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WATER SUPPLY HANDBOOK

A HANDBOOK ON WATER SUPPLY PLANNING AND RESOURCE MANAGEMENT

cember 1996

IWR Report 96-PS-4

U.S. Army Institute for Water Resources
Policy and Special Studies Programs

The Corps of Engineers Institute for Water Resources (CEWRC-IWR) is part of the Water Resources Support Center in Alexandria Virginia. It was created in 1969 to analyze and anticipate changing water resources management conditions, and to develop planning methods and analytical tools to address economic, social, institutional, and environmental needs in water resources planning and policy. Since its inception, IWR has been a leader in the development of tools and strategies to plan and execute Corps water resources planning.

IWR's program emphasizes planning concepts for use by Corps field offices. Initially, this work relied heavily on the experience of highly respected planners and theorists, gained in the many river basin and multiple purpose studies undertaken in the 1960s. As these concepts matured and became a routine part of Corps planning, the emphasis shifted to developing improved methods for conducting economic, social, environmental, and institutional analyses. These methods were essential to implementation of the Water Resources Council's (WRC) Principles and Standards (P&S) and later, Principles and Guidelines (P&G) for water resources planning, which required a multi-objective analysis of tradeoffs among national and regional economic development, environmental quality, and social effects.

Increasingly over the years, IWR has also responded to Corps program development needs by studying policy issues resulting from changes in national objectives and priorities. In addition to directly supporting Corps needs, IWR has established an analytic and strategic competence through the direction of such efforts as the National Drought Management Study, National Waterways Studies, the National Wetlands Mitigation Banking Study, the Federal Infrastructure Strategy, and as a lead participant in the development of policy and procedures for environmental planning and management.

Many of these forward-looking policy and strategic studies were accomplished by the Policy and Special Studies Division. The mission of the Division is to support the Director of Civil Works by assessing and evaluating changing national water resources and related public works infrastructure management needs as they affect Corps Civil Works missions, policies, practices, legislative mandates, and executive directives.

The Division supports the Office of the Assistant Secretary of Civil Works [OASA(CW)] and the Headquarters, U.S. Army Corps of Engineers (HQUSACE) in analyzing current policy issues, and conducting special studies of national and international significance. The Division's work encompasses the following thematic areas:

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For further information related to the program, call either:

Dr. Eugene Stakhiv
Chief, Policy and Special Studies Division
703-428-6370

Mr. Kyle E. Schilling
Director, Institute for Water Resources
703-428-8015

Department of the Army Corps of Engineers
Water Resources Support Center
Casey Building, 7701 Telegraph Road
Alexandria, VA 22315-3868

Reports may be ordered by writing Arlene Nurthen, IWR Publications, at above address, by e-mail at arlene.nurthen@inet.hq.usace.army.mil, or by fax 703-428-8171.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (*Leave blank*)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 1996	Final

4. TITLE AND SUBTITLE

Water Supply Handbook

5. FUNDING NUMBERS

6. AUTHOR(S)

Theodore M. Hillyer

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

USACE, Water Resources Support Center
Institute for Water Resources
Casey Building, 7701 Telegraph Road
Alexandria, VA 22315-3868

8. PERFORMING ORGANIZATION REPORT NUMBER

IWR Report 96-PS-4

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Headquarters, U. S. Army Corps of Engineers
Directorate of Civil Works
20 Massachusetts Avenue, NW
Washington, DC 20314-1000

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

Available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4650

12a. DISTRIBUTION/ AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

The field of water resources covers a wide range of topics and subject matter. This handbook focuses on one of those, the issue of water supply planning and resource management. Subject matter centers on the U.S. Army Corps of Engineers projects and authorities, but is equally valid for use by others interested in this topic. After an introductory chapter, the handbook describes the authorities, policies and procedures pertaining to storage of water supplies in new and existing Corps reservoir projects and provides several water supply databases. Since reallocation is becoming more of a issue, a chapter is devoted to this topic. A chapter is also provided which, in essence, is a self-contained pamphlet which can be reproduced and provided to local sponsors who may desire to enter into water supply agreements. The handbook then focuses on how water supplies are managed through modeling, water conservation, forecasting, and water control systems. Eight appendices accompany the basic nine chapters of the report, including an appendix on definitions and conversion factors and one as an index of key words.

14. SUBJECT TERMS

Authorities, conservation, databases, drought, forecasting, management, modeling, partnership, policies, procedures, reallocation, reservoirs, water control systems.

15. NUMBER OF PAGES

258

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

WATER SUPPLY HANDBOOK

A Handbook on
Water Supply Planning
and
Resource Management

Prepared by

Theodore M. Hillyer

with

Germaine A. Hofbauer

Institute for Water Resources
Water Resources Support Center
U.S. Army Corps of Engineers
7701 Telegraph Road
Alexandria, Virginia 22315-3868

December 1996

IWR Report 96-PS-4

PREFACE

DECEMBER 1996

The field of water resources covers a wide range of topics and subject matter. This handbook focuses on one of those, the issue of water supply planning and resource management. Subject matter centers on U.S. Army Corps of Engineers projects and authorities, but is equally valid for use by others interested in this topic. The document is intended to serve as a comprehensive desk top reference on water supply topics that are spread throughout a voluminous body of Corps engineer regulations, manuals, technical letters and memoranda, as well as literature from the private sector. The information in this handbook is for reference purposes, and is not intended as a substitute for HQUSACE policy or implementation guidance. It is envisioned that this handbook will be dynamic in that it will be in a state of flux as laws of the land and policies of the Administration and Congress change. The loose leaf design will enable an ease of keeping the handbook current.

The handbook is organized into two parts. This first part is covered by Chapters 1-5 and contains six appendices. After an introductory chapter, this first part covers policies, procedures, and legislation pertaining to storage of water supplies in new and existing Corps reservoir projects and provides several water supply databases. The second part is covered by Chapters 6-9 and contains two additional appendices. This second part focuses on how those supplies are managed through modeling, conservation, forecasting and water control systems.

The report, for development and review purposes only, is currently separated into chapters 1-5 and chapter 6-9. This edition of the handbook covers only chapters 1-5. The additional material is still in the review process and will be published as soon as available.

ACKNOWLEDGMENTS

DECEMBER 1996

This document was developed by the Institute for Water Resources (IWR) with the assistance of the Directorate of Civil Works, Headquarters, U.S. Army Corps of Engineers (HQUSACE). The project manager is Theodore M. Hillyer of IWR's Policy and Special Studies Division, headed by Eugene Z. Stakhiv, Chief. The Director of IWR is Kyle Schilling. A major contributing author was Germaine A. Hofbauer, also of the Policy and Special Studies Division.

Headquarters oversight was provided by Janice E. Rasgus, Policy Review and Analysis Division. David B. Sanford, Jr., as Chief, Policy Review and Analysis Division, provided overall management support.

The author wishes to thank all those from the division and district offices who furnished comments on the draft version of this handbook. The phone calls, faxes, E-mail, and official written comments were all very much appreciated. The responses and concerns expressed, verify the need for a document such as this handbook. Thanks are extended to Charles Joyce of the New England Division; John Burnes, Philadelphia District and Noel Beegle, Baltimore District; Dennis Barnett, South Atlantic Division, Linwood Rogers, Wilmington District, Duane Bailey, Savannah District, and David Luckie of Mobile District; Bill Frechione, Pittsburgh District, Ellen Waggoner, Louisville District, and Robert Smyth and James Roberts of the Nashville District; Robert Post, St. Paul District and Joe Wanielista, Detroit District; James Hanchey, Lower Mississippi Valley Division, Donald Dunn, Memphis District, and Robert Scroeder, New Orleans District; Paul Wemhoener, Omaha District and Donald Hammond of the Kansas City District; Sam Bates of the Southwestern Division, Arthur Birdwell, Fort Worth District, Mike Kielich, Galveston District, and George Losak and Mike Black, Little Rock District; Dennis Wagner of the North Pacific Division and Karen Bahus of the Portland District; Clark Frentzen of the South Pacific Division; and Bill Johnson of the Hydrologic Engineering Center.

Special gratitude is extended to Janet Holsomback of the Tulsa District for her word by word review of the draft and her suggestions for improvement of the standard water supply formats. Special gratitude is also extended to John Breiling of the Portland District for his extensive comments.

Assistance and comments were also provide by the following personnel within HQUSACE: Joann Duman; Zoltan Montvai; Lewis Smith; Norman Edwards; Lillian Almodovar; and last, but foremost, Steve Cone, Chief, Management and Review Office, Policy Review Branch, Policy Review and Analysis Division.

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CHAPTER 1: INTRODUCTION

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A. PURPOSE

The purpose of this study by the U.S. Army Corps of Engineers Institute for Water Resources is to develop a loose leaf "stand alone" water supply handbook. This handbook is to be a comprehensive desk reference for use by the U.S. Army Corps of Engineers (Corps), academia and non-Federal entities interested in water supply planning and management. The focus is two fold: first; on providing water supplies (municipal, industrial, agricultural and emergency/drought contingency) from new and existing Corps reservoir projects, and second; on how those supplies are managed through modeling, water conservation, forecasting and water control systems. It is envisioned that this handbook will be dynamic in that it will be in a constant state of flux as laws of the land and policies of the Administration and Congress change. The loose leaf design will enable an ease of keeping the handbook current. The information in this handbook is for reference purposes, and is not intended as a substitute for HQUSACE policy or implementation guidance.

B. ORGANIZATION OF REPORT

1. Chapter 1: Introduction. This chapter provides the purpose of the report and explains how the report is organized. The report is organized into the various aspects of water supply planning and management. There are two general sections, the first focuses on water supply storage in new and existing reservoir projects and the marketing and contracting for those supplies (Chapters 2-5, accompanied by Appendices A-D) and the second section focuses on the management of those supplies through modeling, conservation, forecasting and water control systems (Chapters 6-9, accompanied by Appendices E and F). These two sections are currently separated into a Final Report (IWR Report 96-PS-4) dated December 1996 for Chapters 1-5 and a Draft Report dated November 1996 for Chapters 6-9 (currently under review). Also provided, as Appendix G, is a listing of definitions and conversion factors and as Appendix H, an index of key words.

2. Chapter 2: Authorities, Policies and Procedures. This chapter presents the legislative landmarks upon which the Corps mission in water supply is founded as well as the major policies and procedures that have evolved from this legislation. Sections are included on Legislation, Municipal and Industrial (M&I) Water Supply, Agricultural Water Supply, Emergency and Drought Contingency Water Supply, and Seasonal Operations for Water Supply. Appendix A and Appendix B accompany this chapter. Appendix A "Legislation" has a compendium of legislation pertinent to water marketing as well as several of the major legislative landmarks in their entirety. Appendix B "Model Formats for Agreements and Permits," contains the three standard water supply agreement formats.

3. Chapter 3: Water Supply Databases. This chapter presents an overview of databases relative to Corps reservoir projects. Sections are included on the Hydrologic Engineering Center's Database Network, Reservoir Database, M&I Water Supply Database and Agricultural Water Supply Database. These latter two databases were developed in the 1980's but were updated by the divisions and districts in March 1996 in response to a request by the Institute for Water Resources (CEWRC-IWR-P) for review of the first draft of chapters 1-5. Appendix C, "Databases," accompanies this chapter. This appendix contains the details of the databases by the following four methods.

- M&I Water Supply Reservoir Database
- M&I Water Supply Agreement Database, Division and District Summaries
- M&I Water Supply Agreement Database by Projects and Agreements
- Agricultural Water Supply Database

4. Chapter 4: Storage Reallocation. The purpose of this chapter and its accompanying appendix, Appendix D, is to provide in more detail the procedures to be followed in the development of a reallocation report. The chapter discusses: the authority and opportunities for reallocations, the policies and procedures to be followed in reallocations, and suggested contents for a reallocation report with examples. Also included is a summary of reallocations that have been performed at Corps reservoir projects.

5. Chapter 5: Water Supply Partnership Kit. This chapter is, in essence, a self-contained pamphlet that can be copied and provided to local sponsors who may desire to enter into water supply agreements. It defines the Corps' mission, authorities, policies and procedures in the area of water supply planning and contracting. It also provides some general background information on the organization and responsibilities of the various levels of the Corps. The pamphlet includes an example of a letter of introduction from the district to the non-Federal sponsor. It is suggested that appropriate model formats be copied and supplied to the prospective sponsor.

6. Chapter 6: Modeling and Water Supply Planning. The purpose of this chapter and its accompanying appendix, Appendix E, is to inform the water supply planners and managers of the types of computer models that can be obtained in the field of water supply planning. The modeling community is discussed. Descriptive data is given for a variety of models as well as where these models can be obtained. Models are subdivided into the following areas: demand forecasting, groundwater, watershed runoff, water distribution system, stream hydraulics, river and reservoir water quality, reservoir/river system operation, and water conservation.

7. Chapter 7: Water Conservation and Planning for Drought. This chapter provides some insight for areas normally outside the Corps traditional role in water supply, namely water distribution and water conservation, as well as the normal role in responding to drought through effective use of Corps reservoirs. Sections are included on water conservation methods, reservoir drought contingency plans, the "National

Study of Water Management During Drought," and on the evaluation of existing water distribution systems.

8. Chapter 8: Water Supply Needs Analysis. This chapter provides a summary of the methods used in forecasting available water supplies and the methods used in forecasting the demand for those supplies. A brief review of the main computer models used in demand forecasting (IWR-MAIN and WEAP), previously described in more detail in Chapter 6, is also presented.

9. Chapter 9: Management of Water Control Systems. This chapter presents a general overview of what is required in the management of water control systems. There are sections on Objectives and Principles of Water Control Management, Development of Water Control Plans, Water Control Data Systems, Management of Water Control Projects, and Preparation of Water Control Documents. An accompanying appendix, Appendix F, provides outlines for four water control documents, Standing Instructions to Project Operators for Water Control, Water Control Plans, Water Control Manuals, and Master Water Control Manuals.

CHAPTER 2: AUTHORITIES, POLICIES AND PROCEDURES

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A. LEGISLATION

1. The Federal Interest. National policy concerning the U.S. Army Corps of Engineers (Corps) role in water supply has been developed over a number of years and is still being clarified and extended by legislation. This policy is based on a recognition that states and local sponsors have the primary responsibility in the development and management of their water supplies. The policy also recognizes a significant but declining Federal interest in the long range management of water supplies and assigns the financial burden of supply to users. The Corps may, however, participate and cooperate with the states and local sponsors in developing water supplies in connection with water resource improvements for construction, operation, maintenance, and modification of Federal navigation, flood control, or multipurpose projects when certain conditions of non-Federal participation are met. A compendium of the legislation pertinent to the Corps water supply program is contained in **Appendix A**. These laws are of major significance to the Corps mission in water supply planning in that they gave the Corps authority to use their reservoirs for surplus water and for municipal, industrial and agricultural water supply. These laws also give the Corps authority to provide emergency water and assist states and local interests in their water supply planning process. Several of these laws have been reproduced in their entirety in **Appendix A.** Four of the more significant legislative landmarks are discussed in the following paragraphs.

2. Section 6, Public Law 78-534. Under Section 6 of Public Law 78-534 (the 1944 Flood Control Act), the Secretary of the Army is authorized to enter into agreements for surplus water with states, municipalities, private concerns, or individuals at such prices and on such terms as he may deem reasonable. These agreements may be for domestic, municipal, and industrial uses, but not for crop irrigation, from surplus water that may be available at any reservoir under the control of the Department of the Army. A copy of Section 6 is provided in **Appendix A**.

3. Section 8, Public Law 78-534.

a. Original Authorization. Under Section 8 of Public Law 78-534 (the 1944 Flood Control Act) Corps lakes in the 17 contiguous Western States in which the reclamation law applies may include irrigation as a project purpose upon the recommendation of the Secretary of the Interior in conformity with reclamation law. Section 8 also provides that the Secretary of the Interior may provide needed irrigation works to make use of irrigation storage. It is the Department of Interior's responsibility to construct, operate, and maintain the additional works needed to utilize irrigation storage as well as enter into agreements for the storage space. When the project costs allocated to irrigation exceeds the estimated amount that can be repaid to the United States by the water users, in accordance with reclamation law, the amount of the excess will be stated and appropriate reference made to the fact that special

authorization by Congress is required. Section 8 was amended by Section 931 of the Water Resources Development Act of 1986 (WRDA '86).

b. 1986 Amendment. Section 931 of Public Law 99-662 (WRDA '86) amends Section 8 of the 1944 Flood Control Act to authorize the Secretary of the Army to allocate water which was allocated in projects operated by the Corps for M&I water supply, and which is not under a repayment agreement, for the interim use for irrigation purposes. A copy of Section 8 of the 1944 Flood Control Act, as amended, is provided in **Appendix A**.

4. Title III, Public Law 85-500.

a. Original Authorization. Title III of Public Law 85-500 (the 1958 River and Harbor Act) is entitled the "Water Supply Act of 1958." Section 301(a), established a policy of cooperation in development of water supplies for domestic, municipal, industrial, and other purposes. Section 301(b) is the authority for the Corps to include municipal and industrial (M&I) water storage in reservoir projects and to reallocate storage in existing projects to M&I water supply. However, as specified in Section 301(d), modifications to a planned or existing reservoir project to add water supply which would seriously affect the project, its other purposes, or its operation, requires congressional authorization. This act was amended by Section 10 of Public Law 87-88 and by Section 932 of Public Law 99-662.

b. Section 10, Public Law 87-88. Section 10 of Public Law 87-88 (the Federal Water Pollution Control Act Amendments of 1961) modified the 1958 Water Supply Act to accept assurances for the use of future water supply as a means of accommodating the construction cost payments for future water supply.

c. Section 932, Public Law 99-662. Section 932 of Public Law 99-662 (WRDA '86), amends the Water Supply Act of 1958, as amended, for Corps projects but not for Bureau of Reclamation projects, by eliminating the 10-year interest free period for future water supply, modifying the interest rate formula, limiting repayment to 30 years, and requiring annual operation, maintenance and replacement costs to be reimbursed on an annual basis.

d. The 1958 Water Supply Act, as Amended. A copy of the 1958 Water Supply Act, as amended, is provided in **Appendix A**.

5. Public Law 88-140. Public Law 88-140, approved 16 October 1963, extended to the non-Federal sponsor of water supply storage the right to use the storage for the physical life of the project subject to repayment of costs. This removed an uncertainty as to the continued availability of the storage space after the 50-year maximum period previously allowed in contracts. A copy of PL. 88-140 is provided in **Appendix A**.

B. MUNICIPAL AND INDUSTRIAL WATER SUPPLY

1. Storage.

a. Definitions. The term "storage" conveys the right to store a resource (water) in a Corps reservoir project without guaranteeing that the resource will be available. The right to withdraw water from the storage space in many cases requires a separate agreement (see following paragraph B1h on water rights). The terms "municipal and industrial," while not defined in the legislative history of the 1958 Water Supply Act, have been defined by the Corps to mean supply for uses customarily found in the operation of municipal water systems, and for uses in industrial processes. The industrial processes can include thermal power generation and mining operations. Agricultural irrigation is not ordinarily found among customers of a municipal system and, therefore, is not eligible to be included in a project under the M&I authority unless so specifically authorized by Congress. Water supply storage will be provided under the authority of the 1958 Water Supply Act, as amended. Services to be provided will normally consist of space in a reservoir for use in regulating the flow of water so that it is useful for water supply purposes, and the provision, where necessary, of facilities in the project structure to provide for the release or withdrawal of stored water for water supply purposes. Repayment agreements for storage space will base the amount of storage on the yield required by the non-Federal sponsor.

b. Cost of Storage. The cost of authorized M&I water supply storage in new and existing projects shall be the total of the construction cost plus interest during construction (if costs are not paid before or during construction) plus interest after the ten-year interest free period (if applicable) allocated to the water supply storage space. This cost shall include (as appropriate), the costs of water supply conduits and the cost of past expenditures for items such as repair, replacement, rehabilitation and reconstruction. The share of the users cost of storage represented in the repayment agreement shall be the same ratio as the share of the users storage space is to the total water supply storage space. An agreement covering all costs allocated to water supply must be approved by both the non-Federal sponsor and the Federal Government prior to construction of a new project, modification of an existing project, or, if no modification is required, the initiation of the use of the storage space in an existing project.

c. New Construction Starts. When water supply is included as a purpose in a project being considered as a new construction start, in unstarted projects previously funded for construction, resumptions, or as a separable element of an ongoing project, current policy is for the project sponsor to repay construction costs allocated to M&I water supply either prior to or during the period of construction. Requests for exceptions to this policy must be forwarded to HQUSACE (CECW-A) for approval prior to preparation of draft feasibility reports.

d. Immediate and Future Use Storage. In the normal context, "immediate use storage" is that storage that the local sponsor must begin payment on immediately upon final approval of the water supply agreement whether or not it is needed, and "future use storage" is all other. Based on provisions in the Water Supply Act of 1958, as amended, not more

than 30 percent of total construction costs can be allotted to water supply for future use. It is, however, Department of Army policy, when practical, to obtain full payment from the non-Federal sponsor for the allocated capital costs of water supply prior to or during construction. For these reasons, storage for future water supply should be formulated only on an exception basis. Requests for such exception should be forwarded to HQUSACE (CECW-A) for approval prior to preparation of draft feasibility reports for new reservoir projects.

e. Single Purpose Water Supply.

(1). Limits. Administration policy prohibits the recommendation of single-purpose water supply projects and limits the percent of M&I water supply storage that can be included in a multiple-purpose project. A proposed project which includes M&I water supply will be defined as a single-purpose water supply project where less than 20 percent of the anticipated national economic development (NED) benefits are attributable to flood control, navigation, environmental restoration, and/or agricultural water supply. (This definition does not apply to proposed modifications or reallocations to existing projects.) An exception is possible if separable, economically justified storage is required to realize flood control, navigation, environmental restoration, and/or agricultural water supply benefits. In this case, at least 10 percent of the total NED benefits must be attributable to these purposes for the project to be considered multipurpose. (EP 1165-2-1).

(2). Funding of Single-Purpose Water Supply Studies. Except for analysis of existing data under Section 22 of the 1974 Water Resources Development Act (Public Law 93-251), the Corps will not use General Investigation funds to conduct single purpose water supply studies, unless specifically directed by Congress and the Administration. The Corps, may, however, conduct single purpose water supply studies for non-Federal interests as a support activity under the provisions of the Intergovernmental Cooperation Act of 1968 (Public Law 90-577). The prohibition against involvement in single-purpose projects does not include reallocations of existing storage or additions of storage to an existing project for the purpose of water supply, providing such action would increase vendible outputs and does not require incremental Federal construction costs.

f. Permanent Rights to Storage. Public Law 88-140 grants permanent rights to storage space to local interests when they have paid the costs of including the storage in the project under an agreement with the Government pursuant to the 1958 Water Supply Act. Their right to use the storage continues as long as the storage is physically available, taking into account equitable reallocations as necessitated by sedimentation. They must also agree to continue to pay their annual share of operation and maintenance costs allocated to the water supply storage space, together with their share of any periodic costs allocated to repair, reconstruction, rehabilitation, or replacement of any features which may be required to operate the project. This right to storage space does not connote a right to water. The right to water must be obtained by separate means (see following paragraph h). Surplus water contracts executed under the authority of Section 6 of the 1944 Flood Control Act, drought contingency water, and seasonal water do not provide permanent right to the storage.

g. Withdrawal and Conveyance Systems. Releases through a dam into the stream are frequently used to convey water from an impoundment to downstream users. It is the user's responsibility to protect the releases made for it from intervening diversion or consumption. The feasibility report must present the evaluation of alternative water supply measures, which must consider the costs of all facilities needed to withdraw and convey water from the various sources to user's system, the impact on project justification of both including or not including these facilities, and the ability and willingness of potential water users to pay for the delivery system. Withdrawal and conveyance facilities may be incorporated as components of Federal projects when they are essential components of plans for effective development and use of water resources for flood control, M&I water supply, agricultural water supply (irrigation), navigation, hydroelectric power production or other purposes in which Federal interest resides. (This provision does not extend to inclusion of local water distribution systems). If, prior to initiation of construction, one or more users can be found to enter into an agreement for repayment of the conduit costs, the conduit may be included as a part of the dam structure. These costs will be identified as a specific water supply costs with 100 percent of the investment costs and the operation, maintenance, repair, reconstruction, rehabilitation, and replacement costs being repaid by the user (EP 1165-2-1). For existing projects with conduits, any remaining unpaid conduit cost shall be prorated just as storage costs are prorated unless one or more entities agree to repay the entire cost.

h. Water Rights. Water rights necessary for the use of the stored water will not be acquired by the Corps but will be obtained as necessary by the water users. The Corps should not become involved in resolving conflicts among water users over the right to use stored water for water supply purposes, but will look to responsible state agencies to resolve such conflicts. Where more than one user is involved in the same project, it is desirable that arrangements be made with a single agency, if practicable, for payment and use of the entire water supply storage. Possible encroachment on water supply released for downstream areas will be carefully considered by the Corps and fully coordinated with the responsible local interests as well as the state agency responsible for the administration of water rights and water laws. Prior to entering into an agreement, the non-Federal sponsor shall, where a requirement of State law, provide proof of a water right for the water to be stored or released from the Corps project. For additional information on water rights see Chapter 7 of this report and EP 1165-2-1.

i. Water Quantity and Quality. Water supply agreements under the authority of the 1958 Water Supply Act are for storage space only. The Federal Government makes no representation with respect to the quantity or quality of water and assumes no responsibility for the treatment, or availability of the water.

2. Reallocations. A change in the use of storage in an existing reservoir project from its present use to M&I water supply (reallocation) is authorized by the Water Supply Act of 1958. Reallocations or addition of storage which would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes, shall be made only upon the approval of Congress. Providing the above criteria are not violated, fifteen (15) percent of total storage capacity allocated to all

authorized project purposes or 50,000 acre feet, whichever is less, may be allocated from storage authorized for other purposes or may be added to the project to serve as storage for M&I water supply at the discretion of the Commander, USACE. For reallocations up to 499 acre-feet the Commander, USACE has delegated approval authority to the division commander. Reallocations which exceed the Commander's authority may be approved at the discretion of the Secretary of the Army if such reallocations do not require Congressional approval as described above. As a result of the present climate where it is becoming increasingly difficult to formulate and construct multipurpose reservoirs, reallocation of reservoir storage from an exiting authorized purpose to M&I water supply is becoming an increasingly viable option to district planners. Because of this increased viability, a separate chapter in this handbook (Chapter 4 and accompanying Appendix D) is devoted to reallocations.

3. Addition of Storage. When water supply storage is added to an existing project and existing storage space is not reallocated, a willingness to pay concept will be used to assign costs to the new water supply purpose. Under this concept the non-Federal sponsor shall be responsible for paying 100 percent of the new construction costs allocated to water supply to be paid during the construction period of the modification plus an amount equal to 50 percent of the sponsor's savings. The sponsor's savings are defined as the cost of the most likely alternative to be constructed by the non-Federal sponsor in lieu of the proposed modification, less the cost of the modification attributed to water supply.

4. Reduced Price for Certain Storage.

a. Applicability. Section 322 of WRDA '90 authorized a reduced price of water for low income communities. The provisions are applicable only to those cases when the updating methodology is utilized to determine the price of water and is discretionary in that the ASA(CW) may, but is not required to offer the lower price. Section 322 should be used only for public water supply needs consistent with the purposes of the Water Supply Act of 1958. Should questions concerning the applicability of the provisions to specific entities and/or purposes arise, HQUSACE (CECW-A) should be contacted prior to negotiations.

b. Definition of Community. Low income communities are identified by the law as communities with a population of less than 20,000 which are located in counties with a per capita income of less than the per capita income of two-thirds of the counties in the United States. A community may be any sector of the public located in one or more qualifying counties which is served by a single M&I water supply system. In many cases, the entity providing the water service may not be an actual city, town or other governmental jurisdiction, but rather a rural water system or cooperative. Only water systems which are publicly licensed and/or controlled and regulated by state water laws are eligible for repayment agreements under this section. Ownership of such systems may, however, be publicly or investor owned. The right to enter into an agreement is limited to the actual water supply system and not to a larger water supplier or state water agency which provides water to smaller systems. Population is to be based on the latest decennial census figures unless annual census estimates have been made and published. Not all water suppliers will serve communities with census data, therefore, estimates

of population based on numbers of residential hookups and county average persons per household should be used. A community, for the purposes of this provision may extend across county boundaries, however, all counties served must qualify as low income counties to obtain the reduced price allowed under this Section.

c. Data Source for Per Capita Income. The data source for the per capita income shall be the same as that used for the ability to pay for flood control. These data will be published annually by HQUSACE (CECW-P) in an engineer circular. The factors are based on county per capita personal income for each of the last three calendar years for which information is available. For example, for Fiscal Year 1995, such information is based on the years of 1990-92. This source of data is published yearly in the Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business.*

d. Price. The price to be charged is the greater of (1) benefits foregone or, (2) the updated cost of storage but not to exceed $100 per acre foot of storage space. Individual contract prices, once approved, are not subject to further indexing. The $100 per acre-foot of storage set forth in the authorization is applicable only to contracts signed in fiscal year 1991. This price shall be adjusted on 1 October every year based on the Consumer Price Index for the September immediately preceding the fiscal year. This price index is published monthly in the Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*. The September index is published in the October issue and is normally available in December.

5. Surplus Water.

a. Definition. An agreement for "surplus water" conveys the right to a specific resource (water) out of a Corps project that the sponsor has acquired the rights to by some other means. The authority to sell surplus water was granted to the Corps by Section 6 of the 1944 Flood Control Act, as amended. Under this authority, the Secretary of the Army is authorized to make contracts for surplus water with states, municipalities, private concerns, or individuals at such prices and on such terms as he may deem reasonable. Surplus water will be classified[1] as water stored in a Department of Army reservoir which is not required because the authorized need for the water never developed or the need is reduced by changes which have occurred since authorization or construction.

b. Limitations. Surplus water declarations will only be made when related withdrawals would not significantly affect authorized purposes. Agreements covering surplus water will normally be for small amounts of water and for temporary use as opposed to storage reallocations and a permanent right to that storage. Terms of the agreements are normally for five (5) years, with an option for a five (5) year extension, subject to the space being needed for the authorized purposes, or the authorized purpose is deauthorized. All such agreement extensions will be subject

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[1]Change in definition from that of ER 1105-2-100, Part 4 Section VII, Paragraph 4-32b(1), recommended by Office of Chief Counsel, 27 February 1996.

to recalculation of reimbursement. Use of the Section 6 authority is allowed only where non-Federal sponsors do not want to purchase storage because: use of the water is desired for a short term only; or use would be temporary pending development of the authorized use and reallocation of storage is not appropriate.

c. Reporting Requirements. Surplus water agreements will be accompanied by a brief letter report covering topics similar to those of storage reallocation reports (see Chapter 4) and shall include how and why the storage is determined to be surplus. The scope of the letter report should be commensurate with the amount of storage under review, the time period of use, and economic and environmental considerations. The views of the affected state(s) will be obtained, as appropriate, prior to consummating any agreement using the Section 6 authority. These views shall be included in the letter report. Declaration of surplus irrigation water in the 17 Western states (see Paragraph C1 of this chapter) will require appropriate coordination/consultation with the Department of the Interior (Bureau of Reclamation).

d. Cost. The annual price deemed reasonable for surplus water supply is to be determined by the same procedure used to determine the annual payment for an equivalent amount of reallocated storage (see Chapter 4). To this annual cost will be added an estimated annual cost for operation, maintenance, repair, replacement, rehabilitation and reconstruction. The total annual price is to be limited to the annual costs of the least costly alternative, but never less than the benefits foregone or, in the case of hydropower, revenues foregone. For certain small withdrawals (including a group of separate users at a specific project), under Section 6 authority, a standard minimum charge or standard unit charge should be established and applied for all of the numerous withdrawals. All proposals for establishment of such standard charges must be submitted to HQUSACE (CECW-A) for approval.

6. Repayment Provisions.

a. Interest Rate.

(1). General. The Federal discount, repayment and reimbursement, hydropower, and water supply interest rates are published yearly by HQUSACE (CECW-PD) in the form of an economics guidance memorandum. The most recent of these memorandums was issued in November 1996 and is for use in Fiscal Year 1997. The discount rates applicable to water supply are provided in the following paragraphs.

(2). Water Supply Act of 1958. Shown in **Table 2-1** are the interest rates which have been determined by the Department of the Treasury in accordance with provisions of the Water Supply Act of 1958, Section 301(b). These rates are applicable to projects under construction with authorized water supply storage and reallocations approved prior to the effective date of WRDA '86 (17 November 1986).

Table 2-1
1958 Water Supply Act Interest Rates

Fiscal Year	Interest Rate%	Fiscal Year	Interest Rate%	Fiscal Year	Interest Rate%	Fiscal Year	Interest Rate%
1959	2.670						
1960	2.699	1970	3.342	1980	7.250	1990	10.075
1961	2.632	1971	3.463	1981	8.605	1991	9.920
1962	2.742	1972	3.502	1982	9.352	1992	9.737
1963	2.936	1973	3.649	1983	10.051	1993	9.503
1964	3.046	1974	4.012	1984	10.403	1994	9.319
1965	3.137	1975	4.371	1985	10.898	1995	9.226
1966	3.222	1976	5.116	1986	11.070	1996	9.134
1967	3.225	1977	5.683	1987	10.693	1997	9.012
1968	3.253	1978	6.063	1988	10.371	1998	
1969	3.256	1979	6.595	1989	10.250	1999	

(3). The Water Resources Development Act of 1986. The interest rates shown in **Table 2-2** have been determined by the Department of the Treasury in accordance with provisions of Section 932 of WRDA '86. These rates shall be used for new projects not under construction as of 17 November 1986 (where repayment is made over a 30-year period), storage reallocated to M&I water supply (including reallocations under the authority of Section 322 of WRDA '90) and for surplus water, drought contingency and seasonal use of water agreements. The interest rates shall be readjusted every five years. The authorized one-eighth of one percentage point for transaction costs (see Section 106 of WRDA '86) has already been added to the Department of Treasury furnished rates in the values shown in Table 2-2.

Table 2-2
1986 Water Resources Development Act Interest Rates

Fiscal Year	Interest Rate (%)	Fiscal Year	Interest Rate (%)	Fiscal Year	Interest Rate (%)
1987	7.625	1992	8,125	1997	7.125
1988	10.000	1993	7.500	1998	
1989	9.250	1994	6.125	1999	
1990	8.250	1995	7.750	2000	
1991	9.125	1996	6.750	2001	

b. Repayment Period.

(1). General. For new projects, current policy is to repay all costs during the period of construction. For existing projects and for reallocated storage (including reallocations under the authority of

Section 322 of WRDA '90), the maximum repayment period used to calculate annual payments will be 30 years from the date in which storage is available. For addition of storage, the costs are to be repaid within 25 years from completion of project modification, or if water supply is already a project purpose, within 30 years from the time the project was first used for water supply.

(2). Date of Availability.

((a)). Existing Storage. For existing storage, the date the storage is available will be the plant-in-service date or the date the first storage repayment agreement is signed, whichever is later.

((b)). Reallocated Storage. For reallocated storage, the date the storage is available will generally be the date the repayment agreement is signed by the ASA(CW) or his duly authorized representative.

c. Interest Free Period. A ten-year interest free period for future use water supply shall be available only for authorized M&I storage in projects completed or under construction as of November 17, 1986. The ten-year interest free period is not applicable for agreements in existing projects where the plant-in-service date was set more than 20-years ago or for reallocated storage.

d. Annual Operation and Maintenance Expense. Non-Federal sponsors (including those determined as being a low-income community under the authority of Section 322 of WRDA '90) are responsible for all operation and maintenance expenses allocated to water supply. These costs must be paid yearly and should be paid in advance based on an estimated expenditure. Appropriate adjustment will be made at the end of the year. These annual billings are to be between the district and sponsor and approval and/or review by higher authority is not required.

e. Repair, Replacement, Rehabilitation, and Reconstruction Costs. Costs allocated to water supply which are associated with repair, replacement, rehabilitation and reconstruction are to be paid by all non-Federal sponsors either during construction of such item or in lump sum, with interest, upon completion of construction. The non-Federal sponsor should be encouraged to establish a sinking fund in order to cover these costs should they occur. Costs expended in existing projects for these programs prior to entering into a repayment agreement shall be added to the initial project investment cost for repayment purposes except in the case of reallocated storage (see Chapter 4).

f. Dam Safety Program Costs.

(1). Costs. Costs of project modification for dam safety shall be in accordance with the provisions of Section 1203(a)(1) of WRDA '86. Under these provisions, fifteen (15) percent of the costs of the modification are allocated among purposes and shared with appropriate project sponsors in the same percent as the joint-use expenditures are allocated in the original cost allocation. Where water supply storage is reallocated, the terms of the reallocation agreement will form the basis for the assignment of dam safety costs. The portion of the fifteen (15) percent of the dam safety modification cost assigned to the water supply purpose would be allocated in the same manner as was used as the

basis for the assignment of costs. For example, if a dam safety modification cost $20,000,000, and the unit of water supply storage assigned to the sponsor was 2.5% of the joint-use costs, then the water supply sponsor would be required to pay ($20,000,000 x 0.15 x 0.025) or $75,000 of the dam safety modification cost.

(2). Repayment Period. Recovery of the non-Federal share of the dam safety modification cost will be determined by the current arrangement for project cost recovery. If the current agreement does not contain a provision for recovery of this cost, it will need to be modified, or a new agreement signed to cover the dam safety cost sharing. If no current agreement covers this cost, the sponsor may elect to repay the cost, with interest, over a period up to 30 years in accordance with provisions of Section 1203(a)(2) of WRDA '86. The interest rate to use for repayment shall be as prescribed in Section 1203 (which is the same as the water supply rate prescribed in Section 932 of WRDA '86) and shall remain constant for the repayment period.

7. Processing Repayment Agreements.

a. Disposition of Revenues. All revenues received from water supply repayment agreements shall be deposited in the Treasury of the United States as miscellaneous receipts.

b. Model Agreement Format for Water Supply Storage. Provided in **Appendix B**, is the standard format to be used when entering into water supply storage agreements under the authority of the 1958 Water Supply Act, as amended. Payment provisions in this format are for new projects, unused storage space in existing projects, added storage and for all reallocated storage (including storage reallocated under the low-income community provisions of Section 322 of WRDA '90). Bracketed language may be changed as appropriate in particular circumstances and material peculiar to either present or future use storage may be deleted if such storage is not included in the contract. For projects where construction was initiated after 31 December 1971 (date of enactment of Public Law 91-611), non-Federal parties to water storage agreements must meet the requirements of Section 221 of the Flood Control Act of 1970 (42 U.S.C. 1962-5b), as amended.

c. Disclosure of Lobbying Activities. Water supply storage agreements will be accompanied by a signed "Certificate Regarding Lobbying" and, if applicable, a completed "Disclosure of Lobbying Activities." These forms are provided as Exhibit E to the Water Storage Agreement. These forms must be thoroughly discussed with the sponsor prior to signature by the District Engineer. Completed forms will be attached to the agreement prior to its signature by the District Engineer, and kept on file by the district for later submission to HQUSACE, if requested.

d. Model Agreement Format for Surplus Water. Provided in **Appendix B**, is the standard format to be used when entering into surplus water agreements. The agreement can also be tailored to the format of a storage agreement. Terms of the agreement are normally for five (5) years, with an option for a five (5) year extension, subject to the space being needed for the authorized purpose, or the authorized purpose is deauthorized. All such agreement extensions will be subject to recalculation of reimbursement.

e. Submittal and Review.

(1). Development of Draft Agreements. It is recognized that in most cases the model agreements provided in Appendix B will require minor modifications and this is accepted. However, during initial negotiations leading to a draft agreement, significant departures from policy, the model formats, or any complex interpretations of policy or legislation, are to be submitted to HQUSACE (CECW-A) before spending the time and resources to negotiate a draft agreement. All draft agreements should be discussed with the local sponsor prior to submittal of the draft to higher authority. Any and all departures from the draft agreements are to be detailed in a paper which is to accompany the draft.

(2). Approval Authority for Storage Agreements. The first storage agreement on any project will be approved by the ASA(CW) as will all agreements which deviate from the approved model (other than editorial changes). Approval authority for subsequent agreements and reallocation reports which do not require Congressional approval has been delegated to the Commander, USACE, and to division and district commanders in accordance with the instructions provided on **Table 2-3**. Where the 4000 ac-ft/10% limit expressed in footnote 5 of the table has been or will soon be exceeded, the request for extending the delegation of authority for the next 4000 ac-ft/10% increment will be submitted for approval. The reallocation report will document both the immediate needs and impacts as well as the prospects for utilization of and impacts caused by, placing the entire increment under a repayment agreement. When approval is received, the delegations as laid out in the table will remain in effect for the entire increment.

(3). Approval Authority for Surplus Water Agreements. Procedures similar to those described in the preceding paragraph for water storage shall be applied to surplus water agreements. Approval authority shall be in accordance with the instructions provided in **Table 2-4**. Agreements submitted to HQUSACE (CECW-A) shall be accompanied by a brief letter report (see Paragraph B5c of this chapter).

(4). Limits on Policy Changes. The cutoff point for incorporation of policy changes into water supply agreements will be the date of approval of the draft agreement by the ASA(CW). An approved agreement will be exempt from application of policy changes provided a final agreement is signed by the non-Federal sponsor within six months of the date of approval of the draft agreement. An exception may be granted to the six-month limitation, however, a request for an exception should accompany the draft agreement and must contain a complete justification.

Table 2-3
Water Supply Storage Agreement Approval Authority[1]

Drafts

Acre-Feet[2]		Storage Agreements[3]		
From	To	Without Reallocation	With[4] Reallocation	Reallocation Reports[5]
0	99	District[6]	District[6]	District
100	499	Division[6]	Division[6]	Division
500	999	Division[6]	ASA(CW)	HQUSACE[7]
1000	& up	ASA(CW)	ASA(CW)	HQUSACE[7]

Finals[8]

Acre-Feet[2]		Storage Agreements	
From	To	Without Reallocation	With[4] Reallocation
0	499	District	District
500	999	District	HQUSACE
1000	& up	HQUSACE	HQUSACE

Notes:
[1] A copy of all approved agreements will be provided to ASA(CW).

[2] In any particular agreement, the acre-feet of storage needed to produce the water under agreement on a dependable basis.

[3] At projects where storage agreements have been previously approved. The first storage agreement on any project will be approved by the ASA(CW).

[4] For reallocations which do not require Congressional approval, i.e., no significant effect on other authorized purposes and/or no major structural or operational changes.

[5] When the cumulative amount of storage reallocated exceeds the lesser of 4000 ac-ft of 10% of available storage, reports will be submitted to ASA(CW) prior to approval.

[6] When using approved model or approved model with editorial changes only. Agreements involving other changes will be submitted to ASA(CW) for approval.

[7] Submitted to ASA(CW) with the draft agreement prior to approval.

[8] When using the approved draft agreement and local signature within 6 months of draft approval. If beyond 6 months or if changes are made, the final agreement will be resubmitted for approval to the office with approval authority for the draft. If the proposed agreement involves changes other than editorial changes, the agreement will be submitted to ASA(CW) for approval. The ASA(CW) reserves the right to retain approval authority of any final agreement he approved as a draft. In cases where that right will be exercised in advance, the draft agreement will so note.

Table 2-4
Surplus Water Agreement Approval Authority[1]

Drafts

Acre - Feet [2]			
From	To	Agreement [3]	Letter Report [4]
0	99	District [5]	District
100	499	Division [5]	Division
500	999	Division [5]	HQUSACE [6]
1000	& up	ASA(CW)	HQUSACE [6]

Finals [7]

Acre - Feet [2]		
From	To	Agreement [3]
0	499	District
500	999	District
1000	& up	HQUSACE

Notes:
[1] A copy of all approved agreements will be provided to the ASA(CW).

[2] The storage needed to produce the agreed to water on a dependable basis.

[3] Not affecting authorized purposes (water not being used for an authorized purpose). When surplus water agreements involve water being used for an authorized purpose, they will be treated like a reallocation agreement and report (see Table 2-4).

[4] When the cumulative amount of storage reallocated exceeds the lesser of 4000 acre-feet or 10% of available storage, reports will be submitted to ASA(CW) for approval.

[5] When using approved model or approved model with editorial changes only. Agreements involving other changes will be submitted the ASA(CW) for approval.

[6] Submitted to ASA(CW) with the draft agreement prior to approval.

[7] When using the approved draft agreement and local signature within 6 months of draft approval. If beyond 6 months or if changes are made, the final agreement will be resubmitted for approval to the office with approval authority for the draft. If the proposed agreement involves changes other than editorial changes, the agreement will be submitted to ASA(CW) for approval. The ASA(CW) reserves the right to retain approval authority of any final agreement he approved as a draft. In cases where he will exercise that right in advance, the draft agreement will so note.

