APPENDIX A

Minutes of Public Meetings

LEA COUNTY 40-YEAR WATER PLAN
PUBLIC MEETING
MINUTES

Eunice Community Center
Eunice, NM
April 18, 2000, 6:30 p.m.

1. Bob Carter introduced Dan Boivin and Jerry May of Leedshill-Herkenhoff and Roger Peery of Shomaker and Associates.

2. Dan Boivin briefed those present on what a 40 year water plan is and what it is supposed to do. The ISC, in response to the developing water crisis in New Mexico has asked different regions within the state to develop comprehensive ways of looking at what their water reserves are and planning for the use of that water in the future. Two things Leedshill-Herkenhoff have are a description of our available water, the way it has been used, and demand for water, the way it will be used. It was made clear that the Ogallala will be the main topic of discussion but all other basins in the County will also be defined. The nuts and bolts planning has been done, now they are looking for public input for the plan.

3. Roger Peery discussed water quality in the Jal and Lea County Underground Water Basin. It is a basin of alluvial fill that runs in a north-south direction. The alluvium (interbedded layers of sand, silt, gravel, clay, etc.) gets up to 750 feet thick in the deepest areas. A small part of the aquifer is in New Mexico, but it extends farther south into Texas, and in the last twenty years there have only been a few feet of draw down. Water quality is pretty good. Some manmade problems such as hydrocarbon contamination are present. Total dissolved solids are around 750 milligrams per liter, which is classified as moderately hard water. Fluoride concentration ranges from 2 to 3 milligrams per liter. These levels are not considered harmful, but higher concentrations produce mottling in teeth of younger children. Even higher levels are known to cause crippling skeletal sclerosis. Overall, we are in pretty good shape as long as there isn't a lot of extra groundwater development, or as long as Texas doesn't see this as an opportunity , since the some wells produce hundreds of gallons a minute in some areas in the deeper part of the aquifer. Mr. Carter asked if there is a lot a farming in this area. It was replied that this is mostly ranch area. Mr. Carter then asked if the Santa Rosa is in this area. Mr. Peery replied that the Santa Rosa is above this. Contamination of wells and water was mentioned by Ms. Doom. Mr. Peery noted that this is one thing that the report is lacking. LH and Shomaker tried to find evidence of contamination so as to identify it in the study, but neither the New Mexico Environment Department nor the Oil Conservation District records indicate any problems here, even though there obviously are. Mr. Stephenson suggested that Bob Allen, owner of Safety and Environmental Solutions in Hobbs, be contacted and he may be able to help with this. Mr. Allen conducted tests on wells that are being contaminated by oil.

Due to a malfunction with recording equipment, the minutes are incomplete. However, since those present were members of the Lea County Water Users

Association, the engineers, government representatives and the press, the presentation was given roundtable and discussion was mostly informal.

LEA COUNTY 40-YEAR WATER PLAN
PUBLIC MEETING
MINUTES

Hobbs Office Complex, 1923 N. Dal Paso
Hobbs, NM
April 19, 2000, 6:30 p.m.

1. Dennis Holmberg, Lea County Manager made introduced Jerry May, Dan Boivin and Roger Peery and gave a brief history of the water plan to date.

2. Dan Boivin gave the project introduction.

3. During Roger Peery's discussion of water quality in the county, it was asked if the red contour lines on the maps were where the water quality was the best. Mr. Peery replied that these lines show only contour intervals. Mr. Holmberg mentioned that Lea County Water Users association is paying U.S.G.S. to monitor wells in the county.

   It was asked exactly how much of an affect of agricultural use in Gaines and Yoakum County was having on water supply. Mr. Peery answered that they looked at all the data in the county and the overall effects of the declining aquifers, but didn't try to estimate how much pumping in Texas actually drew down the aquifer in that area. But it is obvious by the open contours on the map that Texas pumping is having as big of an impact as New Mexico pumping in this area. This only holds true on the border. As you start to move farther away from the border, the pumping impacts don't carry over that well.

   Dennis Holmberg pointed out that the State Engineer used to fund the monitoring of wells. However, they stopped funding that project last year, so this year Lea County Water Users is paying U.S.G.S. to monitor eighty wells in the same areas.

   It was asked what will happen to the Ogalalla in the future if water is still consumed at the same rate that it is being consumed now. Mr. Peery replied projections were made by the State Engineer's Office and that they will be that this question will be answered later in the presentation.

   In areas where new draw down is shown, it was suggested that this might be where the Cummings plant, Conoco wells, potash mines or Carlsbad's city wells are located.

   A citizen asked if similar volumes are being lost to Texas every year. Mr. Peery replied that as the draw downs continue, less and less water will be lost to Texas because there is less and less aquifer to move the water through.

4. Mr. May said that domestic use is expected to remain about the same. Mr. Holmberg asked if "domestic use" means use in individual homes in the county. Mr. May replied that yes, this is self-supplied water for households, typically farms. Mr. Holmberg continued by saying that most of the growth right now is in the unincorporated areas that are not served

by the municipalities, so even one percent growth will more in the unincorporated areas. Mr. May pointed out that Leedshill-Herkhoff showed a small increase in domestic use for this reason. Typically, the State Engineer allows three acre feet a year per household. The plan increases domestic use from 1,000 acre feet a year to just over 2,000 acre feet a year to include over 300 households. However, the average household probably will not use all of the allowed water.

5. No questions.

6. Would it be possible to work with pump installers to monitor water wells? Mr. May answered getting farmers to record their water levels would also help. The more data you have, the better to show what is happening in the area.

7. No questions.

8. Do we have less water on earth now? There *is* less water in Lea County.

The problem with the Ogalalla is that it is under the Caprock which does not allow rainwater into it so that, at most, half an inch of the annual 16 inch rainfall will get in. Can holes be drilled in the Caprock to allow more rainfall in? It is possible to drill holes in the Caprock and create capture areas for the rainwater. The Caprock is 60 feet in some places. Possibly target decent size drainages, build some structures to bring water to a point, get it to the Caprock, and develop an efficient way to get that water into the aquifer. Mr. Holmberg said that this is something that was tried thirty years ago. Holes were drilled in buffalo wallows, but there were problems with contamination. But surely we will know more today to prevent this sort of thing from happening again. Mr. Peery noted that something like this is not without cost. A citizen stated that since water is necessary, the expense is unavoidable.

How far to the north is the Santa Rosa? It comes up to and underneath the Caprock because of the way it tilts.

The Ute project to run water to Elida has spent over $2 million. Would it be cheaper to drill deeper wells and pump from underneath? Unfortunately, the water that is deeper is of worse quality, so it would have to be treated also.

So what is the next step for the water plan? Leedshill-Herkenhoff associates will take these comments into consideration, put the recommendations that have made here into a draft for that will be issued to the Lea County Water Users Association Plan Review Committee. Any feedback from the Committee about that draft will then be put together in a final draft for presentation which will be in the city libraries for public review. Then, finally, it will be sent to the Interstate Stream Commission. They will also address such issues as cloud seeding or the time frame in which some of the water-saving suggestions can take place.

Did the engineers assume that the future climate would be similar to that of the last twenty years? Yes, they assumed the climate would be the same as in the recent past. They have

addressed the idea of drought in terms of recommending drought management plans and drought management strategies. They have not been put together for the plan, but they have been recommended. So if a drought does hit (as some are predicting) the squeeze could be more severe. Drought is not unusual; there is a dry period every decade.

Concerning the protection of groundwater, why are there are no regulations on the construction of water wells? There are on artesian wells, but the wells in Lea County are allowing rainwater to wash contaminants down wells. Mr. Peery state that 100 foot seals were recommended to the State Engineer, but most likely 50 foot seals will be required.

Will the engineers check on any of the large-scale drip-irrigation systems? There is a pilot study in Dona Ana County, possibly Deming, the results of which they are very interested in even though it has just been implemented. This is the only one known of in New Mexico at the moment. It is probably very conscious of initial costs. This system is best for even household irrigation.

There was no actual "O.K." for blaming the oil industry for contaminating the ground water. Mr. Boivin recalls that the problem was the unlined pits up until the '60s.

What is the timetable for having the water plan ready to present? Depending on how long it takes the committee to get back to them, LH could have everything together in a month to six weeks for another review for the committee. Then the final draft could be finished in half that time, so a copy could be presented to ISC by August.

How many water plans have been submitted and accepted by the ISC? One, Estancia Basin.

LEA COUNTY 40-YEAR WATER PLAN
PUBLIC MEETING
MINUTES

Lea County Courthouse
100 N. Main, Lovington, NM
April 20, 2000, 6:30 p.m.

1. Dennis Holmberg introduced the water engineers, Dan Boivin and Jerry May of Leedshill Herkenhoff, Inc. and Roger Peery of Shomaker & Associates, Inc.

2. Dan Boivin gave the project introduction.

3. When showing the water quality map for the mid 1980s, it was asked if the circles inside the Lovington area show an increase or a decrease in water quality. Mr. Peery replied that this indicates an increase in specific inductants, which means a decrease in water quality. This means that more salts have gone into the water.

   What is the impact of the lowering of the water table or the thinning of the saturated thickness? Usually when you get closer to the bottom of a zone like the Ogalalla, you might increasingly pick up naturally occurring salts. Has LH differentiated those impacts of oilfield and natural activity or is this overall quality? This is overall quality. The reason it has been attributed to oilfield activity is because in 1967-1968, once the State required brine to be disposed of differently to keep it from going into the aquifer, the water quality increased.

   Has LH delineated on any maps where poor quality water is the result of natural draw down, and would this be a useful suggestion for the water plan? LH can attempt to look at this, but the difficulty is that there is so little data on the water quality currently in the aquifer. How about producing an overlay of oil and gas productionary with the water to attempt to begin to differentiate? To go a step further, retrieving brine production records from the OCD might be helpful. Mr. Peery replied that they have been in contact with OCD and have found their records to be cumbersome and incomplete.

   It was also suggested that saline water would show up again later, since it is heavier and would sink to the bottom of the aquifer.

   How deep are the water samples taken? There is no set depth they are taken from, it depends on how the particular well is completed. It's like comparing apples and oranges in terms of well depths. Some wells are all the way through the entire saturated thickness of the aquifer; some may be just in the upper portion.

