

Memorandum

Date : December 29, 1989

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(Meeting of January 27, 1989)

From : Public Utilities Commission—San Francisco

530-1

File No.: X580

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Subject: Revised Working Cash Allowance Procedure for Small Water Utilities

Summary

The present standard simplified method for determining working cash allowance does not work well for small water utilities. The Water Utilities Branch has studied the problem and proposes a new simplified method for Commission approval. The proposed method addresses concerns expressed by the California Water Association (CWA) representing the regulated water industry. A copy of the Branch's study conveying the details of the new method is attached to this memorandum.

Background

Most businesses need, in addition to their owners' investments in plant, equipment, supplies, and other tangibles, a minimum continuing level of readily available funds to function effectively. A working cash allowance is needed to pay a return to utility owners for funds invested in the company for such purposes as meeting expenses before receipt of the corresponding revenues, maintaining minimum bank balances, and the incurrence of certain deferred debits and credits not included in the income statement. Thus, utility rate cases typically include consideration of an allowance for working cash in rate base.

For two decades the Commission has used Standard Practice U-16, "Determination of Working Cash Allowance," to establish appropriate working cash allowances. For large utilities, U-16 specifies a detailed method which provides an excellent, objective method for estimating working cash allowance levels. Because of its complexity, however, the detailed method is seldom employed by small utilities; for them, U-16 also presents a simplified method.

For small water utilities, it has long been recognized that U-16's simplified method frequently produces anomalous results. The problem stems primarily from the fact that the simplified method does not account well for the common small water utility practice of billing quarterly, semiannually or annually in advance, and from changes in the timing of expense and income tax payments since the present simplified method was developed.

Assistant Utilities Engineer Antoine Gamarra of the Water Utilities Branch has completed a study and devised a new simplified method. The results were presented to CWA's Small Company Committee as representatives of the regulated water industry, and, where appropriate, their comments and suggestions have been incorporated into the final version.

Discussion

The Branch's study began by analyzing data from Commission decisions in eighty-three large water company district rate cases and seventy-five small water company rate cases, using linear regression to seek correlations between customers, revenues, expenses and rate base components and working cash. The results indicated that there is no discernible relationship between these gross measures and working cash allowance that would provide the basis for a simple, consistent working cash allowance estimating method using direct ratios.

Finding no reliable correlations between working cash allowance and the usual ratemaking measures, the Branch determined to devise a method using as a framework U-16's detailed method, simplifying and combining inputs where appropriate. The detailed method was chosen as the model because it is generally acknowledged as producing a reliable, objective result which conforms well to the Commission's definition of working cash allowance. The resulting new simplified method classifies small water company expenses into one of five categories, each with a predetermined number of lag days based on typical Commission-adopted or easily derived standard figures. Revenue lead or lag days are predicated on billing intervals (in advance or in arrears, monthly, bimonthly, quarterly, etc.). After combining the revenue and expense lag figures, adjustments are applied for such items as minimum bank deposits, working funds, prepayments, special deposits, and customer deposits.

The detailed method frequently produces a negative working cash allowance figure, and the same is true for the Branch's new simplified method. A negative working cash allowance indicates that the utilities' owners, rather than needing to provide working funds themselves, can rely on revenues paid in advance by their customers with something left over that is available for other investment. For large utilities, the negative figure is

actually included in the summary of earnings as a deduction from rate base in recognition of the fact that utility owners have customer-supplied funds available for investment. For small utilities, however, the amounts are minimal and they rarely have such investment opportunities. The proposed new simplified method, therefor, treats negative working cash allowance results as zero.

To evaluate its effects, the proposed new simplified method was applied to the adopted summaries of earnings from fourteen small water company rate cases and the results compared with the adopted working cash allowance amounts obtained from the old simplified method. The results were working cash allowance reductions averaging about 3.2% of rate base, and revenue requirement reductions averaging about 0.5% of adopted revenues.

The Branch shared its initial findings and the early version of its proposed method with the Small Company Committee of CWA. In May, 1988, representatives of the Branch met in a working session with the Committee and discussed how the method might be improved. Where appropriate, CWA's concerns have been addressed in the final version.

