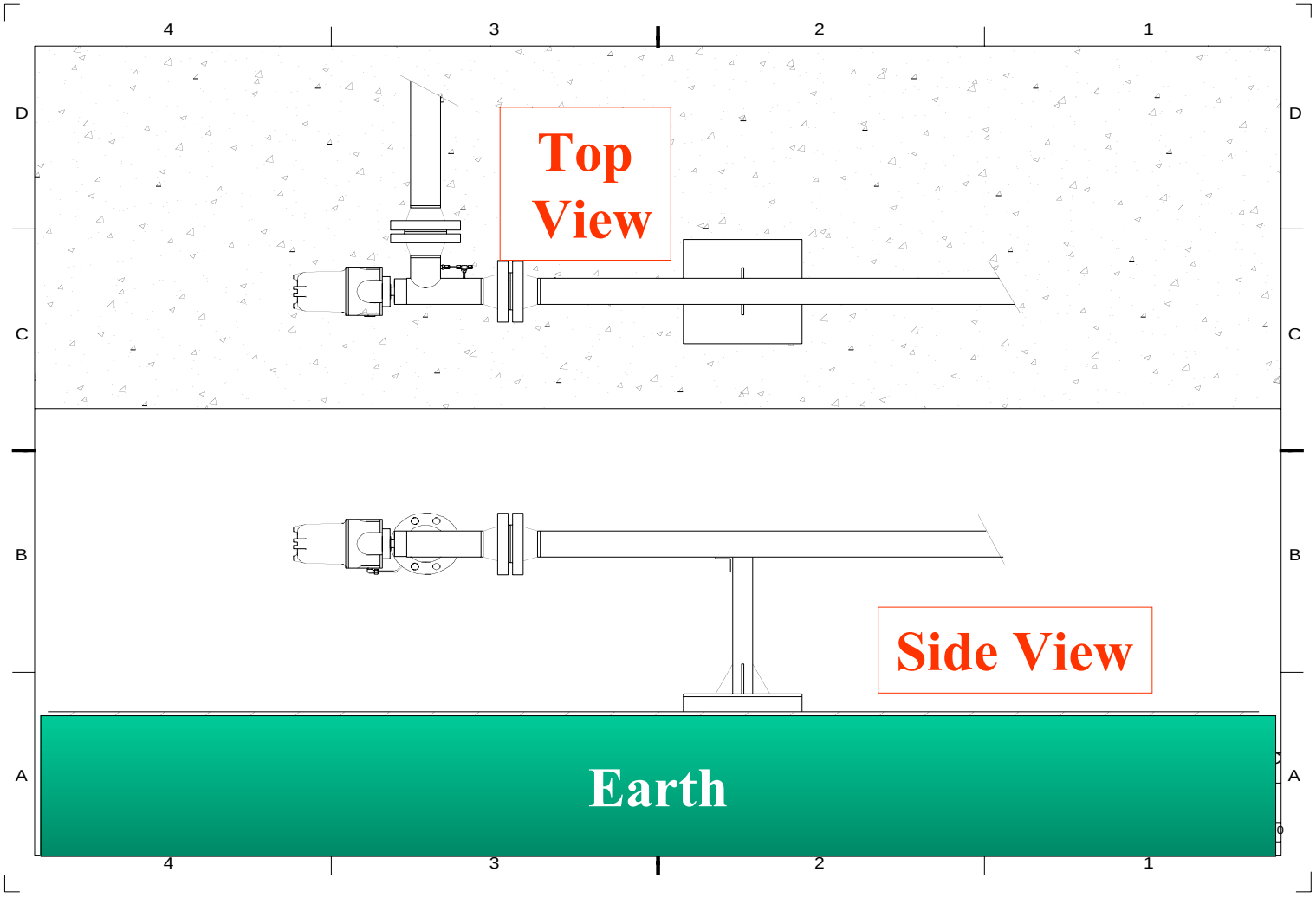
Incorrect Flow Through Installation

Better than Previous but, This Mounting Would Favor Holding up Gas