   Is the Ogalalla receiving that much recharge that it is improving water quality? There is only about ½ inch of precipitation a year that makes it back into the aquifer, but it is better water quality than was going in with the brine. Another thing to think about is, as you pump that water from areas where the contamination was occurring, it is going to start moving

toward the production wells and add some dilution to the aquifer.

With a 65 foot decline in some of the border areas, how much water is left? 100 to150 feet in some areas, 150-200 feet of saturated thickness in others. There is some water there, but it is being mined out at a fairly quick rate.

Is this 150 feet from ground level to the bottom of the water? This measurement is from the top of the water to the redbeds.

How far will water flow toward one well? Will it draw water five or ten miles away? Not in this type of aquifer. You're not able to measure draw down at that distance of a single well. If draw down is heavy on the Texas border, how far in will it go? It's difficult to say. Pumping creates cones of depression, which all overlap and create a domino effect, so it is difficult to determine what is the result of Texas pumping. Obviously, along the NM-TX border there is an impact from their pumping, but probably no more than five miles into New Mexico, but that is just a guess since there are so many wells pumping in New Mexico also.

4. How about pursuing gene technology for improving water efficiency in crops? This is something that will have a great impact on the future, but LH is trying to get Lea County to work with the available technology that is capable of being implemented now.

5. No questions.

6. How deep is the water underneath the Ogalalla? Depending on where you are, it is about 600 feet down or so. But the main problem is these wells don't generally yield a lot of water, maybe tens of gallons a minute. There are rare reports of hundreds of gallons a minute. So this might not be the answer for agriculture. It might be a help, but not a total solution.

   Is the fact that El Paso is taking cleaned up waste water and returning it to the aquifer for future use making salt water rise in Mexico? The effects depend on how the aquifers are set up. If fresh water is put in, does it push the salt water aside? This would not happen here because our water table is dropping down, and we're basically replacing water.

   Can oilfield water be treated and put back in? Yes.

7. No questions.

8. What is the range of error for irrigated agriculture water use since wells aren't monitored? Probably + or -35 to 40%. The State calculates it in different ways. They look at delivery requirements, precipitation for a period of record and come up with an estimated number for that year. This is done in five year increments. Does it matter how far off they are? The fact is the water table is dropping, and something must be done now to start saving water. Short of some people volunteering to meter their wells, there won't be any firm numbers. The biggest reasons people don't meter their wells are 1) they don't have to; and 2) the State Engineer's rule has always been "you use it or you lose it." Either you put all your water to

beneficial use or, in theory, they could say that you are subject to forfeiture or abandonment In actuality, they must issue a letter saying you've got four years to put this water to beneficial use.

How much water returns to the ground? One third acre foot returns to the ground for every acre foot used.

What is the efficiency of the old sprinkler system? 35 to 40% efficient. The efficiency of the drip system is in the high 90s, close to 100%.

Can the federal government require LEPA systems? There is a program going on right now with the Farm Coop here in which the federal government give matching funds (spend $1000, they will give $1000) to change to the new system.

What is the water level at the state line? South of Hobbs along the border, there is less than 50 feet of saturated thickness; immediately east of Hobbs along the border, 100 feet; and just a few spots with a little over 100 feet of saturated thickness.
Mr. Holmberg noted that High Plains Underground Water District did a study on air injection to force water water levels to rise. There are issues with this practice, such as how it will affect the recharge. They also looked at many of the things that we have discussed tonight, including alternative water sources, transporting water, different pipelines.

He then introduced Mary Helen Follingstad of the ISC and asked her if we are asking the right questions or if she feels that there is anything we have missed. She replied that she is encouraged that Dan Boivin mentioned he idea of sustaining water. She felt that the atmosphere was more open and our group was not afraid to ask the hard questions.

Mr. Holmberg then invited any one who may have questions or concerns about the water plan to address them to their LCWUA representatives or him at the courthouse.

APPENDIX B

Minutes of Steering Committee Meetings

LEA COUNTY WATER USERS ASSOCIATION

MINUTES OF STEERING COMMITTEE MEETING

NOVEMBER 19, 1998, 10:30 AM

Note: This meeting was conducted with the interim steering committee composed of Mr Don Bratton, Mr Scott Bussell and Mr Bob Carter, pending selection of the final committee membership.

1 See attached attenders list

2 Mr Roughton gave an overview of activities to date. The Request for Proposals for Funding from the Interstate Stream Commission (ISC) has been responded to as a combined effort of Leedshill Herkenhoff (LH) and Mr Holmberg's office. LH will respond to a request for applications for funding from the Bureau of Reclamation. $25,000 will be applied for in conjunction with other non-federal funding (matching funds).

3 An outline of the proposed report was passed out for review. The outline is directly from the ISC produced Regional Water Planning Handbook (Handbook) with the addition of a discussion of the recommended plan. The steering committee had no changes to the outline.

4 Data gathering procedures were discussed. Much of the required data must come from association members. Discussed the needs for the plan document and the fact that just gathering data is not sufficient to allow production of a comprehensive plan. All interested parties/stakeholders must be involved and must both understand and agree to the final plan. The method of requesting data was discussed and it was agreed that all correspondence will flow through Mr Goff as the Association Chairman, addressed to Mr Holmberg's office. The flow of information from the association to LH will be through Mr Roughton.

5 The project schedule will be updated to reflect the contract starting date (October 1, 998). A status report and updated schedule (if necessary) will be included in the minutes of each monthly steering committee meeting.

6 The next monthly meeting format was discussed. LH will produce a draft press release for distribution by association members in order to attract as many participants as possible to the next meeting. The format of the meeting will be to provide an overview of

LEA COUNTY WATER USERS ASSN.

STEERING COMMITTEE MEETING 11-19-98

NAME	AFFILIATION	PHONE/FAX
DEB ROUGHTON	LEEDSHILL HERKENHOFF	247-0294/242-48
John Shomaker	Shomaker & Assoc.	345-3407/345-992
DAN BOIVIN	LEEDSHILL HERK	247-0294/242-48
Don Bratton	City of Hobbs	505/393-2937
Scott Bussell	John West / City of Hobbs	393-3117 ex
Bob CARTER	City of Lovington	396-2894

7 Mr. Hemann submitted an article from the magazine Beef fated January, 1999 regarding efforts to conserve water in the Ogallala Aquifer. Mr. Roughton will copy the article to all Steering Committee members and return to original to Mr. Hemann.

8 A discussion was held regarding the project schedule. As the gathering of data is a slow process Mr. Roughton will discuss the possibility of extending Phase I of the project into Phase II, making the work of both phases both due at the same time to allow more data gathering time. The project schedule will be reviewed along with a status report at each monthly Steering Committee meeting.

9 The next monthly meeting was discussed. We will continue to hold meetings on the third Tuesday of each month. The next meeting (March 16, 1999) will be held at 6:00 PM in the Lea County Cultural Center. Subsequent meetings may be moved to later in the evening to allow use of daylight hours by Steering Committee members.

Respectfully submitted,

ROBERT E. ROUGHTON, P.E.
Project Manager
Leedshill Herkenhoff, Inc.

cc: Buster Goff, Chairman - c/o County Managers Office
Dennis Holmberg, County Manager
Roger Perry, JSAI

including assessing potential sources of groundwater contamination from data at the OCD, TNRCC, and NMED. Considered using data request form for domestic users and arial photographs for locating domestic and agricultural wells as well as oil and gas activities that may impact the groundwater.

7 The association members stated their concern and interest in the legal issues associated with the regional water plan. They hope to raise some of their questions and concerns to a member of the team working on the legal aspects of this project.

8 The association members agreed that the extension of Phase I of the project into Phase II is a good idea to allow for responses to the data request forms and more data gathering.

9 Mr. Nims agreed to provide copies of the Regional Water Planning Handbook and related information by the next Steering Committee Meeting in order to give association members a better idea of what type of data is important for this project.

10 The next monthly meeting was discussed. The next meeting (April 20, 1999) will be held at 7:00 PM instead of 6:00 PM to allow use of daylight hours by the Steering Committee members. It will still be located in the Lea County Cultural Center and Mr. Nims agreed to notify the County of the time change.

Respectfully submitted,

S.

Joshua S. Nims
Staff Hydrogeologist
John Shomaker & Associates, Inc.

cc: Buster Goff, Chairman – c/o County Managers Office
Dennis Holmberg, County Manager
Robert Roughton, LH

98064 - 01-0400

LEA COUNTY WATER USERS ASSOCIATION
MINUTES OF STEERING COMMITTEE MEETING

MAY 26, 1999, 7:00 PM

1 In attendance:

Ernie Wheeler - Municipal
Leon Hemann - Farming/Ranching
Mark Alexander - Farming/Ranching
Bob Roughton - Leedshill Herkenhoff

The meeting was held following the LCWUA Board meeting.

2 Bob Roughton gave an overview of activities to date (see attached status report). Information is coming in slowly. Board directed LH to produce a revised letter requesting Farming/Ranching well data for Board review and third mailout. As of this meeting about 20% of all mailouts have been returned.

3 Ernie Wheeler continues his efforts to gain access to the remaining municipal users information.

4 Consultant team continues to receive conservation issues data as it pertains to regional water plans. Reviewed the SEO guidelines for conservation, which is not in the form a rules at this time, only guidelines.

6. Reviewed results of preliminary mapping (hand entered information on top of the GIS base map).

5 The next Steering Committee meeting is scheduled for June 15, 1999 at the Lea County Cultural Center in Hobbs at 7:00 PM. LH will work with Monica (County Manager's Office) on notifying all Steering Committee Members.

6 The meeting was adjourned at 8:30 PM.

Respectfully Submitted,

ROBERT E. ROUGHTON, P.E.
Project Manager
Leedshill Herkenhoff, Inc.

cc: Buster Goff, Chairman, LCWUA
Dennis Holmberg, County Manager
Roger Perry, JSAI
LCWUA Steering Committee Members

98064 - 01-0400

LEA COUNTY WATER USERS ASSOCIATION
MINUTES OF STEERING COMMITTEE MEETING

JULY 20, 1999, 7:00 PM

1 In attendance:

Leon Hemann - Farming/Ranching
Mark Alexander - Farming/Ranching
Bob Roughton - Leedshill Herkenhoff
Jerry May - Leedshill Herkenhoff
Scott Bussell - Lea County Water Users Association

2. Bob Roughton gave an overview of activities to date (see attached status report). The majority of background and hydrogeologic information has been gathered including a significant amount of information from the State Engineer Office in Roswell. Individual well data from agricultural users continues to come in slowly. LH has produced the revised letter requesting Farming/Ranching well data and is in the process of mailing it out. As of this meeting about 25% of all mailouts have been returned (150 returned filled out, an additional 40 returned as undeliverable). Discussed additional data needs on water quality. Project team will contact municipalities directly for any information they have. Discussed various sections of the report and the status of report development to date. Scott Bussell requested that the project team further expedite the project schedule to have a reviewed draft ready by the legislative session in 2000. LH will discuss with the team and submit a revised schedule reflecting our best ability.