Conclusions

The Water Utilities Branch's proposed new simplified method of determining working cash allowances for small water utilities is the result of a thorough study which considered a number of alternatives. The comments and suggestions of the regulated water industry have been considered in the final version. There is a general consensus that the proposed method provides an objective, equitable measure of working cash allowance for small water utilities. The proposed method should be adopted by the Commission.

attachment

STUDY AND
PROPOSED REVISION
OF SIMPLIFIED
WORKING CASH ALLOWANCE PROCEDURE
FOR SMALL WATER UTILITIES

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EXECUTIVE SUMMARY

The purpose of a working cash allowance is to allow a return to utility owners for funds invested in the utility for such purposes as meeting expenses before receipt of the corresponding revenues, maintaining minimum bank balances, and the incurrence of certain deferred debits and credits not included in the income statement.

The Commission has used Standard Practice U-16, "Determination of Working Cash Allowance" for two decades. We've long recognized that U-16's simplified method frequently produces anomalous results. The Water Utilities Branch has studied the problem and proposes a new simplified method in this report. The proposed method incorporates comments and changes suggested by the California Water Association representing the regulated water industry.

The Branch's study began by analyzing data from Commission decisions in eighty-three large water company district rate cases and seventy-five small water company rate cases, using direct proportional relationships and linear regression to seek correlations between working cash and customers, revenues, expenses, taxes and rate base. No viable relationships were found capable to produce a new consistent simplified working cash allowance procedure.

Finding no reliable correlations, the Branch developed a simplified method using as a framework Standard Practice U-16's detailed method, by simplifying and combining procedural steps in the detailed method. The new simplified method classifies small water company expenses into one of five categories, each with a predetermined number of lag days based on typical Commission-adopted or easily derived standard figures. Revenue lag days are specified based on billing intervals. After combining the revenue and expense lag figures, adjustments are made for such items as minimum bank deposits, working funds, prepayments, special deposits, and customer deposits.

Since the detailed method may produce a negative working cash figure, the same is true for the Branch's new simplified method. A negative working cash figure indicates that the utilities' owners can rely on ratepayer-provided funds to operate the utility, and the excess is available for other investments. For small utilities the amounts are minimal and they rarely have investment opportunities. Therefore, the proposed new simplified method treats negative working cash as zero.

The proposed method recommended by the Branch allows more consistency in determining working cash allowance, is derived from the detailed method which conforms to the working cash allowance definition set by the Commission, simplifies the process for utilities with more than two billing practices, eliminates any special study based on the engineer's judgment, and is in the best interest of the ratepayers.

INTRODUCTION

REVISION

This is a revised version of the January 25, 1988 "Working Cash Study and Proposal". This revised version is a result of the meeting with California Water Association (CWA) on May 9, 1988. The agreed-upon changes between the Water Branch and CWA are : 1) to increase revenue lag days for arrears billing by substituting the 20 lag days for 1/2 the billing period (but no less than 20 days nor more than 50 days) due to customers paying their bills after presentations for arrears billing, 2) update income tax lag days from 62 to 59 lag days and 3) if the resulting working cash is negative, a figure of zero dollars will be used.

RECOMMENDATION

The Commission should consider an alternative to the Simplified Method (SM) of Standard Practice U-16, "Determination of Working Cash Allowance", for small water utilities. This recommendation is based on a study of working cash (WC) allowance for large and small water companies. The proposed SM allows more consistency in determining WC, is derived from the detail method (DM) which conforms to the WC definition set by this Commission, simplifies the process for utilities with more than two billing practices, eliminates any special study based on the engineer's judgment, and is in the best interest of the ratepayers.

DEFINITION

According to Standard Practice U-16, "Determination of Working Cash Allowance", "The reason for allowing cash working capital in rate base is to compensate investors for funds provided by them which are permanently committed to the business for funds for the purpose of paying operating expenses in advance of receipt of offsetting revenues from its customers and in order to maintain minimum bank balances."

CURRENT WORKING CASH ALLOWANCE PROCEDURE

BRIEF DESCRIPTION

Standard Practice U-16 sets forth two suggested methods: A SM (Simplified Method), and a DM (Detail Method). The DM of determining WC allowance is called "the weighted average or lead-lag days" method. The SM of determining WC allowance is based on an amount equivalent to cover two month's operating expenses.

DETAIL METHOD (DM)

The DM according to Standard Practice U-16 states, "Basically, the procedure is to determine, by analyzing certain current assets balance sheet accounts, the operational cash required by the utility and then deducting from this amount the average working cash available as the result of collecting revenues in advance of paying expenses." The DM considers the average weighted periods of time during which a company has money invested in the business for paying operating expenses.