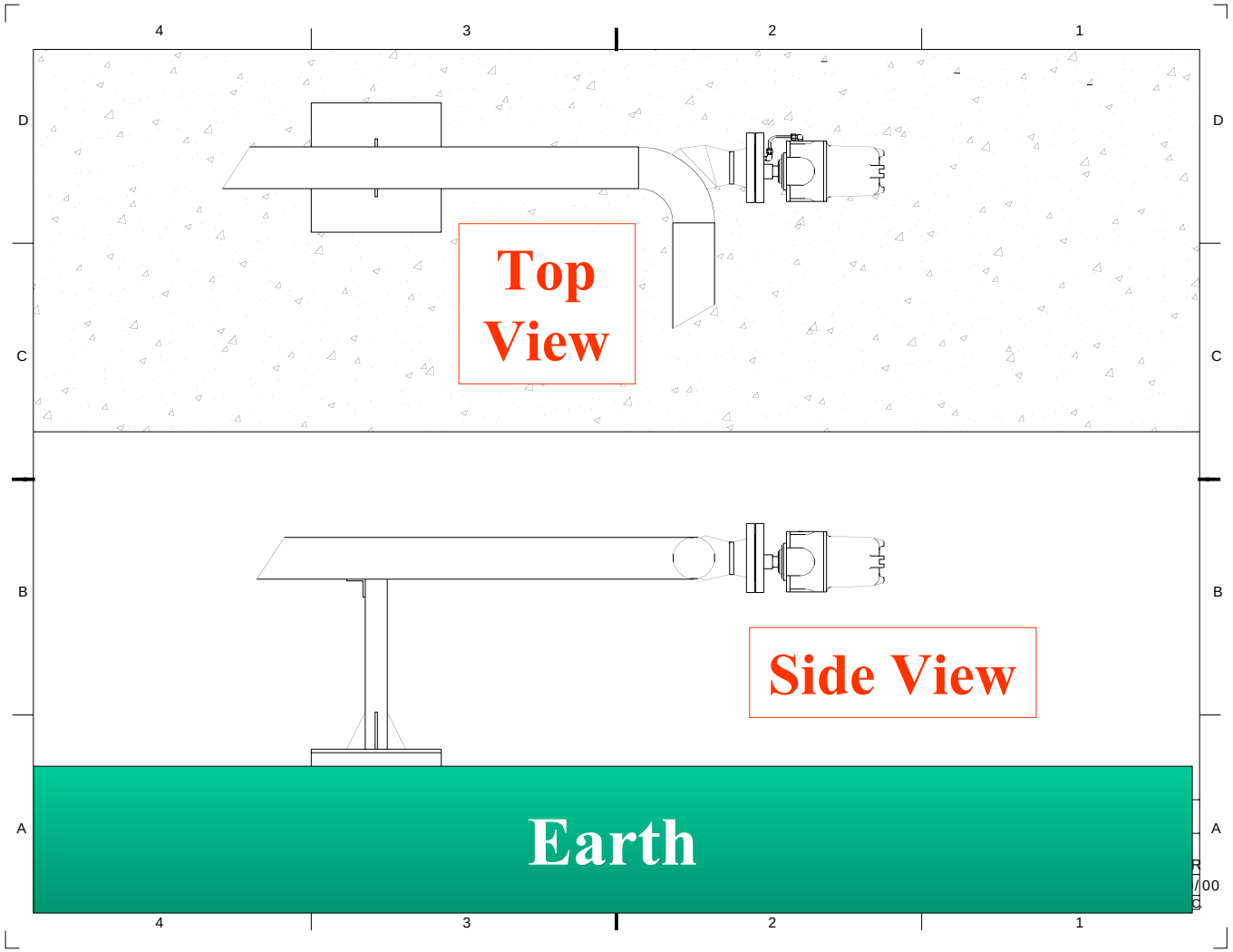
Correct Flow Through Installation

Best Overall This Mounting Allows Everything That Goes In to Go Through and Out