3 The Steering Committee suggested not meeting in August due to mid August work loads for everyone. The next meeting is scheduled for September 21, 1999 at the Lea County Events Center in Hobbs at 7:00 PM. This will be an important meeting as the team will have preliminary report sections and information to be reviewed and discussed. LH will work with Monica Russell (County Manager's Office) on notifying all Steering Committee Members.

4 The meeting was adjourned at 9:00 PM.

Respectfully Submitted,

ROBERT E. ROUGHTON, P.E.
Project Manager
Leedshill Herkenhoff, Inc.

cc: Buster Goff, Chairman, LCWUA
Dennis Holmberg, County Manager
Roger Perry, JSAI
Galen Buller, M&A
LCWUA Steering Committee Members

98064 - 01-0400

LEA COUNTY WATER USERS ASSOCIATION
MINUTES OF STEERING COMMITTEE MEETING

September 21, 1999, 7:00 PM

1 In attendance:

Leon Hemann - Farming/Ranching
Mark Alexander - Farming/Ranching
Ernie Wheeler - Municipalities
John Benard - Public Utilities
Cleve Griffin - Domestic Users
Jerry May - Leedshill Herkenhoff

2 Steering Committee members, with the exception of Mark Alexander, had received the Preliminary Draft Report of the Lea County 40 Year Regional Water Plan the previous Friday. Members stated that they did not have enough time to fully review the document and suggested another meeting (see item number 4 below) should be held.

3 Jerry May, Leedshill-Herkenhoff, discussed the contents of the Preliminary Draft Report, in particular the future water use projections and conservation measures. Comments from Steering Committee members generally consisted of questions and suggestions regarding proposed future data collection and conservation measures. Future aquifer drawdown predictions by the NMSEO were also discussed.

4 The Steering Committee suggested that another meeting or teleconference be set up in two weeks in order to further discuss the Preliminary Draft Report. Leedshill-Herkenhoff will contact the Lea County Water Users Association regarding the additional meeting. The next monthly meeting is scheduled for October 19, 1999 at the Lea County Events Center in Hobbs at 7:00 PM.

5 The meeting was adjourned at 8:30 PM.

APPENDIX C

Public Involvement Data

LEA COUNTY BOARD OF COMMISSIONERS
RESOLUTION NO. 00-OCT-029R

A RESOLUTION APPROVING THE FORTY YEAR WATER PLAN AND SUPPORTING THE OBJECTIVES OF THE PLAN.

WHEREAS, Lea County Water Users Association was formed by a joint powers agreement approved by the NM Department of Finance and Administration on September 18, 1997.

WHEREAS, Lea County is a member of the Lea County Water Users Association and is represented on the Board of the Lea County Water Users Association.

WHEREAS, through local government appointments, all sectors of Lea County are represented on the Board. This includes, but is not limited to, oil and gas, farming and ranching, dairy industry, soil and water conservation district, as well as city and county governments.

WHEREAS, the Lea County Water Users Association contracted with Leedshill-Herkenhoff, Inc. to prepare a forty year water plan under the guidelines of the New Mexico Interstate Stream Commission template on September 24, 1998.

WHEREAS, the water plan is now ready for submission to the Interstate Stream Commission for acceptance.

NOW, THEREFORE BE IT RESOLVED by the Lea County Board of Commissioners that the forty year water plan is approved and that this Board supports the initiatives and objectives of that plan.

PASSED, APPROVED AND ADOPTED this _____ day of _____, 2000.

LEA COUNTY BOARD OF COMMISSIONERS

Ken Batson, Chairman

Ross Black, Vice-Chairman

W.H. Brininstool, Member

Zeak Williams, Member

Harry Teague, Member

ATTEST: Lea County Clerk
Pat Chappelle

By: Deputy

LEA COUNTY WATER USERS ASSOCIATION
RESOLUTION

A RESOLUTION APPROVING THE FORTY YEAR WATER PLAN AND SUPPORTING THE OBJECTIVES OF THE PLAN.

WHEREAS, Lea County Water Users Association was formed by a joint powers agreement approved by the NM Department of Finance and Administration on September 18, 1997.

WHEREAS, the City of Eunice is a member of the Lea County Water Users Association and is represented on the Board of the Lea County Water Users Association.

WHEREAS, through local government appointments, all sectors of the City of Eunice are represented on the Board. This includes, but is not limited to, oil and gas, farming and ranching, dairy industry, soil and water conservation district, as well as city and county governments.

WHEREAS, the Lea County Water Users Association contracted with Leedshill-Herkenhoff, Inc. to prepare a forty year water plan under the guidelines of the New Mexico Interstate Stream Commission template on September 24, 1998.

WHEREAS, the water plan is now ready for submission to the Interstate Stream Commission for acceptance.

NOW, THEREFORE BE IT RESOLVED by the Eunice City Council Members that the forty year water plan is approved and that this Board supports the initiatives and objectives of that plan.

PASSED, APPROVED AND ADOPTED this 26 day of October, 2000.

Lea County Water Users Association Members

Buster Goff, Chairman

Gary Fonay, Member

E. A. Woodell, Jr., Member

Jim Britton, Member

Scott Bussell, Member

Becky Jo Doom, Member

Bob Carter, Member

John Norris, Member

Betty Rickman, Member

Bill Brininstool, Member

J. W. Neal, Member

Steve Pearce, Member

ATTEST: County Clerk
Pat Chappelle

By:

PASSED, APPROVED AND ADOPTED this 26th day of October, 2000.

Eunice City Council Members

Gailand L. Overton

Gailand L. Overton, Mayor

JoAnn Davis

JoAnn Davis, Member

E. A. Woodell

E. A. Woodell, Jr., Member

Paul Najera

Paul Najera, Member

Roger Holland

Roger Holland, Member

Natalie Meyers, Member

Lloyd Simpson

Lloyd Simpson, Member

Maurice Gardner

Maurice Gardner, Member

Billy Thrash

Billy Thrash, Member

ATTEST: City Clerk
JoAnn Jones

JoAnn Jones

By:

PASSED, ADOPTED AND APPROVED this 26th day of October, 2000.

HOBBS CITY COMMISSION

JIMMY E. WOODFIN, Mayor

GARY FONAY, Commissioner

MARK BAWCUM, Commissioner

HECTOR RAMIREZ, Commissioner

JOE CALDERON, Commissioner

ATTEST:

JAN FLETCHER, City Clerk

TATUM TOWN COUNCIL
RESOLUTION NO. 104-00-01

A RESOLUTION APPROVING THE FORTY YEAR WATER PLAN AND SUPPORTING THE OBJECTIVES OF THE PLAN.

WHEREAS, Lea County Water Users Association was formed by a joint powers agreement approved by the NM Department of Finance and Administration on September 18, 1997.

WHEREAS, the Town of Tatum is a member of the Lea County Water Users Association and is represented on the Board of the Lea County Water Users Association.

WHEREAS, through local government appointments, all sectors of the Town of Tatum are represented on the Board. This includes, but is not limited to, oil and gas, farming and ranching, dairy industry, soil and water conservation district, as well as city and county governments.

WHEREAS, the Lea County Water Users Association contracted with Leedshill-Herkenhoff, Inc. to prepare a forty year water plan under the guidelines of the New Mexico Interstate Stream Commission template on September 24, 1998.

WHEREAS, the water plan is now ready for submission to the Interstate Stream Commission for acceptance.

NOW, THEREFORE BE IT RESOLVED by the Tatum Town Council that the forty year water plan is approved and that this Board supports the initiatives and objectives of that plan.

PASSED, APPROVED AND ADOPTED this 26 day of October, 2000.

TATUM TOWN COUNCIL

Betty Rickman

Betty Rickman, Mayor

Judy Lambert

Judy Lambert, Member

Ronald Glover

Ronald Glover, Member

Robert Singleton, Member

Rue Mauk

Rue Mauk, Member

ATTEST: City Clerk
Deanne Gruben

Deanne Gruben

By:

JAL CITY COUNCIL
RESOLUTION NO. 001026-1

A RESOLUTION APPROVING THE FORTY YEAR WATER PLAN AND SUPPORTING THE OBJECTIVES OF THE PLAN.

WHEREAS, Lea County Water Users Association was formed by a joint powers agreement approved by the NM Department of Finance and Administration on September 18, 1997.

WHEREAS, the City of Jal is a member of the Lea County Water Users Association and is represented on the Board of the Lea County Water Users Association.

WHEREAS, through local government appointments, all sectors of the City of Jal are represented on the Board. This includes, but is not limited to, oil and gas, farming and ranching, dairy industry, soil and water conservation district, as well as city and county governments.

WHEREAS, the Lea County Water Users Association contracted with Leedshill-Herkenhoff, Inc. to prepare a forty year water plan under the guidelines of the New Mexico Interstate Stream Commission template on September 24, 1998.

WHEREAS, the water plan is now ready for submission to the Interstate Stream Commission for acceptance.

NOW, THEREFORE BE IT RESOLVED by the Jal City Council that the forty year water plan is approved and that this Board supports the initiatives and objectives of that plan.

PASSED, APPROVED AND ADOPTED this 26th day of October, 2000.

