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WATER RESOURCES  
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DIVISION OF WATER RESOURCES  
WATER DIVISION II

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*Pueblo*

MEMORANDUM

TO: Jeris Danielson, State Engineer

FROM: Robert W. Jesse, Division Engineer *Robert W. Jesse*

SUBJECT: Annual Meeting

This memo will be the conclusions and recommendations of the Division Engineer's annual report to the State Engineer. I'll briefly describe what happened in the Division last year, what we plan for actions next year and what my recommendations are for the operations of the Division.

Division 2's year was comparatively uneventful as water year's go. We had lots of water. The river call was on the John Martin Reservoir for a significant part of the summer. This had the effect of being a virtual free river upstream, although it does not bring in the Conservancy District rights at Pueblo as it did in '85. It does ease a great deal of the administration. Virtually all of the ground water wells were in priority by their appropriation dates in a '48 river call, and the so called three day rule makes for very little ground water administration, not that there's much of it in any case, mainly because of the canals being abundantly supplied with river water, the cost of electricity, well machinery and the low price of crops. It just doesn't make much ground water pumping feasible, so there was virtually no ground water administration last year from the standpoint of curtailing ground water pumping beyond the three day rule.

Division II is now, in January of 1987, fully staffed, we have not only a full staff, but one of the best staffs of any division. We are going through a period of training and readjusting and looking forward to the new water year. We, unfortunately, did leave a lot of things undone in '86 that should have been done. We are going to catch up the best we can. We have had to set priorities, our emphasis was on field work, which will have the effect to catch up on our hydrographic records.

We have not been able to supervise the Water Commissioners as much as we should have. We certainly are going to work toward that in the future, and that will be one of the top items on my list in '87. We have acquired a full-time man to act as liason between the Division office and the engineering consultants, and that has taken quite a bit of the detail work off of the Division Engineer.

We have moved into our new quarters downtown in the bank building. We are scheduled to move upstairs into more spacious and, I think, better offices. We've had a great deal of trouble with organization, getting telephones was a nightmare, but all in all everything seems to have gone fairly well.

The future of the valley is uncertain, with increased pressure on ditches to sell their water. The valley received the first decree for a ditch, (The Rocky Ford Ditch) in Division II being sold and delivered out of the basin to Aurora. The requirements for this particular decree are going to place an additional burden on the Division Engineer's office and the decree did make provision for the employing of one part-time person to assist in the data collection and accounting. We have not received all the details on how this is going to be handled yet. If he'll be a State man or if he'll be an Aurora man, he'll work in our office, or he'll work in his own office, or exactly what is going to happen is still up in the air.

The cities of Colorado Springs and Pueblo are in the process of decreeing their transmountain return flows and exchanges. This too will require some additional personnel from the Division Engineer's office and will require some extensive and complex accounting and will be a considerable workload in addition to what we're already doing.

The transmountain effluent exchanges are comparatively straightforward and, while they are a great deal of detail, are not all that complex. It is a problem that would be suitable for a computer program.

One of the elements in these decrees that we have consistently objected to, and have not allowed, is the exchange of the return flow from transmountain water applied for lawn irrigation. That issue in all cases has been separated and will be tried, on its merits separately, sometime in the future.

As far as goals of the Division Engineer's office, we do need to exert a great deal more effort toward well administration. We need to make certain that every well that has been ordered, either on a replacement well permit or by a court decree, to install a meter--actually has a meter--that it's operating, that it's read, entered in the data bank. Now that we have a full staff, I would expect to see some tremendous increases in this. This sort of administration would also include the meter reading and entering of non-tributary wells, of which we don't have many, but those that we have we must keep good records of.

Another goal is the administration by the Division staff of the Water Commissioners. We have had a few incidents where Commissioners may not have been supervised closely enough, and the office either could have been or has been embarrassed. We need to get out to these guys more often than we do.

We need to put a great deal more emphasis on the Water Court and the Referees for both hearings and consultations. We have a good rapport with our new Referee, but we need to maintain and expand on that.

The Water Court has begun the issuing of decrees in the Federal cases, it's been a long battle. These are appropriative rights that are starting to be decreed. We have gone over each of those decrees three or four times, and it looks like they, (the United States and Water Court) are going pretty well along with the direction we're taking.

We do need to increase communications with the Denver office and with the other Divisions. Meetings and discussions with the other Water Resources people, I find to be extremely helpful. It gives me a good insight on what the other Divisions are doing and I certainly learn much more than I convey in these meetings. I would like to have the time and the energy to do more of that.

As far as recommendations to the State Engineer, we need to keep an eye on the new legislature to make certain that nothing gets into the law that is going to hurt us.

We need to maintain our funding. Of course, for Division 2, we really need to maintain the funding for the Compact suit. I was encouraged by the words of the new director of the department, who is knowledgeable of the Compact suit, and his support--at least in the press. This Arkansas litigation, while it's another lawsuit, is one we cannot afford to lose. We don't have the water to give to anyone, whether it be Kansas or Aurora.

This concludes my remarks.

DIVISION ENGINEER'S  
ANNUAL REPORT  
IRRIGATION DIVISION NO. 2  
1987 Irrigation Year  
Nov. 1, 1986 - Oct. 31, 1987

Submitted to:  
Dr. Jeris Danielson  
State Engineer

by:  
Robert W. Jesse  
Division Engineer

January 19, 1988

ORAL PRESENTATION '87 DIVISION ENGINEER'S MEETING

Thank you, Jeri, for this chance to address this group. I'll start off by responding to the goals that were listed on Attachment B of the agenda, not necessarily in the order they were listed.

Our strategic plan we have pretty much accomplished; staying within our budget, trying to develop additional resources and to develop new policies in governmental relations. That's a pretty broad series of topics. We haven't overspent significantly, so I consider us within budget. Our plan to utilize the chain of command--we are probably as good as we have been in the past on that. We are certainly aware that we need improvement, but sometimes in the heat of a problem don't keep all the players informed. Upholding of our statutory duties--some of those we have little control over. The ones over which we have control, such as the administration of water rights and preserving the priority system, I believe fit together, so if you do one you generally do the other. We have made a serious attempt to develop our personnel, our employee recognition, our communication. I'm sure there will be other comments on job training and we'll join in this with everyone promoting training. We have sent people to seminars and such training as we have access to and we have tried very hard to do more of this sort of thing than we have in the past. Our public image and our public education -- we have had public information meetings. Some were more successful than others, but we've learned a lot on how to draw a crowd and publicity. We're working on that. In developing personnel, the concept is team-work and I'm glad to see that I'm on the support group in the sub-groups later in the program. I feel very strongly about this team concept. My favorite response to the concept of team--like a football team, where we all have different positions and we all do different things in different plays, and too often,

it's only the person that throws the ball or the person that catches the ball that gets any recognition. But, none of it would be possible without people in the line, people doing the blocking, somehow we need to convey to these people that their participation is vital and appreciated. But, we also need to somehow convey that it works both ways, that we need their blocking and their support and we need their input, but we also need to make certain that once the play is called we've got to carry it through. We also need to make sure that everyone understands there's only one quarter-back and he gets to call the plays. We need to demand that they support the team. To insist that while we'll support them, they'll also support us. When I have an employee who has deviated, I have almost a little lecture on team-work and the football team and all of this, (most of which is ignored). I think it fits into the direction we are headed. That we are a team and all have our position and we all realize that sometimes we may not agree with the signal that's called and sometimes we may not be successful in executing; but we still are part of a team and we cannot run our own game.

The first issue I would like to put forth or describe is the issue of water quality. Water quality, for the first time, is beginning to become an issue in Division 2. It's become a concern. The problem we have with Lake Cheraw is simply the tip of an iceberg. We don't know how big and what shape this is, but we know because there's a tip that there is a problem and we need to be careful we don't run aground on it. The interest in quality by the public, from one end of the valley to the other, is enormous. If you want to get into a fist-fight in Lamar, you need merely to mention dumping Lake Cheraw. The concern of the entire valley is apparent. The practice of some of the entities, namely Colorado Springs and Pueblo, and to some extent even the Conser-

vancy District, in decreeing their right to exchange we have discovered the very practice of exchanging has the effect of being a water treatment process. Any time you trade 2,000 parts per million tds water for 200 parts per million tds water you have, in effect, treated it cheaply and efficiently, and non-environmentally damaging at least for cities. The transfer cases first began, the issues of water quality were not permitted by the Court. That would be unthinkable today, we have evolved that far. The questions that we have most often are, "What are you going to do about it? What's the State Engineer's position?" We've wrestled with this a little bit and we have come to the conclusion that a great number of the exchange cases can be administered, mechanically quite easily, some are more complex than others, but it is accounted. We have discovered that the effect of an exchange may well not be to the quantity of water in the stream, and that for the main part of the time, the exchanger is actually putting more water in than he is taking out. Again, the case of Cheraw, we have a case where somebody wants to put 2,500 A.F. of water into the river and claim nothing for it. That does not violate any traditional water rights concepts nor does it interfere with the priority system. However, the quality of the water they add, if it's not suitable for the purpose for which it was intended, would cause an injury to other water right users and even to other people who do not have water rights--the birds and the fish and the little warm furries that live in the river banks. The issue of quality is here. A great number of the questions are not susceptible to traditional logic and thinking.

The objective, or what we need to decide, and make sure that we are on both legal and engineering safe grounds is what is our response?

What is our posture going to be? Are we going to allow the Water Quality Control Commission to enact non-point source regulations unopposed.