C. AGRICULTURAL WATER SUPPLY

1. Reclamation Areas. The Reclamation Act of 1902, Public Law 57-161, established irrigation in the West as a national policy. Storage of water for irrigation of agricultural lands, whether to meet the entire needs or to supplement natural supplies, may be considered in plan formulation. The Reclamation Act authorized the Secretary of the Interior to locate, construct, operate and maintain works for the storage, diversion, and development of waters for the reclamation of arid and semi-arid lands in the Western States (32 Stat. 388, 43 U.S.C. 1457). Section 8 of the 1944 Flood Control Act provides that Corps reservoirs may include the irrigation purpose upon the recommendation of the Secretary of the Interior in conformity with Reclamation Law. The Chief of Engineers considers that Section 8 applies only in the 17 western states to which the Reclamation Law applies. The 17 western states are defined as those 17 contiguous states lying west of the 98th meridian. In these 17 western states, in conformity with Reclamation Law, the repayment arrangements and agreements for irrigation water from Corps reservoirs is administered by the Bureau of Reclamation.

2. Non-Reclamation Areas. Subsection 103(c)(3) of WRDA '86 establishes the cost sharing that is applied to agricultural water supply outside of the 17 Reclamation states. In non-Reclamation states, non-Federal sponsors must provide 35 percent of the joint and separable construction costs assigned to this purpose, and 100 percent of the joint and separable costs of operation, maintenance, repair, reconstruction, rehabilitation, and replacement, allocated to this purpose. Non-Federal sponsors requesting irrigation capacity as a project purpose should provide a firm expression of intent to use and pay for the requisite storage, should obtain, as necessary, water rights or their equivalent, from the State, and posses legal power to enter into a repayment agreement with the Federal government.

3. Interim Use of M&I Water Supply Storage for Irrigation.

a. Authority. Section 931 of WRDA '86 provides that for any reservoir project constructed and operated by the Corps, the Secretary of the Army is authorized to allocate storage which was allocated in the project for M&I water supply, and which is not under contract, for the interim use for irrigation purposes.

b. Reporting Requirements. Repayment agreements for use of water supply storage for irrigation use under the authority of Section 931 of WRDA '86 shall follow the same reporting requirements as those for surplus water agreements (see Paragraph B5c of this chapter). A letter report shall accompany the draft agreement. The report shall document the exact use of the water to assure that it will not be used for M&I purposes, explain the manner in which the annual costs in the agreement were developed and show the impacts of the interim use of the water supply for irrigation on the currently existing uses of such storage. The letter report will also include an appropriate analysis describing and assessing any adverse and/or beneficial environmental impacts that are expected to result from the interim use of storage for irrigation purposes, that were not discussed in the Final Environmental Impact Statement for the project.

c. Repayment Provisions.

(1). Cost Sharing. The cost to the non-Federal sponsor under Section 931 agreements shall be 35 percent of the original project investment cost allocated to M&I water supply (for the block of storage to be used for irrigation). The project water supply interest rate in effect when the project went under construction is to be used for all interest computations including the repayment amortization schedule for the interim use storage agreement. In the case of projects that went under construction after 17 November 1986, the rate will be as established in Section 932 of WRDA '86 and will be adjusted at 5-year intervals (see Table 2-2). The period of analysis for computing the annualized payment shall be 30 years. The non-Federal sponsor shall also be responsible for 100 percent of the operation and maintenance expense and the repair, replacement, rehabilitation, and reconstruction costs allocated to the storage space being placed under agreement. The term of the agreement for this interim use shall not exceed five (5) years. An option for incremental five year extensions is allowed with the basic agreement only if recalculations for annual operation and maintenance expense and repair, replacements, rehabilitation and reconstruction costs are performed at the end of each five year increment.

(2). Annual Cost Computation. The annual operation and maintenance expense for the required interim use storage/water may be estimated if the expected annual operation and maintenance cost is relatively low and would not justify annual billing procedures. Otherwise, reimbursement of applicable actual project operation and maintenance expenses would be required. An estimated annual repair replacement, rehabilitation and reconstruction cost is to be determined and included as a part of the annual repayment costs.

(3). Credit. Future sponsors for municipal and industrial use of the storage space shall not receive any credit from the interim use payments toward repayment of investment cost when such interim use is for agricultural water supply.

4. Processing Repayment Agreements. Processing repayment agreements for agricultural water supply outside of the 17 western states and for Section 931 agreements shall be the same as for surplus water (see Paragraph B7e(3) and Table 2-4 of this chapter).

D. EMERGENCY AND DROUGHT CONTINGENCY WATER SUPPLY

1. Emergency Water.

a. Clean Drinking Water. Public Law 84-99 as amended by Section 82 of Public Law 93-251, provides the Chief of Engineers with discretionary authority to provide emergency supplies of clean water, on such terms as he determines to be advisable, to any locality which he finds is confronted with a source of contaminated water causing or likely to cause a substantial threat to the public health and welfare of the inhabitants of the locality. Work under this authority requires a request from the governor of the state where the source of water has become contaminated and is normally limited to 30 days. Loss of water source or supply is not correctable under this authority.

b. Disaster Relief. Public Law 95-51 further amended Public Law 88-49 to provide the Secretary of the Army authority under certain statutory conditions to construct wells and to transport water to farmers, ranchers, and political subdivisions within areas the Assistant Secretary of the Army for Civil Works, determines to be drought distressed. A written request for assistance may be made by any farmer, rancher or political subdivision within a distressed area. Corps assistance will only be considered when non-Federal sponsors have exhausted reasonable means for securing necessary water supplies (within the limits of their financial resources) including assistance from other Federal agencies.

c. Restrictions. Evaluations of requests for assistance are to be tempered by the fact that Corps assistance is supplemental to state and local efforts. Long term solutions to water supply problems are the responsibility of state and local interests. The authorities are not to be used to provide drought emergency water assistance in cases where a livestock owner has other options. Those options include raising funds from private sources through a loan and by selling all or part of the herd, even though the sale may be at deflated prices, to purchase water or facilitate relocation of the animals to an area where water is available. Federally-owned equipment must be used to the maximum extent possible. Assistance can be provided to transport water for consumption. The cost of transporting water is provided by the Corps; however, cost of purchasing and storing water is the non-Federal sponsor's responsibility. In addition, assistance can be provided to construct wells. Federal costs for well construction must, however, be repaid.

d. Emergency Water Supply Planning. In accordance with an interagency agreement between Defense and Interior, dated 8 March 1983, the Department of the Army has absorbed emergency water supply functions which formerly were a responsibility of the Department of the Interior under E.O. 11490. That executive order, issued 28 October 1969 (and amended by E.O. 11921 issued 11 June 1976) provided that the Secretary should: prepare a national emergency plan and develop preparedness programs covering all usable waters, from all sources within the jurisdiction of the United States, which can be managed controlled and allocated to meet emergency requirements; give appropriate consideration to emergency preparedness factors in the conduct of regular agency functions; and be prepared to implement, in the event of an emergency, the prepared plan for such event. The transferred responsibilities

complement previously held authorities and will permit more comprehensive and efficient management of water as a scarce resource during an emergency. This program is managed by CECW-O.

2. Drought Contingency Water.

a. Authority. Water control managers will continually review and adjust water control in response to changing public needs. Many areas of the country face chronic or serious drought conditions. Preparation of drought contingency plans is, for Corps projects with controlled reservoir storage, a part of the Corps overall water control management activities. Drought and other emergencies affecting domestic, municipal and industrial water supplies will likely generate requests for water stored in Corps reservoirs. When these situations occur, requests may require immediate action. Section 6 of the Flood Control Act of 1944 provides adequate authority to permit temporary withdrawal of water from Corps projects to supplement normal supplies in time of drought. In providing surplus water under the Section 6 authority, the preferred approach is for a state or political subdivision to enter into an agreement with the Secretary of the Army and to agree to act as wholesaler for all of the water requirements of individual users. This places the local governments in a position to help their citizens during difficult times and minimizes the potential for problems that could arise if the Secretary was to determine who was entitled to shares of surplus water based on assessments of local needs. The Drought Contingency Plan appendix of the Water Control Manual (see Chapter 9 and Appendix F) for each Corps reservoir should assess the availability of surplus water (storage) for emergency water supply withdrawals.

b. Cost. The price for drought contingency water supply will be determined in the same manner as for surplus water (see paragraph B5 of this chapter) but never less than $50 per agreement per year. All revenues from drought contingency agreements shall be deposited in the Treasury of the United States as miscellaneous receipts.

c. Submittal and Review. For projects with approved Drought Contingency Plans the District Commander has approval authority for emergency demands which require less than 100 acre-feet of storage and the Division Commander for demands which require from 100 to 499 acre-feet. These agreements should follow the format for surplus water agreements except the term of the agreement shall not exceed one year. Requests for larger amounts and agreements not following the standard, should be submitted to HQUSACE (CECW-A).

d. Processing Repayment Agreements. All situations should be the subject of a Section 6 agreement (**Appendix B**).

3. Declaration of a State of Emergency. For those locations where the Governor of the state has declared a state of emergency due to the drought, small amounts of surplus water (withdrawals from 50 acre-feet of storage or less) for domestic and industrial uses and not for crop irrigation purposes may be made available under Section 6 of the Flood Control Act of 1944. Project managers are authorized to sign the agreements via the form provided in **Appendix B**. However, if the water user will be installing water lines or other facilities or equipment, then an appropriate real estate instrument must be issued under ER 405-1-12.

E. SEASONAL OPERATIONS FOR WATER SUPPLY

1. Legislative and Policy Guidance. General Congressional authority for seasonal operation for water supply as an alternative to reservoir storage, (not to include unscheduled emergency drought conditions, see paragraph D) has not been established to date. Where not specifically authorized, seasonal operation of a project for water supply may be conducted consistent with authorized project purposes and law, subject to hydrologic and hydraulic capability of the project, in order to provide an intermediate seasonal source of water supply. This water supply could be used to enhance groundwater replenishment, to increase downstream flows, or to otherwise enhance the general usage of the project for M&I purposes. Such modifications, however, must be consistent with authorized project purposes and law and must be documented in the project water control plan in accordance with ER 1110-2-240.

2. Repayment Provisions.

a. Project Costs to be Repaid. Pricing policy for changes in project operations for seasonal M&I water supply shall require the non-Federal sponsor to pay to the Federal government the following costs:

(1). One hundred (100) percent of the new construction costs and new operational costs including the cost of revising the water control plan;

(2). A share of joint use operation, maintenance, rehabilitation, and replacement cost based on use-of-facilities cost allocation;

(3). The value of benefits foregone;

(4). The value of damages or losses incurred by others as a result of the changed operations (may be the same as (3) above); and

(5). A partial reimbursement of the existing Federal investment in the project in the form of a payment in an amount equal to one-half of the savings to the benefited non-Federal interest (the cost of the least cost alternative minus the specific costs of the modifications listed in (1) through (4) above).

b. Limit on Cost. The cost to the non-Federal sponsor, excluding annual O&M costs, should not exceed the costs derived for permanent reallocation as described in paragraph A2b.

3. Processing Repayment Agreements. Agreements for seasonal water will be processed similar to those for storage space (see Paragraph B7 of this chapter).

F. REFERENCES

The following U.S. Army Corps of Engineers Headquarters publications:

EM 1110-2-1304, 12 October 1982. Civil Works Construction Cost Index System, Chapters 1-2.

EP 1165-2-1, 15 February 1996. Digest of Water Resources Policies and Authorities.

ER 405-1-12, 20 November 1985. Real Estate Handbook, Chapters 23-27.

ER 1105-2-100, 28 December 1990. Guidance for Conducting Civil Works Planning Studies.

ER 1110-2-240, 8 October 1982. Water Control Management.

CECW-PA/CECW-E, 4 April 1994. Policy Guidance Letter No. 43, Cost Sharing for Dam Safety Assurance.

CECW-PD Memorandum, November 1996. Economic Guidance Memorandum 97-2: Fiscal Year 1997 Interest Rates.

CHAPTER 3: WATER SUPPLY DATABASES

DECEMBER 1996

A. DATABASE NETWORK

1. Network Concept. A database network concept was developed by the Corps of Engineers (Corps) Hydrologic Engineering Center (HEC), Davis, California. This concept is contained in *HEC Reservoir Database Network* draft report dated March 1994. The network concept is illustrated in **Figure 3-1**. At the center, or hub, of the network is a database, NETID, that contains identifying information for all Corps reservoirs including locks and dams. Each reservoir has over 20 unique identifiers; e.g., river, state, county, hydrologic unit, latitude and longitude, congressional district, zip code, etc. Each identifier provides a key piece of information that may be used to access information in other databases and which can then be used for a variety of planning and management purposes. The concept of accessing other databases is also illustrated in Figure 3-1 with spokes reaching out from the center. Without some common identifier to link the databases with the reservoirs the information in the other databases cannot be accessed. For additional information on this network contact Mr. Bill Johnson at CEWRC-HEC, phone (916) 756-1104.

2. Databases Used. The databases currently in the network and used for the standard reports come from a variety of sources. These databases are as follows:

a. Reservoir Network Identification Information (NETID). This database contains location and identification information to enable Corps reservoirs to be linked with other databases. This database has been developed and is maintained by HEC (CEWRC-HEC) by Bill Johnson, phone (916) 756-1104.

b. Water Control Data (NEWPERT). Originally developed by the Hydraulics and Hydrology Branch, Headquarters (CECW-EH) from a survey of district offices, this database contains hydrologic data about floods, runoff, water control and reservoir storage. For additional information on this database, contact Dick DiBuono (CECW-EH) by phone at (202) 761-8511.

c. Authorized and Operating Purposes of Corps of Engineer Reservoirs (LEGAUTH). This database was developed in response to Section 311 of the Water Resources Development Act of 1990 (see following Paragraph B3). It contains the authorizing public laws, referenced House and Senate documents and excerpts from the authorizing legislation. It was developed and is maintained by HEC by Bill Johnson, phone (916) 756-1104.

d. National Inventory of Dams - Corps of Engineers Dams (COEDAM). This database is a subset, with later additions, of the National Inventory of Dams database (1982) and contains only Corps dams. The data describes the structural, hydrologic and other physical features of the dam and reservoir. This database is maintained in Headquarters (CECW-EP) by Wayne King, phone (202) 761-8689.

e. Hydroelectric Power at Corps of Engineers Projects (CEHYDRO). This database on hydroelectric power was developed and is maintained by the Institute for Water Resources (CEWRC-IWR-R) by Mike Walsh, phone (703) 428-7087.

f. Natural Resources Management System (NRMS). This system contains a number of databases that define recreational facilities and visitation at Corps projects including reservoirs. This system is maintained at Headquarters, in the Operations, Construction and Readiness Division (CECW-ON) by Judy Rice, phone (202) 761-1796.

g. Water Supply Contracts (WSCONT). When this database was originated, the phrase "water supply contract" was used, this has since been changed to "water supply agreement." No one in the Corps currently has the responsibility for this database or to keep it updated. The database that is contained in the HEC network was developed by CECW-P in the late 1980's. This database was updated by CEWRC-IWR-P through a survey of divisions and districts in March 1996 to reflect conditions current at that time. This is the primary database that relates to storage for municipal and industrial water supply. Detailed information on this database is contained in following Paragraph C. For additional information, contact Ted Hillyer (CEWRC-IWR-P), phone (703) 428-6140.

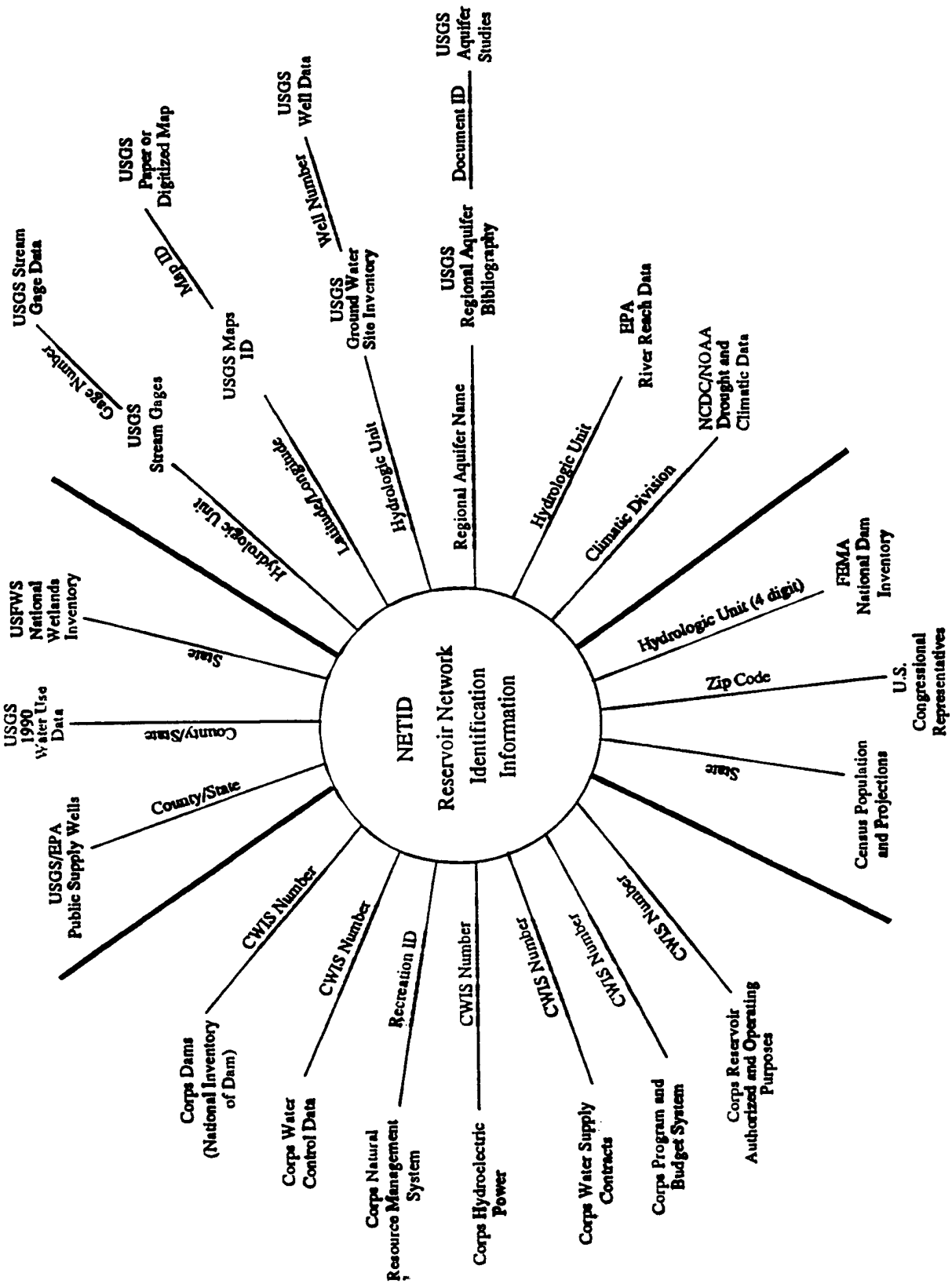


Figure 3-1
HEC Reservoir Database Network

B. RESERVOIR DATABASE

1. Definition of "Reservoir". The word "reservoir" as generally used in Corps terminology, can be either a dam and reservoir project or a lock and dam project for which water control management is routinely required to control either water level and/or water flow. Excluded from this list are other kinds of water control structures such as river diversion structures and pumping stations that do not routinely impound water. Water for municipal and industrial, agricultural, seasonal, low flow, and for contingencies is made available from lock and dam projects as well as dam and reservoir projects. However, "storage" for municipal and industrial water supply purposes is found only in dam and reservoir projects.

2. Authorized Purposes. Most purposes served by Corps reservoirs fall into eight general categories; flood control, navigation, hydroelectric power, irrigation, municipal/industrial water supply, water quality, fish/wildlife, and recreation. The purposes that a reservoir is to serve are given in laws that may be grouped into three categories; (1) laws initially authorizing construction of the project, (2) laws specific to the project passed subsequent to construction, and (3) laws that apply generally to all Corps reservoirs. Specific project authorizations (categories 1 and 2, above) are found in a variety of public laws but most commonly in a series of River and Harbor and Flood Control acts passed by Congress since 1870. Recent project authorizations have been contained in a series of Water Resources Development acts. Laws that apply generally to all projects (above category 3) are very few in number. With respect to water supply, general legislation is contained only in Public Law 78-534, 1944 Flood Control Act, as amended, (for surplus water and agricultural water) and in Public Law 85-500, 1958 River and Harbor Act, as amended, (for storage space). This latter act (Title III of Public Law 85-500) also provides the authority for the Corps to reallocate storage in projects for the purpose of municipal and industrial water supply.

3. Database.

a. Corps Report. A study conducted by the Corps in response to Section 311 of the 1990 Water Resources Development Act (Public Law 101-640), determined that there were a total of 541 Federally-owned reservoirs operated by the Corps. The results of the study are contained in a July 1992 report entitled *Authorized and Operating Purposes of Corps of Engineers Reservoirs*. For each reservoir, information is provided about the purposes for which it is authorized, the laws granting authority, and the purposes for which water is being controlled by the Corps. These data are arranged in table format for ease of reference and are contained in an appendix to the report. Also contained in the report are appendices which list all the public laws cited in the report together with the dates of enactment, statute numbers and popular or common name. Also provided are indexes to the projects alphabetically by state, alphabetically by project name, and by Corps division and district office. This is the "LEGAUTH" database that is contained in the HEC network.

b. Summary. The 1992 report lists a total of 182 projects which contain M&I water supply as either an "operating purpose" and/or an "authorized purpose." This list of 182 projects is provided in **Appendix C**. The projects are listed by division and district and indicate whether M&I water supply is an operating purpose and/or an authorized purpose, the location by state(s), and whether M&I water supply storage is provided. The cross reference on M&I water supply storage was developed from the data contained in Paragraph C of this chapter. A summary of this information is provided in **Table 3-1**. Almost half (43 percent) of the reservoir projects that have water supply as either an operating purpose and/or an authorized purpose are located in the Southwestern Division, followed by the Ohio River Division with 15 percent and the Missouri River Division with about 12 percent.

Table 3-1
Reservoirs with M&I Water Supply as a Purpose

Division	Number of Projects	Number with M&I Water Supply as an Operating Purpose	Number with M&I Water Supply as an Authorized Purpose	Number of Different States	Number with M&I Water Supply Storage Agreements
NED	3	3	3	2	3
NAD	6	6	6	3	4
SAD	19	17	15	6	10
ORD	28	28	19	6	17
NCD	12	10	11	4	1
LMVD	6	5	6	4	5
MRD	21	17	21	8	9
SWD	78	64	77	6	65
NPD	4	2	4	2	2
SPD	5	4	5	2	1
TOTAL	182	156	167	37	117

C. MUNICIPAL AND INDUSTRIAL WATER SUPPLY DATABASE

1. National Summaries.

a. Total Storage. The national total of all municipal and industrial (M&I) water supply storage contained in Corps reservoir projects is shown in **Table 3-2**. These numbers represent an updated survey of the data contained in the HEC WSCONT network database. This survey of the divisions and districts was performed by CEWRC-IWR-P in March 1996. This table represents a total by division and shows there are 240 signed M&I water supply agreements in 117 reservoir projects. These 117 projects have a total of about 9.5 million acre-feet of storage for M&I water supply. In this table "present use" defines the storage that is under a signed agreement for immediate use. Some of this storage has already been repaid and some is being repaid over a 30 to 50 year period. The "future use" includes storage that is under a future repayment agreement as well as storage that is not under a repayment agreement. The total storage, including the cost of specific water supply facilities, is about $1.3 billion. This dollar value is reflective of the investment cost used in the contract (see Appendix B) and, accordingly, is not in current dollars. The table also includes storage that has been reallocated. The vast majority (approximately 74 percent) of the storage is contained in reservoir projects located in the Southwestern Division.

Table 3-2
National Total by Division
M&I Water Supply Storage Database

Division:	Storage	Space	(Acre Feet)	Contract	Price		($1000)
Proj./Cont.	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
NED: 3/3	41,240	0	41,240	7,507.9	0	0	7,507.9
NAD: 4/5	97,210	4,000	101,210	119,625.0	7,500.0	0	127,125.0
SAD: 10/19	120,626	96,740	217,366	107,983.9	9,586.0	219.0	117,788.9
ORD: 17/18	577,940	53,469	631,409	54,393.0	15,996.2	68.3	70,457.5
NCD: 1/1	14,900	0	14,900	4,811.6	0	0	4,811.6
LMVD: 5/3	167,000	187,750	354,750	17,945.0	18,904.0	0	36,849.0
MRD: 9/13	157,560	595,080	752,640	13,181.3	73,120.8	2,696.4	88,998.5
SWD: 65/174	5,044,246	2,012,885	7,057,131	329,204.2	383.952.2	4,616.7	717,773.1
NPD: 2/2	26,800	27,800	54,600	11,550.7	13,502.3	0	25,053.0
SPD: 1/2	88,000	212,000	300,000	8,290.0	96,624.9	0	104,914.9
Total: 117/240	6,335,522	3,189,724	9,525,246	674,492.6	619,186.4	7,600.4	1,301,279.4

b. Storage Under a Repayment Agreement. The amount of storage in Corps reservoir projects that is under either a present and/or future use repayment agreement and the corresponding dollar value of this storage is shown, by division, in **Table 3-3**. As shown, a little over 8.7 million

acre feet of storage is under a repayment agreement for either present use (6.3 million acre feet) or future use (2.4 million acre feet). This storage is represented by a corresponding construction cost of about $1.2 billion (including conduit costs). In comparing Table 3-3 with Table 3-2, it is shown that approximately 67 percent of the 9.5 million acre feet of storage and corresponding construction cost is under a present use repayment agreement and 25 percent is under a future use repayment agreement. Again, these values are from an updated survey made in March 1996 of Corps divisions and districts by CEWRC-IWR-P.

Table 3-3
National Total by Division
M&I Storage Under a Repayment Agreement

	Storage Space (Acre Feet)			Contract Price			($1000)
Division	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
NED	41,240	0	41,240	7,507.9	0	0	7,507.9
NAD	97,210	4,000	101,210	119,625.0	7,500.0	0	127,125.0
SAD	120,626	96,740	217,366	107,983.9	9,586.0	219.0	117,788.9
ORD	577,940	51,269	629,209	54,393.0	11,696.2	68.3	66,157.5
NCD	14,900	0	14,900	4,811.6	0	0	4,811.6
LMVD	167,000	0	167,000	17,945.0	0	0	17,945.0
MRD	157,560	513,180	670,740	13,181.3	50,545.4	365.4	64,092.1
SWD	5,044,246	1,515,150	6,559,396	329,204.2	328,475.3	4,087.9	661,767.4
NPD	26,800	18,200	45,000	11,550.7	7,772.0	0	19,322.7
SPD	88,000	212,000	300,000	8,290.0	96,624.9	0	104,914.9
Total	6,335,522	2,410,539	8,746,061	674,492.6	512,199.8	4,740.6	1,191,433.0

c. Storage Not Under a Repayment Agreement. The amount of storage in Corps reservoir projects that has not been committed to a repayment agreement is shown, by division, in **Table 3-4**. This shows that only 779,185 acre feet (approximately 8 percent) of the 9.5 million acre feet of the storage that has been included in constructed projects has not been placed under a reimbursement agreement. While the Southwestern Division has placed the vast majority of storage under contract, it also has the majority of the storage space that is not under a repayment agreement (approximately 64 percent).

Table 3-4
National Total by Division
M&I Storage Not Under a Repayment Agreement

	Storage	Space	(Acre Feet)	Contract	Price		($1000)
Division	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
NED	0	0	0	0	0	0	0
NAD	0	0	0	0	0	0	0
SAD	0	0	0	0	0	0	0
ORD	0	2,200	2,200	0	4,300.0	0	4,300.0
NCD	0	0	0	0	0	0	0
LMVD	0	187,750	187,750	0	18,904.0	0	18,904.0
MRD	0	81,900	81,900	0	22,575.4	2,331.0	24,906.4
SWD	0	497,735	497,735	0	55,476.9	528.8	56,005.7
NPD	0	9,600	9,600	0	5,730.3	0	5,730.3
SPD	0	0	0	0	0	0	0
Total	0	779,185	779,185	0	106,986.6	2,859.8	109,846.4

2. Division and District Summaries. The summary of municipal and industrial water supply agreements by division and district are presented in **Appendix C**.

3. Projects and Signed Agreements. Detailed information on each M&I water supply agreement is presented in **Appendix C**. This list is subdivided by division, district, project, and then by individual agreement. In this appendix the following definitions are followed:

a. Present Storage and Present Investment. This is the storage space and corresponding cost that is under present or immediate use in the water supply agreement.

b. Conduit Cost. In some reservoir projects, a specific water supply conduit is included as part of the dam and intake structure. This cost is to be repaid through one or more water supply agreements.

c. Type. This refers to the type of water supply agreement; i.e., storage, surplus, withdrawal, temporary use of irrigation storage space, reallocation of flood control (or some other storage space), etc.

D. AGRICULTURAL WATER SUPPLY DATABASE

1. Introduction. Agricultural water supply is included in Corps reservoir projects in the Western states under repayment agreements between the Bureau of Reclamation and the local sponsors. To date, there are no agricultural water supply agreements in Corps reservoir projects in the Eastern states, although "irrigation" can be an authorized project purpose such as in the Central and Southern Florida Flood Control Project.

2. Irrigation Storage in Completed Corps Projects. Irrigation storage and the corresponding total and Federal cost for this storage is shown in **Table 3-5**. This data, originally compiled in a 1982 survey by CECW-P, was updated by CEWRC-IWR-P in a survey of divisions and divisions in March 1996. This information shows there are 47 completed projects which include agricultural water supply. The 47 completed projects include about 772 thousand acre-feet of "specific" irrigation storage space and another 52.7 million acre-feet of storage that was classified as "joint" (see Appendix G for definition). This joint storage can be used for flood control, navigation and/or hydroelectric power as well as for irrigation purposes. The total Federal cost allocated to the irrigation purpose, less the reimbursable cost, is listed as about $1.5 billion. The data by project for these 47 completed projects is contained in **Appendix C**.

Table 3-5
Irrigation Storage at Completed Projects

Division	Number of Projects	Total Project Cost ($1000)	Total Federal Cost (1) ($1000)	Storage For Reserved Irrigation	
				Joint (1000 AF)	Specific (1000 AF)
Missouri River	9	1,233,433	381,734	48,233.0	312.0
Southwestern	5	161,500	112,100	259.6	440.8
North Pacific	21	2,309,680	743,760	394.9	0
South Pacific	12	323,270	218,819	3,777.0	19.5
Total	47	4,027,883	1,456,413	52,664.5	772.3

Footnote:
(1) Total cost less reimbursable cost.

3. Irrigation Storage in Corps Projects Which are Under Construction. There are a total of four projects under construction which contain storage for agricultural water supply. These four projects (Elk Creek, Willow Creek, Santa Rosa, and New Melones) include 200,000 acre feet for specific irrigation storage and another 164,000 acre feet for joint irrigation storage. The Federal and total cost of this storage is, respectively, $365 million and $600 million. Details by project are contained in **Appendix C.**

E. REFERENCES

U.S. Army Corps of Engineers Draft Report, HEC, March 1994. Hydrologic Engineering Center Reservoir Database Network.

U.S. Army Corps of Engineers Report, HQUSACE, July 1992. Authorized and Operating Purposes of Corps of Engineers Reservoirs.

CHAPTER 4: STORAGE REALLOCATION

DECEMBER 1996

A. AUTHORITY

1. Water Supply Act of 1958. Reallocation can be considered to be a reassignment of the usage of existing storage space in a reservoir project to a higher and better use. Authority for the Corps to reallocate to municipal and industrial (M&I) water supply is contained in Public Law 85-500, Title III, Water Supply Act of 1958, as amended (72 Stat. 319)(see Appendix A). Section 301(b), of this Act states "...it is hereby provided that storage may be included in any reservoir project surveyed, planned, constructed or to be surveyed, planned, and/or constructed ... to impound water for present or anticipated future demand or need for municipal and industrial water supply." Section 301(d) of the Act states "[M]odifications of a reservoir project heretofore authorized, surveyed, planned, or constructed to include storage as provided in subsection (b), which would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes, shall be made only upon the approval of Congress as now provided by law."

2. Guidance. All official Corps guidance on reallocations can be found in ER 1105-2-100, dated 28 December 1990. In this regulation, the guidance on reallocation of water supply storage is contained in Chapter 4, Section VII, Paragraph 4-32d (Project Purposes) and in Chapter 6, Section XV, Paragraph 6-205 (Cost Allocation). Periodic Engineering Circulars and Policy Guidance Memorandums can also be issued on this procedure. The intent of this chapter on storage reallocation is to capture all current policies and procedures including those that may not be included in current regulations.

B. OPPORTUNITIES

1. Reservoirs.

a. Multipurpose Pools. A typical multipurpose reservoir consists of three pools; a flood control pool, a conservation pool, and an inactive or sediment pool. The flood control pool is normally kept empty to permit storage of runoff during times of high inflow. The conservation pool can consist of dedicated storage for one or more of the following purposes; hydropower, navigation, water supply, water quality, or irrigation. Recreation can also have dedicated storage, but in most all Corps multipurpose reservoir projects, the recreation feature utilizes the top of the conservation pool. The inactive or sediment pool is generally not available to meet downstream water needs as it is normally storage set aside for hydropower head and/or to store the sediment that is expected to accumulate over the life of the project.

b. Types of Reallocations. Opportunities to reallocate storage in Corps reservoirs from an authorized purpose to M&I water supply was the subject of a study performed by the Institute for Water Resources. The study, *Opportunities For Reservoir Storage Reallocation,* IWR Policy Study 88-PS-2, dated July 1988, documents eight opportunities available for reallocation. These are:

(1). Use of water supply storage not under contract;

(2). Temporary use of storage allocated for future conservation purposes and sediment;

(3). Storage made available by change in conservation demand or purpose;

(4). Seasonal use of flood control space during dry season;

(5). Reallocation of flood control space;

(6). Modification of reservoir water control plan and method of regulation;

(7). Raising existing dam; and

(8). System regulation of Corps and Non-Corps reservoirs.

c. Limits of this Chapter. This chapter limits the study of reallocations to those that permanently transfer storage from another authorized use (flood control, hydropower, other conservation, or sediment) to M&I water supply.

(1). Change in Conservation Storage Demand or Need. Originally authorized project purposes may no longer be required to meet present needs or may be available for some new equal or higher purpose. The opportunity then exists to modify or update the authorized project purposes through reallocation. For example, changes in a reservoir's upstream conditions may provide an opportunity to consider whether to extend the period that sediment could be collected without encroachment on other storage, or allow a portion of the storage initially reserved for sediment to be reallocated to water supply. Another case is where water quality storage originally provided to dilute pollutants may no longer be needed if pollutants are now being removed before being discharged into a stream or river. The most common example of reallocation of conservation storage is when storage is reallocated from hydropower. This has been accomplished several times when the benefits of such reallocation are positive. In these cases, however, it may be necessary to transfer some of the revenues collected from the water supply user to the local power marketing agency. If reallocation of hydropower storage is contemplated and an economic question arises, the Power Branch of the U.S. Army Corps of Engineers North Pacific Division (CENPD-ET-WP) should be contacted for assistance. This branch (the Hydropower System Economic Evaluation Center) is the official center of expertise for hydropower evaluation in the Corps.

(2). Reallocation of Flood Control Space. Three conditions which create an opportunity to reallocate flood control storage to water supply storage are:

• Where reallocated flood control storage volumes are small and have little or no effect on flood protection. If the effect is large, Congressional action is required;

• Where the downstream floodplain has changed or supplemental protection has been provided; and

• Where reservoirs have been designed to a maximum site capacity which is larger than required by hydrologic analysis, excess flood control storage may be available.

2. Partnerships. Opportunities for reallocation can also be created through new partnerships with states and other water agencies. The Memorandum of Understanding (MOU) between the State of Kansas and the Department of the Army is the principal example. This MOU was signed on 11 December 1985 and was an effort to realize the highest level of benefits possible in existing Corps regulated reservoirs in the state. While the MOU has since expired, it was example of a unique opportunity to:

• Solve the State's water supply problems regarding availability and dependability;

• Increase the recovery of Federal investments occurring in the State's water resources developments;

• Shift a greater portion of operation and maintenance costs from the Federal government to the State; and

• Establish a water resource management plan.

The major benefits to the State of Kansas and to the Nation are summarized in **Table 4-1**. Such partnerships occur where careful planning and analyses precede cooperative discussions which develop partnerships in which all parties benefit. Should similar situations occur in other areas of the nation, districts should prepare a letter report laying out the circumstances and forward to HQUSACE (CECW-A).

3. History of Reallocations. Between 1958 and 1979, several reallocations were performed under the discretionary authority of the Commander, USACE. None of these reallocations were greater than 15 percent of total usable storage and/or 50,000 acre-feet. The price paid for this reallocated storage was based on the original cost of storage. In 1979 a new pricing policy was instituted which required the higher of benefits or revenues foregone, replacement cost, or the updated cost of storage to be charged for the reallocated cost of storage. Shown in **Appendix D** is a list of the reallocations that have been made at Corps projects, and while not complete, this does show considerable interest in this method of obtaining M&I water supply for a variety of uses. A summary of the reallocations is provided in **Table 4-2**.

Table 4-1
Benefits of the Kansas MOU

Major Benefits to the State of Kansas	Major Benefits to the Nation
1. Create a dependable water supply since the users never controlled the quality or the quantity of the releases which would take place under the old system. 2. Determined the availability of excess water storage which would be made available through the studies performed under the agreement. 3. Gained control over the lake regulation as a means of enhancing their water management program. 4. Price of water supply storage based on the same basis that would have occurred if such storage had originally been authorized for water supply storage in lieu of the more expensive updated cost of storage required by ER 1105-2-100.	1. Reimbursement of Federal investment and operation and maintenance cost for the State acquisition of water supply storage in the reservoirs. 2. Obtained the State of Kansas' protection of the water quality inflows and releases which would make it possible to meet the Federal government's water quality objectives. 3. The State of Kansas would make up-front payments to secure their commitment and responsibility within the agreement.

Table 4-2
Summary of Reallocations 1965-1996

Reallocated Purpose	Number of Reallocations	Storage Reallocated (acre-feet)
Hydropower	14	96,805
Flood Control	7	96,290
Conservation	4	10,863
Other or Unknown	9	66,602
Total	34	270,560

4. Reallocation Studies. The interest in studying Corps reservoir projects for possible reallocation and/or modification of project operations for municipal and industrial water supply purposes is continuing. As shown in the Presidents budget submission to Congress for Fiscal Year 1997, there is $2.116 million budgeted for three reconnaissance and six feasibility studies considering reallocation. A summary of these study proposals is contained in **Table 4-3**.

Table 4-3
Reservoir Reallocation Studies
Presidents FY 97 Submission to Congress
(Continued on next page)

District	Phase	Phase Total Federal Cost ($000)	FY 97 Budget ($000)	Description
CENAB	Feas.	712.0	34.0	Jennings Randolph Lake, Reallocation, MD & WV. Studies have confirmed that the lake is a cost-effective and environmentally acceptable solution to meet the future water supply needs of the State of Maryland and the Washington, D.C. Metro Area.
CEORP	Recon.	445.0	175.0	Youghiogheny Lake Storage Reallocation, PA & MD. Westmoreland and North Fayette Counties, PA have requested the Corps to explore the potential for reallocation of a portion of the lake storage for water supply.
CEMRK	Recon.	160.0	155.0	Wilson Lake, Review of Completed Projects, KS. The Kansas Water Office has requested a reallocation study at Wilson Lake (constructed 1964) for potential water supply storage for the cities of Hays and Russell
CEMRK	Recon.	250.0	25.0	Kanopolis Lake, Review of Completed Projects, KS. Interest in water supply storage at the project has been expressed by the Bureau of Reclamation, the Kansas Water Office, and other Federal, state, and local organizations.
CENPS	Feas.	2,100	320.0	Howard Hanson Dam, Addition of Storage, WA. Studies have indicated that there is an opportunity to significantly increase summer water storage at the reservoir to provide needed municipal water supply, enhance Anadromous fish, and to a lesser degree improve downstream recreation. The dam (constructed in 1962) could provide a least-cost source of water to satisfy the demands of the rapidly growing Seattle-Tacoma urban area.
CESPL	Feas.	700.0	350.0	Prado Basin Water Supply, CA. The study will investigate the feasibility of raising the conservation pool during the flood season.

District	Phase	Phase Total Federal Cost ($000)	FY 97 Budget ($000)	Description
CESPL	Feas.	1,120.0	370.0	Los Angeles County Drainage Area Water Conservation and Supply (Hansen and Lopez Dams), CA. Water storage reserves in Los Angeles County have diminished considerably due to population growth and years of drought. The study is investigating various methods for the capture and release of surface flows for groundwater recharge and water conservation. In this case the "reallocation" would consist of holding water from the winter runoff in the flood control pool for use as seasonal operation during the summer for water supply purposes.
CESPL	Feas.	1,120.0	430.0	Los Angeles County Drainage Area Water Conservation and Supply (Santa Fe and Whittier Narrows Dams), CA. Same as above.
CESPL	Feas.	450.0	257.0	Alamo Lake Project Review, AZ. The study will evaluate the feasibility of modification of storage allocation and operation of the dam for fish and wildlife restoration and enhancement purposes.

C. PROCEDURES

1. Policies. A reallocation action is separate from a reallocation report in that a report may include future needs and can be approved, but the action of reallocation can only be in the context of satisfying immediate needs. An immediate need can be defined as the amount of storage the sponsor will begin payment for immediately upon signature of the water supply agreement. This reallocation action is not complete until a water supply agreement for those immediate needs is approved. Accordingly, when the need for reallocation or addition of storage at a project first arises, districts are encouraged to survey not only the immediate water needs but should include the water needs for the next 15-20 year planning horizon and include this entire need in one reallocation report although such need may be met through several reallocation actions over a period of several years. Agreements submitted after approval of the original reallocation report shall be accompanied by the original approved report with information indicating the changes in impacts (if any) since the time of the report. The new information shall also determine the price of storage in the new agreement.

2. Reallocation Report.

a. Purpose. Whenever a reallocation is contemplated, a reallocation report must be prepared. This report can vary in length

depending upon the magnitude of the change and the issues encountered. The purpose of the report and the topics to be discussed, however, are as follows:

(1). Identify and quantify the new use and user;

(2). Evaluate the impacts on other project purposes and users;

(3). Determine environmental effects;

(4). Determine the price to be charged the new user; and

(5). Determine appropriate compensation, if any, to existing users/beneficiaries.

b. Outline. A suggested outline for a reallocation report is given in **Box 4-1**. The text of the report shall contain the major subject matter elements (not necessarily to be used as headings) as presented in the table. The level of detail should be commensurate with the amount of storage reallocated and/or the problems encountered as a result of the reallocation. A reallocation report may, in some cases, even serve as a reauthoriztion report. This would be expected in major river basin changes. A detailed outline of a reallocation report, including examples, is provided in **Appendix D**.

3. Funding for Reallocation Studies. In general, the determination of the feasibility of reallocating storage in an existing reservoir should be conducted under the framework established by the March 10, 1983, Water Resources Council's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, better known as the "Principles and Guidelines" (P&G). While there is flexibility in funding either a one or two phase report (as best fits the situation), such a study will normally be conducted as a two-phase study with reconnaissance and feasibility phases. The reconnaissance study should be sufficiently detailed to determine if a feasibility study is warranted and if Congressional authorization is required for reallocation or addition of storage for M&I water supply. The reconnaissance phase will normally be accomplished using Operation and Maintenance (O&M), General funds. The use of the authority of Section 216 of the 1970 Flood Control Act (Public Law 91-611) (see Appendix A) and the regular survey authority, however, are also options. If O&M funds were utilized and Congressional authorization is required, cost sharing of the additional studies with the non-Federal sponsor would be required in accordance with the provisions in Section 105 of WRDA '86. The Federal share of the additional studies, or the feasibility phase cost in the case of a Section 216 or regular survey authority, should be derived from the General Investigations appropriation. At the start of the study, if the proposed reallocation is likely to require Congressional authorization, contact HQUSACE (CECW-A) for additional quidance on requesting funds for the feasibility phase. If the reallocation is determined to be warranted, but does not require additional studies or Congressional authorization, the O&M, General fund may be used to complete the reallocation at Federal expense.

