CHAPTER 1

INTRODUCTION

Nowadays the use of fuel oil is so extensive that there is a need to be aware of its harmful effects on the environment, especially that of the sulfur dioxide (SO_2) and the lead vapor produced by the combustion of fuel oil. Obviously the way to minimize the detrimental effects is to reduce the concentrations of the sulfur and lead in the fuel. Thus it is necessary to determine the concentrations of sulfur and lead in the fuel oil used today.

By nature fuel oil contains sulfur (S) which is converted to SO_2 during combustion. Lead (Pb) is added to the fuel to increase the efficiency of the motor-car engine. The Government recommends that the concentrations of S and Pb in the fuel oils should not exceed 1.0 % weight and 0.45 gm/dm^3 respectively.

This thesis is about the use of non-dispersive X-ray fluorescence technique in providing rapid and accurate analysis for S and Pb. The main advantage of this technique over other methods of analysis is that there is no treatment required on the fuel.

<u>Objective and Scope of Study</u>

1. To determine the S and Pb contenting in fuel oil by X-ray fluorescence technique.

2. To design a prototype of a radioisotope excited X-ray fluorescence analyzer for determining S and Pb in fuel oil.