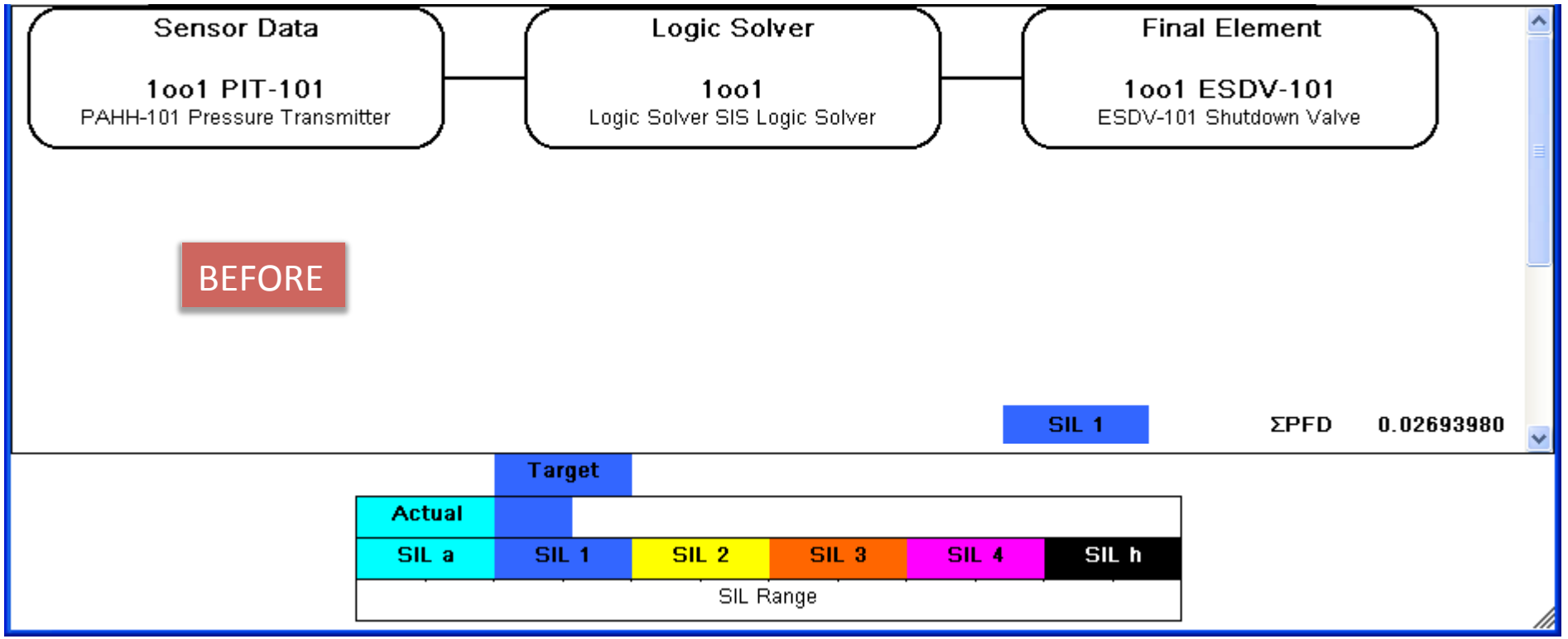
SIL Calculations: Before and After Configuration changes

