MINUTES OF
ARKANSAS RIVER COMPACT ADMINISTRATION
MEETING

Cow Palace Inn
Lamar, Colorado

December 11, 1979

Attendance:

Federal Representative
Frank G. Cooley, Meeker, CO. (Chairman)

Colorado Members:
William McDonald, Denver
Leo Idler, Lamar, (Treasurer)
Kent Reyher, Las Animas

Kansas Members:
Guy E. Gibson, Topeka
Carl E. Bentrup, Deerfield
W. F. Stoeckly, Garden City

Secretary
Lane L. Hackett, Lamar

Others Attending:

L. J. Eddy		Coolidge, KS.
Oliver Hines		Coolidge, KS.
Bernard Wagner		Garden City, KS.
Henry Gillan Jr.		Garden City, KS.
Howard C. Corrigan		Garden City, KS.
Edward DeKeiser		Deerfield, KS.
L. A. Jackson		Las Animas, CO.
Delbert Walace	Las Animas Cons. Canal	Las Animas, CO.
Don Taylor	Ft. Lyon Canal Co.	Las Animas, CO.
Leroy Mauch	Ft. Lyon Canal Co.	Lamar, CO.
Jerry Hughes	USGS	Pueblo, CO.
Hayes Grubb	USGS	Garden City, KS.
Rene A. Parker	USGS	Garden City, KS.
Alan Burns	USGS	Denver, CO.
Ron Steger	USGS	Pueblo, CO.
John J. Lefferdink	Ft. Lyon Canal Co.	Lamar, CO.
Alvin Spady	Ft. Lyon Canal Co.	Las Animas, CO.
Paul Weimer	Ft. Lyon Canal Co.	Lamar, CO.
Dean Smartt	Ft. Lyon Canal Co.	McClave, CO.
Lee Irwin	Ark. Valley Journal	LaJunta, CO.
P. O. Abbott	Fry-Ark Project	Pueblo, CO.
Robert Jesse	Div. Engr. Office	Pueblo, CO.
Jim Kasic	Div. Engr. Office	Pueblo, CO.
Bill Howland	Div. Engr. Office	Las Animas, CO.
John Dumeyer	Hydro Engineering	Pueblo, CO.
LeRoy Nickelson	Fort Bent Ditch (Supt.)	Lamar, CO.
Edward Smartt	Amity Canal Co.	Lamar, CO.
Leo Pollart	Amity Mutual Irr. Co.	Holly, CO.
Paul McGrath		Bristol, CO.
John Cunico	Corps of Engr.	

(Continued)

Jack Vayhinger	Colo. Div. of Wildlife	Colo. Springs, CO.
Charles L. Thomson	SE CO. Water Cons. Dist.	Pueblo, CO.
A. L. Fuller	Corps of Engrs.	John Martin Resv., CO.
Bob D. Faucett	Corps of Engrs.	John Martin Resv., CO.
Duane Helton	C.W.C.B	Denver, CO.

MEETING CALLED TO ORDER

Mr. Carl Bentrup called the meeting to order @ 10:00 A.M. in place of Mr. Frank Cooley (Chairman) who arrived @ noon with Bill McDonald due to adverse weather conditions near Denver. All the other Compact members were present at the beginning. Mr. Bentrup then introduced guests from Kansas representing Associated Ditches of the Arkansas River Basin in Kansas.

Approval of the minutes of the last meeting Aug. 15, 1979 at Copper Mt. Resort was postponed until the next meeting to allow more time to review them and make corrections.

REPORT OF ACTIVITIES By Lane Hackett

OPERATIONS REPORT
November 1, 1978 - October 31, 1979

The winter storage began at 12:00 P.M. October 31, 1978 with the reservoir being empty July 15, 1979.

A Colorado demand for river flow of 7 cfs was released Nov. 1, 1978 and maintained to Jan. 12, 1979. A river flow release was made April 12, 1979 of 20 cfs on Colo. demand and canceled April 13, 1979 as weather conditions below John Martin and inflow justified closing the gates for summer storage.

Winter Compact storage ended at 2400 hours April 8, 1979 with 7,109 acre feet accumulated and Amity's winter water storage of 8,675 for a total of 15,784 acre-feet in John Martin. Pursuant to the resolution adopted by the Administration in March, 1979 and the distribution agreement of ditches in Water District No. 67, transfer of this water into various accounts began April 8, 1979 and ended April 12, 1979.

Ten summer storage periods accurred this year as follows:

Began		Ended		Accumulated
1100 Hours	April 13, 1979	0001 Hours	April 16, 1979	543 A.F.
1030 "	May 30, 1979	1200 "	June 1, 1979	1,128 "
1030 "	June 3, 1979	1030 "	June 4, 1979	2,204 "
0930 "	June 9, 1979	1300 "	June 12, 1979	7,057 "
1600 "	June 24, 1979	0900 "	June 26, 1979	3,689 "
2100 "	July 16, 1979	0900 "	July 17, 1979	1.019 "
1000 "	July 18, 1979	1000 "	July 20, 1979	2,161 "
1000 "	Aug. 1, 1979	2400 "	Aug. 2, 1979	2,205 "
2400 "	Aug. 15, 1979	0800 "	Aug. 17, 1979	3,295 "
0800 "	Oct. 22, 1979	2400 "	Oct. 31, 1979	1,362 "

Operation of John Martin reservoir under the summer storage program enhanced storage periods this year that probably would have passed through a dry reservoir for Colorado Priority administration as historically operated. Furthermore, this is the first year since 1968 the reservoir has not been vacated most of the summer season.

(Continued)

Compact measuring stations, radio transmitters and print out receivers were operational with few exceptions during the year. Excellent cooperation has been received from State and Federal agencies during the year. The Colorado Water Resources Technician, Wm. Howland, at Las Animas, assistance in flow measurements and equipment trouble shooting contributed very much for improved flow information and records this year.

Storage in John Martin Reservoir is 10,484 acre feet.

SECRETARYS REPORT
Nov. 1, 1978 - Oct. 31, 1979

The data & reports for the Thirtieth, 1978 Annual Report were prepared and delivered to the printer in Feb. 1979. Copies of same were distributed according to the mailing list and requests as received throughout the year.

Considerable amount of time was spent early in the year meeting and working with the Colo. Division of Water Resources, Corp of Engrs., and all entities envolved in the summer storage program. Receiving flow information, pan evaporation, the reservoir elevation reports in conjunction with the accounting for the storage program was made daily and some more often. Gate change adjustments numbered 162 for the year.

A call for 1979-80 funds was transmitted to each State in August. The Kansas check was received in September, Colorado's check has not been received.

The 1980-81 budget as approved by the Administration was transmitted to the Governors in early August.

Communications with Local, State, and Federal agencies has been maintained. Water related meetings concerning the lower Arkansas River were attended if at all possible.

Respectfully,

Lane L. Hackett
Secretary

Motion

Mr. Leo Idler moved to have the monthly reports of the Summer Storage Program be included in the minutes of this meeting. Seconded by Mr. Kent Reyher. Passed

Mr. Leo Idler then gave a Treasurer Report (exhibit B in the CPA's report) for the year ended June 30, 1979. Mr. Idler then gave a report on receipts and disbursements for the period July 1, 1979 thru December 11, 1979.

Those reports are as follows:

TREASURERS REPORT

Cash in Band, July 1, 1978		$ 18,075
Receipts:		
Revenue from Assessments:		
Colorado	11,019	
Kansas	7,346	
Interest	741	
Miscellaneous Incomme	4	
Total Receipts		19,110
Disbursements:		
Geological Survey	19,400	
Insurance	75	
Professional Fees	425	
Office Supplies	77	
Printing	650	
Secretary's Salary - Net	2,255	
Payroll Taxes	290	
Telephone	933	
Typing & Mailing	137	
Travel & Meetings	759	
Moving Expense - Office	27	
Total Disbursements		25,028
Excess of Receipts over Disbursements		(5,918)
Cash Balance, June 30, 1979		$ 12,157

July 1, 1979 thru December 11, 1979

Balance on hand July 1, 1979		$12,157.58
RECEIPTS:		
Colorado	$	
Kansas	8,058.00	
Interest	143.13	
Total funds available		20,358.71
DISBURSEMENTS:		
Geological Survey	$4,900.00	
Professional Fees	200.00	
Office Expense	153.12	
Printing	104.17	
Secretary's Salary	874.43	
Payroll Taxes	110.34	
Telephone	648.47	
Travel & Meetings	291.76	
Office Equipment	627.12	
TOTAL DISBURSEMENTS		7,909.41
Balance on hand		$12,449.30
Checking Account	$ 663.06	
Pass Book Savings	11,786.24	
	$12,449.30	

Motion

Mr. Leo Idler moved the Treasurers Report be accepted. Seconded by Mr. Fred Stoeckly (?). Passed

COMMITTEE REPORTS

Legal and Administrative----No report.

