

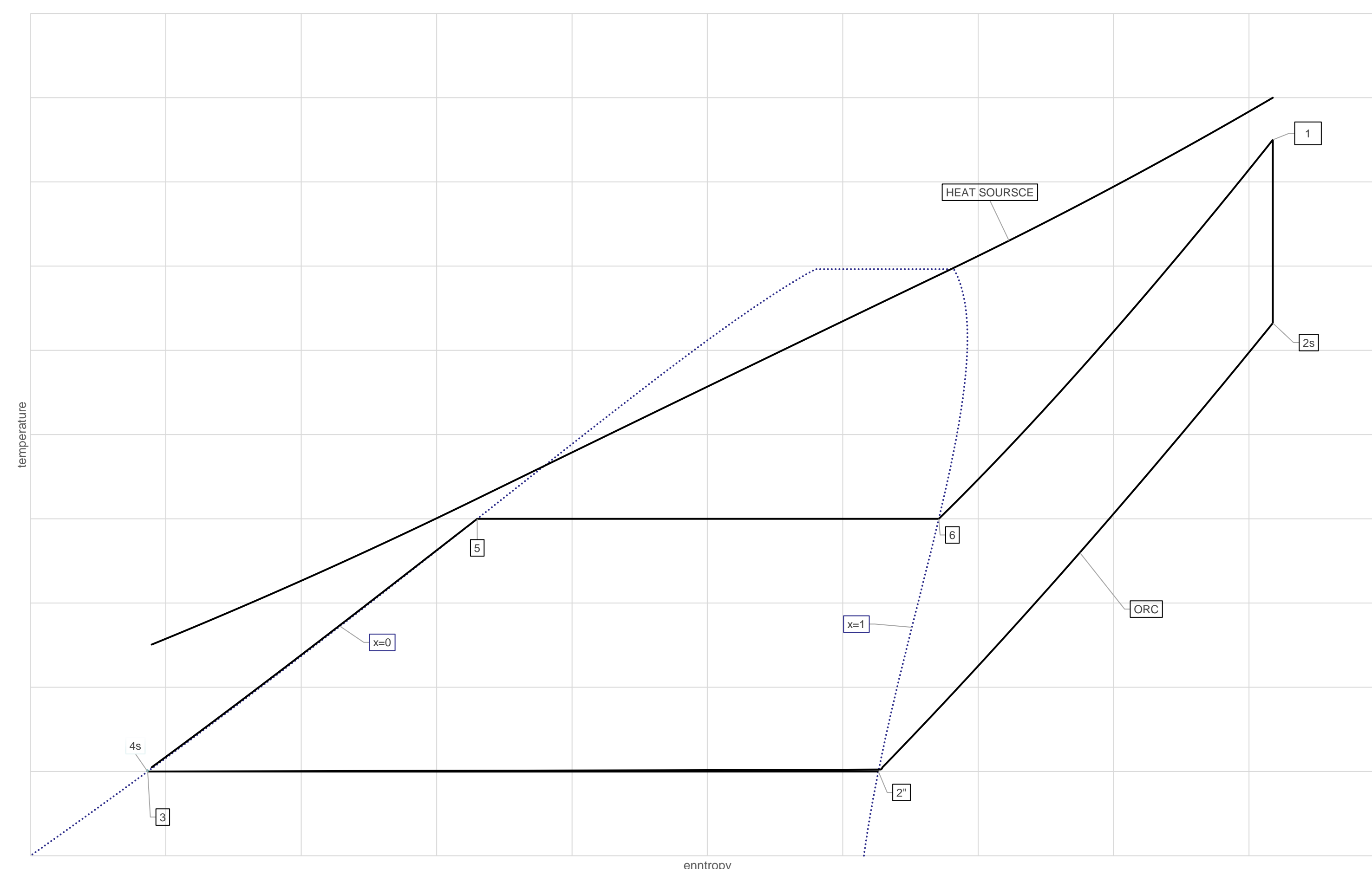
COMPARISON OF SELECTED ORGANIC COMPOUNDS USED AS WORKING FLUID IN SECONDARY CIRCUIT IN NPP



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Introduction

Small efficiency of nuclear power plants is a problematic issue. In this paper author suggested to use Organic Rankine Compounds (ORC) instead of water.