Before - 1oo1 Sensor and 1oo1 Final Element Configuration



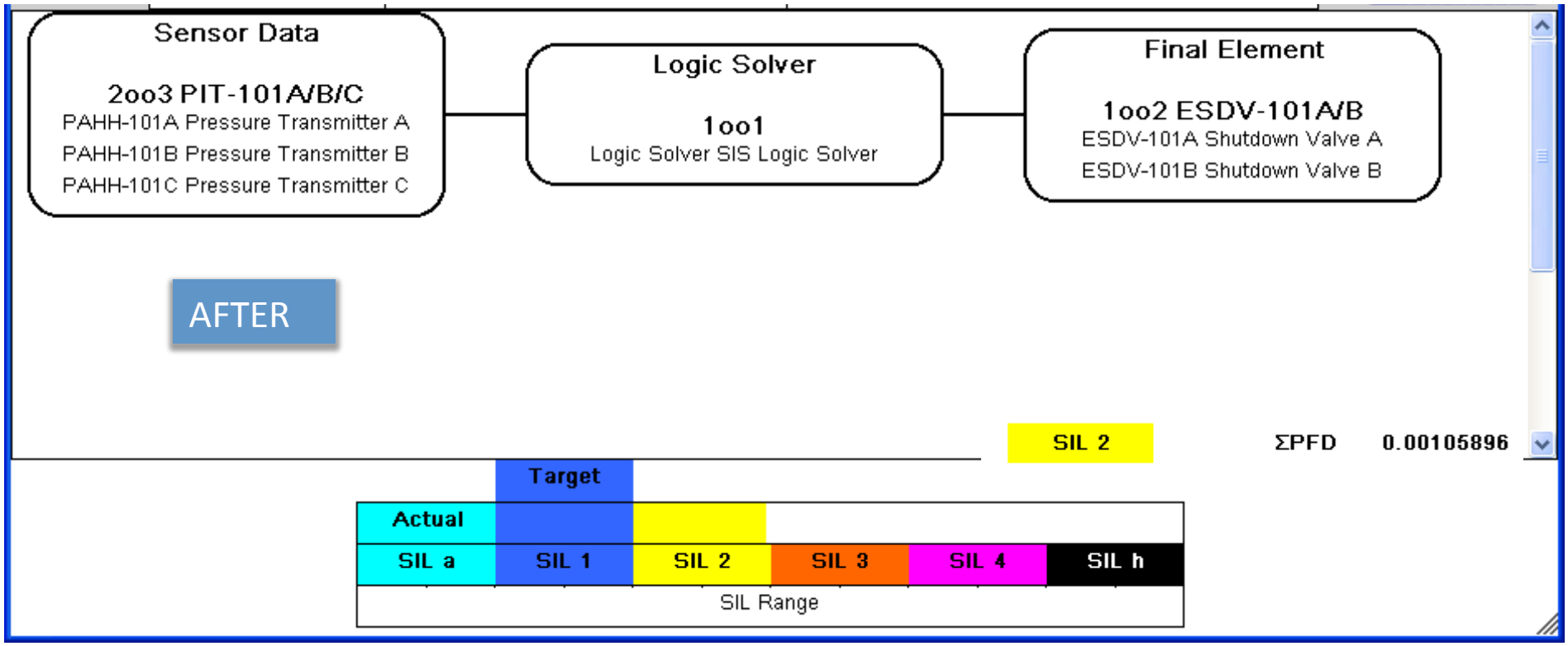
Scenario 1 PFD of Configuration = $PFD_{(PIT)} + PFD_{(LS)} + PFD_{(ESDV)}$

$= (1-e^{-(LambdaD_{PIT}).(1-DC_{PIT}).(T1/2 + MTTR_{PIT}) + DC_{PIT}.MTTR_{PIT}}) + (1-e^{-(LambdaD_{LS}).(1-DC_{LS}).(T1/2 + MTTR_{LS}) + DC_{LS}.MTTR_{LS}}) + (1-e^{-(LambdaD_{ESDV}).(1-DC_{ESDV}).(T1/2 + MTTR_{ESDV}) + DC_{ESDV}.MTTR_{ESDV}}) = 0.026937$

"Before" – What SilCore does in the background!

SIL Calculations: Before and After Configuration changes

A minute later….. - 2oo3 Sensor, 1oo2 Final Element



Scenario 2 PFD of Configuration = $PFD_{(PIT)} + PFD_{(LS)} + PFD_{(ESDV)}$

$$1 - ((1 - (1-e^{-(\lambda_{PIT.A}).(1-DC_{PITA}).(T1/2 + MTTR_{PIT.A}) + DC_{PITA}.MTTR_{PIT.A}}) \cdot (1-e^{-(\lambda_{PIT.B}).(1-DC_{PIT.B}).(T1/2 + MTTR_{PIT.B}) + DC_{PITB}.MTTR_{PIT.B}}) \cdot (1 - (1-e^{-(\lambda_{PIT.A}).(1-DC_{PITA}).(T1/2 + MTTR_{PIT.A}) + DC_{PITA}.MTTR_{PIT.A}}) \cdot (1-e^{-(\lambda_{PIT.C}).(1-DC_{PIT.C}).(T1/2 + MTTR_{PIT.C}) + DC_{PIT.C}.MTTR_{PIT.C}}) \cdot (1 - (1-e^{-(\lambda_{PIT.B}).(1-DC_{PIT.B}).(T1/2 + MTTR_{PIT.B}) + DC_{PITB}.MTTR_{PIT.B}}) \cdot (1-e^{-(\lambda_{PIT.C}).(1-DC_{PIT.C}).(T1/2 + MTTR_{PIT.C}) + DC_{PIT.C}.MTTR_{PIT.C}}) \cdot (1 - (1-e^{-(\lambda_{PIT.A}).(1-DC_{PITA}).(T1/2 + MTTR_{PIT.A}) + DC_{PITA}.MTTR_{PIT.A}}) \cdot (1-e^{-(\lambda_{PIT.B}).(1-DC_{PIT.B}).(T1/2 + MTTR_{PIT.B}) + DC_{PITB}.MTTR_{PIT.B}}) \cdot (1-e^{-(\lambda_{PIT.C}).(1-DC_{PIT.C}).(T1/2 + MTTR_{PIT.C}) + DC_{PIT.C}.MTTR_{PIT.C}}))$$

