Petrochemical Industry is the fastest growing industry manufacturing variety of chemicals. The waste generated during the manufacturing of the basic chemicals is of prime concern to the Environmentalist. The waste is commonly found to contain complex organic compounds including metals. Inspite of the present treatment technology involving physico-chemical and biological processes, the petrochemical waste disposal site found to contain persistent toxic organic compounds. Thus, the recent advances in bioremediation for the treatment of persistent organic pollutants will be highly significant. In the present research study, the potential source of micro-organisms have been assessed for effective and efficient remediation of toxic organic compounds. The petrochemical waste disposal site have been characterized for physico-chemical and microbial analysis to assess the potential adapted micro-organisms. The microbial consortium developed and potential micro-organisms specific to remediation of the toxic compounds have also been identified using scale-up process technique. The potential micro-organisms will be versatile source for remediation of persistent toxic compounds. Further, the identification of gene from the potential micro-organism for a specific compound would be beneficial to develop the recombinant Genetically Modified Organisms (GMOs) for the bioremediation of complex waste generated by petrochemical industry.