LeMessurier Consultants Structural Engineers	By ETH	Date 7/17/15	File No. 81085.002	Sheet No. 1/1
	Subject NBMCT BLAST RADII, NMFS LIMITS, INTEGRATION PERIOD			

BASIC SIMILITUDE EQN (SWISDAK 1978, 15)

$$\text{PARAMETER} = K\left(\frac{W^{1/3}}{R}\right)^{\alpha}$$

COEFFICIENTS FOR PENTOLITE (SWISDAK, 17)

	P	I	Θ
K	56.5	5.73	0.084
α	1.14	0.91	-0.23

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EFFECTIVE WEIGHT

SWISDAK EQNS ARE FOR WATERBORNE EXPLOSIVES.
NBMCT EXPLOSIVES ARE BURIED IN BEDROCK UNDER OVERBURDEN
JASCO ASSUMES 4"ϕ BEDROCK UNDER OVERBURDEN CAN BE SIMULATED CONSERVATIVELY AS A CHARGE IN A 24"ϕ, 1" THICK PIPE (p.23)

$$\text{COUPLING EFFICIENCY} = 34.37 + 0.005\left(\frac{50^{\#}(24")}{1"}\right) \quad \text{(DOWILENSKI + FENTON 2003, 16)}$$

$$= \underline{40.4\%}$$

$$W = \frac{50^{\#}(0.404)}{2.2\ \#/kg} = \underline{9.18\,kg} \qquad W^{1/3} = \underline{2.09}$$

NMFS LIMITS

$P = 75.6\,psi$ AT $R = 127.4\,m$

$$75.6 = (145\ \tfrac{psi}{MPa})(56.5)\left(\tfrac{2.09}{127.4}\right)^{1.14}$$

$$\Theta = 0.452\,ms = (2.09)(0.084)\left(\tfrac{2.09}{127.4}\right)^{-0.23}$$

$I = 18.4\,psi\text{-}ms$ AT $R = 310\,m$

$$18.4 = (145)(2.09)(5.73)\left(\tfrac{2.09}{310}\right)^{0.91}$$

$$\Theta = 0.554\,ms = (2.09)(0.084)\left(\tfrac{2.09}{310}\right)^{-0.23}$$

I IS INTEGRATED TO A TIME OF:

$\tau = 5\Theta$ (SWISDAK, 17)

$\tau = 5(0.554) = \underline{2.77\,ms}$

$\tau = 6.7\Theta$ (GLE 1993)

$\tau = 6.7(0.554) = \underline{3.71\,ms}$

$\underline{3.71\,ms \ll 25\,ms}$