Are we going to actively participate in the proceedings before the Quality Control Commission, and are we going to somehow equip ourselves and our gaging stations and our hardware; which I'll touch on in a minute, so we can present testimony and expert evidence, if we don't who will? The G.S.? Our objectives should be uniform throughout the state and should be defensible, both from historic water law, water rights, the priority system and even inter-state compacts, although water quality is not an issue in Division 2's compact.

The second issue I would like to touch on is the SUTRON system. This system is probably the greatest innovation that has come down the pike, certainly in my tenure in the water business. All of the traditional hardware used and the techniques used are substantially the same as they were when I started back in '56. Probably this is true even as far as the turn of the century. The Sutron Satellite Communication System is an opportunity for us to develop the real time, if there's such a term, both data and records. We need to work in our office, (and we have some plates in the annual report to support the fact that we have had some success) on quality control.

We need to instill in our people the concept that quality control is what we're after. The data--we must have 100% capture and it's got to be good, and it's got to be acceptable and understandable to the public. The objective is to promote the use of this tool. We have ditch companies now that regularly interrogate the Sutron. We have other states who regularly interrogate the satellite data. We need to promote this to get these people to using



this state of the art, to get them using this in their planning and operations. We can add other elements of quality to the platforms. We are going to try that if we make release out of Lake Cheraw, as much to demonstrate that the system can be used in this fashion as to train our own people in how to set up and use this hardware. If we're going to get the continued support of the water user community, we've got to insure a quality product and we have to promote why this is better than 'brand X' and why it's a usable tool.

Issue number 3, I just want to say a couple of words, and that's on the budget and our funds and money; stuff dear to our hearts. The problem--the issue--we need to understand the report and we need to understand the tabulation of it and where these numbers originate and where they go. Our objectives I would think would be to reward frugality and conservation and to avoid emergencies, to avoid crunches where possible, realizing that if the Governor issues a 2% reduction there's no way to avoid that as an emergency, but I'm not sure that we can't improve our planning and schedule disbursements and payments. We, in Division 2, need to do this. I don't know how the other divisions are getting along in this regard, but I know we need this kind of thing in Division 2.

These issues are the issues that we have decided to promote here. My assistants and I kicked this around to some length, I've even talked to some of my associates and I think the pressing issue in Division 2 is going to be the quality questions and our posture on them. I think the Sutron is now accepted. It is a tool, it is a very good tool. It can be made better. It can be used--it's a multi-purpose tool, and can be developed for a lot of purposes that we haven't even thought about yet. The scope is almost unlimited. The new technology coming out almost boggles the mind. I had demonstrated a few weeks

ago a sonar sounding device, it can simply be clipped on to a bridge rail, hooked to a Sutron and presto, you've got an instant stream gage. The budget stuff, we just need to attempt to understand what we have and to understand the processes and the forces at work.

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(1987 Irrigation Year)

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INTRODUCTORY STATEMENT  
ANNUAL DIVISION ENGINEER'S REPORT  
IRRIGATION DIVISION NO. 2  
PUEBLO, COLORADO  
1987

This report is the annual summary compiled by the Division Engineer's office for the State Engineer, and is a summary of water administration activities completed or in progress as of October 31, 1987. It attempts to identify upcoming problems and work items for Irrigation Year 1988. The recommendations portion of this report is respectfully submitted to the State Engineer to assist him to formulate administrative policy and guidelines with regards to personnel and water administration as more fully defined in section 37-80-101 through 109, CRS, 1973 (Amended).

#### AREAL EXTENT

IRRIGATION DIVISION NUMBER 2 CONSISTS OF ALL LANDS WITHIN THE ARKANSAS RIVER DRAINAGE, INCLUDING ITS TRIBUTARIES AND ALL LANDS IRRIGATED FROM DITCHES AND CANALS DIVERTING WATER FROM SAME. THE DIVISION IS COMPOSED OF THIRTEEN WATER DISTRICTS (10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 66, 67 and 79) COMPRISING THE COUNTIES OF EL PASO, CHAFFEE, LAKE, FREMONT, CUSTER, PUEBLO, PARK, LAS ANIMAS, TELLER, CROWLEY, OTERO, BENT, PROWERS, BACA AND KIOWA. DIVISION 2 OVERALL COVERS AN AREA OF 26,150 MILES OR 25.1% OF THE STATE.

## WINTER WATER PROGRAM

The Winter Water Program has maximized use of irrigation water normally applied in the winter months by storing the water for summer application. The 1987 Winter Water Program commenced November 15, 1986, and concluded March 15, 1987. This was the eleventh year of operation of the voluntary\* Winter Water Program since its inception in irrigation year 1976. (The Program was not in operation in irrigation year 1978. During the 1987 Program, storage in Pueblo Reservoir by direct flow participants was curtailed to 20,179 A.F. because of lack of storage space in the reservoir. When storage was curtailed in Pueblo Reservoir several direct flow ditch companies elected to divert and apply their percentage of river production at their headgate during the remainder of the Program. A summary of Winter Water Program storage is included in the Statistical section of this report.

### WINTER WATER PROGRAM OPERATIONS

- I. By foregoing winter diversions, the water will be accounted for by storage in Pueblo Reservoir or headgate diversions on a percentage basis of total river production.
- II. A division of total river production below 100,000 A.F. entitles the off channel storage participants to 71.2 percent of the river flow and the direct flow participants, 28.8 percent of the river flow.
- III. The Amity Canal receives the next 2,750 A.F. over 100,000 A.F.
- IV. When the system reaches 102,750 A.F., 2,250 A.F. of water is released to the Colorado Canal, pro-rata from winter water stored in reservoirs upstream from Pueblo. (Not applicable this year.)
- V. The Holbrook Canal receives the next 356 A.F. over 102,750 A.F.
- VI. A division of total river production above 103,106 A.F. entitles the off channel storage participants to 75 percent of the river flow and the direct flow participants, 25 percent of the river flow.
- VII. Winter water that is delivered to the Amity Canal account in John Martin Reservoir will not be depleted by transit loss occurring from the Arkansas at Las Animas Gauge to John Martin Reservoir. All participating entities except Fort Lyon will pay Amity's loss, based on the Livingston Formula, on a pro-rata basis. Any winter water delivered to the Fort Lyon or Consolidated accounts in John Martin will be charged a transit loss based on the Livingston Formula.

\*After eleven years of a successful voluntary Winter Water Program the Division 2 Water Court awarded the applicants an interlocutory Decree for the Winter Water Program on November 10, 1987.

## ARKANSAS COMPACT OPERATIONS

The allocation of storage in John Martin was made by the Engineering Technician in Las Animas, according to the April 14, 1980 Operating Plan as supplemented by the spill criteria adopted by the Compact Commission in 1984.

The 1987 Irrigation Year was marked by the spilling of the Conservation Pool, which caused all Winter Water, all Article III Water, and all Accounts to spill. The Corps of Engineers assumed the operation of the gates when the Flood Pool was first invaded and maintained that operation until the 1st of July. The release rate was set at 3,000 feet, which with the concurrence of the Operations Secretary and the State Engineer was the maximum safe channel capacity. The water did flow through Colorado, through Kansas and the Arkansas River was a live stream clear to the Mississippi River, the first time this has happened since 1965.

The Fort Lyon did not store in John Martin this year, although the Amity did store both Winter Water and part of the water allocated to the Great Plains System under their decree that was finally approved by the Water Court in 1987.

At the meeting in December, the Division Engineer was re-elected as the Operations Secretary of the Compact and was allocated \$6,100.00 for expenses incurred by him in the Operations Secretary's office.

The Compact Administration participated in the Sutron Satellite Monitoring System and did contribute to the operations of the satellite. The Kansas Water Commissioner's did have access to the system and did frequently use the system in the administration in Kansas, as did the Water Commissioner, the Engineering Technician and the Division Engineer in Colorado.

The storage of water for the Amity in John Martin, under Article III, encountered no problems. The 35% charge to the Transit Loss Account was

assessed and delivered with no problem and the operations were marked by cooperation with Kansas and the water users in both states this year. The unused Transit Loss Account was reallocated under the formula to both states on the first of November.

Kansas has 98,571.81 A.F. on November 1, 1987, not counting their share of water stored so far this winter.

The delivery to Kansas was calculated after the free river period and all runs were made with only a minor use of the Transit Loss Account. There is no question that all runs were made.

Again this year there were two storage events on Muddy Creek where very small amounts were measured and then stored in the Permanent Pool. The Permanent Pool was brought up to 10,000 A.F. during the Free River period with no objection from other water users or Kansas.

There was no time during the year when a call from District 67 was effective through John Martin and we do not anticipate such a call next year as the calling criteria formulas and the amount in storage in each account would seem to preclude the possibility of such an event occurring in 1988, or if it does occur in 1988 to be very late in the season.



## PUEBLO RESERVOIR OPERATIONS

Storage in Pueblo Reservoir under the Winter Water Program began November 15, 1986, and was limited to 15,000 A.F. by the Board of Trustees of the Winter Water Program. The Highline Canal elected to store an additional 5,000 A.F. of Winter Water under the program in their account, for a total of 20,000 A.F.

From January 5, 1987, through April 15, 1987, the Bureau of Reclamation permitted water to be stored in the Joint Use Pool. The Joint Use Pool is space above the Conservation Pool which can be used during the winter months, but must be evacuated by April 15 for flood protection.

The maximum contents reached in Pueblo Reservoir in I.Y. 1987 was 271,010 A.F., attained on February 7, 1987.

