

Attachment 2

Response by Barry Hall to

Data Request No. 9C

from Stuart Conrad
representing AG Processing

in Case No. WO-98-204

9.C. Attachment

Supposing a linear relation between total installed cost of pipe and pipe diameter:

Such a relation may be expressed:

$$(1) \quad C = c d ; \quad C \doteq \text{cost/ft}, \quad c_1 \doteq \text{constant} \\ d \doteq \text{pipe diameter}$$

For any given pressure the flow capacity of a pipe is proportional to the cross-sectional area:

$$(2) \quad A = \pi r^2 = \pi \left(\frac{d}{2}\right)^2$$

simply:

$$(3) \quad A = c_2 d^2$$

Flow capacity, then, is

$$(4) \quad Q = c_3 d^2 ; \quad Q \doteq \text{flow capacity} \\ d \doteq \text{diameter} \\ c_3 \doteq \text{constant}$$

Performing some simple algebra on (4)

$$C_4 Q^{1/2} = d$$

Substituting (5) into the cost per foot, one obtains:

$$C = C_1 C_4 Q^{1/2} = C_5 Q^{1/2}$$

For an individual pipe the cost increases with the square root of capacity.

For the entire system it is assumed that larger size pipe will be employed whenever it is economic to do so.