United States Department of the Interior

BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

IN REPLY
REFER TO: 440
832.-

July 10, 1975

Memorandum

To: Regional Director, PN, MP, LC, UC, SW, UM, LM
Chief, Division of Water O&M, E&R Center
Chief, Division of Planning Coordination, E&R Center

From: Commissioner

Subject: Final Report of Task Force on Water Marketing

A water-marketing task force was formed in accordance with our memorandum dated May 3, 1973. A copy of a preliminary task force report dated January 1974 was furnished you for comment. Those comments were considered in preparation of the final report. A copy of that report is attached for your use and application of the guidelines included therein, both in planning and contract negotiations, wherever appropriate. When the guidelines do not fit specific situations, please furnish the details and alternate proposals for our review and approval.

/S/ G. G. Stamm

Enclosure

TASK FORCE REPORT

ON

WATER MARKETING

BUREAU OF RECLAMATION

APRIL 1975

APRIL 1975

REPORT OF THE
COMMISSIONER OF RECLAMATION'S
WATER MARKETING TASK FORCE

United States Department of the Interior

BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

IN REPLY REFER TO: 440
832.

APR 2 1975

Memorandum

To: Commissioner

Through: Assistant Commissioner - Resource Management

From: Chairmen, Water Marketing Task Force

Subject: Task Force Report

Transmitted herewith is the report of the water marketing task force which you established by memorandum of May 3, 1973.

The task force was formed to study and recommend planning and contracting procedures that would better define existing water uses, recognize the new categories of suburban and part-time farm water use, and provide flexible repayment requirements for changing water use over time. Planners and contract negotiators have needed guidance in these matters, and we believe the task force has developed guidelines to fill this need.

During the study is was found there were related subjects involving the planning and marketing of Reclamation water which should also be reviewed. Thus, the scope of the task force assignment was broadened and guidelines were also developed in those areas.

The recommendations included in this report for your consideration are meant to be used as guidelines. Upon your acceptance, we propose to submit them for adoption and application Bureau-wide, with the understanding that Regional Directors will have flexibility to recommend alternate procedures for specific situations when other approaches are required.

Enclosure

REPORT OF THE COMMISSIONER OF RECLAMATION'S
WATER MARKETING TASK FORCE

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PURPOSE AND SCOPE

The repayment of reimbursable project costs by the project beneficiaries has been one of the basic concepts of the Reclamation program since its inception under the Reclamation Act of June 17, 1902. Numerous changes have occurred during the evolution of the Reclamation program to its present state as is revealed by amendments to the Act of 1902 and additions to Reclamation law. Many of these changes in the law and the program have been made to accommodate unforeseen changes in water and land use as well as to meet increased demands for irrigated agricultural production and social demands. It has been recognized for some time, however, that additional flexibility is required in Reclamation's water marketing program to conform it to current needs. Population growth and increased standards of living are accelerating the conversion of agricultural water to urban, suburban, rural, municipal, industrial, and specialty uses.

The Bureau of Reclamation's water marketing policies are influenced by many factors: Reclamation and State laws and their interpretation, specific congressional authorizations, public support, and political

determinations. With seven regions covering 17 contiguous Western States and Hawaii, each with its own State laws, varying water demands, and repayment ability, the water marketing policies have been tailored to fit varying specific needs or preferences. For example, the Pacific Northwest Region (Oregon, Idaho, and Washington) utilizes repayment contracts almost exclusively whereas the Mid-Pacific Region (California and Nevada) and projects of the Missouri River Basin Project use water service contracts for service from water supply and conveyance facilities and repayment contracts for water distribution facilities. Basin accounts have been authorized for use in some areas while other areas, such as the Southwest Region, must rely solely upon the repayment ability of the direct project beneficiaries.

The changing economic and social values of the population which demand municipal, industrial, and domestic water service, and water for recreational areas and quality improvement have radically changed the emphasis of the Reclamation program and its repayment aspects. While the Reclamation program does recoup the reimbursable expenditures, which most Federal programs do not, it is criticized for the interest-free aspects of the irrigation function and the lack of full payment by some of the irrigators of their allocated costs. In view of these many factors, the Commissioner of Reclamation on May 3, 1973, established a Water Marketing Task Force.

The task force was composed of representatives of the Division of Water and Land Operations, Division of Project Development, and Associate Solicitor - Energy and Resources. The first meeting of the task force was in May 1973, and as an outgrowth committees were formed to prepare papers on different subjects. Those papers were exchanged among all task force members and a second meeting of the task force was held in August 1973 to discuss these subjects. Subsequently, a mini-task force was formed to prepare a preliminary draft of report for review by staffs of the Commissioner's office, the E&R Center, regional offices, and the Associate Solicitor - Energy and Resources.

The preliminary report was published in January 1974, and comments were received that spring. This final report was prepared using the recommendations of the task force and comments received on the preliminary draft of report. The preliminary report presented conflicting viewpoints as options for consideration and it has been necessary to decide, in view of the comments, which options to recommend for implementation.

A special task force was formed on September 6, 1974, and met in mid-September. That group reviewed comments on all the optional recommendations, but it was most concerned with recommendations regarding small tracts. A consensus of that group is herein reflected in recommendations regarding definitions, and payments for use of water on small tracts.

The Water Marketing Policy Task Force has worked within the context of Reclamation law, and not deliberated on questions such as interest-free irrigation financing, more stringent repayment requirements, or the acreage limitation effects on repayment. The major issues which the task force did address itself to are:

1. The definition of water uses
2. Agricultural, municipal and industrial water marketing policy
3. Rural residential and suburban agricultural water marketing policies
4. Compatibility between cost allocation and repayment
5. Shortage provisions, reserve funds, and water management

The task force members who participated in this report are:

*George Blake	Washington, D.C. (Co-chairman)
*Mervin de Haas	Sacramento, California
Gene Hinds	Boulder City, Nevada
Don Justus	Boise, Idaho
Samuel Kennedy	Denver, Colorado
George Loomis	Amarillo, Texas
Glenn Masters	Denver, Colorado
Conrad Miller	Denver, Colorado
Harold Mathes	Billings, Montana
Howard Pearson	Salt Lake City, Utah
*Ben Prichard	Denver, Colorado
Paul Sant	Salt Lake City, Utah
Edward Talbot	Denver, Colorado
*Larry Vinsonhaler	Boise, Idaho (Co-chairman)

Participants at the last meeting of the task force also included Alvin Bielefeld, Field Solicitor, Billings, Montana, Ed Leland, Billings, Montana, and Dean Bucy, Denver, Colorado.

The mini-task force members who prepared the preliminary report are denoted by an asterisk.

The special task force members include those members on the mini-task force and:

Frank E. Ellis	Washington, D.C.
Edmund Barbour	Denver, Colorado
Glenn Masters	Denver, Colorado
Alan Kleinman	Denver, Colorado

SUMMARY OF RECOMMENDATIONS

The following recommendations are made with the intent that they be considered for use as general policy. The many individual complex variations that occur in Reclamation water marketing situations preclude setting such policy as inviolate. Adopted recommendations should be implemented with the provision that exceptions will be permitted with approval of the Commissioner on a case-by-case basis.

Definitions

Municipal and industrial water will be defined as "water furnished to municipalities, to industrial establishments, and for commercial recreational uses." Water uses involving reimbursement of project costs that are associated with farming, suburban living, or noncommercial recreation will be considered to be in the agricultural category.

Establishment of Water Charges

Municipal and Industrial (M&I) - The M&I rate will be based, as a minimum, upon repayment of its allocated cost with interest.

Agricultural - The commercial agricultural water rate will be based primarily upon payment capacity, but other criteria will be considered in establishing the rate. The agricultural rate structure will be made up of an account charge and a charge per acre of irrigable land or per

acre-foot of project water. This rate structure will permit the recovery of additional project revenues as the type of project ownerships change from commercial to part-time agriculture or suburban living.

Type of Contracts

The costs of project water supply and main conveyance facilities will be recovered under water service contracts whereas repayment contracts will be used for project distribution facilities. The recovery of costs for projects which include both federally financed water supply, main conveyance, and distribution facilities should be a combination water service-repayment type. Both the physical facilities and the water users' repayment ability should be considered in the determination of which project costs to place under the repayment portion of the contract.

Period of Payments

Payments under repayment contracts, other than operation, maintenance, and replacement (OM&R) payments if the United States is operating the facilities, will terminate when the initial contract term has expired, but charges becoming due pursuant to water service contracts will continue after the initial contract term, until the water users have repaid all of the reimbursable project costs allocated to the M&I and agricultural water functions.

Adjustment of Rate

Water service contracts should provide for rate review and possible rate adjustment every 5 years. Repayment contracts should provide for announcement of the repayment obligation upon completion of project construction when the actual plant-in-service cost is known.

Contract Term

The term of the contract should be for 40 years unless otherwise authorized by Congress. However, flexibility should be permitted and, if it can be supported, consideration given to making some water service contracts of 15-to 20-years duration.

Water Use Buildup in Water Service Contracts Where There are Multi-contractors for Water from the Same Facilities

Agricultural water service contracts should permit a 15-year buildup in water use during which time some target quantities should be reached. The minimum buildup in payments for M&I water use should include: (1) A short-term minimum based on 1 percent of the maximum annual quantity of water under contract with a progressive 1 percent increase per year to 10 percent in the 10th year; and (2) a long-term minimum quantity equal to 60 percent of the total water which would be realized if the maximum annual amount under contract was used every year. The short-term minimum would be included in reaching the long-term minimum requirement.

Readiness-to-Serve Charge in Industrial Water Use Option Contracts

Option contracts of 10-years duration can be written for industrial water use. During this period, with certain exceptions, the contractor should be required to make payments in the same manner as the short-term minimum requirement for M&I contracts.