Box 4-1, Suggested Contents for a Reallocation Report

- Purpose
  - Request for M&I water supply
  - Authority for seeking reallocation
- Project Background
  - Project authorization, construction and operation history
  - Project purpose and outputs
  - Project map and pertinent data table
  - Information on previous water supply agreements
- Economic Analysis (Reallocation Feasibility)
  - Water supply demand analysis
  - Analysis of water supply alternatives (benefits)
  - Impacts on other project purposes (benefits foregone)
- Derivation of User Cost
  - Water supply storage/yield analysis
  - Cost of storage analysis
  - Revenues foregone and cost account adjustments
  - Summary, users cost
- Other Consideratons
  - Test of financial feasibility
  - Cost account adjustments
  - Environmental considerations
- Conclusions and Recommendations
  - Summarization of findings
  - Reference applicable appendices
  - Recommedation of the District Engineer
- Appendices
  - NEPA documation (EA w/FONSI or EIS)
  - Documation of opportunity for public review of action
  - Letters and views of other Federal, state, and/or local interests affected by the action

4. Cost of Reallocated Storage.

a. General. The cost allocated to the non-Federal sponsor for the capital investment for reallocated storage space will normally be established as the highest of the benefits or revenues foregone, the replacement cost, or the updated cost of storage in the Federal project. The non-Federal sponsor is also responsible for any specific construction and/or operational costs associated with the reallocation action including costs associated with the revision of the water control plan and environmental mitigation costs. The cost shall not, however, include the cost of past expenditures for replacement, rehabilitation and reconstruction. These later costs are excluded, as the price charged to the user will be at least the price of the storage space in a new project, which assumes the project is in a new state of repair.

b. Benefits Foregone. Benefits foregone are generally estimated using standard Corps' national economic development (NED) evaluation criteria in compliance with the P&G. The benefits foregone should be

estimated for the remaining economic life of the project or 50 years which ever is greater. For reallocations from hydropower storage which are within the discretionary authority of the Commander, USACE, benefits foregone may be based on current estimates of long-term power rates obtained from local power marketing agencies or calculated in accordance with P&G procedures where appropriate models are readily available. For larger reallocations, estimates should be calculated in accordance with P&G procedures for evaluation of hydropower benefits.

c. Revenues Foregone. Revenues foregone to hydropower are the reduction in revenues accruing to the U.S. Treasury as a result of the reduction in hydropower outputs based on the existing rates charged by the power marketing agency. Revenues foregone from other project purposes are the reduction in revenues accruing to the U.S. Treasury based on any existing repayment agreements.

d. Replacement Costs.

(1). From Flood Control. If the reallocated storage is being taken from the flood control pool, it may be appropriate to utilize the replacement cost of equivalent protection where such adverse impacts warrant such replacement measures. Replacement of flood control storage would be appropriate when there is a real estate taking and when the value of the lost flood control storage is greater than the value of the added M&I storage. This would not be appropriate for reallocations within the discretionary authority of Commander, USACE, which by definition do not seriously impact authorized purposes and, therefore, would not warrant replacement measures for foregone flood control.

(2). From Hydropower. For reallocations from hydropower pools, the replacement cost of power should normally be considered equal to the benefits foregone and calculated in accordance with P&G procedures for evaluation of hydropower benefits. In some instances, where the power marketing agency has existing contracts with their customers, the replacement cost of power may be determined by the estimated cost to the power marketing agency to obtain power outputs from an alternative source to fulfill the Federal Government's obligations for the duration of the agreements. Once the agreements expire, the replacement cost of power should be equal to the benefits foregone for the remainder of the period of analysis. Documentation of such agreements and estimates of replacement costs of power to fulfill the agreements should be included in the reallocation report.

e. Updated Cost of Storage. Under the updated cost of storage procedure, the cost of the reallocated storage is determined through a three-step process:

(1). Cost at Time of Construction. Compute the cost of the reallocated storage at the time of construction by using the "Use of Facilities" cost allocation;

(2). Midpoint of Construction. Determine the midpoint of the physical construction period; and

(3). Update Cost. Using the appropriate index(s) update the cost from the midpoint of the construction period to the beginning of the

fiscal year in which the contract for the reallocated storage is approved. These three steps are displayed in **Table 4-4**.

Table 4-4
Updated Cost of Storage Procedure

Step	Formula	Definitions (Storage in acre-feet)
1	$C_{rs} = (C_t - C_s) \times \frac{S_r}{S_t - (S_s + S_h)}$	Crs = Cost of reallocated storage Ct = Total cost Cs = Cost of specific facilities Sr = Reallocated storage St = Total storage Ss = Sediment storage Sh = Hydropower head storage

Step	Construction Phase	Definition
2	Construction Initiated	Either of the following: 1) Start of the month when lands were first acquired; or 2) Date when the first construction agreement was awarded.
	Construction Completed	End of the fiscal year in which final deliberate impoundment of the reservoir was initiated.
	The midpoint of Construction	The month which is half way between initiation and completion of construction.

Step	Time	Cost Item	Index[1]
3	Prior to 1967	All items	ENR
	1967 to Present	Relocations	ENR
		Building, grounds and utilities	ENR
		Permanent operating equipment	ENR
		All other items except lands [2]	CWCCIS

Footnotes:
1. Index.
ENR = *Engineering News Record* Construction Cost Index (see following paragraph 5).
CWCCIS = Corps'"Civil Works Construction Cost Index System," which is maintained in EM 1110-2-1304.

2. Lands. The value of lands will be updated by the weighted average update of all other project features.

5. Engineering News Record Index. The *Engineering News Record* Construction Cost Index is comprised in the following manner: 200 hours of common labor at the 20-city average of common labor rates, plus 25 cwt of standard structural steel shapes a the mill price, plus 22.56 cwt

(1.128 tons) of portland cement at the 20-city price, plus 1,088 board-feet of 2 x 4 lumber at the 20-city price. The following cities comprise the 20-cities: Atlanta, Baltimore, Birmingham, Boston, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco, and Seattle. In this index, 1913 = 100. The annual average index history from 1906 to the present is provided in **Table 4-5** and the monthly index from January 1970 to the present is provided in **Table 4-6**.

Table 4-5
ENR Construction Cost Annual Average Index

		1920	251	**1940**	242	**1960**	824	**1980**	3237
		1921	202	**1941**	258	**1961**	847	**1981**	3535
		1922	174	**1942**	276	**1962**	872	**1982**	3825
		1923	214	**1943**	290	**1963**	901	**1983**	4066
		1924	215	**1944**	299	**1964**	936	**1984**	4146
		1925	207	**1945**	308	**1965**	971	**1985**	4195
1906	95	**1926**	208	**1946**	346	**1966**	1019	**1986**	4295
1907	101	**1927**	206	**1947**	413	**1967**	1074	**1987**	4406
1908	97	**1928**	207	**1948**	461	**1968**	1155	**1988**	4519
1909	91	**1929**	207	**1949**	477	**1969**	1269	**1989**	4615
1910	96	**1930**	203	**1950**	510	**1970**	1381	**1990**	4732
1911	93	**1931**	181	**1951**	543	**1971**	1581	**1991**	4835
1912	91	**1932**	157	**1952**	569	**1972**	1753	**1992**	4985
1913	100	**1933**	170	**1953**	600	**1973**	1895	**1993**	5210
1914	89	**1934**	198	**1954**	628	**1974**	2020	**1994**	5408
1915	93	**1935**	196	**1955**	660	**1975**	2212	**1995**	5471
1916	130	**1936**	206	**1956**	692	**1976**	2401	**1996**	5618
1917	181	**1937**	235	**1957**	724	**1977**	2576	**1997**	
1918	189	**1938**	236	**1958**	759	**1978**	2776	**1998**	
1919	198	**1939**	236	**1959**	797	**1979**	3003	**1999**	

Table 4-6
ENR Construction Cost Monthly Index

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1970	1309	1311	1314	1329	1351	1375	1414	1418	1421	1434	1445	1445
1971	1465	1467	1469	1513	1551	1589	1618	1629	1654	1657	1665	1672
1972	1686	1691	1697	1707	1735	1761	1772	1777	1786	1794	1808	1816
1973	1838	1850	1859	1874	1880	1896	1901	1902	1929	1933	1935	1939
1974	1940	1940	1940	1961	1961	1993	2040	2076	2089	2100	2094	2101
1975	2103	2128	2128	2135	2164	2205	2248	2274	2275	2293	2292	2297
1976	2305	2314	2322	2327	2357	2410	2414	2445	2465	2478	2486	2490
1977	2494	2505	2513	2514	2515	2541	2579	2611	2644	2675	2659	2660
1978	2672	2681	2693	2698	2733	2753	2821	2829	2851	2851	2861	2869
1979	2872	2877	2886	2886	2889	2984	3052	3071	3120	3122	3131	3140
1980	3132	3134	3159	3143	3139	3198	3260	3304	3319	3327	3355	3376
1981	3372	3373	3384	3450	3471	3496	3548	3616	3657	3660	3697	3695
1982	3704	3728	3721	3731	3734	3815	3899	3899	3902	3901	3917	3950
1983	3960	4001	4006	4001	4003	4073	4108	4132	4142	4127	4133	4110
1984	4109	4113	4118	4132	4142	4161	4166	4169	4176	4161	4158	4144
1985	4145	4153	4151	4150	4171	4201	4220	4230	4229	4228	4231	4228
1986	4218	4230	4231	4242	4275	4303	4332	4334	4335	4344	4342	4351
1987	4354	4352	4359	4363	4369	4387	4404	4443	4456	4459	4453	4478
1988	4470	4473	4484	4489	4493	4525	4532	4542	4535	4555	4567	4568
1989	4580	4573	4574	4577	4578	4599	4608	4618	4658	4658	4668	4685
1990	4680	4685	4691	4693	4707	4732	4734	4752	4774	4771	4787	4777
1991	4777	4773	4772	4766	4801	4818	4854	4892	4891	4892	4896	4889
1992	4888	4884	4927	4946	4965	4973	4992	5032	5042	5052	5058	5059
1993	5071	5070	5106	5167	5262	5260	5252	5230	5255	5264	5278	5310
1994	5336	5371	5381	5405	5405	5408	5409	5424	5437	5437	5439	5439
1995	5443	5444	5435	5432	5433	5432	5484	5506	5491	5511	5519	5524
1996	5523	5532	5537	5550	5572	5597	5617	5652	5672	5708	5727	5730
1997												
1998												
1999												

6. Cost Accounts. All income and expenses (investment, operation, maintenance, replacement, etc.) associated with the water supply function shall be separately identified in the official cost account record. When there is a loss of revenue from existing purposes, or additional operation and/or maintenance expense to existing purposes are incurred because of the new water supply addition, such charges shall be shown as a direct charge against the water supply function. All revenues lost to the project as well as downstream areas must be considered. This loss will effect the appropriate cost reductions in the existing project purposes and all revenues from the new addition will be credited to the new purpose. If hydropower revenues are being reduced as a result of the reallocation, the power marketing agency will be credited for the amount of revenues foregone to the U.S. Treasury as a result of the reallocation assuming uniform annual repayment. In instances where existing repayment agreements between the power marketing agency and their customer would result in a cost to the Federal Government to acquire replacement power to fulfill the obligations of the agreements, an additional credit to the power marketing agency can be made for such costs incurred during the remaining period of the agreements. Such credits should not actually be made for replacement costs until the costs are incurred and documented by the power marketing agency.

7. Financial Feasibility. As a test of financial feasibility, the governing annual cost of storage derived as determined in paragraph C4 of this chapter, should be compared to the annual cost of the most likely, least costly alternative that would provide an equivalent quality and quantity of water which the non-Federal interest would undertake in the absence of utilizing the Federal projects. This analysis is to be included in the reallocation report.

8. Approval. Providing the criteria of the 1958 Water supply Act are not violated, 15 percent of total storage capacity allocated to all authorized project purposes or 50,000 acre feet, whichever is less, may be allocated from storage authorized for other project purposes or may be added to the project to serve as storage for M&I water supply at the discretion of the Commander, USACE. For reallocations up to 499 acre-feet the Commander, USACE has delegated approval authority to the division commander. Reallocations which exceed the Commander USACE's authority may be approved at the discretion of the Secretary of the Army if such reallocations do not require Congressional approval as described above. The approval of the reallocation report, however, does not signify an approval to reallocate storage. Such approval is governed by the final signature of the water supply agreement. See Chapter 2, Table 2-3 for additional detail.

D. REFERENCES

The McGraw Hill Company. Engineering News-Record, a monthly magazine by a division of McGraw Hill, publishers.

U.S. Army Corps of Engineers, HQUSACE, 28 December 1990. Guidance for Conducting Civil Works Planning Studies, ER 1105-2-100.

U.S. Army Corps of Engineers, IWR, July 1988. Opportunities for Reservoir Storage Reallocation, Policy Study 88-PS-2.

Water Resource Council, 10 March 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation.

CHAPTER 5:
WATER SUPPLY PARTNERSHIP KIT

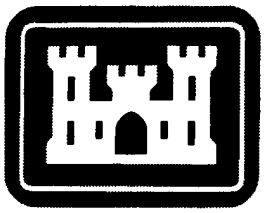
DECEMBER 1996

A. INTRODUCTION

This chapter is meant to be a self-contained pamphlet that can be copied and provided to local sponsors who may desire to enter into municipal and industrial water supply agreements. The pamphlet includes an example of a letter of introduction from the District Commander to the non-Federal sponsor, defines the Corps' mission in the area of water supply and provides some general background on the organization and responsibilities of the Corps. Draft water supply agreements from Appendix B should be attached to the pamphlet as required by the sponsor.

B. ATTACHMENT

Provided as an attachment is "WATER SUPPLY PARTNERSHIP KIT."



_____ District

U.S. Army
Corps of Engineers

WATER SUPPLY

PARTNERSHIP KIT

December 1996

DISTRICT LETTERHEAD

*** E X A M P L E ***

Dear Sponsor:

I am pleased to welcome you as a partner with the U.S. Army Corps of Engineers in the development and management of the Nation's water supply and to provide you with a copy of this Water Supply Partnership Kit.

The Corps of Engineers has been developing municipal and industrial water supply agreements with non-Federal sponsors for storage space in our reservoir projects since 1948. As of August 1996, we had 240 contracts in 117 different projects for about 9.5 million acre-feet of storage space. This space represents a Federal investment of about $1.3 billion in actual dollars. This district has ___ contracts in ___ reservoirs for a total of _____ acre-feet of storage space.

This Partnership Kit contains a collection of tools designed to help you to better understand the Corps' water supply mission. It includes the water supply authorities under which we operate and the various options we have to help satisfy your water supply needs, including model formats for different types of water supply agreements. It also includes some basic information on the Corps organization, addresses of all the offices and responsibilities of the various levels within the organization. We believe that if we improve our understanding of each other our partnerships will be more efficient, productive and successful in providing quality projects and service.

In this district [the water supply function is handled in the _____(branch)_____. The chief of this branch is _____.] (or) [the initial contact is with the project manager at _____ Lake. The project manager at this lake is _____ .] Mr./Ms. can be reached by phone at _____. If you have any ideas about how this kit can be improved, or suggestion about other ways in which we can help, please do not hesitate to contact me at the above address.

Sincerely,

_____
(Name)

_____
(Title)

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INTRODUCTION

We welcome you as a partner with the U. S. Army Corps of Engineers in the development and management of the Nation's water resources. This Partnership Kit contains a collection of tools designed to help you better understand the Corps mission in the area of municipal and industrial water supply and how you can utilize this mission to help you meet your water supply needs. This kit also includes some general information about the Corps, as well as more specific information about the District office in your area.

The Army Corps of Engineers (Corps) is the Federal government's largest water resources development and management agency. Our water resources (Civil Works) program began in 1824, when Congress first appropriated funds for improving navigation. Since then, we have been involved in improving navigation in rivers and harbors, reducing flood damages, and protecting our shorelines. Many projects designed for these missions also generate hydroelectric power; supply water for cities, industries and agriculture; and provide outdoor recreation. Entwined within these missions is environmental management and restoration.

WATER SUPPLY MISSION

National policy concerning the Corps role in water supply has been developed over a number of years and is still being clarified and extended through budgetary guidance and by legislation enacted through water resources development acts. This policy is based on a recognition that states and local interests have the primary responsibility in the development and management of their water supplies. The Corps role in water supply can be defined by three legislative acts. These are; Section 6 of the 1944 Flood Control Act (surplus water), Section 8 of the 1944 Flood Control Act (agricultural water supply), and the 1958 Water Supply Act (storage). In limited circumstances, we may also provide emergency supplies of clean water to a locality confronted by a source of contaminated water likely to cause a substantial threat to public health. These specifically defined roles are discussed in more detail in the following sections in the order of significance from a Corps mission standpoint.

WATER SUPPLY STORAGE

AUTHORITY.

Most likely, your request for assistance from the Corps to help you solve your water supply needs will fall under the general category of "water supply storage." The authority for the Corps to include storage for municipal and industrial (M&I) water supply in both new and existing reservoir projects is contained in the 1958 River and Harbor Act. Title III of this Act (Public Law 85-500) is entitled the "Water Supply Act of 1958." While this act gives the Corps authority to modify projects for water supply, any modification which would seriously affect the project, its other purposes, or its operation, can only be accomplished with the approval of Congress.

The 1958 Water Supply Act has been amended twice, once by Section 10 of the Federal Water Pollution Control Act Amendments of 1961, and again by Section 932 of the Water Resources Development Act of 1986 (WRDA '86). The 1961 amendment eased restrictions of the 1958 Act by permitting the acceptance of assurances for the use of future water supply as a means of accommodating the construction cost payment for future water supply. The 1986 amendment put more burden on the non-Federal sponsor for water supply in Corps projects, but not for water supply in Bureau of Reclamation projects. This amendment eliminated the 10-year interest free period; modified the interest rate formula; reduced the repayment period from 50 to 30 years; and required the annual operation, maintenance and replacement costs to be reimbursed on an annual basis. This latter requirement was already a part of Corps repayment policy. For your information, a copy of the 1958 Water Supply Act, as amended, is provided as **Attachment A**.

One other act has had a major impact on the Corps mission in providing storage in projects. This act was Public Law 88-140, enacted on 16 October 1963. Under this act, the non-Federal sponsor of water supply storage has the right to the use of the storage for the physical life of the project after the costs of storage have been repaid, and subject to the continued repayment of annual operating costs. This provision removed the uncertainty as to the continued availability of the storage space after the 50-year maximum period previously allowed in contracts.

DEFINITION.

What exactly does the Corps mean by "M&I water supply storage?" While the term has not been defined in law, the Corps has taken it to mean supply for uses ordinarily found among customers of a municipal systems and for uses in industrial processes. Services to be provided will normally consist of space in a reservoir for use in regulating the flow of water so that it is useful for water supply purposes, and the provision, where necessary, of facilities in the project structure to provide for the release or withdrawal of stored water for water supply purposes.

Water rights necessary for the use of the stored water will not be acquired by the Corps but will be obtained as necessary by the water users. Where it is a requirement of State law, the non-Federal sponsor shall provide proof of a water right for the water to be stored or released from the Corps project.

Water supply agreements under the authority of the 1958 Water Supply Act are for storage space only. The Federal government makes no representation with respect to the quality or quantity of water and assumes no responsibility for the treatment, or availability of the water.

COST.

Your most primary concern is probably with the cost; how much will the Corps charge me for the water I want and what will be the repayment requirements? That is not a easy question to answer because it depends upon a number of factors. These factors include:

1) is this to be a new project, or is it already constructed?

2) if the project is existing was it constructed before or after 1986?

3) if the project is existing, is the space you want to utilize already authorized, or will it require a reallocation?

4) are you a low income community and, therefore, available for a reduced price for water under certain circumstances? and

5) regardless of the above factors, what other costs may you be responsible for?

The following sections will attempt to clarify the cost and repayment responsibilities for each of the above situations.

1) New Projects: A "new" project is classified as one for which construction started on or after 17 November 1986, the date of enactment WRDA '86. Since the Corps' ability to construct new multipurpose reservoirs projects is severely limited, the possibility of storage in new projects is unlikely. However, should the storage be in one of these "new" projects, the ***cost*** of storage will be the actual construction cost allocated to the amount of storage assigned to your use. While the law permits the ***repayment*** of these costs over a 30-year period, Administration policy requires the repayment of these costs either before or during the period of construction of the reservoir project. For this reason, all water supply storage in "new" projects is committed to non-Federal sponsors prior to construction and there is no available storage in new projects for new sponsors. Policy also prohibits the construction of single purpose water supply projects; i.e., water supply can only be considered when at least 20 percent of the new

project benefits are attributed to flood control, navigation, environmental restoration, and/or agricultural water supply.

2) Existing Projects With Uncommitted Storage Space: There are 20 Corps reservoir projects located in six states with almost 780,000 acre-feet of municipal and industrial water supply storage space that is not currently under a repayment agreement and is available for your use. These projects, the storage, the state and the Corps district office responsible for the project is provided in **Table 1**. If you are located in the proximity of one of these projects, you should enter into an agreement for this storage as it is less expensive than new storage or reallocated storage. In these projects the ***cost*** to be repaid is the actual cost assigned to the storage space at the time of construction. There are two options for ***repayment*** of these costs over time.

Table 1
Existing Corps of Engineers Projects With Authorized But Uncommitted Storage Space

Corps District	Project	State	Acre -Feet
Pittsburgh	Stonewall Jackson	West Virginia	2,200
St. Louis	Clarence Cannon	Missouri	20,000
Vicksburg	DeGray	Arkansas	167,750
Kansas City	Long Branch	Missouri	6,200
	Smithville	Missouri	75,700
Little Rock	DeQueen	Arkansas	17,275
Tulsa	Birch	Oklahoma	7,630
	Broken Bow	Oklahoma	144,145
	Copan	Oklahoma	2,500
	Eufaula	Oklahoma	42,967
	Hugo	Oklahoma	2,198
	Kaw	Oklahoma	80,211
	Keystone	Oklahoma	1,999
	Oologah	Oklahoma	15,595
	Optima	Oklahoma	*
	Pine Creek	Oklahoma	20,600
	Skiatook	Oklahoma	47,652
	Tenkiller Ferry	Oklahoma	5,016
	Waurika	Oklahoma	109,600
	Wister	Oklahoma	347
Portland	Lost Creek	Oregon	9,600

* Optima Lake in the Tulsa District was designed for 76,200 acre-feet of water supply storage. However, due to changed conditions, Optima has never filled. Optima has no storage or yield.

The first repayment option is to repay the costs over a period of 30 years from the date of availability of the storage space. The date of availability is defined as the plant-in-service date of the project or the date the first water supply agreement in the project was signed, whichever is later. The interest rate to use in this case will be the rate as established by the 1958 Water Supply Act for the date of initiation of project construction. These interest rates are shown in **Table 2**. If this repayment option is utilized, in many cases the period left to repay the cost will be less than 30 years. If this is the case, then another option is available to the local sponsor.

Table 2
1958 Water Supply Act Interest Rates

Fiscal Year	Interest Rate (%)	Fiscal Year	Interest Rate (%)	Fiscal Year	Interest Rate (%)
1959	2.670				
1960	2.699	1970	3.342	1980	7.250
1961	2.632	1971	3.463	1981	8.605
1962	2.742	1972	3.502	1982	9.352
1963	2.936	1973	3.649	1983	10.051
1964	3.046	1974	4.012	1984	10.043
1965	3.137	1975	4.371	1985	10.898
1966	3.222	1976	5.116	1986	11.070
1967	3.225	1977	5.683		
1968	3.253	1978	6.063		
1969	3.256	1979	6.595		

The second repayment option is to permit the repayment of costs over a 30-year period at the repayment rate as prescribed in Section 932 of WRDA '86. In this case, the rate will be the rate that is current as of the time of signing of the water supply agreement. This rate will be adjusted at 5-year intervals over the repayment period. The rate will be increased by one-eight of one percentage point for transactions costs. These rates are shown in **Table 3**. In this table, the rates have been increased to include the transaction factor. While these rates are not applicable to what rates may be in the future, they do give an indication of what the past rates have been and the fact that they can vary significantly from one year to the next. The interest rate formula is defined in the 1958 Water Supply Act, as amended, that is provided in **Appendix A**.

Table 3
1986 Water Resource Development Act Water Supply Interest Rates

Fiscal Year	Interest Rate (%)	Fiscal Year	Interest Rate (%)	Fiscal Year	Interest Rate (%)	Fiscal Year	Interest Rate (%)
1987	7.625	1990	8.250	1993	7.500	1996	6.750
1988	10.000	1991	9.125	1994	6.125	1997	7.125
1989	9.250	1992	8.125	1995	7.750	1998	

3) Reallocations: Since the Corps is currently not constructing many reservoir projects, the most viable means to obtain storage in Corps reservoirs is through reallocation. Reallocation is considered to be a reassignment of the usage of existing storage space in a reservoir project to a higher and better use. In this process, economic, political and public welfare issues are taken into consideration. The reallocation process is normally conducted through a "Reconnaissance" study phase that is fully funded at the Federal level. If this study proves feasible, then a more detailed "Feasibility" study is undertaken. This study is funded equally between us, and you may provide up to one-half of your share (that is, up to one-quarter of the total study cost) by in kind services instead of cash. The details of this study process can be provided by your local Corps office.

Since 1979, nine of the Corps districts have performed a total of 27 reallocations. These reallocations transferred storage from flood control, hydroelectric power, water quality, and sediment reserve, to M&I water supply. These procedures reallocated a total of about 260,000 acre-feet of storage space. In addition, the Presidents Fiscal Year 1996 budget has a total of $2.36 million for an additional nine reallocation studies. These studies are being performed by the Baltimore, Pittsburgh, Kansas City (2), Tulsa, Seattle, and Los Angeles (3) Districts.

The ***cost*** of reallocated storage assigned to you will be the highest of the benefits or revenues foregone as a result of the allocation, the replacement cost of an equivalent amount of storage in another or a new project, or the updated cost of storage in the Federal project. The cost which usually governs is the updated cost of storage. This procedure is an attempt to duplicate the cost of the project, as originally constructed, at today's prices. This process updates original construction cost through use of the *Engineering News Record* Construction Cost Index and the Corps' "Civil Works Construction Cost Index System." Your portion of the cost is then prorated based on the storage reallocated to your use.

Repayment of costs assigned to the reallocation will be over a period of 30 years from the date of availability of the storage space. This date of availability is normally considered to be the date the repayment agreement is signed by the Assistance Secretary of the Army (Civil Works) (ASA(CW)) or his duly authorized representative. The interest rate to use for repayment will be the rate as established in WRDA '86 (see **Table 3**). The rates are adjusted at 5-year intervals over the repayment period. The 10-year interest free period is not available for reallocated storage. In addition, any cost associated with the reallocation; e.g., the relocation of camping and picnic facilities as a result of a raise in the lake level, must be paid prior to or during the relocation period.

4) Low Income Community: Section 932 of the 1990 Water Resources Development Act authorized, at the discretion of the ASA(CW), a

reduced price of water for low income communities. Low income communities are identified by the law as communities with a population of less than 20,000 which are located in counties with a per capita income of less than the per capita income of two-thirds of the counties in the United States. For the purposes of this provision, a community may extend across county boundaries, however, all counties served must qualify as low income counties to obtain the reduced price allowed under this Section. The amount of storage which can be made available to any one community under this provision is the amount required in any reservoir to yield two million gallons of water per day. This provision for a reduced price is only applicable to reallocations.

The ***price*** under this provision of law is the greater of (1) benefits foregone, or (2) the updated cost of storage but not to exceed (for fiscal year 1991) $100 per acre foot of storage space. Individual contract prices, once approved, are not subject to further indexing. The $100 charge was applicable only to contracts signed in Fiscal Year 1991. This price shall be adjusted on 1 October every year based on the Consumer Price Index for the September immediately preceding the fiscal year. This price index is published monthly in the Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business.*

Repayment is permitted over 30 years from the date the water supply storage agreement is signed by the ASA(CW). The applicable interest rate for repayment is that authorized by WRDA '86 (see **Table 3**). This rate will be adjusted at 5-year intervals over the repayment period. If you think you may be eligible for this pricing policy, please contact your local Corps district office.

5) Additional Costs. Regardless of the method used to assign to you the cost of storage in the Corps project, you will also be responsible for your pro-rata share of additional costs required to operate and maintain the project. These costs consist of:

Annual operation and Maintenance Expense. All non-Federal sponsors (including those determined as being a low-income community) are responsible for all operation and maintenance expenses allocated to their portion of the water supply storage space. These costs are to be paid yearly and should be paid in advance based on an estimated expenditure.

Repair, Replacement, Rehabilitation, and Reconstruction Costs. Costs allocated to water supply which are associated with these four items are to be paid by the non-Federal sponsor either during construction of such item or in lump sum, with interest at the rate prescribed in WRDA '86, upon completion of construction. You are encouraged to establish a sinking fund in order to cover these costs should they occur. Costs expended in existing projects for these programs prior to entering into a repayment agreement shall be added to the initial project investment cost for repayment purposes. An exception to this rule is for reallocated storage which, through the updating procedure, assumes a new project.

Dam Safety Assurance Costs. Modifications to a dam project and related facilities deemed necessary for dam safety assurances shall be considered to fall under the provisions of rehabilitation except for cost sharing. Costs of project modification for dam safety shall be in accordance with the provisions of Section 1203 of WRDA '86. Under this provision, 15 percent of the cost of the dam safety assurance modification is allocated among purposes and shared with appropriate project sponsors.

SURPLUS WATER

AUTHORITY.

A lesser used authority for the Corps to contract for water supply was authorized by Section 6 of the 1944 Flood Control Act. Under this Section, the ASA(CW) is authorized to enter into agreements for surplus water with states, municipalities, private concerns, or individuals at

such prices and on such terms as he may deem reasonable. These agreements may be for domestic and M&I uses but not for crop irrigation, from surplus water that may be available at any reservoir under the control of the Department of the Army.

DEFINITION.

Surplus water is classified as either; (1) water stored in a Corps reservoir which is not required because the authorized need for the water never developed or the need is reduced by changes which have occurred since authorization or construction, or (2) water which would be more beneficially used as M&I water than for the authorized purpose and which, when withdraw, would not adversely affect existing lawful uses of such water over some specified time period.

Agreements covering surplus water will normally be for small amounts of water and for temporary use as opposed to storage reallocations and a permanent right to that storage. Surplus water agreements will be limited to a 5-year period. Use of the Section 6 authority is allowed only where non-Federal sponsors do not want to purchase storage because use of the water is desired for a short term only, or, use would be temporary pending development of the authorized use.

COST.

The ***cost*** for surplus water is determined by the same procedure as used to determine an equivalent amount of reallocated storage. ***Repayment*** of this storage is to be based on an annualized amount based on repaying the cost of the storage over a 30-year period. The interest rate to use for this annualized computation is that as authorized in WRDA '86 (see **Table 3**). To this annual cost will be added an estimated annual cost for operation, maintenance, repair, replacement, rehabilitation and reconstruction. The **total annual price** is to be limited to the annual costs of the least costly alternative, but never less than the benefits foregone, or, in the case of hydropower, revenues foregone.

Should you require a 5-year extension to your water supply agreement, such addition may be granted on a case by case basis. The cost however, will be redetermined based on current prices and interest rates.

AGRICULTURAL WATER SUPPLY

AUTHORITY.

The Reclamation Act of 1902, Public Law 57-161, established irrigation in the 17 contiguous western states as a national policy to be administered by the Secretary of the Interior. Section 8 of the 1944 Flood Control Act provides that Corps reservoirs may store water for irrigation of agricultural lands upon the recommendation of the Secretary of the Interior.

COST.

The ***cost*** and ***repayment*** for irrigation storage depends upon your location.

1) Western States. If you are in one of the 19 western states (including Alaska and Hawaii), in conformity with Reclamation Law, the ***cost*** and ***repayment*** arrangements and agreements for irrigation water from Corps projects will be determined, and is administered by, the Bureau of Reclamation.

2) Eastern States. Subsection 103(c)(3) of WRDA '86 establishes the ***cost*** that is applied to agricultural water supply stored in Corps projects east of the Reclamation states. In these non-Reclamation states, non-Federal sponsors must provide 35 percent of the construction costs assigned to the storage space, and 100 percent of the operation, maintenance, repair, reconstruction, rehabilitation and replacement costs. ***Repayment*** of construction costs shall be made during the period of construction of the project.

3) Interim Use of M&I Water Supply Storage for Irrigation. Section 931 of WRDA '86 provides that for any reservoir project constructed and operated by the Corps, the ASA(CW) is authorized to allocate storage which was allocated in the project for M&I water supply, and which is not under contract, for the interim use for irrigation purposes. These projects and the amount of storage available is shown in **Table 1**. The ***cost*** to you for this storage will be 35 percent of the construction cost and 100 percent of the operation and maintenance expense, repair, replacement, rehabilitation, and reconstruction costs allocated to the storage space being placed under contract. ***Repayment*** shall be annualized on a 30-year basis based on the original project construction cost. The interest rate will be the project rate that was in effect at the time of initiation of the project (see **Tables 2** and **3**). The term of the agreement for this interim use shall not exceed five (5) years. An option for incremental five year extensions is allowed with the basic agreement only if recalculations for annual operation and maintenance, replacements, rehabilitation and reconstruction costs are performed at the end of each five year increment.

EMERGENCY WATER SUPPLY

CLEAN DRINKING WATER.

Public Law 84-99, as amended by Section 82 of the Water Resource Development Act of 1974, provides the Corps an opportunity to provide emergency supplies of clean water to any locality which the Chief of Engineers finds is confronted with a source of contaminated water causing or likely to cause a substantial threat to the public health and welfare of the inhabitants of the locality. ***Cost*** and ***repayment*** shall be as the Chief of Engineers determines to be advisable. Work under this authority requires a request from the governor of the state where the source of water has become contaminated and is normally limited to 30 days. Loss of water source or supply is not correctable under this authority.

DISASTER RELIEF.

Public Law 88-99 was further amended by the Disaster Relief Act of 1974 Appropriations (Public Law 95-51), to provide the ASA(CW) authority under certain statutory conditions to construct wells and to transport water to farmers, ranchers, and political subdivisions within areas he determines to be drought distressed. A written request for assistance may be made by any farmer, rancher or political subdivision with a distressed area. Corps assistance will only be considered when non-Federal sponsors have exhausted reasonable means for securing necessary water supplies (within the limits of their financial resources) including assistance from other Federal agencies.

RESTRICTIONS.

Evaluation of requests for assistance are to be tempered by the fact that Corps assistance is supplemental to state and local efforts. Long term solutions to water supply problems are the responsibility of state and local interests. These authorities are not to be used to provide drought emergency water assistance in cases where a livestock owner has other options. Assistance can be provided to transport water for consumption by Federally owned equipment with the cost of transportation to be paid by the Corps. Cost of storage of the water, however, is a non-Federal responsibility. Federal assistance can also be provided to construct wells. The Federal cost, however, must be repaid.

DROUGHT CONTINGENCY WATER

AUTHORITY.

Section 6 of the 1944 Flood Control Act (surplus water) provides adequate authority to permit temporary withdrawal of water from Corps projects to supplement normal supplies in time of drought. Should you have such a need, the preferred approach is for a state or political

subdivision to enter into an agreement with the ASA(CW) and to agree to act as the wholesaler for all the water requirements of individual users. This places the local governments in a position to help their citizens during difficult times and minimizes the potential for problems that could arise if the ASA(CW) was to determine who was entitled to shares of surplus water based on assessments of local needs.

COST.

The ***cost*** for drought contingency water supply will be determined in the same manner as for surplus water but never less than $50 per agreement year.

SEASONAL OPERATIONS FOR WATER SUPPLY

AUTHORITY.

General Congressional authority for seasonal operations for water supply as an alternative to reservoir storage space has not been established to date. Where not specifically authorized, seasonal operation of a project for water supply may be conducted consistent with authorized project purposes and law, subject to hydrologic and hydraulic capability of the project, in order to provide an intermediate seasonal source of water supply. This water supply could be used to enhance groundwater replenishment, to increase downstream flow, or to otherwise enhance the general usage of the project for M&I purposes.

COST.

The ***cost*** to be repaid is:

(1) 100% of the new construction costs and new operational costs including the cost of revising the water control plan;

(2) A share of the joint use operation, maintenance, rehabilitation, and replacement cost based on the use-of-facilities cost allocation;

(3) The value of benefits foregone;

(4) the value of damages or losses incurred by others as a result of the changed operations (may be the same as (3) above); and

5) A partial reimbursement of the existing Federal investment in the project in the form of a payment in an amount equal to one-half of the savings to the benefited non-Federal interest (the cost of the least cost alternative minus the specific costs of the modifications listed in (1) thought (4) above).

There is to be limit on the cost (excluding annual operation and maintenance payments) which is not to exceed the costs derived for permanent reallocation as described earlier.

The ***repayment*** shall be consistent with the charges as developed in the above paragraph on costs as previously developed for storage and surplus water.

REPAYMENT AGREEMENTS

DISPOSITION OF REVENUES.

For your information, none of the payments you make to the Corps District associated with your interest in water supply, is maintained in the District Office or even a "Corps Account" for general use by the Corps. All revenues received from water supply repayment agreements is deposited in the Treasury of the United States as miscellaneous receipts.

MODEL AGREEMENTS

The Corps has prepared model water supply agreements for each class of water supply as discussed above. A copy of each of these agreements is provided as **Attachment B.** Payment provisions in this format are for new projects, unused storage space in existing projects, added storage and for all reallocated storage (including storage reallocated under the low-income community provisions of Section 322 of the 1990 Water Resource Development Act).

Bracketed language may be changed as appropriate in particular circumstances and material peculiar to either present or future use storage may be deleted if such storage is not included in the agreement.

CORPS ORGANIZATION AND RESPONSIBILITIES

INTRODUCTION

Our Civil Works work force consists of about 28,000 individuals, including some 250 military personnel, who represent over one hundred different professional engineering, scientific, environmental and managerial specialty areas. Our Civil Works chain of command has four basic levels of authority, ranging from the Assistant Secretary of the Army for Civil Works in Washington, D.C., to the thirty-six District offices across the Nation. Each Corps office is generally organized according to project development functions. Approximately 90 percent of the work force is at the District level.

CIVIL WORKS ORGANIZATION

THE ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS).

The Assistant Secretary of the Army (Civil Works) (ASA(CW)) is appointed by the President. The Assistant Secretary leads, directs and supervises the Corps Civil Works Program. The Assistant Secretary is also responsible for all Corps foreign activities not exclusively in support of U.S. military forces overseas. These responsibilities are exercised in accord with the program of the President.
The Assistant Secretary manages the Civil Works program through:

1) The annual legislative program, which usually includes recommended authorizations to conduct studies and construct projects;

2) The annual Civil Works budget, which includes requests for funding for selected studies and projects;

3) Providing policy to the Corps, and interpreting policy guidance on specific studies, projects and programs.

The current Assistant Secretary and his address is:

H. Martin Lancaster
Department of the Army
Office of the Assistant Secretary (Civil Works)
108 Army Pentagon
Washington, D.C. 20310-0108.

HEADQUARTERS.

The Headquarters, U.S. Army Corps of Engineers (HQUSACE) is commanded by the Chief of Engineers. For Civil Works, the Chief reports to the ASA(CW), and has delegated most responsibility for managing the Civil Works Program to the Director of Civil Works.

The current Chief of Engineers and his address is:

LTG Joseph N. Ballard
Chief of Engineers (CECG)
20 Massachusetts Ave. N.W.
Washington, D.C. 20314-1000

The current Director of Civil Works and his address is:
MG Russell L. Fuhrman
Director of Civil Works (CECW-ZA)
20 Massachusetts Ave. N.W.
Washington, D.C. 20314-1000

The Headquarters is responsible for organizational leadership and efficient management of the program and resources of the Corps. It ensures that policy established by the ASA(CW), including interpretive policy guidance on specific projects and programs, is applied to all phases of project development. The Headquarters also monitors and provides guidance to the Division; provides progress reports to the ASA(CW); supports and helps the Assistant Secretary in working with other agencies and organization; and, together with the ASA(CW), testifies to Congress in support of the Civil Works Program.

DIVISIONS.

Reporting to HQUSACE are eleven Divisions commanded by Division Engineers for Civil Works purposes. The Divisions are the regional Corps offices responsible for the supervision and management of their subordinate Districts, including monitoring, providing Quality Assurance and Quality Control, and approving (where delegated) District work.

Divisions are also responsible for efficient use of personnel and funds, ensuring that the Districts' activities are compatible with policy, and monitoring and reporting to HQUSACE on progress. They serve as the regional Corps interface with other regional agencies and organizations within their boundaries. Division Engineers testify to the Congress regarding the status of their work.

DISTRICTS.

The thirty-six Districts are led by District Engineers. The Districts are the local Corps offices responsible for conducting and completing their assigned Civil Works studies, projects and programs. They are accountable, and must report periodically, to Divisions on the progress and problems encountered in their work.

The Districts are the foundation of the Corps Civil Works Program. District professionals manage water resources developments over a project's entire life cycle; they conduct planning studies, perform project design, oversee the building of projects by construction contractors, and manage completed Corps facilities. They write reports, prepare drawings, estimate costs and schedules, negotiate agreements, and perform all of the day-to-day tasks necessary to get the job done. They are the Corps' face to the Nation, working closely with sponsors and other project partners, other government agencies, businesses, interest groups, homeowners, and all other members of the public. Sponsor contacts and work with the Corps are almost exclusively at the District level.

Districts are also responsible for issuing Section 10 and Section 404 permits for dredging or other construction in the nation's waters, providing responses to natural disasters and national security emergencies, and maintaining a variety of real estate activities related to both Civil Works and Army programs.

A map that displays Division and District boundaries, and a list of Division and District addresses, is provided as **Attachment C**.

RESEARCH AND DEVELOPMENT CENTERS AND LABORATORIES

We also maintain a major research program at five research and development centers and laboratories. These are:

Water Resources Support Center (CEWRC)
7701 Telegraph Rd.
Casey Building
Alexandria, VA 22315-3868
Phone: 703/428-0015

Waterways Experiment Station (CEWES)
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Phone: 601/636-3111

Construction Engineering Research Laboratory (CECER)
P.O. Box 9005
Champaign, IL 61826-9005
Phone: 217/373-7201

Topographic Engineering Center (CETEC)
7701 Telegraph Road
Alexandria, VA 22315-3864
Phone: 703/355-2600

Cold Regions Research and Engineering Laboratory (CECRL)
72 Lyme Road
Hanover, NH 03755-1290
Phone: 603/646-4100

Each of these laboratories and centers is available to conduct applied research and provide technical assistance in direct support of Corps Districts in project development.

ATTACHMENT A

Public Law 85-500

the 1958 River and Harbor Act

Title III, Water Supply Act of 1958, as amended

(72 Stat. 319)

PUBLIC LAW 85-500, 1958 RIVER AND HARBOR ACT
TITLE III; WATER SUPPLY ACT OF 1958, as amended
(72 Stat. 319)

Sec. 301. (a) It is hereby declared to be the policy of the Congress to recognize the primary responsibilities of the States and local interests in developing water supplies for domestic, municipal, industrial, and other purposes and that the Federal Government should participate and cooperate with States and local interests in developing such water supplies in connection with the construction, maintenance, and operation of Federal navigation, flood control, irrigation, or multiple purpose projects.

(b) In carrying out the policy set forth in this section, it is hereby provided that storage may be included in any reservoir project surveyed, planned, constructed or to be planned, surveyed and/or constructed by the Corps of Engineers or the Bureau of Reclamation to impound water for present or anticipated future demand or need for municipal or industrial water, and the reasonable value thereof may be taken into account in estimating the economic value of the entire project: *Provided,* That the cost of any construction or modification authorized under the provisions of this section shall be determined on the basis that all authorized purposes served by the project shall share equitably in the benefits of multiple purpose construction, as determined by the Secretary of the Army or the Secretary of the Interior, as the case may be; *Provided further,* That before construction or modification of any project including water supply provisions for present demand is initiated, State or local interests shall agree to pay for the cost of such provisions in accordance with the provisions of this section; *And provided further,* That (1) for Corps of Engineers projects, not to exceed 30 percent of the total estimated cost of any project may be allocated to anticipated future demands, and (2) for Bureau of Reclamation projects, not to exceed 30 percentum of the total estimated cost of any project may be allocated to anticipated future demands where State or local interests give reasonable assurances, and there is reasonable evidence, that such demands for the use of such storage will be made within a period of time which will permit paying out the costs allocated to water supply within the life of the project; *And provided further,* That for Corps of Engineers projects, the Secretary of the Army may permit the full non-Federal contribution to be made, without interest, during construction of the project, or, with interest over a period of not more than thirty years from the date of completion, with repayment contracts providing for recalculation of the interest rate at, five-year intervals, and for Bureau of Reclamation projects the entire amount of the construction costs, including interest during construction, allocated to water supply shall be repaid within the life of the project but in no event to exceed fifty years after the project is first used for the storage of water for water supply purposes, except that (1) no payment need be made with respect to storage for future water supply until such supply is first used, and (2) no

interest shall be charged on such cost until such supply is first used, but in no case shall the interest-free period exceed ten years. For Corps of Engineers projects, all annual operation, maintenance, and replacement costs for municipal and industrial water supply storage under the provisions of this section shall be reimbursed from State or local interests on an annual basis. For Corps of Engineers projects, any repayment by a State or local interest shall be made with interest at a rate to be determined by the Secretary of the Treasury, taking into consideration the average market yields on outstanding marketable obligations of the United States with remaining periods to maturity comparable to the reimbursement period, during the month preceding the fiscal year in which costs for the construction of the project are first incurred (or, when a recalculation is made), plus a premium of one-eight of one percentage point for transaction costs. For Bureau of Reclamation projects, the interest rate used for purposes of computing interest during construction and interest on the unpaid balance shall be determined by the Secretary of the Treasury, as of the beginning of the fiscal year in which construction is initiated, on the basis of the computed average interest rate payable by the Treasury upon its outstanding marketable public obligations, which are neither due nor callable for redemption for fifteen years from date of issue. The provisions of this subsection insofar as they relate to the Bureau of Reclamation and the Secretary of Interior shall be alternative to and not a substitute for the provisions of the Reclamation Projects Act of 1939 (58 Stat.1187) relating to the same project.