Engineering---No report. There was discussion on studies of river loss below John Martin Resevoir with input from the USGS.

SUMMER STORAGE PROGRAM

Mr. Bob Jesse explained some of the problems encountered in operations of the storage accounts.

Mr. Bill Howland then gave a report on the amount of water in accounts of Kansas and District 67 ditches behind John Martin closing the Summer Storage period Oct. 31, 1979. At that time 5,040 acre-feet was distributed in the following accounts leaving the conservation pool empty as of midnight Oct. 31, 1979.

Kansas	2735.48 A.F.	Manvil	55.86 A.F.
Keesee	53.66 "	X Y Canal	118.81 "
Ft. Bent	531.47 "	Buffalo	777.97 "
Amity	404.61 "	Sisson	39.03 "
Lamar Canal	161.84 "	City of Lamar	118.93 "
Hyde	42.34 "	Total	5040.00 A.F.

As of midnight December 10, 1979 the Compact Conservation Pool had accumulated 5620.87 A.F.. Account water totaled 4863.13 A.F. (5040 A.F. less evaporation and seepage). That gives a total storage of 10,484 acre-feet as of midnight Dec. 10, 1979.

DISCUSSION

Discussion then pertained to the following points of interest:

1. Evaporation of water behind John Martin (explained by Mr. Jim Kasic and Mr. Bill Howland).
2. Account water in John Martin not used by April 1, 1980 will be entered into the Compact Conservation Pool.
3. Clearification on the amount of water behind John Martin belonging to the ditches in Kansas.
4. Percent of transit losses of water being delivered to ditches during the summer from account water.
5. Losses of river deliveries due to irrigation wells in the Arkansas Valley.

Coffee Break

CHANNEL CAPACITY STUDY By The Corps of Engineers---By Mr. John Cunico

This study refers to the maximum channel capacity of the Arkansas River at Avondale in relation to water flow releases from the Pueblo Dam. The study is continuing in cooperation with the Southeast Colo. Water Conservancy Distr. and the State. When water is available for delivery thru the Pueblo Dam, more study will continue on increasing the channel capacity of 5000 cfs at Avondale.

Mr. John Cunico also expressed that we will be seeing more of the Corps in the Arkansas Valley. He stressed there is a need for water conservation (remarks from Pres. Carter and the Chief of Engr.). Col. Roth of the Corps will be setting up a special organization within the district to study and make recommendations on ways to conserve water.

Discussion was then related to the release capacity of the Trinidad Dam.

FINDING A NEW SECRETARY---Comm. Members: Carl Bentrup and Leo Idler

The committee for finding a new secretary for the Compact Administration made the following recommendations:

1. That the administration request the Colo. State Engr. Office to furnish factual data and make minor gate changes at John Martin regarding agreement water. Also, have the State responsible for closing the gates when there is storage and declaring when the reservoir is empty (currently the secretaries responsibility).
2. That Mr. Leo Idler be the Compact Secretary.

Discussion

Discussion then pertained to the following points:

1. The Secretary's salary---Thought it should be left as previously planned. It is currently $3600.00.
2. Clarification of duties for: Compact Secretary, State Engr. Office, and the operations committee of the Compact.---The Secretary should have the ultimate responsibility. The Div. Engr. at Las Animas would be the technician and coordinator.
3. More comments on the Secretary's salary.

Committee Appointed

Mr. Carl Bentrup then appointed Mr. Guy Gibson as a committee of one representing the administration to negotiate with Mr. Leo Idler for the secretary's salary.

MOTION

Mr. Fred Stoeckly moved we elect Mr. Leo Idler as Secretary of the Compact Administration. Seconded by Mr. Kent Reyher. Passed

Discussion

Discussion then pertained to the first recommendation of the committee. How do we go about amending the By-Laws to give the Div. Engr. Office the right to regulate the gates at John Martin? Mr. Guy Gibson stressed the Compact should never release any of its authority to anyone. Instead of changing the By-Laws, we should first develop rules and regulations designating responsibilities.

MOTION

Mr. Guy Gibson moved that the Compact adopt the concept of changing the duties of the Compact Secretary and utilizing the resources of the State Div. Engr. Office in operating the gates at John Martin as discussed earlier in this meeting; and, that a committee be appointed by the chairman to develop a memorandum of understanding as to the duties and responsibilities of the State Engr. Office and have this memorandum of understanding be made available to the State and the Compact's Legal Committee for reviewing and making comments.

Mr. Leo Idler seconded the motion. After some discussion, Mr. Leo Idler then dropped his second since he felt the Colorado delegation needed to first confer with their legal representative who wasn't present yet. There was no other second and no vote taken.

RECESS

The meeting was then recessed for lunch.

MEETING CALLED BACK TO ORDER

The meeting was called back to order by Mr. Frank Cooley who then introduced Mr. Bill McDonald, successor to Felix Sparks as secretary of the Colorado Water Conservation Board and new member of the Compact as a Colorado member. Arrival of Mr. Cooley and Mr. McDonald made a full delegation of the Compact Administration.

Discussion

There was much discussion on developing a memorandum of understanding on the duties of the Compact Secretary and the Div. Engr. of Colo. in operation of the gates at John Martin.

Mr. Leo Idler then pointed out that if there is to be a change in the Compact By-Laws that it must be advertised prior to a change. Therefore, until any change is made, the secretary of the compact will carry out his usual duties in operations at John Martin.

By general consensus of the membership, action on this matter would be postponed until the next meeting (at Garden City in March).

REPORT ON USGS TRANSIT TIME STUDY

Mr. Jerry Hughes, Sub-District Chief USGS at Pueblo, reported events that occured since the Copper Mt. meeting where the Colorado Dist. of the USGS was asked to develop a proposal to evaluate the travel time and transit loss between John Martin Dam and Garden City, KS. A technical committee making this study was made up of individuals in the Colo. Destrict of the USGS and Kansas representatives of the USGS.

A copy of the proposal they developed is attached to these minutes.

Mr. Alan Burns, chairman of the committee, presented their proposal on the transit loss. He explained the purpose, field-data collection, analyses, and presentation of results of the study process. With this study a model would be made, with the aid of computers, to develop figures for transit losses related to anticedent conditions in the past and at present. The total cost for the study would be estimated at $110,000.00 and take two years covering three fiscal years.

Mr. Jerry Hughes then informed us that omitted from the report was the fact that USGS will match funds. With a total cost of $110,000 the States, Kansas & Colorado, would pay $55,000 and USGS $55,000.

Discussion

Discussion brought out much concern that the budget years and water actually available for a particular year for the study may be a problem. Mostly, the amount of water required for the study.

Mr. Guy Gibson and Mr. Bill McDonald felt funds from their respective states could not be received in time for the proposal's first year study. Also, the chances of receiving other contributing funds were slim.

(Continued)

Mr. Carl Bentrup asked if the study could be done with releases that are allowed under the compact (1000 cfs normally) instead of 1500 cfs.

Mr. Guy Gibson was curious on: the amount of water required for the study, how are irrigation wells to be handled during releases, and, what is their affect on the river conditions?

PROPOSAL POSTPONED

The Compact Administration decided to postpone action on this proposal until the Garden City meeting in March.

More Discussion

More discussion was then heard on the USGS's proposal.

Mr. Guy Gibson felt he would have little success in receiving funds from the State of Kansas for the proposal study since the Kansas USGS is already planning a 3 year study from the state line to Garden City, KS. Their study in Kansas would not be as extensive as the proposal presented today, however, problems in funding are still large.

Mr. Frank Cooley then requested Mr. Jerry Hughes to attend the Garden City meeting with a revised proposal with two plans:

Plan A...Basically, the current porposal with revisions.