The DM was developed in 1928 and then modified and introduced in 1947 before the Commission. The DM takes into account revenue lags which arise when the utility has extended credit to customers and expense lags which arise when the utility has received credit. The lead-lag study first measures, from the midpoint of the month, the weighted average days of lead or lag of payment of expenses by analyzing each expense component to determine how many days on the average before or after a reference point is made. This procedure measures, on the average, the number of days the utility has available the amount of the expense before its payment. A similar analysis of weighted average days is made of revenues by classes of customers to determine the average number of days that the utility has extended credit to its customers for the cost of service supplied by the utility.

SIMPLIFIED METHOD (SM)

The SM for WC is applicable to small utilities where a detailed study would be impractical from a work-time viewpoint. The purpose of the SM is to be able to calculate WC for unsophisticated companies for rate base. Fundamentally, the same principles apply for the SM as for the DM. That is, by first determining the Operational Cash Requirement (OCR) and then subtracting amounts available to the utility in forms of tax accruals or other funds not supplied by investors.

The SM bases WC requirement upon a certain number of months' expenses for fuel and/or commodity purchases, and a certain number of months of the remaining operating expenses, excluding taxes, depreciation and uncollectibles. The number of months usually depends on the type of billing and rate schedules by which the utility collects its revenues. The selection of the number of months of operating expenses is based upon earlier Commission decisions commencing with Decision No. 2947, dated November 30, 1915 which states "The Commission ordinarily allows for working capital an amount equivalent to cover two month's operating expenses." Standard Practice U-16 states "In later decisions the Commission, in ruling on working capital, separated the working capital into working cash allowance and materials and supplies, and also deducted from working cash capital an amount equivalent to a percentage of certain tax accruals which were held by the company for tax payments to be made in the future."

WORKING CASH ALLOWANCE ANALYSIS

PURPOSE OF ANALYSIS

The purpose of analyzing Standard Practice U-16 dated September 13, 1968 is to update, to simplify, to be consistent, and to see if the current procedure is in the best interest of the ratepayers.

The current DM for determining WC is the most accurate method which conforms to the WC definition set forth by this Commission.

ANALYSIS OF LARGE WATER COMPANIES/DISTRICTS

Information from eighty-three (83) large water district decisions was analyzed. The four factors considered in the study were total revenues, expenses including taxes, expenses excluding taxes, and rate base excluding working cash. The study attempted to see if any proportional relationship existed between any of the four factors and WC. The results in figure 1 show very wide ranges.

<u>RATIO</u>	<u>PERCENT</u>		
	HIGH	LOW	AVERAGE
WC / Total Revenues	16.60%	-13.91%	3.35%
WC / Expenses Excluding Taxes	27.91%	-21.41%	5.56%
WC / Expenses Including Taxes	27.03%	-25.87%	5.26%
WC / Rate Base Excluding WC	8.61%	-4.06%	1.65%

Figure 1

Another study considered all the above factors to acquire a formula using linear regression, and to determine which factors are more influential in determining WC. The results were a linear equation with a correlation coefficient r-squared of 0.198 (correlation coefficient determines the goodness of fit ranging from 0, worse fit, to 1, best fit; if r-squared exceeds .85 the fit is good), and the most influential factor being "rate base" with a correlation coefficient r-squared of .083 . The low correlation tends to support that the factors analyzed were not sufficient to develop a model formula for WC.

The studies of large water districts using various simplified models produced unfair estimates of WC for both the ratepayers and the utility for certain water districts. The simplified working cash models were on the average 18% higher than the adopted WC allowances set by the Commission. Overall, any simplification would benefit the utility and burden the ratepayers. This is due to the nature of simplification.

In general, the simplification process consist of reducing the number of steps in the current DM. In doing so, steps considered least influential in the outcome are eliminated or incorporated into other steps. Every water company/district has its own unique characteristics, and therefore each step in the procedure has a different weight on the outcome. Thus simplifying one DM might work for one water company/district but the same might not work for another. In simplifying the lead-lag method, expenses were grouped into 5 to 7 categories with set lead-lag days. These set lag days were based on the current DM recommended lag days, on the average lag days used for large water company districts in 1987, on current tax payments for California Corporation Franchise Tax, Federal Income Tax, and on a weekly payroll.

In conclusion, simplifying the DM for large water companies using ratios, linear regressions, or simplifying the current DM by setting specified lead-lag days does not work to the advantage of any party.