(c) The provisions of this section shall not be construed to modify the provision of section 1 and section 8 of the Flood Control Act of 1944 (58 Stat. 887), as amended and extended, or the provisions of section 8 of the Reclamation Act of 1902 (32 Stat. 390).

(d) Modifications of a reservoir project heretofore authorized, surveyed, planned, or constructed to include storage as provided in subsection (b), which would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes, shall be made only upon the approval of Congress as now provided by law.

Sec. 302. Title III of this Act may be cited as the "Water Supply Act of 1958".

Approved July 3, 1958;

As amended by Section 10, Public Law 87-88 (79 Stat. 210); and

As amended by Section 932 of Public Law 99-662 (100 Stat. 4196).

ATTACHMENT B

Model Formats

for

Water Supply Agreements

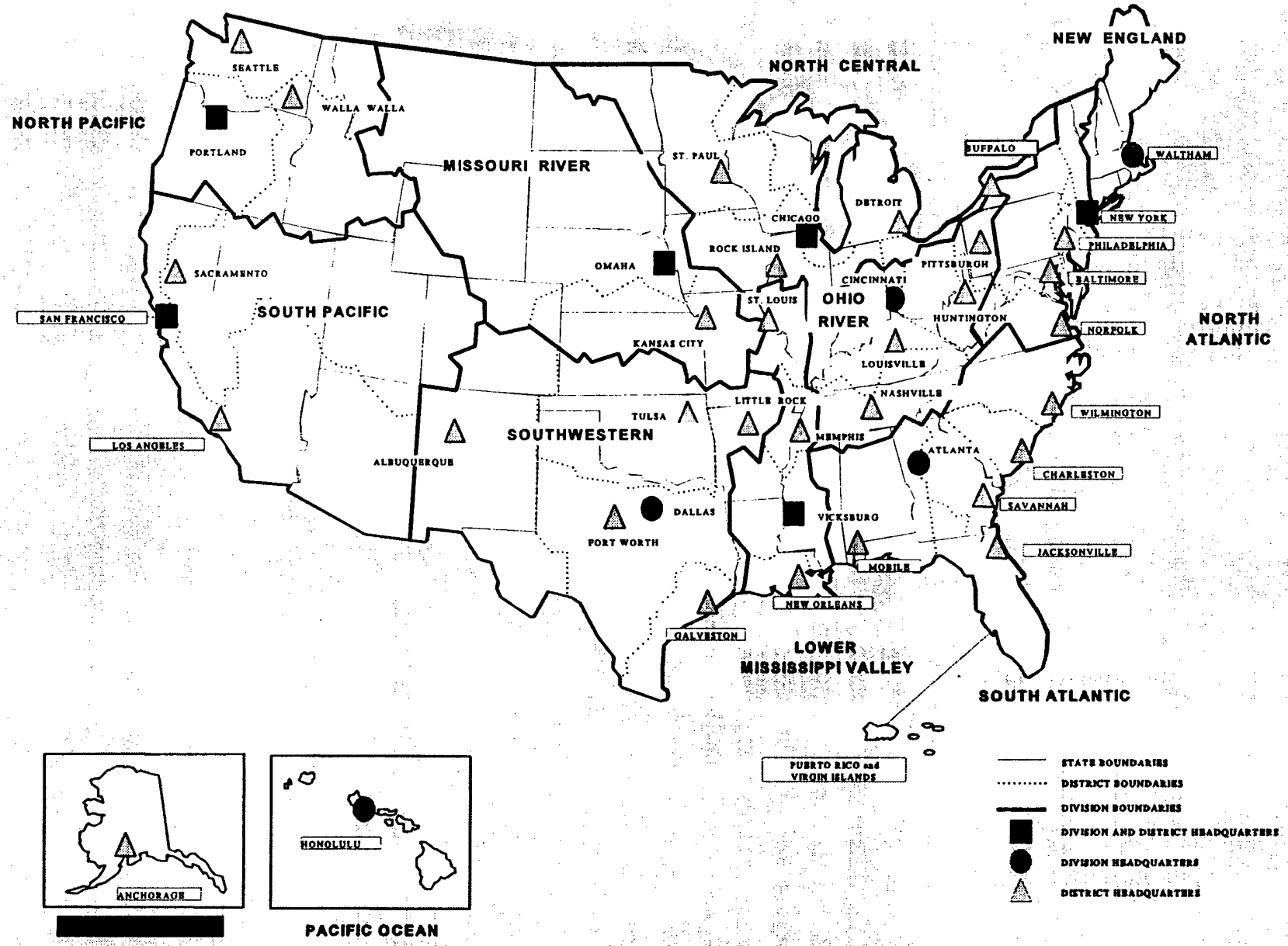
(Note: Districts should copy appropriate model formats and include behind this page. Model formats are maintained as Appendix B of this IWR Report 96-PS-4 and as Appendix K of ER 1105-2-100.)

ATTACHMENT C

Civil Works

Division and District Boundaries and Addresses

CIVIL WORKS
Division/District Boundaries



Civil Works
Division and District Addresses

Headquarters
U.S. Army Corps of Engineers
Directorate of Civil Works
20 Massachusetts Avenue, N.W.
Washington, DC 20314-1000
202/761-0105

U.S. Army Engineer Division,
Lower Mississippi Valley
P.O. Box 80
Vicksburg, MS 39181-0080
601/634-5750

U.S. Army Engineer District,
Memphis
Room B-202
167 North Main Street
Memphis, TN 38103-1894
901/544-3221

U.S. Army Engineer District,
New Orleans
P.O. Box 60267
New Orleans, LA 70160-0267
504/862-2204

U.S. Army Engineer District,
St. Louis
1222 Spruce Street
St. Louis, MO 63103-2833
314/331-8010

U.S. Army Engineer District,
Vicksburg
4155 Clay Street
Vicksburg, MS 39180-3435
601/631-5010

U.S. Army Engineer Division,
Missouri
12565 West Center Road
Omaha, NE 68144-3869
402/697-2400

U.S. Army District,
Kansas City
700 Federal Building
Kansas City, MO 64106-2896
816/426-3201

U.S. Army Engineer District,
Omaha
215 North 17th Street
Omaha, NE 68102-4978
402/221-3900

U.S. Army Engineer Division,
New England
424 Trapelo Road
Waltham, MA 02254-9149
617/647-8220

U.S. Army Engineer Division,
North Atlantic
90 Church Street
New York, NY 10007-2979
212/264-7101

U.S. Army Engineer District,
Baltimore
P.O. Box 1715
Baltimore, MD 21203-1715
410/962-4545

U.S. Army Engineer District,
New York
Jacob K. Jarvis Federal Building
New York, NY 10278-0090
212/264-0100

U.S. Army Engineer District,
Norfolk
803 Front Street
Norfolk, VA 23510-1096
804/441-7601

U.S, Army Engineer District,
Philadelphia
Wanamaker Building
100 Penn Square East
Philadelphia, PA 19107-3390
215/656-6501

U.S. Army Engineer Division,
North Central
111 North Canal Street
Chicago, IL 60606-7205
312/353-6310

U.S. Army Engineer District,
Buffalo
1776 Niagara Street
Buffalo, NY 14207-3199
716/879-4200

U.S. Army Engineer District,
Chicago
111 North Canal Street, Suite 600
Chicago, IL 60606-7206
312/353-6401

U.S. Army Engineer District,
Detroit
P.O. Box 1027
Detroit, MI 48231-1027
313/226-6762

U.S. Army Engineer District,
Rock Island
P.O. Box 2004
Rock Island, IL 61204-2004
309/794-5224

U S. Army Engineer District,
St. Paul
190 5th Street East
St. Paul, MN 55101-1638
612/220-0200

U.S. Army Engineer Division,
North Pacific
P.O. Box 2870
Portland, OR 97208-2870
503/326-3700

U.S. Army Engineer District,
Alaska
P.O. Box 898
Anchorage, AK 99506-0898
907/753-2504

U.S. Army Engineer District,
Portland
P.O. Box 2946
Portland, OR 97208-2946
503/326-6000

U.S. Army Engineer District,
Seattle
P.O. Box 3755
Seattle, WA 98124-2255
206/764-3690

U.S. Army Engineer District,
Walla Walla
201 North 3rd Avenue
Walla Walla, WA 99362-1876
509-527-7700

U.S. Army Engineer Division, Ohio River
P.O. Box 1159
Cincinnati, OH 45201-1159
513/684-3002

U.S. Army Engineer District, Huntington
502 8th Street
Huntington, WV 25701-2070
304/529-5395

U.S. Army Engineer District, Louisville
P.O. Box 59
Louisville, KY 40201-0059
502/582-5601

U.S. Army Engineer District, Nashville
P.O. Box 1070
Nashville, TN 37202-1070
615/736-5626

U.S. Army Engineer District, Pittsburgh
Room 1828
William S. Moorehead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222-4186
412/644-6800

U.S. Army Engineer Division, Pacific Ocean
Building 230
Fort Shafter, HI 96858-5440
808/438-1500

U.S. Army Engineer District, Honolulu
Building 230
Ft. Shafter, HI 96858-5440
808/438-1069

U.S. Army Engineer Division, South Atlantic
Room 493
77 Forsyth Street, SW
Atlanta, GA 30335-6801
404/331-6711

U.S. Army Engineer District, Charleston
P.O. Box 919
Charleston, SC 29402-0919
803/727-4344

U.S. Army Engineer District, Jacksonville
P.O. Box 2970
Jacksonville, FL 32232-0019
904/232-2241

U.S. Army Engineer District, Mobile
P.O. Box 2288
Mobile, AL 36628-0001
334/690-2511

U.S. Army Engineer District, Savannah
P.O. Box 889
Savannah, GA 31402-0889
912/652-5226

U.S. Army Engineer District, Wilmington
P.O. Box 1890
Wilmington, NC 28402-1890
910/251-4501

U.S. Army Engineer Division, South Pacific
630 Sansome Street, Room 720
San Francisco CA 94111-2206
415/705-1414

U.S. Army Engineer District, Los Angles
P.O. Box 2711
Los Angeles, CA 90053-2325
213/894-5300

U.S. Army Engineer District, Sacramento
1325 J Street
Sacramento, CA 95814-2922
916/557-7490

U.S. Army Engineer District, San Francisco
211 Main Street
San Francisco, CA 94105-1905
415/744-3021

U.S. Army Engineer Division, Southwestern
1114 Commerce Street
Dallas, TX 75242-0216
214/767-2502

U.S. Army Engineer District, Albuquerque
P.O. Box 1580
Albuquerque, NM 87103-1580
505/766-2731

U.S. Army Engineer District, Fort Worth
P.O. Box 17300
Fort Worth, TX 76102-0300
817/334-2300

U.S. Army Engineer District Galveston
P.O. Box 1229
Galveston, TX 77553-1229
409/766-3001

U.S. Army Engineer District Little Rock
P.O. Box 867
Little Rock, AR 72203-0867
501/324-5531

U.S. Army Engineer District, Tulsa
P.O. Box 61
Tulsa, OK 74121-0061
918/669-7201

ATTACHMENT D

Key Word Index

Key Word Index

APPENDIX A

LEGISLATION PERTINENT TO THE WATER SUPPLY PROGRAM

DECEMBER 1996

Table of Contents

COMPENDIUM OF LEGISLATION

1. Public Law 57-161, The 1902 Reclamation Act, 17 June 1902. This act *established irrigation in the West as a National policy.* The Act authorized the Secretary of the Interior to locate, construct, operate and maintain works for the storage, diversion, and development of waters for the reclamation of arid and semi-arid lands in the Western States (32 Stat. 388, 43 U.S.C. 1457).

2. Public Law 78-534, 1944 Flood Control Act, 22 December 1944.

a. Section 6, *Contracts for Surplus Water*, authorized disposal by the Secretary of the Army, for domestic and industrial uses, of surplus water available at reservoirs (58 Stat. 890, 33 U.S.C. 708). (See Page A-5 for complete text)

b. Section 8, *Additional Irrigation Works*, provided that Corps reservoirs may include irrigation as a purpose in 17 western states (58 Stat. 891, 43 U.S.C. 390). These provisions were modified by Section 931 of Public Law 99-662. (See Page A-7 for complete text, as amended)

3. Public Law 84-99, Emergency Flood Control Work, 28 June 1955. This act *amends Section 5 of the 1941 Flood Control Act, as amended.* This act authorized an emergency fund, with replenishment on an annual basis, for flood emergency preparation, flood fighting and rescue operations or for repair or restoration of flood control work threatened or destroyed by flood including strengthening or extending deemed necessary by the Chief of Engineers (69 Stat. 186, 33 U.S.C. 701n). These provisions were modified by Section 82 of Public Law 93-251 and by Section 2 of Public Law 95-51. (See Page A-9 for complete text, as amended)

4. Public Law 85-500, 1958 River and Harbor Act, 3 July 1958. Title III of this act is entitled *The Water Supply Act of 1958.* Section 301 provided that storage may be included for present and future municipal or industrial water supply in Corps or Bureau of Reclamation projects, the costs plus interest to be repaid by non-Federal entities within the life of the project but not to exceed 50 years after first use for water supply. No more than 30 percent of total project costs may be allocated to future demands. An interest-free period, until supply is first used, but not to exceed ten years, was permitted (72 Stat. 319, 43, U.S.C. 390b). These provisions were modified by Section 10 of Public Law 87-88 and Section 932 of Public Law 99-662. (See Page A-13 for complete text, as amended)

5. Public Law 87-88, Water Pollution Control Act Amendments of 1961, 20 July 1961.

a. Section 2(b)(1), amended existing law to provide for the *consideration of storage in Federal projects for water quality control*, except that such storage shall not be a substitute for adequate treatment or control at the source (75 Stat. 204, 33 U.S.C. 1153). Amended by Section 102(b), Public Law 92-500.

b. Section 10, *Water Supply Act of 1958 Amendments*, modified the 1958 Water Supply Act with respect to construction cost payments for future water supply demands (75 Stat. 210).

6. Public Law 88-140, 16 October 1963. This law, *Permanent Right to Storage*, extended non-Federal right to use reservoir water supply storage to the physical life of the project. This removed an uncertainty as to the continued availability of the storage space after the 50-year maximum period previously allowed in contracts (77 Stat. 249, 43 U.S.C. 390-c-e). (See Page A-15 for complete text)

7. Public Law 90-577, 16 October 1968. This law, the *Intergovernmental Cooperation Act of 1968*, provides for cooperation and coordination of activities among levels of government, improved administration of programs for technical services to states and local governments, intergovernmental coordination on policy and administration of development assistance programs within urban areas, and periodic congressional review of such grants-in-aid programs (82 Stat. 1098; 42 U.S.C. 4201).

8. Public Law 91-611, River and Harbor and Flood Control Act of 1970, 31 December 1970.

a. Section 216, *Completed Project Review*, authorized review and report to Congress of the operation of completed projects when found advisable due to significantly changed physical or economic conditions.

b. Section 221, *Written Agreement*, provides that the construction of any water resources project by the Corps shall not be commenced until each non-Federal interest has entered into a written agreement to furnish its required cooperation for the project (84 Stat. 1831, 42 U.S.C. 1962d-5b). Clarified by Section 4 of Public Law 92-222 and amended by Section 912(a) of Public Law 99-662. (See Page A-17 for complete text, as amended)

9. Public Law 92-222, River Basin Monetary Authorization Act of 1971, 23 December 1971. Section 4, *Written Agreement*, clarifies that Section 221 of Public Law 91-611 does not apply to storage for future water supply (85 Stat. 799).

10. Public Law 93-251, Water Resources Development Act of 1974, 7 March 1974.

a. Section 22, *Planning Assistance to States*, provides authority for cooperating with any state in preparation of comprehensive plans for water resources development, utilization, and conservation (88 Stat. 21, 42 U.S.C. 1962d-16). This section has been amended by Section 168 of Public Law 94-587 (increase of monetary limits only), Section 605 of Public Law 96-597, Section 921 of Public Law 99-662 (increase in monetary limits only), Section 319 of Public Law 101-640, Section 208 of Public Law 102-580, and Section 221 of Public Law 104-303. (See Page A-19 for complete text, as amended)

b. Section 82, *Emergency Water Supplies*, modified Section 5 of the 1941 Flood Control Act, as amended, to authorize providing emergency supplies of clean drinking water when contaminated supplies are a threat to public health and welfare of locality. Contamination must result from flood (88 Stat. 34).

11. Public Law 95-51, Disaster Relief Act of 1974 Appropriations, 20 June 1977. Section 2 amends Section 5 of the 1941 Flood Control Act, as amended by Public Law 84-99 (Emergency Flood Control Funds, 28 June 1955), to allow the Corps to provide *Emergency Supplies of Water* and to construct wells in drought areas (91 Stat. 233).

12. Public Law 96-597, Appropriations Act, U.S. Insular Areas. Section 605 amends the provisions of Section 22, Public Law 93-251 *(Planning Assistance to States)*, applicable to Guam, American Samoa, the Virgin Islands, the Northern Marianas, and the Trust Territory of the Pacific Islands (94 Stat. 3482).

13. Public Law 99-662, Water Resources Development Act of 1986, 17 November 1986.

a. Section 103 (c), *Construction Cost Sharing*, established new cost sharing requirements for municipal and industrial water supply and for agricultural water supply (100 Stat. 4085).

b. Section 105, *Study Cost Sharing*, established a requirement that, for Corps feasibility studies, appropriate non-Federal interests contribute 50 percent of the study costs (100 Stat. 4088).

c. Section 912(a), *Section 221 Agreements*, amends Section 221 of the Flood Control Act of 1970 with respect to written agreements for local cooperation and has added provisions designed to enforce local fulfillment of the agreement (100 Stat. 4189).

d. Section 707, *Capital Investment Needs for Water Resources*, authorized the Assistant Secretary of the Army for Civil Works to estimate long term capital investment needs for, among other things, municipal and industrial water supply (100 Stat. 4158). This section together with Section 729 of Public Law 99-662, provided the impetus for the *National Drought Study*.

e. Section 729, *Study of Water Resources Needs of River Basins and Regions*, requires the Assistant Secretary of the Army for Civil Works, in coordination with the Secretary of the Interior and in consultation with other governmental agencies, to study "water resources needs of river basins and regions of the United States." This section specifically requires consultation with "State, interstate, and local governments" (100 Stat. 4164). This section together with Section 707 of Public Law 99-662, provided the impetus for the *National Drought Study*.

f. Section 917, *Emergency and Disaster Authority*, further amends Section 5 of the 1941 Flood Control Act, as amended, to authorize provision of emergency supplies of clean water, whether for drinking or other critical need (100 Stat. 4192).

g. Section 931, *Interim Use of Water Supply for Irrigation*, amends Section 8 of the 1944 Flood Control Act to authorize interim allocation of future municipal and industrial water supply storage in Corps reservoirs for irrigation purposes (100 Stat. 4196).

h. Section 932, *Water Supply Act Amendments*, amends the 1958 Water Supply Act in the following respects; eliminates the 10-year interest free period for future water supply; modifies the interest rate formula; limits the repayment period to 30 years; and requires allocated annual operation, maintenance and replacement costs to be reimbursed annually. These amendments apply only to Corps projects and not to Bureau of Reclamation projects (100 Stat. 4196).

i. Section 1203, *Dam Safety*, requires non-Federal interests which are participating in reimbursable purposes of a project to share in the costs of modifying Corps dams and related facilities resulting from changes deemed necessary for safety purposes (100 Stat. 4263).

14. Public Law 101-640, Water Resources Development Act of 1990, approved 28 November 1990.

a. Section 310(b), *Public Participation*, directs the Secretary of the Army to ensure that significant opportunities for public participation are provided in developing or revising reservoir operating manuals.

b. Section 319, *Fees for Development of State Water Plans.* Amends Section 22 of Public Law 93-251, as amended, to requires fees for the development of state water plans, the establishment of a collection procedure, a phase-in for the fees, and how the fees are to be deposited and used (104 Stat. 4642).

c. Section 322, *Reduced Price for Certain Water Supply Storage*, provides that a small of amount of water supply storage in Corps reservoir projects may be made available for low income communities at a reduced price (104 Stat. 4643, 33 U.S.C. 2324). (See Page A-21 for complete text)

15. Public Law 102-580, Water Resources Development Act of 1992, 31 October 1992. Section 208 *(Fees for Development of State Water Plans)*, amends Section 22 of Public Law 93-251, as amended, to provide for a credit for in-kind services and to include "Indian Tribes" as available for assistance under this law (106 Stat. 4829).

16. Public Law 104-303, Water Resources Development Act of 1996, 12 October 1996. Section 221, *Planning Assistance to States*, amends Section 22 of the Water Resources Development Act of 1974, as amended, to expand the areas of planning effort to include watersheds and ecosystems, and expands the annual program budget to $10,000,000 and the per state expenditure to $500,000.

TEXT OF MAJOR LEGISLATIVE LANDMARKS

PUBLIC LAW 78-534
1944 FLOOD CONTROL ACT
33 U.S.C. § 708

Section 6; Contracts for Surplus Water (58 Stat. 890). That the Secretary of War is authorized to make contracts with States, municipalities, private concerns, or individuals, at such prices and on such terms as he may deem reasonable, for domestic and industrial uses for surplus water that may be available at any reservoir under the control of the War Department: *Provided,* That no contracts for such water shall adversely affect then existing lawful uses of such water. All moneys received from such contracts shall be deposited in the Treasury of the United States as miscellaneous receipts.

Approved December 22, 1944.

PUBLIC LAW 78-534
1944 FLOOD CONTROL ACT
43 U.S.C. § 390

Section 8; Additional Irrigation Works, as amended (58 Stat. 891). Hereafter, whenever the Secretary of War determines, upon recommendation by the Secretary of the Interior that any dam and reservoir project operated under the direction of the Secretary of War may be utilized for irrigation purposes, the Secretary of the Interior is authorized to construct, operate and maintain, under the provisions of the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto), such additional works in connection therewith as he may deem necessary for irrigation purposes. Such irrigation works may be undertaken only after a report and findings thereon have been made by the Secretary of the Interior as provided in said Federal reclamation laws and after subsequent specific authorization of the Congress by an authorization Act; and, within the limits of the water users' repayment ability such report may be predicated on the allocation to irrigation of an appropriate portion of the cost of structures and facilities used for irrigation and other purposes. Dams and reservoirs operated under the direction of the Secretary of War may be utilized hereafter for irrigation purposes only in conformity with the provisions of this section, but the foregoing requirement shall not prejudice lawful uses now existing: *Provided,* That this section shall not apply to any dam or reservoir heretofore constructed in whole or in part by the Army engineers, which provides conservation storage of water for irrigation purposes. In the case of any reservoir project constructed and operated by the Corps of Engineers, the Secretary of the Army is authorized to allocate water which was allocated in the project purpose for municipal and industrial water supply and which is not under contract for delivery, for such periods as he may deem reasonable, for the interim use for irrigation purposes of such storage until such storage is required for municipal and industrial water supply. No contracts for the interim use of such storage shall be entered into which would significantly affect then-existing uses of such storage.

Approved December 22, 1944.

As amended by Section 931, Public Law 99-662 (100 Stat. 4196).

PUBLIC LAW 84-99
EMERGENCY FLOOD CONTROL WORK
33 U.S.C. § 701n
(69 Stat. 186)

An act to amend section 5 of the Flood Control Act of August 18, 1941 (55 Stat. 650), as amended, pertaining to flood emergencies; extraordinary wind, wave, or water damage to federally authorized hurricane or shore protective structures; emergency supplies of water; cost and benefit feasibility assessment factors; drought; well construction; and water transportation.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That: Section 5 of the Flood Control Act of August 18, 1941, as amended, is hereby further amended to read as follows:

(a)(1) There is authorized an emergency fund to be expended in preparation for emergency response to any natural disaster, in flood fighting and rescue operations, or in the repair or restoration of any flood control work threatened or destroyed by flood, including the strengthening, raising, extending, or other modification thereof as may be necessary in the discretion of the Chief of Engineers for the adequate functioning of the work for flood control; in the emergency protection of federally authorized hurricane or shore protection being threatened when in the discretion of the Chief of Engineers such protection is warranted to protect against imminent and substantial loss to life and property; in the repair and restoration of any federally authorized hurricane or shore protective structure damaged or destroyed by wind, wave, or water action of other than an ordinary nature when in the discretion of the Chief of Engineers such repair and restoration is warranted for the adequate functioning of the structure for hurricane or shore protection. The emergency fund may also be expended for emergency dredging for restoration of authorized project depths for Federal navigable channels and waterways made necessary by flood, drought, earthquake, or other natural disasters. In any case in which the Chief of Engineers is otherwise performing work under this section in an area for which the Governor of the affected State has requested a determination that an emergency exists or a declaration that a major disaster exists under the Disaster Relief and Emergency Assistance Act [42 U.S.C.A. § 5121 et seq.], the Chief of Engineers is further authorized to perform on public and private lands and waters for a period of ten days following the Governor's request any emergency work made necessary by such emergency or disaster which is essential for the preservation of life and property, including, but not limited to, channel clearance, emergency shore protection, clearance and removal of debris and wreckage endangering public health and safety, and temporary restoration of essential public facilities and services. The Chief of Engineers, in the exercise of his discretion, is further authorized to provide emergency supplies of clean water, on such terms as he determines to be advisable, to any locality which he finds is confronted with a source of contaminated water causing or likely to cause a substantial threat to the public health and welfare of the inhabitants of the locality. The appropriation of such moneys for the initial establishment of this fund and for its replenishment on an annual basis, is hereby authorized: *Provided,* That pending the appropriation of sums to such emergency fund, the Secretary of the Army may allot, from existing

flood-control appropriations, such sums as may be necessary for the immediate prosecution of the work herein authorized, such appropriations to be reimbursed from the appropriation herein authorized when made. The Chief of Engineers is authorized, the prosecution of work in connection with rescue operations, or in conducting other flood emergency work, to acquire on rental basis such motor vehicles, including passenger cars and buses, as in his discretion are deemed necessary.

(2) In preparing a cost and benefit feasibility assessment for any emergency project described in paragraph (1), the Chief of Engineers shall consider the benefits to be gained by such project for the protection of -

(A) residential establishments;

(B) commercial establishments, including the protection of inventory; and

(C) agricultural establishments, including the protection of crops.

(b)(1) The Secretary, upon a written request for assistance under this paragraph made by any farmer, rancher, or political subdivision within a distressed area, and after a determination by the Secretary that (A) as a result of the drought such farmer, rancher, or political subdivision has an inadequate supply of water, (B) an adequate supply of water can be made available to such farmer, rancher, or political subdivision through the construction of a well, and (C) as a result of the drought such well could not be constructed by a private business, the Secretary, subject to paragraph (3) of this subsection, may enter into an agreement with such farmer, rancher, or political subdivision for the construction of such well.

(2) The Secretary, upon a written request for assistance under this paragraph made by any farmer, rancher, or political subdivision within a distressed area, and after a determination by the Secretary that as a result of the drought such farmer, rancher, or political subdivision has an inadequate supply of water and water cannot be obtained by such farmer, rancher, or political subdivision, the Secretary may transport water to such farmer, rancher, or political subdivision by methods which include, but are not limited to, small-diameter emergency water lines and tank trucks, until such time as the Secretary determines that an adequate supply of water is available to such farmer, rancher, or political subdivision.

(3)(A) Any agreement entered into by the Secretary pursuant to paragraph (1) of this subsection shall require the farmer, rancher, or political subdivision for whom the well is constructed to pay to the United States the reasonable cost of such construction, with interest, over such number of years, not to exceed thirty, as the Secretary deems appropriate. The rate of interest shall be that rate which the Secretary determines would apply if the amount to be repaid was a loan made pursuant to section 636(b)(2) of Title 15.

(B) The Secretary shall not construct any well pursuant to this subsection unless the farmer, rancher, or political subdivision for whom the well is being constructed has obtained, prior to construction, all necessary State and local permits.

(4) The Federal share for the transportation of water pursuant to paragraph (2) of this subsection shall be 100 per centum.

(5) For purposes of this subsection -

(A) the term "construction" includes construction, reconstruction, or repair;

(B) the term "distressed area" means an area which the Secretary determines due to drought conditions has an inadequate water supply which is causing, or is likely to cause, a substantial threat to the health and welfare of the inhabitants of the area including threat of damage or loss of property;

(C) the term "political subdivision" means a city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over the water supply of such public body;

(D) the term "reasonable cost" means the lesser of (i) the cost to the Secretary of constructing a well pursuant to this subsection exclusive of the cost of transporting equipment used in the construction of wells or (ii) the cost to a private business of constructing such well;

(E) the term "Secretary" means the Secretary of the Army, acting through the Chief of Engineers; and

(F) the term "State" means a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Trust Territory of the Pacific Islands.

Approved June 28, 1955;
As amended by:
Section 82, Public Law 93-251 (88 Stat. 34); and
Section 2, Public Law 95-51 (91 Stat. 233).

PUBLIC LAW 85-500
1958 RIVER AND HARBOR ACT
TITLE III; WATER SUPPLY ACT OF 1958, as amended
43 U.S.C. § 390b
(72 Stat. 319)

Sec. 301. (a) It is hereby declared to be the policy of the Congress to recognize the primary responsibilities of the States and local interests in developing water supplies for domestic, municipal, industrial, and other purposes and that the Federal Government should participate and cooperate with States and local interests in developing such water supplies in connection with the construction, maintenance, and operation of Federal navigation, flood control, irrigation, or multiple purpose projects.

(b) In carrying out the policy set forth in this section, it is hereby provided that storage may be included in any reservoir project surveyed, planned, constructed or to be planned, surveyed and/or constructed by the Corps of Engineers or the Bureau of Reclamation to impound water for present or anticipated future demand or need for municipal or industrial water, and the reasonable value thereof may be taken into account in estimating the economic value of the entire project: *Provided,* That the cost of any construction or modification authorized under the provisions of this section shall be determined on the basis that all authorized purposes served by the project shall share equitably in the benefits of multiple purpose construction, as determined by the Secretary of the Army or the Secretary of the Interior, as the case may be; *Provided further,* That before construction or modification of any project including water supply provisions for present demand is initiated, State or local interests shall agree to pay for the cost of such provisions in accordance with the provisions of this section; *And provided further,* That (1) for Corps of Engineers projects, not to exceed 30 percent of the total estimated cost of any project may be allocated to anticipated future demands, and (2) for Bureau of Reclamation projects, not to exceed 30 percentum of the total estimated cost of any project may be allocated to anticipated future demands where State or local interests give reasonable assurances, and there is reasonable evidence, that such demands for the use of such storage will be made within a period of time which will permit paying out the costs allocated to water supply within the life of the project; *And provided further,* That for Corps of Engineers projects, the Secretary of the Army may permit the full non-Federal contribution to be made, without interest, during construction of the project, or, with interest over a period of not more than thirty years from the date of completion, with repayment contracts providing for recalculation of the interest rate at, five-year intervals, and for Bureau of Reclamation projects the entire amount of the construction costs, including interest during construction, allocated to water supply shall be repaid within the life of the project but in no event to exceed fifty years after the project is first used for the storage of water for water supply purposes, except that (1) no payment need be made with respect to storage for future water supply until such supply is first used, and (2) no interest shall be charged on such cost until such supply is first used, but in no case shall the interest-free period exceed ten years. For Corps of Engineers projects, all annual operation, maintenance, and replacement costs for municipal and industrial water supply storage under the provisions of this section shall be reimbursed

from State or local interests on an annual basis. For Corps of Engineers projects, any repayment by a State or local interest shall be made with interest at a rate to be determined by the Secretary of the Treasury, taking into consideration the average market yields on outstanding marketable obligations of the United States with remaining periods to maturity comparable to the reimbursement period, during the month preceding the fiscal year in which costs for the construction of the project are first incurred (or, when a recalculation is made), plus a premium of one-eight of one percentage point for transaction costs. For Bureau of Reclamation projects, the interest rate used for purposes of computing interest during construction and interest on the unpaid balance shall be determined by the Secretary of the Treasury, as of the beginning of the fiscal year in which construction is initiated, on the basis of the computed average interest rate payable by the Treasury upon its outstanding marketable public obligations, which are neither due nor callable for redemption for fifteen years from date of issue. The provisions of this subsection insofar as they relate to the Bureau of Reclamation and the Secretary of Interior shall be alternative to and not a substitute for the provisions of the Reclamation Projects Act of 1939 (58 Stat.1187) relating to the same project.

(c) The provisions of this section shall not be construed to modify the provision of section 1 and section 8 of the Flood Control Act of 1944 (58 Stat. 887), as amended and extended, or the provisions of section 8 of the Reclamation Act of 1902 (32 Stat. 390).

(d) Modifications of a reservoir project heretofore authorized, surveyed, planned, or constructed to include storage as provided in subsection (b), which would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes, shall be made only upon the approval of Congress as now provided by law.

Sec. 302. Title III of this Act may be cited as the "Water Supply Act of 1958".

Approved July 3, 1958;

As amended by Section 10, Public Law 87-88 (79 Stat. 210); and

As amended by Section 932 of Public Law 99-662 (100 Stat. 4196).

PUBLIC LAW 88-140
PERMANENT RIGHTS TO STORAGE
43 U.S.C. § 390-c-e
(77 Stat. 249)

An act defining the interest of local public agencies in water reservoirs constructed by the Government which have been financed partially by such agencies.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, cognizant that many States and local interests have in the past contributed to the Government, or have contracted to pay to the Government over a specified period of years, money equivalent to the cost of providing for them water storage space at Government-owned dams and reservoirs, constructed by the Corps of Engineers of the United States Army, and that such practices will continue, and, that no law defines the duration of their interest in such storage space, and realizing that such States and local interests assume the obligation of paying substantially their portion of the cost of providing such facilities, their right to use may be continued during the existence of the facility as hereinafter provided.

Sec. 2. That this Act be applicable to all dams and reservoirs heretofore or hereafter constructed by the United States Government (acting through the Corps of Engineers of the United States Army) wherein either a part of the construction cost thereof shall have been contributed or may be contributed by States or local interests (hereinafter called "local interests") or local interests have acquired or may acquire rights to utilize certain storage space thereof by making payments during the period of such use as specified in the agreement with the Government and wherein the amount of money paid, exclusive of interest, is equivalent to the cost of providing that part of such dam and reservoir which is allocated to such use, whether such share of cost, shall have been determined by the "incremental cost" method or by the "separable costs-remaining benefits" method or by any other method. Included among the dams and reservoirs affected by this Act are those constructed by the Corps of Engineers of the Department of the Army, but nothing in this Act shall be construed to affect or modify section 8 of the Flood Control Act of 1944.

Sec. 3. The right thus acquired by any such local interest is hereby declared to be available to the local interest so long as the space designated for that purpose may be physically available, taking into account such equitable reallocation of reservoir storage capacities among the purposes served by the project as may be necessary due to sedimentation, and not limited to the term of years which may be prescribed in any lease agreement or other agreement with the Government, but the enjoyment of such right will remain subject to performance of its obligations prescribed in such lease agreement or agreement executed in reference thereto. Such obligations will include continued payment of annual operation and maintenance costs allocated to water supply. In addition, local interests shall bear the costs allocated to the water supply of any necessary reconstruction, rehabilitation, or replacement of project features which may be require to continue satisfactory operation of the project. Any affected local interest may utilize such facility so long as it is operated by the Government. In the event that the Government concludes that it can no longer usefully and economically maintain and operate such facility, the responsible department or agency

of the Government is authorized to negotiate a contract with the affected local interest under which the local interest may continue to operate such part of the facility as is necessary for utilization of the storage space allocated to it, under terms which will protect the public interest and provided that the Government is effectively absolved from all liability in connection with such operation.

Sec. 4. Upon application of any affected local interest its existing lease or agreement with the Government will be revised to evidence the conversion of its rights to the use of the storage as prescribed in this Act.

Approved October 16, 1963.

PUBLIC LAW 91-611
1970 RIVER AND HARBOR AND FLOOD CONTROL ACT
42 U.S.C. § 1962d-5b

Section 221; Water Resources Projects; Written Requirements, as amended (84 Stat. 1831).

(a) After December 31, 1970, the construction of any water resources project, or an acceptable separable element thereof, by the Secretary of the Army, acting through the Chief of Engineers, or by a non-Federal interest where such interest will be reimbursed for such construction under the provisions of section 1962d-5a of this title or under any other provision of law, shall not be commenced until each non-Federal interest has entered into a written agreement with the Secretary of the Army to furnish its required cooperation for the project or the appropriate element of the project, as the case may be. In any such agreement entered into by a State, or a body politic of the State which derives its powers from the State constitution, or a governmental entity created by the State legislature, the agreement may reflect that it does not obligate future State legislative appropriations for such performance and payment when obligation future appropriations would be inconsistent with State constitutional or statutory limitations.

(b) A non-Federal interest shall be a legally constituted public body with full authority and capability to perform the terms of its agreement and to pay damages, if necessary in the event of failure to perform.

(c) Every agreement entered into pursuant to this section shall be enforceable in the appropriate district court of the United States.

(d) After commencement of construction of a project, the Chief of Engineers may undertake performance of those items of cooperation necessary to the functioning of the project for its purposes, if he has first notified the non-Federal interest of its failure to perform the terms of its agreement and has given such interest a reasonable time after such notification to so perform.

(e) The Secretary of the Army, acting through the Chief of Engineers, shall maintain a continuing inventory of agreements and the status of their performance, and shall report thereon annually to Congress.

(f) This section shall not apply to any project the construction of which was commenced before January 1, 1972, or the assurances for future demands required by the Water Supply Act of 1958, as amended [43 U.S.C.A. § 390b].

Approved December 31, 1970.
Amended by:
Section 4, Public Law 92-222, 85 Stat. 799; and
Section 912(a), Public Law 99-662, 100 Stat. 4189.

PUBLIC LAW 93-251
1974 WATER RESOURCES DEVELOPMENT ACT
42 U.S.C. § 1962d-16

Section 22; Planning Assistance to States, as amended (88 Stat. 21).

(a) The Secretary of the Army, acting through the Chief of Engineers, is authorized to cooperate with any State in the preparation of comprehensive plans for the development, utilization, and conservation of the water and related resources of drainage basins, watersheds, or ecosystems located within the boundaries of such State and to submit to Congress reports and recommendations with respect to appropriate Federal participation in carrying out such plans.

(b) Fees.-

(1) Establishment and Collection. - For the purpose of recovering 50 percent of the total cost of providing assistance pursuant to this section, the Secretary of the Army is authorized to establish appropriate fees, as determined by the Secretary, and to collect such fees from States and other non-Federal public bodies to whom assistance is provided under this section.

(2) In-Kind Services.- Up to ½ of the non-Federal contribution for preparation of a plan subject to the cost sharing program under this subsection may be made by the provision of services, material, supplies, or other in-kind services necessary to prepare the plan.

(3) Deposit and Use. - Fees collected under this subsection shall be deposited into the account in the Treasury of the United States entitled, "Contributions and Advances, Rivers and Harbors, Corps of Engineers 8862" and shall be available until expended to carry out this section.

(c) There is authorized to be appropriated not to exceed $10,000,000 annually to carry out the provisions of this section except that not more than $500,000 shall be expended in any one year in any one State.

(d) For the purposes of this section, the term "State" means the several States of the United States, Indian tribes, the Commonwealth of Puerto, Guam, American Samoa, the Virgin Islands, the Commonwealth of the Northern Marianas, and the Trust Territory of the Pacific Islands.

Approved March 7, 1974.
As amended by:
Section 168, Public Law 94-587, 90 Stat. 2936;
Section 605, Public Law 96-597, 94 Stat. 3482;
Section 921, Public Law 99-662, 100 Stat. 4194;
Section 319, Public Law 101-640, 104 Stat. 4642;
Section 208, Public Law 102-580, 106 Stat. 4829; and
Section 221, Public Law 104-303 (WRDA '96)

PUBLIC LAW 101-640
1990 WATER RESOURCE DEVELOPMENT ACT
33 U.S.C. § 2324

Section 322; Reduced Price for Certain Water Supply Storage (104 Stat. 4643).

(a) Provision of Storage Space.--If a low income community requests the Secretary to provide water supply storage space in a water resources development project operated by the Secretary and if the amount of space requested is available or could be made available through reallocation of water supply storage space in the project or through modifications to operation of the project, the Secretary may provide such space to the community at a price determined under subsection (c).

(b) Maximum Amount of Storage Space.--The maximum amount of water supply storage space which may be provided to a community under this section may not exceed an amount of water supply storage space sufficient to yield 2,000,000 gallons of water per day.

(c) Price.--The Secretary shall provide water supply storage space under this section at a price which is the greater of --

(1) the updated construction cost of the project allocated to provide such amount of water supply storage space or $100 per acre foot of storage space, whichever is less; and

(2) the value of the benefits which are lost as a result of providing such water supply storage space.

(d) Determinations.--For purposes of subsection (c), the determinations of updated construction costs and value of benefits lost shall be made by the Secretary on the basis of the most recent information available.

(e) Inflation Adjustment of Dollar Amount.--The $100 amount set forth in subsection (c) shall be adjusted annually by the Secretary for changes in the Consumer Price Index of All Urban Consumers published by the Bureau of Labor Statistics.

(f) Non-Federal Responsibilities.--Nothing in this section shall be construed as affecting the responsibility of non-Federal interests to provide operation and maintenance costs assigned to water supply storage provided under this section.

(g) Low Income Community Defined.--The term "low income community" means a community with a population of less than 20,000 which is located in a county with a per capita income less than the per capita income of two-thirds of the counties in the Unites States.

Approved November 28, 1990.

APPENDIX B

MODEL FORMATS FOR AGREEMENTS AND PERMITS

DECEMBER 1996

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MODEL FORMAT FOR
WATER SUPPLY STORAGE AGREEMENTS
THIS AGREEMENT DOES NOT REPRESENT A HQUSACE APPROVED MODEL AGREEMENT

WATER STORAGE AGREEMENT

BETWEEN THE UNITED STATES OF AMERICA

AND

_____

FOR

WATER STORAGE SPACE IN _____

THIS AGREEMENT, entered into this ____ day of _____, 19___, by and between THE UNITED STATES OF AMERICA (hereinafter called the "Government") represented by the District Engineer executing this agreement, and _____ _____ (hereinafter called the "User"*);

WITNESSETH THAT:

WHEREAS, the **Flood Control Act of 19 ___ (Public Law ___, ___Congress), authorized the construction, operation, and maintenance of the [Project]*** on [Waterway], [State], (hereinafter called the "Project"); and

WHEREAS, the User desires to enter into an agreement with the Government for the use of storage [included in the Project] [added to the Project by action of _____] for municipal and industrial water supply, and for payment of the cost thereof in accordance with the provisions of the Water Supply Act of 1958, as amended (43 U.S.C. 390b-f); and

WHEREAS, the User as shown in Exhibit "A" attached to and made a part of this agreement, is empowered to enter into an agreement with the Government and is vested with all necessary powers of accomplishment of the purposes of this agreement, [including those required by Section 221 of the Flood Control Act of 1970 (42 U.S.C. 1962d-5d) (as amended);]

NOW, THEREFORE, the Government and the User agree as follows:

ARTICLE 1 - Water Storage Space.

a. Project Construction. The Government, subject to the directions of Federal law and any limitations imposed thereby, [shall design and construct] [has designed and constructed] [shall modify] [has modified] the Project so as to include therein space for the storage of water by the User.

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* Other appropriate terms may be used in lieu of User here and uniformly throughout the agreement.

