

STI CONTROLS

Downers Grove, IL

RADAR LEVEL TRANSMITTERS



Radar Level Transmitter ?





Non-contact radar applications

- † Wet Wells/Clean Wells
- † Sumps
- † Sump Pits
- † Sludge Storage
- † Lift Stations
- † Open Channel Flow
- † Chemical Feed Tanks
- † Digester Level
- † Fuel Storage
- † Sodium Hypochlorite





Radar - Applications



- q 8' D x 5' square pit (concrete)
- q Water
- q E = 80
- q Atmospheric/Ambient
- q Turbulence
- q "floaters"
- q False targets



WWTP LEVEL APPLICATIONS

- Lift Station Wet Wells
- Influent Wet Wells
- Scum Pits
- Sludge Tanks
- Chemical Tanks
- Digester Liquid
- Filters
- Excess Flow Tanks

TYPES of LEVEL TRANSMITTERS

- Contact
- Non-Contact

CONTACT TYPES

- Head Type (Really Pressure)
- Submersible (Really Pressure with external chamber)
- Capacitance

NON-CONTACT

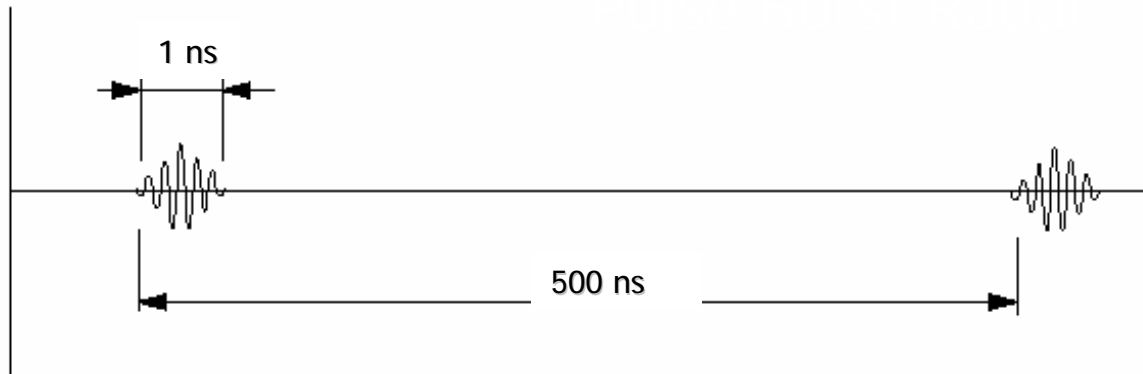
- Ultrasonic
- Radar



PRINCIPLES of RADAR



TAR – Theory of Operation



Bursts of 5.8 or 6.3GHz microwave energy

SPEED OF LIGHT = ?

299,792,458 m/sec

186,282.397 miles/sec

670,616,629.384 miles/hr





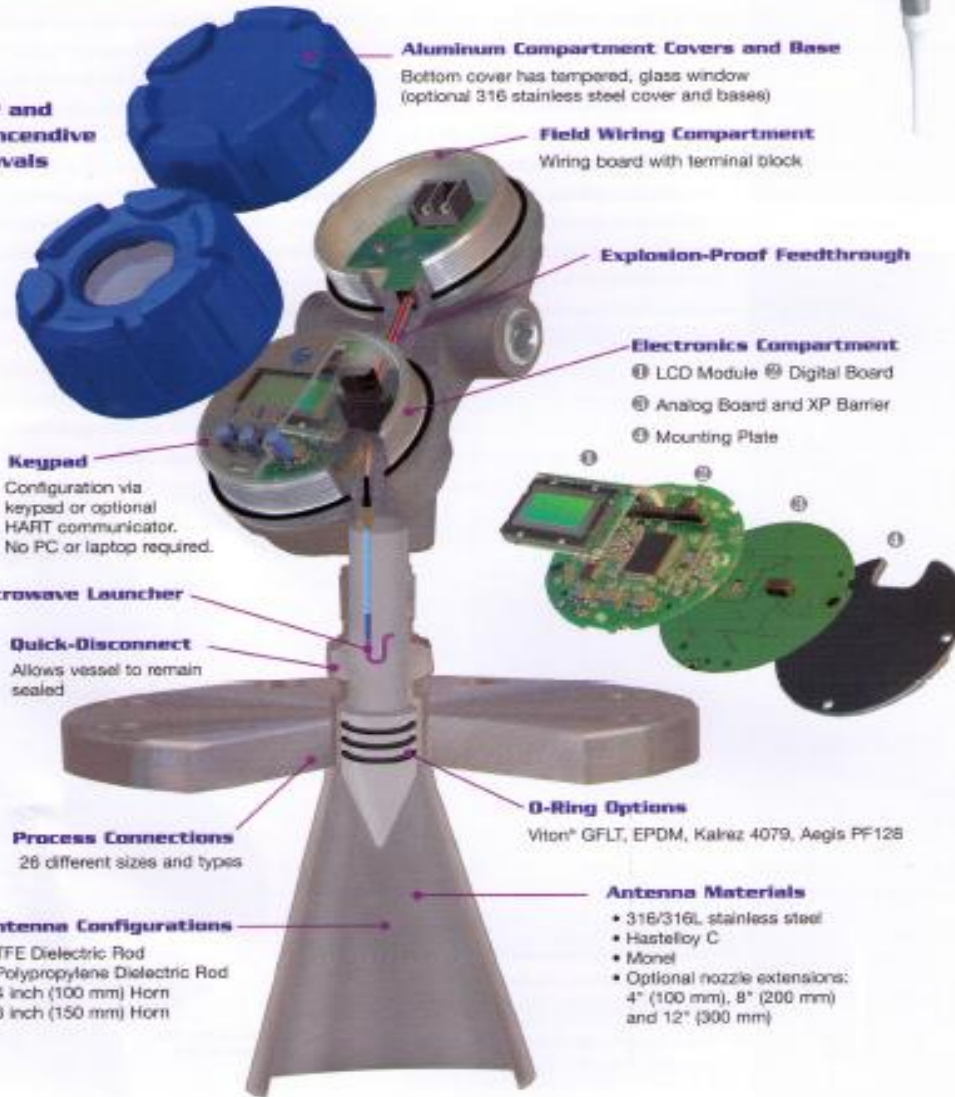
The Anatomy of a Pulsar Transmitter and Sensor

