EQUATIONS (Koch, 1986)

*Drawdown around constant flow line sink

$$\Delta H(x',y') = \left(\frac{Q}{2\pi T}\right)\left[ln[(b+(c^2+b^2)^{0.5})/c] - cosh^{-1}[H(x',y')]\right]$$

where

ΔH(x',y')	feet	drawdown at point x', y'
Q	cfd	discharge
T	ft²/day	Transmissivity
b	feet	radius of influence, drawdown is zero at this external elipse minor semiaxis length
c	feet	one half length of line sink (one half length of mine cut)
x'	feet	one component of vector from middle of line sink to point of interest
y'	feet	one component of vector from middle of line sink to point of interest
H	feet	Head function at x',y'

*Approximation of radius of influence

$$b = 2[(Tt)/S]^{0.5}$$

where

b	feet	radius of influence
T	ft²/day	Transmissivity
t	day	time
S	unitless	Storativity
		Storativity generally ranges between 0.00005 and 0.005 in confined aquifers

INPUT

CONSTANTS

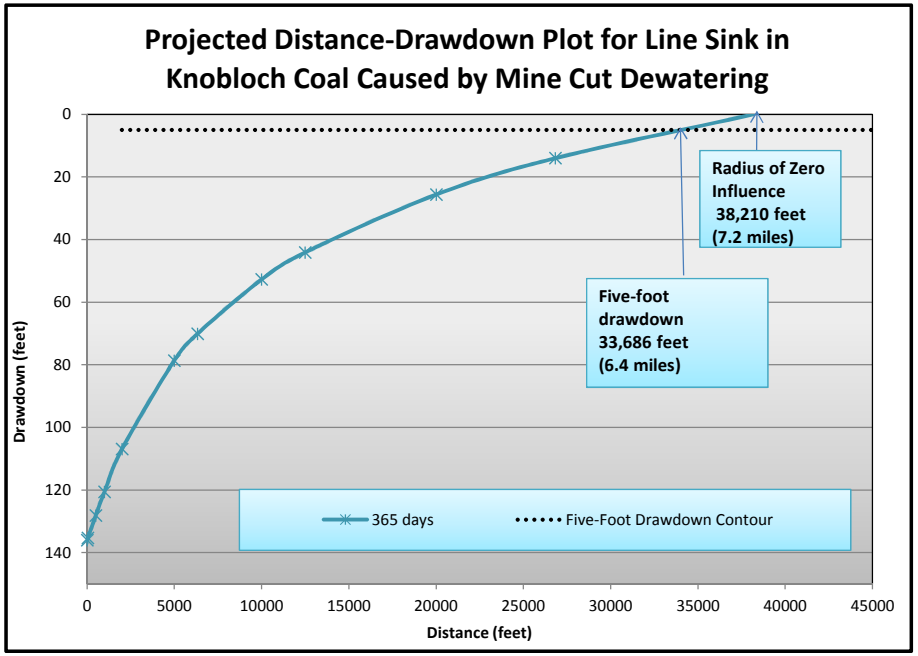
T	100	ft²/day
S	0.0001	unitless
Q	24992.922	cfd
c	2500	feet
x'	0	feet
t (days)	365	days

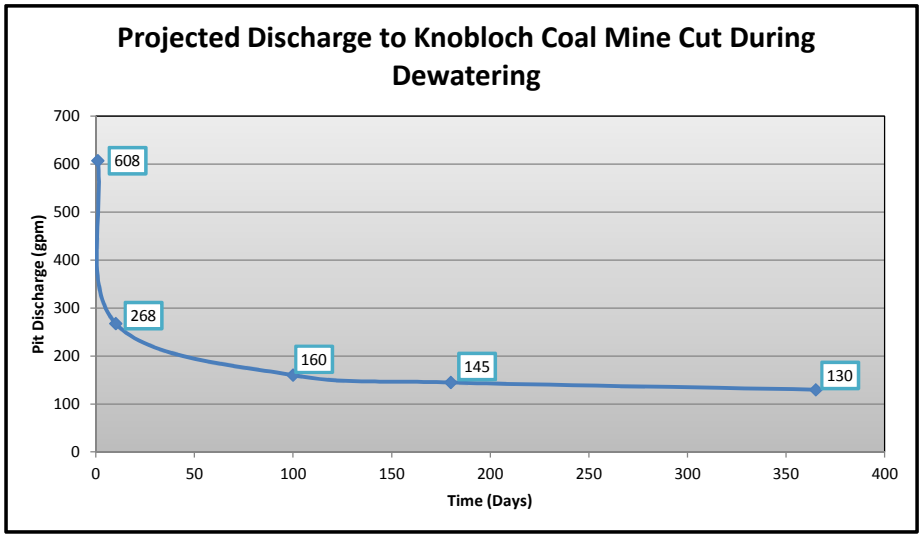
VARIABLES

y' (feet)	H	H²
5	1.000002	1.000004
50	1.0002	1.0004
500	1.019804	1.04
1000	1.077033	1.16
2000	1.280625	1.64
5000	2.236068	5
6324.6	2.720311	7.40009
10000	4.123106	17
12500	5.09902	26
20000	8.062258	65
26833	10.77968	116.2016
38210	15.31668	234.6007

OUTPUT

t(days)	365
b (feet)	38210
x'=0, y' (feet)	ΔH(x',y') feet
5	136.0
50	135.3
500	128.2
1000	120.6
2000	106.9
5000	78.7
6324.6	70.1
10000	52.8
12500	44.1
20000	25.6
26833	14.0
38210	0.0





OTTER CREEK MINE EXHIBIT 314C APPENDIX B GROUNDWATER FLOW MODEL DEVELOPMENT, CALIBRATION, AND MINE DEWATERING SIMULATION	Analytical Mine Dewatering Drawdown Projections	FIGURE 2-10