JAL CITY COUNCIL

Mary C. "Claydean" Elkins, Mayor

Darrold Stephenson

Darrold Stephenson, Member

Theresa Herrera

Theresa Herrera, Member

Curt Pittman, Mayor Pro-Tem

John Allen, Member

Roberta Barnes

Roberta Barnes, Member

Rick Little, Member

Dewayne Jennings

Dewayne Jennings, Member

Sydney Kennedy

Sydney Kennedy, Member

ATTEST: City Clerk
Skeet Posey

Skeet Posey

By:

MR. ROGER HOLLAND: Here.
MRS. MONICA RUSSELL: Natalie Meyers?
(No response).
MRS. MONICA RUSSELL: Lloyd Simpson?
MR. LLOYD SIMPSON: Here.
MRS. MONICA RUSSELL: Maurice Gardner.
MR. MAURICE GARDNER: Here.
MRS. MONICA RUSSELL: Billy Thrash.
MR. BILLY THRASH: Here.
MRS. MONICA RUSSELL: Representing Hobbs, Jimmy Woodfin.
MR. JIMMY WOODFIN: Here.
MRS. MONICA RUSSELL: Gary Fonay.
MR. GARY FONAY: Here.
MRS. MONICA RUSSELL: Mark Bawcum?
MR. MARK BAWCUM: Here.
MRS. MONICA RUSSELL: Hector Ramirez.
MR. HECTOR RAMIREZ: Here.
MRS. MONICA RUSSELL: Joe Calderon.
MR. JOE CALDERON: Here.
MRS. MONICA RUSSELL: Representing Jal, Mary C. Elkins.
(No response).
MRS. MONICA RUSSELL: Darrold Stephenson.

MR. DARROLD STEPHENSON: Here.
MRS. MONICA RUSSELL: Theresa Herrera?
MRS. THERESA HERRERA: Here.
MRS. MONICA RUSSELL: Curt Pittman.
(No Response).
MRS. MONICA RUSSELL: John Allen.
(No Response).
MRS. MONICA RUSSELL: Roberta Barnes.
MRS. ROBERTA BARNES: Here.
MRS. MONICA RUSSELL: Rick Little.
(No Response).
MRS. MONICA RUSSELL: Dewayne Jennings.
MR. DEWAYNE JENNINGS: Here.
MRS. MONICA RUSSELL: And Sydney Kennedy.
MRS. SYDNEY KENNEDY: Here.
MRS. MONICA RUSSELL: Representing Lovington, Troy Harris.
MR. TROY HARRIS: Here.
MRS. MONICA RUSSELL: Pat Wise.
MR. PAT WISE: Here.
MRS. MONICA RUSSELL: Anna Trujillo.
MRS. ANNA TRUJILLO: Here.
MRS. MONICA RUSSELL: Bill Shipp.

(No Response).
MRS. MONICA RUSSELL: Dixie Drummond.
(No Response).
MRS. MONICA RUSSELL: Representing Tatum. Betty Rickman.
MRS. BETTY RICKMAN: Here.
MRS. MONICA RUSSELL: Judy Lambert.
MRS. JUDY LAMBERT: Here.
MRS. MONICA RUSSELL: Ronald Glover.
MR. RONALD GLOVER: Here.
MRS. MONICA RUSSELL: Robert Singleton.
(No Response)
MRS. MONICA RUSSELL: And Rue Mauk.
MR. RUE MAUK: Here.
MRS. MONICA RUSSELL: And for Lea County, Ken Batson.
MR. KEN BATSON: Here.
MRS. MONICA RUSSELL: Ross Black.
MR. ROSS BLACK: Here.
MRS. MONICA RUSSELL: Bill Brininstool.
MR. BILL Brininstool: Here.
MRS. MONICA RUSSELL: Zeak Williams?
(No response).

MRS. MONICA RUSSELL: And Harry Teague.
MR. HARRY TEAGUE: Here.
MR. DENNIS HOLMBERG: Mr. Chairman, we have a quorum of all city commissions present.
MR. BUSTER GOFF:Each commission has a quorum. Could we all stand for the pledge, please?
(Pledge recited).
MR. BUSTER GOFF: Our first item would be the presentation of the 40-year plan by Leedshill-Herkenhoff.
MR. DENNIS HOLMBERG: You can use the mike there.
MR. ROGER PEERY: Okay. I'm Roger Peery. I'm with John Shomaker and Associates. We have worked with Leedshill-Herkenhoffon on this 40 year water plan. And what I'm going to do tonight is just give a brief presentation of the plan, and the involvement from various people we had during the course of the plan. I'll focus primarily on Jal, and the Lea County underground water basin, and some of the things that have happened, and those that have not happened, due to water pumping over time. Also, a little bit of summary about water use in terms of total amount of water

9

diverted, and projections for the next 40 years at the 20-40. Also here tonight is Charlie Leader with Leedshill-Herkenhoff.

What we did as part of this study is look at all the different underground water basins within Lea County, and starting at the top of this diagram, this clear area up here is the undeclared basin. That's everything up North where the Ogallala ends outside of the Caprock area. And this central portion is the Lea County underground water basin, which consists of the Ogallala Aquifer, and there's a little section of the Roswell Basin in here, which we did not consider because it's such a small portion. There's really not much water to develop or use in that area. And we have the Capitan Aquifer in here, and the Carlsbad Aquifer down at the very bottom. And this little small piece right here is the Jal underground aquifer. I'm going to start off with Jal. There's not a lot to say about the Jal Aquifer in terms of it hasn't been impacted by the pumping that they have done there for their municipal users. There's been very little decline over time. The aquifer essentially is a little bowl of alluvium of sand and gravel material. It

10

extends to about a depth of 750 feet below the surface at its maximum, and it's really only used by Jal. It does extend into the Texas side, so it is subject to some development there if anybody had the opportunity to use that aquifer. This is the geologic cross section which is essentially just a slice of the earth, so if you slice the earth down and stood beside it and looked at it, this is, you know, just a diagram of what it would look like. And what you have is the red beds that surround this little alluvium -- little ovial aquifer there. And this blue line represents the water table. So you have got up to about 750 feet of saturated sediments there, and as I said, the pumping over time hasn't affected the water draw downs hardly at all. There have been some water quality problems associated with naturally occurring fluoride as I recall with concentrations being near the MCL in some cases, which is the maximum contaminant level allowed by the Environmental Protection Agency. This next diagram is again a cross section of what you see in the Ogallala aquifer.

MR. DENNIS HOLMBERG: Roger, can you move that up a little bit higher?

11

MR. ROGER PEERY: Sure.

MR. DENNIS HOLMBERG: So that the people in the back can see the things?

MR. ROGER PEERY: Yeah. It's pretty thin writing there. It's kind of a white cross section. The Ogallala Aquifer again consists primarily of sand, silts and gravels. Very permeable material. It yields a lot of water to wells as you know. And what it is, is this little thin piece of aquifer up here, it's underlaid by 1,000 or more feet of red beds in some places, so you are working off of a pretty limited supply of water in terms of actual saturated thickness. The saturated thickness at its maximum is a little over 200 feet in some places, and as you get out towards the margins of the aquifer, it essentially pinches out to zero along Mescalaro Ridge or what's known as the Caprock. The ground water development in the Lea County underground water basin or the Ogallala essentially started in the 1950's. Prior to that it was maybe 500 acres feet a year. Pretty limited development, but in the 1950's with the advent of the drilling technology and pumps, ground water development really took off and hit a peak of about 170,000 acre feet per

12

year withdrawals in about 19 -- I think it was 1957. And all through the 50's it was pumped pretty high.

This area right here, I'm following with my pencil shows the extent of the Ogallala Aquifer where it's essentially zero saturated thickness of 70's. And these red lines indicate draw downs that occurred in the aquifer -- let me move this up so you can see it -- during the period from 1950 to 1960. So what we have is we have draw downs of 20 feet in this area. This is Hobbs down here for reference. Lovington. Draw down to 25 feet East of Hobbs, or Lovington rather. Draw down to 10 to 25 feet North of Hobbs. So the early development is starting to have its impact on the aquifer quite readily, quite quickly. And these draw downs, if continued over time, what I'm going to show you the next couple of pictures is just two different time periods where we're going to compare the draw downs in the aquifer, or look at how they have continued. Now this is the period from 1968 to 1981. Looking at the changes in the aquifer over that time. And what we're looking at here is accumulative effects. We have got another 10 feet

13

of draw down in this area starting from Hobbs, going off to the North, and then up to 20 feet along the New Mexico-Texas Border. And those are in addition to the draw downs that you saw over that 1950 to '60 period. So in some of these areas we are now approaching, you know, 40 to 50 feet of draw down in the aquifer. As you can see, the contour was extended to open it to the -- is in the Texas side, and that's because of pumping in Texas is also drawing down the aquifer in that area as well. And draw downs into New Mexico from pumping in Texas are projected to come in a couple of miles. That was primarily work done by the State engineer's office in the model that they had developed in 1999. So that it is having some impact in that area. And this is again more draw downs over the period from 1981 to 1998. The area we saw last time that was starting to get bigger along the New Mexico-Texas Border, again we have another 10 to 25 feet of draw down there. A little bit of recovery in the aquifer to the West of Lovington, and to the North of them a little bit. A little bit of recharge in through there. Again we have more -- more draw down of 10 to 20 feet. So now we are looking at accumulative draw

14

downs since 1950 of upwards to probably 65 feet or more in some areas. So we are continuing to draw down the aquifer, in addition to the impacts that we're seeing from pumping in Texas. Water quality declined a little bit over time in terms of total dissolved solids. Once the state engineer, and the Oil -- the OCD changed the procedure where it couldn't discharge brine into unlined pits, basically the water quality has improved since that time and gotten back to what it was historically.

