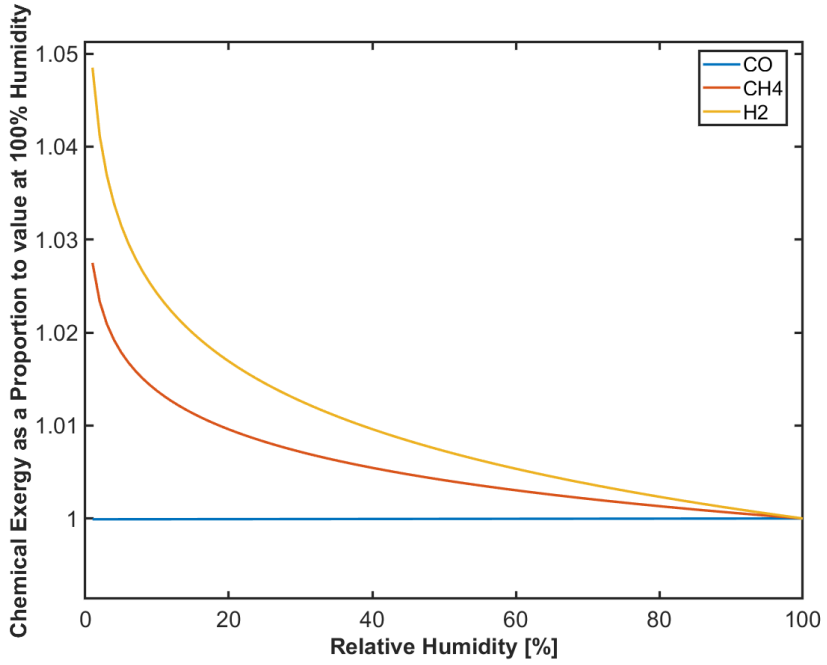
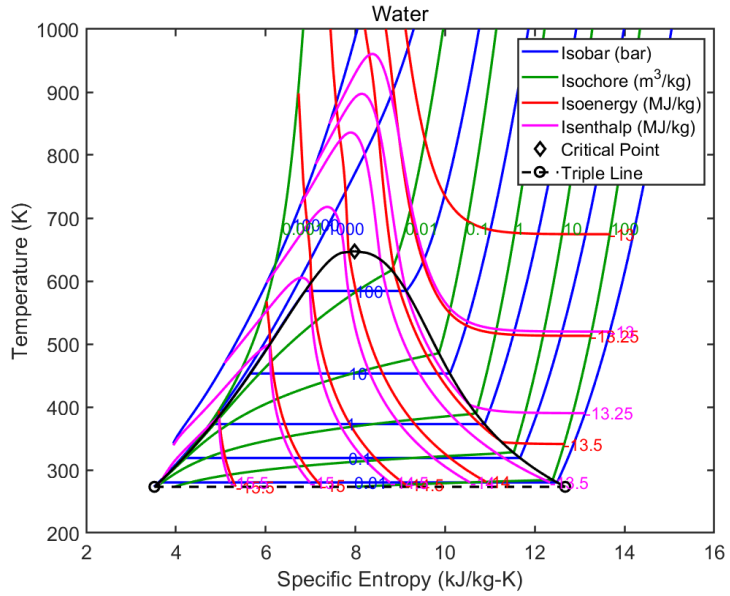
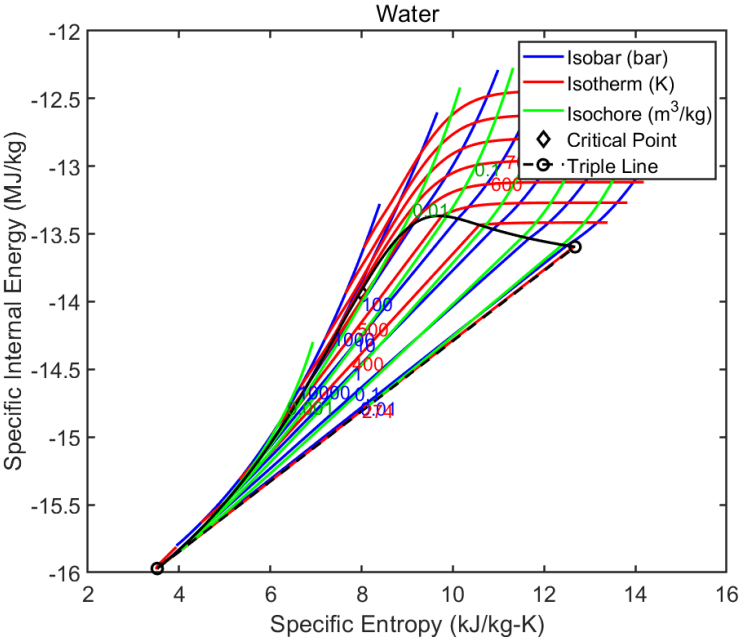
Adam Potter
1/24/2023

