DRAFT ITINERARY
ENERGY CLAIMS – FORENSIC INVESTIGATION

A three day introduction to the Forensic Investigation of Energy Claims

DATE: 7-9 June 2016

DAY ONE

09.00 – 09.15 **INTRODUCTION**
Outline of Course and objectives

09.15 – 10.00 **PRINCIPLES OF FORENSIC CLAIMS INVESTIGATION**
An introduction to the conduct of scientific, forensic claim investigations

10.00 – 11.00 **INTRODUCTION TO ROOT CAUSE & FAILURE ANALYSIS**
Introduction to Industry methods. Explanation of "Why Tree" method. Advantages and disadvantages of Industry standard methods for Insurance focussed investigations. Why a typical industry cause investigation is potentially different from a forensic investigation for insurance purposes

11.00-11.15 **COFFEE**

11.15 – 12.00 **LABORATORY TECHNIQUES – METALLURGICAL**
An introduction to some of the available laboratory techniques used in forensic investigations: Including: Tensile Testing, Hardness Testing, Impact Testing, Fatigue Testing, Crack Tip Opening Displacement, Microstructural Inspection. Scanning Electron Microscopy,

12.00 – 13.00 **VISIT TO METALLURGICAL LABORATORIES – Set up fatigue testing experiment and view other metallurgical tests**

13.00 – 13.45 **LUNCH**

13.45 – 14.30 **LABORATORY TECHNIQUES – CHEMICAL**
An introduction to some of the available laboratory techniques used in forensic investigations. Including: Atomic Analysis, Thermal Analysis, Spectral Analysis, Component Separation.

14.30 – 15.30 **VISIT TO CHEMISTRY LABORATORIES**

15.30 – 16.15 **CORROSION**
General Corrosion, Pitting Corrosion, Galvanic Corrosion, Stress Corrosion Cracking. Common Corrosion Reduction Methods and associated problems

16.15 – 16.30 **TEA**

16.30 – 17.15 **STRUCTURE AND COMPONENT FAILURES**
The failure of structures and components, ductile and brittle failure, fatigue failure and vibration, pressure rupture, overload. hydrogen cracking, hydrogen induced stress cracking. A look at various common modes of failure.

17.15 - 17.30 **DISCUSSION AND QUESTIONS**

17.30 **RETURN TO HOTEL –**

1900 **TRANSPORT TO RESTAURANT FOR DINNER**

DAY TWO

09.00-09.45 **NON-DESTRUCTIVE TESTING**
An introduction to the available techniques and their application, including Composites Testing using Laser Shearography

09.45-10.45 **VISIT TO NDT LABORATORIES AND SWSNDT**

10.45 – 11.00 **COFFEE BREAK**

11.00 – 11.45 **DESIGN, DEFECTS, & DEFECTIVE PARTS**
An introduction to material/product specification, faulty design and defective parts.

11.45 – 12.45 **FIRE AND EXPLOSION INVESTIGATION**
Fire investigation, tracing a fire back to the primary cause. Typical problems encountered and case studies.

12.45 – 13.30 **LUNCH**

13.30 – 15.00 **LABORATORY WORK**
Delegates will be split into groups to review a failure investigation
The groups will perform the following: -
- *Gas Chromatography*: Detection of contaminants
- *Material Testing:* Energy claims case studies, including inspection of actual samples and review of test methods

15.00 - 15.45 **RISER CONSTRUCTION, COMMON FAILURES AND INVESTIGATION TECHNIQUES**
Overview of typical riser construction. Understanding the role of each constituent part or layer. Common Failure Types.

15.45 – 16.00 **COFFEE**

16.00 – 17.00 **VISIT TO FOREST FARM LABORATORIES – INTRODUCTION TO RISER DISSECTION AND INSPECTION**

17.00 **RETURN TO HOTEL**

1900 **TRANSPORT FOR DINNER AT RESTAURENT**

DAY THREE

0900 – 0945 **WELDING**

Review of Arc, Friction, Thermite and Laser Welding. Welding metallurgy, Heat Treatment, Corrosion of Welds, Cracking of Welds, Stress Corrosion Cracking, Hydrogen.

0945 – 10.30 **ENVIRONMENTAL CLAIMS INVESTIGATION**

The investigative forensic process and its application to the investigation of pollution and contamination claims. Review of the techniques available including computer modelling.

10.30 – 10.15 **COFFEE**

10.15 – 11.00 **BIOCORROSION AND OTHER MICROBIAL ACTIVITIES**

An introduction to microbial induced corrosion and remediation measures, the microbial souring of reservoirs, the use of microbes for enhanced oil recovery, and synthetic DNA taggants as an aid to locate and identify pollution sources.

11.00 – 11.45 **FATIGUE AND FATIGUE LIFE – WHAT IS THE DIFFERENCE?**

What is Fatigue? Understanding of "Fatigue Life". Overview of common types of fatigue failure. Predicting fatigue failure.

Fatigue Testing Review (Demo runs concurrently with both days but results analysed in above presentation).

11.45 – 12.30 **COMPOSITE MATERIALS**

Introduction to Composite Materials, their structure, uses, and typical failure issues.

12.30 – 13.15 **LUNCH**

13.15 – 14.00 **FINITE ELEMENT ANALYSIS (FE)**

An introduction to FE and its uses in Forensic Root Cause & Failure Investigations

14.00 – 14.45 **CONCLUSIONS, SUMMARY AND DISCUSSION**

14.15 **TRANSPORT TO STATION**