

Reference list of installed MPPE units Offshore and (F) LNG produced water

MPPE unit	Flow rate m ³ /h ² (1)	Composition	Inlet concentration Mg/l (ppm)	Outlet concentration mg/l (ppm)
The Netherlands				
Vermillion (Total) (Harlingen) Offshore gas (3)	4-6	Al, Ar esp. benzene	2000-3000	< 0.5
Shell/Exxon (NAM B.V.) Offshore gas produced water k15A	3-5	Al, Ar, PAH	Hundreds	> 90% removal
Shell/Exxon(NAM B.V.) Offshore gas produced water K15B	3-5	Al, Ar, PAH	Hundreds	> 90% removal
TOTAL F15A E&P, Ofshore gas produced water	3	Al, Ar, PAH	500	< 0.05
Norway				
Statoil/Shell Ormen Lange Offshore gas produced water	68	Al, Ar, PAH	Hundreds	> 99% removal
Statoil Kollsnes Offshore Gas PW	20	Al, Ar, PAH	Hundreds	>99% removal
Offshore Atlantic StatoilHydro Asgard A Gas/condensate produced water (2)	3	Ar, PAH	70-80	>98% removal
Offshore Atlantic StatoilHydro Troll B (oil) (2)	9	Al, Ar, PAH	15-25	95-99% removal
Asia/Australia				
Offshore South China Sea (2)	3	Al, Ar	200/500	> 99% removal
Woodsite Pluto Australia LNG Terminal, Australia	40	Al, Ar, PAH	Hundreds	> 99% removal
Shell Floating LNG Prelude, Australia	140	Al, Ar, PAH	Hundreds	> 99% removal
Inpex Ichthys FPSO offshore Australia	180	Al, Ar, PAH	Hundreds	> 99% removal

(1) 1m³/hr = 4.4 gpm
 (2) Long duration test
 (3) Combined groundwater and process water
 (4) Combined with biotreatment

Abbreviations:

CHC= Chlorinated Hydrocarbons
 AL=Aliphatics=dispersed oil
 CFHC=Chlorinated Fluorinated HC's
 THT = Tetrahydrothiophene
 Ar = Aromatics (BTEX)
 PAH = Poly Aromatic Hydrocarbons
 DNAPL = Dense Non Aqueous Phase Liquids
 DBOFM=Design Build Own Finance Maintain
 DBOM = Design Build Operate

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