This is a pie chart that just shows basically the users of water and what the total diversions were during 1995. As you can see, irrigated agriculture accounts for the largest use at 131,000 acre feet. And as you recall, I said back in the late 50's it was a maximum of about 170,000 acre feet. The next largest user is the public water system at 16,000 acre feet. And then the mining industry at a little over 11,000 acre feet. The total diversions over that period of time were about 175,000 acre feet. What the State engineer did with their model was to predict a 40-year period up to 20-40 assuming pumping was going to continue the same at essentially today's rate,

15

150 to 170,000 acre feet per year in the Ogallala Aquifer. We made some projections for water use out to 20-40. There's been a lot of new development going on with needing to supply milk to the cheese plant, and if we start to assume that a lot of the land that's in the CRP right now comes back out of that program, and goes into production, instead of having to haul in feed from outside the county, water use is actually projected to more than double by 20-40. And as I said at some of the public meetings that we had early on, the good news is there's actually the paper water rights to provide that water, but the reality is we don't have a physical wet water to provide that much water out of 20-40. One other thing that was brought up at some of the public meetings and some of the meetings we had with the Water Users Association was we know Texas is pumping more water all the time. So therefore, they have increased the gradient or how steep the water table is from New Mexico into Texas. So the natural thought was, well, if the water table is steeper, it's moving faster, and therefore, Texas is sucking our water over at a faster rate. And to kind of show you what I mean, as you look at

16

the -- this is just kind of a schematic to show you. It's not the real gradient or anything, but in 1950 we had more or less a platter aquifer at that time before development started real hard in New Mexico and in Texas. And in 1998 the water table moving from New Mexico into Texas has steepened. You can kind of think of it as a pipe that was laying flat, and now it's on angle a little bit. So you say, yeah. We are definitely getting a lot of our water taken away from us, but what really happens is you have less water in the aquifer because of all of these draw downs we have had. We are now missing this upper part of the aquifer. There's, even though the pipe, if you will, is tilted a little bit more steeply. The water is moving more steeply there, the pipe isn't as full. It can't carry as much water. So we are actually losing less water to Texas every year than we did predevelopment. And this shows my calculations as to how much water has gone from New Mexico into Texas. In 1968 about 59,000 acre feet per year were naturally going across. Decreased to about 46,000 acre feet in 1981, and then came up a little bit, because there was some changes in the amount of people that were pumping

every year to about 49,000 acre feet, but the general trend is still, they are getting less water over there, because there's just less water to go over there. And with that, I would like to conclude with my presentation, and certainly be willing to take any questions you might have.

MR. BUSTER GOFF: Is there any questions from each -- any of the commission members?

MR. DENNIS HOLMBERG: Mr. Chairman, I think there may be some questions then after Mr. Leader with Leadsil finishes his presentation.

MR. ROGER PEERY: Charlie?

CHARLIE LEADER: I think the only thing I would like to add, following Mr. Peery is what we have in Chapter 8 is the framework, and it's a flexible framework for plans to try and maximize the water resources that are available. It combines conservation. It combines management alternatives. It combines ways to make the best use of the aquifers that are there, in terms of what might be further developed, and we present a possible time table for implementing the various alternatives that are there, and this is there for your consideration. We've tried as best we could

to leave this as a flexible plan, because at this point in time, we need the buy in from the representative governments that are here tonight, because as said in our work groups, the Water Users Association is not in a position to buy any of the entities here, to make a commitment and that's why you all are here tonight, to give us your buy in on this plan. And one of the ideas is that over time we will work out an implementation strategy that is suitable, and combines the elements that are described in Chapter 8. And let's see. That's really about all I have to say. If there are some specific questions on some of the recommendations that we have made, I would be happy to take them.

MR. DENNIS HOLMBERG: Mr. --

MR. BUSTER GOFF: Any questions?

MR. DENNIS HOLMBERG: Mr. Chairman?

MR. BUSTER GOFF: Yes.

MR. DENNIS HOLMBERG: I might suggest if you could go into some of the -- either you or maybe Len together go into some of those recommendations for the commission members to understand how that -- why those recommendations were made.

MR. LEN STOKES: Do you want me to do that, Charlie?

MR. DENNIS HOLMBERG: I don't know which one of you feels appropriate in doing that. I think maybe before Len starts, for the commissioners to know, through this process we had our first meeting, we had approx -- what, Buster, what did we have? 250, 300 people at the original meeting. We broke into groups representing the various aspects of water users. Oil and gas; mining, and utilities, municipal, and in the private sector, as well. And had them review what some of their needs, and concerns were, specifically supply and demand at the current time, and then kind of brought those issues together so we would see what the supply and demand is now, and to project out what was needed in the future, and that's where Chapter 8 kind of comes in to then look at where we are at with our supply, where we are at with the demand we have, and how we can better make this aquifer last longer. And through that process, we had, I think -- Len, was it three other public meetings in various areas, or was it two? I can't -- but anyway, we had two or three other public meetings

in various areas of the county to solicit participation in this, as well. And our consultant for the Water Users Association has been Len Stokes, and he has kind of been our voice when we had certain concerns. Len, would you like to go from there?

MR. LEN STOKES: Thank you, Dennis. My name is Len Stokes. I have worked for your Water Users Association for a little over a year. One of my jobs was to kind of get this, and tie it in to where it fit the area, and it still met the template dictated by the Interstate Stream Commission. One of the things that we found in looking at the template, and what was wanted was alternatives, and those alternatives if you look through here range everything from low flow toilets to desalinization or importing of water. So what we did was not just jump in and say, we need to do A,B,C,D,E, because I don't think anybody was ready to start doing that at this point in time. So we tried to be a little more flexible with the implementation schedule, and I think if you look, and it's on page 824 of your water plan is where the sample and implementation schedule is. It's in Table 8.3.

25

the next year or so, you develop your management strategy and then over the next -- not just three years, but 40 years you implement that, and you do what you can to make your basins sustainable and your fresh water supply sustainable for growth and the benefit of the county. Dennis, did that handle that?

MR. DENNIS HOLMBERG: I think that kind of covers that.

MR. BUSTER GOFF: Any questions? Concerns?

MR. DENNIS HOLMBERG: Mr. Chair --

MR. BUSTER GOFF: Yes. We have a question.

MR. PAUL NAJERA: Well, what I was going to say was, I know that around Buckeye, there's a lot of wells that's pumping fresh water to the mines. And you know, eventually them wells are going to deplete.

MR. LEN STOKES: Uh-huh.

MR. PAUL NAJERA: And that might be one thing that we need to start looking at, and maybe we could use other different water, other than fresh water for the mines.

MR. LEN STOKES: That -- let me find

26

it, but that is one of the alternatives that's listed in Chapter 8 is to start using nonpotable water. Either brackish or brine water.

MR. PAUL NAJERA: Yeah.

MR. LEN STOKES: Not only for the mines, but different parts of the petroleum industry where it can be used is well instead of using fresh water. So that is part of the alternative.

MR. BUSTER GOFF: Any other questions? A good question.

MR. W.H. GRAHAM: Len, if you will, refresh us, looking ahead a little bit with the report assuming that it's approved, it comes from the local organization, that it goes through the Interstate Stream Commission for their review and approval. Is that correct? And how is the State engineer, the state engineer's office involved in any way, and what is the result, what benefit, what are we driving for by getting an approval of this? What are we trying to put in place in terms of benefits to the local group and the county?

MR. LEN STOKES: Okay. Your statement was basically correct. There's one difference. It does not go to the Interstate Stream Commission

27

for approval. It goes to the Interstate Stream Commission for acceptance. And acceptance is based upon us following the template. Now one thing, I don't know if everyone knows here, when the grants were handed out in the State of New Mexico to fund these 40 year water plans we didn't get any of it. And so you all funded this water plan. I know that that was costly, but I will tell you one thing that is a very great benefit I feel is that this is your water plan. This water plan wasn't dictated to you on how it would be done. The template was followed. I see no reason that this plan will not be accepted. On to the next part of the question. The purpose of the 40 year water plan is to protect the water in this region. And the 40 year water plan concept was developed in the 1980's after the City of El Paso tried to go in and appropriate waters in New Mexico for use in El Paso, Texas. And when the Supreme Court threw out the, just the straight barring of exporting of water during the commerce clause, one of the issues that was brought up was, and the way to protect this water was to show that this water was going to be needed in New Mexico. Well, that's -- that was the inception of the 40

28

year water plan. And that's what this 40 year water plan does. If you look at the water plan and the predictions, those -- those are possible scenarios that show that the water will be needed here, and that will protect our water from being appropriated, for example, if the City of Lubbock, and I'm not saying -- there has never been any -- that's probably a bad analogy, because they have never made an attempt or question coming in here and drilling wells, but let's just say that if a large city in Texas wanted to drill wells here, this water plan would protect our water from that. It would also protect our water from an appropriation going over to the Pecos or anywhere out of this basin, because what we have shown in the water plan is that there is a need for this water in Lea County. The State engineer does not -- really doesn't have anything to do with this. This is all part of the Interstate Stream Commission. The office is joint, but they are really two separate divisions. The State engineer serves as the secretary of the Interstate Stream Commission. This plan has been developed with the Interstate Stream Commission. They have been to the last two or three meetings, I believe. They

29

have taken an active role. We have talked to them -- here again, you get to some of these different alternatives back there. They wanted originally set in stone we would do this, in this year and this the next year, and we have met with them, and dealt with them and shown them that that's not just possible. Plus that's not required in the 40-year plan. So I think that we're in good shape in acceptance, and I think that the plan that you have here will protect the water in the Lea Basin. I think that the management alternatives that can come out of this plan are what are really going to benefit the county as a whole in the future. Did that answer it? Is there?

MR. W.H. GRAHAM: That's great.

MR. LEN STOKES: Is that?

MR. W.H. GRAHAM: Yes. Thank you.

MR. LEN STOKES: Yes, sir.

MR. BUSTER GOFF: Any other questions?

MAN'S VOICE: Mr. Goff?

MR. BUSTER GOFF: Yes.

MR. BILL BRININSTOOL: Bill Brininstool. Len, are they going to honor our commitment that we are trying to make 55,000 acres in Lea County? Are they going to honor that, or

30

just put it in limbo, or what?

MR. LEN STOKES: Mr. Brininstool, I don't know. We haven't pursued it. I think that, you know, there's several alternatives left. What we are really pushing for is for them to close this basin and go to appropriations. At that time we can take our appropriations, and look and see if we wish to pursue any of those. If any of the entities wish to pursue those, or if we let those drop, because we basically done what we wanted to and closed off the basin to future new appropriations because there's a sufficient amount of water rights there right now. I mean that will be a decision that you all are going to have to make in the future, but what we did is we have kept other appropriators out of this basin while we got our water plan done. And that was the, you know, that was the objective of filing those applications to begin with. Now there's going to have to be a decision made based on the reaction of the state engineer to our request to close the basin is what I would (inaudible). I don't know exactly what your policy decision is going to be on that, when that time comes. And I know that didn't answer your question very well, and I

31

couldn't because I just don't really know what you all are going to do.

MR. BUSTER GOFF: Well, it did what we was needing to do.

MR. LEN STOKES: Yes, sir. That's correct.

MR. BUSTER GOFF: Any other questions? Comments? Do you have anything else?

MR. LEN STOKES: No.

MR. BUSTER GOFF: Well, at this point --

MR. LEN STOKES: Buster --

MR. BUSTER GOFF: Yes.