Pulsar's dual enclosures orient wiring and electronics on the same plane for convenient wiring, configuration and

display. The display features a two-line, eight-character LCD. A three-button keypad provides the user interface.



IS, XP and Non-Incendive Approvals





Antenna offerings



Std. RAA
Dielectric Rod



Dielectric Rod
with extension



RA6
6" Horn



All-Polypropylene
Dielectric Rod with
extension



All-Polypropylene
Dielectric Rod with
extension and
faced flange



† Installing the Antenna

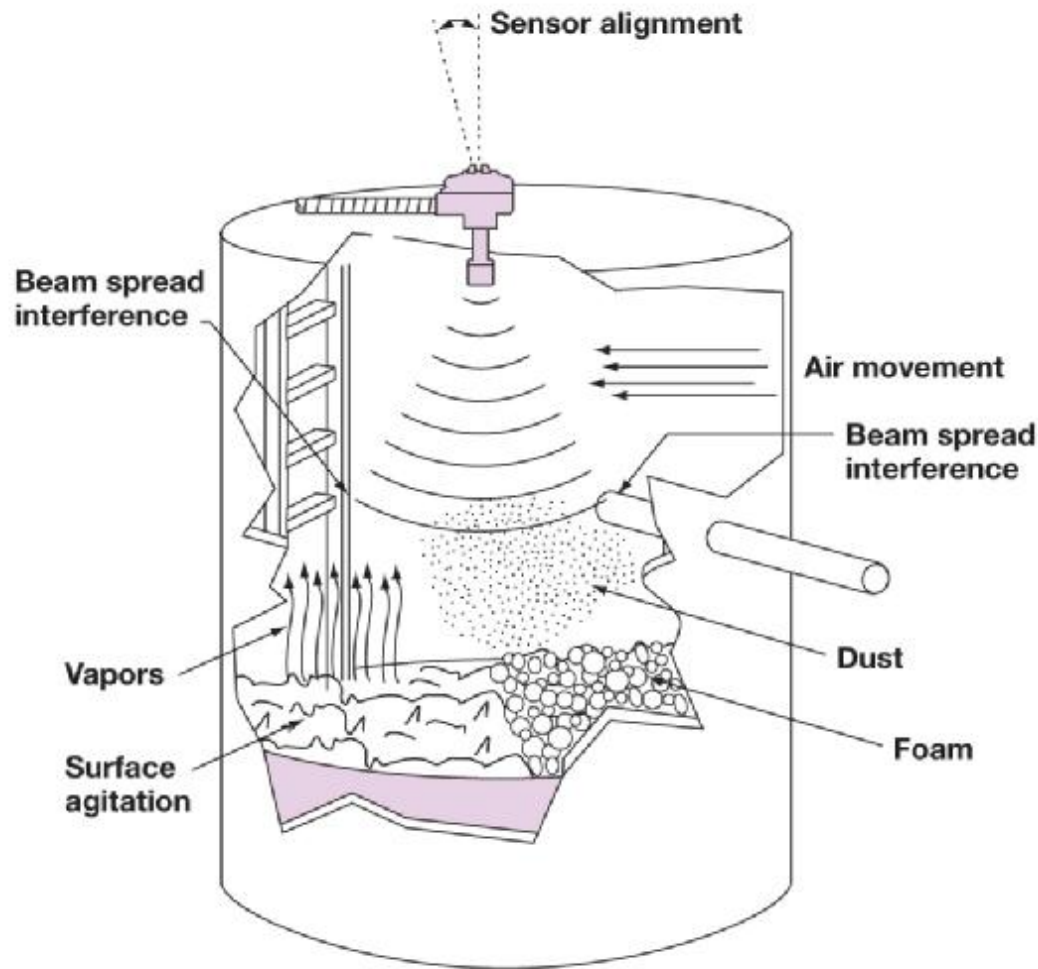
† Location

† Beam Angle

