The removal of boron from aqueous solution through plasma-modified and unmodified AFX anion-exchange membrane was investigated by the Donnan dialysis (DD) method. The surface of anion-exchange membrane was treated by electron cyclotron resonance plasma (ECR) to enhance the performance. The effects of plasma-modified anion-exchange membrane and initial boron concentration on the boron removal were investigated at 25 °C. The optimum pH was chosen as 9.5 from the literature data. The flux values (J) and recovery factor (RF) of boron were obtained before and after the plasma modification. Under Donnan dialysis conditions, flux values and recovery factors of boron were calculated and the highest values were obtained for plasma-modified AFX membrane as compared with the unmodified one. This situation can be explained by change of morphology of pores in the plasma-modified membrane. In addition, the different valence anions also influence the flux of boron and the order of flux was found as Cl⁻>SO₄²⁻.