In accordance with the allocation principles of the SECWCD, project water purchased for agricultural purposes can be retained until May 1 of the following year, and project water purchased for domestic use can be carried over from year to year. Due to the amount of priority river water available this year the SECWCD elected to allow the agricultural project water to remain in storage for an additional year.

Pueblo Reservoir stored approximately 19,000 of water under its 1939 storage right during the period April 20, 1987, through May 12, 1987. Storage under this decree occurs when John Martin Reservoir spills, John Martin Reservoir began spilling on March 24, 1987. Storage in Pueblo Reservoir did not begin until April 20, 1987, and was curtailed to 19,000 A.F. because of the lack of storage space available.

Flood water was stored in Pueblo Reservoir on several occasions when peak flow criteria of 6,000 c.f.s. at the Arkansas River near Avondale gage was reached. The peak flow criteria is set by the Corps of Engineers and flow is regulated at Pueblo Reservoir. The Division Engineer, with concurrence of the Corps adjusted the peak flow to 5,000 c.f.s. during the period that emergency releases from Cucharas Reservoir were flowing down the Huerfano River and entering the Arkansas River below the Avondale gage. All flood waters stored were released as conditions permitted.

## GROUND WATER WELL INSPECTIONS AND INVESTIGATIONS

In July, 1987, Division 2 staff made two trips to investigate the "Preiser Wells", which are the subject in Case 86CW91, contesting the State Engineer's and Division Engineer's application on the Three Day Rule on Steele's Fork Creek in Lincoln County. The case is still pending.

In 1987, Division staff have continued to enforce the conditions on newer well permits in the Arapahoe formation in the Park Vista Subdivision East of Colorado Springs. Permits issued before 1977 limited lawn irrigation to one acre; between 1977 and 1981 permits limited lawn irrigation to 1,000 square feet; after 1982 permits prohibited any outside irrigation. Three trips to the area have been made, to date six orders to cease outside irrigation have been issued. Division staff and the Park Vista Home Owners Association are now looking for a possible Augmentation Plan that would allow outside irrigation for those who want it.

Between August 11 and August 18, Division staff alone with three temporary employees went to 900 wells to find power meter numbers. The power meter numbers were needed to get power usage from Centel Corporation for use in the Colorado-Kansas lawsuit of the 900 wells visited, 240 had the power meters removed.

## GROUND WATER WELL INSPECTIONS

There were 121 applications to late register existing domestic wells that were individually field checked. Over 2,800 miles were driven in field checking late registration applications.

In 1987, other well permits issued were as follows:

Numbers	Type
326	Domestic or Livestock
319	Household Use Only
54	Exempt Replacements
31	Exempt Commercial
29	Wells in Subdivisions with Decreed Water Rights
35	Senate Bill 5 Wells
45	Monitoring Wells
63	Well Permit Denials
3	Geothermal
6	New Non-Exempt Tributary Wells

JOHN MARTIN RECREATION POOL

In the beginning of Irrigation Year 1987, on November 1, there was 7817.53 A.F. in the Recreation Pool, while the reservoir contained 226,308 A.F. By May 21st, after an inflow into the Recreation Pool of 2478.61 A.F., it was filled to capacity, at 10,000 A.F. Winter Evaporation of the Recreation Pool consisted of 296.1 A.F. Total inflow into the pool was 2587.95 with two minor inflow events occurring in August and September. A time summary of contents follows:

1987 RECREATION POOL ACCOUNT

<u>Month</u>	<u>Contents beg. of month A.F.</u>	<u>Inflow A.F.</u>	<u>Evap. A.F.</u>	<u>Release A.F.</u>	<u>Contents End of month A.F.</u>
November	7817.53	0.00	42.94	0.00	7774.59
December	7774.59	0.00	39.67	0.00	7734.92
January	7734.92	0.00	27.73	0.00	7707.19
February	7707.19	0.00	51.73	0.00	7655.46
March	7655.46	0.00	96.81	0.00	7558.65
April	7558.65	0.00	24.03	0.00	7534.62
May	7534.62	2478.61	13.23	0.00	10000.00
June	10000.00	0.00	0.00	0.00	10000.00
July	10000.00	0.00	257.50	0.00	9742.50
August	9742.50	47.45	209.22	0.00	9580.73
September	9580.73	61.89	159.34	0.00	9483.28
October	9483.28	0.00	105.87	0.00	9377.41
<hr/>					
TOTALS		2587.95	1028.07	0.00	

REGULAR PARTICIPATION IN  
THE WATER USER COMMUNITY.

There were four Winter Water Meetings throughout the progress of the 1987 Irrigation Year for which the Division keeps records and makes reports. Winter Water was decreed in an interlocutory judgement in Water Case 84CW179 on November 10, 1987.

The Division Engineer, as he has in past years, attended all special and regular meetings of the Southeastern Colorado Water Conservancy District. There were approximately 15 of these, during which the Division office makes a report giving the contents of the major reservoirs and flows of rivers, and a summary of administration within the Division. The meetings usually have a question and answer session during which the local paper and occasionally T.V. and radio media coverage. Quite often, the Division Engineer's report/comments are quoted by these news media, and copies of newspaper articles are routinely forwarded to the Denver office.

There are a total of five Conservancy Districts within Division 2. The Staff has attended approximately 12 meetings of the Purgatoire District. The Upper Arkansas Conservancy District meetings were attended by Bruce Smith, Water Commissioner of District 11 on twelve occasions.

The Arkansas River Compact has been increasingly taxing on the Division Engineer's time and will continue in the foreseeable future, particularly since the Division Engineer was re-elected as Operation's Secretary.

OFFICE INVOLVEMENT IN THE WATER USER COMMUNITY

Invited Participation:

The following is a chronologic listing of contacts with water user community, which were accomplished after invitation or special requests for information input during Irrigation Year 1987.

<u>Date:</u>	<u>Meeting, Investigation, Etc.:</u>
11/5	A meeting was had with Engineering Consultants at the office of Hill & Robbins to aid in Drawing Maps for Water Rights plotting.
11/20	A field investigation with the water users along Steele's Fork was conducted by Division 2 staff.
11/25	An Arkansas River Compact meeting with the Colorado Delegation was attended to discuss December Winter Water.
11/26	A field investigation was conducted on the question of tributaries of the Youtzey Springs.
12/4	A meeting was conducted with Gary Bostrum of Colorado Springs relative to Twin Lakes Operation and Transmountain water.
12/5	An informational meeting was conducted with Mr. Hatton of the Homestake Trout Club and the required evaporation replacement of some proposed ponds. This eventually resulted in an application to the Water Court which required much less effort by this office to follow to assure non-injury to vested water rights.
12/11	An informational meeting was attended with Rex Mitchell to discuss terms, conditions and requirements for the Boggs Flats water right transfer.
12/16	Division 2 staff, along with the State Engineer and a representative of the A.G.'s office toured and investigated water diversions within the Cheyenne Mountain NORAD site.
12/17	Division 2 staff met with staff from S.C.S. relative to flooding problems along 4 Mile Creek near Canon City. A field investigation was conducted with Division 2 staff providing water rights information.
12/19	A Winter Water meeting of the Operations Committee was attended by the staff of Division 2.
12/31	The staff of Division 2 attended a dedication ceremony at

the USGS, at which time Water Resource Investigations Report 85-4092 was dedicated to the memory of the late Jim Kasic.

- 1/2 The Division Engineer inspected Clay Creek Dam after a complaint and request for help.
- 1/15 The Division Engineer attended an AVDA meeting in La Junta.
- 1/26 The staff of Division 2 met with Colorado Springs representatives to discuss mitigation of injury to Hoosier Ditch in Colorado Springs exchange plan.
- 1/27 The Deputy Division Engineer met Pueblo Planning & Zoning to discuss augmentation requirements for out of priority diversions.
- 1/27 The Division Engineer attended the 14th Annual Lower Arkansas Water Management Association meeting and discussed proposed legislation with Representative Juan Trujillo.
- 2/3 Division 2 staff toured the Las Vegas Treatment Plant with Colorado Springs officials.
- 2/11 Staff of the Division 2 office met with St. Charles Mesa Water Association to attend annual meeting.
- 2/26 The Deputy Division Engineer was an invited guest at the Upper Arkansas Watershed Association meeting, at which Satellite Monitoring and Dam Classification and Ownership were discussed.
- 2/28 The Division Engineer was an invited speaker at the Colorado Water Conference in La Junta.
- 3/3 The Division Engineer conducted an interview with the Arkansas Valley Journal with regards to administration.
- 3/11 & 12 The Division Engineer and the Deputy Division Engineer were guest lecturers at Pueblo Community College on surface water administration, groundwater administration and water quality.
- 3/17 & 18 The Division Engineer was the principal speaker for a tour of the Arkansas River Valley, conducted for the City of Colorado Springs and their Exchange case.
- 3/19 The Deputy Division Engineer attended a regular meeting of the Huerfano County Commissioners meeting in Walsenburg to speak on Water Districts and water administration.

