Corrosion Resistance of Pipes in Louisiana Regarding the Mississippi River Saltwater Intrusion

Nguyen, Sarah (School: Patrick F. Taylor Science &amp
Technology Academy)

Louisiana pipelines are made of many different materials as they were all built during different times where certain metals were optimal. These aging pipes can be hazardous to the community, as leaching of certain metals (such as lead) can infiltrate water systems. The issue of corroded pipes is becoming more prominent as the Mississippi River saltwater intrusions cause increased levels of dissolved ions, leading to faster corrosion. Three salt spray chambers were used to test the effects of three different salinity levels on three different sets of pipe samples (iron, galvanized steel, copper) over a 168 hour trial at 100°F. The salinity levels tested were 0.0%, 2.0%, and 5.0%. Following the corrosion process, the visual grade of rust was determined using the ISO 8501-1 scale (A-D). Visually, the most corroded were the iron pipes, with rankings of B, C/D, and D (0.0%, 2.0%, 5.0%, respectively). The least corroded were the galvanized steel pipes, with rankings of A, B, and A/B, and in between were the copper pipes as they had rankings of B, C, and C. Therefore, it can be inferred that galvanized steel is the most efficient material as it proved to be the most corrosion resistant of the three, while iron was the least. This experiment also offers a basis for further research on the corrosion resistance of varying materials and the impact of salinity on corrosion, as other materials and salinity levels could be implemented in future experimentation.

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