ANALYSIS OF SMALL WATER COMPANIES

Information from seventy-five (75) small water company resolutions was analyzed. The four factors considered in the study were total revenues, expenses including taxes, expenses excluding taxes, and rate base excluding WC. The study attempted to see if any proportionality existed between any of the four factors and WC. The results in figure 2 show WC has no direct proportionality to any of the factors.

<u>RATIO</u>	<u>PERCENT</u>		
	HIGH	LOW	AVERAGE
WC / Total Revenues	25.14%	0.00%	5.75%
WC / Expenses Excluding Taxes	19.32%	0.00%	6.96%
WC / Expenses Including Taxes	19.00%	0.00%	6.52%
WC / Rate Base Excluding WC	20.93%	0.00%	4.22%

Figure 2

Another study considered all the above factors plus total customers to acquire a formula by using linear regression and to determine which factors were more influential in determining WC. The results were a linear equation with a correlation coefficient r-squared of 0.704, and the most influential factor being "total revenues" with a correlation coefficient r-squared of 0.439 .

The best correlation was with utilities with fewer than 500 customers. These water companies have fewer customers to spread the cost of working cash, and therefore, a slight deviation in WC has more of an impact on ratepayers. Figure 3 shows the correlation between estimated WC using the five factor formula derived with a correlation coefficient r-squared of .840 and the

adopted WC allowed in Commission resolutions for small water companies with fewer than 500 customers.

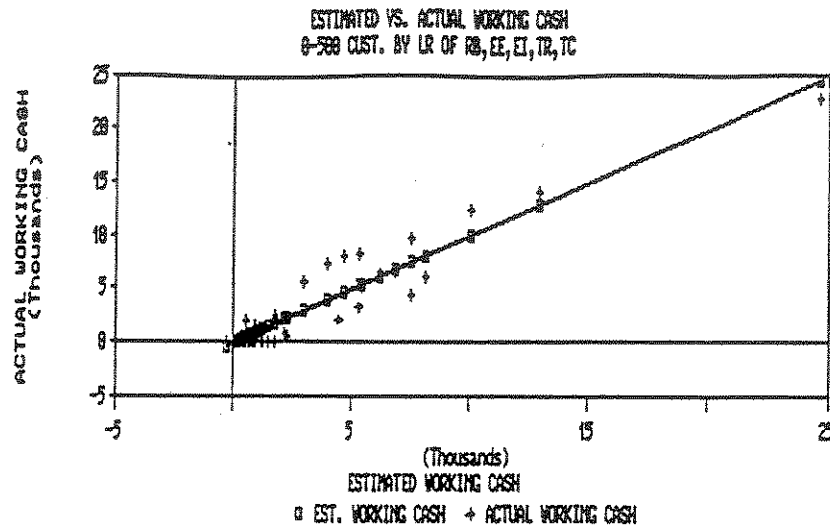


Figure 3

Even though the same principles apply for the current SM as for the DM, the SM overstates WC. The process does not consider the basic aspects involved in determining WC. The current SM leaves much of the responsibility to the engineer's judgment and thus lacks consistency.

PROPOSED SIMPLIFIED WORKING CASH ALLOWANCE PROCEDURE

PROPOSED SIMPLIFIED METHOD

An alternative for the SM will have to be in the best interest of the ratepayers, hopefully will simplify the procedure, and should be consistent with the WC definition set forth by this Commission.

The proposed SM, developed directly from the DM, consist of three phases: Expense Lag, Revenue lag and Operational Cash Requirement (OCR). The proposed SM is made up of the seven steps which follow: (See Appendix A)

STEP 1: To determine the expense lag days use the specified set lag days (See Appendix B for development of specified set lag days for expenses) for 5 categories of expenses and multiply this by the corresponding amount in each category and then add the result and divide by the total expenses. To estimate income taxes assume WC to be 5% of rate base.

STEP 2: To determine the revenue lag days use the specified set lag days (See Appendix C for development of specified set lag days for revenues) for the 12 billing periods applicable to the utility's billing practice and multiply the corresponding revenues and then add the results and divide by the total revenues.

STEP 3: To determine the net expense lag take the difference between the revenue lag days (STEP 2) and expense lag days (STEP 1) then divide by 365 days and multiply by the total expenses. This is the average WC allowance from collecting revenues before payment of expenses.

STEP 4: The OCR is the cash required for average minimum bank deposits, working funds, prepayments, special deposits, deferred debits and notes receivable. This is capital invested for efficient operation of day to day operations.