Plan B...A new proposal reaching from John Martin to the state line and/or from the state line to Garden City, KS.

DIVISION OF WILDLIFE STORAGE RESOLUTION By Jack Vayhinger

Mr. Jack Vayhinger requested the compact to extend the former storage resolution passed in 1976 to include the remainder of the Muddy Creek Reservoir storage right to John Martin Reservoir. The courts have issued a decree on this water (8,425 acre feet) to be added to the orifinal 5,000 acre feet totaling 13,425 acre feet.

The Division of Wildlife would then be able to store in John Martin this amount (less transit and evaporation loss) for recreational use. Gauges have been installed on Muddy Creek (one) and Rule Creek (one) to determine the amount of water which would have been stored behind Muddy Creek Reservoir and delivered to John Martin.

MOTION

Mr. Bill McDonald, representing the Colorado delegation, moved to adopt the following resolution:

WHEREAS, the Arkansas River Compact Administration on August 14, 1976 approved operating criteria for the establishment and maintenance of a permanent pool in John Martin Reservoir; and,

WHEREAS, the Arkansas River Compact Administration on August 14, 1976 approved the use of the water right evidenced by Civil Action 1434 in the Bent County District Court as a source of water supply for the above memtioned permanent pool; and,

WHEREAS, such water right resulted from the transfer in 1968 of 5000 acre feet of an original 13,425 acre feet water right known as the Muddy Creek Reservoir water right; and,

WHEREAS, the Arkansas River Compact Administration on August 14, 1976 recognized that water deliveries from other sources could be added to the permanent pool water supply, subject to approval by this administration; and,

(Continued)

WHEREAS, the State of Colorado has transfered the remaining portion of the Muddy Creek Reservoir water right amounting to 8425 acre feet in Case W-4605 Colorado District Court for Water Division II and desires to utilize this additional source for the permanent pool; and,

NOW THEREFORE, BE IT RESOLVED, that this Compact Administration approves the use of the water right evidenced by the decree from W-4605 in the Colorado District Court of the Water Division II as an additional source of water supply for the permanent pool in John Martin Reservoir.

Seconded by Mr. Kent Reyher --- no vote

RECESS

Mr. Guy Gibson then asked for a 10 minute recess to allow the Kansas delegation time for a caucus on this resolution. It was granted by Mr. Frank Cooley, then the meeting was brought back to order.

MOTION

Mr. Kent Reyher moved to refer this resolution to the operations committee to study the resolution and report back to the compact at the Garden City meeting. Seconded by Mr. Fred Stoeckly. Passed

RESOLUTION ON SUMMER STORAGE ACCOUNTS at John Martin Reservoir

Mr. Bill McDonald reported that this item refers to the Summer Storage Accounts in John Martin Reservoir for ditches in Water Dist. 67 and the State of Kansas.

Pryor to any continuation of a similar resolution for 1980, time was to be given for ditches above and below John Martin to air concerns of the resolution and study any proposal changes. Such a meeting was scheduled Oct. 31, 1979 in Lamar, CO. in cooperation with the C.W.C.B. and the Div. Engr. Office, however, due to bad weather, the meeting was cancelled.

ITEM POSTPONED

Mr. Bill McDonald asked that any resolution on Summer Storage Accounts in John Martin be postponed until the next meeting at Garden City, KS. to allow more time for Colorado and Kansas ditches to study this past year's operations and clearify concerns of the resolution.

This was approved.

Discussion

Even though no action was going to take place at this meeting, remarks were requested since it was presumed that many in attendance were there because of the resolution.

Mr. John Lefferdink, representing the Fort Lyon Canal Co., expresseed concern with the operations this past year and had possible legal objections (whether direct flow was stored). Also, no provisions were made for correction when errors had been made in operations.

Most of the ditches in Water Dist. 14 and 17 were concerned more with operations of the resolution than the objective and

purpose of the resolution---which is to better utilize the small amount of water we have in the Arkansas Valley

Representatives of Associated Ditches of the Arkansas River Basin in Kansas were present and reported they had (by unanimus vote) decided to cancel continuation of the 1979 resolution as written. Mr. Edward DeKeiser expressed that the Kansas ditches were not satisfied with the amount of water being delivered to the state line. They have tried to time their releases when losses would be minimal (a wet river bed). Yet, only a 50% delivery of releases made it to the state line in July of 1979. Kansas ditches requests to have more time to study the reasons for these losses before continuing.

Mr. Delbert Wallace, of the Las Animas Consolidated Canal, shared a concern for the possibility of storing Las Animas Consolidated Canal water in John Martin to exchange with ditches in District 67 for direct flow which passes their headgate during the summer.

AMITY WINTER STORAGE PROGRAM

Mr. Leo Pollart, representing Amity Mutual Irrigation Co., informed us that Amity is participating in the Winter Storage Program this year. Agreement between the Ft. Lyon Canal Co. and Amity Mutual Irrig. Co. had been reached concerning the storage of Great Plains water behind John Martin.

MOTION

Mr. Carl Bentrup moved that the Amity Storage Plan be reviewed by the compact for storage during 1980-81 before there is a continuation of the program. Seconded by Mr. Guy Gibson. Passed

Representatives of the Amity Mutual, Kansas ditches, and the Colorado Division Engineer's Office will meet to air concerns about the water from the Great Plains Storage to John Martin Reservoir before the Garden City meeting. Mr. Carl Bentrup is to make arrangements for that meeting.

DATE CHOSEN for the Garden City Meeting

The date of March 12, 1980 (Wednesday) was chosen as the next meeting date to be held at Garden City, KS. SEE NOTE:

AGREEMENTS UNDERTAKEN by past Compact Administrations

Mr. Fred Stoeckly requested that a list of agreements, the Compact Administration has undertaken over the years, be furnished to all members of the compact to help keep members informed as to the actions taken by pryor compact members. Mr. Frank Cooley asked Mr. Leo Idler to compile this information; preferably in a loose-leaf notebook, so new agreements can be added.

NOTE: During the month of February 1980, all administration members and others appropriate received notice that; the meeting of the Arkansas River Compact Administration originally scheduled for March 12 has been moved to Friday, March 21st. It will still be held in Garden City, Kansas, at the Wheatlands Convention Center, 1131 East Sulton. The meeting will start at 9:30 A.M.

RESOLUTION HONORING Lane L. Hackett -- Compact Secretary

The motion to prepare a resolution honoring Lane L. Hackett as Secretary of the Compact Administration was passed at the Copper Mt. meeting in August 1979. Following is the proposed resolution to be acted upon during this meeting.

WHEREAS, Lane L. Hackett has served with distinction as Secretary to the Arkansas River Compact Administration since 1966; and,

WHEREAS, Lane L. Hackett has brought his special talents in ably and competantly fulfilling the duties assigned to him and in assisting with the many technical water resource problems which have confronted the Arkansas River Basin during his tenure as Compact Administration Secretary; and,

WHEREAS, Lane L. Hackett has rendered long, faithful, and meritorious service to the Compact Administration relating to the conservation, utilization, and development of water and related land resources of the Arkansas River Basin involving numerous water organizations in Colorado and Kansas; and,

WHEREAS, Lane L. Hackett in both his personal and public life has always demonstrated a deep and sincere regard for his fellow men and has unselfishly devoted his effort, abilities, and time to the welfare of the people in the Arkansas River Basin in Colorado and Kansas; and

WHEREAS, Lane L. Hackett has always vigorously and honorably executed his duties with great integrety and a deep respect for the responsibilities placed upon him;

BE IT NOW THEREFORE RESOLVED, that the Arkansas River Compact Administration (being assembled in its regular annual meeting this 11th day of December 1979) does hereby express its deep gratitude and appreciation for the untiring service and assistance rendered by Lane L. Hackett as Secretary to the Compact Administration; and

BE IT NOW THEREFORE FURTHER RESOLVED, that the Arkansas River Compact Administration wish Lane L. Hackett, his wife, and family the best of health, happiness, and prosperity in all their future endeavors;

THAT TAKING THIS RESOLUTION IN ITS PRESENT FORM, the Chairman (Representative to the United States of the Arkansas River Compact Administration) and its members be hereby directed to transmit a certified copy of this Resolution to Mr. and Mrs. Lane L. Hackett, to the Governors of the States of Colorado and Kansas, and to the President of the United States of America.