Specification of Obligation or Rate in Contracts

A maximum contractual obligation can be specified in repayment contracts if sufficient flexibility is permitted to assure the repayment of the actual plant-in-service cost. Unless required by State law, the maximum water rate should not be stated specifically in water service contracts.

Cost Allocation

A functional separable cost-remaining benefit method of cost allocation should normally be used. Following the initial allocation, the costs allocated to the M&I and agricultural functions will be combined to permit suballocations as the result of changing water use in subsequent years. In certain approved cases, the M&I and agricultural water use functions will be combined into a water supply function to be used throughout the cost allocation.

Water Management

Water service contracts should provide for the establishment by contracting entities of a base charge for water with significant increases in the charges for additional water quantities.

Water Shortages

Hydrologic studies should be based on an equal sharing of water shortages by all water users with water service contracts written accordingly. When a water user demonstrates a need for a firm water supply, and there is adequate water available, the water user should be permitted to contract for the quantity of water required, possibly at a premium rate, to meet his needs in a water-deficient year.

Reserve Funds

The accumulation of an emergency reserve fund should be mandatory for all contracting entities operating Reclamation facilities. The need for replacement and repayment reserve funds should be determined on a case-by-case basis. The size of the emergency and replacement reserve funds should be determined by using Figure 3 of this report.

AGRICULTURAL AND MUNICIPAL AND INDUSTRIAL WATER MARKETING POLICY

BACKGROUND

In the past, the Bureau of Reclamation's prime goal was the development of storage, conveyance, and distribution works to provide water for commercial agricultural purposes. M&I water use was only a minor function in Bureau projects. While the Reclamation Project Act of 1939 did permit the sale of water for M&I purposes, it stated explicitly that ". . . no contract relating to municipal water . . . shall be made unless, in the judgment of the Secretary, it will not impair the efficiency of the project for irrigation purposes." In most recently authorized projects involving both irrigation and M&I water service, the authorizing act has specifically excluded compliance with the provision of the 1939 Act granting priority to irrigation.

Some recent project authorizations have made M&I water service an explicit or sole project purpose. Examples are: (1) the Colorado River Storage Act of April 11, 1956, which authorized M&I water service as a project purpose with the costs to be repaid with interest in 50 years; (2) the Act of June 27, 1960, which authorized the Secretary to construct the Norman Project, Oklahoma, for the principal purpose of furnishing M&I water service; and (3) the Southern Nevada Project, authorized by the Act of October 27, 1965, which provides for only M&I water service.

Title III of the Water Supply Act of July 3, 1958, authorized the Corps of Engineers and Bureau of Reclamation to cooperate in and develop water storage supplies for municipal, industrial, and other purposes, including authority to impound water for future M&I demand. This act is an alternative to and not a substitute for the 1939 Reclamation Project Act.

Regardless of the added emphasis on arrangements for M&I water service, the Bureau of Reclamation's participation in regard to M&I water has historically been relegated to the construction of storage and conveyance facilities with the construction, in many cases, of the distribution, treatment, and related facilities being the responsibility of non-Bureau interests.

DEFINITIONS

Two major water-use classifications which have evolved over the years in Reclamation studies and contracts are agricultural or irrigation and M&I. If the water pricing policy for the various classes of water use were similar, there would be no need to define or classify water use. The Reclamation Project Act of 1939 separates but does not define the categories of water use.

The term "municipal" carries the common distinction of having to do with domestic, municipal, and commercial service to a city or town. The term "industrial" pertains to a particular branch of trade or manufacture, and when used in conjunction with "municipal" the joint term normally refers to the purchasing entity, which in turn markets the water within a given sector for both municipal and industrial purposes. Agriculture relates to the art or science of cultivation of the soil and production of crops and livestock. M&I water use invariably carries a rate substantially higher than that for agricultural water use as the rate structure for the former is predicated upon costs of project facilities and alternative sources of a like supply and is interest bearing, while the latter is related to repayment ability and does not bear interest.

As applied to Reclamation contracts, "municipal and industrial" water has been defined as water used on tracts of land of less than 2 acres. The origin of that definition is obscure, but it has been included in many Reclamation contracts since 1951. The definition has been criticized because of the apparent arbitrariness of the selection of the size of tract and the resultant effect of a sharp deviation in the project rate structure as the size of ownership exceeds the 2-acre limitation.

The effect of the abrupt change from 2 acres and the higher rate for M&I water is further intensified by the trend toward subdivision of agricultural land into small tracts, usually located near existing towns and cities. Depending somewhat on the size of the tracts, the land is often

owned by professional people wanting the amenities of country life and part-time farm operators who are employed in town but supplement income from those jobs by farming the small tracts. Because there is a relatively small quantity of water required and because of the intown income, a payment ability exists which is believed to be generally higher than that computed as payment capacity for a commercial agricultural endeavor in the same area. Thus, there is a gradual change in size of ownerships and payment capacity with an abrupt change in Reclamation's definition and rate. To help alleviate the inequitable charges from this situation, we suggest that there should be a rate differential on a unit basis which gradually decreases from that charged to small tracts to that charged to commercial agricultural use. If the recommendation to modify the definitions and rate structures is implemented, the needed changes for equity among users will be accomplished and the intent of Congress in recognizing the difference in water uses will be satisfied.

We believe that in most instances the only water considered to be used for M&I purposes outside municipalities should be that used for commercial recreation and industrial purposes. The following definition of M&I water used is proposed for future contracts:

Municipal and industrial water shall mean water furnished to municipalities, to industrial establishments, and for commercial recreational uses.

In some instances, contracts have been entered into with irrigation districts whereby the district provides municipal water in addition to agricultural water from the project facilities. Examples of this are the East Greenacres Unit, Rathdrum Prairie Project, Idaho, and the

Spokane Valley Project, Washington, where irrigation districts provide water for municipal use by means of facilities constructed by the Bureau of Reclamation. This water is intended for use within the dwelling unit for culinary and sanitary purposes similar to that furnished a municipality. Therefore, in these examples the definition of M&I water would be expanded to include the furnishing of water to an irrigation district.

Commercial recreational water uses would be included in the M&I category when water is used for golf courses or for those uses in which a membership or participant fee is charged for the recreation but which do not usually involve planting and harvesting crops. Under some circumstances, planting and harvesting of crops may be involved, but these activities would primarily be for esthetic purposes and would benefit the specific recreational activity only. Water uses which involve reimbursement of project costs associated with farming, suburban living, or noncommercial recreation will be considered to be in the agricultural category.

Commercial agriculture would represent those uses of water that result in an output identified as agricultural commodity or product such as livestock and dairy, field crops, fruits, and vegetables. Also included would be irrigation of crops to provide cover for use by waterfowl or other game birds, and water used for fish farms. Suburban agriculture is characterized by the use of water on small tracts. This water is

principally used for the irrigation of lawns and gardens and pasture. An example of the latter would be pasture for grazing horses which are kept for recreational enjoyment.

ESTABLISHMENT OF WATER CHARGE

The 1939 Reclamation Project Act provides that the repayment obligation and the amount of the annual water charge or rate is to be determined by the Secretary within the constraint that they should be sufficient to cover "an appropriate share of the annual operation and maintenance cost and an appropriate share of the fixed (construction) charges." It has been the policy in the case of water supplied for domestic, municipal, industrial, and miscellaneous purposes to establish the repayment obligation or the water rate at a level to repay, as a minimum, the cost allocated to that function with interest. The payment for agricultural water has been established within the repayment capability of family-size commercial agricultural enterprises.

Charges normally paid by water users are applied toward recovery of capital and OM&R costs. Where an OM&R component is included in the water service rate, it is possible that in the initial years of operation when water deliveries are low, the rate would have to be increased significantly on a unit basis if there are to be adequate revenues to cover the actual OM&R costs as well as the other designated rate components. In some instances where project facilities are operated by the United States and payments are received pursuant to water service contracts,

OM&R costs are billed separately. This provides some flexibility since it could, if necessary, permit consideration of capitalizing OM&R expenditures without stipulating the procedure in the contract.

It is recommended that if facilities are operated by the United States consideration should be given to recovering OM&R costs under a separate billing.

Municipal and Industrial Water - Two parameters were discussed by the task force as guides in pricing M&I water: (1) the minimum amount should be that required to recover the costs allocated to M&I service from the project with interest; and (2) the maximum should be that to recover an amount with interest that would not exceed the cost which would be incurred in developing the water supply in the absence of the Federal undertaking. Consideration should also be given to the repayment requirements of the other project functions and the charge should, in many instances, be increased to include irrigation financial assistance and project reserves.

Other concepts discussed by the task force were: (1) the establishment of an area-wide rate for water where there is comparable service; (2) determining a rate for industrial water service independent of municipal water whereby the value of the commodity produced could be recognized in the rate; and (3) establishing the industrial water rate, particularly in option contracts, by means of a bidding procedure. In

addition, consideration was given to the use of short-term rather than long-term interest rates; however, it was concluded that since long-term contracts are executed, short-term interest rates should not be applied.

The task force recommends that the current procedures of establishing minimum M&I water charges by repayment of costs with interest on specific projects be continued.

The cost of present water supplies, the demand and competition for water, the irrigation financial assistance needed, and other factors which have an effect on the use and price of water need to also be considered. In some instances, the adoption of area-wide water rates may be warranted. No consensus was reached in regard to pricing on the basis of the value of products or by a bidding procedure.

Agricultural Water - As indicated in the discussion pertaining to definitions, the term agricultural water is intended to encompass water used for both commercial and suburban agricultural purposes. The following discussion pertains to the establishment of the commercial agricultural water charge and a proposed agricultural water rate structure designed to result in the payment of additional revenues to the United States as the type of ownerships in the project area traverses from commercial agricultural to suburban agricultural enterprises.

