



# Academic

## INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“TEN YEARS WORKING TOGETHER FOR A SUSTAINABLE FUTURE”

---

## Produced water treatment by nanofiltration

TURRA, C.\* , GIACOBBO, A., BERNARDES, A. M.

LACOR, PPGE3M, Universidade Federal do Rio Grande do Sul, Rio Grande do Sul

\*Corresponding author, claudiaturran@gmail.com

---

### Abstract

The problem about produced water (PW) is worst if we consider that, for a single gallon of petroleum, there are three gallons of produced water as byproduct. PW is composed of a wide range of salts, suspended solids, chemical products such as antiflocculating and anticorrosive substances and some organic products, being a treatment necessary either to disposal to the environment as to reuse . For this, the membrane processes such as ultra, micro and nanofiltration is becoming an option. In this study, nanofiltration (NF) membrane was characterized in terms of hydraulic permeability ( $L_p$ ) and rejection coefficient ( $f$ ), to be used as membrane process for onshore PW treatment. A synthetic effluent, simulating PW from onshore platform, was treated by NF in different operational conditions, combining three values of feed flow rate (96, 192 and 240 L.h<sup>-1</sup>) and pressures varying from 2 – 6 bars. Temperature and pH were practically constant, with few modifications during the assays. The optimal regime, ie. feed flow rate and applied pressure, was the combination of 192 L.h<sup>-1</sup> of feed flow rate and 6 bars of pressure, which was capable to remove more than 81% of ions present in the synthetic PW. Between all the assays, the NF membrane was washed until  $L_p$  reached at least 90% the initial value. This fact proves that NF is a very effective method in salts removing from PW, promoting water reuse, recycling and correct disposal.

**Keywords:** membrane processes, nanofiltration, reuse and disposal, produced water treatment

---