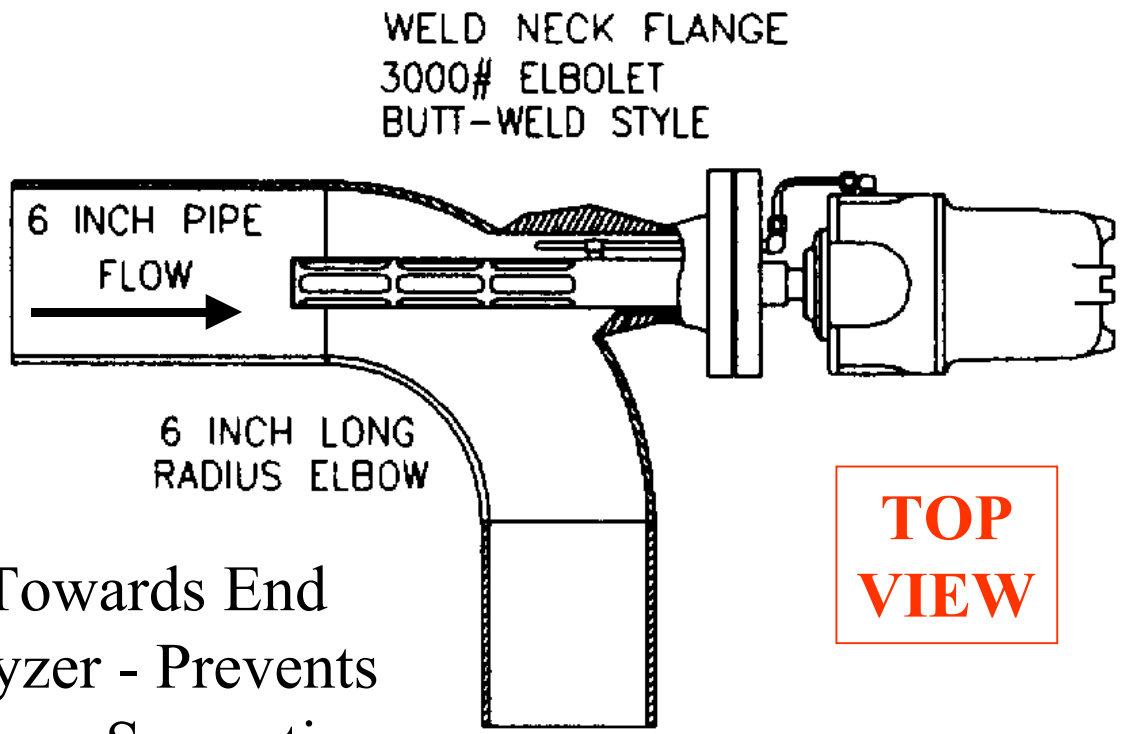
Correct “L” Analyzer Installation



Correct Insertion Installation



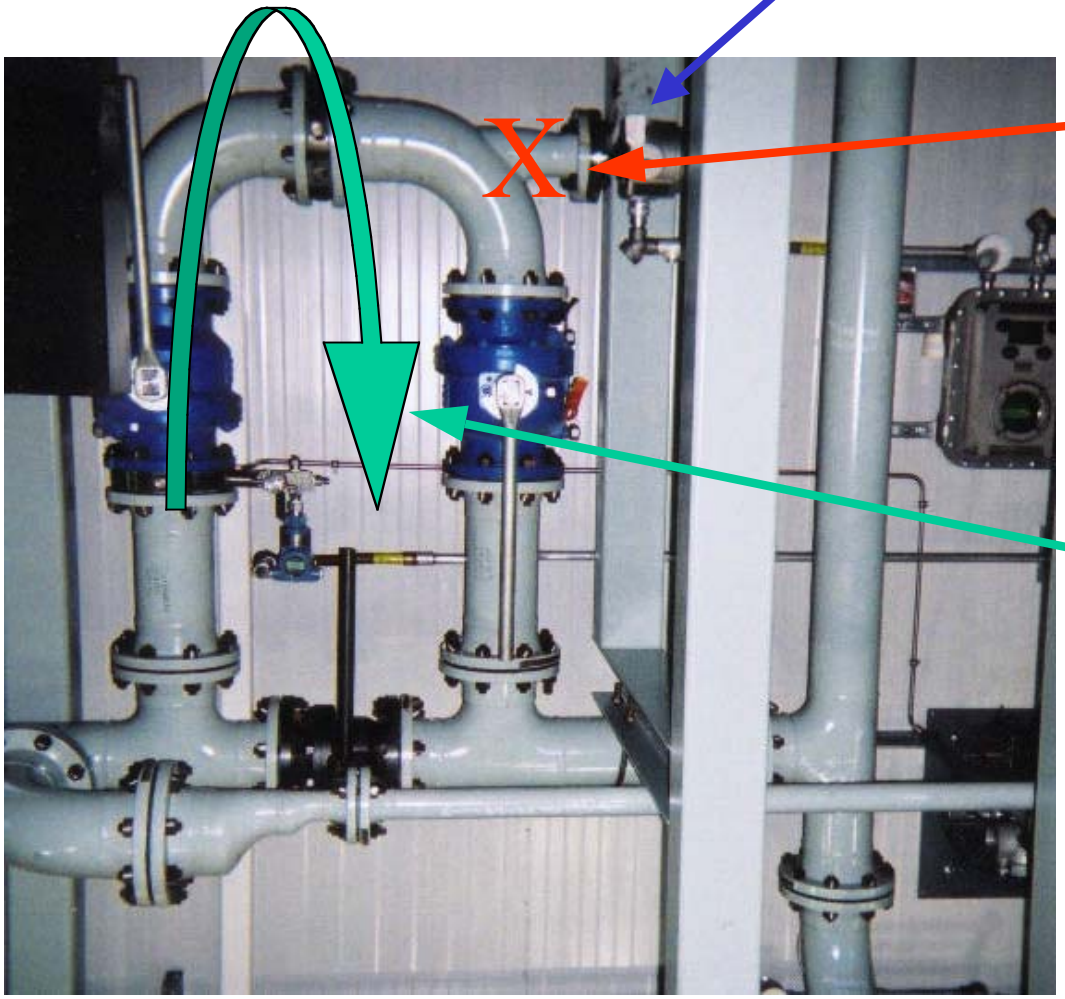