- 3/31 The Division Engineer met with Mr. Clevenger of Westcliffe to discuss water rights.
- 4/7 The Deputy Division Engineer met in Colorado Springs at St. Francis Hospital to field inspect and advise on monitoring wells and a substitute water supply plan to allow diesel fuel pollution abatement.
- 4/8 The Division Engineer met with the Upper Fountain Water Users Association at the Fountain Town Chambers to speak about water administration on the Arkansas River.
- 4/15 The Division Engineer met with SECWCD to discuss Operating Procedures on the Fry-Ark Project.
- 4/28 The Division Engineer toured Fort Carson and discussed Federal water rights.
- 4/29 The Division Engineer was a principal speaker for SECWCD's tour of Fountain Creek drainage.
- 5/8 The Division Engineer was a guest speaker at Leadership Pueblo and presented a talk on water administration at that conference.
- 5/9 Cucharas Dam began to fail and Division 2 staff were at the site on numerous occasions conversing and advising. (See special report.)
- 5/12 The Division Engineer attended the first of three public information meetings, which were publicized and attended by anyone wishing to ask any water administration questions.
- 5/20 & 21 The Deputy Division Engineer toured the Transmountain diversion sites of Division 2 with the representatives of Pueblo and Colorado Springs who operate these.
- 5/27 The Division Engineer met with the St. Charles Mesa Water Association to discuss the Boggs Flat Augmentation Plan.
- 5/28 The Division Engineer met with Patti Mercer of the Department of Wildlife to tour the Mount Shavano Fish Hatchery.
- 6/5 The Division Engineer attended a "Leadership Colorado" conference as a guest lecturer.
- 7/2 The Division Engineer finished touring Ft. Carson to field inspect structures claimed in their Federal case.
- 7/15 The Division Engineer met in Rocky Ford with the AVDA to



- discuss the Colorado Springs Exchange case.
- 7/30 The Division Engineer met in La Junta to discuss the Lake Cheraw problem.
- 8/4 & 5 Division 2 staff toured Transmountain Diversions of Colorado Springs and Rampart Reservoir.
- 8/25 Division 2 staff presented the second of three Public Informational meetings at the Trinidad City Council Chambers.
- 9/3 Staff of Division 2 toured the Pueblo Water Works facilities.
- 9/10 The staff of Division 2 attended the third of three Public Informational Meetings in Salida at the Upper Arkansas Water Conservancy District meeting.
- 9/23 The Division Engineer was guest speaker for the SECWCD's tour of the Pueblo Water Works.
- 10/15 & 16 The Division Engineer was a guest speaker on the AVDA tour of Transmountain Diversions.
- 10/20 The Division Engineer met with SECWCD personnel on the Lake Cheraw problem.
- 10/23 The Division Engineer attended a Winter Water Meeting; this was just prior to the long awaited decree in this case.
- 10/26 & 27 Meetings were attended by Division 2 personnel with representatives from Colorado Springs, and the USGS to discuss Transit Losses and their computation on Fountain Creek.

FURTHER INVOLVEMENT IN WATER USERS COMMUNITY  
DURING IRRIGATION YEAR 1987

During the I. Y. 1987, The Division Engineer, at the suggestion of the State Engineer, scheduled and conducted three Public Informational Meetings in Water Districts 17, 19 and 11. These were held on various dates (see "Invited Participation") with the general public invited by news media announcements. The Division Engineer took staff and the local Water Commissioners to these meetings to discuss any and all topics of public interest. Overall, the meetings were moderately attended and in the I. Y. 1988 meetings we intend to apply some of our public information knowledge to enhance attendance.

There was no call through John Martin in Irrigation Year 1987 so that Agreement B was not implemented. The agreement entitled Agreement "B" signed November 1, 1984, by water users of Water Districts 14, 17 and 67 and by the Division Engineer; defines when a call from Water District 67 will be enforced above John Martin. That agreement is now and shall remain in effect until an affected party demonstrates injury. Such injury not having been proven, nor even claimed provides the condition for a continuing agreement, (See April 14, 1980, Operating Plan). Agreement B is the ongoing support documentation that Agreement "A" governs calls. Any calls downstream to John Martin will be pursuant to Agreement A, article 2, which says:

Any single ditch below John Martin can, if not satisfied by antecedent flow, call on ditches above John Martin when their account in John Martin that is derived from water transferred from the conservation pool is at or below their proportional share of a 17,500 A.F. pool and not before. When this condition is met, the call will propagate through John Martin Reservoir.

The Division Engineer conducted/participated in over ten tours in the Arkansas River Drainage, some of which are listed under Invited Participation in this report.

## KANSAS-COLORADO LAWSUIT PROGRESS

State of Kansas vs. Colorado, No. 105, Original, which was filed by Kansas on December 16, 1985, has considerably increased the Division 2 work load. The function of the Division 2 office in regard to Case No. 105 has been to act as liaison between engineering consultants and basin water users and to supplement the information gathering process. This activity has been carried out by Division Engineer Jesse and a Water Resource Engineer, P. O. Abbott, hired by the State for this purpose. Abbott worked from April 7 through October 7, 1986, on contract and subsequently was appointed to a full time position. Liaison activities conducted by the Division Office in I.Y. 1987 are as follows:

- Nov. 7, 1986: Supplied Jeris Danielson, for certification and transmittal to Raymond Willms, U.S. Bureau of Reclamation, the Trinidad Reservoir Operation Accountings for 1979-1984.
- Nov. 17: Supplied Ray Bennett requested data on six main-stem Arkansas River gages.
- Nov. 18: Supplied Bill Steele with requested return-flow references.
- Nov. 19: Supplied C. J. Reich copies of the Sunnyside Park judgement and decree and information on Medano-Hudson Branch Ditches.
- Nov. 20: Supplied William Attwool and Ann Clift requested information on Groundwater data, Arkansas River Valley Aquifer.
- Nov. 26: With C. J. Reich met with Gary Bostrum, Marie del Toro and Harold Miskel of the Colorado Springs Department of Utilities and with Bud O'Hara and Pete Juba of the Pueblo Board of Water Works.
- Dec. 2: Supplied C. J. Reich with data on Comanche Power Plant return flow.
- Dec. 12: Obtained for the Colorado representatives of the Arkansas River Compact Commission copies of U. S. Geological Survey Water Supply Papers 2200 and 2253.
- Dec. 17: Reviewed and discussed with Bob Jesse, M. E. MacDougall, letter of December 8, 1986, to Raymond H. Willms and the report which that letter concerned, "Trinidad Reservoir Operating Principles Draft Review"-December 20, 1985.
- Jan. 13, 1987: Supplied Chin Y. Lee information on Plans of Augmentation in the Arkansas River basin involving artificial groundwater recharge.
- Jan. 22: Completed memorandum on "Sales, Transfers and exchanges of

water rights in the Arkansas River basin of Colorado that would be reflected in the records of diversion."

- Feb. 9: Supplied Dennis M. Montgomery requested back-up material for the 1964 supplement to Trinidad Project Report. This copied from material found in files of the Bureau of Reclamation.
- Feb. 11: Supplied C. J. Reich copy of Progress Report Oxford Farmer's Ditch Company System Investigation. Irrigation Seasons 1968 to 1970.
- Feb. 13: Made cursory review of Boyle Engineering Corporations confidential report "Arkansas River Basin Study, Data Collection Report", November, 1986.
- Feb. 25: Completed computation of flow of Arkansas River at Canon City, Coloado, for the period 1925-1975, adjusted for the effects of Transmountain diversion into and out of the basin and reservoir storage above the gage.
- Mar. 4: With Bob Jesse and Hal Simpson, met with Dan Boyd, Charles Reich, Bill Hahn and Young Yoon to discuss files being created by Boyles on reservoir in the Arkansas River Bain.
- Mar. 5: With Dennis Montgomery and Bill Hahn met with George Bailey, Richard Fouch, LaLonna Meoska, Jim Martin and Harriet Lewallen of CENTEL to discuss the availability of that company's power records for use in estimating ground-water pumpage.
- Mar. 11: Supplied Bill Steele with material requested from the Pueblo Office of the Corps of Engineers.
- Mar. 16: At request of C. J. Reich, reviewed "Data on Major Ditches, tabulation A."
- Mar. 20 & 23 Supplied Dan Boyd with additional bibliograph entries for the Arkansas River Basin Study.

With Water Commissioners of each District downstream from Canon City completed and transmitted to Ray Bennett Arkansas River Basin Storage Facility Summaries.

Date of Transmittal	Water District(s)
March 27	14, 15
April 15	17
April 17	18, 19
April 27	16
May 1	12
May 5	10
May 8	67
May 22	Sheets catalogued in wrong dst.
May 27	79

Mar. 30	Supplied Dennis Montgomery with requested papers on salinity and solute transport obtained through the Pueblo Subdistrict of the U.S. Geological Survey.
Mar. 30:	Supplied Dennis Montgomery and Dan Boyd decrees concerning wells under the Excelsior Ditch.
Apr. 1:	Supplied Dennis Montgomery copies of decrees of cases W-145, W-80CW19 and W-65.
Apr. 8:	Supplied Dennis Montgomery a copy of the decree of case 845CW195.
Apr. 15:	Completed report on "Wells Pumping into Ditches and Canals" requested by Hal Simpson.
Apr. 20:	Supplied C. J. Reich copies of additional reports located in the Pueblo office.
Apr. 23:	Transmitted to C. J. Reich Appendix Vol. IV of VII Project Planning Report No. 7-8A:491, Initial Development, Gunnison-Arkansas Project borrowed from Pueblo office of Bureau of Reclamation. (Returned 4/30/87)
Apr. 23:	Supplied C. J. Reich and Bill Steele a copy of Letter Report on "Analysis of Canal Loss" by John Dumeyer.
May 1:	Supplied Bill Steele copies of certain reports concerned with case 83CW18.
May 5:	Replied to Dennis Montgomery's letter of April 29, 1987, giving appraisal of the value of certain reports.
May 8:	With Bob Jesse, replied to inquiry by Dennis Montgomery on Trinidad Project Operating Principles.
May 8:	Supplied C. J. Reich copies of Gunnison-Arkansas Project Appendices. (Returned, Vol. VI, 5/21/87; Vol's I & III, 7/29/87)

May 19: With Ken Cooper reviewed for Bill Hahn the "Consolidated Wells List-Colorado".