The Reclamation Project Act of 1939 was designed to alleviate some of the difficulties that commercial agricultural water users had encountered in meeting repayment requirements. A legal interpretation of the Act was that its principal purpose was to establish the water users' repayment on the basis of economic factors pertinent to their ability to pay. The irrigators' ability to pay is determined by budgeting representative farm situations reflecting future with and without project conditions. A representative crop pattern, including livestock enterprises where appropriate, is projected for the service area; budgets are prepared on the basis of farm interviews, general knowledge of the area including soil characteristics, and any secondary information available. The budgets include gross income and the costs of management, labor, and return to capital priced at estimated market value which are deducted from the gross farm income. The residual value, less a margin of about 25 percent for contingencies and incentive, is assumed to be available to apply against the costs of project water service.

This procedure is sound conceptually. However, there are severe accuracy limitations in the determination of ability to pay by the use of farm budgets. In this computation, assumptions must be made regarding the price of all inputs, outputs, and crop yields. Intangible items such as level of management and farm efficiency have significant effects on the results. Thus, in reality, the results are only an indicator of the level of the repayment and should not be treated as a precise determination.

For lack of a better indicator, payment capacity determinations must continue to be the primary guide in setting commercial agricultural water rates.

In some service areas, there are other data that can be utilized to help support a value or market price for water. In these cases these values should be used in conjunction with payment capacity determinations to verify irrigation water rates.

The following are examples of other values that should be considered:

1. Project service areas that have a current water supply have established a current cost of water. The cost of this water to the farmer will be accounted for as an expense in the budget. Even so, the amount farmers are paying for this water in the absence of the project indicates at least a minimum repayment ability. This current cost of water should be used as support for payment capacity determinations by the farm budget method.

2. When the project is designed to augment a ground water basin that is declining, the costs of continued pumping could be less than project water costs. This situation could exist until the depth to ground water increases to the level that pumping costs equal or exceed project costs. Whenever the above or a similar case arises, consideration must be given to the effect on rates and the marketing situation.

3. The cost of developing and delivering project water should be a major consideration when arriving at a rate. As a minimum, the water users must pay the project OM&R costs and to be financially acceptable, a portion of the project construction cost.

4. The selection of the service area should include consideration of competition among environment, recreation, and fish, as well as irrigation. This competition is not always in terms of economics or willingness to pay but is in terms of pressure not to dam rivers and not to divert water away from streams. The demand for water for these purposes will reduce water available for irrigation and M&I use. The water that is available for irrigation should be applied on the most productive land to achieve the highest value crops. This will be reflected in a higher ability to pay thus supporting increased water charges. These higher charges will permit water users to support a larger portion of their project costs.

In summary, in addition to major reliance on payment capacity; other criteria should be given full consideration.

After the commercial agricultural rate has been determined, repayment based on different criteria should be considered for small tracts. Suburban water use or water use on part-time farms are recognized as classes of use which should not be charged a rate based on the commercial farm payment capacity. Because of amenities associated with living in

the rural and suburban environment, and the fact that off-farm income is used to establish the family's standard of living, it is equitable that a higher rate be charged than that charged for water used on the commercial farm.

As more stringent repayment requirements are imposed in order to demonstrate project financial feasibility, additional revenue from the small tract category becomes increasingly important to project payout and benefits.

The task force recommends that the agricultural water rate structure be composed of a charge per individual customer, or an account charge, plus a charge per acre of irrigable land or acre-foot of water.

This rate structure will generate additional project revenue. It will also provide an equitable unit water charge which will automatically be higher at the end of the scale where ownerships are small with a gradual reduction in the unit charge to equal the agricultural rate where ownerships reflect the commercial agricultural enterprise. The charge would be paid by each water user within the contracting organization for each noncontiguous ownership not identifiable in the M&I category.

In many cases the water service to small tracts will be on an irrigation delivery pattern. In these cases the M&I charge per acre might not be equitable for the service provided. With this in mind

the account charge should be negotiated at as high a level as possible that will not preclude development. It is recommended that the cost of water to irrigate an acre of land should be within a range which has an upper limit based on the lesser of (1) the rate necessary to repay the irrigation cost allocation with interest, or (2) the M&I rate converted to a per acre basis; and a lower limit based on repayment of the cost allocated to irrigation without interest. For the conversion of the M&I water service rate to an acreage charge, 3 acre-feet of water per acre will be assumed as the per-acre requirement. As used herein, unless otherwise specified the interest rate should be determined pursuant to the Water Supply Act of 1958.

IMPLEMENTATION OF ACCOUNT CHARGE CONCEPT

(Hypothetical example in which agricultural rates are based in part on acreage. Adjustments necessary for rates based on water quantities.)

KNOWN

Jones River Project - Western United States

Repayment period - 40 years

Repayment interest rate - 3-1/2 percent

M&I Category

Estimated average sales 50,000 acre-feet annually

Rate required to repay full allocated costs at 3-1/2 percent interest in the 40-year repayment period = $25 per acre-foot

Rate per acre at standard 3 acre-feet per acre = 3 x $25 = $75

Agricultural Category

Estimated average size of land developments and farms and number of accounts:

	Acres	Accounts
Less than 5 acres	10,000	4,000
5 - 15 acres	20,000	2,000
Over 15 acres	70,000	1,000
Total	100,000	7,000

Commercial size farm:

Rate @ 75 percent of payment capacity = $8 per acre
Average size farm used in payment capacity computation = 80 acres

Rate required to repay full costs allocated to irrigation: @ 3-1/2 percent interest = $60 per acre: without interest = $20

ACCOUNT CHARGE COMPUTATIONS

Since the account charge computation is to be negotiated within a range whose ceiling is the lesser of the M&I charge per acre ($75) or the agricultural charge per acre required to repay full cost allocated to agriculture with interest ($60), the latter will be used as the ceiling and herein referred to as the maximum charge per acre. The lower limit would be the rate required to repay full cost allocated to irrigation without interest ($20). Assume year round water service, and that the maximum charge per acre was acceptable to the customer.

Difference in maximum and normal agricultural rates = $60 - $8 = $52 per acre.

Account charge = Difference in rates + $\frac{\text{Difference in rates}}{\text{Commercial size farm acreage}}$

= \$52 + $\frac{\$52}{80 \text{ acres}}$ = \$52.65

Agricultural charge per acre = Maximum charge per acre minus account charge = \$60 - \$52.65 = \$7.35 per acre

(Thus, the rate for 80 acres = $\frac{\$52.65 + (\$7.35 \times 80)}{80}$ = \$8 per acre which is the rate based on payment capacity)

Knowing the account charge and agricultural rate per acre, a curve can be developed. (See Figure 1)

Computation of anticipated agricultural revenue

Two procedures can be followed. For demonstration purposes only, both procedures are shown in this example as follows:

1. Based on acreage and number of accounts:

   Anticipated agricultural revenue =

   (100,000 acres x \$7.35 + 7,000 accounts x \$52.65) x 40 years = \$44,100,000

2. Based on estimated size of developments:

The average rates for acreages below 5 acres, and for acreages between 5 and 15 acres are rates on the curve which would be those which apply at the midpoint of each step on the developed curve (See Figure 1). That is, in this example the former rate would be the rate found on the rate curve at 2.5 acres and the latter would be that at 10 acres.

Under 5 acre rate = $\frac{2.5 \times \$7.35 + \$52.65}{2.5}$ = \$28.41 rounded to \$28 per acre

5 - 15 acre rate = $\frac{10 \times \$7.35 + \$52.65}{10}$ = \$12.62 rounded to \$13 per acre

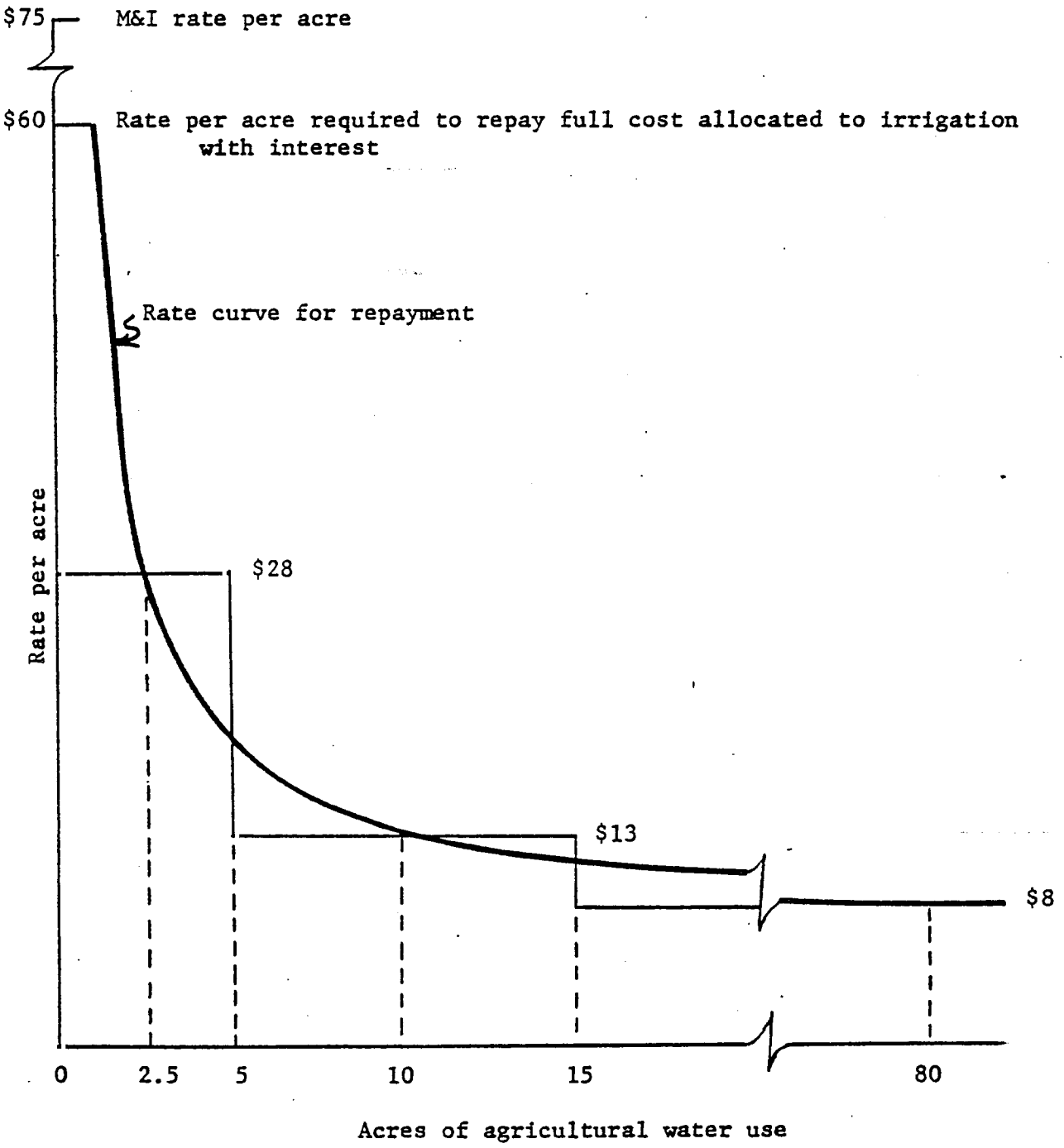
Anticipated agricultural revenue for 40-year period:

