

CASE STUDY

QUALITATIVE RISK ASSESSMENT FOR HYDROGEN PRODUCTION PLANT

✉ sales@sonomatic.com

🌐 www.sonomatic.com



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OVERVIEW

This hydrogen production process was designed to facilitate the environmentally friendly production of hydrogen and graphite with low emissions. The production process efficiently transforms natural gas and similar feedstocks into hydrogen and high-quality graphite.

This qualitative risk assessment focuses on the pressure vessels and piping circuits within the facility in total of 29 pressure vessels and 103 piping circuits. It also covers the temporary pressure vessel and piping constructed from Incoloy 800HT material, intended for less than a year use before transitioning to Inconel 617 material. The primary objective of this assessment is to assess and analyse risk category of pressure vessel and piping circuits in this facility ultimately leading to the development of the Inspection Management Plan (IMP).

SERVICES

The project covers total of 29 pressure vessels and 103 piping circuit for the production plant. The main objective of the project was to evaluate and analyse the risk category associated with the pressure vessel and piping at the facility using qualitative approach based on the guidelines set forth by API 580 and API 571.

The outcome of the qualitative risk assessment is to serve to recommend an inspection plan tailored to the identified risks for both the pressure vessel and piping. Additionally, it seeks to establish an updated and comprehensive database of information related to the pressure vessel and piping, facilitating ongoing monitoring, and ensuring the integrity of operations.

OUTCOME

The facility's overall risk ranking falls within the moderate-risk category. This is primarily attributed to the numerous operating parameters that require further monitoring, given that the facility is still in early operations and has not yet undergone inspections.

In response to the risk assessment findings, an IMP has been established, encompassing detailed specifications for inspection intervals, methods, and recommended dates. Additionally, a comprehensive Inspection Test Plan (ITP) has been established based on priority and risk. These measures, once implemented, will prepare the production facility to proactively anticipate and mitigate potential degradation threats, thereby upholding a secure operational environment.

Summary of Overall Risk					
Equipment Type	Quantity	Very High	High	Moderate	Low
Pressure Vessel	29	1	5	23	0
Piping Circuit	103	1	3	99	0
Total	132	2	8	122	0