MR. LEN STOKES: -- let me make one statement. There's a little bit of stuff in here. When you all approved this, if that's what you decide to do, there's, I would like to approve this, and allow us to do a few little verbiage changes such as changing the stuff in the brine. The major concept, none of that will change, but as far as, instead of saying, we are wasting brine, that we are disposing of it, I have spent -- we have really spent a lot of time on the last two chapters, because they're the, you know, the alternative chapters, and I need to go back

32

through and reread this just pointed out to me. I need to go back through and really reread these earlier chapters and maybe make a few minor verbiage changes, but besides that, I think your plan is in very good shape.

MR. BUSTER GOFF: Okay. Are we ready for the vote of the resolution?

MR. DENNIS HOLMBERG: Yes, sir.

MR. BUSTER GOFF: Let me -- I really don't want to have my back to the Hobbs connection. I don't know why.

MAN'S VOICE: (Inaudible).

MR. BUSTER GOFF: Yeah. The first one would be the Lea County Water Users. Now, should we have a motion to accept these first?

MR. DENNIS HOLMBERG: Yes.

MR. BUSTER GOFF: Okay.

MR. DENNIS HOLMBERG: Yes. What you'll do is have a motion and a second with each one -- within each one of the entities for adoption. According to your -- if I might, Buster, when your water plans were sent to city clerks and city managers, they came along with a resolution that hopefully each one of you received. And that resolution is required as a

33

portion of our water plan. We will be happy to show the buy in of the communities, and acceptance of the water plan, and that's what this process is. So you should at least receive one, and we'll start with the Water Users Association, and then go down on your agenda.

MR. BUSTER GOFF: Do we have a motion to accept this resolution?

MR. J.W. NEAL: So moved.

MR. BUSTER GOFF: Second?

WOMAN'S VOICE: (Inaudible).

THE REPORTER: Pardon me. I'm not getting names.

MR. BUSTER GOFF: Okay.

MR. J.W. NEAL: So moved.

THE REPORTER: J.W. Thank you.

MR. J.W. NEAL: J.W. Neal.

MRS. BECKY JO DOOM: Second, Becky Jo Doom.

MR. BUSTER GOFF: There's a motion and a second. All in favor of this resolution say, Aye.

VOICES: "Aye".

MR. BUSTER GOFF: Any opposed? Okay. The next --

34

MR. J.W. NEAL: Does that have to be a roll call vote?

MR. DENNIS HOLMBERG: No, sir. It does not. As an ordinance, we would need a roll call. Mr. Reagan, is that correct?

MR. GARY DON REAGAN: Well.

MR. DENNIS HOLMBERG: As a resolution, it does not require a roll call?

MR. GARY DON REAGAN: For safety purposes, I always recommend a roll call on every vote, period.

MR. DENNIS HOLMBERG: I think that that's fine then.

MR. BUSTER GOFF: We'll do that.

MR. DENNIS HOLMBERG: Monica, would you do the roll call, please?

MONICA RUSSELL: E.A. Woodell?

MR. E.A. WOODELL: Yes.

MR. BUSTER GOFF: No. It's the Lea County.

MONICA RUSSELL: Oh. Yeah.

WOMAN'S VOICE: He took that.

MR. BUSTER GOFF: Oh, yeah.

MRS. MONICA RUSSELL: Yeah.

MR. BUSTER GOFF: He took. Sorry.

35

MRS. MONICA RUSSELL: Gary Fonay.

MR. GARY FONAY: Yes.

MRS. MONICA RUSSELL: Jim Britton?

MR. JIM BRITTON: Yes.

MRS. MONICA RUSSELL: Scott Bussell.

MR. SCOTT BUSSELL: Yes.

MRS. MONICA RUSSELL: Becky Jo Doom.

MRS. BECKY JO DOOM: Yes.

MRS. MONICA RUSSELL: Bob Carter.

MR. BOB CARTER: Yes.

MRS. MONICA RUSSELL: John Norris is not here. Betty Rickman?

MRS. BETTY RICKMAN: Yes.

MRS. MONICA RUSSELL: Bill Brininstool?

MR. BILL BRININSTOOL: Yes.

MRS. MONICA RUSSELL: Buster Goff.

MR. BUSTER GOFF: Yes.

MRS. MONICA RUSSELL: J.W. Neal?

MR. J.W. NEAL: Yes.

MRS. MONICA RUSSELL: And Steve Pearce?

MR. STEVE PEARCE: Yes.

MR. BUSTER GOFF: Okay. Now, it's City of Eunice voting on Resolution Number 811.

36

Is there a motion to accept this resolution?

MAN'S VOICE: I'll make a motion.

THE REPORTER: Pardon me. I'm not -- I don't know the names.

MR. BUSTER GOFF: Can you state your name?

MR. LLOYD SIMPSON: Lloyd Simpson.

THE REPORTER: Thank you.

MR. BUSTER GOFF: Is there a second?

MAN'S VOICE: I'll second.

THE REPORTER: Pardon me. I didn't get the name.

MR. PAUL NAJERA: Paul Najera.

THE REPORTER: Thank you.

MR. PAUL NAJERA: I'll second it.

MR. BUSTER GOFF: There's a motion and second. We'll have a roll call.

MONICA RUSSELL: Gailand Overton.

MR. GARY DON REAGAN: The mayor does not vote except --

MONICA RUSSELL: Oh, he does not? Okay. JoAnn Davis?

MRS. JOANN DAVIS: Yes.

MRS. MONICA RUSSELL: E.A. Woodell?

MR. E.A. WOODELL: Yes.

37

MRS. MONICA RUSSELL: Paul Najera?
MR. PAUL NAJERA: Yes.
MRS. MONICA RUSSELL: Roger Holland?
MR. ROGER HOLLAND: Yes.
MRS. MONICA RUSSELL: Natalie Meyers is not here. Lloyd Simpson?
MR. LLOYD SIMPSON: Yes.
MRS. MONICA RUSSELL: Maurice Gardner?
MR. MAURICE GARDNER: Yes.
MRS. MONICA RUSSELL: Billy Thrash?
MR. BILLY THRASH: Yes.
MONICA RUSSELL: And that's all.
MR. BUSTER GOFF: Okay. Okay. City of Hobbs voting on Resolution Number 3625. Is there a motion?
MR. GARY FONAY: Gary Fonay. I'll make a motion to approve Resolution 3625.
MAN'S VOICE: Second.
THE REPORTER: Who seconded?
MAN'S VOICE: Mark Bawcum.
MR. MARK BAWCUM: Mark Bawcum.
MR. BUSTER GOFF: Okay. Roll call.
MONICA RUSSELL: Sorry.
MR. BUSTER GOFF: There's a motion and a second.

38

MRS. MONICA RUSSELL: Jimmy Woodfin?
MR. JIMMY WOODFIN: Yes.
MRS. MONICA RUSSELL: Gary Fonay.
MR. GARY FONAY: Yes.
MRS. MONICA RUSSELL: Mark Bawcum.
MR. MARK BAWCUM: Yes.
MRS. MONICA RUSSELL: Hector Ramirez.
MR. HECTOR RAMIREZ: Yes.
MRS. MONICA RUSSELL: Joe Calderon?
MR. JOE CALDERON: Yes.
MR. BUSTER GOFF: Okay. City of Jal, you're voting on Resolution Number 001026-1. Is there a motion?
DARROLD STEPHENSON: Darrold Stephenson, I move that we pass the resolution.
MR. BUSTER GOFF: Okay.
MR. DEWAYNE JENNINGS: Dewayne Jennings.
MR. BUSTER GOFF: Okay. There's a motion and a second. Roll call?
MONICA RUSSELL: Mary Elkins? Does she vote? She's not here. Darrold Stephenson?
MR. DARROLD STEPHENSON: Here. Yes.
MRS. MONICA RUSSELL: Theresa Herrera?
MRS. THERESA HERRERA: Yes.

39

MRS. MONICA RUSSELL: Curt Pittman? He's not here. John Allen is absent. Roberta Barnes?
MRS. ROBERTA BARNES: Yes.
MRS. MONICA RUSSELL: Rick Little is not here. Dewayne Jennings?
MR. DEWAYNE JENNINGS: Yes.
MRS. MONICA RUSSELL: And Sydney Kennedy?
MRS. SYDNEY KENNEDY: Yes.
MR. BUSTER GOFF: Okay. And City of Lovington, you are voting on Resolution Number 102600-1. Is there a motion?
MR. TROY HARRIS: Troy Harris. I move for the adoption of Resolution 102600-1.
MR. BUSTER GOFF: Is there a second?
MRS. ANNA TRUJILLO: Second.
THE REPORTER: I --
MR. BUSTER GOFF: Anna Trujillo.
THE REPORTER: Thank you. There's a motion and a second. Roll call.
MONICA RUSSELL: Troy Harris?
MR. TROY HARRIS: I'm the mayor.
MONICA RUSSELL: Oh, sorry. Pat Wise.
MR. PAT WISE: Yes.

40

MRS. MONICA RUSSELL: Anna Trujillo.
MRS. ANNA TRUJILLO: Yes.
MRS. MONICA RUSSELL: Bill Shipp and Dixie Drummond are absent.
MR. TROY HARRIS: For a quorum, I need to vote for --
THE REPORTER: I can't hear.
MR. TROY HARRIS: I vote for the adoption.
MRS. MONICA RUSSELL: Okay.
MR. BUSTER GOFF: Okay. The town of Tatum, you are voting on Resolution Number 104-00-01. Is there a motion?
MRS. JUDY LAMBERT: Judy Lambert makes a motion to adopt the Resolution 104-00-01.
MR. RUE MAUK: Rue Mauk, I second the motion.
THE REPORTER: I couldn't hear him.
MRS. MONICA RUSSELL: Rue Mauk.
THE REPORTER: Thank you.
MR. BUSTER GOFF: There's a motion and a second. Roll call.
MONICA RUSSELL: Betty Rickman.
MRS. BETTY RICKMAN: Yes.
MRS. MONICA RUSSELL: Judy Lambert?