$$+ (1-e^{-(\lambda_{LS}).(1-DC_{LS}).(T1/2 + MTTR_{LS}) + DC_{LS}.MTTR_{LS}})$$

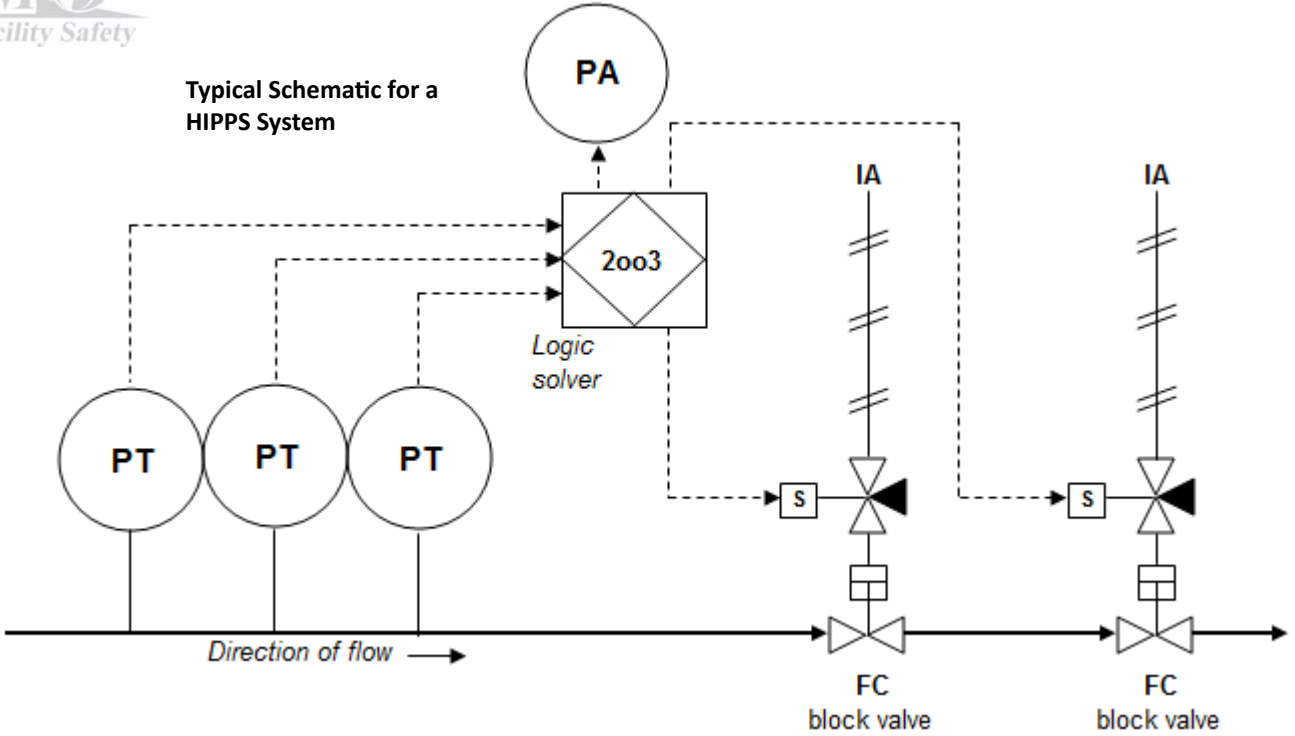
$$+ (1-e^{-(\lambda_{ESDV.A}).(1-DC_{ESDV.A}).(T1/2 + MTTR_{ESDV.A}) + DC_{ESDV.A}.MTTR_{ESDV.A}}) \cdot (1-e^{-(\lambda_{ESDV.B}).(1-DC_{ESDV.B}).(T1/2 + MTTR_{ESDV.B}) + DC_{ESDV.B}.MTTR_{ESDV.B}})$$

= 0.0001059

"After" – What SilCore does in the background!

SilCore user interface saves hours of work spent writing out PFD equations on paper or spreadsheets! The SilCore calculation engine is robust and can carry out very complex PFD configuration calculations. Modifying element and block configurations can be done in minutes, with the results of parameter and block changes visible immediately!

Typical Schematic for a HIPPS System



High Integrity Pressure Protection System (HIPPS), is a type of SIS, which is comprised of sensors, logic solver and final elements dedicated to overpressure protection.

Safety Instrumented System

Typical HIPPS Valves