# TECHNOLOGIES OF OILY WASTE STREAM: CASE STUDY OF AN EU-ASIA PROJECT IN THAILAND

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## Introduction

This paper examines sustainable technologies of oily waste stream in Thai industries, detailing a case study of an EU-supported project within the Asia Invest Programme. Handling and Treatment of Oil Contaminated Water in Thai Industries and Trade (PROTEKT) is co-funded by the European Union and the implementing Consortium. This 18-month project aims at developing practiced-oriented guidelines specifically for Thailand on management of oil waste

## Reasons to act

Thailand has experienced big changes in recent times: undergoing an economic boom for most of the 1990's, the country experienced fast expansion and diversification of its industry, creating economic growth. Economic growth, however, has taken its toll on the environment, where water pollution has become one of the most serious environmental problems. The most common water pollution is oil, though the contribution of industries in this respect. Today, there is increasing awareness that Thai's economic development must be sustainable in the long-term. Under these circumstances, Thailand seems in a position to adopt measures to ensure environmentally sound production without hindering economic growth. The necessary measures to attain this objective should then shift attention towards small to medium-sized enterprises (SMEs), which, because of their large numbers, represent the backbone of Thailand's industrial growth (Hisatomi, 2002) and also major source of pollution in the country. Many of these industries produce process or non-process oily wastes and wastewaters.

Petroleum products contain thousands of different organic compounds. They range in structure from the simple compound, like methane, to highly complex compounds like polycyclic aromatic hydrocarbons (PAHs) (Clancey, 1999). Hydrocarbons from oil can move to atmosphere or settle through water to bottom sediments, where they may persist for years. Heavy metals, oil additives and combustion by-products from oil may build up in various media, e.g. move to atmosphere or settle to bottom sediments. Although vegetable oils and oily wastewaters from food industry are not as acutely toxic as many petroleum products, uncontrolled releases can result in significant environmental damage. Non-petroleum oil may stay in the water for longer time due to lower volatility even though some oils and animal fats can biodegrade more rapidly. Many food-processing activities need to maintain certain level of hygiene that will increase the amount of wastewaters that can be contaminated by oil, fat and grease.

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On a general scale, there are many common impacts to species and ecosystems despite of the oil type (Sawyer et al., 1994). Physical, chemical or toxic effects are the result of oily wastewater discharge from both petroleum spills as well as oil spills from food industry into water bodies, as well as leakages into soil. In many ways, the basic issues are similar though the scale and resources available may be very different. Comparison with similar industries and trades demonstrates that there are tangible benefits to be gained from a positive response to such waste material. The reasons to act can bring benefits and advantages from a pro-active response to the handling and treatment of oil-contaminated water as well as threats and costs if the challenge is ignored. Reasons to act include, among others, the following:

- Cost saving and improved management control (recognition of potential costs savings, reduced costs through waste minimization and energy efficiency);
- Compliance with legislation;
- Meeting stakeholder expectations (improved public relations profile, marketing advantage);
- Improved environmental performance (improved management of environmental issues, raised staff awareness);
- Motivation to implement effective environmental management
- Monitoring (efficiency tracing and compliance)

**Practical guidelines**

This common approach has helped PROTEKT consortium to propose a series of technical and managerial measures aimed to offer direct support to the selected companies. A special chapter in practice-oriented guidelines was dedicated to a systematic approach for treatment of oily contaminated wastewater, with up-to-date technologies tailored for the specific profile of Thai industry. The response options were treatment techniques based on physical, chemical and biological processes. Best practice examples from both technical and managerial sector were given to emphasize the importance of adopting and implementing of an effective environmental management system.

The validation of guidelines was done by a joint European/Thailand workshop with an interdisciplinary circle of Thai industries and trades who are directly or indirectly involved in handling and treatment of oil contaminated water. The workshop organized in Bangkok in February 2008 was made up of four main sessions, which were background, principle, application, and action on handling oily waste. The structure of the program as well as material used on both presentations and handouts are based on the guidelines. This meeting gave participants not only knowledge of dealing with oily waste in an environmentally sound way, but also an opportunity to apply their experience in the form of role-play. At the end of the day, participants learnt why and how environmentally friendly production can bring most benefits to their organization; to implement management policy and procedure; and to prevent oil contaminated water and its environmental impacts. Furthermore, team building and relationship between groups and each participant were noticeably successful.

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Following the workshop, a two-day interdisciplinary training course was organized by consortium and effectively implemented at King's Mongkut's University of Technology in Bangkok. The training course intended to give knowledge and skills for thirty-two participants from different industries and local government organizations. The course was a real success, participants showing a great enthusiasm for all activities required and sending requests for organizing this kind of training course again.

The resulted guidelines validated by the workshop and completed with suggestions and feedback from the training course are the basis for the development of a practice-oriented, distance learning module on handling and treatment of oily wastewater and its subsequent integration into industries and trades. The guidelines, distance learning module and additional material related to the project are available free of charge on the Internet at http://www.protekt.hs-bremen.de.

## Conclusions

Among specific benefits for local Thai industries directly addressed, the joint project PROTEKT aimed and succeeded to raise Asian awareness of European values and procedures as well as boosting the exchange of technology and know how, which is a vital factor for both economies. In the light of globalization, this project will promote awareness of international environmental problems and provide integrated skills to overcome them at an international level.

## References


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