UNIVERSITI TEKNOLOGI MARA

EFFECT OF DIFFERENT VOLUMETRIC FLOWRATES USING SAFETY ANALYSIS FOR POWER TO METHANOL PRODUCTION PLANT

WAN EDAYU NATASHA BINTI WAN MANSOR

B.Eng

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ABSTRACT

The increase of the carbon dioxide, CO_2 emission to the atmosphere has caused the increase of the temperature of the Earth. Thus, Global warming also increases. The source of the CO_2 emissions is from human activities such as deforestation and burning fuel and coal that used in methanol plant in order to supply electricity. In order to decrease the CO_2 emission, the Power to Methanol method plant was introduced. Power to Methanol plant is the plant that produce methanol by using the carbon dioxide capture and hydrogen that produced from electrolysis of water. So, the concentration of CO_2 in atmosphere will be reduced. However, based on the research before, the only aspect that has been considered such as energy, market and economy analysis. However, safety analysis also needs to be considered. So, this research targets to produce Power to Methanol plant that has minimal risk. In order to achieve the target, this research will determine the effect of volumetric flowrate of hydrogen and carbon dioxide feed by using Aspen Hysis. This research also will analyze the safety analysis of the methanol plant by using method of Quantitative Risk Assessment, QRA.

CHAPTER ONE

INTRODUCTION

1.1 Research Background

Gas exterior from burning of fossil fuels and extensive deforestation has contributed to an increase the concentration of carbon dioxide in the atmosphere from the beginning of the Industrial Revolution time period (Rezaei 2016). In recent times, a statistic stated that, if the greenhouse gas emission continues at the present rate, Earth's surface temperature could surpass historical values as early as possible, with almost unsafe effect on ecosystems, biodiversity and the living condition of people all around the world. This estimation will lead to increase the Global warming. As the scientist reported, Global warming is defined as an increase in the average temperature of the Earth's atmosphere, specifically an increase great enough to cause changes in the global climate conditions.

As the Global warming increase the global temperature, it would result in increasing the level of sea and will change the amount and pattern of environment, including an expanse of the dessert regions. The main cause of the increasing the global temperature is the increase emission amount of fuel gas such as carbon dioxide, methane, and nitrous oxide to the atmosphere. However, carbon dioxide is the most important cause of the global warming as the amount of the carbon dioxide emission is much larger than other gasses as showed in Figure 1.1.