Insertion Installation in Elbow



TOP VIEW

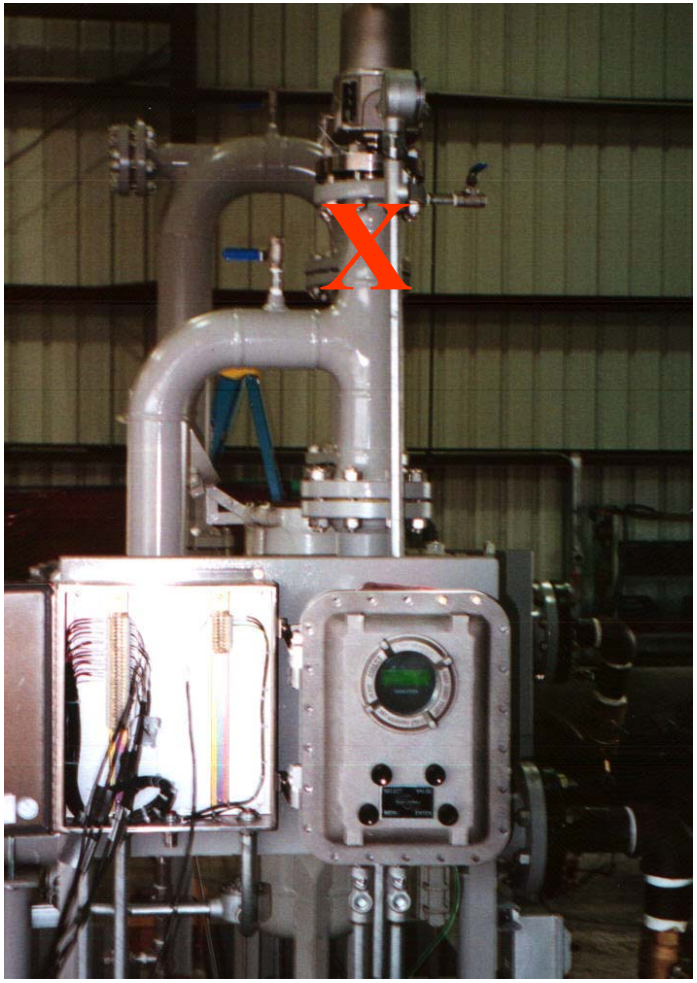
Flow Towards End Of Analyzer - Prevents Elbow from Separating Oil & Water