** Use correct authorization citation (e.g., WRDA of 19__, Public Law __-__).

*** Language in [ ] brackets is to be used or deleted as appropriate.

b. Rights of User.

(1) The User shall have the right to utilize an undivided ____ percent (estimated to contain _____ acre-feet after adjustment for sediment deposits) of the usable storage space in the Project between elevations _____ feet and _____ feet above National Geodetic Vertical Datum, which usable conservation storage space is estimated to contain _____ acre-feet after adjustment for sediment deposits. This storage space is to be used to impound water for [present] [present and anticipated future] [anticipated future] demand or need for municipal and industrial water supply. [___ percent (an estimated _____ acre-feet) of the space which User has a right to utilize is for present use water storage and] [_____ percent (an estimated _____ acre-feet) is for future use water storage.]

(2) The User shall have the right to withdraw water from the lake, or to order releases to be made by the Government through the outlet works in the Dam, subject to the provisions of Article 1c and to the extent the aforesaid storage space will provide; and shall have the right to construct all such works, plants, pipelines, and appurtenances as may be necessary and convenient for the purpose of diversion or withdrawals, subject to the approval of the District Engineer as to design and location. The grant of an easement for right-of-way, across, in and upon land of the Government at the Project shall be by a separate instrument in a form satisfactory to the Secretary of the Army, without additional cost to the User, under the authority of and in accordance with the provisions of 10 U.S.C. 2669 and such other authorities as may be necessary. Subject to the conditions of such easement, the User shall have the right to use so much of the Project land as may reasonably be required in the exercise of the rights and privileges granted under this agreement.

c. Rights Reserved. The Government reserves the right to control and use all storage in the Project in accordance with authorized Project purposes. The Government further reserves the right to take such measures as may be necessary in the operation of the Project to preserve life and/or property, including the right not to make downstream releases during such periods of time as are deemed necessary, in its sole discretion, to inspect, maintain, or repair the Project.

d. Quality or Availability of Water. The User recognizes that this agreement provides storage space for raw water only. The Government makes no representations with respect to the quality or availability of water and assumes no responsibility therefor, or for the treatment of the water.

e. Sedimentation Surveys.

(1) Sedimentation surveys will be made by the District Engineer during the term of this agreement at intervals not to exceed fifteen (15) years unless [the District Engineer determines that such surveys are unnecessary] [otherwise agreed to in writing by both parties]. When, in the opinion of the District Engineer, the findings of such survey indicate any Project purpose will be affected by unanticipated sedimentation distribution, there shall be an equitable redistribution of the sediment reserve storage space among the purposes served by the Project including municipal and industrial water supply. The total available remaining storage space in the Project will then be divided among the various Project features in the same ratio as was initially utilized. Adjusted pool elevations will be rounded to the nearest one-half foot. Such findings and the storage space allocated to municipal and industrial water supply shall be defined and described as an exhibit which will be made a part of this agreement and the water control manual will be modified accordingly.

(2) The Government assumes no responsibility for deviations from estimated rates of sedimentation, or the distribution thereof. Such deviations may cause unequal distribution of sediment reserve storage greater than estimated, and/or encroachment on the total storage at the Project.

ARTICLE 2 - Regulation of and Right to Use of Water. The regulation of the use of water withdrawn or released from the aforesaid storage space shall be the sole responsibility of the User. The User has the full responsibility to acquire in accordance with State laws and regulations, and, if necessary, to establish or defend, any and all water rights needed for utilization of the storage provided under this agreement. The Government shall not be responsible for diversions by others, nor will it become a party to any controversies involving the use of the storage space by the User except as such controversies may affect the operations of the Project by the Government.

ARTICLE 3 - Operation and Maintenance. The Government shall operate and maintain the Project and the User shall pay to the Government a share of the costs of such operation and maintenance as provided in Article 5. The User shall be responsible for operation and maintenance of all installations and facilities which it may construct for the diversion or withdrawal of water, and shall bear all costs of construction, operation and maintenance of such installations and facilities.

ARTICLE 4 - Measurement of Withdrawals and Releases. The User agrees to furnish and install, without cost to the Government, suitable meters or measuring devices satisfactory to the District Engineer for the measurement of water which is withdrawn from the Project by any means other than through the Project outlet works. The User shall furnish to the Government monthly statements of all such withdrawals. Prior to the construction of any facilities for withdrawal of water from the Project, the User will obtain the District Engineer's approval of the design, location and installation of the facilities including the meters or measuring devices. Such devices shall be available for inspection by Government representatives at all reasonable times. Releases from the water supply storage space through the Project outlet works shall be made in accordance with written schedules furnished by the User and approved by the District Engineer and shall be subject to Article 1c. The measure of all such releases shall be by means of a rating curve of the outlet works, or by such other suitable means as may be agreed upon prior to use of the water supply storage space.

ARTICLE 5 - Payments. In consideration of the right to utilize the aforesaid storage space [and the water supply conduit] in the Project for municipal and industrial water supply purposes, the User shall pay the following sums to the Government:

a. Project Investment Costs. (Include appropriate paragraph from the following.)

[(a) Project Investment Costs. (For projects operational or under construction as of 17 November 1986.)

(1) The User shall repay to the Government, at the times and with interest on the unpaid balance as hereinafter specified, the amounts stated below which, as shown in Exhibit "B" attached to and made a part of this agreement, constitute the entire [estimated] [actual] amount of the investment costs, including interest during construction, allocated to the water storage [and the water supply conduit] right acquired by the User under this agreement. The interest rate to be used for purposes of computing interest during construction and interest on the unpaid balance will be the coupon rate as determined by the Secretary of the Treasury on the basis set forth in the Water Supply Act of 1958, Title III of PL 85-500. For the Project, construction of which was initiated in FY ___ this interest rate is ____ percent.

The User shall repay:

100 *percent of the construction cost of specific water supply facilities, [estimated at] $_____
_____ percent of the total Project joint-use construction costs, [estimated at] $_____
Interest during construction, [estimated at] $_____

Total [estimated] amount of Project investment costs allocated to the User $_____

* Revise as necessary if there is more than one user of the water supply conduit in the Project or delete if inappropriate.

(2) The Project investment costs allocated to the storage space indicated in Article 1b(1) as being provided for present demand [and the water supply conduit] is [currently estimated at] $_____, on the basis of the costs presented in Exhibit "B". The amount of the Project investment costs allocated to the storage for present demand shall be paid within the life of the Project in not to exceed 30 years from [the plant-in-service date, _____] [the date the first agreement for water supply storage space in the Project was approved by the Secretary of the Army (or his duly authorized representative), _____] [the date of approval of this agreement by the Secretary of the Army (or his duly authorized representative)]. The payments shall be in equal consecutive annual installments, the first of which shall be due and payable within 30 days after the User is notified by the District Engineer [that the project is completed and operational for water supply purposes]. [of approval of this agreement by the Secretary of the Army (or his duly authorized representative)]. Annual installments thereafter will be due and payable on the anniversary date of the date of notification. Except for the first payment which will be applied solely to the retirement of principal, all installments shall include accrued interest on the unpaid balance at the rate provided above. The last annual installment shall be adjusted upward or downward when due to assure repayment of all of the investment costs allocated to the storage for present demand within 30 years (not to exceed the year _____) from the above date.

(3) The Project investment costs allocated to the storage space indicated in Article 1b(1) as being provided for future demand, is [currently estimated at] $_____ on the basis of the costs presented in Exhibit "B". No principal or interest payment with respect to this storage for future water supply is required to be made during the first 10 years following the plant-in-service date unless all or a portion of such storage is used during this period. The amount to be paid for any portion of such storage which is used shall be determined by multiplying the percentage of the total storage for future water supply which is placed in use by the total amount of the Project investment costs allocated to future water supply. Interest at the rate provided above will be charged on the amount of Project investment costs allocated to the storage for future water supply which is not being used from the tenth (10th) year following the plant-in-service date until the time when such storage is first used. The User will annually pay the interest as it becomes due until the storage is used. When any portion of the storage for future water supply is used, payment of both principal and interest for the portion used must be started, and the amount of the Project investment costs allocated thereto, with interest on the unpaid balance as provided above, shall be paid within the life of the Project in not to exceed 30 years from the date established in Article 5a(2). The payment for each portion shall be in equal consecutive annual installments [beginning within 30 days after the date of first use of such portion.] [commencing with the next anniversary of the notification date as stipulated in Article 5a(2). The first payment shall include interest on the investment cost of such portion from the date of first use of such portion to the next anniversary date as stipulated in Article 5a(2).] Annual installments thereafter will be due and payable on the anniversary date of the date of first use. Except for the first payment which will be applied solely to the retirement of principal, all installments shall

include accrued interest on the unpaid balance at the rate provided above. The last annual installment for any portion of the storage for future water supply shall be adjusted upward or downward when due to assure repayment of all of the investment costs allocated to such portion within the repayment period.

(4) An estimated schedule of annual payments for the water supply storage [and the water supply conduit] provided for present demand is attached as Exhibit "C" of this agreement. The annual payments as provided therein shall be made subject to Article 6. [Payment schedules for the storage provided for future water supply demands will be furnished by the District Engineer when use of such storage is started, and if based on estimated costs will be subject to Article 6.]

[(a) Project Investment Costs. (For Reallocations of Storage)

(1) The User shall repay to the Government, at the times and with interest on the unpaid balance as hereinafter specified, the amounts stated below which, as shown in Exhibit "B" attached to and made a part of this agreement, constitute the entire actual amount of costs allocated to the water storage right acquired by the User under this agreement. The amount of costs is based on [revenues foregone] [benefits foregone] [replacement cost] [updated cost of storage] [provisions of Section 322 of Public Law 101-640] [(other as appropriate)]. The interest rate to be used for purposes of computing interest on the unpaid balance will be the yield rate adjusted at five-year intervals as determined by the Secretary of the Treasury on the basis set forth in Section 932 of the 1986 Water Resources Development Act. For this agreement, the starting interest rate shall be that rate in effect at the time the agreement is approved. For FY _____, such rate is ___ percent. Should the agreement not be signed in FY _____, the amounts due herein will be adjusted to reflect the application of the appropriate rate.

(2) The cost allocated to the storage space indicated in Article 1b(1) is currently estimated at $ _____ on the basis of the costs presented in Exhibit "B". These costs shall be repaid within the life of the Project in not to exceed 30 years from the date of approval of this agreement by the Secretary of the Army. The payments shall be in equal consecutive annual installments, adjusted at 5-year intervals as shown in Exhibit "C". The first payment shall be due and payable within 30 days after the User is notified by the District Engineer [of approval of this agreement by the Secretary of the Army (or his duly authorized representative)] [that the project modification is completed and operational for water supply purposes.] Annual installments thereafter will be due and payable on the anniversary date of the date of notification. Except for the first payment which will be applied solely to the retirement of principal all installments shall include accrued interest on the unpaid balance at the adjustable rates as provided above. The last annual installment shall be adjusted upward or downward when due to assure repayment of all of the investment costs allocated to the storage within 30 years from the above date.]

[(a) Project Investment Costs. (For projects not yet under construction and for specific costs of construction associated with reallocations).

(1) The user shall repay to the Government, at the times as herein after specified, the amounts stated below which, as shown in Exhibit "B" attached to and made a part of this agreement, constitute the entire estimated amount of the construction costs allocated to the water storage [and the water supply conduit] right acquired by the User under this agreement.

The User shall repay:

[_____ percent of the Project construction cost of specific water supply facilities estimated at $_____.]
_____ percent of the Project joint-use construction cost allocated to water supply estimated at $_____.
Total estimated amount of Project construction costs allocated to the User is $_____.

(2) The Project construction costs allocated to the storage space indicated in Article 1b(1) as being provided for present demand [and the water supply conduit] is currently estimated at $_____, on the basis of the costs presented in Exhibit "B". The costs shall be repaid during the period of construction in the following manner. (Fill in as appropriate). The last payment shall be adjusted upward or downward as appropriate to assure repayment of all the construction cost allocated to the Users storage right during the period of construction.

(3) An estimated schedule of annual payments for the allocated water supply costs is attached as Exhibit "C" of this agreement.]

b. Reconstruction, Rehabilitation, and Replacement Costs. The User will be required to pay _____ percent of the cost of joint-use reconstruction, rehabilitation, and replacement of Project features which may be required to continue satisfactory operation of the Project. Payment of these costs shall be made either incrementally during construction or in lump sum (including interest during construction) upon completion of construction.

c. Annual Operation and Maintenance (O&M) Expense.

(1) Present Use Storage. The User will be required to pay [_____ percent of the annual O&M expense of specific water supply facilities. In addition, the User will be required to pay] _____ percent of the annual experienced joint-use O&M expense of the Project.

[(2) Future Use Storage. (This paragraph may be appropriate only for those projects operational or under construction as of 17 November 1986). [If storage for future water supply demands is used during the ten-year interest-free period, the share of the annual joint-use O&M expense which the User will be required to pay, [in addition to _____ percent of the annual O&M expense of specific water supply facilities,] will be increased commensurate with the User's percentage of future water supply storage being used, up to a total, for both present and future storage space, of _____ percent of such expense. Upon expiration of the ten-year interest free period, the User's share of such expense shall immediately become (the above maximum) percent.] [Since the ten-year interest-free period has expired the User shall be required to pay, [in addition to ____ percent of the annual O&M expense of specific water supply facilities,] ____ percent of the annual joint-use O&M expense.]

(3) Payment. Payments for O&M expense are due and payable in advance [on the plant-in-service date] [on the date for payment of Project investment costs as set forth in Article 5a(2)] and shall be based on O&M expense for the Project in the Government fiscal year most recently ended. The amount of each annual payment will be the actual experienced O&M expense ([specific plus] allocated joint-use) for the preceding fiscal year or an estimate thereof when actual expense information is not available. (The following bracketed language may be appropriate only for those projects operational or under construction as of 17 November 1986) [Should future increment usage during the ten-year interest-free period commence on other than the anniversary date of present usage, O&M expense for that portion of a year would be prorated by months in use prior to said anniversary date on the basis of the actual experienced joint-use O&M expense for the preceding Government fiscal year. The first payment, in such a case, shall

be due and payable within 30 days from the date of scheduled first use of storage space. Subsequent annual payments shall be made on the date for payment of project investment costs as set forth in Article 5a(2).]

d. Prepayment. The User shall have the right at any time to prepay the indebtedness under this Article, subject to redetermination of costs as provided for in Article 6, in whole or in part, with accrued interest thereon to the date of such prepayment.

e. Delinquent Payments. If the User shall fail to make any of the aforesaid payments when due, then the overdue payments shall bear interest compounded annually until paid. The interest rate to be used for overdue payments due under the provisions of Articles 5a, 5b, and 5c above shall be that determined by the Department of Treasury's Treasury Fiscal Requirements Manual (1 TFRM 6-8000, "Cash Management"). The amount charged on payments overdue for a period of less than one year shall be figured on a monthly basis. For example, if the payment is made within the first month after being overdue after a 15-day grace period from the anniversary date of the date of notification, one month's interest shall be charged. Thereafter a month's interest will be charged for any portion of each succeeding month that the payment is delinquent. This provision shall not be construed as giving the User a choice of either making payments when due or paying interest, nor shall it be construed as waiving any other rights of the Government, at law or in equity, which might result from any default by the User.

[f. Credit. (This paragraph may be appropriate only for those projects operational or under construction as of 17 November 1986 and is not applicable for interim use for agriculture.) If storage under a future-use agreement is used for other beneficial purposes during the interim between the end of the ten-year interest-free period and the time water supply use is initiated and the Federal Government receives payments for such interim use, then the User shall be credited with an appropriate share of payments made under Article 5b and 5c.]

ARTICLE 6 - Adjustment to Project Investment Cost. (In reallocations of storage, this article should be deleted). (This paragraph may be appropriate only for those projects operational or under construction as of 17 November 1986). The investment cost shown in this agreement and the exhibits is based on [[the Governments' best estimates. At the plant-in-service date and again within five years after such date, the District Engineer shall make a revised interim estimated determination of investment costs.] [actual costs at the plant-in-service date. Five years after such date, the District Engineer shall make a revised interim estimated determination of investment costs.] [actual costs five years from the plant-in-service date.] Further interim determinations of cost will be made at intervals considered necessary by the District Engineer. All interim cost estimates will take into account the actual costs to the extent they are then known. Such further interim determinations will be performed at such periods so as to keep the User reasonably informed as to the required payment. On each occasion of a cost adjustment, the annual payments thereafter due shall be adjusted upward or downward so as to provide for repayment of the balance due in equal installments during the remaining life of the repayment period. The last such investment cost adjustment will be made when the last of the construction general funds have been expended. Such final determination will include the Government's approved estimate of any pending real estate items and any known claims not previously accrued.] [actual final construction costs of the project.] Any further investment cost accruing to the User's water storage right shall be repaid under reconstruction, rehabilitation and replacement costs if capitalized or under operation and maintenance expense if not capitalized.

ARTICLE 7 - Duration of Agreement. This agreement shall become effective when approved by the Secretary of the Army (or his duly authorized representative) and shall continue in full force and effect for the life of the Project.

ARTICLE 8 - Permanent Rights to Storage. Upon completion of payments by the User, as provided in Article 5a herein, the User shall have a permanent right, under the provisions of the Act of 16 October 1963 (Public Law 88-140, 43 U.S.C. 390e), to the use of the water supply storage space in the Project as provided in Article 1, subject to the following:

a. The User shall continue payment of annual operation and maintenance costs allocated to water supply.

b. The User shall bear the costs allocated to water supply of any necessary reconstruction, rehabilitation, or replacement of Project features which may be required to continue satisfactory operation of the Project. Such costs will be established by the District Engineer and repayment arrangements shall be in writing in accordance with the terms and conditions set forth in Article 5b for reconstruction, rehabilitation, and replacement costs, and be made a part of this agreement.

c. Upon completion of payments by the User as provided in Article 5a, the District Engineer shall redetermine the storage space for municipal and industrial water supply in accordance with the provisions of Article 1e. Such redetermination of reservoir storage capacity may be further adjusted from time to time as the result of sedimentation resurveys to reflect actual rates of sedimentation and the exhibit revised to show the revised storage space allocated to municipal and industrial water supply.

d. The permanent rights of the User under this agreement shall be continued so long as the Government continues to operate the Project. In the event the Government no longer operates the Project, such rights may be continued subject to the execution of a separate agreement, or additional supplemental agreement providing for:

(1) Continued operation by the User of such part of the facility as is necessary for utilization of the water supply storage space allocated to it;

(2) Terms which will protect the public interest; and,

(3) Effective absolvement of the Government by the User from all liability in connection with such continued operation.

ARTICLE 9 - Release of Claims. (Project documents for certain projects require a specific hold and save harmless agreement from the water supply sponsor. In those cases, the project document language should be used.) The User shall hold and save the Government, including its officers, agents and employees harmless from liability of any nature or kind for or on account of any claim for damages which may be filed or asserted as a result of the storage in the Project, or withdrawal or release of water from the Project, made or ordered by the User or as a result of the construction, operation, or maintenance of the water supply facilities and appurtenances thereto owned and operated by the User except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE 10 - Assignment. The User shall not transfer or assign this agreement nor any rights acquired thereunder, nor suballot said water supply storage space or any part thereof, nor grant any interest, privilege or license whatsoever in connection with this agreement, without the approval of the Secretary of the Army, or his duly authorized representative provided that, unless contrary to the public interest, this restriction shall not be construed to apply to any water that may be obtained from the water supply storage space by the User and furnished to any third party or parties, nor any method of allocation thereof.

ARTICLE 11 - Officials Not to Benefit. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be

construed to extend to this agreement if made with a corporation for its general benefit.

ARTICLE 12 - Covenant Against Contingent Fees. The User warrants that no person or selling agency has been employed or retained to solicit or secure this agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the User for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this agreement without liability or in its discretion to add to the price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 13 - Protective Covenant. (Should be deleted when not applicable).

a. In order to utilize the water storage space, the User must acquire a [permit] [loan] from_____. Pending approval of this [permit] [loan], the Government shall reserve for the User _____acre-feet of storage for municipal and industrial water supply purposes for a period of up to _____ months. For this privilege, the User shall pay the Government $1.00 per acre-foot of storage space per year for a total of $_____. The payment is not refundable and shall be due and payable within 30 days after the User is notified by the District Engineer that the agreement has been approved. Should the User be unable to secure said [permit] [loan] it shall notify the District Engineer of said failure and the agreement shall be considered terminated at that time.

b. In the event of any termination pursuant to this Article, the User shall, upon request of the District Engineer, promptly remove at User's own expense, any facilities constructed on Project land for water withdrawal and restore premises around the removed facilities to a condition satisfactory to the District Engineer.

ARTICLE 14 - Environmental Quality. During any construction, operation, and maintenance by User of any facilities, specific actions will be taken to control environmental pollution which could result from such activity and to comply with applicable Federal, State, and local laws and regulations concerning environmental pollution. Particular attention should be given to:

a. Reduction of air pollution by control of burning, minimization of dust, containment of chemical vapors, control of engine exhaust gases and of smoke from temporary heaters;

b. Reduction of water pollution by control of sanitary facilities, storage of fuels and other contaminants, and control of turbidity and siltation from erosion;

c. Minimization of noise levels;

d. On-site and off-site disposal of waste and spoil; and,

e. Prevention of landscape defacement and damage.

ARTICLE 15 - Federal and State Laws.

a. Compliance. In acting under its rights and obligations hereunder, the User agrees to comply with all applicable Federal and State laws and regulations, including but not limited to the provisions of the Davis-Bacon Act (40 U.S.C. 276a et seq.); the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-333); Title 29, Code of Federal Regulations, Part 3; and Sections 210 and 305 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646).

b. Civil Rights Act. The User furnishes, as part of this agreement, an assurance (Exhibit D) that it will comply with Title VI of the Civil Rights Act of 1964 (78 Stat. 241, 42 U.S.C. 2000d, et seq.) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations.

c. Regulatory Program. Any discharges of water or pollutants into a navigable stream or tributary thereof resulting from the User's facilities and operations undertaken under this agreement shall be performed only in accordance with applicable Federal, State, and local laws and regulations.

d. Lobbying Activities. The User furnishes, as part of this agreement, a certification (Exhibit E and if applicable, a Disclosure of Lobbying Activities) that it will comply with Title 31 U.S.C. Section 1352 of the limitation on use of appropriated funds to influence certain Federal contracting and financial transactions (Public Law 101-121, October 23, 1989) and Federal Acquisition Regulation 52.203-12 issued pursuant thereto.

ARTICLE 16 - Definitions. (Delete those inappropriate)

a. Project [construction] [investment] costs. The initial cost of the Project, including: land acquisition; construction; [interest during construction on the value of land, labor, and materials used for planning and construction of the Project].

b. Interest during construction. An amount of interest which accrues on expenditures for the establishment of Project services during the period between the actual outlay and the time the Project is first made available for water storage.

c. Specific costs. The costs of Project features normally serving only one particular Project purpose.

d. Joint-use costs. The costs of features used for any two or more Project purposes.

e. Plant-in-service date. This date is the date that the Project is physically available to initiate deliberate impoundment for water supply purposes.

f. Annual operation and maintenance (O&M) expense. Annual expenses funded under the O&M, General account. These expenses include the daily Project O&M costs as well as those O&M costs which are not capitalized.

g. Reconstruction, rehabilitation and replacement cost. Costs funded under the Operation and Maintenance, General or Construction, General accounts, but not associated with initial Project investment or construction costs. Such expenditures are for costly, infrequent work that is non-recurring in nature and are intended to ensure continued satisfactory operation of the Project.

h. Fiscal year. Refers to the Government's fiscal year. This year begins on 1 October and ends on 30 September. The September calendar year corresponds to the fiscal year.

i. Life of the project. This is the physical life of the Project.

j. District Engineer. Refers to the District Engineer of the _____ District of the United States Army Corps of Engineers, or his/her successor or designee.

ARTICLE 17 - Approval of Agreement. This agreement shall be subject to the written approval of the Secretary of the Army or his duly authorized

representative and shall not be binding until so approved.

IN WITNESS WHEREOF, the parties have executed this agreement as of the day and year first above written.

APPROVED:

_____
1/

DATE: _____

THE UNITED STATES OF AMERICA

By _____
(District Engineer)

By [Insert name of User]
(Title)

(Necessary approvals and countersignatures required by State and local law with respect to execution on behalf of the User must be ascertained by the District Engineer and his Counsel and added to the signature block.)

1/ Fill-in Title of appropriate approving government official if other than District Commander. The approving official for HQUSACE is the Director of Civil Works.

EXHIBIT A
CERTIFICATION

(Format 1. To be used in agreements with entities that retain an attorney.)

I, _____, Attorney for the _____, have reviewed the foregoing agreement executed by _____, and as principal legal officer of/for the _____ certify that [I have considered the legal effect of Section 221 of the 1970 Flood Control Act (Public Law 91-611) and find that] ___ _____ is legally capable of entering into the obligations contained in the foregoing agreement and that, upon acceptance, it will be legally enforceable.

Given under my hand, this _____ day of _____ 19

_____

Attorney for the _____

(Format 2. To be used in agreements with entities that are incorporated, not retaining an attorney, but having a board of directors with an officer who has custody of the corporate seal.)

I, _____, Certify that I am _____ of the _____, named as User herein, that _____, who signed this agreement on behalf of the User was then _____ _____ of said User, and said agreement was duly signed for and on behalf of the said User by authority of its governing body and powers. In WITNESS WHEREOF, I have hereunto affixed my hand and the seal of said_____, this _____ day of_____ 19__.

(Seal) _____

(Format 3. To be used in agreements with individual users.)

Sate of _____ SS.
County of _____

Before me on the _____ day of _____ 19_ appeared _____who acknowledged to me that he/she signed the foregoing instrument for the purpose therein expressed.

(Seal) _____
[Notary Public]

EXHIBIT B COST COMPUTATIONS

I - LAKE STORAGE

Feature	Elevation (ft., NGVD)	Usable Storage* (ac. ft.)	Percent of Conservation Storage	Percent of Water Supply Storage
Flood control	___ - ___	____		
Conservation	___ - ___	____	100.00	
Water Supply	___ - ___	(____)	___	100.00
User		(____)	___	____
Present		(____)	___	____
Future		(____)	___	____
Others		(____)	___	____
Other purposes	___ - ___	(____)	___	
Other purposes	___ - ___	____		
Total		____		

*Storage remaining after 100 years of sedimentation from the date the project is operational.

II - ALLOCATION OF ESTIMATED CONSTRUCTION COST

Feature	Cost ($)	Percent of Project Joint-Use Construction Cost %
Flood control	_____	
Specific	(_____)	
Joint-use	(_____)	_____
Recreation	_____	
Specific	(_____)	
Joint-use	(_____)	_____
Water Supply	_____	
Specific	(_____)	
Joint-use	(_____)	_____
Other Purposes	_____	
Specific	(_____)	
Joint-use	(_____)	_____
Road Betterments (specific	_____	
Cultural Resources (specific)	_____	
Total	_____	100.00

EXHIBIT B (Continued)

III - INVESTMENT COSTS TO BE REPAID BY USER FOR WATER SUPPLY STORAGE

Present Use: 1/

Cost of_____ acre-feet of water supply storage (__ % X $___)	= $ _____
Cost of specific facilities	= _____
Subtotal	= _____
Interest during construction 2/	= _____
Total investment present use	= $ _____

Future Use: 3/

Cost of ____ acre-feet of water supply storage (__ % X $___)	= $ _____
Interest during construction 2/	= _____
Total investment future use	= $ _____

Total investment cost under this agreement;
Present Use plus Future Use = $ _____

Notes:

1/ If appropriate, add to present use costs, the cost of interest due to the lapse of the l0-year interest free period.

2/ Include which ever of the following is applicable:
"Based on preliminary cost estimate of $___ X interest rate of __% X l/2 the estimated construction period of ___ years."
(or)
"Based on actual construction expenditures by quarter and an interest rate of __ %."

3/ Costs cannot exceed 30 percent of the total estimated project construction cost as determined in Exhibit B-II.

EXHIBIT B (Continued)

IV - TOTAL ANNUAL COST TO USER FOR PRESENT USE WATER SUPPLY STORAGE

Interest and amortization:

$ _____ X ___ factor based on ___ payments,
___ with interest at __ %. = $ _____

Operation and maintenance: 1/

Joint-use [estimated] [actual for FY]:
___% X ___ %2/ X $_____ = $ _____

Specific water supply facilities:
100% X $_____ [estimated] [actual for FY] = $ _____

Reconstruction, rehabilitation and replacement: 3/

Joint-use:
___% X ___ X 4/ X $_____ = $ _____

Specific water supply facilities:
l00% X $_____ [estimated] [actual for FY_] = $ _____

TOTAL ESTIMATED ANNUAL COST = $ _____

Notes:
1/ Payment due and payable on the date specified in Article 5(a)(2).

2/ Percent of Project joint-use operation and maintenance cost allocated to water supply.

3/ Reconstruction, rehabilitation and replacement costs are payable only when incurred as specified in Article 5(b)(3). It is suggested that the amount shown be placed in a reserve or sinking fund for future contingency.

4/ Percent of Project joint-use reconstruction, rehabilitation and replacement cost allocated to water supply.

EXHIBIT C
AMORTIZATION SCHEDULE
PRESENT DEMAND 1/

Total Cost $ _____

Number Of Payments 30

Interest Rate, Percent 2/ ___%

APPLICATION

Annual Payment Number	Amount Of Payment	Interest	Allocated Cost		Balance Allocated Cost
1	$	$	$	$	
2					
3					
.					
.					
.					
.					
.					
30	3/				0

Notes:

1/ This 30 year amortization schedule is applicable to:
   a. Those projects not operational or under construction as of 17 November 1986 which will be repaid over time in lieu of during construction; and
   b. All reallocations.

2/ In accordance with Section 932 of the Water Resources Development Act of 1986, this interest rate will be adjusted at five year intervals throughout the repayment period. The rate is the yield rate as determined by the Secretary of the Treasury plus 1/8 %.

3/ The last (30th) payment will be adjusted upward or downward to assure all costs are repaid within 30 years of approval of this agreement.

EXHIBIT D
ASSURANCE OF COMPLIANCE

ASSURANCE OF COMPLIANCE WITH THE DEPARTMENT OF DEFENSE DIRECTIVE UNDER TITLE VI OF THE CIVIL RIGHTS ACT OF 1964, AS AMENDED; THE AGE DISCRIMINATION ACT OF 1975; AND THE REHABILITATION ACT OF 1973, AS AMENDED

The party executing this assurance, being the applicant recipient of Federal financial assistance under the instrument to which this assurance is attached; HEREBY AGREES THAT, as a part of its obligations under the aforesaid instrument, it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352), as amended (42 U.S.C. 2000d), and all requirements imposed by or pursuant to the Directive of the Department of Defense (32 CFR Part 300), issued as Department of Defense Directive 5500.11 (December 28, 1964), pursuant to that title; The Age Discrimination Act of 1975 (42 U.S.C. 5102); the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), to the end that in accordance with the aforementioned Title, Directive and Acts, no person in the United States shall on the ground of race, color, age, sex, religion, handicap or national origin be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant-Recipient receives Federal financial assistance from the Department of the Army and HEREBY GIVES ASSURANCE THAT it will immediately take any measures necessary to effectuate this agreement.

If any personal property or real property, or interest therein, or structure thereon is provided or improved with the aid of Federal financial assistance extended to the applicant-recipient by the Department of the Army, or if such assistance is in the form of personal property or real property, or interest therein or structure thereon, then this assurance shall obligate the applicant-recipient or in the case of any transfer of such property, any transferee, for the period during which the property is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits, or for the period during which it retains ownership or possession of the property whichever is longer. In all other cases, this assurance shall obligate the applicant-recipient for the period during which the Federal financial assistance is extended to it by the Department of the Army. The Department of the Army representatives will be allowed to visit the recipient's facilities. They will inspect the facilities to ensure that there are no barriers to impede the handicap's accessibility in either programs or activities.

THIS ASSURANCE is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property,

discounts or other Federal financial assistance extended after the date hereof to the applicant-recipient by the Department of the Army, including installment payments after such date on account of arrangements for Federal financial assistance which were approved before such date. The applicant-recipient recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the applicant-recipient, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign this assurance on behalf of the applicant.

Date _____

_____
(Applicant-Recipient)

By _____

Title _____

_____

_____

(Applicant-Recipient's Mailing Address)

EXHIBIT E
CERTIFICATION REGARDING LOBBYING

[Project Name]

1. The undersigned certifies, to the best of their knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress in connection with the water supply agreement for the [project name], the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities", in accordance with its instructions. This form is available to users by requesting it telephonically at (202)761-0116, or by writing to HQUSACE (CECW-A), 20 Massachusetts Avenue, NW, Washington, D.C., 20314-1000.

c. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31 U.S.C. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

SPONSOR

BY _____

DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OMB
0348-0046

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action:	2. Status of Federal Action:	3. Report Type:
☐ a. contract b. grant c. cooperative agreement d. loan e. loan guarantee f. loan insurance	☐ a. bid/offer/application b. initial award c. post-award	☐ a. initial filing b. material change **For Material Change Only:** year _____ quarter _____ date of last report _____

4. Name and Address of Reporting Entity:	5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime:
☐ Prime ☐ Subawardee Tier _____, *if known*: Congressional District, *if known*:	Congressional District, *if known*:
6. Federal Department/Agency:	7. Federal Program Name/Description: CFDA Number, *if applicable*: _____
8. Federal Action Number, *if known*:	9. Award Amount, *if known*: $
10. a. Name and Address of Lobbying Entity (*if individual, last name, first name, MI*):	b. Individuals Performing Services (*including address if different from No. 10a*) (*last name, first name, MI*):

(*attach Continuation Sheet(s) SF-LLL-A, if necessary*)

11. Amount of Payment (*check all that apply*):	13. Type of Payment (*check all that apply*):
$ _____ ☐ actual ☐ planned	☐ a. retainer ☐ b. one-time fee ☐ c. commission ☐ d. contingent fee ☐ e. deferred ☐ f. other; specify: _____
12. Form of Payment (*check all that apply*): ☐ a. cash ☐ b. in-kind; specify: nature _____ value _____	

14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted, for Payment Indicated in Item 11:

(*attach Continuation Sheet(s) SF-LLL-A, if necessary*)

15. Continuation Sheet(s) SF-LLL-A attached: ☐ Yes ☐ No

16. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Signature: _____

Print Name: _____

Title: _____

Telephone No.: _____ Date: _____

Federal Use Only:

Authorized for Local Reproduction
Standard Form - LLL

DISCLOSURE OF LOBBYING ACTIVITIES (CONTINUATION SHEET)

Reporting Entity: _____ Page _____ of _____

Authorized for Local Reproduction
Standard Form - LLL-A

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE

This disclosure form hall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filling, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbing entity for influencing or attempting to influence an office or employee of any agency, a Member of Congress, an office or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbing activity is and/or has been secured to influence the outcome of a covered Federal action.

2. Identify the status of the covered Federal action.

3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last preciously submitted report by this reporting entity for this covered Federal action.

4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known., Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the St. tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in item 4 checks, "Subawardee," then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.

6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if know. For example, Department of Transportation, United States Coast Guard.

7. Enter the Federal program name or description for the covered Federal action (item 1). If know, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.

8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award loan commitment for the prime entity identified in item 4 or 5.

10. (a). Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.

(b). Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle initial (MI).

11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.

12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution. Specify the nature and value of the in-kind payment.

13. Check the appropriate box(es). Check all boxes that apply., If other, specify nature.

14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee((s), or Member(s) of Congress that were contacted.

15. Check whether or not a SF-LLL-A Continuation Sheet(s) is attached.

16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

MODEL FORMAT
FOR SURPLUS WATER AGREEMENTS

****THIS AGREEMENT DOES NOT REPRESENT A HQUSACE APPROVED MODEL AGREEMENT****

SURPLUS WATER AGREEMENT

BETWEEN THE UNITED STATES OF AMERICA

AND

_____

FOR

SURPLUS OF WATER FROM _____

THIS AGREEMENT, entered into this _____ day of _____, 19__, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government") represented by the District Engineer executing this agreement, and _____ _____, (hereinafter called the "User"*);

WITNESSETH THAT:

WHEREAS, pursuant to **Public Law _____, _____ the Congress, _____ Session, approved _____ 19__, the Government has constructed and is operating _____, (hereinafter called the "Project"); and,

WHEREAS, Section 6 of the Flood Control Act of 1944 (Public Law 78-534), as amended, provides that the Secretary of the Army is authorized to enter into agreements with states, municipalities, private concerns, or individuals, at such prices and on such terms as he may deem reasonable, for domestic and industrial uses for surplus water that may be available at any reservoir under his control provided that no agreements for such water shall adversely affect the existing lawful uses of such water; and,

WHEREAS, the User desires to enter into an agreement with the Government for the privilege of withdrawing surplus water from the Project;

NOW, THEREFORE, the parties do mutually agree as follows:

ARTICLE 1 - Water Supply and Withdrawals.

a. The Government will reserve _____ acre feet of storage space in the Project in order to meet the water demands of the User. From this storage space the User shall have the privileges of withdrawing water at a rate not to exceed _____ during the term of this agreement as specified in Article 5 hereof.

_____

* Other appropriate terms may be used in lieu of User here and uniformly throughout the agreement.

** Use correct authorization citation (e.g., WRDA of 19__, Public Law __-____).

b. The User shall have the right to construct, operate and maintain installations and facilities, or to enter into agreements with third parties therefor, for the purpose of withdrawing water from the Project, subject to the approval of the District Engineer as to design and location of such installation and facilities. All costs associated with such installations and facilities or any modifications thereof or any future construction in connection therewith, shall be without expense to the Government.

c. The Government reserves the right to control and use all storage in the Project in accordance with authorized Project purposes. The Government further reserves the right to take such measures as may be necessary in the operation of the Project to preserve life and/or property, including the right not to make downstream releases during such periods of time as are deemed necessary, in its sole discretion, to inspect, maintain, or repair the Project.

d. The User recognizes that this agreement provides storage space for raw water only. The Government makes no representation with respect to the quality or availability of water and assumes no responsibility therefor, or for treatment of the water. The water level of the Project will be maintained at elevations which the Government deems will best serve the authorized purposes of the Project, and this agreement shall not be construed as giving the User any rights to have the water level maintained at any elevation. The User further recognizes that it is acquiring no permanent right to the use of storage in the Project.

ARTICLE 2 - Metering. For the purpose of maintaining an accurate record of the water withdrawn from the Project, the User agrees to furnish and install, or cause to be installed, meters or measuring devices satisfactory to the District Engineer, without cost to the Government. As required, the User agrees to furnish to the District Engineer advance estimates of need and records of the quantity of water actually withdrawn. Such devices shall be available for inspection by Government representatives at all reasonable times.

ARTICLE 3 - Regulation of the Use of Water. The regulation of the use of and water rights needed for the water withdrawn or released from the storage space shall be the sole responsibility of the User and under the sole authority of the User in accord with Federal, State, and local laws and shall not be considered a part of this agreement. The Government shall not be responsible for the use of water by the User, nor will it become a party to any controversies involving the water use, except as such controversies may affect the operations of the Project.

ARTICLE 4 - Consideration and Payment. (To be determined by the pricing policy as described in paragraph B5 of Chapter 2. Derivation of costs and storage volumes need to be provided in an exhibit similar to that used in storage agreements as shown in Appendix B, Exhibit B, of this Chapter).

(a) In consideration of the right to withdraw _____ acre-feet per calendar year for [not to exceed five (5) years] from the Project for municipal and industrial water supply purposes, the User shall pay the Government $____ [per year, the first of] which shall be due and payable within thirty (30) days of the effective date of the agreement as set forth in Article 5 herein. [Future payments thereafter will be due and payable on [the anniversary date the first payment is due.][(day and month) each following year, beginning in (year).]]

(b) The repayment amount shown in Article 4(a) is based [upon joint use and specific water supply construction costs updated to October 19____ price levels using appropriate indices and the Fiscal Year 19____ water supply interest rate of ____ percent as computed by the Secretary of the Treasury in accordance with Section 932 of the Water Resources Development Act of 1986 (Public Law 99-662)] [on the provisions of Section 322 of the Water Resources Development Act of 1990 (Public Law 101-640)].

(c) If the User shall fail to make any payment under this agreement within thirty (30) days of the date due, interest thereon shall accrue at the rate as determined by the Department of Treasury's Treasury Fiscal Requirements Manual (1 TFRM 6-8000, "Cash Management") and shall compound annually from the date due until paid. This provision shall not be construed as waiving any other rights the Government may have in the event of default by the User, including but not limited to the right to terminate this agreement for default.

ARTICLE 5 - Duration of Agreement. This agreement shall become effective as of the date of the approval by the [Secretary of the Army or his duly authorized representative] [District Engineer], and shall continue in full force and effect under the conditions set forth herein, for a period of not to exceed five (5) years from the said date of approval. Upon expiration, this agreement may be extended by mutual agreement for additional periods of not to exceed five (5) years each. All such agreement extensions shall be subject to recalculation of reimbursement.

ARTICLE 6 - Termination of Agreement.

a. Either party may terminate this agreement and the privilege of withdrawing water upon [period] written notice. In the event of termination under this paragraph, the Government will make pro rata refund for any balance of the agreement term for which payment has been made and the User will pay all charges which have accrued through the date of the termination.

b. The Government may terminate this agreement and the privilege of withdrawing water upon ninety (90) days written notice, if the User shall default in performance of any obligation of this agreement. Upon such a termination, User shall continue to be liable to the Government for any monies owned and for any costs incurred by the Government as a result of the default.

c. In the event of any termination pursuant to this Article or Article 5, User shall, upon request of the District Engineer, promptly remove, at User's own expense, any facilities constructed on Project land for water withdrawal and restore premises around the removed facilities to a condition satisfactory to the District Engineer.

ARTICLE 7 - Rights-of-Way. Occupancy and use of Project lands shall be in accordance with any permits, rights-of-way, or easements granted to the User by the Government.

ARTICLE 8 - Release of Claims. The User shall hold and save the Government, including its officers, agents, and employees, harmless from liability of any nature or kind for or on account of any claim for damages which may be filed or asserted as a result of the withdrawal or release of water from the Project made or ordered by the User, or as a result of the construction, operation or maintenance of any facilities or appurtenances owned and operated by the User except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE 9 - Transfer or Assignment. The User shall not transfer or assign this agreement nor any rights acquired thereunder, nor suballot said water or storage space or any part thereof, nor grant any interest, privilege or license whatsoever in connection with this agreement, without the approval of the Secretary of the Army or his duly authorized representative provided that, unless contrary to public interest this restriction shall not be construed to apply to any water which may be withdrawn or obtained from the water supply storage space by the User and furnished to any third party or parties or to the rates charged therefor.

ARTICLE 10 - Officials Not to Benefit. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

ARTICLE 11 - Covenant Against Contingent Fees. The User warrants that no person or selling agency has been employed or retained to solicit or secure this agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the User for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this agreement without liability, or in its discretion, to add to the agreement price or consideration the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 12 - Environmental Quality. During any construction, operation, and maintenance by the User of any facilities, specific actions will be taken to control environmental pollution which could result from such activity and to comply with applicable Federal, State and local laws and regulations concerning environmental pollution. Particular attention should be given to (1) reduction of air pollution by control of burning, minimization of dust, containment of chemical vapors, and control of engine exhaust gases, and of smoke from temporary heaters; (2) reduction of water pollution by control of sanitary facilities, storage of fuels and other contaminants, and control of turbidity and siltation from erosion; (3) minimization of noise levels; (4) onsite and offsite disposal of water and spoil; and (5) prevention of landscape defacement and damage.

ARTICLE 13 - Federal and State Laws.

a. The User shall utilize the water withdrawn from the Project in a manner consistent with Federal, State, and local laws.

b. The User furnishes, as part of the agreement, an assurance (see Appendix B, Exhibit D, of this Chapter) that the User will comply with Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. 2000d, et seq) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations.

c. Any discharges of water or pollutants into a navigable stream or tributary thereof resulting from the User's facilities and operations undertaken under this agreement shall be performed only in accordance with applicable Federal, State and local laws and regulations.

ARTICLE 14 - Approval of Agreement. This agreement shall be subject to the written approval of the Secretary of the Army or his duly authorized representative and shall not be binding until so approved.

IN WITNESS WHEREOF, the parties have executed this agreement as of the day and year first above written.

APPROVED:

_____
1/

DATE:_____

THE UNITED STATES OF AMERICA

By _____
(District Engineer)

[Insert name of User]

By _____
(Title)

1/ Fill-in Title of appropriate approving Government official if other than the District Engineer.

(Necessary approvals and countersignatures required by State and local law with respect to execution on behalf of the User must be ascertained by the District Engineer and his Counsel and added to the signature block.)

