

**Role of bicarbonate ions and iron bacteria in forming tubercle  
relevant to graphitic corrosion of ductile iron**

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**Abstract**

We experienced natural gas low pressure ductile iron pipe corrosion as high as 0,384 mm/y in aerobic soil with highly alkalinity that had been considered to be mildly corrosive as per AWWA C105-10. To elucidate this phenomenon, burial test of a ductile iron coupon was carried out in the same soil. Analyses of corrosion site of the coupon were made using electron probe micro analyzer and X-ray diffraction. Iron bacteria were identified. Other bacteria such as sulphate reducing bacteria were enumerated. Electrochemical techniques using corrosion potential, electrochemical impedance spectroscopy (EIS) and polarization curves were also applied to this study. In this paper, particular emphasis is placed on the role of bicarbonate ions and iron bacteria in forming tubercle relevant to graphitic corrosion of ductile iron.