† Obstructions

† Nozzles

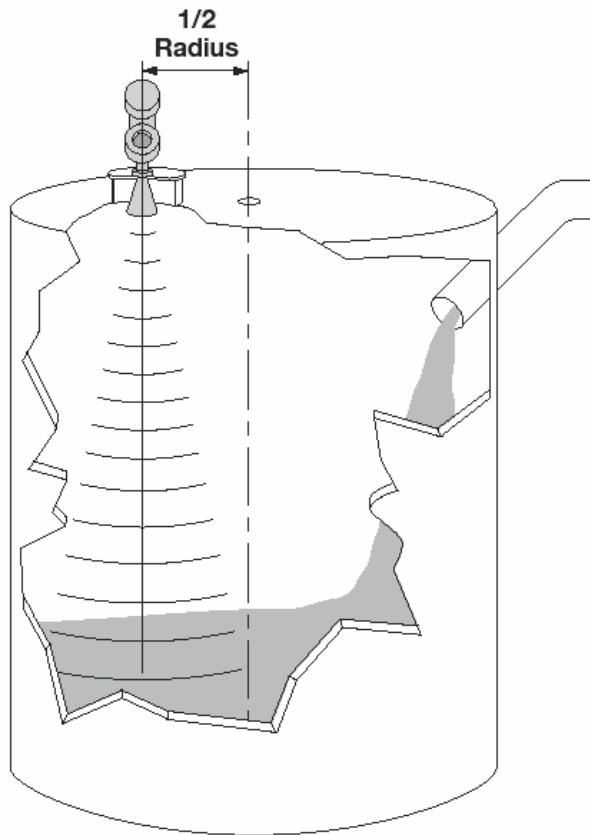




Location - Obstructions

Mount in a location which avoids or minimizes obstructions





Location- spurious echoes

Mount $\frac{1}{2}$ the tank radius to minimize multipath and multiple echoes

- † Do not mount in the center of the vessel!
- † Mount $>18''$ (460mm) from sidewall



Installing the Transmitter

- † Polarization
 - † Orientation
- † False Targets
- † Multipath
- † Multiple Echoes



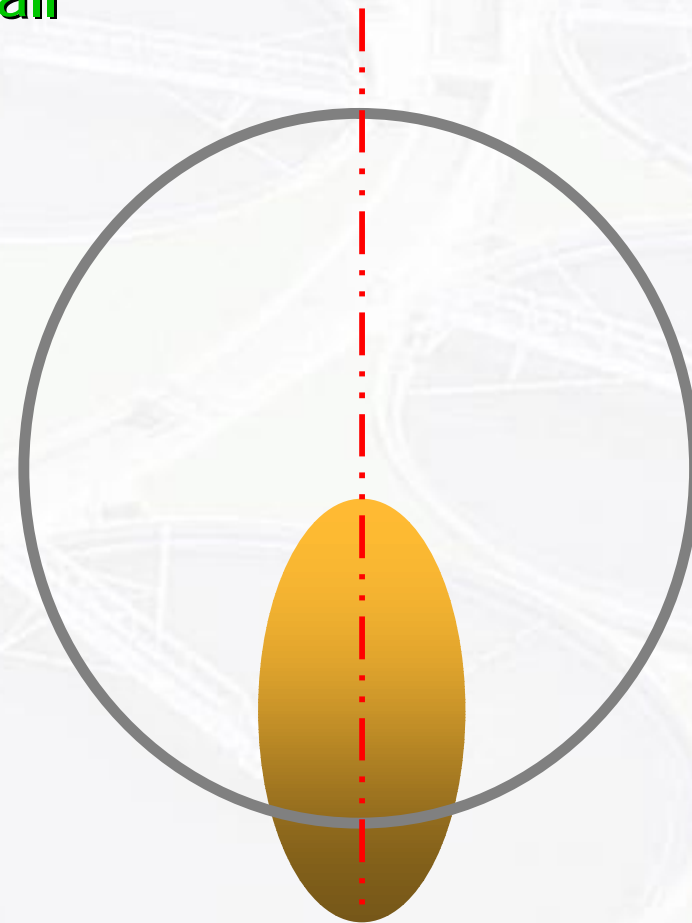
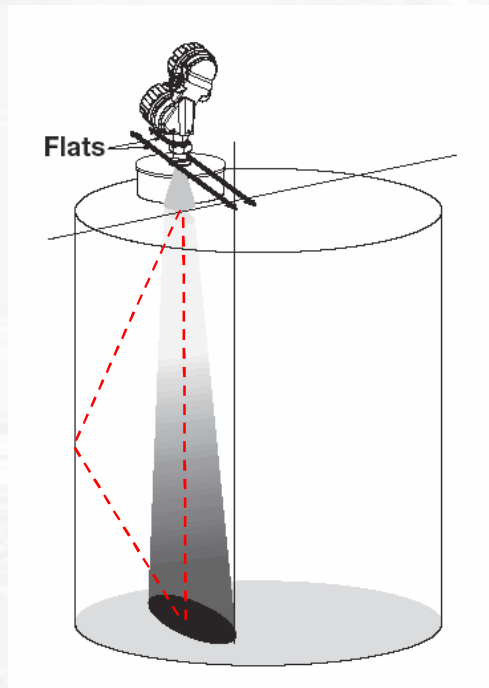
Initial Installation - Orientation