Description of the research problem

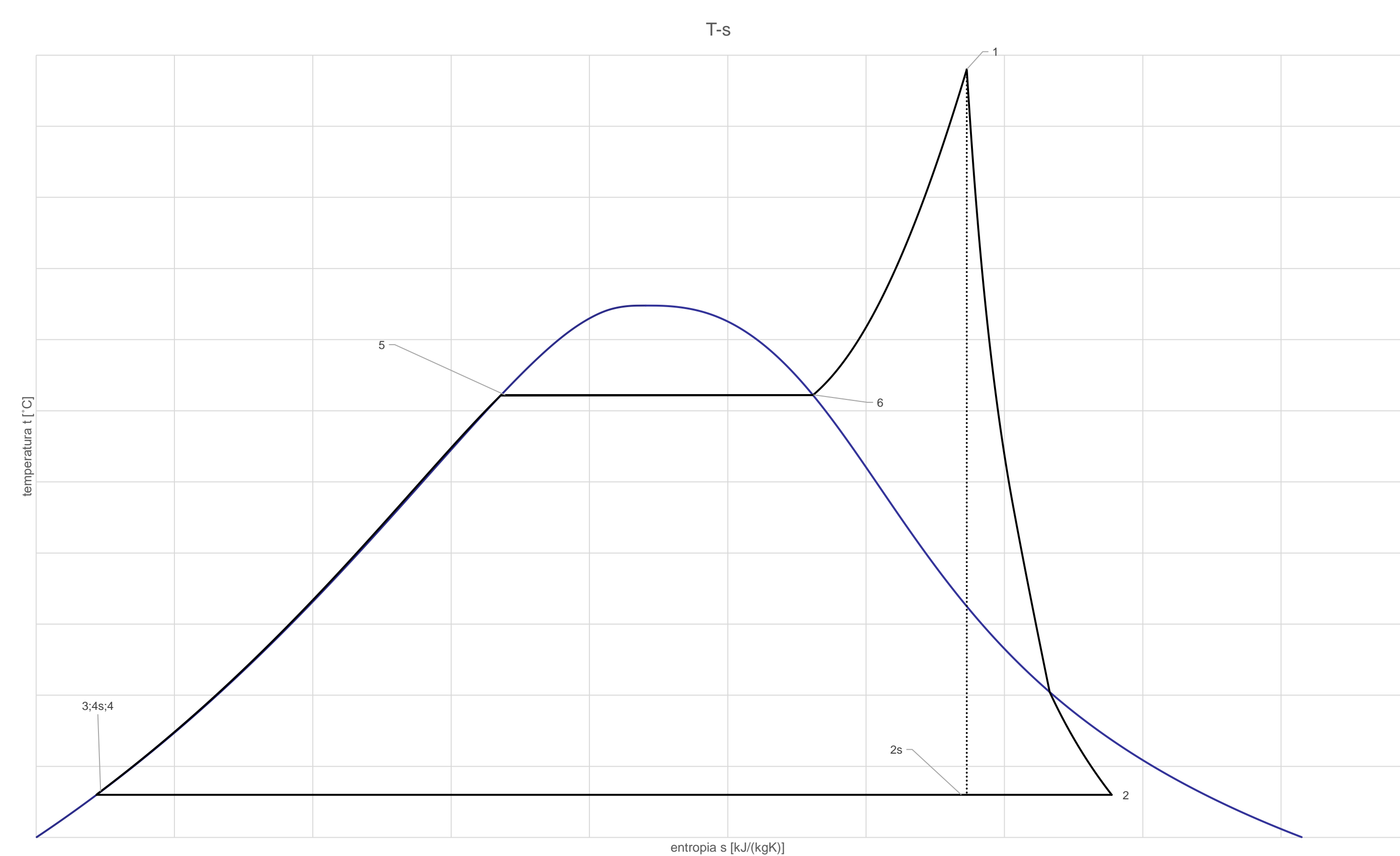
To fairly compare ORCs with water, author had to fix some parameters. For example constant temperatures in inlet and outlet of Steam Generator or efficiency of turbines and pumps. Another problem is latent heat of evaporation. In water reactors its imposible to superheat freash steam but use of supercritical ORC allows for that.

Metodology

Choosing compounds was done with comparison of existing ORC plants and RefProp database. Heat balance of plant was done with theoretical formulas. Parameters of compouds were calculated with RefProp and checked with existing thermodynamical formulas.

Results

Smaller heat capacity of organic compounds requires bigger flows. Lesser values of critical points in ORC allowed superheating of steam at 15,5 MPa and higher. Amonia being more compressible fluid alowed for a smaller turbine.



Conclusions

With ORC being used only for smaller planst (up to few MWe) it's difficult to predict behaviour of such compounds. Thers needs to be bigger analysis of fisibility of implementation at large scale ORC plants. Moreover research into BWR might give better results .