May 19: Supplied George Moravec information on land classification aerial photographs located in the Pueblo Office of the Bureau of Reclamation.

May 21: Supplied C. J. Reich certain requested information on John Martin Reservoir, the Groundwater Management Act of 1965, and use of return flow from transmountain diversion.

May 27: Supplied C. J. Reich with copy of resolution concerning John Martin Reservoir Permanent Pool.

June 3: At Ray Bennett's request, checked progress on compilation of the reservoir tabulation.

June 15: Completed survey (May 8-June 15) of lands above canals receiving water from these canals by lift pump.

June 16 & 30,  
Oct. 30: Supplied C. J. Reich with Reports of the Operation Secretary Concerning the Operation of John Martin and certain resolutions on the operation of that reservoir.

July 9: With Ken Cooper, met with Bill Hahn and Jim Slattery on consolidated wells list, with Ray Bennett and Jeff Schulz on reservoir tabulation and with Chuck Reich on John Martin Reservoir.

July 15 (14?) At request of Ray Bennett and Jeff Schulz determined to extent possible the period of operation for these reservoirs on the Tabulation with capacities greater than 1,000 acre feet.

July 27: Supplied C. J. Reich information on futile calls in the Arkansas River basin.

July 30: Supplied C. J. Reich records of Hoosier Pass Tunnel imports.

July 30: Supplied Bob Hamburg two reports on phreatophytes in the Arkansas River basin.

Aug. 5: Supplied C. J. Reich disk with RIVCAL.DBF, the River Call Database File.

Aug. 6: Gave requested opinion to Bob Jesse on the purpose behind Spronk request for certain decrees.

Aug. 7: Supplied C. J. Reich copies of certain decrees and legal documents with reference to futile calls.

- Aug. 11 thru  
Aug. 18 With Ken Cooper, George Ridenour, Don Taylor and three summer student employees (Steve Goure, Peter Knudsen, & Matt Davidson), surveyed wells within the CENTEL service area to tie meter number to well location to enable use of power records for estimation of ground-water pumpage.
- Aug. 28: Supplied Dennis Montgomery copies of judgement and decrees of cases requested by Spronk Water Engineers, Inc. (W-4497, W-4496, W-1777, W-879, W-880, W-1343: W-3185 and W-2927).
- Sept. 2: Supplied C. J. Reich information on John Martin Reservoir in regard to the river call.
- Sept. 3: Supplied C. J. Reich information on Standing Operation Procedures, Pueblo Dam and Reservoir.
- Sept. 9: Supplied C. J. Reich informatin on the Leadville precipitation gage.
- Sept. 9: Supplied C. J. Reich additional bibliographic listing.
- Sept. 10: Completed report on "Initial use of imported water in the Arkansas River basin of Colorado."
- Sept. 11: With Ray Garcia and Chuck Roberts inspected the Medano and Hudson Ditches.
- Oct. 9: Replied to specific questions addressed to me in Dennis Montgomery's letter of September 28, 1978.
- Oct. 21: Supplied Ray Bennett with copy of Hydro Engineering report of October 20, 1978.

The Special Master to hear State of Kansas vs. State of Colorado, No. 105, Original; The Honorable Wade H. McCree, Jr., passed away after a short illness in September, 1987. Mr. Arthur L. Littleworth of California has been appointed Special Master.

A request was made by Colorado and Kansas that the period for case preparation be extended to December 31, 1988, and the period for additional discovery thereafater be extended to six months or until June 30, 1988. The decision of the Special Master on this request is pending as of this writing, (November 24, 1987.)

## PERSONNEL

Again, as in 1986, there have been numerous personnel changes in Division 2 during the 1987 Irrigation Year.

On November 24, 1986, Chuck Roberts assumed the position of Deputy Division Engineer. Mary Ann Ridenour was on board November 1, 1986, to help with diversion record entry and she worked part-time until June, 1987. Frank Kipple filled the vacant Water Resource A hydrographer position on January 5, 1987, to finally bring the engineering positions in Division 2 to full staff.

Three changes occurred with regard to Water Commissioners in Water Division 2 during the 1987 Irrigation Year. On May 5, 1987, David Shepard, Water Commissioner for Water District 67, resigned. That position was vacant until October 1st when Bob Hamilton was appointed as the new Senior Water Commissioner for Water District 67. On July 15, 1987, George Wichmann retired from the Water District 12 Water Commissioner position. That position was temporarily filled by Charlie Judge for the rest of Irrigation Year 1987. In October of 1987, Division 2 was requested to aid in diversion data verification in Water Districts 15 and 18 for the Arkansas River Compact Litigation. This project required an additional 28 man days of permanent part-time help, as well as a concerted 3 week effort by 4 FTEs from the Division 2 office.

Annually, starting in 1986, the Division office has awarded a Water Commissioner of the Year Award to one of the deserving Water Commissioners. The Water Commissioner of the Year for 1987 was Bob Brgoch in Water District 16. Bob's exemplary work, especially with regard to the Cucharas Dam failure, has demonstrated his outstanding performance in everyday, extraordinary, as well as ordinary tasks. Bob's award was given to him by the State and Division Engineers on October 14th at the annual Water Commissioner's Meeting.

Public contacts by Division II personnel include office walk-ins, telephone calls and person to person contacts. Non-irrigation season public contacts average 665 per month, while the irrigation season averaged nearly 1,503 per month with a high in July of 1,998. Overall, Division 2 personnel, including office personnel and Water Commissioners, made over 16,200 public contacts in I. Y. 1987.

The Division Engineer performed 95 consultations and hearings with the Referee. Personnel within the office made 118 Court appearances.



ARKANSAS RIVER COMPACT OPERATIONS  
EXECUTIVE OVERVIEW

The Arkansas River Compact, again in Irrigation Year 1987, consumed much of Division 2 personnel's time, including portions of the time of 2.0 FTE Engineers (Pueblo office), 1.0 FTE Engineering Technician II (at Las Animas) and partial FTEs for an Engineering Technician I and the Division Engineer.

There was only one compact meeting during the year, occurring on December 8, 1987. The regular order of business included a Cheraw Lake report (see special reports.) Ray Willms of U.S.B.R. made a presentation regarding the Trinidad Reservoir Operations Study. The Commission scheduled subsequent meetings the 3rd week of February, 1988, and April 27, 1988, for discussion of the Operations Study. The Winter Water Decree 84CW179 was discussed with Kansas maintaining, to Colorado's obvious but silent disagreement, that the Compact Commission should have the authority to approve such a decree before it's actually decreed. Colorado maintains the Commission may review, but has no authority to approve or disapprove the decree. It was determined that revised by-laws were needed and they are being drafted for future consideration. Kansas discussed their designation of an "Intensive Groundwater Use Control Area" along the Arkansas River at the stateline and downstream. This indicates their tacit admission of depleting the Arkansas River by pumping alluvial wells, ironically the same sin for which they charge Colorado, but which they are just now addressing themselves. The Compact Commission has proposed to maintain and indeed in 1989-90 increase by 14% their support of the Satellite Monitoring System.

There was one Engineering Committee meeting on December 2, 1987, during which Tommy Thomson of SECWCD and Gary Soldano of Colorado Department of Health gave a presentation regarding the Lake Cheraw problem.

### AUGMENTATION WATER

There are two organizations whose principal business is to provide augmentation water to non-exempt tributary wells. These are the Colorado Water Development and Protective Association, 248 members and 568 member wells, and the Lower Arkansas Water Management Association, 113 members and 392 member wells. CWDPA has not, as of this date, yet applied to Water Court to decree a Plan of Augmentation to cover its work.

As of January 1, 1988, there are 99 decreed Plans of Augmentation varying in size from one well to 250 wells. Eighty-three of these plans are in operation.

There were 6 new Plans of Augmentation decrees in 1987.

In 1987, 38.75 shares of Twin Lakes water will be released for 17 Plans of Augmentation that use Twin Lakes water.

## FREE RIVER REPORT

A special and unusual condition of a Free River occurred on three different occasions (see River Call list in Statistical Summary). This condition was close in Irrigation Years 1985 and 1986, however, in previous years, because John Martin wasn't spilling, the river had an administrative (though undecreed) call of 1948--John Martin (filling). An interesting side light of the Free River call was the enlightenment of Water Commissioners most of whom had continuously administered a call during their careers. In fact, except for a brief period in 1965, this is the first incidence of a free call situation since the construction of John Martin. Free River conditions occurred on March 24th through May 1, again on May 5 through June 29th and finally June 30 through July 7th.