STEP 5: The deductions from OCR is the capital not supplied by the utility such as customer deposits, deferred credits, and insurance reserves.

STEP 6: To determine the WC allowance add the net expense lag (STEP 3) to the OCR (STEP 4) and then subtract "Deductions from Operational Cash Requirement" (STEP 5). If the result is negative, a figure of zero will be used.

PROS-CONS BETWEEN CURRENT VERSUS PROPOSED METHOD

Three basic aspects are involved in determining WC: when revenues are collected, when expenses are paid, and how much capital is invested for the efficient operation of the utility.

REVENUES

The current SM considers the revenues by setting the number of months of expenses used in determining WC based on the utility's billing practice. Only four billing practices are set which are monthly flat and metered, and bimonthly flat and metered. For other billing practices the number of months are determined by a special study, and this rests on the engineer's judgment. In addition, where utilities have more than one billing procedure, expenses should be allocated to each type of billing and service in proportion to total operating revenues received under each. In other words, if a utility has more than one billing procedure that does not conform to the four billing practices set up, the engineer must make a judgment study and then proportion out the expenses to each type of billing. There are 9 different tariff schedules with the options of collecting revenues monthly, bimonthly, quarterly, semiannually and annually.

Hence, the proposed SM bases the revenue aspect on when revenues are collected by setting lead-lag days for 12 different billing practices used in calculating the revenue lag days. This eliminates any special study required by the engineer, and allows more consistency in determining WC.

EXPENSES

The current SM bases the selection of the number of months of operating expenses based upon a Commission decision dated November 15, 1915 which states "The Commission ordinarily allows for working capital an allowance equivalent to cover two months operating expenses." This is based on practices of the Commission before the DM was introduced in 1947. The DM is the best method which conforms to the working cash definition. The proposed method derives the expense lag from the DM but uses specific lead-lag days for five categories of expenses only.

OCR or INVESTED CAPITAL

The current SM does not account for OCR with regards to average minimum bank deposits, working funds, prepayments, special deposits and notes receivable, which allows the utility to operate in an efficient manner. It also does not consider deductions from OCR with regards to customer deposits, deferred debits, and insurance reserves which also allows the utility to operate in an efficient manner. The proposed method considers all this. The SM deducts tax accruals from the OCR. The proposed SM considers taxes as an expense, and is considered in the

expense lag analysis.

RESULTS

WC allowance for fourteen small water companies' adopted in Commission decisions and resolutions were compared with the proposed method (See Appendix D). The average number of customers was 416. The results show WC on the average to decrease by \$3,590 which decreases on the average the rate base by 3.2 % and the revenues by .5%.

CONCLUSION

At the beginning this study's primary objective was to simplify the current WC methods by using ratios, and/or linear regression formulas on data from decisions and resolutions. The results show a wide range in ratios and no apparent feasible linear regression formula to accurately calculate WC. Also, the study reveals that the current SM is inadequate in determining WC and overstates WC when compared to the DM, which conforms to the WC definition set forth by this Commission. In view of this, the Commission must fulfill its responsibility to the best long term interest of the ratepayers and to enforce reasonable rates. The proposed SM fulfills the Commission's responsibilities by being able to more accurately determine WC for rate making purposes.

Also in comparison to the current SM, the proposed SM has many advantages such as: eliminating any special study required by the engineer, allowing more consistency in determining WC, simplifying the process for utilities with more than two billing practices, and being derived directly from the DM which conforms to the WC defined by this Commission.

APPENDIX A : PROPOSED WORKING CASH SIMPLIFIED METHOD

SAMPLE WATER CO.

TEST YEAR 1988

CATEGORIES OF EXPENSES	AMOUNT	SPECIFIED	
	DOLLARS	SET LAG DAYS	
	(1)	(2)	(1) x (2)
Payroll	\$8,000	11	88000
Insurance	\$5,000	-183	-915000
Depreciation, Uncollectibles, Reg. Com. Exp.	\$3,000	0	0
Other expenses, including other taxes	\$8,000	25	200000
Income Taxes (Intial estimate for Working Cash is 5% of Rate Base)	\$1,000	59	59000
	-----		-----
TOTAL EXPENSES =	\$25,000 = (A)		-568000 = (B)
1. EXPENSE LAG DAYS = (B)/(A) =			-22.7 = (C)

