



71-980302-CLN-01

TO: R ELLIS
FROM: C NEUMEYER
SUBJECT: FIELD AT MIDPLANE

Per your request I calculated the worst case field contours on the midplane just outside of the vacuum vessel.

Two worst case PF circuit current distributions were selected, one which produces the maximum vertical field, and one the maximum radial field, in the area of interest.

Currents were constrained in magnitude to be either zero or full rated current, and constrained in polarity to be consistent with a positive plasma current. Plasma current was not included (it reduces the external field). Note that while the upper and lower coil current can be different in PF1a, PF2, and PF3, the coils are connected directly in series in PF4 so that the current must be the same in the upper and lower coils.

Following currents were used for the worst case vertical field.

Coil	R	Z	dZ	dR	Amp-Turns
OH	0.1318	0	4.2626	0.0449	-2.30E+07
PF1aU	0.1803	1.4483	0.5388	0.0416	-7.20E+05
PF1aL	0.1803	-1.4483	0.5388	0.0416	-7.20E+05
PF1b	0.3048	-1.8188	0.1712	0.0848	0.00E+00
PF2aU	0.7991	1.9335	0.0679	0.1627	-2.80E+05
PF2bU	0.7991	1.8526	0.0679	0.1627	-2.80E+05
PF2aL	0.7991	-1.9335	0.0679	0.1627	-2.80E+05
PF2bL	0.7991	-1.8526	0.0679	0.1627	-2.80E+05
PF3aU	1.4945	1.6335	0.0679	0.1864	-3.00E+05
PF3bU	1.4945	1.5526	0.0679	0.1864	-3.00E+05
PF3aL	1.4945	-1.6335	0.0679	0.1864	-3.00E+05
PF3bL	1.4945	-1.5526	0.0679	0.1864	-3.00E+05
PF4aU	1.7827	0.7275	0.0679	0.0678	-1.00E+05
PF4bU	1.7946	0.6466	0.0679	0.0915	-1.60E+05
PF4cU	1.8065	0.5657	0.0679	0.1153	-1.80E+05
PF4aL	1.7827	-0.7275	0.0679	0.0678	-1.00E+05
PF4bL	1.7946	-0.6466	0.0679	0.0915	-1.60E+05
PF4cL	1.8065	-0.5657	0.0679	0.1153	-1.80E+05

Following currents were used for the worst case radial field.

Coil	R	Z	dZ	dR	Amp-Turns
OH	0.1318	0	4.2626	0.0449	-2.30E+07
PF1aU	0.1803	1.4483	0.5388	0.0416	-7.20E+05
PF1aL	0.1803	-1.4483	0.5388	0.0416	-7.20E+05
PF1b	0.3048	-1.8188	0.1712	0.0848	5.60E+05
PF2aU	0.7991	1.9335	0.0679	0.1627	-2.80E+05
PF2bU	0.7991	1.8526	0.0679	0.1627	-2.80E+05
PF2aL	0.7991	-1.9335	0.0679	0.1627	2.80E+05
PF2bL	0.7991	-1.8526	0.0679	0.1627	2.80E+05
PF3aU	1.4945	1.6335	0.0679	0.1864	-3.00E+05
PF3bU	1.4945	1.5526	0.0679	0.1864	-3.00E+05
PF3aL	1.4945	-1.6335	0.0679	0.1864	3.00E+05
PF3bL	1.4945	-1.5526	0.0679	0.1864	3.00E+05
PF4aU	1.7827	0.7275	0.0679	0.0678	-1.00E+05
PF4bU	1.7946	0.6466	0.0679	0.0915	-1.60E+05
PF4cU	1.8065	0.5657	0.0679	0.1153	-1.80E+05
PF4aL	1.7827	-0.7275	0.0679	0.0678	-1.00E+05
PF4bL	1.7946	-0.6466	0.0679	0.0915	-1.60E+05
PF4cL	1.8065	-0.5657	0.0679	0.1153	-1.80E+05

Flux and field plots for the two cases are attached.

cc:

NSTX File