Incorrect Insertion Installation



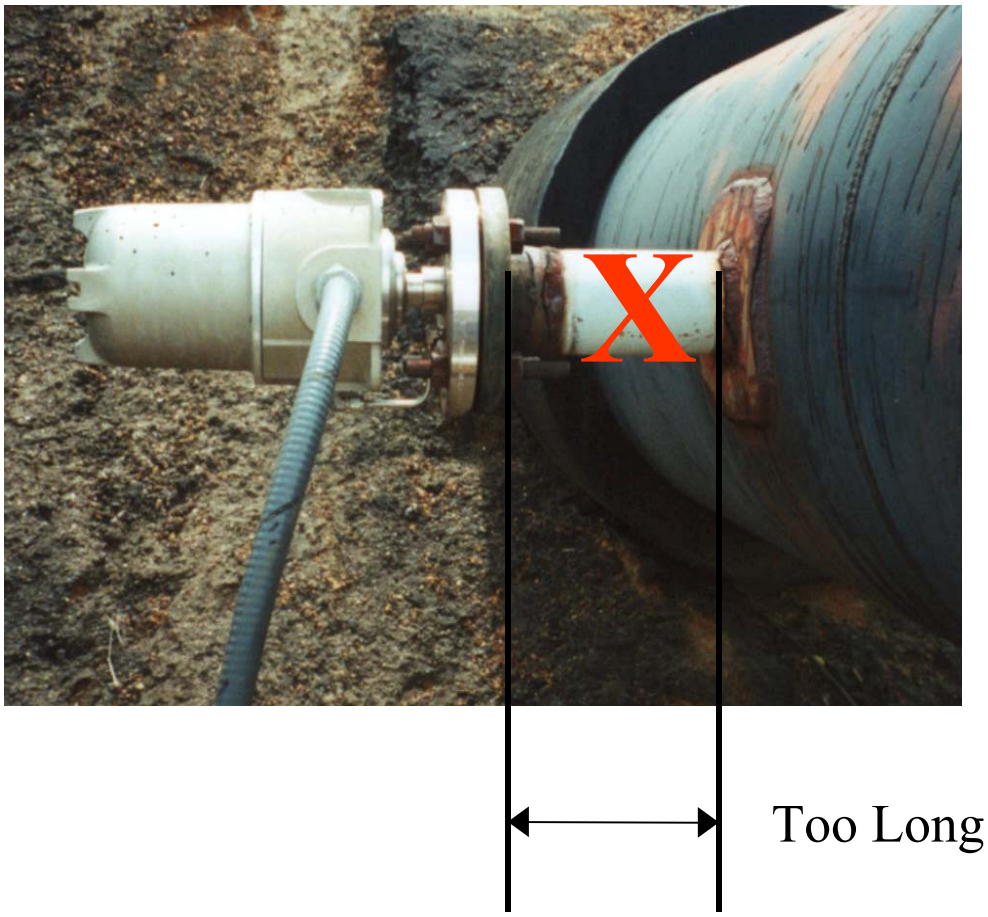
- Weldolet is Too Long
- Analyzer is at the Highest Place - Gas Can Be Captured
- Loop Should be Same Plane as Rest of Piping Then What Comes in Will Go Out

Incorrect Insertion Installation



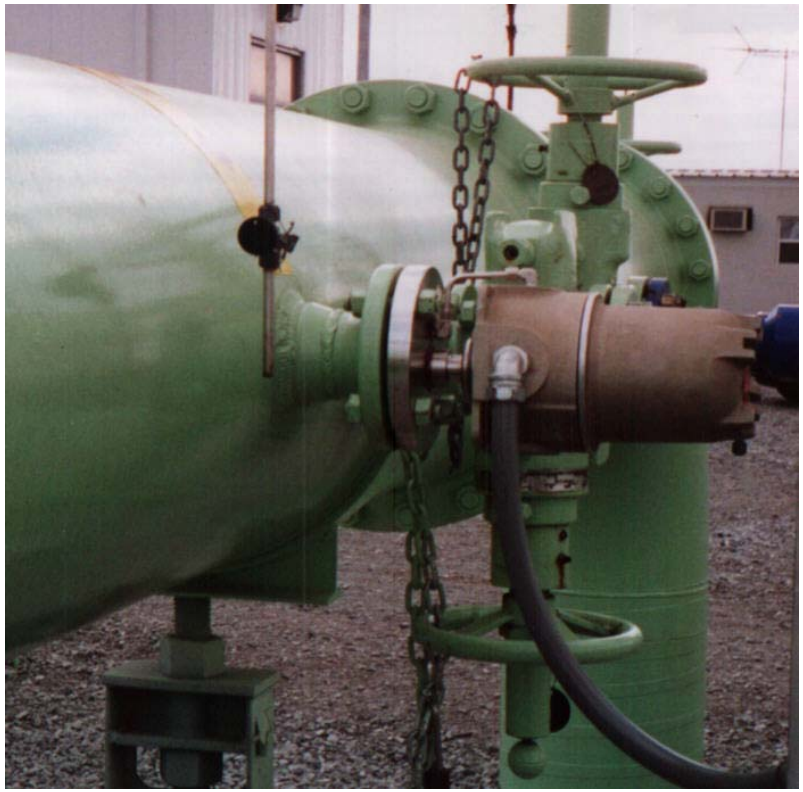
- Sensing Region of Analyzer is Not Into The Region of Liquid Flow- Weldolet and Flange Spacing Too Long
- The Analyzer is at The Highest Place in the Piping - This Can Allow Oil or Gas to Remain in the Analyzer

Incorrect Insertion Installation



This Mounting Has Too Long of A Distance Between Pipeline and Flange - Insertion Analyzer Does Not See Main Flow

