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Abstract (600 word limits)

Temperature factor effects on the occurrence of stress corrosion cracking of main gas pipelines.

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According to data from publicly held company “Severgazprom” two graphs were plotted and they show that the number of defects from stress corrosion cracking (SCC) uplifts with increasing temperature (Fig.1). Sections of 115 km in length were considered. The temperature intervals at which the main gas pipelines were operated ranged from + 60 ° C to + 25 ° C in the summer, from + 30 ° C to -30 ° C in the winter. Steel grade 17G1S, the diameter of the pipes varied from 1020 mm to 1420 mm. Thetemperature intervals at which the main gas pipelines were operated ranged from + 60 ° C to + 25 ° C pipelines were operated ranged from + 60 ° C to + 25 ° C in the summer, from + 30 ° C to -30 ° C in the winter. Steel grade 17G1S, the diameter of the pipes varied from 1020 mm to 1420 mm. Also, the researches of M V Chuchkalov and A G Gareev were compared. The approximation was applied to their data and it was revealed that with an increase in temperature from 0 ° C to + 70 ° C, the activation energy necessary for the process of occurrence of SCC on steel grade X70 decreases from 34 kJ /mole to 4 kJ /mole. The study of two graphs based on the results of slow strain rate testing shows that when the temperature was changed from + 25 ° C to + 50 ° C, the susceptibility to SCC increased from 0.85 to 0.87 for steels X65 and to 0.9 for steels X60. This indicates a direct effect of temperature as a detrimental factor, which increases the susceptibility of the metal to stress corrosion. Analysis of the second graph allows us to conclude that when the temperature increases from + 25 ° C to + 50 ° C, the ability of the metal to absorb hydrogen is doubled for X65 steels and upsurges for X60 steels by 2.5 times, and with growth of hydrogen concentration increases the risk of SCC. As a result of the work was demonstrated a clear dependence of the occurrence of stress corrosion on the main gas pipelines on the temperature.

Biography (200 word limit)

Nazarova M N, Akhmetov R R and Kraynov S A wrote this article to analyze and compare the data in order to contribute to the formation of an objective opinion on the issue of the growth of SCC defects of the main gas pipelines. According to available data, a histogram of the dependence of defects due to SCC from the distance from the compressor station was constructed, and graphs of the dependence of the accident density due to stress corrosion in the winter and summer were also plotted. Data on activation energy were collected and analyzed in which occurrence of stress corrosion is most likely constructed, a plot of activation energy versus temperature is plotted, and the process of occurrence of SCC on two different grades of steels under the action of different temperatures was analyzed.

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