CONDITION BASED MONITORING OF TRANSFORMER UTILISING INFRARED THERMOGRAPHY AND DISSOLVED GAS ANALYSIS TECHNIQUES

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ABSTRACT

The title of this project is 'Condition Based Monitoring (CBM) of transformer utilising Infrared Thermography (IRT) and Dissolved Gas Analysis (DGA)'. Thermography technique is applied to the external parts of the transformer, such as housing, bushing/ termination and cooling system. While DGA is used to predict the condition of the transformer through the study of the resultant dissolved gas from oil sample taken.

The primary objectives are to provide an early detection of defect and addressed it before they lead to major breakdown. This paper will also prove that condition monitoring or predictive maintenance is very beneficial compared to preventive maintenance in terms of increasing equipment availability, reduced maintenance cost and more efficient repair.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

Transformers in general, over the last 40 to 50 years, have proven to be efficient and reliable. The majority of mechanical and electrical faults that occurred are detected prior to, during or shortly after commissioning. These faults may be quickly analysed and rectified.

Transformers represent a large capital investment for industries, and a return on that investment must be realised in the form of long-term reliability. Without information concerning transformers insulating oil quality, cooling system and all bushing/termination conditions, maintenance scheduling is no more than guesswork. An effective condition-based monitoring (CBM) program is therefore a critical component of strategic planning.

The need for improved performance from expensive industrial plant has in recent years necessitated the application of CBM methodologies. These can provide early warning of potential failure with the opportunity of organising avoidance strategies to minimise lost time and unexpected costs, thus greatly improving manufacturing efficiency. The continuing drive for improved efficiencies demands that a more educated analysis of monitored signals provides an indication of or even diagnoses the cause of a fault.

The level of urgency of a condition can then be determined, thus enabling the necessary action to be taken over an appropriate time period; maintenance can be scheduled based on plant condition rather than on a time-based regime.