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# Optimization of Rouge Removal and Passivation Techniques for Stainless Steel Pipes at AbbVie

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Optimization of Rouge Removal and Passivation Techniques for Stainless Steel Pipes at AbbVie

A Major Qualifying Project Report

submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

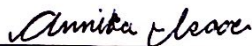
In partial fulfillment of the requirements for the

Degree of Bachelor of Science

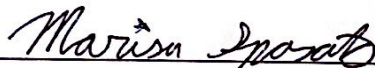
by



Adam Croteau



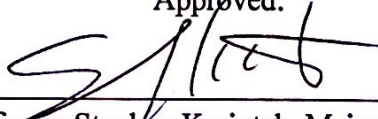
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Marisa Sposato

Date: April 17, 2018

Approved:



Professor Stephen Kmiotek, Major Advisor

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Pipes accumulate rouge from rusted equipment upstream, chlorides in the fluid passing through pipes, or exposure to high temperature steam. Rouge and micropits on stainless steel pipes resulting from rusted equipment upstream is focused on. The purpose of this project was to determine the most effective procedure to remove rouge and micropits via remediation (rouge removal) followed by oxidation (restoration of the passive layer). Coupons were rouged with HCl, remediated with citric or phosphoric acid, and passivated with hydrogen peroxide, potassium permanganate, and air. Results of interest include weight loss, a color analysis using RGB and HSV values, and changes in surface roughness.

This MQP contains information deemed confidential to the business interest of the industrial sponsor. Please contact Stephen Kmiotek at [sjkmiotek@wpi.edu](mailto:sjkmiotek@wpi.edu) for additional information.