CC GasMix Tutorial Example

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Depth = 220 fsw
= 7.67 ata

SP = 1.2

DF = 1.0

TGD = 5.2

PN_2 = 2.7

Loop	Diluent
Constraints: $PO_2 = SetPoint\ SP \rightarrow\ FO_2^{loop} = \frac{SP}{D_{ata}}$ $= \frac{1.2}{7.67}$ $PN_2 = 2.7$ or better for EAD = 80fsw $= 0.156$ Total Gas Density = TGD or better	Constraints: $PO_2\ at\ MOD$ = "diluent flush PO_2" $= DF\ \rightarrow\ FO_2^{dil} = \frac{DF}{D_{ata}}$ $FO_2^{dil} = \frac{1.0}{7.67} = 0.13$
To address PN_2 constraint, $FN_2^{loop} = \frac{PN_2}{D_{ata}} = \frac{2.7}{7.67} = 0.352$ then $FHe^{loop} = 1 - FN_2^{loop} - FO_2^{loop}$ $= 1 - .156 - .352 = 0.492$ Calculate loop gas density using loop gas fractions and compare to TGD. If it is less than TGD, then finish by calculating diluent gas fraction as seen to the right →	$\omega = \frac{D_{ata} - SP}{D_{ata} - DF}$ $FN_2^{dil} = \frac{FN_2^{loop}}{\omega}$ $FHe^{d} = \frac{FHe^{loop}}{\omega}$
If total gas density from above is greater than TGD, then we must calculate inert gas loop fractions that yield the required gas density (at MOD). $FHe^{loop} = \frac{SP \cdot d_{O_2} + (D_{ata} - SP) \cdot d_{N_2} - TGD}{D_{ata} \cdot (d_{N_2} - d_{He})}$ $= \frac{1.2 \times 1.428 + 6.47 \times 1.251 - 5.2}{7.67 \times 1.072}$ and $= 0.56$ $FN_2^{loop} = 1 - FHe^{loop} - FO_2^{loop}$ $= 1 - 0.56 - 0.156 = 0.284$ Finish by calculating diluent gas fractions that give the above loop gas fractions upon reaching SetPoint →	$\omega = \frac{D_{ata} - SP}{D_{ata} - DF} = \frac{6.47}{6.67} = 0.97$ $FN_2^{dil} = \frac{FN_2^{loop}}{\omega} = \frac{0.284}{0.97} = 0.293$ $FHe^{d} = \frac{FHe^{loop}}{\omega} = \frac{0.56}{0.97} = 0.577$ TMX 13/58

Gas Density =
$7.67 \times (0.156 \times 1.428 + 0.352 \times 1.251 + 0.492 \times 1.072)$
$= 5.77 > TGD = 5.2$