Under 5 acres = \$28 x 10,000 acres x 40 years =	\$11,200,000
5 - 15 acres = \$13 x 20,000 acres x 40 years =	10,400,000
Over 15 acres = \$8 x 70,000 acres x 40 years =	22,400,000
Total	\$44,000,000

Benefits would be computed on a case-by-case basis using some or all of the above facts and computations. Generally, procedure (2) above will provide a basis for determination of the most accurate benefits for the smaller acreages.

Figure 1

EXAMPLE OF AGRICULTURAL WATER RATE
WHICH INCLUDES AN ACCOUNT CHARGE



TYPE OF CONTRACTS TO BE USED

The Reclamation Project Act of August 4, 1939 (53 Stat. 927), provides the present basis for contracting for the repayment of reimbursable costs associated with facilities to furnish water from Federal Reclamation projects. As provided by the Act, the Secretary of the Interior is authorized to market water for agriculture and M&I purposes under contracts providing for the repayment of a specified contractual obligation within a designated period (normally referred to as a "repayment contract"), or for the payment of appropriate charges for the delivery of water over a designated period (normally referred to as "water service contract").

Water service contracts offer advantages not provided by repayment contracts. Due to annual variations in water supplies and demands, water service contracts encourage the most efficient use of project water particularly when the project water source is coupled with non-project sources of supply. While repayment contracts assure the return of a stipulated obligation, this can also be accomplished in water service contracts through the establishment of minimum purchase requirements and by periodic rate review and adjustment. Reclamation law permits the renewal of water service contracts which could provide the means to continue receiving revenue for the life of the project where continuing service is provided or until the conversion provisions which are applicable to agricultural water service contracts through the Act of July 2, 1956, are implemented and repayment is achieved.

The task force recommends that (1) arrangements involving water supply and conveyance facilities be contracted under water service contracts wherever possible, and (2) that repayment contracts be used for those irrigation facilities that are generally associated with distribution of water to the lands.

This would require no legislative change since section 9(e) of the 1939 Reclamation Project Act provides that in the event water service contracts are made for furnishing water for irrigation purposes, the costs of any irrigation water distribution facilities constructed by the United States shall be covered by a repayment contract entered into pursuant to subsection 9(d).

Both the physical facilities and the water users' repayment ability should be considered in the determination of which project costs to place under the repayment portion of the contract.

In those instances where the water users have adequate financial ability to repay the costs of the facilities which would normally be classified as distribution facilities, the costs to be included in the repayment portion of the contract would be based upon a physical determination. However, where this is not the case, the costs to be included in the repayment portion of the contract would be determined by starting at the end of the system and including facilities and costs to the point where the available payment capacity, leaving an allowance for water service

charges, is fully utilized. The residual costs would be covered by the water service portion of the contract by means of specified water rates which would extend for a longer period than the repayment portion of the contract.

The foregoing examples are illustrated as follows:

Total cost of facilities	=	$15
Distribution	=	7
Water supply	=	8

Example I

Adequate Financial Ability to Repay Physical Works Which Could be Classified as Distribution

Facilities	Defined by Facilities	Defined by Financial Ability
Distribution	$ 7	$ 7
Water Supply	8	8
Total	$15	$15

Example II

Inadequate Financial Ability to Repay Physical Works Which Could be Classified as Distribution

Facilities	Defined by Facilities	Defined by Financial Ability
Distribution	$ 7	$ 5
Water Supply	8	10
Total	$15	$15

Some projects may consist solely of facilities which can be physically classified as distribution and which also provide a domestic water supply. Such an example is the East Greenacres Unit of the Rathdrum Prairie Project, Idaho, which includes a series of wells and a pressure pipe distribution system to provide both an irrigation and a domestic water supply. In this case, the determination of what constitutes the distribution facilities is limited by the commercial agricultural water users' repayment ability. Under the recommended policy, the costs to be included as a joint irrigation-domestic obligation under the repayment portion of the contract would be determined pursuant to payment capacity. The M&I interest-bearing portion of the repayment obligation would be determined periodically on the basis of water use. The remainder of the project costs would be covered by the water service portion of the contract by means of water rates. An illustration of this concept follows:

Total cost of facilities	=	$15
Distribution	=	15
Water Supply	=	0

Distribution Works Providing Both Commercial Agricultural and Domestic Water Supply

Facilities	Defined by Facilities	Defined by Financial Ability
Distribution	$15	$ 5 Interest bearing amount determined periodically
Water Supply	0	10
Total	$15	$15

Consideration was given by the task force to including an account charge in the repayment portion of the contract. This could result in the repayment of the obligation sooner if the lands were subdivided in which event the commercial agricultural water service rate would be increased since there would be added payment capacity available to pay for the water supply facilities. It was concluded, however, that it would simplify the administrative aspects if the contract variations were restricted as much as possible to the water service contracts. On this basis, the repayment portion of the contract should consist of a specified obligation, a definite repayment term, and fixed annual payments which would only vary if the system were being used for M&I purposes requiring interest payments on a portion of the unpaid obligation.

The adoption of a unilateral policy to restrict contracting to water service contracts or combination water service-repayment contracts may be questioned since existing legislation permits the use of repayment contracts. However, existing legislation does not appear to give the contractor the option to select the contractual arrangements. Water service contracts could be required for new projects by including this type of repayment plan in all future planning reports with variations contingent on approval by the Commissioner.

PERIOD OF PAYMENTS

Repayment contracts written under sections 9(d) and 9(c)(1) of the 1939 Reclamation Project Act have provided for the termination of the construction installments once the specified construction charge obligation has been repaid. However, the concept of continuing payments for continuing service and use of facilities has considerable merit, particularly in the case where the contractual obligation is considerably less than the cost of the project facilities.

The use of water service contracts implies the service principle which is associated with public utilities whereby continued service is provided for continued payment. It can be interpreted that such a policy is consistent with sections 9(e) and 9(c)(2) of the Reclamation Project Act which authorized the use of water service contracts. However, the Act of July 2, 1956, permits the conversion of agricultural water service contracts to repayment contracts upon the determination that the remaining amount of the construction cost which is properly assignable for ultimate return by irrigators can probably be repaid within the prescribed period. There is not similar legislation for municipal, industrial, and miscellaneous water supplied under water service contracts. Further, the Act of June 21, 1963, providing for renewal of M&I contracts, makes such renewal contingent on renegotiation of ". . . the charges set forth in the contract in light of the circumstances prevailing at the time of renewal . . . ."

Legislation has been enacted in various areas to establish basin accounts whereby revenues realized from the sale of commercial power from Federal facilities are used to repay those project costs allocated to agricultural water service which are in excess of the water users' ability to pay within the prescribed period under repayment contract arrangements. This, in effect, recognizes the indirect benefits realized by other sectors of the economy through irrigated agricultural development.

The task force discussed the following options in regard to the period of payments:

Option 1 - Water users would continue to pay under all types of contracts as long as service is provided.

Option 2 - Water service charges would continue for the life of storage and major conveyance facilities. The construction charge payments due under repayment contracts for distribution systems would terminate when the obligation is repaid.

Option 3 - Permit payout under all contracts:

1. Within the initial contract term with application of financial assistance from power revenues;

2. At such time that the reimbursable project costs are fully repaid by the water users without power financial assistance.

It was concluded that option 1 was not feasible since it would necessitate the exclusive use of water service contracts, and be difficult to justify, particularly when project facilities are transferred to the water users to operate and maintain.

Option 2 is similar to the procedure being followed in the Central Valley Project. However, on that project the water supply and conveyance facilities are operated by the Bureau of Reclamation and continuous service, including maintenance and replacement, is being provided. This is not the case in many other Reclamation projects.

Option 3(1) is the procedure which is now being followed in many regions. However, it is questionable that payments should terminate at a specific time while water users continue to enjoy substantial financial assistance and have the ability to continue to pay.

Even though the present value of $1, collected 40 years from now is only about $0.10 (discount rate of 5-7/8 percent) it seems appropriate to require continuation of payments beyond 40 or 50 years if there are still outstanding reimbursable project costs or if the reimbursable project costs have been repaid in part by power revenues.

Therefore, it is recommended that the repayment portions of the contracts terminate when the initial term has expired but that the water service portion of the contract be renewed continuously until the water users have repaid all of the reimbursable project costs allocated to the M&I and agricultural water functions (Option 3(2)).