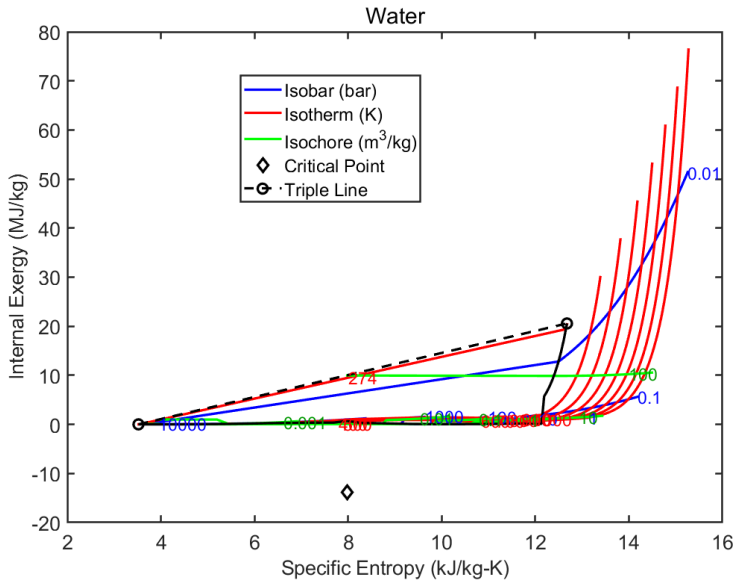
ME370B Project 2

Gas	LHV [J/kg]	HHV [J/kg]	Exergy [J/kg]	Flow Exergy [J/kg]
Hydrogen	1.200e+08	1.418e+08	1.167e+08	1.167e+08
Carbon Monoxide	1.010e+07	1.010e+07	9.806e+06	9.806e+06
Methane	5.003e+07	5.551e+07	5.172e+07	5.172e+07
Propane	4.635e+07	5.034e+07	4.869e+07	4.869e+07
Nitrogen	0.000e+00	0.000e+00	2.463e+04	2.463e+04
Oxygen	0.000e+00	0.000e+00	1.240e+05	1.240e+05
Carbon Dioxide	0.000e+00	0.000e+00	4.416e+05	4.416e+05
Natural Gas	4.613e+07	5.109e+07	4.771e+07	4.771e+07
Simplified Syngas	2.081e+07	2.293e+07	2.036e+07	2.054e+07
Engineering Air	-7.881e-15	-7.881e-15	3.611e+03	3.611e+03
Compressed Engineering Air	-7.881e-15	-7.881e-15	1.241e+05	2.015e+05
Cold Engineering Air	-7.881e-15	-7.881e-15	4.731e+03	4.731e+03
Warm Engineering Air	-7.881e-15	-7.881e-15	3.141e+05	3.141e+05




Water
Isobar (bar)
Isochore (m3/kg)
Isoenergy (MJ/kg)
Isenthalp (MJ/kg)
Critical Point
Triple Line
Temperature (K)
Specific Entropy (kJ/kg-K)


Water
Isobar (bar)
Isotherm (K)
Isochore (m3/kg)
Critical Point
Triple Line
Specific Internal Energy (MJ/kg)
Specific Entropy (kJ/kg-K)



The two options for water's dead state is as a vapor or as a liquid with the difference being the latent heat of water at STP. I chose that the dead state of water should be as a liquid. I believed that this was more appropriate because at standard temperature and pressure water is a liquid; it is only a vapor at room temperatures when the vapor has a low partial pressure. Thus I assert that liquid water is closest to a true environmental dead state.

Total time: ~15 hrs
I thought that while the exergy and LHV/HHV function creation was useful in understanding the concepts, much of my time wasnt related to the thermodynamics but with confusion interfacing with GRI30. I know that some recommendations are given, but I could have saved a lot of frustration is more was given on the GRI30 functions, specifically which functions are bulk (applying to all 53 species), specific to a species, or specific to an element (much of my time was sorting this out for 10-15 functions). Questions 3 and 4 seem less useful conceptually although I guess plotting practice is a skill.