MODEL FORMAT
FOR WATER WITHDRAWAL PERMITS

****THIS AGREEMENT DOES NOT REPRESENT A HQUSACE APPROVED MODEL AGREEMENT****

WATER WITHDRAWAL PERMIT
FROM _____ LAKE

Pursuant to the authority contained in Section 6 of the Flood Control Act of 1944 and in recognition of the declaration of emergency in the State of _____, as declared by the Governor, this permit grants permission to _____ (User) _____ to withdraw water subject to the following conditions:

a. Payment of _____ 1/ for the withdrawal of up to _____ 2/ gallons of water during _____ 3/. User will report the amount of each withdrawal to the Project Office.

b. Right-of-entry and permission to withdraw water is granted only at the location(s) designated by the U.S. Army Corps of Engineers.

c. Should facilities, such as roads, etc. be damaged by the User as a result of emergency uses, the User may be assessed and billed a follow up charge to help in the cost of necessary repairs.

d. Users copy of this permit must be displayed during water withdrawal.

f. The User certifies that water withdrawn from the project is for domestic and/or industrial purposes and will not be used for crop irrigation purposes.

g. The User agrees to comply with appropriate State laws concerning water rights and uses and will obtain permits as are required.

h. The User shall hold and save the Government, including its officer, agents, and employees, harmless from liability of any nature or kind for or on account of any claim for damages which may be filed or asserted as a result of the withdrawal of water from the Project by the User, or as a result of the operation or maintenance of any facilities or appurtenances owned and operated by the User.

User's Name: _____ (Print) Government Approval: _____ (Project Manager)

Address: _____ Today's Date: _____
Telephone: _____

User's Signature: _____

Notes:
1/ The dollar value of the storage utilized as determined by the pricing policy, or $50, whichever is larger. The $50, represents the minimum cost for storage that will be marketed.

2/ The number of gallons that the storage utilized yields on an annual basis. The minimum amount being the yield represented by a cost of $50.

3/ Explain the time period allowed for the withdrawal as well as other time related specifications for the withdrawal, such as a maximum rate over any given time period. The period shall not exceed one year.

APPENDIX C

DATABASES

DECEMBER 1996

Table of Contents

M&I WATER SUPPLY RESERVIOR[1] DATABASE

[1] Definition and list of reservoirs from U.S. Army Corps of Engineers Report entitled "Authorized and Operating Purposes of Corps of Engineers Reservoirs," Appendix E, dated July 1992.

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
New England Division				
Colebrook	Yes	Yes	CT/MA	Yes
East Brimfield	Yes	Yes	MA	Yes
Littleville	Yes	Yes	MA	Yes
North Atlantic Division				
Philadelphia District				
Beltzville	Yes	Yes	PA	Yes
Blue Marsh	Yes	Yes	PA	Yes
Francis E. Walter	Yes	Yes	PA	No
Baltimore District				
Cowanesque	Yes	Yes	PA	Yes
Jennings Randolph	Yes	Yes	MD/WV	Yes
Stillwater Lake	Yes	Yes	PA	No

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
South Atlantic Division				
Wilmington District				
B. Everett Jordan	Yes	Yes	NC	Yes
Falls Lake	Yes	Yes	NC	Yes
John H. Kerr	Yes	Yes	VA/NC	Yes
Philpott	Yes	Yes	VA	No
W. Kerr Scott	Yes	Yes	NC	Yes
Savannah District				
Hartwell	Yes	Yes	SC/GA	Yes
J. Strom Thurmond	Yes	Yes	SC/GA	Yes
New Sanannah Bluf L&D	Yes	No	SC/GA	No
Richard B. Russell	Yes	Yes	SC/GA	Yes
Jacksonville District				
Central & Southern Florida	Yes	Yes	FL	No
Cerrillos Dam & Reservoir	Yes	Yes	PR	Yes
Four River Basins	Yes	Yes	FL	No
Portugues D&R	No	Yes	PR	No
Mobile District				
Allatoona	Yes	Yes	GA	Yes
Bay Springs L&D	Yes	No	MS	No
Bufort Dam-L. Sidney Lanier	Yes	Yes	GA	No
Jim Woodruff L&D	Yes	No	FL	No
Okatibbee Lake	No	Yes	MS	Yes
West Point	Yes	No	GA	No

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
Ohio River Division				
Pittsburgh District				
Berlin Lake	Yes	Yes	OH	Yes
Michael J. Kirwan	Yes	Yes	OH	Yes
Mosquito Creek	Yes	Yes	OH	Yes
Stonewall Jackson	Yes	Yes	WV	Yes
Tygart River Lake	Yes	Yes	WV	No
Huntington District				
Alum	Yes	Yes	OH	Yes
John W. Flannagan	Yes	Yes	VA	Yes
North Fork of Pound Lake	Yes	Yes	VA	Yes
Paint	Yes	Yes	OH	Yes
Tom Jenkins Dam	Yes	Yes	OH	Yes
Louisville District				
Barren River Lake	Yes	Yes	KY	Yes
Brookville	Yes	Yes	IN	Yes
Caesar	Yes	Yes	OH	Yes
Green River	Yes	Yes	KY	Yes
Monroe	Yes	Yes	IN	Yes
Nolin	Yes	Yes	KY	No
Patoka	Yes	Yes	IN	Yes
Rough River Lake	Yes	Yes	KY	Yes
William H. Harsha Lake	Yes	Yes	OH	Yes
Nashville District [2]				
Barkley	Yes	No	KY	No
Center Hill Lake	Yes	No	TN	No
Cheatham L&D	Yes	No	TN	No
Cordell Hull L&D	Yes	No	TN	No
Dale Hollow Lake	Yes	No	TN	No
J. Percy Priest	Yes	No	TN	No
Martin	Yes	No	KY	No
Old Hickory L&D	Yes	No	TN	No
Wolf Creek Dam	Yes	No	KY	No

[2]Although storage space is not allocated for water supply on either a permanent (PL 85-500) or temporary (PL 78-534) basis, water is being withdrawn by municipalities and industries for M&I purposes. Consequently, during drought, consideration is given to keeping the lake level above the supply pipe intakes.

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
North Central Division				
Detroit District				
Menasha L&D	Yes	No	WI	No
Rock Island District				
Coralville	No	Yes	IA	No
Red Rock	No	Yes	IA	No
Saylorville	Yes	Yes	IA	Yes
St. Paul District				
Gull	Yes	Yes	MN	No
Homme	Yes	Yes	ND	No
Leech Lake Dam	Yes	Yes	MN	No
Orwell	Yes	Yes	MN	No
Pine River Dam	Yes	Yes	MN	No
Pokegama Dam	Yes	Yes	MN	No
Sandy Lake Dam	Yes	Yes	MN	No
Winnibigoshish Dam	Yes	Yes	MN	No
Lower Mississippi Valley Division				
St. Louis District				
Carlyle	Yes	Yes	IL	Yes
Clarence Cannon Dam	Yes	Yes	MO	Yes
Lake Shelbyville	Yes	Yes	IL	Yes
Rend Lake	Yes	Yes	IL	Yes
Vicksburg District				
Caddo	No	Yes	LA	No
DeGray	Yes	Yes	AR	Yes

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
Missouri Division				
Omaha District				
Big Bend Dam, Lake Sharpe	Yes	Yes	SD	No
Bowman-Haley	No	Yes	ND	Yes
Chatfield	Yes	Yes	CO	No
Ft. Peck Dam	Yes	Yes	MT	No
Ft. Randall Dam	Yes	Yes	SD	No
Garrison Dam	Yes	Yes	ND	No
Gavins Point Dam	Yes	Yes	SD/NE	No
Oahe Dam	Yes	Yes	ND/SD	No
Kansas City District				
Clinton	Yes	Yes	KS	Yes
Hillsdale	Yes	Yes	KS	Yes
Kanopolis	Yes	Yes	KS	No
Long Branch	Yes	Yes	MO	Yes
Melvern	No	Yes	KS	No
Milford	Yes	Yes	KS	Yes
Perry	Yes	Yes	KS	Yes
Pomme De Terre Lake	No	Yes	MO	No
Pomona	Yes	Yes	KS	Yes
Rathburn	Yes	Yes	IA	Yes
Smithville	Yes	Yes	MO	Yes
Stockton	No	Yes	MO	No
Tuttle	Yes	Yes	KS	No

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
Southwestern Division				
Little Rock District				
Arthur V. Ormand L&D	No	Yes	AR	No
Beaver	Yes	Yes	AR	Yes
Bull Shoals	Yes	Yes	AR	No
Dardanelle L&D	No	Yes	AR	No
David D. Terry L&D	No	Yes	AR	No
DeQueen	Yes	Yes	AR	Yes
Dierks	Yes	Yes	AR	Yes
Emmitt Sanders L&D	No	Yes	AR	No
Gillham	Yes	Yes	AR	Yes
Greers Ferry	Yes	Yes	AR	Yes
James W. Trimble L&D	No	Yes	AR	No
L&D #3 - Arkansas River	No	Yes	AR	No
L&D #5 - Arkansas River	No	Yes	AR	No
Millwood Lake	Yes	Yes	AR	Yes
Murray L&D	No	Yes	AR	No
Nimrod	Yes	Yes	AR	Yes
Norfork	Yes	Yes	AR	Yes
Norrvell L&D	No	Yes	AR	No
Ozark Jetta - Taylor L&D	No	Yes	AR	No
Table Rock	Yes	Yes	MO	No
Toad Suck Ferry L&D	No	Yes	AR	No
Wilbur D. Mills L&D	No	Yes	AR	No
Ft. Worth District				
Aquilla	Yes	Yes	TX	Yes
Bardwell	Yes	Yes	TX	Yes
Belton	Yes	Yes	TX	Yes
Benbrook	Yes	Yes	TX	Yes
Canyon	Yes	Yes	TX	Yes
Cooper	Yes	Yes	TX	Yes
Ferrell's Bridge Dam	Yes	Yes	TX	Yes
Granger	Yes	Yes	TX	Yes
Grapevine	Yes	Yes	TX	Yes
Hords Creek	Yes	Yes	TX	Yes
Joe Pool	Yes	Yes	TX	Yes
Lavon	Yes	Yes	TX	Yes
Lewisville	Yes	Yes	TX	Yes
Navarro Mills	Yes	Yes	TX	Yes
North San Gabriel Dam	Yes	Yes	TX	Yes
O. C. Fisher	Yes	Yes	TX	Yes
Proctor	Yes	Yes	TX	Yes
Ray Roberts	Yes	Yes	TX	Yes
Sam Rayburn	Yes	Yes	TX	Yes
Somerville	Yes	Yes	TX	Yes
Stillhouse Hollow	Yes	Yes	TX	Yes

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
		Ft. Worth District (continued)		
Town Bluff Dam	Yes	Yes	TX	Yes
Waco	Yes	Yes	TX	Yes
Whitney	Yes	Yes	TX	Yes
Wright Patman	Yes	Yes	TX	Yes
		Tulsa District		
Arcadia	Yes	Yes	OK	Yes
Birch	Yes	Yes	OK	Yes
Broken Bow	Yes	Yes	OK	Yes
Canton	Yes	Yes	OK	Yes
Copan	Yes	Yes	OK	Yes
Council Grove	Yes	Yes	KS	Yes
Denison Dam - Lake Texoma	Yes	Yes	OK/TX	Yes
El Dorado	Yes	Yes	KS	Yes
Elk City	Yes	Yes	KS	Yes
Eufaula	Yes	Yes	OK	Yes
Fall	No	Yes	KS	No
Fort Supply	Yes	No	OK	Yes
Heyburn	Yes	Yes	OK	Yes
Hugo	Yes	Yes	OK	Yes
Hulah	Yes	Yes	OK	Yes
John Redmond	Yes	Yes	KS	Yes
Kaw	Yes	Yes	OK	Yes
Keystone	Yes	Yes	OK	Yes
Marion	Yes	Yes	KS	Yes
Oologah	Yes	Yes	OK	Yes
Optima	No	Yes	OK	Yes
Pat Mayse	Yes	Yes	TX	Yes
Pearson-Skubitz Big Hill	Yes	Yes	KS	Yes
Pine Creek	Yes	Yes	OK	Yes
Sardis	Yes	Yes	OK	Yes
Skiatook	Yes	Yes	OK	Yes
Tenkiller Ferry Lake	Yes	Yes	OK	Yes
Toronto	Yes	Yes	KS	Yes
Waurika	Yes	Yes	OK	Yes
Wister	Yes	Yes	OK	Yes
		Albuquerque District		
Abiquiu	Yes	Yes	NM	Yes

Project	Operating Purpose	Authorized Purpose	State	M&I Storage
North Pacific Division				
Seattle District				
Howard A. Hanson	No	Yes	WA	No
Wynoochee	Yes	Yes	WA	Yes
Portland District				
Lost Creek	Yes	Yes	OR	Yes
Willow Creek	No	Yes	OR	No
South Pacific Division				
Sacramento District				
Coyote Valley	Yes	Yes	CA	No
Dry Creek (Warm Springs)	Yes	Yes	CA	Yes
Martis Creek	No	Yes	CA	No
New Hogan	Yes	Yes	CA	No
Los Angeles District				
Alamo	Yes	Yes	AZ	No

M&I Water Supply Agreement Database[3] Division And District Summaries

[3]Data developed from a survey of Corps divisions and districts made by CEWRFC-IWR-P Memorandum dated 11 March 1996, subject "Review of Draft 'Water Supply Handbook'."

NEW ENGLAND DIVISION

Division Total

Number of Projects with Water Supply: 3
Number of Contracts: 3

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	41,240	0	41,240	7,507.9	0	0	7,507.9
Not Under Contract	0	0	0	0	0	0	0
Total	41,240	0	41,240	7,507.9	0	0	7,507.9

NORTH ATLANTIC DIVISION

Division Total

Number of Projects with Water Supply: 4
Number of Contracts: 5

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	97,210	4,000	101,210	119,625	7,500	0	127,125
Not Under Contract	0	0	0	0	0	0	0
Total	97,210	4,000	101,210	119,625	7,500	0	127,125

Philadelphia District

Number of Projects with Water Supply: 2
Number of Contracts: 2

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	31,880	4,000	35,880	14,000	7,500	0	21,500
Not Under Contract	0	0	0	0	0	0	0
Total	31,880	4,000	35,880	14,000	7,500	0	21,500

Baltimore District

Number of Projects with Water Supply: 2
Number of Contracts: 3

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	65,330	0	65,330	105,625	0	0	105,625
Not Under Contract	0	0	0	0	0	0	0
Total	65,330	0	65,330	105,625	0	0	105,625

SOUTH ATLANTIC DIVISION

Division Total

Number of Projects with Water Supply: 10
Number of Contracts: 19

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	120,626	96,740	217,366	107,983.9	9586.0	219.0	117,788.9
Not Under Contract	0	0	0	0	0	0	0
Total	120,626	96,740	217,366	107,983.9	9586.0	219.0	117,788.9

Wilmington District

Number of Projects with Water Supply: 4
Number of Contracts: 6

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	55,123	79,500	134,623	4,456.0	7,466.0	0	11,922.0
Not Under Contract	0	0	0	0	0	0	0
Total	55,123	79,500	134,623	4456.0	7,466.0	0	11,922.0

Savannah District

Number of Projects with Water Supply: 3
Number of Contracts: 9

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	12,067	17,240	29,307	2,120.5	2,120	0	4,240.5
Not Under Contract	0	0	0	0	0	0	0
Total	12,067	17,240	29,307	2,120.5	2,120	0	4,240.5

South Atlantic Division (continued)
Jacksonville District

Number of Projects with Water Supply: 1
Number of Contracts: 1

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	25,200	0	25,200	98,670	0	0	98,670
Not Under Contract	0	0	0	0	0	0	0
Total	25,200	0	25,200	98,670	0	0	98,670

Mobile District

Number of Projects with Water Supply: 2
Number of Contracts: 3

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	28,236	0	28,236	2,737.4	0	219.0	2,956.4
Not Under Contract	0	0	0	0	0	0	0
Total	28,236	0	28,236	2,737.4	0	219.0	2,956.4

OHIO RIVER DIVISION

Division Total

Number of Projects with Water Supply: 17
Number of Contracts: 18

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	577,940	51,269	629,209	54,393.0	11,696.2	68.3	66,157.5
Not Under Contract	0	2,200	2,200	0	4,300.0	0	4,300.0
Total	577,940	53,469	631,409	54,393.0	15,996.2	68.3	70,457.5

Pittsburgh District

Number of Projects with Water Supply: 4
Number of Contracts: 4

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	83,300	0	83,300	7,032.0	0	68.3	7,100.3
Not Under Contract	0	2,200	2,200	0	4,300.0	0	4,300.0
Total	83,300	2,200	85,500	7,032.0	4,300.0	68.3	11,400.3

Huntington District

Number of Projects with Water Supply: 5
Number of Contracts: 5

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	36,529	51,269	87,798	7,917.2	11,696.2	0	19,613.4
Not Under Contract	0	0	0	0	0	0	0
Total	36,529	51,269	87,798	7,917.2	11,696.2	0	19,613.4

Ohio River Division (continued)

Louisville District

Number of Projects with Water Supply: 8
Number of Contracts: 9

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	458,111	0	458,111	39,443.8	0	0	39,443.8
Not Under Contract	0	0	0	0	0	0	0
Total	458,111	0	458,111	39,443.8	0	0	39,443.8

NORTH CENTRAL DIVISION

Division Total

Rock Island District

Number of Projects with Water Supply: 1
Number of Contracts: 1

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	14,900	0	14,900	4,811.6	0	0	4,811.6
Not Under Contract	0	0	0	0	0	0	0
Total	14,900	0	14,900	4,811.6	0	0	4,811.6

LOWER MISSISSIPPI VALLEY DIVISION

Division Total

Number of Projects with Water Supply: 5
Number of Contracts: 3

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	167,000	0	167,000	17,945	0	0	17,945
Not Under Contract	0	187,750	187,750	0	18,904	0	18,904
Total	167,000	187,750	354,750	17,945	18,904	0	36,849

St. Louis Distirct

Number of Projects with Water Supply: 4
Number of Contracts: 3

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	167,000	0	167,000	17,945	0	0	17,945
Not Under Contract	0	20,000	20,000	0	13,000	0	13,000
Total	167,000	20,000	187,000	17,945	13,000	0	30,945

Vicksburg District

Number of Projects with Water Supply: 1
Number of Contracts: 0

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	0	0	0	0	0	0	0
Not Under Contract	0	167,750	167,750	0	5,904	0	5,904
Total	0	167,750	167,750	0	5,904	0	5,904

MISSOURI RIVER DIVISION

Division Total

Number of Projects with Water Supply: 9
Number of Contracts: 13

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	157,560	513,180	670,740	13,181.3	50,545.4	365.4	64,092.1
Not Under Contract	0	81,900	81,900	0	22,575.4	2,331.0	24,906.4
Total	157,560	595,080	752,640	13,181.3	73,120.8	2,696.4	88,998.5

Omaha District

Number of Projects with Water Supply: 1
Number of Contracts: 2

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	36,500	0	36,500	1155	0	0	1155
Not Under Contract	0	0	0	0	0	0	0
Total	36,500	0	36,500	1155	0	0	1155

Kansas City District

Number of Projects with Water Supply: 8
Number of Contracts: 11

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	121,060	513,180	634,240	12,026.3	50,545.4	365.4	62,937.1
Not Under Contract	0	81,900	81,900	0	22,575.4	2,331.0	24,906.4
Total	121,060	595,080	716,140	12,026.3	73,120.8	2,696.4	87,843.5

SOUTHWESTERN DIVISION

Division Total

Number of Projects with Water Supply: 65
Number of Contracts: 174

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	5,044,246	1,515,150	6,559,396	329,204.2	328,475.3	4,087.9	661,767.4
Not Under Contract	0	497,735	497,735	0	55,476.9	528.8	56,005.7
Total	5,044,246	2,012,885	7,057,131	329,204.2	383,952.2	4,616.7	717,773.1

Little Rock District

Number of Projects with Water Supply: 10
Number of Contracts: 15

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	99.634	212,643	312,277	9,013.6	20,928.0	377.8	30,319.4
Not Under Contract	0	17,275	17,275	0	4,942.4	186.9	5,129.3
Total	99,634	229,918	329,552	9,013.6	25,870.4	564.7	35,448.7

Ft. Worth District

Number of Projects with Water Supply: 25
Number of Contracts: 42

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	3,660,070	814,629	4,474,699	213,064	214,695	623	428,382
Not Under Contract	0	0	0	0	0	0	0
Total	3,660,070	814,629	4,474,699	213,064	214,695	623	428,382

Southwestern Division (continued)

Tulsa District

Number of Projects with Water Supply: 29
Number of Contracts: 116

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	1,113,642	487,878	1,601,520	107,126.6	92,852.3	3,087.1	203,066.0
Not Under Contract	0	480,460	480,460	0	50,534.5	341.9	50,876.4
Total	1,113,642	968,338	2,081,980	107,126.6	143,386.8	3,429.0	253,942.4

Albuquerque District

Number of Projects with Water Supply: 1
Number of Contracts: 1

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	170,900	0	170,900	0	0	0	0
Not Under Contract	0	0	0	0	0	0	0
Total	170,900	0	170,900	0	0	0	0

NORTH PACIFIC DIVISION

Division Total

Number of Projects with Water Supply: 2
Number of Contracts: 2

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	26,800	18,200	45,000	11,550.7	7,772.0	0	19,322.7
Not Under Contract	0	9,600	9,600	0	5,730.3	0	5,730.3
Total	26,800	27,800	54,600	11,550.7	13,502.3	0	25,053.0

Seattle District

Number of Projects with Water Supply: 1
Number of Contracts: 1

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	26,400	18,200	44,600	11,281.0	7,772.0	0	19,053.0
Not Under Contract	0	0	0	0	0	0	0
Total	26,400	18,200	44,600	11,281.0	7,772.0	0	19,053.0

Portland District

Number of Projects with Water Supply: 1
Number of Contracts: 1

Item	Storage Space (Acre Feet)			Contract Price			($000)
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	400	0	400	269.7	0	0	269.7
Not Under Contract	0	9,600	9,600	0	5,730.3	0	5,730.3
Total	400	9,600	10,000	269.7	5,730.3	0	6,000.0

SOUTH PACIFIC DIVISION

Division Total

Sacramento District

Number of Projects with Water Supply: 1
Number of Contracts: 2

Item	Storage Space (Acre Feet)			Contract Price ($000)			
	Present Use	Future Use	Total	Present Use	Future Use	Conduit	Total
Under Contract	88,000	212,000	300,000	8,290.0	96,624.9	0	104,914.9
Not Under Contract	0	0	0	0	0	0	0
Total	88,000	212,000	300,000	8,290.0	96,624.9	0	104,914.9

M&I Water Supply Agreement Database By Projects And Agreements

Note: Investments costs are those construction costs plus interest during construction for which the sponsor is currently responsible. These costs can vary over time in any one contract and they also can vary over time between contracts in the same project. Therefore, all costs are in varying price levels.

NEW ENGLAND DIVISION

COLEBROOK RIVER LAKE
CWIS No. 03650
West Branch Farmington River
Litchfield County, Connecticut

Contractor: The Meto Dist
Present Storage (a-f): 30,700.
Future Storage (a-f): 0.
Present Investment ($1000): 5,281.2
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Mar 65
Type:

EAST BRIMFIELD LAKE
CWIS No. 05120
Quinebaug River
Worcester County, Massachusetts

Contractor: American Optic Co.
Present Storage (a-f): 1,140.
Future Storage (a-f): 0.
Present Investment ($1000): 24.5
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Aug 62
Type:

LITTLEVILLE LAKE
CWIS No. 10000
Middle Branch Westfield River Hampshire County, Massachusetts

Contractor: City of Springfield
Present Storage (a-f): 9,400.
Future Storage (a-f): 0.
Present Investment ($1000): 2,202.2
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Jul 68
Type:

NORTH ATLANTIC DIVISION

Philadelphia District

BELTZVILLE LAKE
CWIS No. 01340
Pohopoco Creek
Carbon and Monroe Counties, Pennsylvania

Contractor: Delaware RBC
Present Storage (a-f): 27,880.
Future Storage (a-f): 0.
Present Investment ($1000): 6,500.
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Sep 80
Type:

BLUE MARSH LAKE
CWIS No. 01780
Tulpehocken Creek
Lebanon and Berks Counties, Pennsylvania

Contractor: Delaware RBC
Present Storage (a-f): 4,000.
Future Storage (a-f): 4,000.
Present Investment ($1000): 7,500.
Future Investment ($1000): 7,500.
Conduit Cost ($1000): 0
Date Contract Approved: Jun 71
Type:

Baltimore District

COWANESQUE LAKE
CWIS No. 04150
Cowanesque River
Tioga County, Pennsylvania

Contractor: Susquehanna River Basin Comm.
Present Storage (a-f): 24,335.
Future Storage (a-f): 0.
Present Investment ($1000): 39,414.
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Jun 86
Type: Reallocation of Flood Control storage

JENNINGS RANDOLPH LAKE
CWIS No. 01770
North Branch Potomac River
Mineral County, West Virginia

Contractor: DC; WSSC; FCWA
Present Storage (a-f): 7,158.
Future Storage (a-f): 0.
Present Investment ($1000): 11,477.
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Nov 70
Type:

Contractor: DC; WSSC; FCWA
Present Storage (a-f): 33,837.
Future Storage (a-f): 0.
Present Investment ($1000): 54,734.
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Aug 82
Type:

SOUTH ATLANTIC DIVISION

Wilmington District

B. EVERETT JORDAN DAM AND LAKE
CWIS No. 12410
Haw River
Chatham, Wake, Orange and Durham Counties, North Carolina

Contractor: State of North Carolina
Present Storage (a-f): 0
Future Storage (a-f): 45,800
Present Investment ($1000): 0
Future Investment ($1000): 4,388.0
Conduit Cost ($1000): 0
Date Agreement Approved: Apr 88
Type: Water supply storage

FALLS LAKE CWIS
No. 05800
Neuse River
Wake, Durham & Granville Counties, NC

Contractor: City of Raleigh
Present Storage (a-f): 11,300.
Future Storage (a-f): 33,700.
Present Investment ($1000): 1,025
Future Investment ($1000): 3,078
Conduit Cost ($1000): 0
Date Contract Approved: Feb 72
Type: Water supply storage

JOHN H. KERR DAM AND RESERVOIR
CWIS No. 08350
Roanoke River
Mecklenburg, Charlotte, Halifax Counties, VA

Contractor: Virginia Beach
Present Storage (a-f): 10,200.
Future Storage (a-f): 0.
Present Investment ($1000): 2,275.7
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Jan 84
Type: Reallocation of hydropower storage

Contractor: Commonwealth of Virginia
Present Storage (a-f): 23
Future Storage: 0
Present Investment ($1000): 5.6
Future Investment: ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jan 89
Type: Reallocation of hydropower storage

Contractor: Mecklenburg Cogeneration Limited Partners
Present Storage (a-f): 600
Future Storage (a-f): 0
Present Investment ($1000): 150.2
Future Investment:($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jun 91
Type: Reallocation of hydropower storage

W. KERR SCOTT DAM AND RESERVOIR
CWIS No. 19220
Yadkin River
Wilkes and Caldwell Counties, North Carolina

Contractor: Wilkes Co. & Winston-Salem
Present Storage (a-f): 33,000.
Future Storage (a-f): 0.
Present Investment ($1000): 999.5
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Jun 60
Type:

Savannah Distict

HARTWELL DAM AND LAKE
CWIS No. 07380
Savannah, Tugaloo and Seneca Rivers
Hart, Franklin, Stephens Counties, Georgia

Contractor: Duke Power Co.
Present Storage (a-f): 7,380.
Future Storage (a-f): 17,240.
Present Investment ($1000): 905.
Future Investment ($1000): 2,120.
Conduit Cost ($1000,): 0.
Date Contract Approved: Jul 76
Type:

Contractor: Franklin County, GA
Present Storage (a-f): 127
Future Storage (a-f): 0
Present Investment ($1000): 21.5
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Feb 90
Type: Reallocation from hydropower

RICHARD B. RUSSELL DAM AND LAKE
CWIS No. 18530
Savannah River
Elbert County, Georgia and Abbeville and Anderson Counties, South Carolina

Contractor: City of Elberton
Present Storage (a-f): 381
Future Storage (a-f): 0
Present Investment ($1000): 419.0
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Sep 90
Type: Reallocation from hydropower

J. STROM THURMOND DAM AND LAKE
CWIS No. 03350
Savannah River
McCormick County, South Carolina

Contractor: City of Lincolnton, GA
Present Storage (a-f): 92.
Future Storage (a-f): 0.
Present Investment ($1000): 0.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 64
Type:

Contractor: City of McCormick
Present Storage (a-f): 1800.
Future Storage (a-f): 0.
Present Investment ($1000): 75.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 71
Type:

Contractor: Savannah Valley Authority, SC
Present Storage (a-f): 92
Future Storage (a-f): 0
Present Investment ($1000): 27.4
Future Investment: ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Oct 89
Type: Reallocation from hydropower

Contractor: Columbia County, GA
Present Storage (a-f): 1,056
Future Storage (a-f): 0
Present Investment ($1000): 313.0
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Nov 89
Type: Reallocation from hydropower and conservation

Contractor: City of Thompson And McDuffie County, GA
Present Storage (a-f): 1,056
Future Storage (a-f): 0
Present Investment ($1000): 334.7
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Aug 90
Type: Reallocation from hydropower

Savannah District (continued)

J. STROM THURMOND DAM AND LAKE (cont.)

Contractor: City of Lincolnton, GA
Present Storage (a-f): 83
Future Storage (a-f): 0
Present Investment ($1000): 24.6
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Apr 90
Type: Reallocation from hydropower

Jacksonville District

CERRILLOS DAM AND RESERVOIR
CWIS No. 74996-01
Cerrillos River
Ponce Municipio, Puerto Rico

Contractor: Common. of PR
Present Storage (a-f): 25,200.
Future Storage (a-f): 0.
Present Investment ($1000): 98,670.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 82
Type:

Mobile District

ALLATOONA LAKE
CWIS No. 00220
Etowah River
Bartow County, Georgia

Contractor: Cobb Co.-Marietta Wtr. Auth.
Present Storage (a-f): 13,140.
Future Storage (a-f): 0.
Present Investment ($1000): 1,268.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 63
Type:

Contractor: City of Cartersville
Present Storage (a-f): 1,996.
Future Storage (a-f): 0.
Present Investment ($1000): 177.
Future Investment ($1000): 0.
Conduit Cost ($1000): 219.
Date Contract Approved: Dec 66
Type:

OKATIBBEE LAKE
CWIS No. 13230
Okatibbee Creek
Lauderdale County, Mississippi

Contractor: Pat Harrison WW District
Present Storage (a-f): 13,100.
Future Storage (a-f): 0.
Present Investment ($1000): 1,292.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 65
Type:

OHIO RIVER DIVISION

Pittsburgh District

BERLIN LAKE
CWIS No. 01400
Mahoning River
Portage and Mahoning Counties, Ohio

Contractor: Mahoning Val. San. Dist.
Present Storage (a-f): 19,400.
Future Storage (a-f): 0.
Present Investment ($1000): 1,365.
Future Investment ($1000): 0.
Conduit Cost ($1000): 1.3
Date Contract Approved: Feb 50
Type:

MICHAEL J. KIRWAN DAM AND RESERVOIR
CWIS No. 19660
West Branch Mahoning River
Portage County, Ohio

Contractor: Trumbull County
Present Storage (a-f): 17,800.
Future Storage (a-f): 0.
Present Investment ($1000): 1,750.2
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 61
Type:

Contractor: Mahoning County
Present Storage (a-f): 35,100.
Future Storage (a-f): 0.
Present Investment ($1000): 3,449.8
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 61
Type:

MOSQUITO CREEK LAKE
CWIS No. 11870
Mosquito Creek
Trumbull County, Ohio

Contractor: City of Warren
Present Storage (a-f): 11,000.
Future Storage (a-f): 0.
Present Investment ($1000): 467.
Future Investment ($1000): 0.
Conduit Cost ($1000): 67.
Date Contract Approved: Feb 48
Type:

STONEWALL JACKSON LAKE
CWIS No. 17580
West Fork River
Lewis County, West Virginia

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 2200.
Present Investment ($1000): 0.
Future Investment ($1000): 4,300.
Conduit Cost ($1000): 0.

Huntington District

ALUM CREEK LAKE
CWIS No. 00280
Alum Creek
Delaware County, Ohio

Contractor: State of Ohio
Present Storage (a-f): 29,700.
Future Storage (a-f): 49,500.
Present Investment ($1000): 6,847.5
Future Investment ($1000): 11,412.6
Conduit Cost ($1000, varying prices): 0.
Date Contract Approved: Jun 68
Type:

Huntington Distrct (continued)

JOHN W. FLANNAGAN DAM AND RESERVOIR
CWIS No. 08550
Pound River
Dickenson County, Virginia

Contractor: John Flannagan Water Auth.
Present Storage (a-f): 356.
Future Storage (a-f): 1,769.
Present Investment ($1000): 57.1
Future Investment ($1000): 283.6
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 77
Type:

NORTH FORK OF POUND LAKE
CWIS No. 12710
North Fork of Pound River
Wise County, Virginia

Contractor: Town of Pound
Present Storage (a-f): 62.
Future Storage (a-f): 0.
Present Investment ($1000): 37.9
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 68
Type:

PAINT CREEK LAKE
CWIS No. 13550
Paint Creek
Ross County, Ohio

Contractor: Highland County Water Co.
Present Storage (a-f): 721.
Future Storage (a-f): 0.
Present Investment ($1000): 189.7
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 86
Type:

TOM JENKINS DAM
CWIS No. 18300
Hocking River
Athens County, Ohio

Contractor: State of Ohio
Present Storage (a-f): 5,690.
Future Storage (a-f): 0.
Present Investment ($1000): 785.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Feb 48
Type:

Louisville District

BARREN RIVER LAKE
CWIS No. 00970
Barren River
Allen and Barren Counties, Kentucky

Contractor: Glasgow
Present Storage (a-f): 681.
Future Storage (a-f): 0.
Present Investment ($1000): 22.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 65
Type: Reallocation of Permanent Pool

BROOKVILLE LAKE
CWIS No. 02060
East Fork Whitewater River
Franklin and Union Counties, Indiana

Contractor: State of Indiana
Present Storage (a-f): 89,300.
Future Storage (a-f): 0.
Present Investment ($1000): 7,541.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 65
Type:

Louisville District (continued)

CAESAR CREEK LAKE
CWIS No. 02350
Caesar Creek
Warren, Clinton and Greene Counties, Ohio

Contractor: State of Ohio
Present Storage (a-f): 39,100.
Future Storage (a-f): 0.
Present Investment ($1000): 5,742.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 90
Type:

GREEN RIVER LAKE
CWIS No. 06960
Green River
Taylor and Adair Counties, Kentucky

Contractor: Campbellsville
Present Storage (a-f): 3,460.
Future Storage (a-f): 0.
Present Investment ($1000): 92.1
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 69
Type:

MONROE LAKE
CWIS No. 11770
Salt Creek
Monroe, Brown and Jackson Counties, Indiana

Contractor: State of Indiana
Present Storage (a-f): 160,000.
Future Storage (a-f): 0.
Present Investment ($1000): 8,015.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 61
Type:

PATOKA LAKE
CWIS No. 13730
Patoka River
Dubois, Orange and Crawford Counties, Indiana

Contractor: State of Indiana
Present Storage (a-f): 129,800.
Future Storage (a-f): 0.
Present Investment ($1000): 14,023.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 70
Type:

ROUGH RIVER LAKE
CWIS No. 15610
Rough River
Breckinridge, Grayson & Hardin Counties, KY

Contractor: Leitchfield
Present Storage (a-f): 120.
Future Storage (a-f): 0.
Present Investment ($1000): 3.6
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 66
Type: Reallocation of Conservation storage

Contractor: Hardinsburg
Present Storage (a-f): 150.
Future Storage (a-f): 0.
Present Investment ($1000): 17.8
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 79
Type: Reallocation of Conservation storage

WILLIAM H. HARSHA LAKE
CWIS No. 05180
East Fork, Little Miami River
Clermont County, Ohio

Contractor: State of Ohio
Present Storage (a-f): 35,500.
Future Storage (a-f): 0.
Present Investment ($1000): 3,987.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 70
Type:

NORTH CENTRAL DIVISION

Rock Island District

SAYLORVILLE LAKE
CWIS No. 16510
Des Moines River
Polk, Dallas, Boone Counties, Iowa

Contractor: State of Iowa
Present Storage (a-f): 14,900.
Future Storage (a-f): 0.
Present Investment ($1000): 4,811.6
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 82
Type: Reallocation of Flood Control storage

LOWER MISSISSIPPI VALLEY DIVISION

St. Louis District

CARLYLE LAKE
CWIS No. 02700
Kaskaskia River
Clinton County, Illinois

Contractor: State of Illinois
Present Storage (a-f): 33,000.
Future Storage (a-f): 0.
Present Investment ($1000): 3,635.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 58
Type:

CLARENCE CANNON DAM - MARK TWAIN LAKE
CWIS No. 02560
Salt River
Ralls County, Missouri

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 20,000.
Present Investment ($1000): 0.
Future Investment ($1000): 13,000
Conduit Cost ($1000): 0.

LAKE SHELBYVILLE
CWIS No. 16691
Kaskaskia River
Shelby County, Illinois

Contractor: State of Illinois
Present Storage (a-f): 25,000.
Future Storage (a-f): 0.
Present Investment ($1000): 4,310.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 62
Type:

REND LAKE
CWIS No. 15190
Big Muddy River
Franklin County, Illinois

Contractor: State of Illinois
Present Storage (a-f): 109,000.
Future Storage (a-f): 0.
Present Investment ($1000): 10,000
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 65
Type:

Vicksburg District

DEGRAY LAKE
CWIS No. 36011
Caddo River
Clark and Hot Springs Counties, Arkansas

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 167,750.
Present Investment ($1000): 0.
Future Investment ($1000): 5,904.
Conduit Cost ($1000): 0.

MISSOURI RIVER DIVISION

Omaha District

BOWMAN-HALEY DAM AND LAKE
CWIS No. 01970
North Fork of Grand River
Bowman County, North Dakota

Contractor: Bowman County Wtr Mgmt Dist
Present Storage (a-f): 15,500.
Future Storage (a-f): 0.
Present Investment ($1000): 825.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Dec 82
Type:

GARRISON DAM AND LAKE
CWIS No. 06400
Missouri River
Bismarch, North Dakota

Contractor: Basin Electric Power Cooperative
Pesent Storage (a-f) 21,000
Future Storage (a-f) 0
Present Investment ($1000): 630 per year
Future Investment ($1000): 0
Conduit ($1000): 0
Date Contract Approved: Oct. 88
Type:

Kansas City District

CLINTON LAKE
CWIS No. 03480
Wakarusa River
Douglas County, Kansas

Contractor: State of Kansas
Present Storage (a-f): 53,520.
Future Storage (a-f): 35,680.
Present Investment ($1000): 3,873.4
Future Investment ($1000): 2,582.3
Conduit Cost ($1000): 312.4
Date Contract Approved: Oct 78
Type:

HILLSDALE LAKE
CWIS No. 07540
Big Bull Creek
Miami County, Kansas

Contractor: State of Kansas
Present Storage (a-f): 7,500.
Future Storage (a-f): 45,500.
Present Investment ($1000): 3,314.2
Future Investment ($1000): 20,107.5
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 74
Type:

LONG BRANCH LAKE
CWIS No. 10030
Little Chariton River
Macon County, Missouri

Contractor: City of Macon
Present Storage (a-f): 4,400.
Future Storage (a-f): 13,800.
Present Investment ($1000): 1,118.3
Future Investment ($1000): 3,507.2
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 72
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 6,200.
Present Investment ($1000): 0.
Future Investment ($1000): 1,575.7
Conduit Cost ($1000): 0.

Kansas City District (continued)

MILFORD LAKE
CWIS No. 11140
Republican River
Geary County, Kansas

Contractor: State of Kansas
Present Storage (a-f): 46,650.
Future Storage (a-f): 253,350.
Present Investment ($1000): 2,028.6
Future Investment ($1000): 1,1017.
Conduit Cost ($1000, varying prices): 0.
Date Contract Approved: Sep 76
Type:

PERRY LAKE
CWIS No. 13920
Delaware River
Jefferson County, Kansas

Contractor: State of Kansas
Present Storage (a-f): 0.
Future Storage (a-f): 150,000.
Present Investment ($1000): 0.
Future Investment ($1000): 9,208.3
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 77
Type:

POMONA LAKE
CWIS No. 14280
One Hundred Ten Mile Creek
Osage County, Kansas

Contractor: RWD #3
Present Storage (a-f): 230.
Future Storage (a-f): 0.
Present Investment ($1000): 13.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 64
Type:

Contractor: RWD #9
Present Storage (a-f): 500.
Future Storage (a-f): 0.
Present Investment ($1000): 37.5
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 74
Type:

Contractor: RWD #3
Present Storage (a-f): 270.
Future Storage (a-f): 0.
Present Investment ($1000): 20.1
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jan 80
Type:

RATHBUN LAKE
CWIS No. 14880
Chariton River
Appanoose County, Iowa

Contractor: Rathbun RWD
Present Storage (a-f): 3,340.
Future Storage (a-f): 0.
Present Investment ($1000): 331.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 86
Type: Reallocation of Conservation storage

SMITHVILLE LAKE
CWIS No.16980
Little Platte River
Clay and Clinton Counties, Missouri

Contractor: City of Plattsburg
Present Storage (a-f): 2,650.
Future Storage (a-f): 8,850.
Present Investment ($1000): 734.8
Future Investment ($1000): 2,458.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 72
Type:

Kansas City (continued)

SMITHVILLE LAKE (continuted)

Contractor: City of Smithville

Present Storage (a-f):	2,000.
Future Storage (a-f):	6,000.
Present Investment ($1000):	555.
Future Investment ($1000):	1,665.1
Conduit Cost ($1000):	53.
Date Contract Approved:	Nov 72
Type:	

Not Under Contract

Present Storage (a-f):	0.
Future Storage (a-f):	75,700.
Present Investment ($1000):	0.
Future Investment ($1000):	21,000.
Conduit Cost ($1000):	2,331.

