The influence of climatic factors on work performance in the oil and gas industry

THE INFLUENCE OF CLIMATIC FACTORS ON WORK PERFORMANCE IN THE OIL AND GAS INDUSTRY

1st edition

November 2013

Published by
ENERGY INSTITUTE, LONDON
The Energy Institute is a professional membership body incorporated by Royal Charter 2003
Registered charity number 1097899

The Energy Institute (EI) is the chartered professional membership body for the energy industry, supporting over 16 000 individuals working in or studying energy and 250 energy companies worldwide. The EI provides learning and networking opportunities to support professional development, as well as professional recognition and technical and scientific knowledge resources on energy in all its forms and applications.

The EI's purpose is to develop and disseminate knowledge, skills and good practice towards a safe, secure and sustainable energy system. In fulfilling this mission, the EI addresses the depth and breadth of the energy sector, from fuels and fuels distribution to health and safety, sustainability and the environment. It also informs policy by providing a platform for debate and scientifically-sound information on energy issues.

The EI is licensed by:
– the Engineering Council to award Chartered, Incorporated and Engineering Technician status;
– the Science Council to award Chartered Scientist status, and
– the Society for the Environment to award Chartered Environmentalist status.

It also offers its own Chartered Energy Engineer, Chartered Petroleum Engineer and Chartered Energy Manager titles.

A registered charity, the EI serves society with independence, professionalism and a wealth of expertise in all energy matters.

This publication has been produced as a result of work carried out within the Technical Team of the EI, funded by the EI's Technical Partners. The EI's Technical Work Programme provides industry with cost-effective, value-adding knowledge on key current and future issues affecting those operating in the energy sector, both in the UK and internationally.

For further information, please visit **http://www.energyinst.org**

The EI gratefully acknowledges the financial contributions towards the scientific and technical programme from the following companies

BG Group
BP Exploration Operating Co Ltd
BP Oil UK Ltd
Centrica
Chevron
ConocoPhillips Ltd
DONG Energy
EDF Energy
ENI
E. ON UK
ExxonMobil International Ltd
International Power
Kuwait Petroleum International Ltd
Maersk Oil North Sea UK Limited
Murco Petroleum Ltd
Nexen
Phillips 66
Premier Oil
RWE npower
Saudi Aramco
Scottish Power
SGS
Shell UK Oil Products Limited
Shell U.K. Exploration and Production Ltd
SSE
Statkraft
Statoil
Talisman Energy (UK) Ltd
Total E&P UK Limited
Total UK Limited
Tullow
Valero
Vattenfall
World Fuel Services

However, it should be noted that the above organisations have not all been directly involved in the development of this publication, nor do they necessarily endorse its content.

ISBN 978 0 85293 669 6

Published by the Energy Institute

Further copies can be obtained from: Portland Customer Services, Commerce Way, Whitehall Industrial Estate, Colchester CO2 8HP, UK.
t: +44 (0)1206 796 351 e: **sales@portland-services.com**

Electronic access to EI and IP publications is available via our website, **www.energypublishing.org**.
Documents can be purchased online as downloadable pdfs or on an annual subscription for single users and companies.
For more information, contact the EI Publications Team.
e: **pubs@energyinst.org**

CONTENTS

Contents cont...

Contents cont...

FOREWORD

The energy industry operates in a wide range of environmental conditions across the globe. Extreme environments like heat, humidity, cold, wind, water and altitude are obviously a potential problem in desert and polar regions, but even in the UK heat can kill those working hard whilst either carrying heavy loads or wearing protective clothing. Those who have had experience in working in hot machinery spaces or of wearing protective clothing know that you do not need to be in a hot region of the world, or be in the middle of summer, to experience significant heat stress when working.

The analysis of different climates and how they affect the ability to control body temperature gives guidance on the impact of environmental conditions on worker safety, health and performance (and hence productivity) in the range of environmental conditions encountered by the industry both globally, and in localised man-made environments such as in machinery spaces and other work spaces where heat and humidity can be particular problems.

ACKNOWLEDGEMENTS

The EI would like to acknowledge the significant work and effort undertaken by the project team and authors of the Extreme Environments Laboratory in the Department of Sport and Exercise Science, University of Portsmouth, and express its appreciation of that work. In particular, the EI wishes to thank Dr Jim House and Professor Michael Tipton.

This report was commissioned by the EI's Health Technical Committee. The EI would also like to acknowledge the contributions of the Health Technical Committee in steering this project to completion. The membership of the Committee includes representatives from the following companies/organisations:

Abermed
BG Group
BP
Capita
Centrica
Chevron
ConocoPhillips
ExxonMobil
HSE
Maersk Oil
Oil & Gas UK
Shell
Statoil
Talisman Energy
University of Portsmouth.

1 INTRODUCTION

This review, conducted by the University of Portsmouth on behalf of the Energy Institute's (EI) Health Technical Committee (HTC), was conducted to provide advice to the UK Oil & Gas Industry (OGI) regarding the effect of climatic factors on work performance. The purpose of this report is to give guidance on the impact of environmental conditions on worker safety, health and performance (and hence productivity) in the range of environmental conditions encountered by the industry both globally, and in localised man-made environments such as machinery spaces, or storage tanks.

The aim of this report is to provide a comprehensive review of the factors associated with working in extreme thermal environments and, if read in total, should provide the reader with sufficient information to produce a policy for workers in such environments. However, for ease of reference the report is organised into sections, each covering a different aspect of working in an extreme thermal environment. Each section may also be used in isolation. To facilitate this mode of use, some information is repeated throughout the document.

The various equipment and safe working times etc. given in this document are intended as examples; the most appropriate equipment to use and safety limits to apply will be specific to particular work tasks, climates and clothing worn. These should be considered on a case-by-case basis, and where appropriate, determined by a work task assessment. The University of Portsmouth is happy to advise OGI companies how such assessments could be conducted, and could assist in conducting these if required. Undertaking such assessments will ensure that tasks are performed within safe limits, and with practices that are not overtly conservative; this should therefore enhance productivity.