Heat Exchanger Failure Investigation Report

Radian received twelve sections of heat exchanger tubing from the Magma Electric Company's 10MW(e) East Mesa binary geothermal power plant. Three tube sections were received from each of four shell and tube heat exchangers (HX1, Hx6, HX8, and Hx10) of the isobutane vaporizer train. All samples were taken from the upper few rows of tubes. Two months later, four more tube sections were received. These four sections were taken from the lower rows of heat exchangers 1, 6 (two sections), and 10. Radian was requested to investigate the cause of severe pitting failure of these heat exchanger tubes. This report is part of a continuing DOE effort to gain insight into the service life of component materials employed in geothermal energy utilization.

Using the space shuttle programme as the framework, this book examines ethical decision making in engineering.

Trevor Kletz has had a huge impact on the way people viewed accidents and safety, particularly in the process industries. His ideas were developed from nearly 40 years working in the chemical industry. When he retired from the field, he shared his experience and ideas widely in more than 15 books. Trevor Kletz Compendium: His Process Safety Wisdom Updated for a New Generation introduces Kletz’s stories and ideas and brings them up to date in this valuable resource that equips readers to manage process safety in every workplace. Topics covered in this book include inherent safety, safety studies, human factors and design. Learn the lessons from past accidents to make sure they don’t happen again. Focuses on understanding systems and learning from past accidents Describes approaches to safety that are practical and effective Provides an engineer’s perspective on safety

This book presents innovative ideas, cutting-edge findings, and novel techniques, methods, and applications in a broad range of cybersecurity and cyberthreat intelligence areas. As our society becomes smarter, there is a corresponding need to secure our cyberfuture. The book describes approaches and findings that are of interest to business professionals and governments seeking to secure our data and underpin infrastructures, as well as to individual users.

Technical Report from the year 2013 in the subject Materials Science, grade: B, Robert Gordon University Aberdeen, course: MSc Oil and Gas Engineering, language: English, abstract: A high pressure gas cooler located in an offshore platform have been operating for more than 10 years. Throughout that period the gas cooler have been subjected to several tube failures, the failures have caused gas leak from the tube side. Several materials upgrades have been used to contain the tube failure. The last choice was to use a more corrosion resistant material Hastelloy C22. Crevice corrosion has been reported as the primary failure mechanism. The tube and tube plate joined surfaces have been exposed to high temperature which is relatively higher than the critical crevice temperature of Hastelloy C22. There was a poor heat transfer between the shell side fluid and tube side due to a small heat transfer area and low fluid velocity in the affected zone. Stress corrosion and fatigue corrosion accounted for the secondary failure mechanism which ultimately caused a crack in the tubes. Other possible reason identified to cause crevice corrosion was the mechanical rolling expansion technique. Oftentimes it creates rear crevices on the tubes with enough geometry to develop crevice chemistry. Mitigation methods such as hydraulic expansion

technique, heat treatment for residual stresses and baffle design enhancements have been proposed in this report. Key words: shell and tube heat exchanger failure; Hastelloy C22 material; tube failure; localized corrosion; crevice corrosion; internal pitting corrosion

As the most comprehensive reference work dealing with knowledge management (KM), this work, consisting of 2 volumes, is essential for the library of every KM practitioner, researcher, and educator. Written by an international array of KM luminaries, its approx. 60 chapters approach knowledge management from a wide variety of perspectives ranging from classic foundations to cutting-edge thought, informative to provocative, theoretical to practical, historical to futuristic, human to technological, and operational to strategic. Novices and experts alike will refer to the authoritative and stimulating content again and again for years to come.

Familiarizes the student or an engineer new to process safety with the concept of process safety management Serves as a comprehensive reference for Process Safety topics for student chemical engineers and newly graduate engineers Acts as a reference material for either a stand-alone process safety course or as supplemental materials for existing curricula Includes the evaluation of SACHE courses for application of process safety principles throughout the standard Ch.E. curricula in addition to, or as an alternative to, adding a new specific process safety course Gives examples of process safety in design

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Academic Paper from the year 2018 in the subject Engineering - Metal Engineering / Metal Processing / Metal Structure, grade: B+, Robert Gordon University Aberdeen, course: Oil and Gas Engineering, language: English, abstract: As a Corrosion Expert, this report centred around the failure investigation of a shell and tube heat exchanger due to corrosion mechanisms. The different types of corrosion, its effect resulting to the failure and possible solutions and recommendations were submitted to the client for further action. The report also sheds light on the alloys used for the design and better alternatives to be used to prevent future degradation of the shell and tube heat exchangers.

Failure Analysis of Microbiologically Influenced Corrosion serves as a complete guide to corrosion failure analysis with an emphasis on the diagnosis of microbiologically influenced corrosion (MIC). By applying the principles of

chemistry, microbiology, and metallurgy, readers will be able to reliably determine the mechanistic cause of corrosion damage and failures and select the appropriate methods for mitigating future corrosion incidents. FEATURES Provides background information on the forensic process, types of data or evidence needed to perform the analysis, industrial case studies, details on the MIC failure analysis process, and protocols for field and lab use Presents up-to-date advances in molecular technologies and their application to corrosion failure investigations Offers specific guidelines for conducting MIC failure analyses and case studies to illustrate their application Examines state-of-the-art information on MIC analytical tools and methods With authors with expertise in microbiology, corrosion, materials, and failure investigation, this book provides tools for engineers, scientists, and technologists to successfully combat MIC issues.

This book covers various topics, from thermal-hydraulic analysis to the safety analysis of nuclear power plant. It does not focus only on current power plant issues. Instead, it aims to address the challenging ideas that can be implemented in and used for the development of future nuclear power plants. This book will take the readers into the world of innovative research and development of future plants. Find your interests inside this book!

Process Plant Layout, Second Edition, explains the methodologies used by professional designers to layout process equipment and pipework, plots, plants, sites, and their corresponding environmental features in a safe, economical way. It is supported with tables of separation distances, rules of thumb, and codes of practice and standards. The book includes more than seventy-five case studies on what can go wrong when layout is not properly considered. Sean Moran has thoroughly rewritten and re-illustrated this book to reflect advances in technology and best practices, for example, changes in how designers balance layout density with cost, operability, and safety considerations. The content covers the ‘why’ underlying process design company guidelines, providing a firm foundation for career growth for process design engineers. It is ideal for process plant designers in contracting, consultancy, and for operating companies at all stages of their careers, and is also of importance for operations and maintenance staff involved with a new build, guiding them through plot plan reviews. Based on interviews with over 200 professional process plant designers Explains multiple plant layout methodologies used by professional process engineers, piping engineers, and process architects Includes advice on how to choose and use the latest CAD tools for plant layout Ensures that all methodologies integrate to comply with worldwide risk management legislation

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The second volume in a series comprising a reliable source of failure analysis case studies for engineering professionals. Volume 1 (1992) was reviewed in the April 1993 SciTech Book News . Volume 2 contains 131 new case studies in the areas of transportation component failures (aircraft-aerospace/g

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