SOUTHWESTERN DIVISION

Little Rock District

BEAVER LAKE
CWIS No. 01230
White River
Carroll County, Arkansas

Contractor: Beaver W.D. No. 1
Present Storage (a-f): 31,000.
Future Storage (a-f): 77,000.
Present Investment ($1000): 1,431.7
Future Investment ($1000): 3,477.1
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 60
Type:

Contractor: Carroll-Boone Wtr. Dist.
Present Storage (a-f): 9,000.
Future Storage (a-f): 0.
Present Investment ($1000): 42.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 77
Type: Reallocation

Contractor: Madison County Water District
Present Storage (a-f) 4,093
Future Stroage (a-f) 0
Present Investment ($1000): 783
Future Investment ($1000): 0
Conduit ($1000): 0
Date Contract Approved: Jun 92, Rev. Apr 96
Type: Reallocation of FC to WS

BLUE MOUNTAIN LAKE
CWIS No. 01800
Petit Jean River
Yell County, Arkansas

Contractor: City of Danville
Present Storage (a-f): 1,550
Future Storage (a-f): 0
Present Investment ($1000): 417.2
Future Investment ($1000): 0
Condit ($1000): 0
Date Agreement Approved: Dec 94
Type: Reallocation of FC to WS

BULL SHOALS
CWIS No. 00820
White River
Marion County, Arkansas

Contractor: Marion County Water District
Present Storage (a-f) 880
Future Storage (a-f) 0
Present Investment ($1000): 85
Future Investment ($1000): 0
Conduit ($1000): 0
Date Contract Approved: Apr. 88
Type: Reallocation of Hydro to WS

DEQUEEN LAKE
CWIS No. 04620
Rolling Fork River
Sevier County, Arkansas

Contractor: Tri-Lakes Water District
Present Storage (a-f): 610
Future Storage (a-f) 0
Present Investment ($1000): 249.5
Future Investment ($1000): 0
Conduit Cost ($1000): 6.6
Date Agreement Approved: Feb 95
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 17,275.
Present Investment ($1000): 0.
Future Investment ($1000): 4,942.4
Conduit Cost ($1000): 186.9

Little Rock District (continued)

DIERKS LAKE
CWIS No. 04770
Saline River
Howard and Sevier Counties, Arkansas

Contractor: Tri-Lake Water Dist.
Present Storage (a-f): 190.
Future Storage (a-f): 9,910.
Present Investment ($1000): 40.6
Future Investment ($1000): 2,110.1
Conduit Cost ($1000): 181.7
Date Contract Approved: Feb 77
Type:

GILLHAM LAKE
CWIS No. 06550
Cossatot River
Howard County, Arkansas

Contractor: Tri-Lakes Wtr Dist
Present Storage (a-f): 323.
Future Storage (a-f): 20,277.
Present Investment ($1000): 167.2
Future Investment ($1000): 5,251.0
Conduit Cost ($1000): 79.
Date Contract Approved: Dec. 80, additonal storage Feb.95
Type:

GREERS FERRY LAKE
CWIS No. 07070
Little Red River
Cleburne County, Arkansas

Contractor: City of Clinton
Present Storage (a-f): 900.
Future Storage (a-f): 0.
Present Investment ($1000): 81.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 70
Type: Reallocation

Contractor: Community Water System
Present Storage (a-f): 225.
Future Storage (a-f): 0.
Present Investment ($1000): 20.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 71
Type: Reallocation

Contractor: Community Water System
Present Storage (a-f): 3,776
Future Storage (a-f): 0
Present Investment ($1000): 457.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Feb 95
Type: Reallocation from FC to WS

MILLWOOD LAKE
CWIS No. 11240
Little River
Hempstead and Little River Counties, Arkansas

Contractor: Southwest AR Wtr Dist
Present Storage (a-f): 44,544
Future Storage (a-f): 105,456
Present Investment ($1000): 4,318.7
Future Investment ($1000): 10,089.8
Conduit Cost ($1000): 110.5
Date Contract Approved: Nov. 80
Type:

NIMROD LAKE
CWIS No. 12620
Fourche LaFave River
Perry County, Arkansas

Contractor: City of Plainview
Present Storage (a-f): 33.
Future Storage (a-f): 0.
Present Investment ($1000): 1.2
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Dec 73
Type: Reallocation

Little Rock District (continued)

NINROD LAKE (continued)

Contractor: City of Plainview
Present Storage (a-f): 110
Future Storage (a-f): 0
Present Investment ($1000): 22.0
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Contract Approved: Sep 94
Type: Reallocaiton of FC to WS

NORFORK LAKE
CWIS No. 12830
North Fork River
Baxter County, Arkansas

Contractor: City of Mtn Home
Present Storage (a-f): 2,400.
Future Storage (a-f): 0.
Present Investment ($1000): 196.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jan 68
Type:

Ft. Worth District

AQUILLA LAKE
CWIS No. 74786
Aquilla Creek
Hill County, Texas

Contractor: Brazos River Authority
Present Storage (a-f): 3,360.
Future Storage (a-f): 30,240.
Present Investment ($1000): 1,257.
Future Investment ($1000): 11,316.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 76
Type:

BARDWELL LAKE
CWIS No. 00930
Waxahachie Creek
Ellis County, Texas

Contractor: Trinity River Auth.
Present Storage (a-f): 10,700.
Future Storage (a-f): 0.
Present Investment ($1000): 823.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 63
Type:

Contractor: Trinity River Auth.
Present Storage (a-f): 21,400.
Future Storage (a-f): 10,700.
Present Investment ($1000): 1,645.
Future Investment ($1000): 823.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 69
Type:

Ft. Worth District (continued)

BELTON LAKE
CWIS No. 01330
Leon River
Bell County, Texas

Contractor: Fort Hood
Present Storage (a-f): 12,000.
Future Storage (a-f): 0.
Present Investment ($1000): 161.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 54
Type:

Contractor: Brazos River Auth
Present Storage (a-f): 113,700.
Future Storage (a-f): 0.
Present Investment ($1000): 1,524.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jan 58
Type:

Contractor: Brazos River Auth
Present Storage (a-f): 247,000.
Future Storage (a-f): 0.
Present Investment ($1000): 3,601.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Dec 60
Type:

BENBROOK LAKE
CWIS No. 01350
Clear Fork of the Trinity River
Tarrant County, Texas

Contractor: City of Ft. Worth
Present Storage (a-f): 7,250.
Future Storage (a-f): 0.
Present Investment ($1000): 310.0
Future Investment ($1000): 0.
Conduit Cost ($1000): 36.
Date Contract Approved: Aug 69
Type:

Contractor: Benbrook W&S Auth
Present Storage (a-f): 7,250.
Future Storage (a-f): 0.
Present Investment ($1000): 310.
Future Investment ($1000): 0.
Conduit Cost ($1000, varying prices): 0.
Date Contract Approved: Feb 72
Type:

Contractor: Benbrook W&S Auth
Present Storage (a-f): 9,208.
Future Storage (a-f): 0.
Present Investment ($1000): 394.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 79
Type:

Contractor: Tarrant County WaterControl And Improvement Distirct No. 1
Present Storage (a-f): 48,792
Future Storage (a-f): 0
Present Investment ($1000): 2,086
Future Invistment ($1000): 0
Conduit ($1000): 0
Date Agreement Approved: 21 June 91
Type: Interim Use of Surplus Water

CANYON LAKE
CWIS No. 02590
Guadalupe River
Comal County, Texas

Contractor: Guadalupe-Blanco River Auth
Present Storage (a-f): 366,400.
Future Storage (a-f): 0.
Present Investment ($1000): 8,080.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 57
Type:

Ft. Worth District (continued)

COOPER LAKE
CWIS No. 03820
South Sulphur River
Delta and Hopkins Counties, Texas

Contractor: Sulphur R. M.W.D.
Present Storage (a-f): 17,750.
Future Storage (a-f): 54,000.
Present Investment ($1000): 3,836.
Future Investment ($1000): 11,670.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 68
Type:

Contractor: City of Irving
Present Storage (a-f): 46,200.
Future Storage (a-f): 54,425.
Present Investment ($1000): 9,985.
Future Investment ($1000): 11,762.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 68
Type:

Contractor: N. TX Mun. Wtr. Dist
Present Storage (a-f): 0.
Future Storage (a-f): 100,625.
Present Investment ($1000): 0.
Future Investment ($1000): 21,747.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 68
Type:

FERRELL'S BRIDGE DAM - LAKE O' THE PINES
CWIS No. 05850
Big Cypress Creek
Marion County, Texas

Contractor: N.E. Texas, MWD
Present Storage (a-f): 250,000.
Future Storage (a-f): 0.
Present Investment ($1000): 1,753.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jul 55
Type:

GRANGER DAM AND LAKE
CWIS No. 75357
San Gabriel River
Williamson County, Texas

Contractor: Brazos River Auth
Present Storage (a-f): 0.
Future Storage (a-f): 37,900.
Present Investment ($1000): 0.
Future Investment ($1000): 12,865.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 81
Type:

GRAPEVINE LAKE
CWIS No. 06760
Denton Creek
Tarrant and Denton Counties, Texas

Contractor: City of Grapevine
Present Storage (a-f): 1,250.
Future Storage (a-f): 0.
Present Investment ($1000): 23.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 53
Type:

Contractor: Dalles Co. Park Cities
Present Storage (a-f): 50,000.
Future Storage (a-f): 0.
Present Investment ($1000): 607.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 54
Type:

Contractor: City of Dallas
Present Storage (a-f): 85,000.
Future Storage (a-f): 0.
Present Investment ($1000): 1,433.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 54
Type:

Ft. Worth Distict (continued)

GRAPEVINE LAKE (continued)

Contractor: City of Grapevine
Present Storage (a-f): 25,000.
Future Storage (a-f): 0.
Present Investment ($1000): 684.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Feb 81
Type:

HORDS CREEK LAKE
CWIS No. 07710
Hords Creek
Coleman County, Texas

Contractor: Central Colorado River Auth
Present Storage (a-f): 5,780.
Future Storage (a-f): 0.
Present Investment ($1000): 100.
Future Investment ($1000): 0.
Conduit Cost ($1000): 5.
Date Contract Approved: Jun 48
Type:

JOE POOL LAKE
CWIS No. 09420
Mountain Creek
Dallas County, Texas

Contractor: Trinity River Authority
Present Storage (a-f): 0.
Future Storage (a-f): 142,900.
Present Investment ($1000): 0.
Future Investment ($1000): 57,955.
Conduit Cost ($1000): 80.
Date Contract Approved: Jun 77
Type:

LAVON LAKE CWIS
No. 09580
East Fork of the Trinity River
Collin County, Texas

Contractor: North Texas MWD
Present Storage (a-f): 100,000.
Future Storage (a-f): 0.
Present Investment ($1000): 1,256.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jul 54
Type:

Contractor: North Texas MWD
Present Storage (a-f): 120,000.
Future Storage (a-f): 0.
Present Investment ($1000): 13,659.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 67
Type:

Contractor: North Texas MWD
Present Storage (a-f): 160,000.
Future Storage (a-f): 0.
Present Investment ($1000): 21,381.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Dec 85
Type:

LEWISVILLE LAKE
CWIS No. 09740
Elm Fork of the Trinty River
Denton County, Texas

Contractor: City of Dallas
Present Storage (a-f): 415,000.
Future Storage (a-f): 0.
Present Investment ($1000): 3,677.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jul 53
Type:

Contractor: City of Denton
Present Storage (a-f): 21,000.
Future Storage (a-f): 0.
Present Investment ($1000): 250.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 54
Type:

Ft. Worth District (continued)

NAVARRO MILLS LAKE
CWIS No. 12260
Richland Creek
Navarro County, Texas

Contractor: Trinity River Auth
Present Storage (a-f): 53,200.
Future Storage (a-f): 0.
Present Investment ($1000): 2,176.
Future Investment ($1000): 0.
Conduit Cost ($1000): 28.
Date Contract Approved: Aug 59
Type:

NORTH SAN GABRIEL DAM - GEORGETOWN LAKE
CWIS No. 75358
North Fork of the San Gabriel River
Williamson County, Texas

Contractor: Brazos River Auth.
Present Storage (a-f): 4,961.
Future Storage (a-f): 24,239.
Present Investment ($1000): 1,022.
Future Investment ($1000): 4,992.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 81
Type:

O. C. FISHER DAM AND LAKE
CWIS No. 16090
North Concho River
Tom Green County, Texas

Contractor: Upper Colorado R. Auth.
Present Storage (a-f): 80,400.
Future Storage (a-f): 0.
Present Investment ($1000): 860.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 48
Type:

PROCTOR LAKE
CWIS No. 14580
Leon River
Comanche County, Texas

Contractor: Brazos River Auth
Present Storage (a-f): 31,400.
Future Storage (a-f): 0.
Present Investment ($1000): 1,314.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 60
Type:

RAY ROBERTS LAKE
CWIS No. 74787
Elm Fork of the Trinity River
Denton County, Texas

Contractor: City of Denton
Present Storage (a-f): 147,471.
Future Storage (a-f): 93,500.
Present Investment ($1000): 22,940.
Future Investment ($1000): 21,241.
Conduit Cost ($1000): 67.
Date Contract Approved: Sep 80
Type:

Contractor: City of Dallas
Present Storage (a-f): 419,709.
Future Storage (a-f): 266,100.
Present Investment ($1000): 65,422.
Future Investment ($1000): 60,324.
Conduit Cost ($1000): 191.
Date Contract Approved: Sep 80
Type:

SAM RAYBURN DAM AND RESERVOIR
CWIS No. 16040
Angelina River
Jasper County, Texas

Contractor: City of Lufkin
Present Storage (a-f): 43,000.
Future Storage (a-f): 0.
Present Investment ($1000): 526.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 69
Type:

Ft. Worth District (continued)

SOMERVILLE LAKE
CWIS No. 17110
Yegua Creek
Burleson and Washington Counties, Texas

Contractor: Brazos River Auth
Present Storage (a-f): 143,900.
Future Storage (a-f): 0.
Present Investment ($1000): 7,197.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 62
Type:

STILLHOUSE HOLLOW LAKE
CWIS No. 17530
Lampasas River
Bell County, Texas

Contractor: Brazos River Auth.
Present Storage (a-f): 204,900.
Future Storage (a-f): 0.
Present Investment ($1000): 6,983.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 62
Type:

TOWN BLUFF DAM - B.A. STEINHAGEN LAKE
CWIS No. 79053
Neches River
Tyler County, Texas

Contractor: Lower Neches Valley Auth
Present Storage (a-f): 94,200.
Future Storage (a-f): 0.
Present Investment ($1000): 2,000.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 55
Type:

WACO LAKE
CWIS No. 19250
Bosque River
McLennan County, Texas

Contractor: City of Waco
Present Storage (a-f): 13,026.
Future Storage (a-f): 0.
Present Investment ($1000): 0.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 58
Type:

Contractor: Brazos River Auth
Present Storage (a-f): 91,074.
Future Storage (a-f): 0.
Present Investment ($1000): 5,577.
Future Investment ($1000): 0.
Conduit Cost ($1000): 216.
Date Contract Approved: Apr 58
Type:

Contractor: Brazos River Auth.
Present Storage (a-f): 47,526.
Future Storage (a-f): 0.
Present Investment ($1000): 15,242.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 84
Type: Reallocation of Flood Control storage

WHITNEY LAKE
CWIS No. 19920
Brazos River
Bosque and Hill Counties, Texas

Contractor: Brazos River Auth
Present Storage (a-f): 50,000.
Future Storage (a-f): 0.
Present Investment ($1000): 1,181.4
Future Investment ($1000): 0.
Conduit Cost ($1000, varying prices): 0.
Date Contract Approved: Nov 82
Type: Reallocation of ?

Ft. Worth District (continued)

WRIGHT PATMAN DAM AND LAKE
CWIS No. 18110
Sulphur River
Bowie and Cass Counties, Texas

Contractor: City of Texarkana
Present Storage (a-f): 91,263.
Future Storage (a-f): 0.
Present Investment ($1000): 1,788.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Feb 54
Type:

Tulsa District

ARCADIA LAKE
CWIS No. 75012
Deep Fork River
Oklahoma County, Oklahoma

Contractor: Edmond Public Works Auth
Present Storage (a-f): 8,460.
Future Storage (a-f): 14,630.
Present Investment ($1000): 16,253.6
Future Investment ($1000): 27,790.0
Conduit Cost ($1000): 266.6
Date Contract Approved: Nov 79
Type:

BIRCH LAKE
CWIS No. 01540
Birch Creek
Osage County, Oklahoma

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 7,630.
Present Investment ($1000): 0.
Future Investment ($1000): 2,209.
Conduit Cost ($1000): 23.

BROKEN BOW LAKE
CWIS No. 02040
Mountain Fork River
McCurtain County, Oklahoma

Contractor: Oklahoma Tourism & Recreation Department
Present Storage (a-f): 60
Future Storage (a-f): 0
Present Investment ($1000): 2.0
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Sep 88
Type:

Tulsa District (continued)

BROKEN BOW LAKE (continued)

Contractor: Broken Bow Public Works Authority
Present Storage (a-f): 4,241
Future Storage (a-f): 4,054
Present Investment ($1000): 161.3
Future Investment ($1000): 107.6
Conduit Cost ($1000): 6.2
Date Agreement Approved: Feb 90
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 144,145.
Present Investment ($1000): 0.
Future Investment ($1000): 3,827.0
Conduit Cost ($1000): 108.1

CANTON LAKE
CWIS No. 02570
North Canadian River
Blaine County, Oklahoma

Contractor: Oklahoma City
Present Storage (a-f): 38,000.
Future Storage (a-f): 0.
Present Investment ($1000): 1,144.6
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 80
Type:

Contractor: Oklahoma City
Present Storage (a-f): 52,000.
Future Storage (a-f): 0.
Present Investment ($1000): 1,566.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 80
Type:

Contractor: Oklahoma City
Present Storage (a-f): 90,000
Future Storage (a-f): 0
Present Investment ($1000): 2,806.9
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Nov 91

COPAN LAKE
CWIS No. 03890
Little Caney River
Washington County, Oklahoma

Contractor: Copan PWA
Present Storage (a-f): 250
Future Storage (a-f): 4,750
Present Investment ($1000): 268.7
Future Investment ($1000): 5,105.2
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 81
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 2,500.
Present Investment ($1000): 0.
Future Investment ($1000): 2,686.9
Conduit Cost ($1000): 24.7

COUNCIL GROVE LAKE
CWIS No. 04100
Grand (Neosho) River
Morris County, Kansas

Contractor: Kansas W.R. Board
Present Storage (a-f): 24,400.
Future Storage (a-f): 0.
Present Investment ($1000): 1,400.
Future Investment ($1000): 0.
Conduit Cost ($1000): 62.
Date Contract Approved: Nov 76
Type:

DENISON DAM - LAKE TEXOMA
CWIS No. 74945
Red River
Grayson County, Texas

Contractor: City of Denison
Present Storage (a-f): 21,300.
Future Storage (a-f): 0.
Present Investment ($1000): 370.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 53

Tulsa District (continued)

DENISON DAM - LAKE TEXOMA (continued)

Contractor: Texas Power & Light
Present Storage (a-f): 16,400.
Future Storage (a-f): 0.
Present Investment ($1000): 286.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 61
Type:

Contractor: Red R. Auth of Texas
Present Storage (a-f): 450.
Future Storage (a-f): 0.
Present Investment ($1000): 9.1
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 69
Type:

Contractor: Red R. Auth of Texas
Present Storage (a-f): 1,806.
Future Storage (a-f): 0.
Present Investment ($1000): 364.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 83
Type: Reallocation of Hydropower storage

Contractor: North Texas MWD
Present Storage (a-f): 75,000.
Future Storage (a-f): 0.
Present Investment ($1000): 16,264.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Dec 85
Type: Reallocation of Hydropower storage

Contractor: Buncombe Creek View Additon
Present Storage (a-f): 1
Future Storage (a-f): 0
Present Investment ($1000): 0.3
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Apr 92
Type: Reallocation of Hyropower

Contractor: Greater Texoma Utility Authority
Present Storage (a-f): 5,500
Future Storage (a-f): 0
Present Investment ($1000): 1,266.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Sep 92
Type: Reallocation of Hyudropower

EL DORADO LAKE
CWIS No. 05350
Walnut River
Butler County, Kansas

Contractor: City of El Dorado
Present Storage (a-f): 51,459
Future Storage (a-f): 91,341
Present Investment ($1000): 13,206.3
Future Investment ($1000): 23,441.2
Conduit Cost ($1000): 838.2
Date Contract Approved: Jun 72
Type:

ELK CITY LAKE
CWIS No. 05360
Elk River
Montgomery County, Kansas

Contractor: Kansas Water Res. Board
Present Storage (a-f): 24,300.
Future Storage (a-f): 0.
Present Investment ($1000): 2,076.
Future Investment ($1000): 0.
Conduit Cost ($1000): 71.
Date Contract Approved: Nov 76
Type:

Tulsa District (continued)

EUFAULA LAKE
CWIS No. 05650
Canadian River
Okmulgee, McIntosh, Haskell and Pittsburg Counties, Oklahoma

Contractor: Haskell Co. Water Co.
Present Storage (a-f): 400.
Future Storage (a-f): 0.
Present Investment ($1000): 35.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 68
Type:

Contractor: Pitts. Co. Water Auth
Present Storage (a-f): 850.
Future Storage (a-f): 0.
Present Investment ($1000): 75.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Aug 68
Type:

Contractor: Haskell Co. RWD NO. 1
Present Storage (a-f): 50.
Future Storage (a-f): 0.
Present Investment ($1000): 4.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jan 69
Type:

Contractor: RWD No. 4 Pitts. Co.
Present Storage (a-f): 50.
Future Storage (a-f): 0.
Present Investment ($1000): 4.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 69
Type:

Contractor: RWD No. 3, Moskogee Co
Present Storage (a-f): 100.
Future Storage (a-f): 0.
Present Investment ($1000): 8.9
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 69
Type:

Contractor: Porum Public Works Auth
Present Storage (a-f): 125.
Future Storage (a-f): 0.
Present Investment ($1000): 11.1
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 69
Type:

Contractor: Lakeside Water Co. Inc
Present Storage (a-f): 20.
Future Storage (a-f): 0.
Present Investment ($1000): 1.8
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 71
Type:

Contractor: Sherwood Forrest Company
Present Storage (a-f): 60.
Future Storage (a-f): 0.
Present Investment ($1000): 5.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 71
Type:

Contractor: RWD No. 3, Haskell Co.
Present Storage (a-f): 25.
Future Storage (a-f): 0.
Present Investment ($1000): 2.2
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jul 74
Type:

Contractor: Krebs Util. Auth
Present Storage (a-f): 280.
Future Storage (a-f): 280.
Present Investment ($1000): 29.1
Future Investment ($1000): 29.1
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 80
Type:

Contractor: Rural WGS Dist #8 McIntosh Co
Present Storage (a-f): 300.
Future Storage (a-f): 1,200.
Present Investment ($1000): 31.6
Future Investment ($1000): 106.1
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 81
Type:

Tulsa District (continued)

EUFAULA LAKE (continued)

Contractor: Porum Public Works Auth
Present Storage (a-f): 280.
Future Storage (a-f): 120.
Present Investment ($1000): 30.1
Future Investment ($1000): 10.6
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 81
Type:

Contractor: Pitts Co. Public Works Auth
Present Storage (a-f): 300.
Future Storage (a-f): 190.
Present Investment ($1000): 33.1
Future Investment ($1000): 25.8
Conduit Cost ($1000): 0.
Date Contract Approved: Dec 81
Type:

Contractor: Longtown, R.W.&S.D.#1
Present Storage (a-f): 1,000
Future Storage (a-f): 0
Present Investment ($1000): 80.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0.4
Date Contract Approved: Apr 85
Type:

Contractor: Public Service Co. of OK
Present Storage (a-f): 0
Future Storage (a-f): 100
Present Investment ($1000): 0
Future Investment ($1000): 8.1
Conduit Cost ($1000, varying prices): .04
Date Contract Approved: Dec 85
Type:

Contractor: McAlester Public Works Authority
Present Storage (a-f): 6,250
Future Storage (a-f): 0
Present Investment ($1000): 505.1
Future Investment ($1000): 0
Conduit Cost ($1000): 2.2
Date Agreement Signed: Oct. 87
Type:

Contractor: Bristow Point Property Owners Association
Present Storage (a-f): 15
Future Storage (a-f): 0
Present Investment ($1000): 1.2
Future Investment ($1000): 0
Conduit Cost ($1000, varying prices): 0.01
Date Agreement Approved: Aug 89
Type:

Contractor: Warner Utilities Authority
Present Storage (a-f): 220
Future Storage (a-f): 0
Present Investment ($1000): 17.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0.08
Date Agreement Approved: Sep 89
Type:

Contractor: Twin Rivers Estates, Inc.
Present Storage (a-f): 9
Future Storage (a-f): 0
Present Investment ($1000): 0.7
Future Investment ($1000): 0
Conduit Cost ($1000): 0.003
Date Agreement Approved: Mar 90
Type:

Contractor: Bridgeport Dunes Condominium Homeowners Assoc., Inc.
Present Storage (a-f): 5
Future Storage (a-f) 0
Present Investment (1000): 0.4
Future Investment ($1000): 0
Conduit Cost ($1000): 0.002
Date Agreement Approved: Sep 90
Type:

Contractor: Pittsburg County RWD #14
Present Storage (a-f): 320
Future Storage (a-f): 0
Present Investment ($1000): 25.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0.1
Date Agreement Approved: Mar 91
Type:

Tulsa District (continued)

EUFAULA LAKE (continued)

Contractor: Duchess Creed Mobile Home Park
Present Use Storage (a-f): 4
Future Use Storage (a-f): 0
Present Investment ($1000): 0.3
Future Investment ($1000): 0
Conduit Cost ($1000): 0.001
Date Agreement Approved: Apr 92
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 42,492
Present Investment ($1000): 0.
Future Investment ($1000): 3,433.7
Conduit Cost ($1000): 15.2

FORT SUPPLY LAKE
CWIS No. 06040
Wolf Creek
Woodward County, Oklahoma

Contractor: OK Board of Public Affairs
Present Storage (a-f): 400.
Future Storage (a-f): 0.
Present Investment ($1000): 38.8
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 64
Type:

HEYBURN LAKE
CWIS No. 07500
Polecat Creek
Creek County, Oklahoma

Contractor: Creek Co. RWD #3
Present Storage (a-f): 300.
Future Storage (a-f): 0.
Present Investment ($1000): 13.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 51.2
Date Contract Approved: Sep 64
Type:

Contractor: Creek Co. RWD #3
Present Storage (a-f): 600.
Future Storage (a-f): 0.
Present Investment ($1000): 34.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 68
Type:

Contractor: Creek Co. RWD #3
Present Storage (a-f): 1,100.
Future Storage (a-f): 0.
Present Investment ($1000): 73.1
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 78
Type:

HUGO LAKE
CWIS No. 07830
Kiamichi River
Choctaw County, Oklahoma

Contractor: Hugo Municipal Auth
Present Storage (a-f): 1,640.
Future Storage (a-f): 18,880.
Present Investment ($1000: 94.
Future Investment ($1000): 1,082.
Conduit Cost ($1000): 30.
Date Contract Approved: Oct 74
Type:

Contractor: Antlers Pub. Works Auth
Present Storage (a-f): 490.
Future Storage (a-f): 430.
Present Investment ($1000): 28.
Future Investment ($1000): 25.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 75
Type:

Contractor: Western Farmers Elect. Coop.
Present Storage (a-f): 6,100.
Future Storage (a-f): 17,350.
Present Investment ($1000): 350.
Future Investment ($1000): 995.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 80
Type:

Tulsa District (continued)

HUGO LAKE (continued)

Contractor: RWD #3, Pushmataha County
Present Storage (a-f): 512
Future Storage (a-f): 0
Present Investment ($1000): 29.4
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Oct 94
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 2,198
Present Investment ($1000): 0.
Future Investment ($1000): 126
Conduit Cost ($1000): 0.

HULAH LAKE
CWIS No. 07850
Caney River
Osage County, Oklahoma

Contractor: Bartlesville
Present Storage (a-f): 15,400.
Future Storage (a-f): 0.
Present Investment ($1000): 618.7
Future Investment ($1000): 0.
Conduit Cost ($1000): 5.3
Date Contract Approved: Jun 57
Type:

Contractor: Hulah Water Dist
Present Storage (a-f): 100.
Future Storage (a-f): 0.
Present Investment ($1000): 4.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 70
Type:

Contractor: Bartlesville Mod
Present Storage (a-f): 2,200.
Future Storage (a-f): 0.
Present Investment ($1000): 88.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 70
Type:

Contractor: Bartlesville
Present Storage (a-f): 2,100.
Future Storage (a-f): 0.
Present Investment ($1000): 84.2
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 82
Type:

JOHN REDMOND DAM AND RESERVOIR
CWIS No. 08530
Grand (Neosho) River
Coffey County, Kansas

Contractor: Kansas Water Res. Bd.
Present Storage (a-f): 34,900.
Future Storage (a-f): 0.
Present Investment ($1000): 4,488.
Future Investment ($1000): 0.
Conduit Cost ($1000): 11.
Date Contract Approved: Oct 75
Type:

KAW LAKE
CWIS No. 08790
Arkansas River
Blaine County, Oklahoma

Contractor: OK Gas & Electric
Present Storage (a-f): 9,150.
Future Storage (a-f): 30,200.
Present Investment ($1000): 2,053.
Future Investment ($1000): 6,775.
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 80
Type:

Contractor: Kaw Reservoir Auth
Present Storage (a-f): 0.
Future Storage (a-f): 0.
Present Investment ($1000): 0.
Future Investment ($1000): 0.
Conduit Cost ($1000): 388.
Date Contract Approved: Mar 81
Type:

Tulsa District (continued)

KAW LAKE (continued)

Contractor: Stillwater Util. Auth.
Present Storage (a-f): 6,662
Future Storage (a-f): 44,788
Present Investment ($1000): 1,530.4
Future Investment ($1000): 10,290.0
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 81
Type:

Contractor: Otoe-Missouria Tribe
Present Storage (a-f): 183
Future Storage (a-f): 0
Present Investment ($1000): 42.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Aug. 93
Type:

Contractor: Kaw Tribe of Oklahoma
Present Storage (a-f): 6
Future Storage (a-f): 0
Present Investment ($1000): 0.2
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: July 93
Type: Interim Use Irrigation

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 80,211
Present Investment ($1000): 0.
Future Investment ($1000): 18,427.9
Conduit Cost ($1000): 0.

KEYSTONE LAKE
CWIS No. 08990
Arkansas River
Tulsa County, Oklahoma

Contractor: Public Service Co. of OK
Present Storage (a-f): 12,500.
Future Storage (a-f): 5,500.
Present Investment ($1000): 1,094.8
Future Investment ($1000): 481.7
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 71
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 2,000.
Present Investment ($1000): 0.
Future Investment ($1000): 175.2
Conduit Cost ($1000): 28.3

MARION LAKE
CWIS No. 10650
Cottonwood River
Marion County, Kansas

Contractor: Kansas Water Res. Bd.
Present Storage (a-f): 38,300.
Future Storage (a-f): 0.
Present Investment ($1000): 1,566.
Future Investment ($1000): 0.
Conduit Cost ($1000): 10.
Date Contract Approved: Nov 76
Type:

OOLOGAH LAKE
CWIS No. 13340
Verdigris River
Rogers County, Oklahoma

Contractor: City of Tulsa
Present Storage (a-f): 285,450.
Future Storage (a-f): 0.
Present Investment ($1000): 9,229.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 391.5
Date Contract Approved:
Mar 58 (38,000 AF); Feb 85 (247,450 AF)
Type:

Contractor: Collinsville
Present Storage (a-f): 6,670.
Future Storage (a-f): 0.
Present Investment ($1000): 215.7
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved:
Aug 58 (500 AF); Jun 5 (6,170 AF)
Type:

Tulsa District (continued)

OOLOGAH LAKE (continued)

Contractor: Public Service Co. of OK
Present Storage (a-f): 20,990.
Future Storage (a-f): 0.
Present Investment ($1000): 678.7
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved:
Aug 58 (5,000 AF);
May 85 (15,990 AF)
Type:

Contractor: RWD #1, Nowata Co.
Present Storage (a-f): 200.
Future Storage (a-f): 0.
Present Investment ($1000): 6.5
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved:
Sep 64 (100 AF);
Mar 85 (100 AF)
Type:

Contractor: RWD #4, Rogers Co.
Present Storage (a-f): 1,590.
Future Storage (a-f): 0.
Present Investment ($1000): 51.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved:
Jan 66 (300 AF); Jul 85 (1,290 AF)
Type:

Contractor: RWD #3, Rogers Co.
Present Storage (a-f): 5,960.
Future Storage (a-f): 0.
Present Investment ($1000): 192.7
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved:
Jan 66 (300 AF); Feb 85 (5,660 AF)
Type:

Contractor: Town of Chelsea
Present Storage (a-f): 670.
Future Storage (a-f): 860.
Present Investment ($1000): 21.7
Future Investment ($1000): 27.7
Conduit Cost ($1000): 0.
Date Contract Approved: Apr 82
Type:

Contractor: City of Claremore
Present Storage (a-f): 445
Future Storage (a-f): 0
Present Investment ($1000): 14.4
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Sep 88
Type:

Contractor: RWD #3, Washington County
Present Storage (a-f): 4,170
Future Storage (a-f): 0
Present Investment ($1000): 134.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jul 92
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 15,595
Present Investment ($1000): 0.
Future Investment ($1000): 504.2
Conduit Cost ($1000): 0.

OPTIMA LAKE
CWIS No. 13370
North Canadian River (Beaver River)
Texas County, Oklahoma

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 76,200.
Present Investment ($1000): 0.
Future Investment ($1000): 4,884.
Conduit Cost ($1000): 70.

Tulsa District (continued)

PAT MAYSE LAKE
CWIS No. 13700
Sanders Creek
Lamar County, Texas

Contractor: Paris, TX
Present Storage (a-f): 43,800.
Future Storage (a-f): 65,800.
Present Investment ($1000): 1,284.
Future Investment ($1000): 1,926.
Conduit Cost ($1000): 0.
Date Contract Approved: Feb 65
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 0.
Present Investment ($1000): 0.
Future Investment ($1000): 0.
Conduit Cost ($1000): 10.

PEARSON-SKUBITZ BIG HILL LAKE
CWIS No. 01450
Big Hill Creek
Labette County, Kansas

Contractor: Kansas W.R. Board
Present Storage (a-f): 9,200.
Future Storage (a-f): 16,500.
Present Investment ($1000): 2,490.5
Future Investment ($1000): 4,465.3
Conduit Cost ($1000): 21.3
Date Contract Approved: Oct 73
Type:

PINE CREEK LAKE
CWIS No. 14030
Little River
McCurtain County, Oklahoma

Contractor: Weyerhaeuser
Present Storage (a-f): 17,640.
Future Storage (a-f): 11,160.
Present Investment ($1000): 1,663.
Future Investment ($1000): 1,052.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 70
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 20,600.
Present Investment ($1000): 0.
Future Investment ($1000): 1,942.
Conduit Cost ($1000): 148.

SARDIS LAKE
CWIS No. 74925
Jackfork Creek
Pushmataha County, Oklahoma

Contractor: OK Wtr. Conserv. Stora. Comm
Present Storage (a-f): 141,700.
Future Storage (a-f): 155,500.
Present Investment ($1000): 7,766.
Future Investment ($1000): 8,522.
Conduit Cost ($1000): 111.
Date Contract Approved: Apr 74
Type:

SKIATOOK LAKE
CWIS No. 75378
Hominy Creek
Osage County, Oklahoma

Contractor: Osage County RWD #15
Present Storage (a-f): 0.
Future Storage (a-f): 0.
Present Investment ($1000): 0.
Future Investment ($1000): 0.
Conduit Cost ($1000): 704.0
Date Contract Approved: Dec 92
Type:

Contractor: Osage County RWD #15
Present Storage (a-f): 0.
Future Storage (a-f): 2,000.
Present Investment ($1000): 0.
Future Investment ($1000): 563.9
Conduit Cost ($1000): 0.
Date Contract Approved: Dec 92
Type:

Tulsa District (continued)

SKIATOOK LAKE (continued)

Contractor: Sand Springs Municipal Authority
Present Storage (a-f): 6,740
Future Storage (a-f): 0
Present Investment ($1000): 1,900.2
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Mar 88
Type:

Contractor: Sapulpa Municipal Authority
Present Storage (a-f): 2,245
Future Storage (a-f): 2,245
Present Investment ($1000): 632.9
Future Investment ($1000): 632.9
Conduit Cost ($1000): 0
Date Agreement Approved: Mar 88
Type:

Contractor: Skiatook Public Works Authority
Present Storage (a-f): 2,108
Future Storage (a-f): 0
Present Investment ($1000): 568.9
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Mar 88
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 47,652
Present Investment ($1000): 0.
Future Investment ($1000): 13,434.9
Conduit Cost ($1000): 0.

TENKILLER FERRY LAKE
CWIS No. 18050
Illinois River
Cherokee and Sequoyah Counties, Oklahoma

Contractor: E. Central OK Water Auth
Present Storage (a-f): 300.
Future Storage (a-f): 0.
Present Investment ($1000): 6.1
Future Investment ($1000): 0.
Conduit Cost ($1000): 11.6
Date Contract Approved: Oct 64
Type:

Contractor: RWD #13, Cherokee County
Present Storage (a-f): 100.
Future Storage (a-f): 0.
Present Investment ($1000): 2.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 67
Type:

Contractor: RWD #2, Cherokee County
Present Storage (a-f): 100.
Future Storage (a-f): 0.
Present Investment ($1000): 2.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Nov 67
Type:

Contractor: Sequoyah Co. Water Assoc.
Present Storage (a-f): 2,200.
Future Storage (a-f): 0.
Present Investment ($1000): 44.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jul 70
Type:

Contractor: Sequoyah Fuels Corp.
Present Storage (a-f): 14,000.
Future Storage (a-f): 0.
Present Investment ($1000): 282.5
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jul 70
Type:

Contractor: Summit Water Inc.
Present Storage (a-f): 140.
Future Storage (a-f): 0.
Present Investment ($1000): 2.8
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 71
Type:

Tulsa District (continued)

TENKILLER FERRY LAKE (continued)

Contractor: Paradise Hills, Inc.
Present Storage (a-f): 220.
Future Storage (a-f): 0.
Present Investment ($1000): 4.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 74
Type:

Contractor: Lake Tenkiller Assoc.
Present Storage (a-f): 200.
Future Storage (a-f): 0.
Present Investment ($1000): 4.3
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved:Mar 81
Type:

Contractor: Greenleaf Nursery Company
Present Storage (a-f): 2,120
Future Storage (a-f): 0
Present Investment ($1000): 27.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jun 94
Type: Interim Use Irrigation

Contractor: Greenleaf Nursery Company
Present Storage (a-f): 300
Future Storage (a-f): 0
Present Investment ($1000): 4.4
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jul 95
Type: Interim Use Irrigation

Contractor: Tenkiller Water Company
Present Storage (a-f): 389
Future Storage (a-f): 0
Present Investment ($1000): 4.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Nov 89
Type:

Contractor: Steep and Ross Land Company
Present Storage (a-f): 17
Future Storage (a-f): 0
Present Investment ($1000): 2.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Nov 89
Type:

Contractor: Mongold Water System
Present Storage (a-f): 5
Future Storage (a-f): 0
Present Investment ($1000): 1.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jan 90
Type:

Contractor: Tenkiller - Aqua Park
Present Storage (a-f): 17
Future Storage (a-f): 0
Present Investment ($1000): 2.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Sep 90
Type:

Contractor: Gore Public Works Authority
Present Storage (a-f): 480
Future Storage (a-f): 0
Present Investment ($1000): 51.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Sep 90
Type:

Contractor: Tenkiller Water Company
Present Storage (a-f): 34
Future Storage (a-f): 0
Present Investment ($1000): 3.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Oct 91
Type:

Contractor: Pettit Bay Water Association
Present Storage (a-f): 5
Future Storage (a-f): 0
Present Investment ($1000): 0.6
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Nov 91
Type:

Tulsa District (continued)

TENKILLER FERRY LAKE (continued)

Contractor: Fin and Feather Resort
Present Storage (a-f): 12
Future Storage (a-f): 0
Present Investment ($1000): 1.5
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jan 92
Type:

Contractor: Sixshooter Water System
Present Storage (a-f): 2
Future Storage (a-f): 0
Present Investment ($1000): 0.3
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jan 92
Type:

Contractor: The Dutchmnan's Cabins
Present Storage (a-f): 6
Future Storage (a-f): 0
Present Investment ($1000): 0.7
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Apr 92
Type:

Contractor: Bill Richardson
Present Storage (a-f): 1
Future Storage (a-f): 0
Present Investment ($1000): 0.1
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Jul 92
Type:

Contractor: Indian Hills Estate Company
Present Storage (a-f): 3
Future Storage (a-f): 0
Present Investment ($1000); 0.4
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Feb 93
Type:

Contractor: Charles Willige
Present Storage (a-f): 2
Future Storage (a-f): 0
Present Investment ($1000): 0.3
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approval: Feb 93
Type:

Contractor: J.R. and M.L. Mosteller
Present Storage (a-f): 2
Future Storage (a-f): 0
Present Investment ($1000): 0.2
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Aug 93
Type:

Contractor: Tenkiller Water Company
Present Storage (a-f): 30
Future Storage (a-f): 0
Present Investment ($1000): 3.8
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: May 94
Type:

Contractor: Tenkiller Water Company, Inc. dba Woodhaven
Present Storage (a-f): 15
Future Storage (a-f): 0
Present Investment ($1000): 1.9
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Sep 94
Type:

Contractor: Burnt Cabin RWD, Inc.
Present Storage (a-f): 12
Future Storage (a-f): 0
Present Investment ($1000): 1.2
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Nov 94
Type:

Tulsa District (continued)

TENKILLER FERRY LAKE (continued)

Contractor: Sunny Heights Water System
Present Storage (a-f): 10
Future Storage (a-f): 0
Present Investment ($1000): 1.2
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: Apr 95
Type:

Contractor Development Company
Present Storage (a-f): 3
Future Storage (a-f): 0
Present Investment ($1000): 0.4
Future Investment ($1000): 0
Conduit Cost ($1000): 0
Date Agreement Approved: May 95
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 5,016
Present Investment ($1000): 0.
Future Investment ($1000): 647.5
Conduit Cost ($1000): 0.

TORONTO LAKE
CWIS No. 18350
Verdigris River
Woodson County, Kansas

Contractor: City of Toronto
Present Storage (a-f): 265.
Future Storage (a-f): 0.
Present Investment ($1000): 21.4
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 65
Type:

Contractor: City of Toronto
Present Storage (a-f): 135.
Future Storage (a-f): 0.
Present Investment ($1000): 11.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 82
Type:

WAURIKA LAKE
CWIS No. 19570
Beaver Creek
Jefferson County, Oklahoma

Contractor: Waurika Proj Mast Conser Dis
Present Storage (a-f): 41,800.
Future Storage (a-f): 0.
Present Investment ($1000): 2,802.2
Future Investment ($1000): 0.
Conduit Cost ($1000): 213.
Date Contract Approved: Sep 70
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 109,600.
Present Investment ($1000): 0.
Future Investment ($1000): 8,042.
Conduit Cost ($1000): 0.

WAURIKA WATER CONVEYANCE FACILITIES
Contractor: Waurika Master Conservancy District
Eastern Segment
Cost ($1000): 9,725.2
Southern Segment
Cost ($1000): 447.9
Western Segment
Cost ($1000): 20,608.5
Date Agreement Approved: Jun 78

WISTER LAKE
CWIS No. 20120
Poteau River
Leflore County, Oklahoma

Contractor: Heavener Util. Auth
Present Storage (a-f): 1,600.
Future Storage (a-f): 0.
Present Investment ($1000): 41.7
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 63
Type:

Tulsa District (continued)

WISTER LAKE (continued)

Contractor: Poteau Valley Imp. Auth
Present Storage (a-f): 4,800.
Future Storage (a-f): 0.
Present Investment ($1000): 125.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Sep 67
Type:

Contractor: A.E.S. Shady Point Inc.
Present Storage (a-f): 7,253.
Future Storage (a-f): 0.
Present Investment ($1000): 109.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: May 87
Type: Reallocation of Conservation Storage

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 347.
Present Investment ($1000): 0.
Future Investment ($1000): 116.
Conduit Cost ($1000): 0.

Albuquerque District

ABIQUIU DAM
CWIS No. 00070
Rio Chama
Rio Arriba County, New Mexico

Contractor: City of Albuquerque
Present Storage (a-f): 170,900.
Future Storage (a-f): 0.
Present Investment ($1000): 0.
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Mar 86
Type:

NORTH PACIFIC DIVISION

Seattle District

WYNOOCHEE LAKE
CWIS No. 67327
Wynoochee River
Grays Harbor County, Washington

Contractor: City of Aberdeen
Present Storage (a-f): 26,400.
Future Storage (a-f): 18,200.
Present Investment ($1000): 11,281.
Future Investment ($1000): 7,772.
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 67
Type:

Portland District

LOST CREEK LAKE
CWIS No. 10090
Rogue River
Jackson County, Oregon

Contractor: City of Phoenix
Present Storage (a-f): 400.
Future Storage (a-f): 0.
Present Investment ($1000): 269.7
Future Investment ($1000): 0.
Conduit Cost ($1000): 0.
Date Contract Approved: Jun 82
Type:

Not Under Contract
Present Storage (a-f): 0.
Future Storage (a-f): 9,600.
Present Investment ($1000): 0.
Future Investment ($1000): 5,730.3
Conduit Cost ($1000): 0.

SOUTH PACIFIC DIVISION

Sacramento District

DRY CREEK (WARM SPRINGS) LAKE AND CHANNEL
CWIS No. 04990
Dry Creek
Sonoma County, California

Contractor: Sonoma Co. Water Agency
Present Storage (a-f): 44,000.
Future Storage (a-f): 88,000.
Present Investment ($1000): 4,145.
Future Investment ($1000): 8,289.
Conduit Cost ($1000): 0.
Date Contract Approved: Jan 65
Type:

Contractor: Sonoma Co. Water Agency
Present Storage (a-f): 44,000.
Future Storage (a-f): 124,000.
Present Investment ($1000): 4,145.
Future Investment ($1000): 88,335.9
Conduit Cost ($1000): 0.
Date Contract Approved: Oct 82
Type:

AGRICULTURAL WATER SUPPLY DATABASE[4]

[4] Original data from a 1982 survey of Corps divisions and districts made by HQUSACE. This data was reviewed and updated as necessary by a survey of Corps divisions and districts made by CEWRC-IWR-P Memorandum dated 11 March 1996 subject: "Review of Draft 'Water Supply Handbook'."

