

5387799920 : MAJOR ENVIRONMENTAL MANAGEMENT

KEYWORDS: INDUSTRIAL WASTES / PETROCHEMICAL PLANT / LANDFILL WASTE / 3R CONCEPT / WASTE MANAGEMENT / PETROCHEMICAL WASTES

PARNUWAT USAPEIN: AN IMPROVEMENT OF INDUSTRIAL SOLID WASTE MANAGEMENT SYSTEM FOR THE THAI PETROCHEMICAL COMPLEX THROUGH 3R CONCEPT. ADVISOR: ASSOC. PROF. ORATHAI CHAVALPARIT, Ph.D., 176 pp.

Sustainable waste management was introduced more than ten years ago, but it has not yet been applied to the Thai petrochemical industry. Therefore, under the philosophy of sustainable waste management, this research aims to apply the reduce, reuse, and recycle (3R) concept at the petrochemical factory level to achieve a more sustainable industrial solid waste management system. Six petrochemical plants in Thailand were surveyed for the case study. The sources and types of waste and existing waste management options were identified. LCA were useful for considering the environmental impact where 3R options were adopted. Lastly, the 3R Indicator (3RI) was introduced to evaluate the performance of 3R option in each case study plant. The results indicated that there were four sources of waste generation: (1) production, (2) maintenance, (3) waste treatment, and (4) waste packaging. The suitable 3R option were proposed and implemented at the case study plants. The result found that 3R options could reduce the amount of landfill waste to 79% and 34% of total waste generated in olefin case study plants and HDPE plant, respectively. This reduction would result in reduced disposal costs and reduced consumption of natural resources. Obviously, 3R methodology has shown high potential of waste reduction for applying with petrochemical industry. In addition, it can not only reduce waste at source but also divert waste from landfill to the recycling stream. LCA analysis identified that the proposed 3R option could reduce GHG emission compared with the landfill option. 3R Indicator, as the new index, can determine not only the capability of landfill waste reduction but also emphasize on the priority of 3R option which is the key point of this concept.

Finally, based on the data obtained from the case study plants, the guideline of improving industrial waste management system toward to zero landfill wastes was proposed in which it expected to be used as a guideline for improving waste management system at the factory level.

Field of Study: Environmental Management

Student's Signature

Academic Year: 2013

Advisor's Signature