41

MRS. JUDY LAMBERT: Yes.
MRS. MONICA RUSSELL: Ronald Glover.
MR. RONALD GLOVER: Yes.
MRS. MONICA RUSSELL: Robert Singleton. And Rue Mauk?
MR. RUE MAUK: Yes.
MR. BUSTER GOFF: Okay. Lea County, you are voting on Resolution Number 00-OCT-029R. Is there a motion?
MR. KEN BATSON: Ken Batson makes a motion to accept resolution 00-OCT-029R.
MR. BUSTER GOFF: Is there a second?
MR. BILL BRININSTOOL: Bill Brininstool seconds it.
MR. BUSTER GOFF: Bill Brininstool. There's a motion and a second.
MRS. MONICA RUSSELL: Ken Batson?
MR. KEN BATSON: Yes.
MRS. MONICA RUSSELL: Bill -- Ross Black?
MR. ROSS BLACK: Yes.
MRS. MONICA RUSSELL: Bill Brininstool?
MR. BILL BRININSTOOL: Yes.
MRS. MONICA RUSSELL: Zeak Williams?

42

Harry Teague?
MR. HARRY TEAGUE: Yes.
MRS. MONICA RUSSELL: That's everyone.
MR. BUSTER GOFF: All commissions voted in favor. Is there anything else? Any comment from the public? Public comment? Dennis?
MR. DENNIS HOLMBERG: If I might --
THE REPORTER: I'm sorry, Dennis. I couldn't hear.
MR. DENNIS HOLMBERG: Dennis.
THE REPORTER: Thank you.
MR. DENNIS HOLMBERG: As we sit here, and we sit here as commissioners, and in making the decision, remember the pie chart that Roger had up there that showed all the various users of water. And as municipalities, we certainly aren't the largest users, and so you have, as you vote, as municipalities were voting really for the county, many of the representatives that you appointed to the Water Users Association may not even be in your municipality districts. The representatives we have were not representing their entity, but representing their interests as they represented the dairy industry, as they represent the municipalities, oil and gas, and the

43

private sector. And so it's something that we will all be working on together, because we're a different -- we're different types of people covering different areas, and so remember that as municipalities we're really representing the entire county and the water basin.
MAN'S VOICE: Mr. Chairman?
THE REPORTER: Who's talking? I'm sorry. I don't know.
MR. BOB CARTER: Bob Carter.
THE REPORTER: Thank you.
MR. BOB CARTER: Yes. Mr. Chairman, on behalf of the Water Users Association, we would like to thank Lea County for taking the lead, because I believe this is the first water plan in the State of New Mexico that has been totally paid for by the entities, themselves. The county took the lead, and thank you, Commissioner Batson and other commissioners for allowing us to use your bank account while we reimbursed you out of our funds as we went along. Without your support this could not have been made possible. So we appreciate that joint effort that Hobbs, Lovington, Eunice, Jal, Tatum and Lea County have shown, not only in this effort, but in others, and

44

we thank you for pulling this wagon with us. And Dennis, we really appreciate you, and your leadership in this, because you have been many miles, many hours, and many hours working on this along with Representative Steve Pearce, and to you, we thank you.
MR. BUSTER GOFF: Thank you, Bob. (APPLAUSE).
MR. BUSTER GOFF: Steve?
MR. STEVE PEARCE: Mr. Chairman, if I -- I don't know if I have got a volume here. If we could discuss a little bit about the urgency of what we're doing here tonight. How many of you have read in the newspaper -- it doesn't matter if you know much about it, but have read about the Mesa Petroleum wanting to ship water up at Lake Meredith all the way down through Texas on down to San Antonio. How many of you have just seen that? They are wanting to do that in a 96-inch pipeline. Now think for a second how many inches 96 are. That's about nine or 10 feet. Something like that. Eight feet, whatever. We have got an eight foot pipeline carrying water that's pumped out of the Ogallala aquifer that's going 300, 400 miles. That's what the state of water is today. Just

45

this last three months you have read about the endangered species thing there in Albuquerque where they had to let water go down through the river to keep the silvery minnow alive. They released 225,000 acre feet of water in 90 days. Now just so you put that in perspective, the city of Albuquerque uses consumptively 50,000 acre feet. They let 225,000 feet go out into the storage reservoirs. Albuquerque in one year uses 50,000 acre feet. All of the irrigation in the middle Rio Grande, that is North of Albuquerque, down to Elephant Butte uses only about 100,000 acre feet. 120,000 acre feet, and that's in a year. The city of Las Vegas, Nevada is trying to get water from anywhere they can get it. And pipeline it from anywhere in the Southwest to the city of Las Vegas. In South Dakota, they had 300 million dollars worth of water projects in the Southeastern corner of the state. The southwestern corner of the state where the aquifer exists. The Ogallala aquifer exists. 300 million dollars in order to create drinking water systems because they are so close to being out of fresh water. So what we're doing here tonight is that we are recognizing that the aquifer is not going to be

46

with us forever. That we need to do something now, or if we wait until we are out of water then it's too late. There are outside sources who would come and take our water, and pump it to San Antonio, or pump it over to Carlsbad and clean the potash mines. And that's completely legal. The U.S. Supreme Court has said it's legal, and so this document that we have approved tonight in its flexibility provides us a protection mechanism, but number two, it should give us all the urgency that we have got to plan how we are using this water. How are we going to do it? What are our value systems in this county for the use of water, and we need to get about implementing those value systems today, because we have got wells that are daily running dry in Lea County, and so it's not that we have got 20 years to think about it. We need to start today, and each of your individual City Commissions needs to start doing things that will cut and curtail their use, and then we need to protect what water we do have from outside sources. And that's what's going on here, it's nation, world wide water is going to be far more strategic from now on than oil has ever been. The Arab countries are buying up water rights now like

47

they used to buy oil rights. So it's not a small problem. It's something that if we're going to exist as a county and as a state, that we have got to address, and again, I thank the people in this whole county who have worked on this so hard. It's a good project. I appreciate Len Stokes' constant advice. Dennis Holmberg and Chairman Goff of this committee. So again thank you very much, and keep in mind what the stakes are. (APPLAUSE).

MR. BUSTER GOFF: Anyone else? Yes?

MRS. BECKY JO DOOM: Becky Jo Doom, Jal. When can we expect this final plan to go through the ISC before they accept it?

THE REPORTER: I'm sorry, ma'am. I can't hear you.

MRS. BECKY JO DOOM: When can we --

THE REPORTER: Can you use the microphone? Maybe that will. Thank you.

MRS. BECKY JO DOOM: When do you think that we might be able to have this plan presented to the ISC for final acceptance?

MR. BUSTER GOFF: Len?

MR. LEN STOKES: Becky Jo, we intend to present this plan at the ISC, at the Interstate

48

Stream Commission meeting next month. That meeting has not, the day has not been scheduled yet, but as soon as it is, we will let you know, and we will be on the agenda. I have already spoken with them.

MR. BUSTER GOFF: Will they accept it? I mean, or?

MR. LEN STOKES: What we will do, we are supposed to take so many copies up there and hand them to the staff. We are just going to hand them to the staff at the meeting, and give a presentation on what we have done to the entire board. It's kind of a publicity deal, but I think it will work well. We want the board to know that we have done our own plan, and we are submitting it for acceptance, and we will do a run down of what we have done in the plan. It's doing a little extra than just taking it into their offices and putting it on their desk.

MR. BUSTER GOFF: When do you expect the acceptance of that? At that board meeting?

MR. LEN STOKES: No. They won't accept it then. The staff will have to go and review it, but the staff has already been, you know, they have been looking at it. It will probably be

after the first of the year. I'm going to say February or maybe March before they do an acceptance of it. I mean we're, with their different lawsuits over the minnow, and other items in the Interstate Stream assistance, it's hard to get on their priority list, but I think we can look for acceptance sometime after the first of the year, and I'll say February or March would be my best guess.

MR. BUSTER GOFF: Okay. Any other questions?

MR. DAN FIELD: Mr. Chairman.

MR. BUSTER GOFF: Yes.

THE REPORTER: I'm sorry. I can't see.

MAN'S VOICE: Dan Field.

THE REPORTER: Thank you.

MR. DAN FIELD: Dan Field. The Interstate Stream Commission granted us two years to have a four-year plan in place. Where are we on that time frame?

MR. DENNIS HOLMBERG: Mr. Chairman, if I might -- Dennis Holmberg.

THE REPORTER: Thank you.

MR. DENNIS HOLMBERG: Dan, we are probably six months past that. We are probably at

30 months instead of the 24 months that we had hoped for, which even at 24 months, I believe, Len is the quickest any water plan has been done. There are some water plans that are now in their eighth and ninth year and still haven't been to the ISC to ask for acceptance.

MR. LEN STOKES: That's correct.

MR. BUSTER GOFF: Any other questions? If there's no other questions, I would like to recognize each of the members of the Lea County Water Users Association for their dedication these last 30 months or more. And they have done an outstanding job for each of the commissions that they represent. Each of the cities that they represent. We've, as you saw on page 824, we have finished the first step of a long implementation schedule, and we certainly intend to continue to be active in this role, and we would appreciate the continued support that each city and town has given us. Thank you.

(APPLAUSE).

MR. BUSTER GOFF: We are adjourned.

(Meeting concluded at 7:24 P.M.)

CERTIFICATE OF COMPLETION OF TRANSCRIPTION

I, STARLA D. WIGGINS, RPR, NM CCR #11; TX CCR #2114; NV CCR #629, DO HEREBY CERTIFY that on October 27th, 2000, that I did report and transcribe the foregoing transcript of the proceeding to the best of my ability.

I FURTHER CERTIFY that I am neither employed by nor related to nor contracted with (unless excepted by the rules) any of the parties or attorneys in this case, and that I have no interest whatsoever in the final disposition of this case in any court.

