$$\frac{\partial F_{66}}{\partial \varphi_{64}^{sp}} = \left(\frac{^{66}Zn}{^{64}Zn}\right)^{sp} - \left(\frac{^{66}Zn}{^{64}Zn}\right)_{ref}^{sple} \left(\frac{64}{66}\right)^{\beta_{sple}}$$

$$\frac{\partial F_{66}}{\partial \beta_{sple}} = \ln\left(\frac{64}{66}\right)\left(1 - \varphi_{64}^{sp}\right)\left(\frac{^{66}Zn}{^{64}Zn}\right)_{ref}^{sple} \left(\frac{64}{66}\right)^{\beta_{sple}}$$

$$\frac{\partial F_{66}}{\partial \beta_{mix}} = -\ln\left(\frac{64}{66}\right)\left(\frac{^{66}Zn}{^{64}Zn}\right)_{meas}^{mix} \left(\frac{64}{66}\right)^{\beta_{mix}}$$