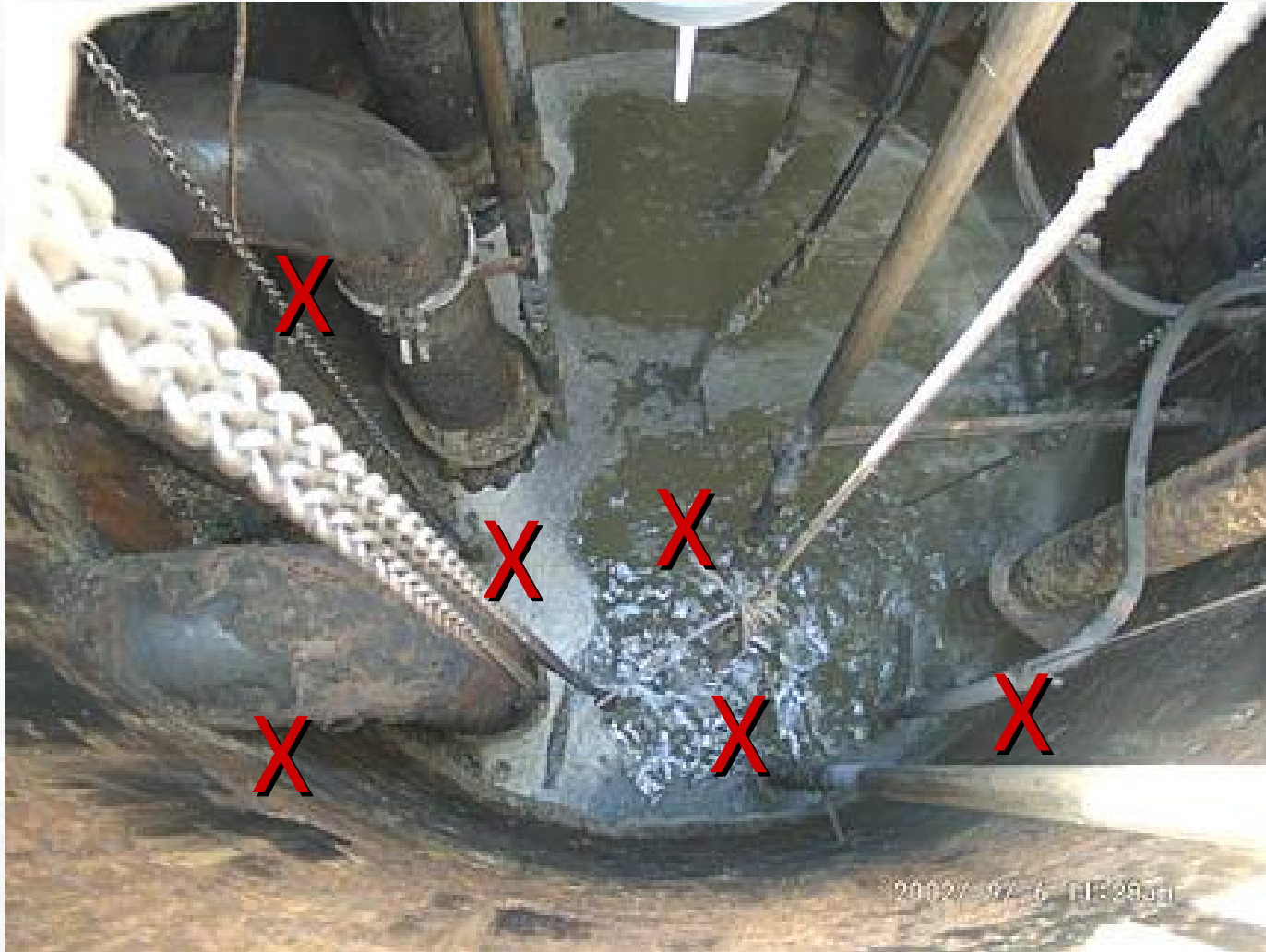


Top View

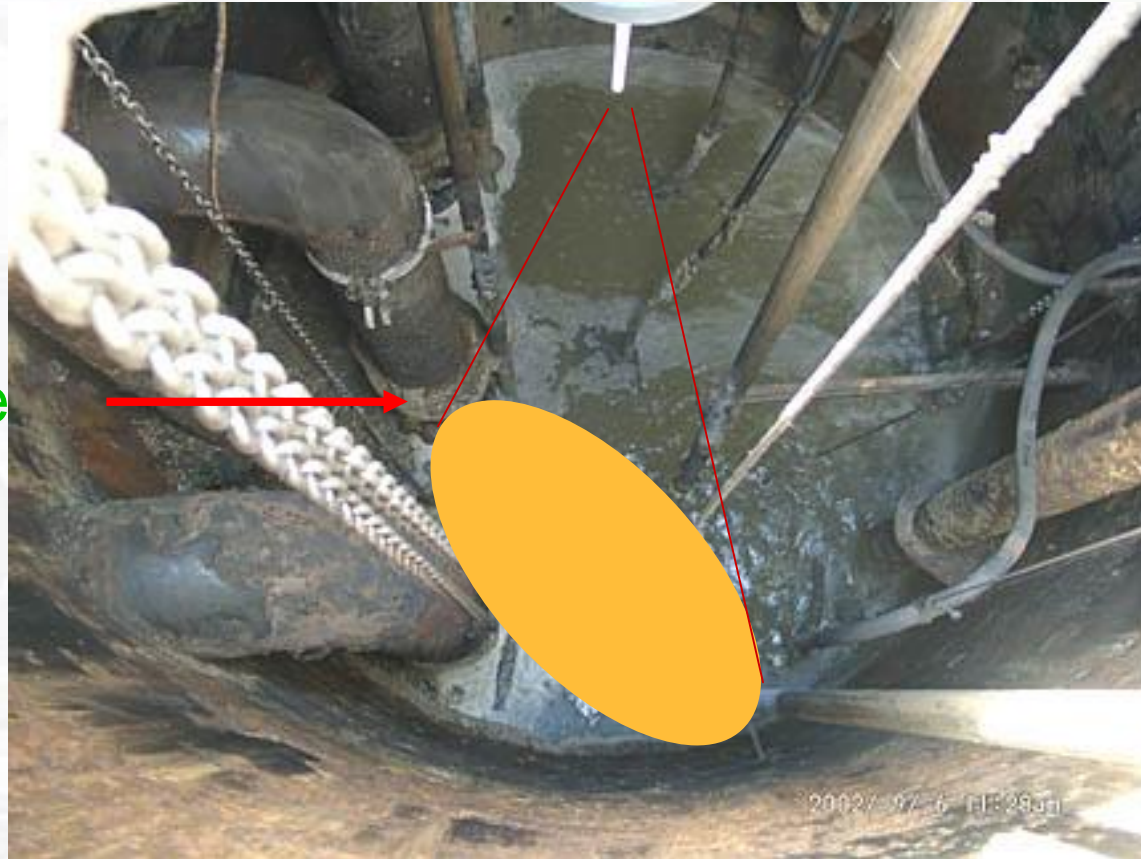


Signal Loss-Multitpath Mounting too close to tank wall aggravates problem





Will “see” flange

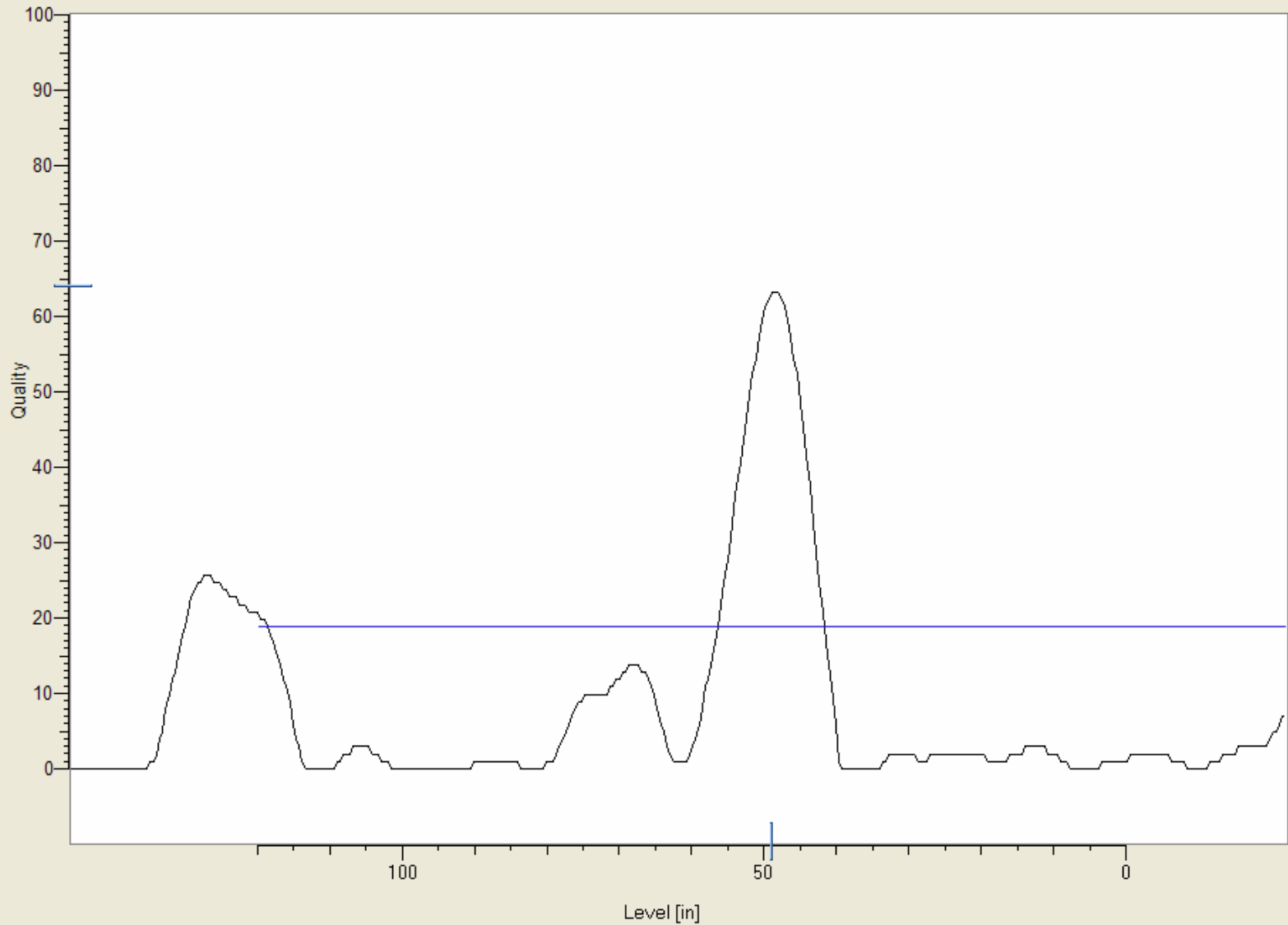


Will NOT “see”
flange



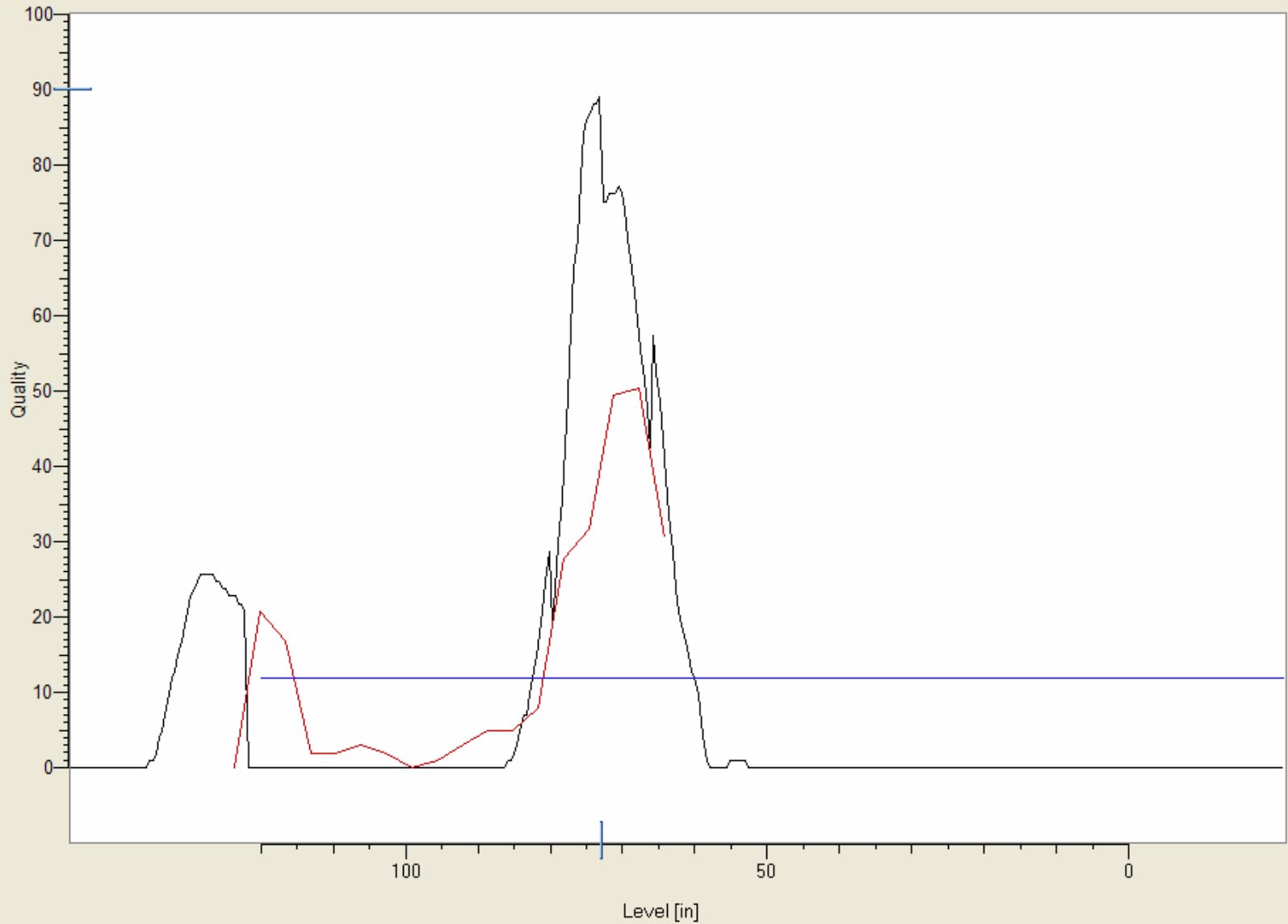


