

ABSTRACT

Design of a Spent Naphthenic Caustic Treatment Plant for an Oil Refinery

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In recent times, oil refineries around the world have been faced with more stringent regulations for liquid and gas effluent streams that can cause air or water pollution. Sodium hydroxide or caustic continues to be one of the primary reagents used in refineries to extract hydrogen sulphide, mercaptans and organic acids from hydrocarbon streams. Used caustic solutions from hydrocarbon treating systems are liquid effluents that, if discharged directly to the natural waterways, could contaminate and adversely affect drinking water quality and aquatic populations. Alternatively, if these used caustic solutions are discharged directly into an onsite wastewater treatment plant (WWTP) they can create a burdensome chemical oxygen demand (COD) and biological oxygen demand (BOD). Therefore, used caustics are normally converted to a form that minimizes the load on the WWTP or they can be sold to chemical companies as a process feedstock.

As part of the government's long-term vision for Trinidad and Tobago, a proposal has been drafted for the construction of an oil refinery in the Point Fortin area. The refinery must ensure compliance with all environmental regulations. While there are various categories of spent caustics, the objective of this project was to design a treatment plant for spent naphthenic caustic produced from the oil refinery. The plant was designed to ensure compliance with the draft Water Pollution Rules of Trinidad and Tobago (2000) and will consequently reduce the risk of negative environmental impacts.

Keywords: Rossi Atwarie; Oil refinery; Naphthenic caustic treatment; Water pollution rules.