So given this 11th day of December, 1979
Frank G. Cooley, Chairman and Representative of the United States

This resolution honoring Lane L. Hackett was passed as written. (Read by Mr. Frank G. Cooley)

TELEMETER STATION for John Martin Reservoir

Mr. Lane L. Hackett explained how a telemeter at John Martin Reservoir would be a great asset to the Compact Secretary to have elevation reports available at any time.

Mr. Jerry Hughes estimated a total first year cost of $2,000. That price includes the telemeter equipment, it's installation, and maintenance, with an annual maintenance cost of $300.00 (these are estimates). The charges will increase if the telephone company has

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to run a line to the telemeter. Money to purchase a telemeter could go thru data acquisition (improvement plans) items in the compact's budget.

Mr. Guy Gibson requested the USGS to further research specific costs of installing a telemeter at John Martin Reservoir and report back to the Compact at the Garden City meeting.

RECESS

ELECTION OF OFFICERS AND COMMITTEES

Vice Chairman -- Carl Bentrup
Operations Comm. -- Fred Stoeckly, Chairman; Leo Idler, Member
Administrative & Legal Comm. -- Bill McDonald, Chrm.; Carl Bentrup, Mem.
Engineering Comm. -- Kent Reyher, Chairman; Guy Gibson, Member
Treasurer -- Leo Idler

TREASURERS BOND

The Treasurers Bond was raised from $15,000 to $20,000. The Secretary is to check for a position schedule bond instead of a bond on a particular person.

OTHER ITEMS OF BUSINESS

1. Mr. Cooley requested payment for transcribing the Copper Mt. minutes from the tape recorder. Amount was $313.00. Approved
2. There was discussion on the tape recording system and the transcribing of the minutes. It was decided we do need to have the tape recorder system for our protection in the future. Mr. Bill McDonald will further research the possibility of using the tapes and the State Court Reporter.
3. Proposed Budget for fiscal year July 1, 1981-June 30, 1982.
4. More discussion on the telemeter at John Martin Reservoir.
5. Annual report will be prepared as it has in the past.

THANKS FOR RECOGNITION

Mr. Lane Hackett expressed his appreciation for the consideration and recognition the Arkansas River Compact Administration has given him; and that he enjoyed working with those involved with the Compact.

MEETING ADJOURNED

Respectfully submitted,

Kent Reyher, Transcriber

United States Department of the Interior
GEOLOGICAL SURVEY
Box 25046
Denver Federal Center
Denver, Colorado 80225
Mail Stop #415

IN REPLY REFER TO:

Water Resources Division
Colorado District

December 7, 1979

Mr. Frank Cooley
Box 98
Meeker, Colorado 81641

Dear Mr. Cooley:

As requested in your letter dated August 20, 1979, and subsequent communication we are enclosing a project proposal entitled "Transit Losses and Traveltimes of Reservoir Releases Along the Arkansas River from John Martin Reservoir Colorado, to Garden City, Kansas," for your review. As arranged, we will present an overview of the project and answer any questions you or other board members may have at the annual meeting of the Arkansas River Compact Administration on December 11 at 9:a.m., in Lamar, Colorado.

Sincerely yours,

J. F. Blakey
District Chief

Enclosure

cc: District Chief, WRD, Lawrence, Kansas
Duane Helton
Leo Idler
Kent Reyher
Guy E. Gileson
Carl E. Bentrup
W. F. Stoeckly

PROJECT PROPOSAL

TRANSIT LOSSES AND TRAVELTIMES OF RESERVOIR RELEASES ALONG THE ARKANSAS RIVER FROM JOHN MARTIN RESERVOIR, COLORADO, TO GARDEN CITY, KANSAS

Proposed for

ARKANSAS RIVER COMPACT ADMINISTRATION

By

U.S. GEOLOGICAL SURVEY, WATER RESOURCES DIVISION

COLORADO AND KANSAS DISTRICTS

December 1979

PROBLEM: John Martin Dam, completed in 1948, was built to control flood waters and for the development of the water resources of the Arkansas River basin. The reservoir was originally intended to supply water to irrigated lands as far downstream as Garden City, Kansas. Reservoir operation and downstream delivery are regulated by the Arkansas River Compact Administration--Colorado Water Law allows water users to transport their water in natural river channels from upstream storage reservoirs to a downstream delivery point provided allowances are made for transit losses. The transit losses associated with reservoir releases from John Martin Dam are presently unknown and based on preliminary review of surface-water records, appear to be changing with time. A knowledge of the transit losses associated with reservoir releases from John Martin Dam will provide water managers and decision makers with information on how the complex stream-aquifer system functions and how transit losses might be reduced. A refinement of existing traveltime information will aid in water-management practices during reservoir-release periods.

A similar study for the Arkansas River from Pueblo Reservoir to John Martin Reservoir was published in 1978 by the U.S. Geological Survey as Water Resources Investigations 78-75 entitled "Transit Losses and Traveltimes of Reservoir Releases along the Arkansas River from Pueblo Reservoir to John Martin Reservoir Southeastern Colorado."

OBJECTIVES : The principal objective of this study is to define transit losses and traveltimes of reservoir releases along the Arkansas River from John Martin Reservoir, Colorado, to Garden City, Kansas. Secondary objectives are to consider examples which reduce transit losses for various antecedent streamflow conditions through selective sizing and scheduling of reservoir releases and to analyze probable historic transit losses.

APPROACH: The U.S. Geological Survey will conduct a two-year study spanning three federal fiscal years to meet these study objectives. The approach to this study is divided into three main sections including field-data collection, data analyses, and presentation of results.

Field-data collection: For the duration of the study three continuous-record streamflow stations including one in Colorado and two in Kansas would be operated to provide additional information on streamflow conditions in the study reach. The main emphasis on data collection will be to provide information to determine transit losses for existing conditions and traveltimes of reservoir releases.

Two reservoir releases from John Martin Reservoir will be intensively monitored; one release in the spring and one release in the summer; to reflect both medium and low antecedent streamflow conditions, respectively. Data collection during the reservoir releases will consist of making a series of streamflow discharge measurements prior to and during the passage of a reservoir release at selected sites along the Arkansas River, and at point of

significant inflow or diversion. The Arkansas River Compact Addministration will provide required water and coordination for these releases. Ideally, the total flow requirements for the test releases is between 1,000 to 1,500 cubic-feet per second for four to five days. Concurrent with streamflow monitoring of these releases, ground-water levels will be measured at wells located near the river to evaluate bank storage and to aid in documenting transit losses. A gain-loss study will be made in the fall of the first year to determine which reaches of the Arkansas River are gaining or losing streamflow.

Data Analyses: Data collected for this study and data obtained for on-going studies will be used for the analysis phase. These data will be analyzed to determine the transit losses and traveltimes for existing conditions of reservoir releases. Transit losses are best investigated by theoretical methods using a hydrologic model, because of the changing hydrologic conditions in the study reach. The results of the modeling will be presented as simulated hydrographs at selected locations in the study area, which will be compared with the observed hydrographs. The computer model, following calibration with observed data, will be used to simulate release hydrographs for a variety of hydrologic conditions.

To interpret the observed data and results from the computer modeling, a definition of transit losses will be required by the Arkansas River Compact Administration and the State Engineers' of Colorado and Kansas. Using this definition, relations will be developed to show the transit losses for various antecedent streamflow conditions for each of several subreaches of the Arkansas River from John Martin Reservoir to Garden City, Kansas.

Another phase of the analyses will be to review and study previously collected data on reservoir releases and ground-water levels to determine historic transit losses. This work may indicate a direction of change in transit losses over a period of time.

Presentation of results: The study progress will be presented in writing and at the annual meeting of the Arkansas River Compact Administration. Surface and ground-water data collected will be published in Water Resources Data for Colorado and Kansas, respectively. An interpretive report will be prepared in the U.S. Geological Survey's Water Resources Investigations Series by personnel from both the Colorado and Kansas offices. In addition to the interpretive report, the computations of transit losses and traveltime results will be made available on a portable computer such as the Hewlett Packard System for easier application of results by water managers.

