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Water treatments mass exodus to improved chemical dosing

When first moved from water reservoirs, water contains materials that need to be treated and or removed. All microorganisms, flora and fauna waste, assorted dirt and insects all need to be dealt with before, water is fit for human consumption. It is understood that, water needs to make many detours in its path from raw supplies to the tap. All these detours start at the treatment plant. At the plant water goes though applications that remove contaminants such as suspended solids, bacteria, algae, fungi, and minerals such as iron and manganese. The final objective is to turn contaminated debris choked water into safe, drinking water.
Many of the key applications in the treatment of potable water involves the addition or dosing of chemistries to progressively treat raw water into grey water and finally to produce potable water. It is here where Coriolis Mass flow meters can help!
Once the larger filterable material is removed or settled out of the water, additives called flocculants are added. This is one of the first places Coriolis mass meter can be employed to monitor and improved chemical dosing.

Flocculants are added to the filtered water to assist in further filtration and sedimentation by helping the fine and the very fine particulates agglomerate making larger particulates easier to filter or settle out. Materials such as Aluminum Sulfate (Alum), Ferric Chloride or various polymers like Aqualum 3003 are used in this process. Depending on the size and the design of the process these can be added a number of ways. In small systems it can be measured and added manually to the tanks or measurement systems. In larger systems the utilization of positive displacement meters or metering pumps can be used to add the precise amount of chemicals required. It is common through-out the purification process to make sure to balance the proper amount of additive to the amount of water being produced. Under dosing can lead to system contamination downstream, due to poor filtration, and over use can lead to chemistry falling out of suspension producing an increasingly conductive coating. With polymers the cost of over dosing is in the high price of the chemical. Line coating with ferric Chloride can lead to errors in the process's magnetic flow meters, due to the conductive coating that is left behind. The key to guaranteeing the proper dose of these additives is the use of Coriolis flow meters.

The accuracy of the Coriolis sensors is better than any other insitu measurement technology. At 0.1% of rate accuracy Coriolis can really improve measurement performance especially at the very low flow rates polymers run. Coriolis sensors are immune to the need for upstream and downstream straight runs so installation is simplified. In addition real time density is also provided by the Coriolis meters so the chemical densities can be confirmed to assure that the line is not aerated and that the proper chemical and dose is being delivered.

Once filtering and settling is done and the large and fine particulate matter is removed then the next step is to add additional chemistries that also benefit from the use of Coriolis flow measurement.

One of the key additives to remove pathogens is some form of chlorine. A common means to add chlorine to the process is to use sodium hypochlorite. Often this chemical flow is dosed automatically or in batches based on need. The flow is again often measured via metering pumps. The challenge is that sodium hypochlorite often outgasses as it sits in the tanks and the feed lines. This chlorine gas can cause the metering pump to vapor lock and fail to add any chemical to the process at

all. In a less serious situation the proper amount of chemistry is under delivered due to a mix of gas and liquid in the lines reducing the density (but not volume) of the chemical. It is the mass of the chemistry added to the water that is essential to successful treatment. With volumetric measurement read by the meeting pumps true flow accuracy can truly be deceiving. The fix for these issues is to have a Coriolis sensor installed after the metering pump feeding flow data that can then control the metering pump speed. If the flow though the Coriolis mass flow meter does not match the needed set point, the control system will increase the pump speed until it does. As the Coriolis sensor measures mass directly and can also measure the fluid's density and gas entrainment insitu, the proper dose can be confirmed and add continuously. Of all the insitu liquid and gas flow measurement systems Coriolis is the only true mass measurement device that does not rely on pipe line velocity or displacement to measure the flow. The actual weight or rather the mass of the fluid is measured, meaning you get a much more precise and accurate measurement whether it's a gas or liquid, hot or cold or under various pressures. A pound of water weighs the same as a pound of chlorine gas, they both weigh a pound.

Additional additives like Ammonia are also seeing systems efficiencies improved when using Coriolis to confirm and control flow rates. Ammonia supports and enhances the purifying nature of chlorine by converting it into chloramine. Coriolis is effectively used to assure the metered amount of ammonia perfectly meets the needed mix ratio to utilize all the chlorine in process without the risk of under dosing and supplying poor quality product as well as limiting chemical waste, due to over dosing.

The list of additives in our water goes on. With Fluoride and anti-foaming agents and anti-scaling agents and anti-rust agents etc.. All of these additives are critical to providing a long term and safe and sustainable supply of consumable water. With the growing complexities of modern water treatment and the increased burden on our water supplies it is becoming increasingly challenging and costly to always offer the expected service to water customers. Integrating Siemens Coriolis mass flow into existing systems and designing new plants with the Siemens Coriolis sensors integrated into the measurement and controls systems can help keep costs down while at the same time improve the quality and reliability of our water supplies.