

City of Kingsport Solves Sewage Water Level Measurement Problem With Two-Wire Radar

RESULTS

- Eliminated costly maintenance requirements
- Reduced configuration and set-up time
- Increased reliability of Intake Pumping operations



APPLICATION

Intake Pumping Station Level

Application Characteristics: Raw sewage water (Dielectric Constant - High), turbulence, vapors, obstacles, harsh environment

CUSTOMER

City of Kingsport, TN in USA

CHALLENGE

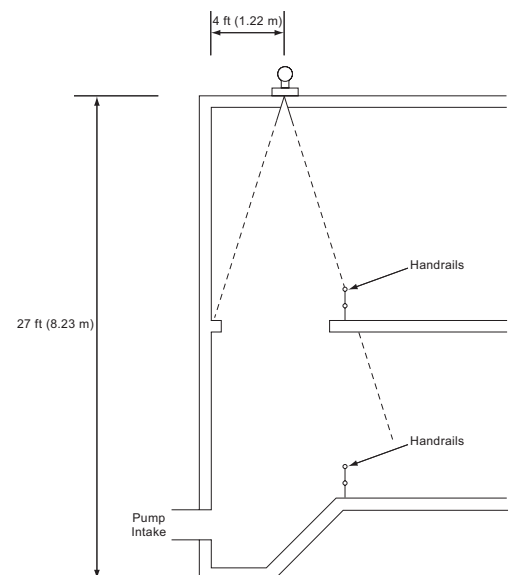
The City of Kingsport in Tennessee has a Raw Sewage Pumping Station, built in 1957. All of their sewage and storm water is collected in this station prior to distribution. The Intake Station has been modified a few times over the decades; however, the original parshall flume that was designed to monitor the flow has not been modified. Frequently when normal rain occurs the parshall flume will overflow. All of this excess storm water and sewage travels into an area that is 18 feet wide x 50 feet long by 27 feet high (5.4 x 15 x 8 m). From this area there are six vertical turbine pumps that activate based on level readings to keep the entire intake station from flooding. They pump up to 25 million gallons (95 M liters) per day to the nearby treatment facility.

The City of Kingsport had been using cable-mounted hydrostatic pressure transducer sensors to activate the pumps. These pressure sensors become clogged with debris and swing with the high turbulence created from the storm waters. The pumps nearest the transducers pull the cable and sensor toward the pump suction.

The view from the ceiling of the pumping station showed a lot of challenges for a top-down non-contacting device in the form of narrow open spaces, handrails, and other equipment. In addition, the surface can be very turbulent and vapors are frequently present.



The view from near the mounting location showed a small surface area and numerous obstacles.



Sketch of the beam width and its estimated position relative to the wall and internal obstacles.

ROSEMOUNT

For more information:
www.rosemount.com


EMERSON
 Process Management

SOLUTION

Emerson Process Management provided a Rosemount 5401 loop-powered non-contact radar for this application. The 5401 is also able to easily detect the smaller surface area when the level is low while ignoring false disturbances in its beam path. In this application, the low frequency version of the 5400 series with an 8" antenna was used. The larger antenna provided a 17° beam angle which allowed a good centered focus on the surface while minimizing reflections from the obstacles on the outside portion of the beam. Although the high frequency 5402 with a 4" antenna and tighter beam width could have handled the obstacles as well, with the turbulence and vapors, 5401 was a better choice.

The Rosemount 5401 has proven to be more reliable than the pressure sensor. The radar readings operate during the turbulent storm water run off as well as when low intake levels are reached when there is a lot of raw sewage and debris. Kingsport has been using the Rosemount 5401 since March, 2004 and has been very satisfied with its performance. Previously, the pressure sensors were failing about every 6 months. Because of the harsh environment, the replacement of the sensors was not a work order that any maintenance personnel wanted. Since the 5401 has replaced the pressure sensors, no more maintenance work orders are needed for the level measurement. The 5401 has greatly increased the reliability of the Intake Pumping operations.

RESOURCES

Emerson Process Management Water & Wastewater Industry

<http://www.emersonprocess.com/solutions/water/index.asp>

Rosemount 5400 Series Two-wire Radar Level Transmitters

<http://www.emersonprocess.com/rosemount/products/level/m5400.html>



A view of the conditions of the sewage pumping station.

The Emerson logo is a trade mark and service mark of Emerson Electric Co. Rosemount and the Rosemount logotype are registered trademarks of Rosemount Inc. All other marks are the property of their respective owners.

Emerson Process Management

Rosemount Division
8200 Market Boulevard
Chanhassen, MN 55317 USA
T (U.S.) 1-800-999-9307
T (International) (952) 906-8888
F (952) 949-7001
www.rosemount.com

Emerson Process Management

Heath Place
Bognor Regis
West Sussex PO22 9SH,
England
T 44 1423 863121
F 44 1423 867554

Emerson Process Management

Emerson Process Management Asia Pacific
Private Limited
1 Pandan Crescent
Singapore 128461
T (65) 6777 8211
F (65) 6777 0947
Enquiries@AP.EmersonProcess.com

ROSEMOUNT[®]

For more information:
www.rosemount.com


EMERSON[™]
Process Management