SWEETWATER SPRINGS WATER DISTRICT

TO: Board of Directors **AGENDA NO. V-E**

FROM: Steve Mack, General Manager

Meeting Date: December 3, 2009

SUBJECT: DISCUSSION RE CAUSES OF WATER LOSS AND UNKNOWN LEAKS

RECOMMENDED ACTION: Receive a report on causes of water loss and leaks by the District.

FISCAL IMPACT: none

DISCUSSION:

At the November Board meeting Directors requested a discussion item on causes of water losses. Staff report District water production and water sales at each monthly Board meeting as part of the General Manager's Report. Included in that report is a chart that tracks both (see Figure 1 in item VII). Over the past year the difference between production and sales has been close to 30%. The District also reports production and sales and the difference in information for the annual audit, shown in Table 1. In that report the difference between production and sales is broken out into three categories: flushing losses (assumed to be 0.5%), known system leaks which is the sum of the estimates staff make for each leak repair done during the year, and unknown losses which is everything else.

To understand system losses, one must first have a conceptual model of what happens in the delivery of water to each customer. With Sweetwater Springs Water District water is pumped from wells that are metered. The water then goes through a treatment system – one for the Guerneville system and one for the Monte Rio system and then into the initial storage tanks in Guerneville and Monte Rio. From there the water goes through a distribution system that is estimated to have 80 miles of pipe with many connections and valves. At each customer the water entering the customer's premises is metered. The difference between sum of the metered amount at the wells and the sum of the metered amount at each customer is the total water loss. This difference is caused by the following:

- Meter error. Meters are the best measurement device available but they are not perfect. Meters are much more likely to measure low than high. There are a few meters on the production side and many on the sales side, so chances are that our customers, in total, are getting more water than they are paying for. The conservative, high estimate for lost sales because of meter error may be 5%.

- Flushing. The District flushes at many locations in the distribution system to maintain water quality in the system to maintain a chlorine residual in sections of the distribution system that does not move much water without flushing and to reestablish fresh clean water in a section that has been recently repaired or near a repair. Staff estimated this

value as 0.5% for FY 09 for Table 1, but it was probably much less. It is not a significant source of system losses.

- Water theft. This has happened in the past, but we do not know of it happening in FY 09. Because our meters are read on a bimonthly basis in person and field staff are constantly out in the many neighborhoods, the water use habits of the District residents are well known. Plus our customers likely would report suspicious behavior associated with the water system. Theft of any significant amount would be difficult to maintain over a long period of time.

- Leaks in the distribution system. The principal source of water loss has to be leaks in the system. Staff report estimates of leakage for each leak repair, but those are gross estimates calculated very hurriedly. We may know when the leak surfaces, but we don't know how long it was leaking prior to that. We don't know how many leaks are going on out of sight at any one time.

The District's Capital Improvement Program (CIP) has focused on replacing distribution system pipe in high leak areas. Over time this should help reduce system losses and the long term trend shows that happening. That program is focused on repairing sections where the leaks have surfaced, but most of the leakage is coming from nonsurfacing leaks. This calls out for a leak detection program to find these nonsurfacing leaks in the distribution system. Staff have equipment to do leak detection and have investigated newer technologies and services that could provide further assistance. In the past the current level of staffing was too involved in repairing existing surface leaks to spend much time on searching for more leaks, however that situation is changing. Leak repairs are down and more time may be available for some proactive searching for the locations of nonsurfacing leaks.

Table 1. Fiscal Year 2009 Water Usage Breakdown

Values are in units. 1 unit=100 cubic feet=748 gallons

	FY 09	%
Production	400,391	
Sales	287,922	71.9%
Flushing Losses (0.5%)	2,002	0.5%
Known System Leaks	5,729	1.4%
Unknown Losses	104,738	26.2%