BENEFITS: The collection of hydrologic data and the computer modeling results provided by this study will provide a better understanding of the distribution, rates, and causes of transit losses and the travel-times of John Martin Reservoir releases for both existing and historic hydrologic conditions. These results will provide water-management alternatives with regards to the operation of John Martin Reservoir and the delivery of stored water, thereby, benefiting water users in this reach of the river. Study results will also provide decision makers with a method for evaluating the legal obligations of reservoir operation and downstream delivery of streamflow of the Arkansas River Compact Administration.

MANPOWER AND COST:

Manpower: Personnel from Colorado and Kansas offices of the U.S. Geological Survey will work together in all aspects of this study.

Cost: Estimates of total cost for Colorado and Kansas include manpower, vehicles and travel expenses, equipment, construction, operation, and maintenance of streamflow gaging stations, and computer charges for data collection analyses and presentation of results for the two-year study. Cost figures assumes the study would start early 1980.

FY 80	FY 81	FY 82	Total
$36,300	$67,900	$4,800	$109,000

JOHN MARTIN INTERIM ACCOUNTING SHEET

APRIL 79

DAY	CONTENT	INFLOW				OUTFLOW								Net Change	Computed Reservoir Total End of Day	REMARKS
						Reservoir Releases										
	Reservoir Total Beginning of Day	Winter Water	Compact Water	AGREEMENT WATER	Sub-Total				COMPACT WATER		W.W. Evap.	Compact Evap.	Sub-Total			
1	[illegible]	0	42.00								12.74	9.26	22.00	40.00	[illegible]	
2	[illegible]		37.00								10.93	8.07	19.00	20.00	[illegible]	
3	[illegible]		127.00								8.05	5.95	14.00	113.00	[illegible]	
4	[illegible]		46.00								3.41	2.59	6.00	40.00	[illegible]	
5	[illegible]		20.00								11.34	8.66	20.00	0	[illegible]	
6	[illegible]		122.00								11.23	9.77	20.00	102.00	[illegible]	
7	[illegible]		41.00								DR	DR	0	41.00	[illegible]	
8	[illegible]		41.00								DR	DR	0	41.00	[illegible]	
9	[illegible]		107.00	2000.00	2107.00				2000.00		43.05	37.95	2086.00	21.00	[illegible]	BEGIN RELEASE INTO ARKS-
10	[illegible]		45.00	2000.00	2045.00				2000.00		13.32	10.68	2024.00	111.00	[illegible]	KANSAS ACCOUNT @ 6001 HRS.
11	[illegible]		45.00	2000.00	2045.00				2000.00		3.21	1.79	2005.00	61.00	[illegible]	APRIL 9, 1979; COMPACT & [illegible]
12	[illegible]		21.00	1102.90	1129.90				1106.90		11.01	8.99	1128.98	1.00	[illegible]	[illegible]
13	[illegible]		145.00								ACRE-L WATER 23.00	0		122.00	[illegible]	[illegible]
14	15906.00		235.00								27.74	.26	27.00	207.00	16113.00	
15	16112.00		164.00						AMITY		38.08	.92	39.00	125.00	16239.00	
16	16239.00		0	542.82	542.82				375.00	542.82	33.00	0	950.82	-408.00	15830.00	
17	15830.00		0	0					600.00		45.00			-645.00	15185.00	
18	15185.00						ET. RENT		600.00		34.00			-634.00	14551.00	
19	14551.00					BUFFALO	37.50		600.00		56.00			-693.50	13857.50	
20	13857.50					37.50	60.00		600.00		32.00			-729.50	13128.00	
21	13128.00					60.00	60.00		600.00		39.00			-759.00	12369.00	
22	12369.00					60.00	60.00		600.00	MANUEL	LAMAR	48.00		-768.00	11601.00	
23	11601.00					60.00	60.00		600.00	7.00	77.00	36.00		-840.00	10761.00	
24	10761.00					60.00	60.00		600.00	16.00	176.00	17.00		-929.00	9832.00	
25	9832.00					60.00	60.00		600.00	16.00	176.00	25.00		-960.33	8871.67	
26	8871.67					60.00	60.00		600.00	16.00	176.00	19.00		-971.00	7900.67	
27	7900.67					60.00	60.00		600.00	16.00	176.00	12.00		-964.00	6936.67	
28	6936.67					60.00	12.81		600.00	16.00	176.00	16.00		-920.86	6015.81	
29	6015.81					7.12	-0-		600.00	16.00	38.61	14.00		-715.73	5300.08	
30	5300.08					-0-			600.00	16.00	-0-	15.00		-671.00	4629.08	
31																

Pan Evap.	MAY 1979 MONTH & DAY	JOHN MARTIN					WINTER WATER				COMPACT WATER				EVAPORATION			
		Reservoir Beginning	Inflow	Evaporation	Release	Reservoir Ending	Inflow	Evaporation	Release	Storage	Inflow	Evaporation	Release	Storage	Storage Capacity Ac. Ft.	Surface Area	Evaporation Rate	Total Evaporation
.27	1	4515													3989	1054	.0157	17
.15	2	3989													3354	932	.0087	8
.18	3	3354													3317	925	.0104	10
.04	4	3317													3307	923	.0035	3
.30	5	3307													3253	912	.0174	16
.50	6	3253													3171	894	.0290	26
.43	7	3171													3154	890	.0249	22
.30	8	3154													3109	880	.0174	15
.22	9	3109													3207	902	.0128	12
.12	10	3207													3225	901	.0070	6
.14	11	3225													3216	904	.0081	7
.24	12	3216													3180	896	.0140	13
.22	13	3180													3154	890	.0128	11
.28	14	3154													3083	874	.0162	14
.23	15	3083													3048	846	.0133	12
.49	16	3048													3013	858	.0284	24
.45	17	3013													2971	847	.0261	22
.25	18	2971													2971	847	.0145	12
.54	19	2971													2979	849	.0197	17
.05	20	2979													2988	852	.0029	2
.04	21	2985													2979	849	.0035	3
.12	22	2979													2945	841	.0070	6
.02	23	2945													2937	839	.0012	1
.20	24	2937													2954	843	.0116	10
.20	25	2954													3022	860	.0116	10
.38	26	3022													2854	820	.0220	18
.25	27	2854													2805	804	.0145	12
.22	28	2805													2846	817	.0186	15
.29	29	2763.00													2822	811	.0168	14
.36	30	2849.04	422.96	.19		3253		19		2830.04	422.96	- 0 -		422.96	3253	912	.0209	19
	31	3253	627.33	.6	483.33	3391	422.96	5.22	483.33	2764.45	627.33	0.78	422.96	626.55	3391	940	.0064	.11
	TOTAL																	