CUCHARAS DAM PARTIAL FAILURE  
SPECIAL REPORT

On May 9, 1987, Cucharas #5 Dam, R 64 W, T 26 S, Sec. 30, owned by Huerfano-Cucharas Irrigation Company, partially failed. An alert Water Commissioner, namely Bob Brgoch, alerted the Division of Water Resources and owners of the problem after a field inspection. The failure manifested itself as a pronounced increase of seepage, which was muddy and an opening of a construction joint on the upstream facing with 6" offset, located 100' left of the right abutment. Also, signs of movement of one and one-half inches at a point 100' right of the spillway and settlement of about 2.0 feet on the crest were observed, beginning May 9th. Settlement scarps appeared on the downstream slope of the embankment. The reservoir was at capacity and spilling at approximately 50 c.f.s. at the time of impending failure. On December 15, 1986, the State Engineer had lifted the previous restriction of 5 feet below emergency spillway crest after reviewing the stability and hydrologic studies and the recommendation of Geotechnical Consultants, Inc.

Division 2 personnel promptly responded to the threatened safety of life and property below the dam by providing, within hours of notification, maps of potential inundation to the Huerfano County Sheriff. These maps had been prepared in 1983 under H.B. 1416 and were the worst case scenario of dam failure. They were very helpful to the Sheriff and very timely in that they gave guidelines to authorities as to what areas were to be evacuated if the conditions became critical. Indeed, if the dam had totally or catastrophically failed, the maps in themselves could have been instrumental in saving human lives and property. The maps also routed the flood hydrograph so travel times (and the associated evacuation times) were clearly indicated.

Division 2 personnel could be commended on initial identification of the problem as well as providing timely and potentially life-saving information.

A veritable plethora of engineers tread the embankment of Cucharas Dam the week after May 9th. Fortunately, the dam never catastrophically failed, but instead proceeded to progressively deteriorate and seep.

In summary, the increased hydrostatic pressure moved portions of the embankment and subsequently stressed and cracked the concrete facing and offset it downstream. The reservoir water poured through these cracks, increasing seepage dramatically and washing fines out of the rock-fill. The increased removal of fines caused additional settlement, resulting in additional displacement, and the cycle began. Seepage waters cleared up eventually, indicating that all the fines had been eroded and continued until there was insufficient hydraulic head in the reservoir to drive the seepage forces. The emergency spillway was notched to hasten controlled evacuation of the reservoir. Today a minimal amount of dead storage of approximately 1,000 A.F. remains upstream of the dam.

## GOALS AND OBJECTIVES REPORT

On June 2nd, the State Engineer directed each Division Engineer to formulate and submit goals and objectives for I.Y. 1987. Division II's Goals and Objectives were submitted to the State EEngineer on June 26th. The following is a list of objectives ordered by priority, tabulating the degree to which they were attained. These objectives were aimed at the overall goals of 1) More complete and accurate records, 2) Better meet public informational and service needs and 3) Administer waters within the Division better. The following chart categorizes objectives by work activity:

CATEGORY	OBJECTIVES	% ACCOMPLISHED	RE-DEFINITION	
Hydrograph	1. To eliminate backlog of unworked hydrographic records	50%	Continue as defined.	
	2. To implement a more efficient system of working records.	50%	Continue as defined.	
	3. To improve the reliability & Utility of the Sat. Mon. Sys. -moving toward directly using SAT. DATA for records.	100%	Accomplished. Continued maintenance. (See Special Rpt.)	
Water Comm.	1. To provide diversion records on time to Denver	90%	Continue as defined-IY '88	
	2. To provide field recon. support to the Pueblo office for Water Cases, wells, etc.	100%	Cont. as def.	
	3. To begin admin. lists which would be used to cross-train or train new personnel & be used by the Pueblo ofc. to better supervise.	35%	To increase the priority of this object to #2 position.	
Ground Water	1. Meter all N.T. wells.	35%	Cont. as def.	
	2. Maintain at least annual reports on all metered wells.	25%	Cont. as def.	
	3. Create a d-base management file for all Plans of Aug., especially those used to augment wells.	5%	Cont. as def.	
Office	A. Clerical			
	1. Reorganize Filing System.	35%	Cont. as def.	
	2. Implement word processing into everyday activities.	25%	Cont. as def.	
	3. Cross-train for work effic. during leaves of absence.	25%	Cont. as def.	
	4. Reorganize well permit file.	0%	Delete file, partially destroyed	
	5. Interior Decorating of office	100%	Delete.	
	B. Supervisory			
	1. Provide cross-training and	10%	Same	

Goals & Objectives continued

	documentation to promote effic. during absences.	10%	Same
	2. Improve & Implement Supervisory skills & techniques.	70%	Continue
	3. Manage by objective.	90%	Continue
Water Court	1. To provide comprehensive consultations with the Water Referee which have each application field checked & reported.	80%	Same-except NOT ALL app's. need field chk.
	2. To maintain & enhance liaison w/the Water Referee & Judge to open channels of communication of DWR policy & Court decisions.	60%	Continue-more staff involvement
Reservoir	1. To continue & maintain accurate reservoir accounting on a daily basis.	100%	Continue
	2. To increase # of Reservoirs for which computer programs are developed (currently=5 to include others by Jan., '88) & charge '88) & charge evap. to all storage.	75%	Continue
	3. Develop Programs to archive reservoir data & river calls by 1/88.	5%	Continue
	4. Cross-train personnel so that there is multiplicity of duties within Division office.	5%	Continue and Redefine at a higher priority.
KS vs CO Suit	To coordinate records & provide liaison for parties involved. To collect & disseminate needed data & info. efficiently.	100%	Continue
	To provide Engineering support to the Division Engineer & State Engineer's office.	50%	Continue

## SATELLITE MONITORING MAINTENANCE

(Fig. 1 Reference)

In moving toward a real time stream flow measurement system, Division 2 embarked on a concerted effort toward zero mechanical defects in the system. Item 3 of Goals and Objectives of the Hydrography work in Division 2 has been accomplished. An accurate and preferred method of determining the degree of success of zero mechanical defects is best accomplished by reviewing "% Clean" under Database Quality of the DMS System Diagnostics. Unfortunately, the VAX system has not maintained these records for I. Y. 87 except for the last 10 days of each month. A review of the transmissions would over the I. Y. show if we're moving closer toward zero mechanical defects. Absent this data a review of computed average daily flows was done to verify performance of the system. Because daily averages are not computed if fewer than 94 data sets are collected within a 24 hour period (i. e. more than 2 transmissions are lost) that statistic was used to verify enhanced system performance accomplished by extra effort by Division 2 personnel. Figure 1 is a Months vs. Cum Days of less than 94 transmissions for years 1986 and 1987. Clearly, an improvement is measured and notable.

# LOST DATA

CUM. STATION DAYS < 94 DATA SETS

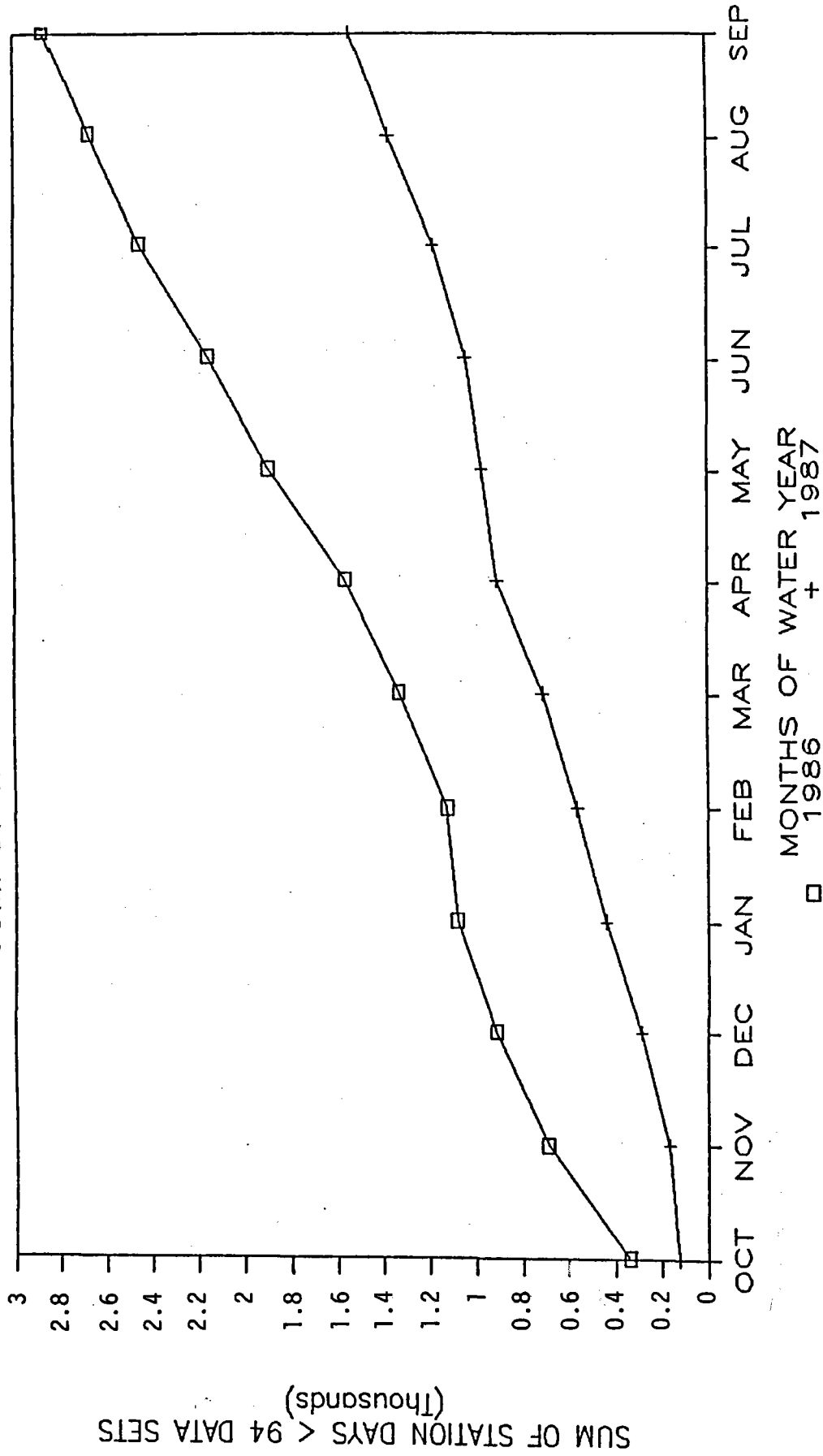


Figure 1



CHERAW LAKE  
SPECIAL REPORT

Cheraw Lake is a natural closed basin playa lake, located approximately 10 miles North of La Junta, containing approximately 10,000 A.F. It has historically collected irrigation tailwater, seepage and runoff and untreated wastewater from a turkey processing plant (until the early 1970's). In an "average" water supply year, evaporation is sufficient to prevent the lake from spilling, however, in recent years it has been filling. In previous years evaporation was greater than inflow, producing an increasing TDS concentration to the present level of 17,000 ppm to approximately 15' depth and upwards of 30,000 ppm at greater depths.