Correct Insertion Installation



- **Correct Distance Between Pipeline and Analyzer**
- **Center of Pipeline Mounting is Correct**

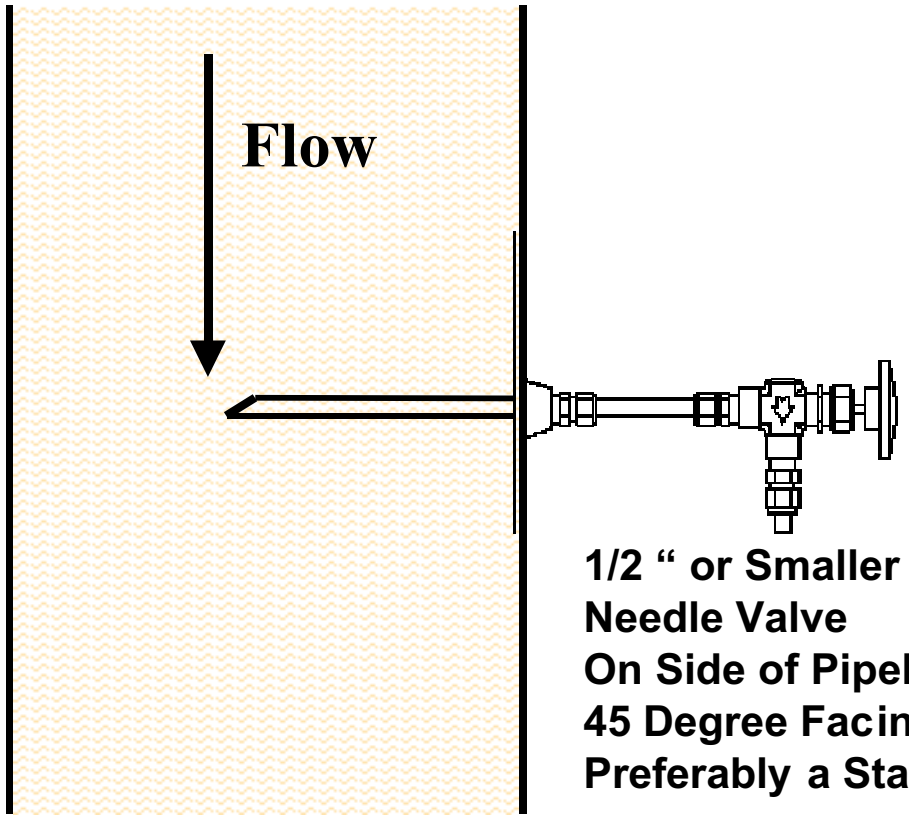
Summary

- Need High Enough Flow Rate to Give Sufficient Mixing of the Oil and Water - Typically Greater Than 2 ft/second.
- Preference is to Mount The Analyzer Such That it is Not the Highest or Lowest Portion of the Pipeline.
  - The Goal is That Everything Which Goes Into the Analyzer Goes Back Out The Other End.
  - Preference is On the Same Plane as the Earth.
- If Liquids Are Higher In Temperature Than 100 Degrees Celsius:
  - Mounting Should Be Vertical With The Electronics Down.
  - This Prevents The Excessive Heat From Affecting The Electronics' Temperature.
- Insertion Analyzers Must Be Mounted Close to the Entry Point - Excessive Length of Flange and/or Weldolets Will Prevent Analyzer From Measuring the Real Flowing Liquids.

Obtaining a Good Sample

- Issues Causing Problems In Sampling are:
  - Temperature, Density (Oil), Natural Surfactants Present, Salinity (Water), Viscosity of the Mix, Presence or Absence of Emulsion Breakers, Velocity at the Sample Port, Physical Pipe Layout - All Affect Sampling
  - Sample Point Must Take Samples From the Center of the Pipeline
  - Static Mixer Upstream of Sample Point is Required
  - Small Tubing and Multi-Turn Valve (all less than 1/2 inch diameter) Should Be Used For Sample Port
- Analyzer Must Be Read During The Sample Extraction
  - Don't Use Time of Pulling Sample and Then Go To The Control Room To Find Out Analyzer Value - The System Does Not Take Data Continuously and Time is Not Always The Same
  - Pull Sample When the Analyzer is Reading A Steady Value

Sample Port Design



1/2 “ or Smaller Swagelock Tubing and Needle Valve
On Side of Pipeline In The Middle Half
45 Degree Facing Upstream
Preferably a Static Mixer Upstream