This will not require a legislative change to eliminate the conversion provisions for commercial agricultural water users now included in the Act of July 2, 1956, since, as a practical matter, if the Secretary determines that the obligation of the irrigators is the total allocated cost, most irrigators would not be able to convert under the provisions of the Act of July 2, 1956, for a considerable period. Further, it is also workable in the Central Valley Project since the project is an integrated project and, as new units are added, the financial capability of the entire project is utilized to repay the integrated project cost.

Since the repayment portion of the contract will terminate upon the full repayment of the costs covered thereunder, the water users' repayment ability, which will become available when such repayment is achieved, will then be applied toward the project costs covered under the water service portion of the contract.

This procedure is illustrated as follows:

Total cost of facilities = $15
Distribution = 7
Water Supply = 8

Facilities	Repayment Obligation to be Paid in Initial Term	Covered by Renewal of Water Service	Total
Repayment portion	$ 5a/	0	$ 5
Water service	5	$5b/	10
Total	$10	$5	$15

a/ Payment capacity inadequate to pay the cost of the distribution facilities.
b/ Includes cost of distribution facilities not covered by repayment portion of contract.

ADJUSTMENT OF CHARGE

Currently the contractual obligation in repayment contracts is adjusted upon completion of project construction and the determination of the actual project costs. Some of the recent water service contracts require adjustments in water rates as changes in water use occur from that initially estimated.

It is recommended that M&I and agricultural water service contracts provide for rate review and possible adjustment every 5 years.

This review would permit changes in the rate to recognize changes in costs, cost allocations, payment capacity, and water use. It should be

recognized that irrigation water rate reviews will necessitate reviews of the farm budgets and other factors used in determining the irrigators' repayment ability. Irrigation development may not have occurred in the initial rate review periods to substantiate a rate change; however, the opportunity to effect changes should be included in the contracts.

CONTRACT TERM

The Reclamation Project Act establishes the contract term at not to exceed 40 years. However, authorizing legislation for project proposals has provided for contracts beyond 40 years but generally not in excess of 50 years, which is roughly half of the anticipated life of the facilities.

There is some merit in setting the contract term at 10 to 20 years in water service contracts with provision to renew pursuant to the Acts of July 2, 1956, and June 21, 1963. However, terms of less than 40 years would (1) be difficult to obtain since many contractors do not want to make significant plant and distribution system investments without the assurance of a long-term contractual commitment irrespective of the contract renewal provisions of the Acts of July 2, 1956, and June 21, 1963, (2) there would be the continuing need for contract renegotiation, and (3) problems might be encountered in negotiating the renewal of the water service portion of the contract, particularly if the term of the repayment portion of the contract had not terminated.

It was initially concluded by the task force that future water service contracts should normally be for 40-year periods unless otherwise authorized by Congress with provisions to provide for periodic rate review and adjustments. Subsequently, in commenting on the preliminary report, some of the regions believed that consideration should be given to water service contracts with terms of 15 to 20 years.

It is recommended that flexibility be permitted and, on a case-by-case basis if supported in view of other considerations, shorter terms be negotiated.

WATER USE BUILDUP IN WATER SERVICE CONTRACTS WHERE THERE ARE MULTI-CONTRACTORS FOR WATER FROM THE SAME FACILITIES

Water service payments should commence with the availability of water. To make the best and most equitable use of the water resource and to assure that the resource is not committed and held indefinitely without beneficial use and monetary compensation, it is necessary to set a minimum buildup in water use and payment. This buildup should represent the contractors' projected water needs over the contract term plus additional stipulations if necessary to meet the minimum requirement.

Irrigation water use usually builds up faster than municipal uses. In many projects a substantial portion of the service area is already under irrigation so the buildup could be as little as 5 to 10 years.

It is recommended that a 15-year buildup period in irrigation water use be established during which time some target quantities should be reached and that the irrigators be permitted that period to fully utilize their water commitment.

This is compatible with the establishment of development periods which cannot exceed 10 years and permits an additional 5 years to reach full agricultural production of the irrigable land.

During the 15-year buildup period some minimum use requirements should be stipulated in the contract with provision to increase or decrease the projected minimum requirements on the basis of actual use as shown in the following example:

Years	Minimum Use Requirement
1 through 5	None
6 through 15	The average of the immediately preceding 5 years. If the average were more or less than the projected requirement, the minimum use requirement for the succeeding years would be increased or decreased by the following ratio: $\frac{\text{Projected use for that year} \times \text{Difference in actual from projected use}}{\text{actual use}}$ If the average were less than the projected use, the maximum quantity of water under contract would also be decreased and the contractor would either make payment compensation to equate payments to projected requirements or relinquish all future entitlement to its use.
16 to end of contract period	The quantity used in the 15th year or the contractual annual maximum. Any water that is not under long-term commitment by that time could be marketed by the United States to any other water user.

Water needs over an interval will vary between domestic and municipal use and industrial use and between uses in each group. In most instances, the demand for municipal water will increase over an extended period as the population being served expands, whereas industrial water use exhibits a relatively short-term buildup except in those specific cases where water use is contingent upon the development of other resources necessary to utilize the water resource (such as the development of the coal resources to utilize water from the Yellowtail and Boysen Units of the Pick-Sloan Missouri Program and units of the Colorado River Storage Project). Further, such development usually consists of units of production being placed in service at different intervals and the water demand is characterized by a "block buildup" rather than a "graduated buildup." Since the recommended water buildup requirement is not compatible with the anticipated water use, this type of water use is a special case to be treated individually.

Some members of the task force suggested that the M&I customer should reach its maximum annual demand by the 20th year and any additional water under contract not used or paid for by the contractor at that time should revert to the United States for further marketing. Other members believed that this was not realistic since M&I water marketed by the Bureau of Reclamation has historically been to municipalities which will experience a long-term buildup in water use. It was agreed that the main concern should be equity among customers and reasonable financial return to the United States. To accomplish this, and still permit annual fluctuations in water sales based on demand, it is recommended that a minimum long-term financial return to the United States should be

established over the repayment period. This should be a certain percentage of the total revenues which could be realized over the initial contract term if the maximum annual quantity of water under contract was paid for every year. Included in the long-term requirement should be short-term criteria consisting of minimum payments during the initial years.

It is recommended that the short-term requirement in the first year that water is available be equivalent to 1 percent of the maximum annual quantity of water under contract with a progressive 1 percent increase to the 10th year.

The 10 percent minimum payments would remain at that level until the actual demands and payments for water use exceed that amount. Thereafter, the payments would be subject to actual demand.

The long-term minimum requirement would be based upon recouping 60 percent of the total revenues which would be realized if the annual maximum quantity under contract was used every year.

The short-term minimum requirement would be included in computing the 60 percent minimum. During the contract term, the entity's entitlement to retain the water supply would remain in effect as long as it met the established buildup criteria. However, a provision should be included in M&I contracts to permit a "pull-back" of the long-term contractual water supply commitment if there is excess water that is not

being put to beneficial use. This is particularly important in areas where there are water deficiencies.

The United States, regardless of the level at which the water use buildup requirement is established, would be assured of the return of the allocated cost through periodic rate review and adjustment. The water rate would initially be established on the basis of the projected water needs or the minimum long-term requirement, whichever is greater. The following factors would affect the magnitude of the rate in subsequent years: (1) Changes in OM&R costs; (2) changes in the project construction cost allocation due to changes in project water use; and (3) purchases in excess of the water use buildup established in the contract which will, if all other factors remain constant, result in a decrease in the water rate.

The following tabulation indicates the impact on certain entities of the foregoing 60 percent minimum requirement.

Impact on Some Entities
If 60% Criteria Were Applied
(Based on requirements expressed by the entities)

Entity	Project	Over 40-year Period			
		Approx. Rate	Entities Water Requirement		Entities Additional Payment to Meet 60% of Maximum
			Payment	% of Maximum	
		$/A.F.	$Million	%	$Million
East Bay MUD	Central Valley	16	40	41.5	18
Salt River Project[a/]	Central Arizona	45.50	168	43	67
Arizona Public Service[a/]	Central Arizona	45.50	212	44	78
90 M&I Entities[a/]	Central Arizona	45.50	2,000	62	0
Total					

a/ Minimum requirement could not be imposed by Reclamation since United States has contract with Central Arizona Project Water Conservation District for repayment of CAP costs. Tucson not included in list of total entities.

Figure 2 illustrates an example of the proposed M&I water use buildup requirement.