BILLING PERIOD	SPECIFIED SET LAG DAYS	
	ARREARS: LAG DAYS	ADVANCE: LAG DAYS
Monthly	38	-15
Bimonthly	63	-30
Quarterly	94	-46
Triannually	113	-61
Semiannually	144	-91
Annually	235	-183

OPERATING REVENUES Flat, Metered, Annual Service Charges, etc.)	ANNUAL	SPECIFIED	
	REVENUES	LAG DAYS	
	(4)	(5)	(4) x (5)
Annual Service Charge in Advance	\$1,000	-183	-183000
Bimonthly Flat in Advance	\$20,000	-30	-600000
Monthly Metered	\$10,000	38	380000
	-----		-----
TOTAL ANNUAL REVENUES =	\$31,000 = (D)		-403000 = (E)
REVENUE LAG DAYS = (E)/(D) =			-13.0 = (F)
NET EXPENSE LAG = ((F)-(C))/365x(A) =			\$666 = (H)
OPERATIONAL CASH REQUIREMENT (OCR) = (Avg. Minimum Bank Deposits, Working Funds, Prepayments Special Deposits, Defferred Debits, Notes Receivable)			\$1,000 = (I)
DEDUCTIONS FROM OPERATIONAL CASH REQUIREMENT = (Customer Deposits, Deferred Credits, and Insurance Reserves)			\$200 = (J)
WORKING CASH (Round to nearest \$10) = (H)+(I)-(J) =			\$1,470

(Note: If figure negative use \$0 for Working Cash)

APPENDIX B : EXPENSE LAG DAYS

PAYROLL LAG DAYS:

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 BASED ON WEEKLY WAGES :

	WAGE PERIOD	MIDPOINT	PAY DAY # OF DAYS
WEEKLY BILLING:	7	3.5	7 days after wage period

3.5 + 7 = 10.5 days

USE 11 LAG DAYS.

INSURANCE LAG DAYS:

 Since payment of premiums can be demanded at inception of insurance policy, lag days of -183 are used to reflect insurance payments at the beginning of each year.

PERIOD	MIDPOINT
365	183

DEPRECIATION, UNCOLLECTIBLES, AND REGULATORY COMMISSION EXP. LAG DAYS:

 Since these expenses are accrued day to day through out the test year, zero lag days are used.

OTHER EXPENSES, INCLUDING OTHER TAXES

 The other expense lag days are based on lag days used for large water company districts working cash allowance with less than \$ 2,000,000 of other expenses for 1987.

Company	District	Other Expense Lag Days	Other Expenses	(1)x(2)
		(1)	(2)	
SO-CAL	CALIPATRIA	26	194	5044
SO-CAL	CLEARLAKE	18	238	4284
SO-CAL	BAY	34	378	12852
C.W.S.	SELMA	26	396	10296
SO-CAL	OJAI	34	435	14790
AZUSA	AZUSA	26	853	22178
SO-CAL	SANTA MARIA	25	1301	32525
C.W.S.	VISALIA	24	1488	35712
C.W.S.	SAN MATEO	24	1569	37656
C.W.S.	CHICO	25	1666	41650
		(A) =	8518	216987 = (B)

AVERAGE OTHER EXPENSES LAG DAYS = (B)/(A) = 25

APPENDIX B :EXPENSE LAG DAYS

INCOME TAX LEAD LAG DAY DETERMINATION :

CCFT

DUE DATE	PERCENT	DAYS	PERCENT x DAYS
4/15/88	22.50%	105	23.6
6/15/88	22.50%	166	37.4
9/15/88	22.50%	258	58.1
12/15/88	22.50%	349	78.5
3/15/90	10.00%	439	43.9

241.5

INCOME TAX LAG DAYS FOR CCFT = $241.5 - 365/2 =$ 59

FIT

DUE DATE	PERCENT	DAYS	PERCENT x DAYS
4/15/88	22.50%	105	23.6
6/15/88	22.50%	166	37.4
9/15/88	22.50%	258	58.1
12/15/88	22.50%	349	78.5
3/15/90	10.00%	439	43.9

241.5

INCOME TAX LAG DAYS FOR FIT = $241.5 - 365/2 =$ 59

INCOME TAX LAG DAYS FOR FIT AND CCFT = 59

NOTE: Caution should be used when applying 59 lag days for tax expenses for utilities which bill annually and semiannually.