PAN EVAP.	JUNE MONTH & DAY	JOHN MARTIN					WINTER WATER AGREEMENT WATER				COMPACT WATER				RESERVOIR EVAPORATION			
		Reservoir Beginning	Inflow	Evaporation	Release	Reservoir Ending	Inflow	Evaporation	Release	Storage	Inflow	Evaporation	Release	Storage	Storage Capacity Ac. Ft.	Surface Area	Evaporation Rate	Total Evaporation
.08	1	3391.00	77.88	4.00	816.88	2648.00	626.55	3.26	816.88	2570.86	77.88	.74	626.55	77.14	3030	862	.0046	4
.17	2	2648.00		8.00	830.00	1810.	76.91	7.77	830.00	1810.00	-0-	.23	76.91	-0-	2687	774	.0099	8
.20	3	1810.00	1227.37	10.00	825.37	2862.00	-0-	10.00	825.37	974.63	1227.37	0	0	1227.37	2862	821	.0116	10
.33	4	2862.00	316.69	17.00	139.69	3022.00	1125.00	5.79	139.69	1954.15	316.69	11.21	1125.00	1067.85	3163	892	.0191	17
.31	5	3022.00	0	16.00	75.00	2931.00	1062.20	10.35	75.00	1931.00	0	5.65	1062.00	-0-	3154	880	.0180	16
.28	6	2931.00	0	13.00	200.00	2718.00	-0-	13.00	200.00	2718.00	0	0	0	0	2879	825	.0162	13
.39	7	2718.00	0	17.00	75.00	2626.00	0	17.00	75.00	2626.00	0	0	0	0	2580	747	.0226	17
.17	8	2626.00	0	7.00	0	2619.00	0	7.00	-0-	2619.00	0	0	0	0	2543	737	.0099	7
.07	9	2619.00	1374.00	4.00	0	3989.00	0	4.00		2615.00	1374.00	0	0	1374.00	3989	1054	.0041	4
.11	10	3989	2798.00	9.00	100.00	6678.00	0	5.90	100	2509.10	2798.00	3.10	0	4168.90	6678	1378	.0064	9
.31	11	6678	2418.	28.00	200	8868.00	0	10.53	200	2298.57	2418.00	17.47		6569.43	8868	1581	.0180	28
.43	12	8868	467.08	42.00	312.50	8980.58	916.67	10.89	312.50	2891.85	467.08	31.11	916.67	6088.73	9188	1682	.0249	42
.44	13	8980.58	-0-	40.00	500.00	8440.58	2000.00	12.88	500.00	4378.97	-0-	27.12	2000.00	4061.61	8758	1571	.0255	40
.46	14	8440.58		41.00	433.34	7966.24	2000.00	21.27	433.34	5924.36	0	19.73	2000.00	2041.33	8248	1525	.0267	41
.48	15	7966.24		41.	300.00	7625.24	2000.	30.49	300.00	7593.87	-0-	10.51	2000.00	30.82	7692	1477	.0278	41
.44	16	7625.24		36.	300	7289.24	31.22	35.85	300.00	7289.24	0	.15	31.22	-0-	7098	1420	.0255	36
.41	17	7289.24		33.	112.50	7143.74	-0-	33.00	112.50	7143.74	0	0	0	0	6914	1402	.0238	33
.38	18	7143.74		31.	50.00	7062.74	0	31.00	50.00	7062.74	0	0	0	0	7055	1416	.0220	31
.71	19	7062.74		58.	56.25	6948.49	0	58.00	56.25	6948.49	0	0	0	0	6914	1402	.0412	58
.35	20	6948.49		28.	-0-	6920.49	0	28.00	0	6920.49	0	0	0	0	6872	1398	.0203	28
.59	21	6920.49		48.	0	6872.49	0	48.00	0	6872.49	0	0	0	0	6914	1402	.0342	48
.28	22	6872.49		22	0	6850.49	0	22.00	0	6850.49	0	0	0	0	6775	1388	.0162	22
.51	23	6850.49		40	0	6810.49	0	40.00	0	6810.49	0	0	0	0	6568	1368	.0296	40
.34	24	6810.49	866.51	29	0	7648.00	0	29.00	0	6781.49	866.51	0	0	866.51	7648	1473	.0197	29
.57	25	7648.00	2653.00	56.	0	10245.00	0	49.66	0	6731.83	2653.00	6.34	0	3513.17	10245	1695	.0331	56
.45	26	10245.00	169.88	45.	187.50	10182.38	1250.00	29.57	187.50	7764.76	169.88	15.48	1250.00	2417.62	10398	1707	.0261	45
.45	27	10182.38		44.	300.00	9838.38	2000.00	35.65	300.00	9431.21	-0-	10.45	2000.00	407.17	10059	1679	.0261	44
.39	28	9838.38		37.	406.25	9395.13	405.64	35.47	406.25	9395.13	0	1.53	405.64	-0-	9628	1644	.0226	37
.43	29	9395.13		40	-0-	9355.13	-0-	40.00	-0-	9355.13		-0-	-0-		9317	1620	.0249	40
.56	30	9355.13		52	60.42	9242.71		52.00	60.42	9242.71					9220	1612	.0325	52
	31																	
	TOTAL																	

24 HRS BEGAN STORAGE.

CONS EMPTY 0452 COOL

JOHN MARTIN INTERIM ACCOUNTING SHEET

JULY 79

DAY	CONTENT	INFLOW				OUTFLOW								Net Change	Computed Reservoir Total End of Day	REMARKS
	Reservoir Total Beginning of Day	Winter Water	Compact Water	Agreement Water	Sub-Total	Reservoir Releases							Sub-Total			
						Amity				Kelsey	Agreement Evap.	Compact Evap.				
1	9242.71	-0-	-0-	-0-	-0-	37.50				-0-	32		69.50	-69.50	9173.21	
2	9173.21					-0-					38		38.00	-38.00	9135.21	
3	9135.21										31		31.00	-31.00	9104.21	
4	9104.21										23		23.00	-23.00	9081.21	
5	9081.21									7.50	30		37.50	-37.50	9043.71	0747 KSE. ACCT. REL. 5 CFS
6	9043.71									10.00	28		38.00	-38.00	9005.71	
7	9005.71									10.00	25.		35.00	-35.00	8970.71	0930 INC. R. FLOW REL. - 745 & 750 KELSEY STG.
8	8970.71									10.00	37		47.00	-47.00	8923.71	1530 CUT RIVER FLOW -50
9	8923.71									10.00	54		64.00	-64.00	8859.71	
10	8859.71									10.00	38		48.00	-48.00	8811.71	
11	8811.71						KANSAS	HYDE	SISSON	10.00	42		52.00	-52.00	8759.71	KSE. STG. - 5 CFS. COLO. RIVER FL. 445
12	7859.71						625	10.	12.50	10.00	61	[illegible]	718.50	-718.50	7041.21	0900 BEGIN KANS. STG REL. 800, SISSON HYDE - 8 CFS. TOTAL - 533 C
13	8041.21						1000	16	20.00	10.00	59	1046.	1105.00	-1105.00	6936.21	
14	6936.21					37.50	1000	16	20.00	10.00	31	1083.50	1114.50	-1114.50	5821.71	0900 AMITY STG. REL. 30 CFS 2400 END AMITY STG REL. 300 CF
15	5821.71					-0-	1000	16	20.00	10.00	27	[illegible]	1073.00	-1073.00	4748.71	0930 STG. REL 523 RIVER FL. 412.
16	4748.71	-0-	420.82	-0-	5168.53		868.06	16	2.47	10.00	30	-0-	932.53	-511.71	4237.00	1015 END SISSON ACCT. / 2100 FL. 2058 END KANSAS ACCT. / CONS. ST
0900 17 2400	4237.00 4453.00		589.00	9.75	4815.48		-0-	16	-0-	10.00	26		52.00	-52.00	4384.00	0900 BEGIN FLOWS TO ACCTS. 2113 CONS. POOL EMPTY
18	4294.00		362.37	-0-	5136.37	-1-1-1-	405.37	16		10.00	18	-0-	449.37	-97.00	4687.00	1000 BEGIN CONS STG. KANS R. FL. 2 1000 ACCT. KANS R. FL. ACCTS
19	11687.00		1572.00		6259.00	Compact	-0-	16		10.00	13.87	1.13	41.00	-41.00	6218.00	1000 END KANS. R. FLOW FND CONS. SISSON STR
1000 20	6218.00		236.91	1166.67	7621.58	1166.67	-1-1-1-1-	16		10.00	19.59	9.41	1221.67	-1221.67	6399.91	
21	6399.91	-0-	-0-	978.38	7378.29	978.38	Amity	16		10.00	31.31	5.69	1041.38	-1041.38	6336.91	-63. COLO. RIVER FLOW - HYDE ACCT - R KSE -
22	6336.91			-0-	6336.91	-0-	390.00	16	20.00	10.00	32.00	-0-	468.00	-468.00	5868.91	0001 BEGIN AMITY ACCT REL. - 24 0001 BEGIN SISSON ACCT. REL. -
23	5868.91					Ft. Bent	-0-	458 4.60	2.48	10.00	28.00		.05 45.08	-45.08	5823.86	0259. SISSON EMPTY 0253 - HYDE EMPTY
24	5823.86					11.67		-0-	-0-	10.00	21.00		42.67	-42.67	5781.19	1000 FT. BENT ACCT. - 10 CFS.
25	5781.19					20.00		-1-1-1-1-	-1-1-1-1-	10.00	33.00		53.00	-53.00	5728.19	
26	5728.19					7.92				10.00	38.00		55.92	-55.92	5672.27	0930 END FT BENT ACCT. REL. -10
27	5672.27					-0-		MANVEL	X-Y	10.00	33.00		43.00	-43.00	5629.27	
28	5629.27					12.50	93.75	8.75	37.50	10.00	36.00		198.50	-198.50	5430.77	0900 - BEGIN FT. BENT ACCT REL. AMITY - 7.5, MANVEL - 2 CFS 10 FLO
29	5430.77					20.00	50.00	14.00	60.00	10.00	35.00		189.00	-189.00	5241.77	0800 END AMITY ACCT. REL
30	5241.77					20.00		14.00	60.00	10.00	19.00		123.00	-123.00	5118.77	
31	5118.77					20.00		14	60.00	10.00	29.00		133.00	-133.00	4985.77	