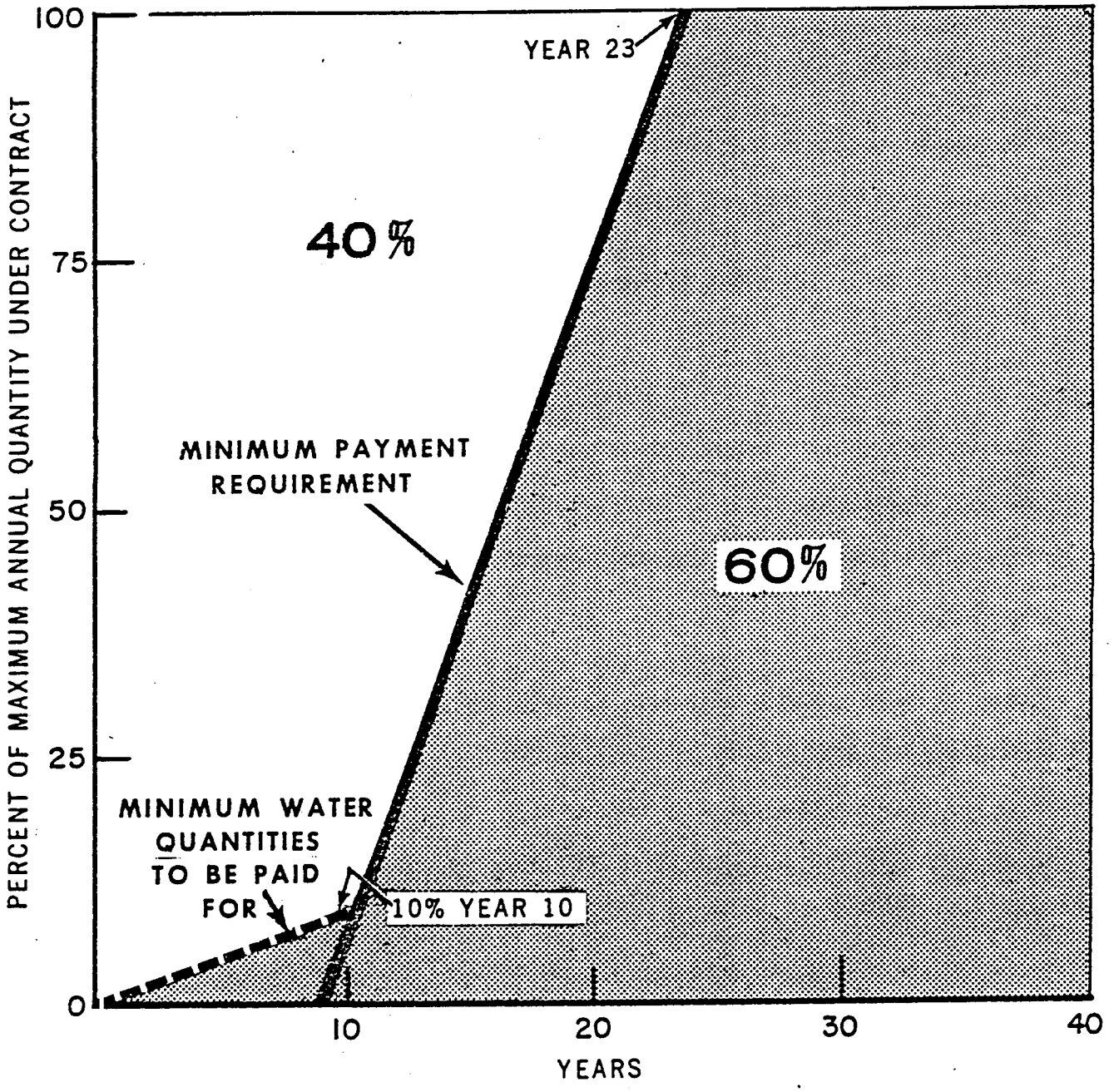
Some criteria which are common to both M&I and irrigation buildup requirements are:

1. Any water above the minimum buildup requirement that is not scheduled and paid for in advance would annually revert to the United States for its use.

2. The contractor would not be entitled to dispose of any water to another entity in excess of the minimum payment requirement.

Figure 2

EXAMPLE OF WATER USERS BUILDUP AND PAYMENT REQUIREMENTS WHERE NO WATER IS REQUIRED UNTIL YEAR 9



3. Except in unusual cases, payments made for water used in any year in excess of that covered by the minimum payment requirement could not be credited against the minimum payment requirement in a subsequent year.

READINESS-TO-SERVE CHARGE IN INDUSTRIAL WATER USE OPTION CONTRACTS

Long-term contracts providing for an option on the water supply for industrial purposes have been executed in some cases where technology or development has not advanced to the point to make beneficial use of the available water supply. Such options have usually been for 10-year periods during which time readiness-to-serve payments were required.

This has been accommodated in the Upper Missouri and Upper Colorado Regions where water for industrial use has been placed under option contracts which provide for (1) a readiness-to-serve payment based on a relatively nominal charge per acre-foot applied against the total quantity of water under contract, and (2) a provision that if during the option period a potential contractor wanted to use and pay for all or a part of the quantity of water under contract, the initial contractor could either begin paying for the water and put it to beneficial use or lose the right to its use.

It is recommended that in some industrial water use option contracts, the contractor be required to make payments during the 10-year period in the same manner as discussed in the M&I water use buildup.

This procedure has the advantage of establishment and acceptance by the customer of one rate; and, as shown in the following example, results in about the same return to the United States that is now being recovered by the use of a separate readiness-to-serve rate.

Readiness-To-Serve Payments

Present Procedure:

1. Sun Oil Company, Contract No. 14-06-600-10,619

   Quantity of water under contract is 35,000 acre-feet
   Rate per acre-foot for water is $11 per acre-foot
   Readiness-to-serve charge is $0.50 per acre-foot
   Annual readiness-to-serve payment is $17,500
   Length of option period is 10 years

2. Peabody Coal Company, Contract No. 14-06-600-101A

   Quantity of water under contract is 40,000 acre-feet
   Rate per acre-foot for water is $9 or $11 per acre-foot
   Readiness-to-serve charge is $0.50 per acre-foot
   Annual readiness-to-serve payment is $20,000
   Length of option period is 10 years

Readiness-To-Serve Payments Received Over 10-Year Option Period:

Present Procedure:

1. Sun Oil is $17,500 annually x 10 years = $175,000

2. Peabody Coal is $20,000 annually x 10 years = $200,000

Proposed Procedure:

1. Sun Oil is required to pay for a total of 19,250 acre-feet at $11 per acre-foot = $211,750

2. Peabody Coal is required to pay for a total of 22,000 acre-feet
   at $9 per acre-foot = $198,000
   at $11 per acre-foot = $242,000

However, as discussed in the previous section, the water demand by some industries, particularly in the energy production fields, is characterized by "block buildup." In these cases, a progressive increase in option payments may not be applicable if it is based upon the ultimate unit of production being placed in service and its associated water demand and consideration should be given to some other procedure.

State law should be considered when drafting contract language pertaining to third-party option provisions so as not to circumscribe the beneficial use requirements.

Policies applicable to industrial water use option contracts are:

1. No subsequent credit would be made in future years for readiness-to-serve payments.

2. The option period should not be greater than 10 years and at the end of the period the contractor would be required to start paying for the quantity of water specified in the contract or the contract will terminate. This quantity could either be the maximum quantity of water under contract or some other payment requirement depending upon the type of proposed development.

3. The United States retains the right during the option period to market any water on an interim basis which is not scheduled for use by the contractor. The contractor cannot market the water to a third party, but the contract should include the opportunity for third parties

to make a bona fide offer for water not being beneficially used during the option period at which time the option contractor would be required to commence paying for the quantity of water specified in the contract for the period immediately following the option period or lose the right to the use of the water to the third party. This quantity could either be the maximum quantity of water under contract or some other payment requirement depending upon the type of proposed development.

SPECIFICATION OF OBLIGATION OR RATE IN CONTRACTS

In repayment contracts the contractual obligation is specified, whereas in water service contracts the general practice has been to specify the water rate but not the contractual obligation. A legal interpretation of some State laws is that a maximum construction obligation must be specified in contracts. This will present no problems in regard to the repayment portion of the combination water service-repayment contract where an obligation will be specified. In those instances where the water users have adequate financial ability to repay the full cost of the distribution works, the maximum construction obligation in the repayment contract should be established at a sufficient level to assure the repayment of the actual plant-in-service cost. Where possible, construction contracts should be broken into segments of work to

permit the deferment of items of work if necessary to help avoid the possibility of one bid for performance of all the work exceeding repayment contract maximum obligations.

Stating a maximum obligation in the water service portion of contracts could present some problems depending upon the interpretation of the law in each State. We believe there are procedures which can be utilized in the contracts and in the election process which comply with interpretation of these statutes and suggest that such compliance be tested by the court through contract confirmation.

Unless required by State law, any reference to a maximum water rate should be omitted from the water service contract.

COST ALLOCATION

BACKGROUND

The initial projects undertaken by the Bureau of Reclamation were single-purpose irrigation projects that did not require the division of costs between functions. However, with the development of multiple-purpose projects it became necessary to distribute costs because of differences in the repayment requirements of the various project functions.

The first cost allocations were based on physical criteria; however, such methods did not recognize the full extent of the services provided. Cost allocations based upon benefits were developed but deficiencies were also noted in these methods. Subsequently, methods involving a combination of both physical and economic criteria were developed and in the early 1950's the separable costs-remaining benefits (SCRB) method was universally adopted by all Federal agencies in the field of water resource development.

Under the SCRB method, the maximum amount (justifiable expenditure) which can be allocated to any project function is the lesser of (1) the benefits accruing from the project to that function or (2) the cost of developing a single-purpose project providing the same level of benefits for that function. The minimum amount allocated to a function (separable cost) represents the cost which could be omitted from the total project cost if the particular function was not included. After deducting the

total separable costs from the total project costs, the residual or joint cost is distributed among all functions proportionate to the remainder of each function's justifiable expenditure.

ADEQUACY OF SEPARABLE COST-REMAINING BENEFIT COST ALLOCATION METHOD TO REFLECT CHANGE IN WATER USE

The estimated benefits for each function are based on projections of the quantities of water used, service, and use of project facilities. These projections are for a 100-year period or the life of the project whichever is least. The cost for the single-purpose alternative is based on constructing a facility to generate an equivalent benefit stream including sufficient capacity to meet the maximum needs of the function. In many cases, and essentially in all cases for M&I, the alternative cost becomes the justifiable expenditure. This procedure causes initial allocation of project costs to a function which may not fully utilize the project's resources until some future time. Thus, in many instances, M&I water users having a 25-35-year buildup in water use are making sizable interest payments or capitalizing these interest charges in initial years when the water user is requiring very little water service. Some M&I users have strongly objected to this situation.