APPENDIX C : REVENUE LAG DAYS

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REVENUE LAG DAY DETERMINATION OF DIFFERENT BILLINGS:

NOTE: Add 1/2 billing period (but no less than 20 days nor more than 50 days) due to customers paying their bills after presentation for arrears billing, and round-off.

IN ARREARS :

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
MONTHLY BILLING: (IN ARREARS)	30.4	15.2	1	1 M, T, W, TH
	30.4	15.2	1	3 FRI.
$4/5 \times (15.2+1+1) + 1/5 \times (15.2+1+3) =$				17.6

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
BIMONTHLY BILLING: (IN ARREARS)	60.8	30.4	1	1 M, T, W, TH
	60.8	30.4	1	3 FRI.
$4/5 \times (30.4+1+1) + 1/5 \times (30.4+1+3) =$				32.8

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
QUARTERLY BILLING: (IN ARREARS)	91.3	45.6	1	1 M, T, W, TH
	91.3	45.6	1	3 FRI.
$4/5 \times (45.6+1+1) + 1/5 \times (45.6+1+3) =$				48.0

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
TRIANNUALLY BILLING: (IN ARREARS)	121.7	60.8	1	1 M, T, W, TH
	121.7	60.8	1	3 FRI.
$4/5 \times (60.8+1+1) + 1/5 \times (60.8+1+3) =$				63.2

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
SEMIANNUALLY BILLING: (IN ARREARS)	182.5	91.3	1	1 M, T, W, TH
	182.5	91.3	1	3 FRI.
$4/5 \times (91.3+1+1) + 1/5 \times (91.3+1+3) =$				93.7

APPENDIX C : REVENUE LAG DAYS

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	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
ANNUAL BILLING:	365.0	182.5	1	1 M, T, W, TH
(IN ARREARS)	365.0	182.5	1	3 FRI.
$4/5 \times (182.5+1+1) + 1/5 \times (182.5+1+3) = 184.9$				

NOTE: For advance billing no lag days needed for customers paying their bills after presentation. Utility should bill sufficiently ahead in order to collect the revenues on the average at the beginning of the billing period.

ADVANCE :	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
MONTHLY BILLING:	30.4	15.2	0	0 M, T, W, TH
(IN ADVANCE)	30.4	15.2	0	0 FRI.
15.2				

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
BIMONTHLY BILLING:	60.8	30.4	0	0 M, T, W, TH
(IN ADVANCE)	60.8	30.4	0	0 FRI.
30.4				

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
QUARTERLY BILLING:	91.3	45.6	0	0 M, T, W, TH
(IN ADVANCE)	91.3	45.6	0	0 FRI.
45.6				

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
TRIANNUALLY BILLING:	121.7	60.8	0	0 M, T, W, TH
(IN ADVANCE)	121.7	60.8	0	0 FRI.
60.8				

APPENDIX C : REVENUE LAG DAYS

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	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
SEMIANNUALLY BILLING: (IN ADVANCE)	182.5	91.3	0	0 M, T, W, TH
	182.5	91.3	0	0 FRI.
			91.3	

	BILLING PERIOD	MIDPOINT	METER READING	BILLING MAILING
ANNUAL BILLING: (IN ADVANCE)	365.0	182.5	0	0 M, T, W, TH
	365.0	182.5	0	0 FRI.
			182.5	

FOR SEASONAL BILLINGS:

- 1) DETERMINE WHEN ON THE AVERAGE ARE THE SEASONAL REVENUES ARE COLLECTED FOR TEST YEAR.
- 2) DETERMINE THE DIFFERENCE IN DAYS BETWEEN WHEN REVENUES ARE COLLECTED (STEP 1) AND THE MIDPOINT OF THE YEAR.
- 3) IF THE REVENUES ARE COLLECTED AFTER THE MIDPOINT OF THE YEAR THE LAG DAYS ARE POSITIVE. IF THE REVENUES ARE COLLECTED BEFORE THE MIDPOINT OF THE YEAR THE LEAD DAYS ARE NEGATIVE.

EXAMPLE 1:

SEASON MAY 1ST TO NOVEMBER 1ST
BIMONTHLY IN ARREARS:

AN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
30	60	90	120	150	180	210	240	270	300	330	36
BILLING PERIODS ---->			120	150	180	210	240	270	300		
BILLING DATES OR BILLS DUE---->					180		240		300		
ARREARS)			(ADVANCE)			180	240		300		
AVERAGE BILLING DATE = (180+240+300)/3 = SEPT 1ST								240			
MIDPOINT OF YEAR JUNE 1ST =								-	180		
DIFFERENCE =								-----			
									60		
ARREARS ADD 1/2 BILLING PERIOD =									30	(60/2)	
NOTE: NO LESS THAN 20 DAYS NOR MORE THAN 50 DAYS)								-----			
TOTAL LAG-LEAD DAYS =									90		

APPENDIX D : 14 SMALL WATER COMPANY STUDY

The data from the fourteen small water companies below were taken from resolutions and decisions from May 1986 to November 1987.

