Processing Contaminated Waters and Flow-Streams with the Natural Acidification Process

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To optimize the process of separating dissolved minerals, heavy metals, chemical compounds, *per* and *polyfluoroalkyl* substances, etc., from contaminated waters and/or flow-streams will require greater and precise *pH* control throughout the remediation process. To achieve this, our current and future facilities will need to incorporate this feature into their overall operations. While this can be accomplished by using a *strong acid* such as *Sulfuric (H_2SO_4)*, due to the sheer and expected overall volume of *acidity* that will be required, an alternative and more cost-effective acidifying method is needed, and that would be to integrate and use a Harmon SO_2-Sulfurous Acid Generator instead. This method oxidizes elemental *sulfur (S)* into *sulfur dioxide (SO_2)* and inputs the resulting gas directly into the contaminated *water* (*H_2O*) or flow-stream to form a *weak acid* known as *Sulfurous ($H_2SO_3^-$)*, which immediately releases its first *free hydrogen proton (H+)* and its remaining *free hydrogen proton (H+)* when the *bisulfite (HSO_3^-)* oxidizes and transforms into *sulfate ($SO_4^=$)* to control the *pH* of the water or flow-stream, which can then be increased or decreased as needed, to aid the remediation process.

The advantages of on-site generating and/or liberating the *acidic free hydrogen protons (H+)* is that this method: eliminates the need to produce and import acidifiers from distant and remote locations; will have the smallest overall *carbon-foot-print* to implement; is the safest to use; provides the required amount of *acidity* at the lowest possible cost; etc. However, the most compelling reason for adopting this method is that it creates *bisulfite (HSO_3^-)* – a oxygen scavenger. So, besides using it to control the *pH* for other processing systems, it may be possible to use this method of acidification as the preferred means to introduce and use *bisulfite* to break-apart and deconstruct the molecular structure of PFAS.

This poster presentation will provide a conceptual overview of how this method of acidification works and how it can be employed.