STARLA D. WIGGINS, RPR, CCR
NM CCR#11; TX CCR#2114;
NV CCR#629
STAR REPORTING SERVICE
P.O. BOX 2154
HOBBS, NM 88241-2154
(505) 397-1319
LICENSES EXPIRE: 12/31/00

B

C

D

E

F

Q

R

3-K497

Tom Kennann	Eunice
John Alexander	Lovington
Hollis Cox	Hobbs
Jerry Dean	Lovington
Shelby V Dilmore	Lovington
M.L. Howry	Hobbs
John Jones	Lovington
Chuck Kelly	Lovington
STEVAN PEARCE	HOBBS
[illegible]	Hobbs
Johnny R. Hannah	Roswell
Bob Carter	Lovington
Janet Seagrave	Hobbs
Tracy Hanna	Hobbs
D Thomas	Hobbs
Buster Hill	Hobbs
Don Bratton	Hobbs
Scott Burgett	Hobbs
Sam Hughes	Eunice
Joel Klein	Tatum
TRACY HEPHNER	WAGON MOUND / ISC

January 14, 1998

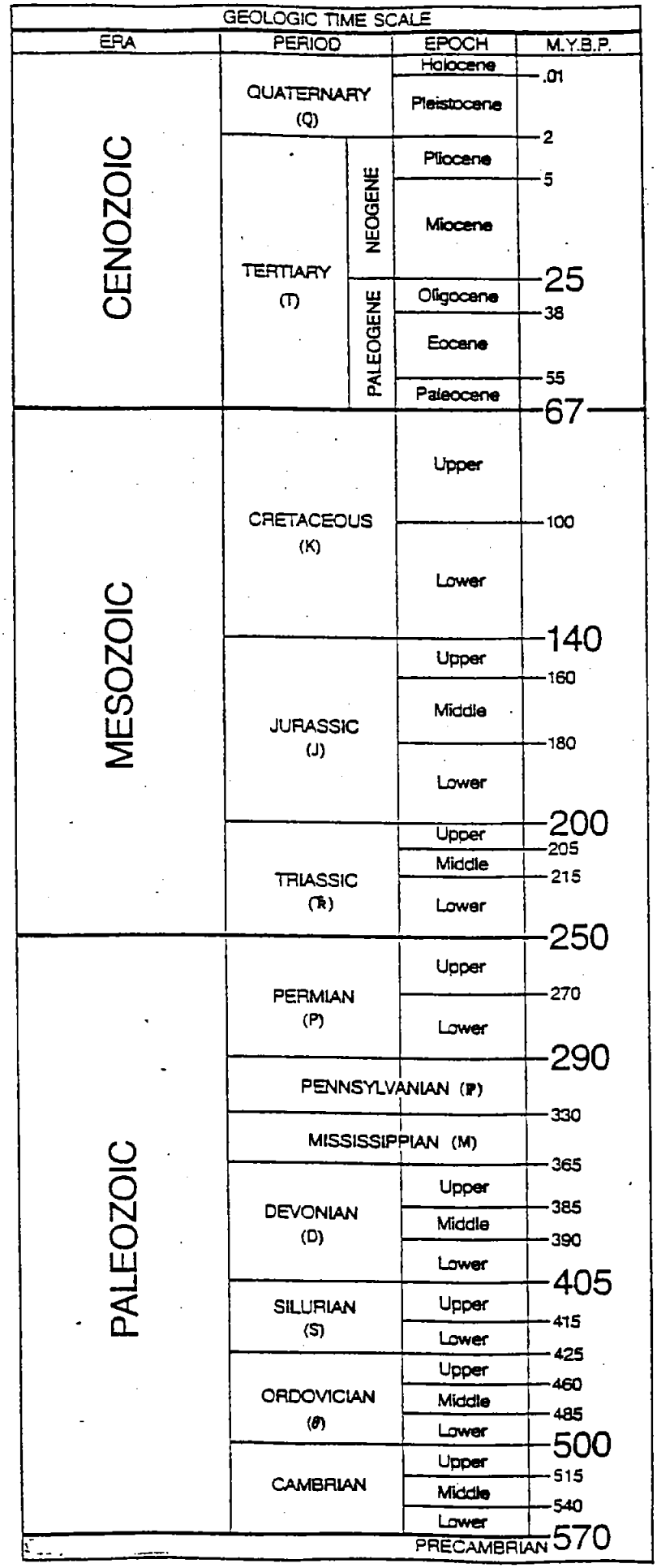
NAME	ADDRESS	PHONE
Tim Wier	Rt 1 Box 355 Lovington NM	398-5496
Linda Powell	HC 70 Box 91 Lovington NM	392-5203
CHAD DUNNAHOO	1700 S. MAIN LOVINGTON	396-5858
DONNA LISBY	1700 S. MAIN Lovington	396-2535
Dan Field	PO Box 1105 Loovington	396-3205
Carl Johnson	Box 517 Jatum	398-6537
Gary Jackson	P.O. Box 747 Hobbs	397-8101
J. O. Jackson	~~Ag Agency for Hobbs~~ EDC of Lea County	392-2965
Janet Seagrave	PO Box 1376, Nobbs 88241	397-2039
Hop Graham	Leader	6-2844
MACK A PAYNE	Box 1601 ~~Box~~ EUNICE NM 88231	394-2935
TONY ELIAS	110 E. 4TH, ROSWELL, NM 88201-	624-6131
Betty Rickman	Box 416 Jatum NM 88267	398-2100
Bob Carter	Box 1268 Lovington	396-2884
Scott Bussell	300 N Turner	397-9375
Don Bratton	P. O. Box 2219 - Hobbs	393-2937
Bo Thomas	300 N. Turner	397-9226
J.W. NEAL	419 West Cain	397-3614
John NORRIS	HCR 70 Box 57 Lovington	396-5986
Becky Jo Doom		
Bill Brinstead		
Buster Goff		
Dennis Holmberg		

January 14, 1999

NAME	PHONE	ADDRESS
Kris Williams	393-6161 x102	P.O. Box 1980 Hobbs, NM 88240
Daniel Russell	397-4556	Lovington
Sharon Inman	398-2108	Tatum
Hop Gwin	6-2544	Lea
Maurice Hughes	394-3145	Eunice
Wallace M. Cox	392-3873879	P.O. Box 1581 Lovington
Betty J. Rickman	398-2108	Box 416 Tatum, NM
Dan Dutd	396-3205	
Lowell Payton	392 5391	5701 N Dal Paso
Buster Hoff	392-7122	
Dave Slaboy	396-2865	City Sal, NM
[illegible]	395-2010	
[illegible]	392-0839	8421 N. Plainfield, Hobbs
Clive Griffin	393-8907	201 W Alto
MACK PAYNE	394-2935	BOX 1801 EUNICE, NM
Roger Peery	345-3407	2703-D Broadband Parkway NE Abq
DOB NOUGHTON	247-0294	500 COPPER AVE NW #5000 ALBQ 87102
Gretf Sterling	398-3279	Tatum
Harry Teague	392-5893	Hobbs
[illegible]	397-2039	EDC PO BOX 1376, Hobbs
Mark [illegible]	396-7063	911 ctr Ave G Courtyard

APPENDIX D

Geologic Time Scale and Stratigraphic Nomenclature Chart


GEOLOGIC TIME SCALE
ERA
PERIOD
EPOCH
M.Y.B.P.
CENOZOIC
QUATERNARY
(Q)
Holocene
Pleistocene
.01
2
TERTIARY
(T)
NEOGENE
Pliocene
Miocene
5
25
PALEOGENE
Oligocene
Eocene
Paleocene
38
55
67
MESOZOIC
CRETACEOUS
(K)
Upper
Lower
100
140
JURASSIC
(J)
Upper
Middle
Lower
160
180
200
TRIASSIC
(Tr)
Upper
Middle
Lower
205
215
250
PALEOZOIC
PERMIAN
(P)
Upper
Lower
270
290
PENNSYLVANIAN (IP)
330
MISSISSIPPIAN (M)
365
DEVONIAN
(D)
Upper
Middle
Lower
385
390
405
SILURIAN
(S)
Upper
Lower
415
425
ORDOVICIAN
(O)
Upper
Middle
Lower
460
485
500
CAMBRIAN
Upper
Middle
Lower
515
540
570
PRECAMBRIAN

Generalized stratigraphic section in the Southern High Plains, New Mexico

(*Known or probable aquifer, regardless of areal extent or production potential)

System	Stratigraphic Unit	Thickness (feet)	Distribution	Physical properties	Water-bearing characteristics
Quaternary	* Alluvium	0 to 200±	Attains greatest thickness in Portales Valley. Crops out extensively on and at edges of High Plains, where it is up to 40 feet thick.	Sand, silt, clay, with gravel generally at base. Mostly poorly consolidated, but contains one or more caliche beds.	In Portales Valley some wells produce more than 1,000 gpm. Elsewhere yields small quantities of water where not above water table. Generally yields fresh water.
Tertiary	* Ogallala Formation	0 to 400, averages about 200	Crops out or underlies alluvium throughout entire area except in Portales Valley where removed by early Pleistocene erosion preceding Quaternary alluviation.	Sand, silt, clay, with fine gravel generally near base. Mostly poorly consolidated. Contains many caliche beds; caliche at present land surface well developed.	Good aquifer where saturated thickness is adequate. Has yielded more than 1,000 gpm to wells in Curry Co., up to 1,700 gpm to wells in Lea Co. Generally yields fresh water.
Cretaceous	* Tucumcari Shale	0 to 180	Crops out locally south of Portales Valley; underlies Cenozoic strata in Roosevelt Co. south of Portales Valley and in northeast third of Lea Co. Thickest in southeast Roosevelt Co.	Upper member yellow clay silt with thin sandstone and limestone; lower member blue shale thin sandstone and limestone; sand and gravel in erosion channels at base is up to 100+ feet thick.	Sand and gravel unit at base yields small to locally large quantities of water; wells in Causey-Lingo area, Roosevelt County tested as high as 1,200 gpm. Generally yields fresh to slightly saline water.
Triassic	* Dockum Group	1,000 (?) to 1,800	Underlies entire area. Crops out locally in High Plains and extensively around edges.	Upper part red shale with lenticular sandstone and limestone interbedded, up to 1,200 ft. thick; lower part sandstone with red shale, up to 600 ft. thick.	Small quantities of water pumped for stock, domestic use; not everywhere reliable aquifer. Lower unit might yield small quantities of fresh water if tested.
Permian	Sedimentary rocks	8,000±	Underlie entire area.	5,000 feet of predominantly dolomite and limestone, overlain by 3,000 ft. of salt and anhydrite.	Permeable units contain only highly saline water.
Pennsylvanian to Ordovician	Sedimentary rocks	3,000 to 6,000	Underlie entire area.	Limestone, dolomite, shale, sandstone.	Permeable units contain only highly saline water.
Precambrian	Metamorphic and igneous rocks	-	Underlie entire area.	Granite and volcanic rocks.	Probably contain little or no water.

Source: NMOSE, 1967