

# Twin Forks MDWCA

## Standard Operating Procedure A.3

### Calculation of Water Supply and Loss Rates

Approved by the Board of Directors  
[September 17, 2005]

#### I. Calculation of Water Supply

##### A. Water Rights

Twin Forks MDWCA owns 55.26 acre-feet of water rights. At 325,851 gallons per acre-foot, these water rights allow the production of 18,006,526.26 gallons of water per year.

##### B. Water Production Capacity

Twin Forks MDWCA has three spring and two wells, with the following (approximate) production capacity [1 gallon per minute is 525,600 gallons/year]:

S1	4 gallons per minute	=	2,102,400 gallons per year
S2	6 gallons per minute	=	3,153,600 gallons per year
S4	1.5 gallons per minute	=	788,400 gallons per year
W1	2 gallons per minute	=	1,051,200 gallons per year
W2	20 gallons per minute	=	10,512,000 gallons per year
TOTAL	33.5 gallons per minute		17,607,600 gallons per year

In recent years, Twin forks MDWCA has produced about 10 million gallons of water per year and has accounted for about 5 million gallons of water per year. It is expected that, with increased attention to leaks, the water not accounted for will drop significantly.

## II. Calculation of Water Losses

Refer to SOP A1 Routine Operation of System for a schematic diagram of the water distribution system.

At present, each residential water meter in the Twin Forks MDWCA system is assigned to one of five routes, and the billing software allows the usage to be printed out by individual meter and/or by route. One needs to know:

- (Sold on Route #1) James Canyon
- (Sold on Route #2) Twin Forks East
- (Sold on Route #3) Twin Forks West
- (Sold on Route #4) Sixteen Springs West
- (Sold on Route #5) Sixteen Springs East and Forest View

In addition there are meters that allow one to read the total water that flows out of a tank. In order to carry out the calculation, one needs to know

- (Produced1) the water metered out of Tank #1 (which goes to James Canyon only),
- (Produced2) the water metered out of Tank #2 (which supplies Twin Forks West, Twin Forks East, and, when pumped through the trans-mountain water pipeline, Sixteen Springs West, Sixteen Springs East, and Forest View), and
- (Produced3) the water metered out of Tank #9 (which supplies Sixteen Springs West, Sixteen Springs East, and Forest View).
- (Transferred1) the water transferred across the mountain by pipeline (this may be an estimate based on pump capacity)

### For James Canyon:

Water into Route #1 distribution system	=	(Produced1)
-Water accounted for	=	-(Sold on Route #1)
Water not accounted for (loss)	=	difference1

$$\% \text{ loss in Route \#1} = \text{difference1} / (\text{Produced1}) \times 100$$

### For Twin Forks West and Twin Forks East:

Water into Route#2/#3 distribution system	=	(Produced2)
	=	-(Transferred1)
Net water into Route #2/#3 distribution system	=	difference2

Water accounted for on Route #2	=	(Sold on Route #2)
Water accounted for on Route #3	=	+(Sold on Route #3)
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Total water accounted on Route #2/#3	=	sum1

Net water into Route#2/#3 distribution system	=	difference2
-Water accounted for on Route #2/#2	=	-sum1
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Water not accounted for on Routes #2/#3	=	difference3

% water not accounted for on Routes #2/#3 = difference3/difference2 x 100

**For Sixteen Springs West, Sixteen Springs East, and Forest View:**

Water produced to Tank #9	=	(Produced3)
Water transferred across mountain	=	+(Transferred1)
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Total water into Route #4#5 distribution system	=	sum2

Water accounted for on Route#4	=	(Sold on Route #4)
Water accounted for on Route #5	=	+(Sold on Route #5)
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Total water accounted for in Route#4/#5 distribution system	=	sum3

Total water into Route #4#5 distribution system	=	sum2
- Total water accounted for in Route#4/#5 distribution system	=	-sum3
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Water not accounted for in Route #4/#5 distribution system	=	difference4

% water not accounted for on Routes#4/#5 = difference4/sum3 x 100

**For the entire water distribution system:**

Water metered from Tank#1	=	(produced1)
+Water metered from Tank#2	=	+(produced2)
+ Water metered from Tank#9	=	+(produced3)
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Total water produced	=	sum4

Water accounted for on Route#1	=	(Sold on Route #1)
+Water accounted for on Route#2	=	+(Sold on Route #2)
+Water accounted for on Route#3	=	+(Sold on Route #3)
+Water accounted for on Route#4	=	+(Sold on Route #4)
+Water accounted for on Route#5	=	+(Sold on Route #5)
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Total water accounted for	=	sum5

$$\begin{array}{rcl} \text{Total water produced} & = & \text{sum4} \\ \text{-Total water accounted for} & & \text{-sum5} \\ \hline \text{Total water not accounted for} & = & \text{difference5} \\ \\ \% \text{ total water not accounted for} & = & \text{difference5/sum4} \times 100 \end{array}$$