RESERVIOR

	JULY 79 MONTH & DAY	JOHN MARTIN					~~WELDER~~ AGREEMENT WATER				COMPACT WATER				EVAPORATION			
		Reservoir Beginning	Inflow	Evaporation	Release	Reservoir Ending	Inflow	Evaporation	Release	Storage	Inflow	Evaporation	Release	Storage	Storage Capacity Ac. Ft.	Surface Area	Evaporation Rate	Total Evaporation
.34	1	9242.71	-0-	32.	37.50	9173.21	-0-	32	37.50	-0-	-0-	-0-	-0-	-0-	9156	1606	.0197	32
.41	2	9173.21		38.	-0-	9035.21		38	-0-						9156	1606	.0238	38
.33	3	9035.21		31	0	9104.21		31							9107	1602.	.0191	31
.23	4	9104.21		23	0	9081.21		23							8916	1585	.0145	23
.32	5	9081.21		30	7.50	9043.71		30	7.50						8995	1592	.0186	30
.30	6	9043.71		28	10.00	9005.71		28	10.00						8980	1591	.0174	28
.21	7	9005.71		25	10.00	8970.71		25	10.00						9107	1600	.0157	25
.40	8	8970.71		37	10.00	8923.71		37	10.00						8868	1581	.0232	37
.59	9	8923.71		54	10.00	8859.71		54	10.00						8884	1583	.0342	54
.42	10	8859.71		38	10.00	8811.71		38	10.00						8680	1564	.0244	38
.47	11	8811.71		42	10.00	8759.71		42	10.00						8493	1548	.0278	42
.70	12	8759.71		61	657.50	8041.21		61	657.50						7975	1502	.0406	61
.73	13	8041.21		59	1046.00	6936.21		59	1046.00						6928	1403	.0423	59
.41	14	6936.21		31	1083.50	5821.71		31	1083.50						5814	1189	.0238	31
.41	15	5821.71		27	1046.00	4748.71		27	1046.00			-0-			4606	1144	.0238	27
.47	16	4748.71	420.82	30	902.53	4237.00		30	902.53	1916.19	420.82	-0-		420.82	4237	1096	.0273	30
.23	17	4237.00 4237.00	588.00 588.00	11.25 24.00	9.75 26.00	4815.00 4784.00	1017.24	10.12 23.42	9.75 26.00	3796.30 4784.00	588.00 588.00	1.13 2.58	-0- 1017.24	1018.70 -0-	4815. 5016	1196	.0215	26
.27	18	4784.00	352.37	18.00	1131.37	4657.00	-0-	18.	431.37	4334.63	352.37	-0-	-0-	352.37	4687	1155	.0157	18
.20	19	4657.00	1572.00	15.00	26.00	6218.00	0	13.87	26.00	4294.76	1572.00	1.13	0	1923.24	6218	1331	.0116	15
.37	20	6218.00	236.91	29.00	26.00	6399.91	1166.67	8.34 19.59	10.83 26.00	4275.59 5413.84	236.91 236.91	9.41	1166.67	2156.91 -0-	6568	1368	.0215	29
.47	21	6399.91	-0-	37.00	26.00	6336.91	978.38	31.31	2600	6336.91	-0-	5.69	978.38	-0-	6298.	1340	.0273	37
.42	22	6336.91		32.00	436.00	5868.91	-0-	32.00	436.00	5868.91		-0-	-0-		5876	1295	.0244	32
.38	23	5868.91		28.00	17.08	5823.83		28.00	17.08	5823.86					5786	1285	.0220	28
.28	24	5823.83		21.00	28.72	5781.19		21.00	28.72	5781.19					5696	1275	.0162	21
.31	25	5781.19		23.00	30.00	5728.19		23.00	30.00	5728.19					5734	1280	.0180	23
.50	26	5728.19		38.00	17.92	5672.27		38.00	17.92	5672.27					6073	1316	.0290	38
.45	27	5672.27		33.00	10.00	5629.27		33.00	20.00	5629.27					5671	1273	.0261	33
.50	28	5629.72		36.00	162.50	5430.77		36.00	162.50	5430.77					5357	1278	.0290	36
.50	29	5430.77		35.00	154.00	5241.77		35.00	154.00	5241.77					5246	1224	.0290	35
.27	30	5241.77		19.00	104.00	5118.77		19.00	104.00	5118.77					5088	1205	.0157	19
.42	31	5118.77		29.00	104.00	4985.77		29.00	104.00	4985.77					4885	1180	.0244	29
	TOTAL																	

RESERVOIR

PAN EVAP	AUGUST '79 MONTH & DAY	JOHN MARTIN					~~WATER~~ AGREEMENT WATER				COMPACT WATER				EVAPORATION			
		Reservoir Beginning	Inflow	Evaporation	Release	Reservoir Ending	Inflow	Evaporation	Release	Storage	Inflow	Evaporation	Release	Storage	Storage Capacity Ac. Ft.	Surface Area	Evaporation Rate	Total Evaporation
.19	1	4985.77	759.23	21.00	104.00	5620.00	183.33	21.00	104.00	5044.10	575.90	0	0	575.90	5620	1247	.0168	21
.33	2	5620.00	1897.00	28.00	104.00	7385.00	168.11	25.13	104.00	5183.08	1628.89	2.87	0	2201.92	7385	1448	.0191	27
.48	3	7385.00	-0-	40.	145.67	7199.33	1000	-28.07	145.67	7009.34	-0-	11.93	7000.00	189.99	7212	1431	.0278	40
.44	4	7199.33		35.	604.00	6560.33	189.07	34.08	604.00	6560.33		.92	189.07	-0-	6651	1375	.0255	35
.44	5	6560.33		33.	584.59	5942.74	-0-	33.00	617.59	5942.74		-0-	-0-		5967	1305	.0255	33
.40	6	5942.74		29.	277.46	5636.28		29.00	277.46	5636.28					5645	1270	.0232	29
.40	7	5636.28		29.	72.67	5534.61		29.00	72.67	5534.61					5544	1259	.0232	29
.68	8	5534.61		49	171.33	5314.28		49.00	171.33	5314.28					5344	1236	.0394	49
.62	9	5314.28		44	208.00	5062.28		44.00	208.00	5062.28					5122	12.21	.0360	44
*.13	10	5062.28		9	208.00	4845.28		* 9.00	208.00	4845.28					4956	1188	.0075	9
.15	11	4845.28		10	90.80	4744.48		10.00	90.80	474448					4968	1190	.0087	10
.61	12	4744.48		42	39.67	4662.81		42.00	39.67	4662.81					4862	1177	.0354	42
.34	13	4662.81		23	54.58	4585.23		23.00	54.58	4585.23					4710	1158	.0197	23
.27	14	4585.23		18	44.00	4523.23		18.00	44.00	4523.23					4515	1138	.0157	18
.36	15	4523.23		45	44.00	4434.23		45.00	44.00	4434.23					4933	1186	.0377	45
.60	16	4434.23	3118.77	51	44.00	7458.00		51.00	44.00	4439.23	3118.77			3118.77	7458	1455	.0348	51
.07	17	7458.00	176.67	6	44.00	7584.67	1333.33	3.49	44.00	5725.07	176.67	2.51	1333.33 Over	1959.60	7472	1456	.0041	6
.16	18	7584.67		13	194.00	7377.67	1956.24	9.64	194.00	7377.67	-0-	3.36	1956.24	-0-	7385	1448	.0193	13
.22	19	7377.67		18	218.33	7141.34		18.00	218.33	7141.34		-0-	-0-		7055	1416	.0129	18
.46	20	7141.34		38	108.33	6995.01		38.00	108.33	6995.01					7255	1435	.0267	38
.27	21	6995.01		23	-0-	6972.01		23.00	-0-	6972.01					7240	1434	.0157	23
.31	22	6972.01		25		6947.01		25.00		6947.01					6984	1409	.0180	25
.23	23	6947.01		18	330.00	6599.01		18.00	330.00	6599.01					6596	1370	.0133	18
.23	24	6599.01		18	177.34	6403.67		18.00	177.34	6403.67					6338	1344	.0133	18
.22	25	6403.67		17	-0-	6386.67		17	-0-	6386.67					6205	1330	.0128	17
.34	26	6386.67		26		6360.67		26		6360.67					6325	1343	.0197	26
.31	27	6360.67		24		6336.67		24		6336.67					6325	1343	.0180	24
.23	28	6336.67		18		6318.67		18		6318.67					6432	1354	.0133	18
.30	29	6318.67		23		6295.67		23		6295.67					6311	1341	.0174	23
.38	30	6295.67		30		6265.67		30		6265.67					6311	1341	.0220	30
	31	6265.67		35		6230.67		35		6230.67					6311	1341	.0261	35
	TOTAL																	

