



CHAPTER I INTRODUCTION

Air pollution is one of serious pollution problems especially in urban areas. It results from a large amount of undesirable materials in the air. The undesirable materials, e.g. volatile organic compounds (VOCs), sulfur oxides (SO_x), and carbon monoxide (CO), can cause not only health problems, but also environmental impacts. With the rise of a number of vehicles on streets and industries these days, controlling the air pollution has become even more important. Table 1.1 shows quantities of major pollutants and their emission sources. These substances are major sources of the air pollution. They are mostly emitted from primary emission sources, such as exhaust gas from vehicles as well as gasoline stations.

Table 1.1 U.S. emissions estimates for 1991 (Values in millions of metric tons per year) (Nevers, 1995)

Source category	PM [*] ₁₀	SO _x	CO	NO _x	VOCs	Pb
Transportation	1.51	0.99	43.49	7.26	5.08	0.00162
Fuel combustion	1.10	16.55	4.67	10.59	0.67	0.00045
Industrial Processes	1.84	3.16	4.69	0.60	7.86	0.00221
Solid waste disposal	0.26	0.02	2.06	0.10	0.69	0.00069
Miscellaneous	0.73	0.01	7.18	0.21	2.59	0.00000
Total	5.44	20.73	62.09	18.76	16.89	0.00497

* Particulate matter, 10 μ or smaller

In Bangkok, Thailand, according to the Department of Land Transport (1998), a number of registered vehicles were 3,125,290 in 1995 and increased to 3,887,075 in 1998 (or approximately 254,000 automobiles registered per

year). Because of the rapid growth of gasoline consumption, gasoline stations have been built to support the highly increasing rate of vehicles. In 1995, a number of gasoline stations were approximately 600 and the consumption of gasoline were about 2 billion liters per year in Bangkok. The Department of Public and Municipal Works (1999) reported that a number of gasoline stations increased to 820 in 1999. It can be stated that the increases in both gasoline stations and vehicles directly contribute to the amount of hydrocarbons emitted into the air. To control the emission of hydrocarbons effectively, one has to know the amount released into the atmosphere.

Although several models have been proposed for approximating the amounts of hydrocarbons emission from many sources, not all available models used for predicting the amounts released from gas stations can represent the real situations very well. This work was to compare the proposed prediction model of released hydrocarbon from gasoline storage as well as some previous models to the experimental data obtained from this study. In addition, the effects of temperature, release vent height and initial gasoline volume on hydrocarbons emission were also investigated experimentally.