PROJECT OPERATION REFLECTED IN COST ALLOCATION

As the project progresses from the planning through operational phases, it is desirable to maintain compatibility among the allocated project

costs, the actual use of the project facilities, project water, and project repayment. To accomplish this without requiring extensive reformulation of the project alternatives and separable costs, various cost allocation methods were reviewed. All methods of cost allocation reflect to some degree the projected use of a project, and an allocation will be correct only as long as the projections are accurate. As the projections change, the allocation for the reimbursable functions should be changed. While other cost allocation methods are perhaps more receptive to changing conditions, it was generally agreed that the SCRB method results in a more equitable functional allocation. With some modifications, particularly by means of suballocation procedures, it can be reflective of changing project conditions without the complications of reallocation.

MODIFIED SEPARABLE COST-REMAINING BENEFIT COST ALLOCATION METHODS

Two modifications of the SCRB method of cost allocation were discussed. One of these was to maintain the current initial functional cost allocation and the other was to combine the irrigation and M&I functions in the initial cost allocation into a water supply function. Following the initial allocations, there would be periodic suballocations between irrigation and M&I water based on projected uses over the original contract period.

The Water Resources Council's "Principles and Standards for Planning Water and Related Land Resources" published on November 10, 1973, states in regard to the cost allocation process that "Each objective and each component of the objectives shall be treated comparably in the cost allocation and each is generally entitled to its fair share of the mutual advantages resulting from a plan." It appears that the use of a water supply function will result in a lesser allocation to water supply than would have been realized if the two functions had maintained their separate identity. This is due to the economies of scale which would be realized by the use of one single-purpose alternative which will probably be the justifiable expenditure for the water supply function rather than separate alternatives for irrigation and M&I.

On the basis of the foregoing, it was concluded that the water supply cost allocation concept should be a secondary procedure to be used with approval by the Commissioner's office on a case-by-case basis.

It is recommended that a functional SCRB cost allocation will normally be used, but in certain approved cases the M&I and agricultural water use functions will be combined throughout the cost allocation.

For repayment purposes, a project cost allocation should be made following construction. The final cost figures and projected water uses should then be incorporated into the allocation. When there are major changes in water use during the original contract period, the SCRB cost

allocation should be revised. The allocation should be reviewed at least once every 10 years.

For the normal procedure, following the functional SCRB cost allocation, a comparison should be made between the M&I and agricultural allocated costs and water projected to be used by each purpose over the repayment period. The allocated costs to the two functions will then be combined to form a single function. At 5-year intervals, new projections of water use will be made. If these projections vary from the original projection, the cost suballocated between M&I and irrigation will vary accordingly, keeping the original marginal percentage differences between allocated costs and water use.

This procedure will permit changing allocations to reflect changes in water use over the repayment period and will tend to maintain the benefit/cost ratios developed in the SCRB cost allocation. After each suballocation, the unpaid investment will be determined for the functions by crediting revenues collected over the period to that point in time. No retroactive adjustments will be made regarding interest. The allocation is illustrated by the following example:

FUNCTIONAL ALLOCATION

INITIAL CAPITAL COST ALLOCATION

SCRB:	Irrigation	M&I	Other Functions	Total
Construction costs	$2,250	$750	$1,000	$4,000

Relationship of initial allocation to projected water use:

Water Supply	Suballocated Cost		Projected Water Use	
	Dollars	Percent	Acre-feet	Percent
Irrigation	2,250	75	16,000	80
M&I	750	25	4,000	20
TOTAL	3,000		20,000	

Ratio of cost to projected water use shows irrigation cost is 5% less than projected irrigation use and M&I cost exceeds projected M&I use by 5%. This differential will be maintained during periodic adjustments.

PERIODIC CAPITAL COST SUBALLOCATION

Water Supply	New Projection of Water Use	
	Acre-feet	Percent
Irrigation	15,200	76
M&I	4,800	24
TOTAL	20,000	

Irrigation suballocation = (.76 - .05) x $3000 = $2130
M&I suballocation = (.24 + .05) x $3000 = 870
TOTAL $3000

The following water supply cost allocation procedure may be used if approved by the Commissioner: The various project functions will be identified and the irrigation and M&I functions will be consolidated into a "water supply" function. The water supply benefits will be composed of the sum of the irrigation and M&I benefits and the alternative project cost will be the cost of developing and operating facilities to provide equivalent service to the consolidated water supply function.

Except for the foregoing deviation the allocation procedure would follow the SCRB method. However, once the project costs allocated to the water supply function are determined, the water supply costs would be suballocated to irrigation and to M&I in proportion to the anticipated water use of the representative function over a selected interval. Subsequently, the actual and estimated water use over the same time frame would be reviewed, the initial water supply cost suballocated, and the unpaid investment determined for the functions by crediting the revenues which had accrued to the respective functions over the previous period.

This cost allocation method is illustrated by the following example:

WATER SUPPLY ALLOCATION

INITIAL CAPITAL COST ALLOCATION

SCRB:	Water Supply	Other Functions	Total
Construction costs	$3,000	$1,000	$4,000

Suballocation:

	Projected Water Use		Suballocated Cost	
Water Supply	Acre-feet	Percent	Dollars	Percent
Irrigation	16,000	80	2,400	80
M&I	4,000	20	600	20
TOTAL	20,000		3,000	

The initial and all subsequent suballocations are based on projected water use.

PERIODIC CAPITAL COST SUBALLOCATION

Water Supply	New Projection of Water Use	
	Acre-feet	Percent
Irrigation	15,200	76
M&I	4,800	24
TOTAL	20,000	

Irrigation suballocation = .76 x $3000 = $2280
M&I suballocation = .24 x $3000 = 720
TOTAL $3000

WATER MANAGEMENT

BACKGROUND

The best time to provide for all of the efficient water-saving facilities that can be accommodated within economic and engineering constraints would be during the plan formulation stages of project development. Planning procedure and the designed efficiency of project irrigation systems may be excellent, but efficient water use will only result with cooperation of the individual water user.

Excessive water use often occurs because it is cheaper than the equipment and labor necessary to reduce the use. Increasing the cost substantially for the water would encourage water management in many cases.

The Bureau of Reclamation currently has an ongoing program to increase the contracting entities' water use efficiency. The program, Irrigation Management Scheduling, involves Federal agencies working with the entities as a consultant to reduce the quantity of applied water. This type of program will appeal to entities purchasing water on a water service basis since they will be able to effect some cost savings. Entities with repayment contracts will not have such an incentive to participate unless excessive use results in significant increases in O&M costs.

The Assistant Secretary - Land and Water Resources had published in the Federal Register of December 27, 1974, for comment, a proposed policy concerning the use and management of water resources which are under

control of the Department of the Interior. An important concept was the possible requirement by the Department of a statement by potential water contractors indicating the planned use of the water. The statement would be comprehensive in all aspects of the proposed source, alternative sources, and plans for efficient management of water use. If it is determined that this policy should not be adopted on a Departmentwide basis, it appears that Reclamation should pursue the possibilities of adopting this idea, or variations thereof, on a Bureauwide basis.

WATER MANAGEMENT PROVISIONS IN CONTRACTS

Some contracts have provided for the establishment by the contracting entity of a base O&M charge. The payment of this charge entitles the water user to a specified quantity of water and a higher rate is assessed for additional water. The increased cost must be significant in order to be effective in deterring excessive water use. The determination of the water allotment associated with the base quantity could vary widely within contracting entities' boundaries. Thus, the determination of a base quantity usually comes about by negotiations with the entity. For ease of administration, application of this principle must be on an entity-wide basis.

It is recommended that water service contracts provide for establishment by contracting entities of a base charge for water with significant increases in the charges for additional water quantities.

WATER SHORTAGES

BACKGROUND

Reclamation projects are planned and constructed on the basis of assumptions regarding the project purposes to be served, the quantity of water to be supplied to each purpose, and the deficiency or water shortage which each purpose can operationally stand.

Storage reservoirs are sized to meet estimated demands less the estimated allowable shortages. The assurance of a full water supply for each and every year during the driest periods would necessitate the reduction of the irrigable area to be served and would result in significant increases in the unit cost of the project in respect to the benefits. A general guideline which has been followed in project planning in some areas is that the allowable irrigation shortage during the year of greatest water deficiency should not exceed 25 percent of the irrigation consumptive-use requirement, and that for a period of water short years, the accumulated irrigation shortage should not exceed 75 percent of the irrigation consumptive-use requirement for the average year. Where M&I water service has been included as a part of the project development, the hydrologic operation has ranged from an equal sharing of shortages to an assured M&I water supply in every year.

The ability to cope with water shortages is quite varied among water users. Some industrial uses, such as cooling water for a nuclear

powerplant, require firm supplies. That supply may be assured by construction of small reservoirs to provide reserve supplies during project operating outages. Other municipal uses, such as general city water supplies, may not be as critical as the industrial or in some cases irrigation supplies. Certain crops, including some perennial plants, can be quite critical and require nearly a full water supply.

When the operation of a multipurpose project is similar to that for which it was planned, the water shortage provisions used in the water service and repayment contracts are generally adequate. However, when there are unanticipated changes in water use, many existing contractual provisions for allotment of water shortages may be inadequate.

WATER SHORTAGE PROVISIONS IN CONTRACTS

Projects under consideration are normally planned to supply all or part of the project water for irrigation, and changes in water use are anticipated to be from irrigation to M&I or other uses. Options for allotting water shortages which have been considered in the development of contract language for each project have either given equal sharing of shortages by all water users, or limited or total preference to M&I.

Under equal sharing of shortages, it is assumed that all water users have the same ability to bear shortages. This approach would accommodate changing use with the least disruption of planned project operation, and the least impact on remaining project uses. However, changes in points

of delivery or amounts of return flow from new users could have some impact on planned project uses.

Some contracts have provided that the M&I water supply will not be reduced in periods of shortages or that the M&I user would be assessed a shortage only after the agricultural user has incurred a specific shortage. Under this approach, it is assumed that the agricultural water users can bear a shortage up to a certain point without a detrimental effect while M&I cannot. A determination should be made as to whether this is truly the case and the magnitude of the shortage which the agricultural use could assume. Under certain conditions, M&I had a preference because project repayment was dependent on M&I revenues, and those customers required firm supplies before entering into contracts.

