

Ich Siriprasert 2008: Application of CALPUFF Modeling System and Emission Factors for Human Health Risk Assessment in Hingrude Coal-Fired Power Plant. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Narumol Vongthanasunthorn, D.Eng. 353 pages.

Increasing number of coal-fired power plants caused by rapid growth of electricity consumption worldwide has drawn a resistance from environmentalists and people concerned with air pollution contributed from these plants. To reduce these problems, EIA is required to be conducted and approved before their construction. However, only a few air pollutants emitted from the plant are commonly investigated in EIA, and human health risk assessment is usually left out of EIA. The main objectives of this study are (1) to identify air pollutants released from a typical coal-fired power plant, (2) to determine the air quality impacts of pollutants released from Hingrude coal-fired power plant using CALPUFF modeling system and U.S. EPA's emission factors, and (3) to calculate human health related risks of air pollutants emitted from Hingrude coal-fired power plant to local people. The study reveals that there are at least 108 pollutants emitted from a typical coal-fired power plant, but only 27 pollutants were tested in CALPUFF modeling system due mainly to availability of U.S. EPA's emission factors of the pollutants. The air quality impacts and most total carcinogenic risks of these pollutants were found acceptable to people in villages near Hingrude coal-fired power plant. However, these pollutants are likely to cause non-carcinogenic effects on these villagers. A possible explanation for this is that only some of the pollutants investigated within this study are considered human carcinogen whereas almost all of them contribute to non-carcinogenic human health related effects. It is therefore suggested that other pollutants emitted from coal-fired power plants, apart from SO<sub>2</sub>, NO<sub>2</sub> and PM<sub>10</sub>, be examined in EIA. Human health risk assessment for these pollutants should also be included within the process of EIA for coal-fired power plant, including Hingrude coal-fired power plant as well.

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Thesis Advisor's signature

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