Irrigation Storage at Completed Projects - Missouri River Division -

Project Name	Total Project Cost ($1000)	Total Federal Cost (1) ($1000)	Storage Reserved For Irrigation			Percent of Project Cost Allocated to Irrigation (%)
			Joint (1000 AF)	Specific (1000 AF)	(%)	
Fort Peck	159,900	48,602	13,649(2)	0	72	21.5
Garrison	294,915	86,692	17,560(2)	0	73	19.9
Oahe	344,571	91,216	16,789(2)	0	72	18.1
Harlan County	46,971	35,416	0	150	18	24.6
Kanopolis	12,577	12,577	0	162(3)	37	(3)
Big Bend (4)	107,187	3,708	0	0	0	0
Fort Randall (4)	198,066	70,004	0	0	0	0
Gavins Point (4)	49,231	13,504	0	0	0	0
Wilson	20,015	20,015	225	0	29	0
Total	1,233,433	381,734	48,233	312	NA	NA

Footnotes:
(1) Total cost less reimbursables.

(2) Joint storage with flood control, navigation and hydroelectric power.

(3) Storage will be reallocated from flood control when irrigation project operable.

(4) Accommodate water withdrawal by permit, irrigation use not allocated.

Irrigation Storage at Completed Projects
- Southwestern Division -

Project Name	Total Project Cost ($1000)	Total Federal Cost (1) ($1000)	Storage Reserved Irrigation For			Percent of Project Cost Allocated to Irrigation (%)
			Joint (1000 AF)	Specific (1000 AF)	(%)	
Canton (2)						
Conchas	15,800	15,800	259.6	0	57	49
John Martin	15,200	15,200	0	357.0	58	0
Waurika	67,100	25,800	0	18.8	6.5	0.2
Trinidad	45,000	39,000	0	20.0	17.5	17.5
Belton (2)	18,400	16,300	0	45.0	36	4.3
Total	161,500	112,100	259.6	440.8	NA	NA

Footnotes:
(1) Total cost less reimbursables.

(2) Originally authorized 61,000 acre feet of irrigation storage was reallocated to municipal and industrial water supply by PL 101-460 (WRDA '90). This space is now under contract to the cities of Olkahoma City and Enid, Oklahoma subject to agreements signed 17 April 1990.

Irrigation Storage at Completed Projects - North Pacific Division -

(Continued on Next Page)

Project Name	Total Project Cost ($1000)	Total Federal Cost (1) ($1000)	Storage Reserved Irrigation Joint (1000 AF)	Storage Reserved Irrigation Specific (1000 AF)	For (%)	Percent of Project Cost Allocated to Irrigation (%)
Cottage Grove	2,460	NA	(2)	(2)	(2)	30
Dorena	14,305	NA	(2)	(2)	(2)	38
Fern Ridge	4,686	NA	(2)	(2)	(2)	43
Blue River	31,324	NA	(2)	(2)	(2)	27
Fall Creek	21,055	NA	(2)	(2)	(2)	40
Applegate	96,320	93,437	65.0	0	76	2.1
Ririe (3)	38,230	32,463	USBR	USBR	USBR	15.1
Lost Creek	148,546	113,410	315.0	0	70	1.5
Wynoochee	24,980	5,260	14.9	0	25	2
John Day	511,000(4)	112,075	0	0	0	0
Detroit-Big Cliff	66,867	21,187	(2)	(2)	(2)	7.6
Lookout Point	97,473	49,575	(2)	(2)	(2)	1.5
Hills Creek	48,973	26,931	(2)	(2)	(2)	9.4
Cougar	60,462	38,738	(2)	(2)	(2)	5.4
Green Peter-Foster	90,157	34,142	(2)	(2)	(2)	6.9
McNary	333,231(4)	64,996	0	0	0	0
Lower Granite	341,804(4)	76,531	0	0	0	0
Little Goose	63,850(4)	2,382	0	0	0	0
Lower Monumental	256,618(4)	51,744	0	0	0	0
Ice Harbor	38,259(4)	1,809	0	0	0	0
Lucky Peak	19,080(5)	19,080	0	0	0	0
Total	2,309,680	743,760	394.9	0	NA	NA

Irrigation Storage at Completed Projects
- North Pacific Division -
(Continued)

Footnotes:
(1) Total cost less reimbursables.

(2) Specific irrigation storage of 1,640,000 acre-feet has been filed on for irrigation use by the United States Bureau of Reclamatiion (USBR). Because of the projects being planned and operated as a system (Willamette Basin), none of the irrigation storage is either separable or project specific and costs are not allocated on a project bases.

(3) Project turned over to USBR.

(4) Irrigation is authorized as only an "incidental" purpose. No cost is allocated to the function nor storage reserved.

(5) Provides irrigation storage during low runoff years when storage in Anderson Ranch and Arrow-Rock (2 USBR projects) would not be sufficient.

Irrigation Storage at Completed Projects
- South Pacific Division -

Project Name	Total Project Cost ($1000)	Total Federal Cost (1) ($1000)	Storage Reserved Irrigation Joint (1000 AF)	Storage Reserved Irrigation Specific (1000 AF)	For (%)	Percent of Project Cost Allocated to Irrigation (%)
Black Butte	14,500	8,714	150	0	100	39.9
New Hogan	15,906	10,148	310	0	100	36.2
Buchanan	25,258	16,140	140	0	100	36.1
Hidden	30,555	25,177	85	0	100	17.6
Pine Flat	39,068	24,800	1,000	0	100	36.5
Terminus	19,060	16,372	142	0	100	14.1
Success	13,993	12,664	80	0	100	9.5
Isabella	22,000	17,424	570	0	100	20.8
Coyote Valley (L. Mendocino)	17,550	9,600	70	0	57	NA
Folsom (2)	100,000	63,000	1,000	0	100	NA
Tat Momoliket (Santa Rosa Wash)	10,600	NA	0	19.5	100	NA
Alamo (3)	14,780	14,780	230	0	22	NA
Total	323,270	218,819	3,777	19.5	NA	NA

Footnotes:
(1) Total cost less reimbursables.

(2) Project operated and maintained by USBR upon completion of construction.

(3) Operated as part of USBR Colorado River water system.

Irrigation Storage, Projects Under Construction

Project Name	Estimated Total Project Cost ($1000)	Estimated Total Federal Cost ($1000) (1)	Storage Reserved For Irrigation			Percent of Project Cost Allocated to Irrigation (%)
			Joint (1000 AF)	Specific (1000 AF)	(%)	
NPD						
Elk Creek (2)	137,680	108,848	0	0	0	6
Willow Creek (3)	38,824	38,824	0	0	0	0
SWD						
Santa Rosa (4) (Los Esteros)	43,400	43,400	0	200,000	44.5	44.5
SPD						
New Melones (5)	380,000	174,100	164,000	0	68	26
Total	599,904	365,172	164,000	200,000	NA	NA

Footnotes:
(1) Total cost less reimbursables.

(2) Construction stopped in 1975. Current activity limited to updating and continuing design, plans, and specifications until construction can be resumed.

(3) Project is authorized with irrigation as a purpose. When contracts for water use are negotiated, joint use storage will be available,. Since all irrigation is future development, no costs have been allocated to the irrigation purpose.

(4) Transfer of storage between Sumner Lake and Santa Rosa. Local sponsor to continue repayment costs associated with Sumner Lake.

(5) To be transferred to USBR upon completion of construction.

APPENDIX D

REALLOCATIONS

DECEMBER 1996

Table of Contents

Summary Of Reallocations

Dist.	Project/User	Date Signed	Storage Reallocated (acre-feet)	Reallocated Purpose
ORL	Barren River Lake, KY City of Glasgow, KY	Nov '65	681	Permanent Pool
ORL	Rough River Lake, KY City of Leitchfield, KY	Aug '66	120	Conservation
SWL	Norfolk Lake, AR City of Mountain Home, AR	Jan '68	2,400	
SWL	Greers Ferry Lake, AR City of Clinton	Nov '70	900	
SWL	Greers Ferry Lake, AR Community Water System	Apr '71	225	
SWL	Nimrod Lake, AR City of Plainview, AR	Dec '73	33	
SWL	Beaver Lake, AR Carroll-Boone Water District	Apr '77	9,000	
ORL	Rough River Lake, KY City of Hardinsburg	Mar '79	150	Conservation
NCR	Saylorville Lake, IA Iowa Natural Resources Council	Aug '82	14,900	Flood Control
SWF	Whitney Lake, TX Brazos River Authority	Nov '82	50,000	
SWT	Denison Dam, Lake Texoma, OK & TX Red River Authority of TX	Aug '83	1,806	Hydropower
SAW	J. H. Kerr Lake, VA & NC City of Virginia Beach, VA	Jan '84	10,200	Hydropower
SWF	Waco Lake, TX Brazos River Authority	Sep '84	47,526	Flood Control
SWT	Denison Dam, Lake Texoma, OK & TX North Texas Municipal Water District	Dec '85	75,000	Hydropower
NAB	Cowanesque Lake, PA Susquehanna River Basin Commission	Jun '86	24,335	Flood Control
MRK	Rathbun Lake, IA Rathbun Regional Water Commission	Nov '86	3,340	Conservation

SWT	Wister Lake, OK A.E.S. Shady Point, Inc.	May '87	7,253	Conservation
SWL	Bull Shoals, AR Marion County	Apr '88	880	Hydropower
SAW	Jonh Kerr Dam and Reservoir, VA Commonwealth of VA	Jan '89	23	Hydropower
SAW	J. H. Kerr Lake, VA & NC State of Virginia	Mar '89	23	
MRK	Rathbun Lake, IA Rathbun Regional Water Commission	May '89	3,340	
SAS	J. Strom Thurmond Lake, GA & SC Savannah V A	Oct '89	92	Hydropower
SAS	J. Strom Thurmond Lake, GA & SC Columbia, County	Nov '89	1,056	Hydropower
SAS	Hartwell Dam and Lake, GA Franklin County, GA	Feb '90	127	Hydropower
SAS	J. StromThurmond Lake, GA & SC City of Lincolnton, GA	Apr '90	83	Hydropower
SAS	J. Strom Thurmond Lake, GA & SC City of Thompson and McDuffie County, GA	Aug '90	1,056	Hydropower
SAS	R. B. Russell Lake, GA & SC City of Elberton GA	Sep '90	381	Hydropower
SAW	John H. Kerr Dam and Reservoir, VA Mecklenburg Cogeneration Limited Partners	Jun '91	600	Hydropower
SWT	Denison Dam, Lake Texoma, OK & TX Buncombe Creek View Addition	Apr '92	1	Hydropower
SWT	Denison Dam, Lake Texoma, OK & TX Greater Texoma Utility Authority	Sep '92	5,500	Hydropower
SWL	Nimrod Lake, AR City of Plainview	Sep '94	110	Flood Control
SWL	Blue Mountain Lake, AR City of Danville	Dec '94	1,550	Flood Control
SWL	Greers Ferry Lake, AR Community Water System	Feb '95	3,776	Flood Control
SWL	Beaver Lake, AR Madison Count Water District	Apr '96	4,093	Flood Control
	Total Reallocations 34		270,560	

Suggested Contents Of A Reallocation Report

Table of Contents

1. Purpose.
   a. Who is requesting the M&I water supply and the amount of storage involved.
   b. What is the authority for the reallocation; will it be discretionary or will it require Congressional approval?

2. Project Background.
   a. Project authorization, construction and operation history.
   b. Project location, purposes and outputs.
   c. Information on previous reallocations and water supply repayment agreements.
   d. Information on approved cost allocation.

3. Economic Analysis (Reallocation Feasibility).
   a. Water Supply Demand Analysis.
   b. Analysis of Water Supply Alternatives (Benefits).

4. Derivation of User Cost.
   a. Hydropower Benefits Foregone.
   b. Hydropower Revenues Foregone.
   c. Hydropower Replacement Cost.
   d. Flood Control Benefits Foregone.
   e. Updated Cost of Storage.
   f. Users Cost.

5. Test of Financial Feasibility.

6. Cost Account Adjustments.

7. Environmental Considerations.

8. Conclusions.

9. Recommendations.

10. Appendices.
    a. Appropriate NEPA Documents.
    b. Letters and views of other Federal and non-Federal interests.
    c. Reports prepared by others.

Report

1. Purpose.

a. Who is requesting the M&I water supply and the amount of storage involved. *(Describe the city or industry that is requesting the storage and indicate how the water usage is projected to grow over the planning period. State the amount of storage that is under consideration in this report for reallocation.)*

b. What is the authority for the reallocation; will it be discretionary or will it require Congressional approval. *(Indicate the approval level for the report and reason for selection of that level; e.g., "Approval of this reallocation study for 50,000 acre-feet of storage from the hydropower pool is within the discretion of the Commander, USACE, as it is 7.75 percent of total storage and the impacts of the reallocation will not seriously affect the existing project purposes nor will it cause major structural or operational changes.")*

2. Project Background.

a. Project authorization, construction and operation history. *(Cite authorizing Public Law, House and/or Senate Documents, and authorized project purposes. Tell when project construction started, when it was placed in operation and when the top of the multipurpose pool elevation was reached. Tell the date hydropower was placed in-service (if appropriate) and any other pertinent operating information. Describe the type of construction used, dam dimensions, information on the spillway, and characteristics of the reservoir area.)*

b. Project location, purposes and outputs. *(Tell location of the project with respect to cities and drainage basins and provide a location map. Describe purposes for which the project is currently operating. If different from those authorized (see above paragraph 2a), explain. Provide a pertinent data table (see **Table 1** for an example.))*

c. Information on previous reallocations and water supply repayment agreements. *(Provide storage amounts, type of purpose from which reallocated, approval authority and date of approval. Also any other pertinent information; e.g., "Southwest Power was provided compensation for lost revenues in the amount of ...".)*

d. Information on approved cost allocation. *(Provide pertinent information and date of approval, as appropriate.)*

Table 1
Project Data Table \1

Feature	Elevation (feet, msl)	Capacity (acre-feet)	Area (acres)	Equiv. Runoff \2
Top of Dam	911.3	---	---	---
Top of Flood Control Pool	892.0	1.674,000	38,300	27.0
Top of Multipurpose Pool	867.0	875,000	24,600	14.1
Bottom of Power Pool \3	830.0	220,000	11,100	3.6
Flood Control Storage	867.0-892.0	774,000	---	12.5
Power Storage	830.0-867.0	655,000	---	10.6
Sediment Storage \4	---	25,000	---	0.4

Footnotes:
\1 From the "Final Integrated Storage Reallocation Report and Environmental Assessment for Stockton Lake, Missouri," Kansas City District, August 1993.

\2 From 1,160 square miles of drainage area upstream from dam.

\3 Power generation is limited to elevations above 845.0 because of the weir constructed to improve the water quality of the hydropower releases.

\4 Sediment storage is initially distributed 1/3 to flood control pool and 2/3 to power pool.

3. Economic Analysis (Reallocation Feasibility).

a. Water Supply Demand Analysis. *(Describe in as much detail as necessary the average daily water demand during drought conditions and how those demands are expected to increase over the period of the study (normally 30-50 years). This demand analysis should already have been performed by the requesting entity and may be in the form of a consultant's report. If this is the case, summarize the report in the text of the reallocation report, and include the entire consultant's report as an appendix. If inter-basin transfer of water is expected, briefly describe amounts to be withdrawn and returned to each system. Major impacts of inter-basin transfer should be covered in the environmental section of the reallocation report.)*

b. Analysis of Water Supply Alternatives (Benefits). *(Briefly describe each of the alternatives investigated as alternative sources of water. Such sources could be "no action", wells, and/or a pipe line from another reservoir. This documents the users alternative to reallocation of storage in the Federal reservoir and is considered to be the "benefit" associated with reallocation. This "benefit" value (economic and environmental) should be higher than the economic and environmental cost associated with reallocation. These alternatives should be described in enough detail to establish a price for a similar quality and quantity of water that is being received from the Federal project. There may be a consultants report for this documentation, if so, summarize and include the report as an appendix to the reallocation report. This paragraph should also briefly mention the reallocations considered (but not the cost associated with them) and should*

consider more than one alternative; e.g., reallocation of flood control, hydropower, or sediment storage and /or raising the top of the flood control pool.)

4. Derivation of User Cost. *(The users cost is considered to be the higher of benefits or revenues foregone, replacement cost, or the updated cost of storage. These items are developed in the following paragraphs. The examples provided in the following paragraphs are from the "Final Integrated Storage Reallocation Report and Environmental Assessment for Stockton Lake, Missouri", prepared by the Planning Division of the Kansas City District, August 1993.* If reallocation of hydropower storage is contemplated and economic questions arise, the Power Branch of the U.S. Army Corps of Engineers North Pacific Division (CENPD-ET-WP) should be contacted for assistance. An outline of the North Pacific Division report, prepared for the Stockton Lake reallocation is provided as page D-15.

a. Hydropower Benefits Foregone. *(Hydropower benefits are based on the cost of the most likely alternative source of power. When power storage is reallocated to water supply, the power benefits foregone are equivalent to the cost of replacing the lost power with the most likely alternative source of power. The power benefits foregone can be divided into two components: the lost energy benefits and the lost capacity benefits. In the case of water supply withdrawals, there is usually a loss of energy benefits, which are based on the loss in generation (both at-site and downstream) as a result of water being withdrawn from the reservoir for water supply rather than passing through the hydro plants. In addition, there could be a loss of capacity benefits as a result of a loss in dependable capacity at the projects. Dependable capacity could be lost as a result of; (a) a loss in head due to lower post-withdrawal reservoir elevations, and/or (b) a reduction in the usability of the capacity due to inadequate energy to support the full capacity during low-flow periods.*

Example. The average annual hydropower benefits foregone are summarized in **Table 2**. The study is based on a maximum water supply withdrawal of 15 million gallons per day (MGD) during the period 1998 through 2015 and 30 MGD from 2016 through 2072. In addition, the user does not plan on constructing pumping capability for more than 15 MGD until the year 2016 because demand is not expected to exceed 15 MGD until after 2015.

Table 2
Hydropower Benefits Foregone

Capacity Value 1/	$46.35/kW/yr)
Loss In Dependable Capacity, 1998-2015	4,552 kW
Loss in Dependable Capacity, 2016-2072	9,103 kW
Total Present Value of Capacity Benefits	$2,300,000
Levelized Annual Loss in Capacity Benefits	$190,100
Average Energy Value 2/ 3/	25.6(mills/kWh)
Average Annual Energy Loss, 1998-2015	3,316,000(kWh)
Average Annual Energy Loss, 2016-2072	6,631,000(kWh)
Total Present Value of Energy Benefits	$1,039,000
Average Annual Loss in Energy Benefits	$85,900
Present Value of Benefits Foregone (1998-2072)	$3,339,000
Average Annual Benefits Foregone	$276,000

Footnotes:
1/ Capacity given in kilowatts (kW)
2/ Energy given in kilowatt hours (kWh)
3/ 1 mill = $0.001

b. Hydropower Revenues Foregone. *(Hydropower revenues foregone represent the value of the income lost to the regional power marketing agency as a result of the lost power. Revenues foregone are based on the power marketing agency's current rates.)*

Example. The average annual hydropower revenues foregone are summarized in **Table 3**. The values are based on a maximum water supply withdrawal of 15 MGD from 1998 through 2015 and 30 MGD from 2016 through 2072.

c. Hydropower Replacement Cost. *(The replacement cost of power as used for computing the cost of reallocated storage is an economic or National Economic Development (NED) cost. In the case of hydropower, the NED cost of replacement power is, by definition, identical to the power benefits foregone. In this example, this is the value for Average Annual Power Benefits Foregone as is shown in Table 4-3 as $276,000. An exception to this rule is where there are existing Federal contracts which obligate the Government to deliver a specified amount of power and/or energy. In such cases, replacement costs will be actual costs incurred to fulfill the Governments obligations during the duration of the contracts and revert to benefits foregone for the remaining period of analysis.)*

Table 3
Hydropower Revenues Foregone

Capacity Charge	$30.24/kWh/yr
Loss in Marketable Capacity 1998-2015	5,231 kW
Loss in Marketable Capacity 2016-2072	10,462 kW
Total Present Value of Marketable Capacity	$1,724,000
Annual Loss in Capacity	$142,500
Energy Charge	6.4 mils/kWh
Average Annual Energy Loss 1998-2015	2,054,000 kWh
Average Annual Energy Loss 2016-2072	4,109,000 kWh
Total Present Value of Energy Loss	$143,300
Average Annual Loss in Energy Revenues	$11,800
Present Value of Revenues Foregone	$1,867,000
Total Annual Revenues Foregone	$154,400

d. Flood Control Benefits Foregone. *(In reallocation of flood control storage, lost flood control benefits in the entire system must be investigated as well as any other impacts on reservoir operations; e.g., lost hydropower benefits and/or the impacts on recreation opportunities. In reallocating flood control storage, it must be remembered that flood control is normally the primary purpose of the project. Any significant reduction in flood control protection which in turn would require mitigation through replacement storage can be considered as being beyond the discretionary authority as defined by Congress in the 1958 Water Supply Act.)*

Example.

(1). Lost Flood Control Benefits. Limited information was available to determine the benefits foregone if water storage is reallocated from flood control to water supply. Primarily, available data from the Sac River basin were used for this study. Stage-damage data from the original project justification and a 1974 reevaluation report were analyzed for the Sac River. The decrease in flood damage reduction benefits that would occur along the Sac River as a result of a reallocation from flood control storage were expressed as a proportion of overall damages. This proportional reduction was then applied to the current estimated flood control benefits for Stockton Lake, which were updated for this analysis. Available data for the downstream rivers (Osage, Missouri, and Mississippi) were insufficient for producing a reliable estimate of impacts. Therefore, a range of benefits was developed. The upper limit assumed that the downstream rivers would receive the same proportional impact as the Sac River; i.e., that a pool

raise causing a one percent reduction in flood control benefits on the Sac also would cause a one percent reduction on the other three rivers. The lower limit assumed that there would be no impact on Mississippi flood waters, but that the impact on the Osage and Missouri Rivers would remain the same. All annual benefits were adjusted to current price levels and the lower limit was established as 0.4 percent of the total annual benefits ($217,700) and the upper limit was established as 1.3 percent of total annual benefits ($665,200).

(2). Lost Hydropower Benefits. A two foot raise in the multipurpose pool would not entirely offset all hydropower benefit losses at Stockton and would not reduce the hydropower losses at the downstream hydropower projects (Harry S. Truman and Bagnell). These values were computed by the North Pacific Division based on information provided by Southwestern Power Administration. The computations are similar to those shown in Table 4-3, with the same capacity and energy values. The total hydropower benefit foregone from reallocation of 50,000 acre-feet of flood control storage was computed to be $2,309,811.

(3). Lost Recreation Benefits. No loss of recreation benefits would be anticipated as a result of an increase in the multipurpose pool even though impacts to recreation facilities and fish and wildlife habitat were identified and are explained in detail in the Environmental Effects paragraph. Most of the impacts would be eliminated by modifying recreation facilities and increased maintenance. These mitigation measures would be paid for by the water supply customer if storage is reallocated from the flood control pool.

(4). Other Costs. If the multipurpose pool was raised two feet, there would be associated costs. These costs are summarized in **Table 4**.

Table 4
Other Costs

Item	Costs Associated with Raising Lake Level 2 feet
Flowage easements	$120,000
Relocation of roads and bridges	$200,000
Historic properties survey and any appropriate mitigation measures	$278,000
Present worth of modifying recreation facilities	$234,700
Present worth of additional recreation O&M	$48,400
Total	$881,100

(5). Total Costs. The total cost associated with reallocation of flood control storage is summarized in **Table 5**.

Table 5
Total Cost with Reallocation from Flood Control Storage

Item	Cost
Lost flood control benefits	$ 217,000 to $ 665,200
Lost hydropower benefits	$2,309,811 to $2,309,811
Lost recreation benefits	$ 0
Other costs	$ 881,100
Total	$3,407,911 to $3,856,111

e. Updated Cost of Storage. *(The cost allocated to the user under this procedure updates the cost of the reservoir to present day price levels and then assigns a percentage of the costs based on the "Use of Facilities" cost allocation procedure. Costs are updated from as built costs to 1967 prices by use of the Engineering News Record (ENR) Construction Cost Index and then from 1967 to current prices by use of the Corps' Civil Works Construction Cost Index System (CWCCIS). Land values will be updated by the weighted average update of all other project features. Costs are to be indexed from the midpoint of the physical construction period to the beginning of the fiscal year in which the contract for the reallocated storage is approved. Construction will be considered as having been initiated at the start of the month when lands for the project were first acquired or on the date when the first construction contract was awarded whichever was earlier. Construction will be considered as having been completed at the end of the government fiscal year in which final deliberate impoundment of the reservoir pool was initiated.*

Use of Facilities Formula for Determining Updated Cost of Storage

$$\text{User cost} = (\text{Total Construction Cost (-) Specific Costs}) \times \frac{\text{Storage Reallocated (AF)}}{\text{Total Usable Storage (AF)}}$$

In the above formula, "usable storage" does not include space set aside for sediment distribution or for hydropower head.)

Example. For this example, the "Reallocation Report and Environmental Assessment for Harry S. Truman Dam and Reservoir, Missouri" will be utilized. This report was prepared by the Kansas City District and is dated March 1994. This report is utilized because it is an older project that requires updating by both the ENR and the CWCCIS. This example, summarized in **Table 6**, updates the Pomme de Terre Lake Project.

Table 6
Updated Cost of Storage

Feature	As-built Joint-Use Costs	1967 ENR / 1959 ENR (Factor)	1967 Cost	FY '94 CWCCIS / FY '67 CWCCIS (Factor)	FY '95 Joint-Use Cost
Lands and Damages	$2,502,900	N/A	N/A	5.989 1/	$14,989,900
Relocations	$1,777,700	1078/811= 1.329	$2,362,600	449.40/100 = 4.494	$10,617,500
Reservoirs	$538,600	1.329	$715,800	486.39/100 = 4.864	$3,481,700
Dams	$8,807,200	1.329	$11,704,800	449.40/100 = 4.494	$52,601,400
Roads	$294,900	1.329	$391,900	465.83/100 = 4.658	$1,825,500
Buildings, Grounds & Utilities	$315,000	1.329	$418,600	424.61/100 = 4.246	$1,777,400
Permanent Operating Equipment	$101,900	1.329	$135,400	424.61/100 = 4.246	$574,900
Total Project Cost	$14,338,200	N/A	N/A	N/A	$85,868,300

Footnote: 1/ Derivation of Factor:
As-built Joint-Use Cost (-) Lands and Damages = $11,835,300.
FY '95 Cost (-) Lands and Damages = $70,878,400.
Ratio 70,878,400/11,835,300 = 5.989

The calculation for the updated cost of storage from Pomme de Terre Lake for 3,700 acre-feet of storage (out of a total usable storage of 637,000 acre-feet) is as follows:

$$\frac{\$85,868,300 \times 3,700 \text{ acre-feet}}{637,000 \text{ acre-feet}} = \$498,757$$

f. Users Cost. (*The cost to the user for the reallocated cost of storage is the higher of the preceding computed numbers. For this comparison, the updated cost of 50,000 acre-feet of storage in the Stockton Lake ($8,968,692) is utilized. This keeps the cost comparison consistent. This comparison is shown in* ***Table 7****.*

Table 7
Comparison of Alternatives to Obtain User Cost

Item	Cost
Lost Hydropower Benefits	$3,339,000
Lost Hydropower Revenues	$1,867,000
Replacement Cost of Hydropower	$3,339,000
Maximum Costs Associated with Lost Flood Control	$3,856,111
Updated Cost of Storage	$8,968,692

Based on this analysis, the updated cost of storage governs the cost of storage to the user. This is not unusual. While it can be costly and time consuming to compute the other costs, it is necessary.)

5. Test of Financial Feasibility. *(Compare the cost of the Federally reallocated storage to the most likely alternative determined in above paragraph 3b. The comparison should be based on the appropriate interest rate and repayment period and take into consideration all costs the user would incur to obtain comparable quantity and quality of water to the same location; i.e., consider treatment and transmission costs if significantly different.)*

Example. As a test of financial feasibility, the annual cost of the reallocated storage (determined in paragraph 4f), is compared to the annual cost of the most likely, least costly, alternative that would provide an equivalent quality and quantity of water which the local interests would undertake in absence of utilizing the Federal project. (This example is from the "Integrated Storage Reallocation Report and Environmental Assessment for Stockton Lake, Missouri", prepared by the Kansas City District, August 1993.) **Table 8** presents the cost of water supply storage space from Stockton Lake expressed as an annual charge using an 8.25 percent interest rate amortized over the remaining 77 year project life (100 year life from date first project purpose placed in operation, (factor 0.0826847), plus annual operation, maintenance, and major replacement cost (OM&R) costs for the storage. The table also presents the estimated annual cost for the most likely non-Federal alternative, Lake Webster West, a single purpose water supply lake located about 10 miles east of Springfield, Missouri. Lake Webster West would have an estimated dependable yield of 30 MGD with a 2% chance of shortage. The cost is expressed as an estimated annual charge using an 8.25 percent interest rate and a 77 year project life.

Table 8
Test of Financial Feasibility

Alternative	Capital Cost	Annual Capital Cost	Annual OM&R Cost	Total Cost
Stockton Lake, Multipurpose Pool				
Storage	$8,968,692	$741,600	$31,000	$772,600
Pipeline	$70,700,000	$5,845,800	$3,164,000	$9,009,800
Total Annual Cost				$9,782,400
Lake Webster West	$87,600,000	$7,243,200	$2,600,000	$9,843,200

As depicted in the above table, reallocation from the multipurpose pool is financially feasible compared with the most likely non-Federal alternative.

6. Cost Account Adjustments. *(Where the reallocation adversely impacts Federal hydropower, a credit to the accounting records should be made based on the estimated loss of power outputs and the current rates charged by the Power Marketing Agency (PMA). Credit can also be made for costs incurred by the PMA for purchasing power to fulfill contracts for the duration of the contracts. Such credit should not be made until such actual costs are incurred and documented that they are directly attributable to the reallocation.)*

7. Environmental Considerations. *(Summarize in one or two paragraphs the environmental effects of each of the alternatives considered and, as appropriate, the need to comply with any other applicable Federal environmental laws or regulation, including the Clean Water Act Section 404(b)(1) Guidelines when activities involve a regulated discharge of dredged or fill material within waters of the United States. Note that the documentation required by the National Environmental Policy Act (NEPA) of 1969 should be included as an appendix.)*

8. Conclusions. *(Summarize in one to two pages the above findings and indicate the non-Federal sponsor's desire to pursue reallocation in the Federal project. Make appropriate reference to appendices (e.g. environmental assessment, letters from the non-Federal sponsor, other coordination activities, etc.)*

9. Recommendation. (Example) Based on the findings in this study and the Environmental Assessment, it is recommended that 5,000 acre feet of storage in the Burke Lake Dam and Reservoir project between elevations 300.0 and 350.5, feet M.S.L. be made available for reallocation from the conservation pool to municipal and industrial water supply. This would satisfy the needs of the city of Springfield, Virginia and the surrounding other small water suppliers in the region.

_____ _____

Date (name)
Rank, Corps of Engineers
District Engineer

10. Appendices. *(Appendices should include the following:*

a. The appropriate NEPA documentation (Environmental Assessment with a signed Finding Of No Significant Impact or an Environmental Impact Statement), required by Public Law 91-190, the National Environmental Policy Act of 1969 (83 Stat. 852, 42 U.S.C. 4121);

b. Letters and views of other Federal, state and/or local interests affected by the reallocation including the documentation of the "Opportunity for Public Review and Comment" required by Section 5 of Public Law 100-676, the Water Resources Development Act of 1988, (102 Stat. 4022, 33 U.S.C. 2312); and

c. Reports prepared by consultants and/or other Corps offices concerning various aspects of the reallocation effort.)

OUTLINE: VALUE OF HYDROPOWER LOSSES[1]

Chapter 1: INTRODUCTION
- a. Purpose and Scope
- b. Project Description
- c. Alternative Measures of Value
- d. Procedure
- e. Conduct of the Studies
- f. Pumping Requirements for Requested Water Supply
- g. Period of Analysis
- h. Interest Rate
- i. Price Level

Chapter 2: LOSS IN ENERGY BENEFITS
- a. Introduction
- b. Power Equation
- c. Average Annual Energy Loss
- d. Seasonal Distribution
- e. Value of Energy
- f. POWRSYM Model
- h. Input Assumptions
- i. Simulations Performed
- j. Energy Values
- k. Energy Benefits Foregone

Chapter 3: LOSS IN CAPACITY BENEFITS
- a. Introduction
- b. Basis of Dependable Capacity Loss
- c. Capacity Definitions
- d. SWPA Marketable Capacity Criteria
- e. Marketable Capacity Losses
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Chapter 4: REVENUES FOREGONE
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Chapter 5. CREDIT TO MARKETING AGENCY
- a. Introduction
- b. Remaining Period of Contract
- c. SWPA Capacity Credit
- d. SWPA Energy Credit

Chapter 6. SUMMARY OF BENEFITS
- a. Power Benefits Foregone
- b. Revenues Foregone
- c. Replacement Cost of Power
- d. Credit to Marketing Agency

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[1] From the Water Supply Reallocation Report, Stockton Reservoir for the City of Springfield, Missouri. Prepared by the Power Branch, CENPD-PE-WP, North Pacific Division, Corps of Engineers. For the Kansas City District, Corps of Engineers, 3 August 1993.

APPENDIX G

DEFINITIONS AND CONVERSION FACTORS

DECEMBER 1996

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DEFINITIONS

Acre-Foot. A unit for measuring the volume of water. It is equal to the quantity of water required to cover 1.0 acre to a depth of 1.0 foot and is equal to 43,560 cubic feet. It is used in measuring volumes of water used or stored.

Amortization. The economic process of repaying or liquidating a debt or recovering the wealth invested in a project over a determined period of time.

Appropriation Water Right. The legal right to the use of a carefully designated amount of water regardless of land ownership or place of use. Allocations among users are made by temporal priority (the party who first beneficially used the water). This system is used predominately in the western United States.

Authorized Project. A project specifically authorized by Congress for construction, generally, through language in an authorization or appropriation act, or a project authorized pursuant to Section 201, of the 1965 Flood Control Act.

Base Flow. One of three components that comprise streamflow and is that component that is return flow from groundwater.

Conjunctive Use. The combined use of surface and groundwater sources of water so as to achieve a greater aggregate yield than if the two had been operated separately.

Construction Cost. The total expenditures to physically build the project including the cost of lands, relocations, engineering, design, administration, and supervision. This cost is sometimes referred to as the "first cost."

Cost Allocation. A systematic distribution of costs among the project purposes of a multipurpose project.

Cost Sharing. The division of cost among various entities which gain benefit including Federal, state, local, or private interests.

Design Flood. The probabilistic estimate of a flood whose magnitude will be equaled or exceeded with a given frequency (for example, 0.1, meaning that on average it will be exceeded 10 times in a 100-year interval).

Drought. A relative term which is generally associated with a sustained period of significantly lower soil moisture levels and water supply relative to the normal levels around which the local environment and society have stabilized.

Drought Contingency Plans. General guides that allow for dynamic management of projects, or systems of projects, to address drought needs.

Drought Management Plans. See definition for Drought Contingency Plans.

Drought Preparedness Study. Planning of management for drought, prepared cooperatively by Federal and non-Federal agencies.

Economic Life. The period determined by the estimated point in time at which the combined effect of physical depreciation, obsolescence, changing requirements for project services, and time and discount allowances will cause the cost of continuing the project to exceed the benefits to be expected from continuation. It maybe equal to or greater than the amortization period and may be equal to, but is generally less than, the physical life.

Evaporation. The changing of the liquid molecule of water to vapor.

Financial Feasibility. Criterion of project acceptability, based upon the financial value of the returns to the sponsoring entity exceeding the financial value of the costs to the sponsoring entity.

Future Use Storage. This is storage space in a project that is not under a repayment agreement and/or is under a repayment agreement, but the payments have not yet started.

Groundwater. The water that occurs beneath the earth's surface.

Guide Curves. A drawing that represents a compilation of regulating criteria, guidelines, curves, and specifications that govern basically the storage and release functions of a water resource project (also called Water Control Diagrams).

Hydrograph. A graphic plot of streamflow over time.

Immediate Use Storage. This is storage space in a project that is under a repayment agreement and payments have been initiated.

Investment Cost. The construction cost plus interest during construction. In water supply agreements, this is the construction cost allocated to that portion of the water supply storage space plus interest during construction for those projects paid out over time, but does not include (if there is any) interest on the unpaid balance.

Joint Costs. Total project costs less the summation of separable costs.

Joint-use Costs. Total project costs less all specific costs.

Prior Appropriation Water Right. The legal right to use water is based on the doctrine of "first in time is first in right," regardless of location or ownership of adjacent land.

Regulation Schedule. A schedule for the operation of a reservoir or system of reservoirs to meet the management goal or objective of the water control plan.

Riparian Water Right. The legal right to use water on land that is adjacent (riparian) to a stream. The amount of water accompanying this right is the maximum that can be used by a riparian landowner without unreasonably impairing other riparian owners. This system is used predominately in the eastern United States.

Safe Yield. The maximum quantity of water which can be reliably available throughout the most severe drought of record, or some other specified criterion. The critical period is often taken as the lowest natural flow on record for the stream.

Seasonal Storage. The maximum allowable water that may be stored in the flood control pool, for other multipurpose use, on a seasonal basis.

Separable Costs. Costs incurred to add a purpose to a project. These costs are normally calculated as a step in project (plan) formulation in considering the economic feasibility of including a purpose in a joint project. The separable cost is the minimum amount which should be considered for allocation to a given purpose. The separable cost for any specified purpose is determined by subtracting from the cost of the multipurpose project the cost of the most economical alternative project to obtain the same benefits as for the other purposes with the specified purpose omitted.

Specific Costs. The costs of identifiable project features normally serving only one purpose, such as a powerhouse or switch yard. These costs are the total cost of identifiable project features for that purpose.

Specific Facilities. Identifiable project features normally serving only one purpose.

Standard Project Flood. The Standard Project Flood (SPF) is the discharge hydrograph resulting from the Standard Project Storm (SPS). The SPS is a hypothetical storm having the most severe flood-producing rainfall depth-area-duration relationship and areal distribution pattern that is considered reasonably characteristic of the region in which the drainage area is located.

Storage Space. The volume in a reservoir project between two different elevations. The normally unit of storage space is acre-feet. There may or may not be any water available within this space.

Water Control Diagrams. These contain the regulation criteria in the form of guide curves and regulation schedules for individual reservoirs. The are used as guides to define various amounts of storage space as primary and secondary flood control storage.

Water Control Plan. The regulation of a project to meet the water management goals of the stream. In many cases, this will be a multi project plan requiring the integration of several individual plans in order to meet the overall river basin management objectives. In such cases, a master water control manual is prepared to define system regulation.

Water Rights. A form of real property, protected by state and Federal laws. Depending on the legal system used in the locale, water rights may originate in ownership of riparian lands or be acquired by statutorily-recognized methods of appropriation.

Yield. The quantity of water which can be taken, continuously, for any particular economic use. For municipal and industrial water supply purposes, this is normally taken as the flow which can be guaranteed during the 50-year drought on a 98% dependability.

Conversion Factors

Length (Example: 1 meter = 39.370 inches)

Item	centimeter	meter	kilometer	inch	foot	mile
centimeter	1	0.01	10{-5}	0.39370	0.032808	6.2137 x 10{-6}
meter	100	1	0.001	39.370	3.2808	6.2137 x 10{-4}
kilometer	10{5}	1000	1	39,370	3280.8	0.62137
inch	2.54	0.0254	2.54 x 10{-5}	1	0.083333	1.5783 x 10{-5}
foot	30.48	0.3048	3.048 x 10{-4}	12	1	1.8939 x 10{-4}
mile	1.6093 x 10{5}	1609.3	1.6093	63,360	5280	1

Area (Example: 1 acre = 0.40469 hectare)

Item	sqm	ha	sqft	ac	sqmi
square meter	1	10{-4}	10.764	2.4711 x 10{-4}	3.8610 x 10{-7}
hectare	10{4}	1	107,639	2.4711	0.0038610
square foot	0.092903	9.2903 x 10{-6}	1	2.2957 x 10{-5}	3.5870 x 10{-8}
acre	4046.9	0.40469	43,560	1	0.0015625
square mile	2.590 x 10{7}	259.00	2.7878 x 10{7}	640	1

Volume (Example: 1 cubic meter = 35.315 cubic feet)

Item	liter	cubic meter	hectare-meter	cubic foot	U.S. gallon	acre-foot
liter	1	0.001	10-{7}	0.035315	0.26417	8.1071 x 10{-7}
cubic meter	1000	1	10{-4}	35.315	264.17	8.1071 x 10{-4}
hectare-meter	10{7}	10{4}	1	353,147	2.6417 x 10{6}	8.1071
cubic foot	28.317	0.028317	2.8317 x 10{-6}	1	7.4805	2.2957 x 10{-5}
U.S. gallon	3.7854	0.0037854	3.7854 x 10{-7}	0.13368	1	3.0689 x 10{-6}
acre-foot	1.2335 x 10{6}	1233.5	0.12335	43,560	325,851	1

Other conversions:
1 milliliter = 1 cubic meter
1 U.S. gallon x 1.2 = 1 imperial gallon
1 cubic foot / second-day = 1.9835 acre-feet = 86,400 cubic feet
1 acre foot = 43, 560 cubic feet = 1,234 cubic meters = 325,829 gallons

Flow (volume/time) or Discharge (Example: 1 gallon / minute = 1.6130 acre-foot / year)

Item	liter / second	cubic meter / second	cubic feet / second	gallon / minute	million gallons / day	acre-foot / year
liter / sec	1	0.001	0.035315	15.850	0.022824	25.567
cubic meter / sec	1000	1	35.315	15,850	22.824	25,567
cubic feet / sec	28.317	0.028317	1	448.83	0.64632	723.97
gal / min	0.063090	6.3090 x 10{-5}	0.0022280	1	0.00144	1.6130
MGD	43.813	0.043813	1.5472	694.44	1	1120.1
acre-ft / yr	0.039113	3.9113 x 10{-5}	0.0013813	0.61996	8274 x 10{-4}	1

Equivalent Flow Rates
1 million acre feet per year = 1,381.3 cubic feet/sec = 39.1 cubic meters/sec = 829.7 million gals/day
1 cubic foot per second = 724 acre-feet/year = 0.028 cubic meters/sec = 0.65 million gallons/day
1 cubic meter per second = 25,546 acre feet/year = 35.3 cubic feet/sec = 22.8 million gallons/day
1 million gallons per day = 1,121 acre feet/ year = 1.547 cubic feet/sec = 0.0438 cubic meters/sec

Kinematic Viscosity (Example: square centimeter / second x 929 = square foot / second)

Item	square meter / second	square centimeter / sec	square foot / sec	centistoke
sqm / sec	1	10{4}	10.7	10{6}
sqcenm / sec (stoke)	10{-4}	1	0.00107	100
sqft / sec	0.0929	929	1	9.34 x 10{4}
centistoke	10{-6}	0.01	1.07 x 10{-5}	1

Pressure (force/area) (Example: psi x 0.433 = ft H_2O)

Item	kPa	psi	ft H_2O	m H_2O	atm
kPa	1	0.145	0.334	0.102	0.00989
psi	6.89	1	2.31	0.704	0.0680
ft H_2O	2.99	0.433	1	0.305	0.0294
m H_2O	9.81	1.42	3.28	1	0.0965
atm	101	14.7	33.9	10.4	1

kPa = kilopascal ft-lb
1 kPa = 1 kN/sqm
kN/sqm = kilonewton per square meter
psi = pounds of force per square inch
ft H_2O = feet of water column which would exert the same pressure
m H_2O = meters of water column which would exert the same pressure
atm = atmospheres

To convert from feet or meters to similar units of another fluid divide by the specific gravity of that fluid (*e.g.*, to convert ft water to ft mercury divide by 13.6, the specific gravity of mercury.)

Power (energy/time) (Example: horsepower x 1.41 = Btu / second)

Item	joule / sec	pounds of force / sec	kilowatt	hp	British thermal unit / second
Joule / sec (watt)	1	0.738	0.001	0.00134	9.48 X 10{-4}
ft-lbf / sec	1.36	1	0.00136	0.00182	0.00128
kilowatt	1000	738	1	1.34	0.948
horsepower (hp)	746	550	0.746	1	0.707
Btu / sec	1055	778	1.05	1.41	1

References for conversion tables:

Maidment, David R. (1993), "Handbook of Hydrology," Professor of Civil Engineering, University of Texas at Austin,McGraw Hill, Inc. (For tables on Kinematic Viscosity, Pressure, and Power).

Walski, Thomas M. (1984), "Analysis of Water Distribution Systems," U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi, Van Nostrand Reinhold Company. (For tables on Length, Area, Volume, and Flow).

APPENDIX H

KEY WORD INDEX

DECEMBER 1996

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