In 1985 releases from Cheraw Lake were done to relieve flooding conditions on S.H. 109 and the Town of Cheraw. Complaints arose from downstream users regarding the quality of the released water and to Colorado Department of Health, Water Quality Control Commission was asked to intercede and require NPDES permits. The Colorado Department of Health (CDH) determined that NPDES permits were not required because 1) discharges by dams have been determined by a Federal Court to not constitute point source discharge because there was no "addition of pollutants" as required by the Federal Clean Water Act and 2) the State of Colorado Water Quality Control Act.

The Colorado Water Quality Control Commission has not adopted salinity standards for any of the Arkansas River basin, so that an NPDES permit could not issue, governing that parameter. Therefore, the WQCC has no regulatory authority. Subsequently, a solution was sought by helping local entities develop a water management plan. A water quality model developed by the Water Quality Control Division indicated, in the Spring of 1986, that a 3:1 dilution ratio of Arkansas River water to the Horse Creek drainage would accomplish historic quality.

At the advice of the Attorney General's Office and after an informational hearing, the WQCC drafted a proposed regulation which has been put in abeyance pending the outcome of efforts of Tommy Thomson, General Manager of the Southeastern Colorado Water Conservancy District, to mediate a local solution. Mr. Thomson's Ad Hoc Committee has an interim solution which is to dilute at ratios of 4:1 to 5:1 about 2500 A.F. of Cheraw Lake water. This plan is suggested for 1987-88 winter season and has not yet been implemented because of opposition by the cities of Lamar and Las Animas and some ditch companies. This is the status quo of the Cheraw Lake situation, with no resolution apparent in the near future.

HYDROLOGY REPORT  
SNOW SURVEY

The following snow course stations were maintained by the Soil Conservation Service in the Arkansas River Drainage for I. Y. '87 and their % of average snowpack are as indicated:

<u>SNOW COURSE</u>	<u>DATE</u>	<u>MAX SNOW DEPTH</u>	<u>MAX ACCUM WATER CONTENT</u>	<u>May 1 1961-1985 AVG.</u>
Apishapa	5/1/87	38	15.7	392%
Burbon	5/1/87	32	12.3	372%
Bison Reservoir	5/1/87	15	5.2	173%
Biglow Divide	5/1/87	29	10.9	210%
*Brumley	4/13/87	--	9.3	93%
Fremont Pass	3/30/87	51	13.1	81%
Four Mile	3/31/87	30	7.6	138%
Huerfano	4/27/87	36	14.1	137%
Ivanhoe	3/27/87	56	14.6	78%
La Veta	4/27/87	20	7.4	180%
Monarch Offshoot	3/27/87	58	16.2	117%
South Colony	3/31/87	83	30.5	120%
Saint Elmo	3/30/87	57	14.6	118%
Spruce Creek	3/30/87	64	17.5	172%
Trout Creek	4/24/87	18	5.8	242%
Westcliffe	3/27/87	39	10.3	139%
*Whiskey Creek	4/15/87	--	18.4	267%

\*No snow course estimated from SNOTEL site.

A Thiessen polygonal analysis of the snow pack data above 9,000' indicates that the Arkansas River Drainage received 179% of the average snowpack basin-wide. The Division 2 office has utilized SNOTEL data accessed through our own user account acquired in I. Y. 1987.

Hydrology (Continued)

PRECIPITATION

The following precipitation stations in the Arkansas River Drainage show a 105-134% increase over the average precipitation of record.

<u>Station</u>	<u>I. Y. 1987</u>	<u>Average (as indicated)</u>	<u>% Average</u>
Turquoise Lake	12.72	9.51 (49-84)	134%
Pueblo Reservoir	13.29	10.87*(51-80)	122%
Trinidad Reservoir	19.93	16.96 (79-84) 15.10 (31-84)	—
John Martin	15.55	11.72 (41-80)	132%
Lamar (greater than)	15.2	14.53 (51-80) (gr. th.)	105%
Garden City, KS	20.84	18.76 (51-80)	111%

\*Pueblo Airport

WINTER WATER PROGRAM  
STORAGE SUMMARY

Pueblo Reservoir.....	20,179.13 A.F.
Fort Lyon.....	86,425.97
Fort Lyon John Martin.....	8,977.00
Holbrook.....	8,443.10
Colorado.....	8,760.17
Amity.....	48,130.94
Amity John Martin.....	18,991.00
Consolidated John Martin.....	7,618.00
Highline (direct diversion).....	6,479.40
Catlin (direct diversion).....	2,881.45
Total System.....	216,886.16 A.F.

Theoretical 100,000 A.F. System

28.8% of System.....	28,800 A.F.
71.2% of System.....	71,200

Amity.....	2,750
Holbrook.....	356

Theoretical 103,106 A.F. System

25% of System.....	28,445.04
75% of System.....	85,335.12

Total System.....	216,886.16 A.F.
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TRANSMOUNTAIN DIVERSIONS SUMMARY

<u>W.D.</u>	<u>RECIPIENT</u>	<u>IYR 1986</u>		<u>IYR 1987</u>		<u>W.D.</u>	<u>SOURCE</u>
		<u>A.F.</u>	<u>DAYS</u>	<u>A.F.</u>	<u>DAYS</u>		
14	CITY OF PUEBLO TENN CRK	1070	78	813	102	11	EWING D.
14	CITY OF PUEBLO TENN CRK	3860	116	2200	103	11	WURTZ D.
14	CITY OF PUEBLO TENN CRK	N.A.	N.A.	580	93	11	WURTZ EXT
14	CITY OF PUEBLO ARK RIV	1920	110	1210	100	11	COLUMBINE D.
17	CATLIN CANAL ARK RIV	220	86	77	72	11	LARKSPUR D.
11	TURQUOISE RES. LK FK CRK	31750	88	3330	52	11	BOUSTEAD TUN
14	CITY OF PUEBLO LK FK CRK	5510	177	3580	174	11	BUSK-IV TUN
14	HIGHLINE CANAL						
14	CITY OF PUEBLO						
10	CITY OF CO SPGS LK FK CRK	16930	89	20420	141	11	HOMESTK TUN
2	CITY OF AURORA						
14	CITY OF PUEBLO LAKE CRK	50600	298	18110	338	11	TW LKS TUN
10	CITY OF CO SPGS LK CRK						

RESERVOIR STORAGE SUMMARY

W.D.	RESERVOIR NAME	STREAM SOURCE	BEG IYR A.F.	PREV IYR(86) %	BEG. IRR A.F.	SEASON %	BEG IYR A.F.	%	IYR OF RCD BEG/SEASON	SEASON %	END IYR A.F.
11	TURQUOISE RES.	LAKE FORK CRK	125057	-4.3	119904	6.39	127560	-1.3	125889	-1.2	124439
11	TWIN LAKES RES.	LAKE CREEK	140153	-0.25	139798	-2.62	136223	2.8	132360	-5.0	125737
11	CLEAR CREEK RES.	CLEAR CREEK	8798	17	10294	-7.2	9603	+2.8	9868	-52.1	5145
14	PUEBLO RES.	ARKANSAS RIVER	245791	10.6	271856	-8.46	250646	+5.6	264609	-13.5	228851
19	TRINIDAD RES.	PURGATOIRE RIV.	16418	33.65	21943	-51.41	14492	-36.6	9192	+402.4	36989
67	JOHN MARTIN RES.	ARKANSAS RIVER	280952	13.66	319346	-41.11	226300	+56.4	353936	-30.4	246368
	TOTAL OTHERS	ARK. RIV. BASIN	260400	20.81	314600	-17.56	267600	+37.6	368100	-28.5	263000
	TOTALS	ARK. RIV. BASIN	1077569	11.15	1197741	-16.01	1032424	+22.7	1266509	-18.6	1030529

WATER DIVERSION SUMMARIES BY DISTRICT\*

W.D.	OBSERVED RECORDINGS	TOT. DIV. A.F.	TOT. DIV. TO STORAGE	NO. ACRES IRRIGATED	AVERAGE A.F. ACRE	TOT. DIVER. NON-IRR.
10	4099	63000	0	11612	3.45	32000
11	2198	131000	100000	18852	6.28	138000
12	4200	255000	1000	12580	16.84	NA
13	698	53000	0	28033	1.89	0
14	3594	321000	31000	30992	10.35	52000
15	1231	31000	2000	4600	5.58	0
16	2054	24000	0	4700	4.97	0
17	2887	925000	400000	140000	4.55	405000
18	693	14000	0	7700	1.77	0
19	3523	84000	56000	30000	2.59	6000
66&67	300	205000	0	76837	2.73	NA
79	1436	19000	0	5000	3.79	0

\*Estimated actual values to be provided at the Spring Meeting of Division Engineers.

