

Low temperature process to recover impaired waters

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ABSTRACT

A low temperature process based on physical principles of gravity and barometric head was developed for efficient recovery of potable water from impaired waters. An example of impaired water demonstrated in this study is secondary effluent from the local wastewater treatment plant. This paper illustrates two different configurations by which impaired waters could be processed; one using direct solar energy; and another using a low grade heat source. These configurations demonstrate the feasibility of utilizing renewable energy sources and waste process heat to drive the water recovery process making it an environment-friendly and cleaner approach. Experimental studies showed that the process was able to achieve the following reductions of key water quality parameters: total dissolved solids from 935 mg/L to 18 mg/L (>98%); total suspended solids from 5.1 mg/L to 0.15 mg/L (>97%); nitrates from 2.4 mg/L to <0.1 mg/L (>95%); ammonia from 26.1 mg/L to <0.5 mg/L (>98%); and coliform from 77 to ~0 mg/L (100%). The effect of process parameters such as heat source temperature, flow rate, and evaporation temperatures on the process performance is presented.

Keywords: Desalination; Water treatment; Wastewater; Effluent; Impaired waters; Low temperature process

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