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A Physical Treatment Method as a Prevention Method for Barium Sulfate Scaling

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Abstract : Barium sulfate ($BaSO_4$) is a hard scaling usually precipitates on the surface of equipment in many industrial systems, as oil and gas production, desalination and cooling and boiler operation. It is a scale that extremely resistance to both chemical and mechanical cleaning. So, $BaSO_4$ is a problematic and expensive scaling. Although barium ions are present in most natural waters at a very low concentration as low as 0.008 mg/l, it could result of scaling problems in the presence of high concentration of sulfate ion or when mixing with incompatible waters as in oil produced water. The scaling potential of $BaSO_4$ using seawater at the intake of seven desalination plants in Kuwait, brine water and Kuwait oil produced water was calculated and compared then the best location in regards of barium sulfate scaling was reported. Finally, a physical treatment method (magnetic treatment method) and chemical treatment method were used to control $BaSO_4$ scaling using saturated solutions at different operating temperatures, flow velocities, feed pHs and different magnetic strengths. The results of the two methods were discussed, and the more economical one with the reasonable performance was recommended, which is the physical treatment method.

Keywords : magnetic field strength, flow velocity, retention time, barium sulfate
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