When a change in water use occurs, the various possibilities regarding shortages are:

1. New use to bear the same shortage as that assigned to the original use;

2. New use to bear the same shortage as that associated with the converted use; and

3. Secretarial apportionment with no stated basis included in the contract.

It is recommended that (1) hydrologic studies and water service contracts reflect an equal sharing of shortages by all water users; exceptions to this policy will require approval by the Commissioner; and (2) when a water user demonstrates a need for a firm annual water supply, and there is adequate water available, the user be permitted to contract for the quantity of water required, possibly at a premium rate, to meet his needs in a water deficient year.

The contractor would be required to pay for this water even if not used. If the contractor did not require the water, the United States would have the right to market it or otherwise use it on an interim basis and retain the revenue.

RESERVE FUNDS

BACKGROUND

The accumulation and maintenance of reserve funds by contracting entities is sound fiscal management ensuring the entities' capability to meet operational and financial commitments. Some States statutes prohibit the accumulation of reserve funds except for specific purposes. The requirement for the establishment of a reserve fund in a contract between a contracting entity and the Bureau of Reclamation provides an acceptable specific purpose.

Emergency reserve funds are established to cover unforeseen and extraordinary costs such as a major canal break or extensive flood damage. Replacement reserve funds cover replacement of certain designated major units of property with relatively short lives. Repayment reserve funds are those that require the accumulation of funds to assure the payment of future obligations.

Emergency Reserve Fund - Most of the contracts executed by the Bureau of Reclamation in recent years involving federally financed irrigation facilities have required the establishment of emergency reserve funds. The amount of the emergency reserve fund is generally related to the estimated average annual operation and maintenance cost, not including costs for pumping energy, which will be incurred annually by the

contracting entity. Also to be considered are the types of facilities and their operation, which may warrant a larger fund.

Emergency reserve funds are generally accumulated by equal annual deposits during the project's first 10 years and restored at a similar rate if the fund is depleted. No reduction is made in the required annual repayment obligation during accumulation or restoration of the fund since expenditures into the fund are considered to be a part of the average estimated annual O&M cost. The fund should be used only for meeting major unforeseen costs for repair or reconstruction due to special stresses to the system such as would be caused by flood damage and not for extensive rehabilitation or betterment since it is intended that the estimated average annual O&M payment provides a sufficient level of maintenance to perpetuate the life of the project facilities.

Replacement Reserve Fund - To cover the cost of replacing designated major items of property, an annual deposit to create a sinking fund is sometimes a contractual requirement. Where the annual replacement is relatively small, the Bureau has not required the accumulation of a replacement reserve fund.

The replacement of movable equipment such as trucks, tractors, and draglines, in addition to many minor items of property, is also provided for as a part of the estimated average annual OM&R costs. In these instances, contractual replacement reserve funds are not required.

Many districts establish separate reserves of their own volition for financing such replacements.

Repayment Reserve Fund - Repayment reserve funds have been required in a few instances when there was a considerable variation in the contractor's amortization ability over time. This situation may occur due to fluctuations in water supplies and political considerations in assessments of ad valorem taxes. Requirements for accumulation and restoration of such funds have been handled on a case-by-case basis.

CONTRACTUAL REQUIREMENTS FOR RESERVE FUNDS

The accumulation of an emergency reserve fund should be mandatory for all contracting entities operating Reclamation facilities; however, the need for replacement and repayment reserve funds should be determined on a case-by-case basis.

As a guide for determining the magnitude of these funds, the attached tabulation, designated Figure 3, should be used. In computing payment capacity, payments into the replacement reserve fund should be considered. Contracts should contain a provision that interest which accrues from replacement reserve funds will remain in the fund and, in effect, reduce the annual required deposits by the

water users. The need for and size of a repayment reserve fund should be determined on a case-by-case basis.

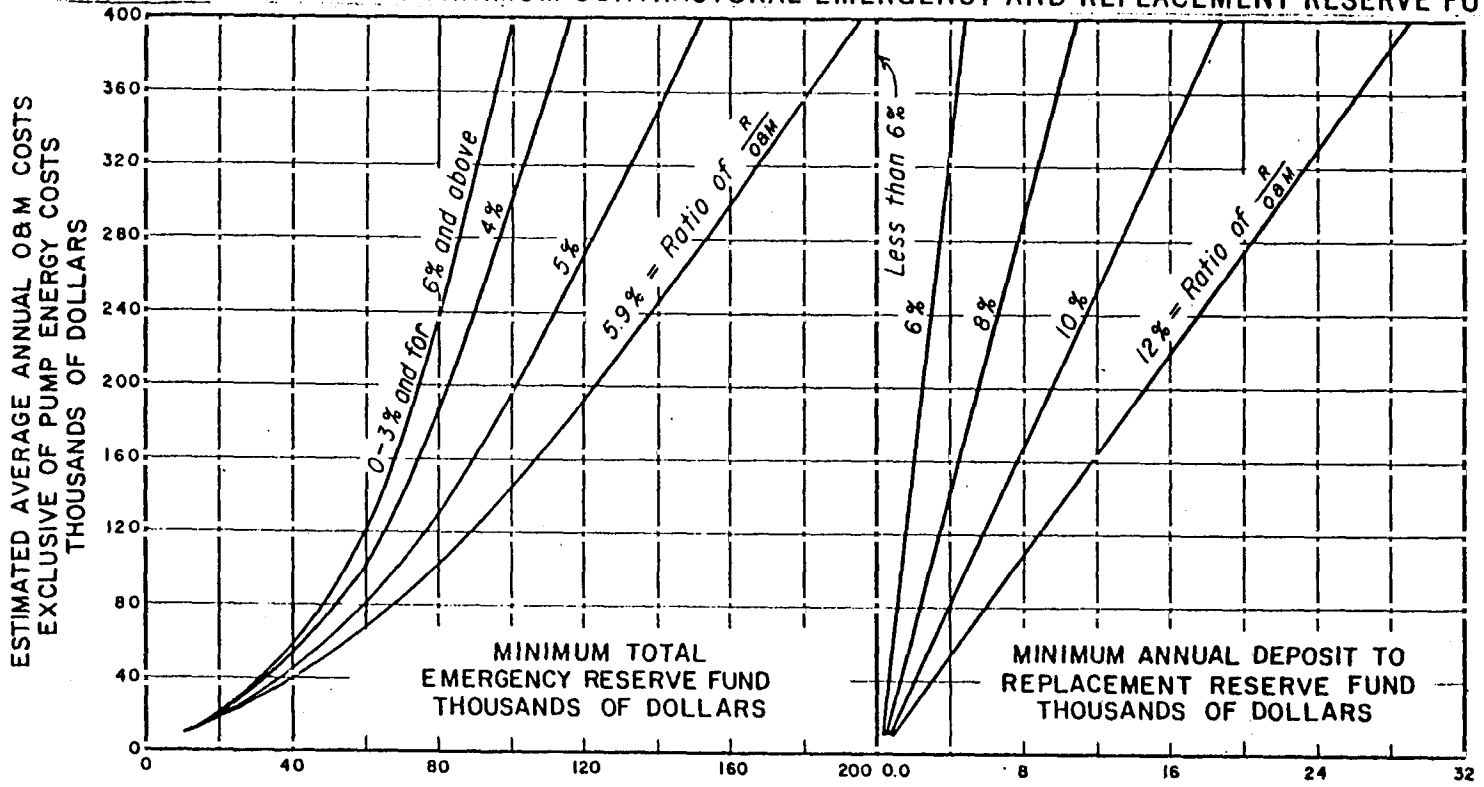
The need for increasing the size of an existing, or establishment of a new reserve fund to finance rehabilitation and betterment programs, which may be required at a future date, has been recognized. However, no real purpose would be served by this requirement because the amortization capacity of the irrigators is decreased by the estimated amount of the operation, maintenance, and replacement expenditures, so a requirement for increasing the size of these funds would result in a corresponding reduction in the amount of the project construction cost that could be repaid annually. Also, in the early years of a new project, accumulation of an amount to cover the cost of future rehabilitation work does not appear as necessary as it has in the past in view of current improved standards of construction and materials. Financing future rehabilitation and betterment work from reserve funds does not appear to be an economic alternative, and it is recommended that such financing continue under present arrangements.

Examples of Use of Reserve Fund Guide (see Figure 3)

Total Annual OMR&P	$143,900	$100,000	$56,000
Less P (Pumping energy cost)	6,400	20,000	3,600
Net OM&R	$137,500	$ 80,000	$53,200
R	$600	$3,000	$5,400
Ratio of R/OM&R	0.4%	3.8%	10.2%
Minimum emergency reserve fund accumulation	$ 62,000	$ 51,000	$37,000
Minimum annual deposit to the Replacement Reserve Fund	-	-	$2,500

Figure 3

GUIDE FOR DETERMINING MINIMUM CONTRACTURAL EMERGENCY AND REPLACEMENT RESERVE FUNDS



Note: Percentages shown on curves are ratios of estimated annual replacements (R) to estimated average annual operation and maintenance (O&M) costs. When ratio exceeds 6%, use both reserve funds. When ratio is less than 6%, use only an emergency reserve fund. Reserve fund requirements for projects where R/O&M exceeds 12% or where annual O&M costs exceed $400,000 should be determined on a case-by-case basis through consultation with the Chief, Division of Water O&M, E&R Center.

a/ Amount from curve should be increased based on the conditions and characteristics of the specific project works to be transferred for operation and maintenance. To determine the appropriate increase, which in extreme cases could be as much as 60%, the following items should be considered: (1) Length of the main conveyance system; (2) The probability of cross-drainage damage; (3) The probability of hail, flooding, or other storm damage; (4) The percentage of the project water supply dependent on a single pumping plant.