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AGREEMENT

	SEPTEMBER MONTH & DAY	JOHN MARTIN					~~KINPER~~ WATER				COMPACT WATER				EVAPORATION			
		Reservoir Beginning	Inflow	Evaporation	Release	Reservoir Ending	Inflow	Evaporation	Release	Storage	Inflow	Evaporation	Release	Storage	Storage Capacity Ac. Ft.	Surface Area	Evaporation Rate	Total Evaporation
.36	1	6230.67		28		6202.67	-0-	28.	-0-	6202.67	-0-	-0-	-0-	-0-	6218	1331	.0209	28
.30	2	6202.67		23		6179.67		23		6179.67					6138	1323	.0174	23
.40	3	6179.67		31		6148.67		31		6148.67					6125	1322	.0232	31
.31	4	6148.67		24		6124.67		24		6124.67					6125	1322	.0180	24
.40	5	6124.67		31		6093.67		31		6093.67					6085	1317	.0232	31
.24	6	6093.67		18		6075.67		18		6075.67					6098	1319	.0140	18
.35	7	6075.67		27	93.75	5954.92		27.	93.75	5954.92					6032	1312	.0203	27
.40	8	5954.92		30.	150.00	5774.92		30.	150.00	5774.92					5902	1298	.0232	30
.37	9	5774.92		28	150.00	5596.92		28	150.00	5596.92					5734	1280	.0215	28
.45	10	5596.92		33	150.00	5413.92		33	150.00	5413.92					5519	1256	.0241	33
.31	11	5413.92		22	150.00	5241.92		22	150.00	5241.92					5258	1226	.0180	22
.34	12	5241.92		24	160.63	5057.29		24	160.63	5057.29					5064	1202	.0197	24
.21	13	5057.29		14	180.00	4863.29		14	180.00	4863.29					4909	1183	.0122	14
x .21	14	4863.29		14	160.00	4689.29		14	160.00	4689.29				+39.71	4791	1168	.0122	14
.11	15	4689.29		7	150.00	4532.29		7	150.00	4532.29				+39.71	4572	1140	.0058	7
.24	16	4532.29		16	100	4416.29		16	100.00	4416.29				+19.71	4436	1123	.0140	16
.23	17	4416.29		15	-0-	4401.29		15	-0-	4401.29					4504	1132	.0133	15
.24	18	4401.29		16		4385.29		16		4385.29					4584	1142	.0140	16
.27	19	4385.29		18		4367.29		18		4367.29					4572	1140	.0157	18
.31	20	4367.29		20	18.75	4328.54		20	18.75	4328.54					4458	1112	.0180	20
.31	21	4328.54		20	106.56	4201.98		20	106.56	4201.98					4226	1095	.0180	20
.21	22	4201.98		13	-0-	4188.98		13	-0-	4188.98					4281	1101	.0122	13
.28	23	4188.98		18		4170.98		18		4170.98					4259	1099	.0162	18
.38	24	4170.98		24		4146.98		24		4146.98					4204	1092	.0220	24
.16	25	4146.98		10		4136.98		10		4136.98					4193	1090	.0093	10
.24	26	4136.98		15		4121.98		15		4121.98					4204	1092	.0140	15
.39	27	4121.98		25		4096.98		25		4096.98					4193	1090	.0226	25
.29	28	4096.98		18		4078.98		18		4078.98					4172	1084	.0168	18
.28	29	4078.98		17		4061.98		17		4061.98					4128	1079	.0162	17
.27	30	4061.98		17		4044.98		17		4044.98					4075	1069	.0157	17
	31																	
	TOTAL																	

AGREEMENT

OCTOBER, 1979

PAN EVAP	OCT. 79 MONTH & DAY	JOHN MARTIN					WINTER WATER				COMPACT WATER				EVAPORATION			
		Reservoir Beginning	Inflow	Evaporation	Release	Reservoir Ending	Inflow	Evaporation	Release	Storage	Inflow	Evaporation	Release	Storage	Storage Capacity Ac. Ft.	Surface Area	Evaporation Rate	Total Evaporation
.27	1	4044.98	-0-	17.		4027.98		17		4027.98					4032	1062	.0157	17
.26	2	4027.98		16.		4011.98		16		4011.98					3989	1054	.0151	16
.18	3	4011.98		11		4000.98		11		4000.98					3989	1054	.0104	11
.17	4	4000.98		10.		3990.98		10		3990.98					4000	1056	.0099	10.
.28	5	3990.98		17		3973.98		17		3973.98					4000	1056	.0162	17
.28	6	3973.98		17		3956.98		17		3956.98					4010	1058	.0162	17
.24	7	3956.98		15		3941.98		15		3941.98					4021	1060	.0140	15
.24	8	3941.98		15		3926.98		15		3926.98					3958	1048	.0140	15
.18	9	3926.98		11		3915.98		11		3915.98					3947	1046	.0104	11
.19	10	3915.98		12		3903.98		12		3903.98					3958	1048	.0110	12
.24	11	3903.98		15		3888.98		15		3888.98					3968	1050	.0140	15
.20	12	3888.98		12		3876.98		12		3876.98					3927	1043	.0116	12
.20	13	3876.98		12		3864.98		12		3864.98					3916	1041	.0116	12
.24	14	3864.98		15		3849.98		15		3849.98					3916	1041	.0140	15
.20	15	3849.98		12		3837.98		12		3837.98					3885	1035	.0116	12
.34	16	3837.98		20		3817.98		20		3817.98					3844	1027	.0197	20
.18	17	3817.98		11		3806.98		11		3806.98					3854	1026	.0104	11
.17	18	3806.98		10		3796.98		10		3796.98					3844	1027	.0099	10
.30	19	3796.98		18		3778.98		18		3778.98					3864	1031	.0174	18
.30	20	3778.98		18		3760.98		18		3760.98					3854	1027	.0174	18
.06	21	3760.98		4		3756.98		4		3756.98					3927	1048	.0035	4
.07	22	3756.98	236.02	4		3989.00		4		3751.98	236.02			236.02	3989	1054	.0041	4
.21	23	3989.00	142.00	13		4118.00		12.23		3740.75	142.00	.77		377.25	4118	1077	.0122	13
.11	24	4118.00	115.00	7		4226.00		6.36		3734.39	115.00	.64		491.61	4226	1095	.0064	7
.10	25	4226.00	138.00	6		4358.00		5.30		3729.09	138.00	.70		628.91	4358	1112	.0058	6
.17	26	4358.00	78.00	11		4425.00		9.41		3719.68	78.00	1.59		705.32	4425	1121	.0099	11
.28	27	4425.00	178.00	19		4584.00		15.97		3703.71	178.00	3.03		880.29	4584	1142	.0162	19
.18	28	4584.00	69.00	12		4641.00		9.70		3694.01	69.00	2.30		946.99	4641	1149	.0104	12
.09	29	4641.00	63.00	6		4698.00		4.78		3689.23	63.00	1.22		1008.77	4698	1156	.0052	6
.14	30	4698.00	268.00	10		4956.00		7.85		3681.38	268.00	2.15		1274.62	4956	1188	.0081	10
.07	31	4956.00	89.00	5		5040.00	1362.33	3.71		5040.00	89.00	1.29	1362.33	-0-	5040	1199	.0041	5
	TOTAL																	