



13-980417-CLN-01

TO: DISTRIBUTION
FROM: S RAMAKRISHNAN
SUBJECT: COIL ELECTRICAL ALLOWABLES

Per your request I have calculated the allowable continuous current, $\int i^2(t)dt$, and ESW at I_{max} for the PF coils.

This is based on allowing a ΔT of 100C, which, based on the inlet water temperature (10C) would bring the coil temperature up to the range where boiling and possible insulation damage might occur. To compute dissipation, copper temperatures are assumed at the maximums ($T_{inlet} + \Delta T_{max}$). Therefore the results are conservative. For instance, the OH limit is less than the rated ESW. This indicates the criticality of the OH protection.

Following are the numbers:

Coil	Iallow (amps @ $\Delta T=$)	I ² Tallow (A ² -sec @ $\Delta T=$)	ESWallow (sec @ I _{max})
ΔT	100.0	100.0	
OH	1527.8	2.96E+08	0.5
PF1a	4535.5	1.59E+09	7.1
PF1b	4586.4	1.59E+09	4.0
PF2a	4930.8	4.86E+09	12.2
PF2b	4930.8	4.86E+09	12.2
PF3a (S1-2a,b)	2856.2	4.86E+09	12.2
PF3b (S1-2a,b)	2856.2	4.86E+09	12.2
PF4a (S1-3a)	5894.9	4.86E+09	12.2
PF4b (S1-3b)	4053.5	4.86E+09	12.2
PF4c (S1-3c)	3676.2	4.86E+09	12.2

cc:

J Chrzanowski

NSTX File