The working cash estimated by the proposed method is a rough estimation because of the lack of information regarding operational cash requirement and specific billing practices. The figures below are a worst case application of the proposed method for utilities due to the assumption of some utilities with the option of billing annually in advance, do so.

COMPANY	WORKING CASH ADOPTED	PROPOSED SM	DIFF.	NO. OF CUST.	CHANGE RATE BASE	CHANGE IN REVENUE
AGATE BAY WATER CO.	\$0	\$0	\$0	511	0.0%	0.0%
BIG HILL WATER CO.	\$8,250	\$3,892	(\$4,358)	224	-7.3%	-0.9%
COAST SPRINGS WATER CO.	\$7,350	\$0	(\$7,350)	215	-10.5%	-1.8%
CAZADERO WATER CO.	\$0	\$0	\$0	153	0.0%	0.0%
GROVE WATER SERVICE	\$1,910	\$0	(\$1,910)	143	-6.9%	-1.1%
GERBER WATER WORKS	\$1,800	\$0	(\$1,800)	288	-6.3%	-0.5%
HACIENDA WATER CO.	\$2,500	\$751	(\$1,749)	156	-2.3%	-0.8%
MINERAL CITY WATER SYS.	\$0	\$0	\$0	173	0.0%	0.0%
PHILLIPS WATER SYS.	\$0	\$348	\$348	25	1.4%	0.5%
RANCHO DEL PARIDISO	\$1,000	\$493	(\$507)	68	-4.9%	-0.5%
REDWOOD WATER CO.	\$0	\$0	\$0	155	0.0%	0.0%
ROGINA WATER CO.	\$18,940	\$16,421	(\$2,519)	750	-1.1%	-0.2%
TAHOE PARIDISE WATER CO.	\$1,000	\$0	(\$1,000)	2296	-0.6%	0.0%
YOSEMITE SPRING PARK	\$29,362	\$0	(\$29,362)	663	-6.0%	-1.3%
AVERAGES =	\$5,151	\$1,565	(\$3,586)	416	-3.2%	-0.5%
Average\$/Customer/Year =	\$1.69	\$0.51	(\$1.18)			

(negative)

_____ Water Company

WORKPAPERS - ADVICE LETTER RATE INCREASE
 Estimating Rate Base - Test Year 19_____
 Working Cash - Simplified Method

	(1)	(2)	(1)x(2)
Total Payroll		11	
Insurance		-183	
Depreciation, Uncollectibles, Reg. Com. Exp.		0	
All other expenses excluding Income Taxes		25	
Income Taxes (Initial estimate for Working Cash is 5% of Rate Base)		* 59	
TOTAL EXPENSES =	= A	// //	= B

BILLING PERIOD	ARREARS: LAG DAYS	ADVANCE: LAG DAYS
Monthly	38	-15
Bimonthly	63	-30
Quarterly	94	-46
Triannually	113	-61
Semiannually	144	-91
Annually	235	-183

TYPES OF REVENUES AND BILLING PERIOD i.e. Flat Bimonthly Advance, Metered Monthly Arrears, Annual Service Charge Advance, etc.)	ANNUAL REVENUES (4)	LAG DAYS (5)	(4)x(5)
TOTAL ANNUAL REVENUES =	= D	// //	= E

EXPENSE LAG DAYS = B / A = _____ = C

REVENUE LAG DAYS = E / D = _____ = F

NET EXPENSE LAG = A x (F - C) / 365 = _____ = H

OPERATIONAL CASH REQUIREMENT = _____ = I
 (Average Minimum Bank Deposits, Working Funds, Prepayments
 and Special Deposits)

DEDUCTIONS FROM OPERATIONAL CASH REQUIREMENT = _____ = J
 (Customer Deposits)

WORKING CASH (Round to nearest \$10) = H + I - J = _____
 (Note: If figure negative use \$0 for Working Cash)

* Caution should be used for utilities which bill annually and semiannually.