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EVALUATION OF THE VESSEL TO QUALIFY ITS MINIMUM SAFE OPERATING TEMPERATURE (MSOT) BELOW THE RATED MDMT

PROBLEM DESCRIPTION:

The vessel V-OL-500 has MDMT of -20°F. During the cold liquid entry through nozzle E - 10" dia., the vessel gets exposed to -30 °F at the operating pressure of 220 psig. The fitness-for-service evaluation of the vessel is required to see if the vessel can be qualified for operation at the minimum safe operating temperature (MSOT) of -30 °F @ 220 psig (Operating Pressure).

RESULTS:

The shell and nozzle E - 10" dia. (which undergoes cold liquid entry of -30 °F) were modeled using FEA software NOZZLEPRO. The loads from piping stress analysis (CAESAR-II) were used to evaluate the nozzle-shell connection. It was found that all the actual stresses are within the allowable stresses for various load cases.

Based on the fitness-for-service evaluation, the vessel V-OL-500 has been rated to minimum safe operating temperature (MSOT) of -38 °F at 220 psig (operating temperature). The MSOT evaluation was done for various pressures and a complete Pressure vs. MSOT plot is enclosed herewith.

PRESSURE vs. MSOT FOR V-OL-500