False Target Rejection



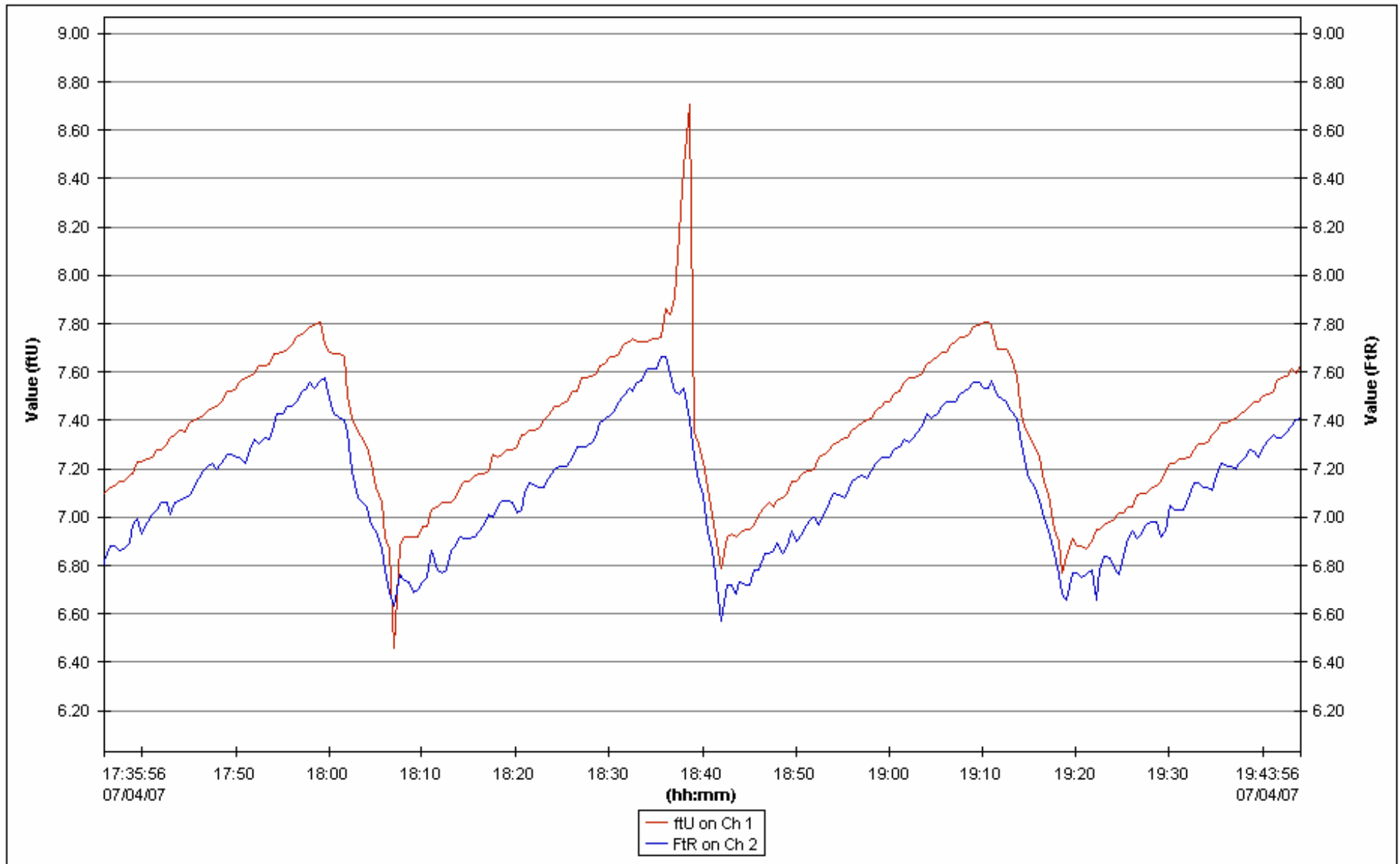


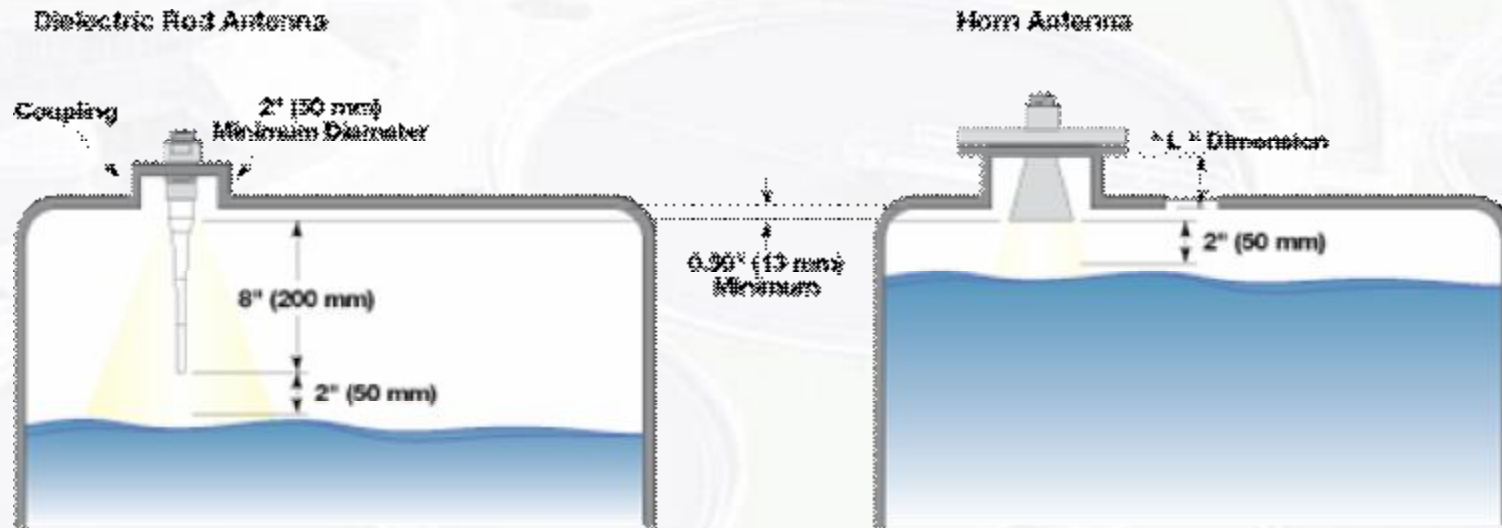
False Target Rejection





Foam buster !





- DO NOT LAUNCH INTO NOZZLE!!



RADAR ADVANTAGES

- Signal will transmit through fog
- Signal will transmit through moderate foam
- Signal will transmit through moderate grease
- Turbulence is not a problem
- Condensation is not a problem
- Accuracy .4" or 0.1% span
- Solid state construction, no parts to wear out
- Maximum Range 65 feet

ULTRASONIC DISADVANTAGES

- Will not transmit through fog
- Will not transmit through moderate foam
- Will not transmit through moderate grease
- Affected by turbulence
- Condensation on surface – no signal
- Accuracy is .25% span
- Transmitter/receiver is piezoelectric crystal – fail after 10-12 years
- Maximum range 35 feet

RADAR ***vs.*** ***ULTRASONIC***

- Fog - No problem
- Foam – No problem
- Moderate grease – No problem
- Turbulence – No problem
- Condensation – No problem
- Accuracy .4" or .1% span
- Long life

- Fog – Problem
- Foam – Problem
- Moderate grease – Problem
- Turbulence – Problem
- Condensation – Problem
- Accuracy .25% span
- Limited life

RADAR DISADVANTAGE

- *Radar costs approximately \$2000,
Ultrasonic available for less than \$1000.*