WATER COURT ACTIVITIES

(CALENDAR YEAR 1987)

No. Application for Decrees	76 Cases	
No. Consultations with Referee	81	(includes 3 Non-tributary)
No. Decrees Issued (Includes 42 U.S. Cases)	151	
No. Dismissals (Includes 3 U.S. Cases)	27	

TYPES OF RULINGS

Findings of Diligence on Conditional Rights	21	
Cancelled Conditional Rights	28	
Conditional Rights Made Absolute	6	
Augmentation Plans Approved (Including Exchanges)	11	
Cases Awarding New Wells	33	
Cases Awarding New Wells in Denver Basin Wells	14	
Cases Awarding New Springs	13	
Cases Awarding New Hydro-Electric Plants	1	
Cases Awarding New Reservoirs (Includes Stock Ponds)	8	
Cases Awarding Change of Location	3	
Cases Awarding Change of Use	2	
Rulings on Protest to 1984 Abandonment List	0	
Cases Appealed to Colorado Supreme Court	2	(85CW14, 84CW132)
Cases Awarding Other Structures (Pipelines, Alternate Points of Diversion, Etc.)	10	

NEW STRUCTURES IN DECREES

Reservoirs (Includes Stock Ponds)	105
Wells (Includes 132 Denver Basin Wells)	270
Springs	92
Other (Pipelines, Alternate Points of Diversion, Etc.)	15



WATER DIVISION NO. 2

ACTIVITY SUMMARY

ACTIVITY	MONTHLY TOTAL	FISCAL YEAR TO DATE
Number of professional and technical staff		7
Number of clerical staff		2
Number of Water Commissioner FTE assigned (full and part-time)		18
Number of decreed surface rights		*8,000
Number of surface rights administered		8,000
Number of wells		***23,170
Number of plans for augmentation		55
Number of consultations with Referee	14	66
Number of Water Court appearances	7	82
Number of meetings with water users	607	7752
Number of meetings to resolve water related disputes		
Number of contacts to give public assistance on water matters (including telephone inquiries and an estimated number of contacts made by water commissioners)	794	8698
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<p>* Estimate from Tabulation.</p>		
<p>** All meetings were to resolve water problems.</p>		
<p>*** Includes Domestic.</p>		

RIVER CALL  
IRRIGATION YEAR 1987

Date	Priority Date	Entity	Districts	Duration of call/days
11/01/86	03/09/1898	Meredith	10-15, 17	67
11/07/86	10/15/1907	Mt. Pisgah	All	128
03/15/87	08/01/1896	Great Plains	10-15, 17	90
03/24/87	Free River	John Martin Spilling	All	38
05/01/87	1948	John Martin	All	4
05/05/87	Free River	John Martin Spilling	All	52
06/29/87	08/31/1893	Fort Lyon #3	10-15, 27	1
06/30/87	Free River	John Martin Spilling	All	7
07/07/87	1948	John Martin	All	1
07/07/87	06/09/1890	Colorado	10-15, 17	2
07/09/87	01/06/1890	Highline (Jr.)	10-15, 17	3
07/12/87	09/25/1889	Holbrook #1	10-15, 17	1
07/13/87	11/14/1887	Catlin #2	10-15, 17	1
07/14/87	09/25/1889	Holbrook #1	10-15, 17	1
07/15/87	11/14/1887	Catlin #2	10-15, 17	2
07/17/87	03/01/1887	Fort Lyon #2	10-15, 17	33
08/10/87	02/26/1887	Oxford #2	10-15, 17	1
08/21/87	12/03/1884	Catlin #1	10-15, 17	3
08/24/87	03/01/1887	Fort Lyon #2	10-15, 17	3
08/17/87	05/01/1887	Bessemer (Jr.)	10-15, 17	1
08/28/87	03/01/1892	Holbrook Res. #1	10-15, 17	2
08/30/87	09/25/1889	Holbrook #1	10-15, 17	3
09/01/87	03/01/1887	Fort Lyon #2	10-15, 17	6
09/08/87	08/01/1896	Great Plains	10-15, 17	1
09/09/87	08/31/1893	Fort Lyon #3	10-15, 17	1
09/10/87	03/01/1887	Fort Lyon #2	10-15, 17	1
10/31/87	03/01/1887	Fort Lyon #2	10-15, 17	55

RELEASES AND DELIVERIES TO KANSAS

MONTH	DEMAND RELEASES	TRANSIT LOSS ACCT RELEASES	FRONTIER DITCH	ARK @ COOLIDGE.KS	DITCH & RIV DEL	CREDITED DEL
April	11392.04*	0.00	98.00	53164.00	53262.00	11962.00
May	62889.20*	0.00	2300.00	133200.00	135500.00	66034.00
June	81129.57*	0.00	1400.00	149900.00	1551300.00	85186.00
July	17172.82**	359.52	1250.00	45838.00	47088.00	18031.00
August	15066.34	1326.53	1601.00	21416.00	23017.00	15820.00
Sept.	1983.50	198.36	0.00	2650.00	2650.00	2083.00
Oct.	7144.69	1020.72	837.00***	12314.00	13151.00***	7502.00

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TOTALS	196778.16	2905.13	7486.00	418482.00	425968.00	206618.00
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\*FORCED RELEASE

\*\*5197.44 FORCED RELEASE

\*\*\* SUTRON DATA

The above table reflects only times when actual releases were being made from John Martin Reservoir plus a 7 day rundown period. "credited delivery" refers to the limitation that credit will not be taken formore than 105 percent of Kansas' demand.

Forced releases by Corp of Engineers calculated separately and noted with \*.

## COMPACT RELEASE & DELIVERIES

Releases to the State of Kansas:

In 1987, a departure from established practice of "release on order" was necessitated because of intrusion into the flood pool of John Martin Reservoir. Releases from the flood pool were begun on March 24 and continued until July 7. Under spill criteria adopted by the Compact Administration, forced releases were begun from the Kansas account on April 20 and continued until July 7. The total of this release was 160,608.25 A.F.

Ordered release #1 was begun at 0900 hours on July 21, at a rate of 500 c.f.s. The release was increased to 700 c.f.s. at 0900 hours on July 28, decreased back to 500 c.f.s. at 0900 hours on August 5, and stopped at 0900 hours on August 14. This release totalled 27,041.72 A.F.

Ordered release #2 was begun at 1300 hours on September 9, at a rate of 500 c.f.s., and stopped at 1300 hours on September 11. This release totalled 1,983.50 A.F.

Ordered release #3 was begun at 0900 hours on October 9, at a rate of 350 c.f.s., and stopped at 1600 hours on October 19. This release totalled 7,144.69 A.F.

Forced release totalled 160,608.25 A.F. Ordered releases totalled 36,169.91 A.F. Total releases for the State of Kansas account were 196,778.16 A.F. Total State Line flow during the period of these releases was 425,968 A.F.

SUMMARY OF HYDROGRAPHIC RECORDS  
1987 IRRIGATION YEAR

STATION	TOTAL DISCHARGE	MAX DISCHG	MIN DISCHG
Lake Fork Crk Above Turq. Res.	10250	210	3.0
Lake Fork Crk Bel. Turq. Res.	6220	27	2.6
Lake Crk above Tw. Lks. Res.	89390	1030	12
Lake Crk bel. Tw. Lks. Res.	104500	1490	13
Ark. Riv. @ Granite	232100	2220	82
Cl. Crk. above Cl. Crk. Res.	56880	534	10
Cl. Crk. bel. Cl. Crk. Res.	61340	473	0
Cottonwood Crk. @ Buena Vista	31780	366	0.50
Chalk Crk. @ Nathrop	42920	540	17.0
Ark. Riv. @ Salida	456400	3550	210
Ark. Riv. nr. Wellsville	543700	4050	250
Grape Crk. nr. Westcliffe	72920	750	15.2
Ark. Riv. @ Canon City	692886	5640	312
Ark. Riv. @ Portland	751960	6040	237
Ark. Riv. above Pueblo	712951	5500	60
Ark. Riv. nr. Nepesta	952885	9410	178
Ark. Riv. nr. Fowler (Bel. Cat. Dam)	977780	5800	170
Huerfano Riv. nr. Redwing	27850	206	7.0
Cucharas Riv. @ Boyd Ranch nr. La Veta	33290	390	6.8
Purgatoire Riv. @ Trinidad	70810	1440	0.5
Luning Arroyo nr. Model	432	56.2	0
Van Bremer Arroyo nr. Model	1180	673	0.08
Purgatoire Riv. nr. Thatcher	92090	---	---
Ark. Riv. @ La Junta	488600	8390	24
Ark. Riv. @ Las Animas	507100	6240	36
Purgatoire River @ Las Animas	89700	2900	2.6
Purgatoire River @ Nine Mile Dam	87240	3075	0
Muddy Crk. @ Muddy Crk. Reservoir	420	120	0
Rule Crk. off Highway 101	1930	501	0